



Direkt durch den  
Hersteller

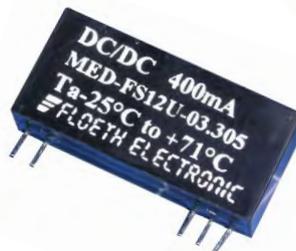
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**DC/DC-Wandler direkt vom Hersteller**  
**COMMERCIAL ----- INDUSTRIAL ----- AUTOMOTIVE ----- KUNDENSPEZIFISCH**



## **FLOETH ELECTRONIC Dienstleistung ( Service )**

1.) Wir bieten kostenlose Unterstützung während der Entwicklungsphase in Absprache mit dem Kunden

- Eingangsspannungs - Schwankungen und Störgrößen seitens der Speisung
- wirkungsvolle Filterung für Störgröße **BURST & SURGE , EMV**
- thermische Gegebenheiten und Streßfaktoren wie Umgebungs- und Betriebstemperatur unter Einbeziehung von Luftdruck- und Lastbedingungen
- diskutieren diverse Probleme, Gehäuse-Verschachtelungen und andere Randbedingungen

### **Neuer Service**

2.) Wir bieten umfassende Lösungen für die AC/DC und DC/DC Versorgungen Ihres Projekts.

2,1.) Kundenspezifische Lösungen für Ihre Schaltungen mit Standard-Moduln oder angepassten Lösungen gegebenenfalls rein kundenspezifisch.

2,2.) Wir legen mit dem Kunden gemeinsam die Anforderungen und Richtlinien fest.

Wir spezifizieren unter allen denkbaren Aspekten wie zum Beispiel

- problematische Spannungsversorgung mit unregulierten Systemen ( load dump )
- Burst & Surge (eigenes EMV - Labor)
- power derating in Höhenlagen über 1000m
- verschachtelten Einbaueinheiten in aggressiver Umgebungstemperatur ( ambienttemp.)

die benötigten Module und optimieren die Spannungsversorgung bis zur endgültigen Serienreife.

Dies realisieren wir auch bei unklaren Verhältnissen ggf. mit Echt-Relationsprüfungen, bei Bedarf gemäß relevanten EMV-Normen und zu günstigen Preisen.

-- ALSO ALLUMFASSEND --

2,3.) Floeth Electronic spezifiziert, testet und gibt Ihre DC/DC - Versorgung projektbezogen frei und übernimmt die volle Verantwortung für die einwandfreie Funktion im Feld.

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## Service

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### 1.) We offer free PRE-DESIGN-ASSISTANCE

- Discuss with the customer subjects as

- \* Fluctuating and polluted input-voltage
- \* Proper filtering for SURGE, Burst & EMI
- \* Thermal stress factors like ambient temperature, operating temperature, air-pressure and load conditions.
- \* Discuss problems like multiple enclosures box in box and try to find a safe solution (all if accepted & requested )

## **NEW SERVICE**

2.) We offer comprehensive AC/DC and DC/DC supply solutions for your project.

2,1.) Customer-design staff cares about their digital circuit only  
We take over free power supply part!

2,2.) We give guide lines, verify and approve the supplies-part to it's final production-state at reasonable costs.

2,3.) FLOETH ELECTRONIC specifies proper DC/DC-supplies, make in home approval test and bears full responsibility for proper operation.

## Operating- Temperature ist nicht gleich Umgebungstemperatur

In Entwickler- und Einkäuferkreisen herrscht bei mehr als 90% eine falsche Vorstellung in Bezug auf die sogenannte operating-temperature vor!

Die Leute meinen, ein Bauteil, welches für operating-temperature +71°C spezifiziert wurde, könne bei einer Umgebungstemperatur von +71°C eingesetzt werden.

Diese Annahme ist fatal! = " tödlich "

Folge: Frühausfälle, hohe Service- und Garantie-Folgekosten sowie Imageverlust.

Die operating temperature - oder zu deutsch - die Betriebstemperatur (Gesamttemperatur) besteht aus der Umgebungstemperatur plus der Temperatur, welche durch die Eigen-erwärmung infolge Verlustleistung im Betriebszustand entsteht (Gehäusetemperatur).

$$t_{\text{Betrieb}} = t_{\text{Gehäusetemperatur}} = t_{\text{Umgebung}} + t_{\text{Verlust}}$$

Bei kommerziellen Wandlern Made in Taiwan, Hong Kong, Japan, GB, Frankreich, Deutschland, Schweiz, USA usw., bedeutet dies, daß diese Wandler in der Regel **nicht** bei nominaler Last in höheren Umgebungstemperaturen als ca. +40°C gefahrlos betrieben werden können. Dies sollte bedacht werden.

Natürlich gibt es der Industrienorm entsprechende Wandler.

Wir bieten DC/DC-Wandler für verschiedene Temperaturbereiche an:

- a) Industrieller Temperaturbereich -40°C bis 71°C ohne Leistungsabschlag  
Umgebungstemperatur oder Ambient-Temperature
- b) Automotive Temperaturbereich -55°C bis +85°C  $T_U$  oder  $T_A$

Serien	CMK	3W	DIP24 bis +71°C
	CMKA	3W	DIP24 bis +85°C
	EIW	6W	50,8x25,4x10,6mm bis +71°C
	DIW	6W / 10W	50,8x50,8x10,6mm bis +71°C
	DAW	6W / 10W	50,8x50,8x10,6mm bis +85°C

Bitte denken Sie daran:

$$t_{\text{Betrieb}} = t_{\text{Umgebung}} + t_{\text{Verlust}}$$

Betriebstemperatur und Umgebungstemperatur nicht verwechseln !

## OPERATING TEMPERATURE AND AMBIENT TEMPERATURE ARE NOT THE SAME!

90% of development- and purchasing staff got the wrong idea about the so-called operating-temperature!

Most people believe they can run a part with a specified operating temperature of +71°C at an ambient temperature of +71°C.

This supposition is fatal and "deadly".

Results are early failures, high costs for service and warranty and a bad reputation.

Operating temperature is the sum of ambient temperature **plus** the temperature generated by resistive losses (part temperature)

$$t_{\text{operating}} = t_{\text{part}} = t_{\text{ambient}} + t_{\text{losses}}$$

This means that commercial converters made in Taiwan, Hong Kong, Japan, GB, France, Germany, Switzerland, USA ect. cannot be operated at their specified burden at temperatures higher than around +40°C without the danger of failing.

But of course there are converters suitable for industrial standards.

We offer DC/DC-Converters for different temperature-ranges:

- a) Industrial temperature range from -40°C up to +71°C  $T_{\text{ambient}}$
- b) Automotive temperature range from -55°C up to +85°C  $T_{\text{ambient}}$

Serien	CMK	3W	DIP24 bis +71°C $t_{\text{ambient}}$
	CMKA	3W	DIP24 bis +85°C $t_{\text{ambient}}$
	EIW	6W	50,8x25,4x10,6mm bis +71°C $t_{\text{ambient}}$
	DIW	6W / 10W	50,8x50,8x10,6mm bis +71°C $t_{\text{ambient}}$
	DAW	6W / 10W	50,8x50,8x10,6mm bis +85°C $t_{\text{ambient}}$

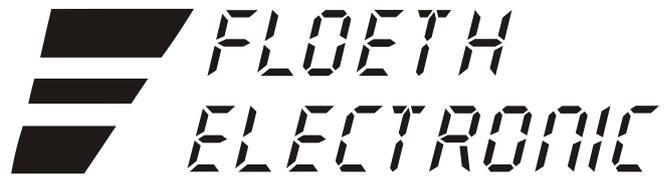
### DO KEEP IN MIND:

$$t_{\text{operating}} = t_{\text{ambient}} + t_{\text{switching+resistive losses}}$$

**DON'T MIX UP OPERATING TEMPERATURE WITH AMBIENT TEMPERATURE !**

DC/DC Converter  
AC/DC Inverters  
Delay-Lines  
Pulsetransformers  
Burst & Surge Filters  
Harmonic Filters  
Switching Power Supplies

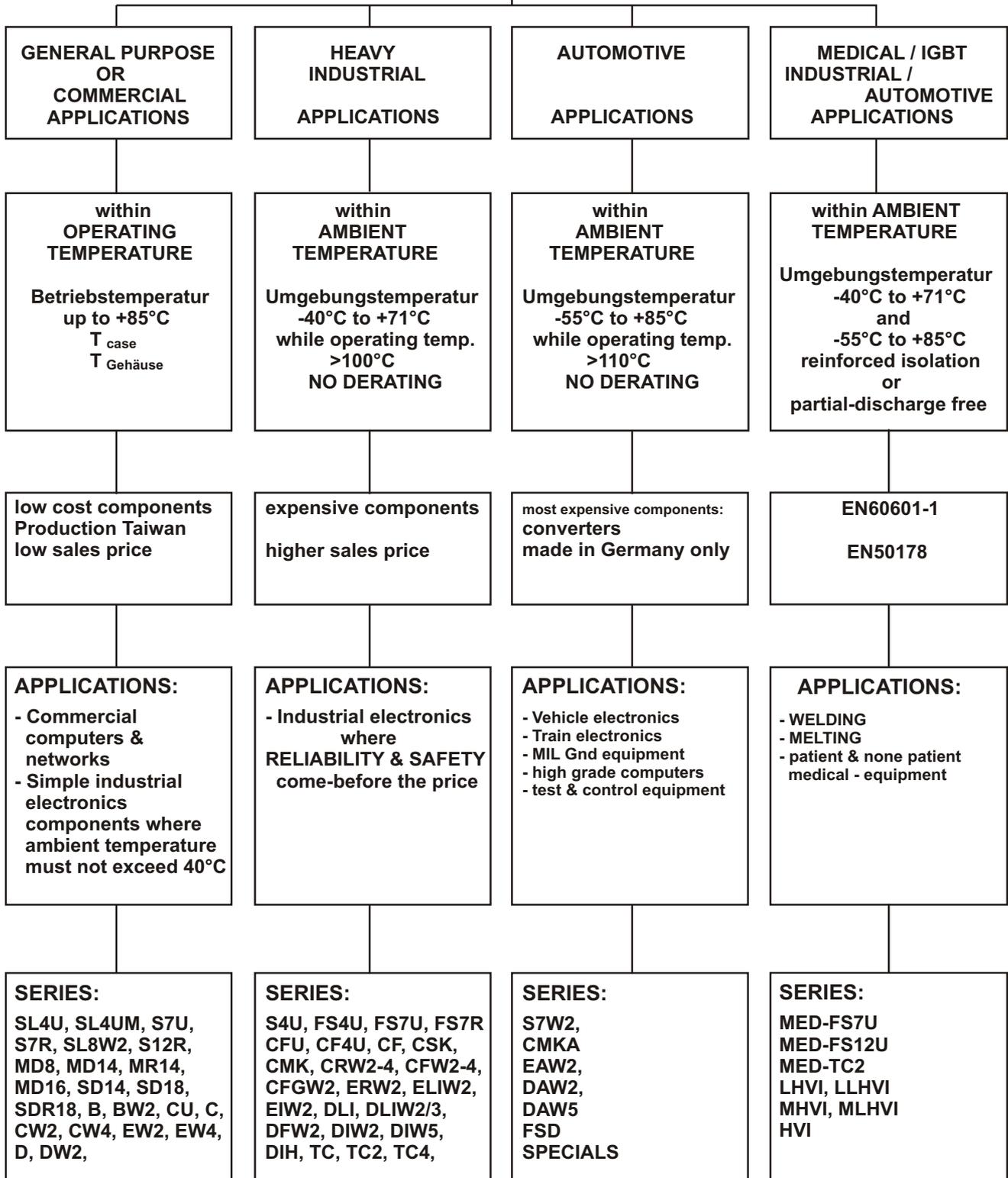
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**FOR YOUR PERSONAL NOTES:**

**DESIGN - DEVELOPMENT - PRODUCTION - SERVICES**  
**DC / DC - CONVERTERS & AC / DC INVERTERS**



## INDUSTRIAL DC/DC CONVERTERS

### Ambient temperature -40°C to +71°C

Series	Case	Power	Output	Page
S4U	SIP 4; not short circuit proof	0,25 - 1W	single	13
FS4U	SIP 4; short circuit proof	1W; 1,5W	single	14
FS7U	SIP 7; short circuit proof	1W; 2W	single/dual	15/16
FS7R	SIP 7; short circuit proof; regulated	0,5W - 1W	single/dual	18/19
FMD8	DIP 8 short circuit proof	0,25-1W	single/dual/isol. output	24/25
CFU	DIP 24 unregulated	2,4-3W	single/dual	26
CF4U	DIP 24 polycarbonate	3W	quadruple	27
CF	DIP 24 polycarbonate/metal	3W	single/dual	28
CSK/CMK	DIP 24 polycarbonate/metal	3W	single/dual/triple	29-32
CRW2	DIP 24 wide input 1:2	3W	single/dual	33
CRW3	DIP 24 wide input 1:3	3W	single/dual	34
CRW4	DIP 24 wide input 1:4	3W	single/dual	35
CFW2/CMW2	DIP 24 wide input 1:2	2-4W	single/dual/triple	36-38
CFW3/CMW3	DIP 24 wide input 1:3	3W	single/dual	39
CFW4/CMW4	DIP 24 wide input 1:4	3-4W	single/dual/triple	40/41
CF(M)GW2	DIP 24 wide input 1:2	3W	dual/triple/isol. output	42/43
ERW2	50,8x25,4 input 4,5V- 6V	6W	single/dual	49/50
ELIW2	50,8x25,4 wide input 1:2	6W	single/dual	51
EIW2	50,8x25,4 wide input 1:2	6W	single/dual	52
DLI	50,8x50,8 high voltage output	5W/8W/10W	single/dual	54/55
DLIW2	50,8x50,8 wide input 1:2	6W/10W	single/dual	56
DLIW3	50,8x50,8 wide input 1:3	6W/10W	single/dual	57
DFW2	50,8x50,8 wide input 1:2	10W	single	58
DIW2	50,8x50,8 wide input 1:2	6W/10W	single/dual	59/60
DIW5	50,8x50,8 wide input 1:5	6W/10W	single/dual	61
EIH	50,8x25,4 Uin = 90V - 190V	6W	single	65
DIH	50,8x50,8 Uin=90-190V/176-380V	6W/10W	single/dual	66
TC	70x55x15	7-20W	single/dual/triple	67/68
TC2	70x55x15 wide input 1:2	20W/25W/30W	single/dual/triple	69
TC4	70x55x15 wide input 1:4	20W/25W/30W	single/dual	70

## AUTOMOTIVE DC/DC CONVERTERS

### Ambient temperature -55°C to +85°C

Series	Case	Power	Output	Page
S7W2	SIP 7; wide input 1:2	2W	single/dual/isol. output	20/21
CMKA	DIP 24 metal	3W	single/dual/triple	29-32
EAW2	50,8x25,4 wide input 1:2	6W	single	53
DAW2	50,8x50,8 wide input 1:2	6W, 10W	single/dual	62/63
DAW5	50,8x50,8 wide input 1:5	6W, 10W	single/dual	64

## High isolation MEDICAL / IGBT - Industrial - Automotive DC/DC CONVERTERS

Series	Case	Power	Output	Page
MED-FS7U	SIP 7 short circuit proof	1W	single/dual	17
MED-FS12U	SIP 12 32x15x9	0,5W - 2W	single/dual/triple	22/23
MED-TC2	70x55x15 wide input 1:2	20W/25W/30W	single/dual	71
LHVI	45x30x15 high isolation	6W (2x3W)	single/dual/isol. output	80/81
LLHVI	71x33x24 high isolation	3,3W - 6W	single/dual/isol. output	82
MHVI	50x50x25 high isolation	15W (2x7,5W)	single/dual/isol. output	83
MLHVI	70x50x20 high isolation	15W	single/dual	84
HVI	103x84x48 high isolation 1:2	60W	single/dual	85
HVI4	103x84x48 high isolation 1:4	60W	single	86

## Step Down / Up - INDUSTRIAL DC/DC CONVERTERS no isolation

Series	Case	Power	Output	Page
FPID	SIP 12 32x15x9	6W	single	44
CSxx-40(60)/yy	DIP 24 polycarbonate / metal	7W	single	45
CSBxx-40(60)/yy	DIP 24 polycarbonate / metal	10W	single	46
CSU-xyyy	DIP 24 polycarbonate / metal	7W	single	47
CPN	DIP 24 polycarbonate / metal	3W, 5W	single	48
FSD	74,5x37,5x15 wide input	10W/12,5W	single/dual	72/73
DSSD5-xyyy	50x50x15 wide input 1:5	12,5W	single	74
TSD2	70x55x12 (28)	30W-50W	single	75
LSD	70x38x12	25W	single	76
TSU3	70x55x15 wide input 1:3	20W-30W	single	77
HSD2	120x80x42 wide input 1:2	100W/200W	single	78
HSD3-xyyyA(B)	120x80x75 ; wide input 1:3 EN55011 input class A/B	100W	single	79

## COMMERCIAL

# DC/DC CONVERTERS up to 100W

### Operating temperature -25°C(-40°C) to +70°C(+85°C)

**Operating temperature is not ambient temperature!**

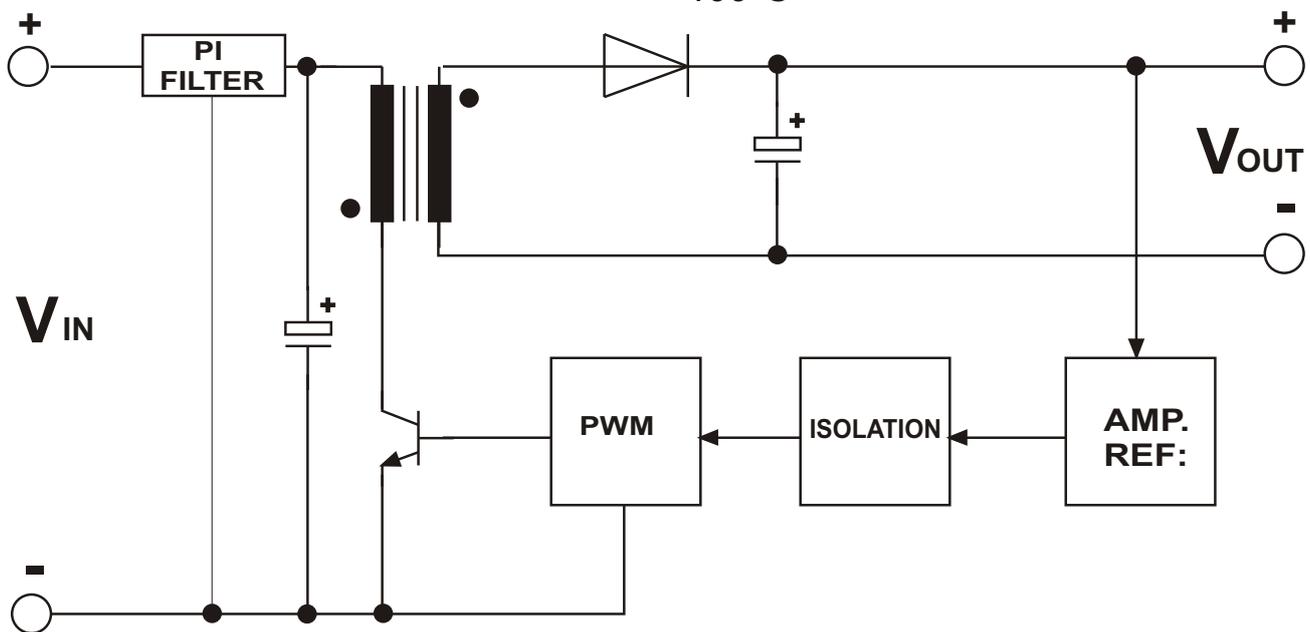
Series	Case	Power	Output	Page
SL4U	SIP4 ; U	1W/2W	single	89
SL4UM	SIP4 ; U	1W	single	90
S6UM	SIP6 ; U	1W	single	91
S7U	SIP7 ; U	1W/2W	single/dual/isol. output	92-94
S7R	SIP7 ; R	0,5W - 2W	single/dual	95/96
SL8W2	SIP 8 ; wide input 1:2 ; R	1W / 2W	single/dual	97/98
S12R	SIP 12 ; R	1W - 1,8W	single/dual	99
MD8	DIP8 ; U	0,25V - 1,25W	single/dual/isol. output	100/101
MD14	DIP14 ; U	1W/2W	single/dual/isol. output	102-104
MR14	DIP 14 ; R	0,5W - 1W	single/dual	105
MD16	DIP16 ; U	0,3W/2,25W	single	106
SD14	SMD; SO14; U	1W / 2W	single	107
SD18	SMD; SO18; U	1W / 2W	dual	108
SDR18	SMD; SO18; R	0,5W /1W	single	109/110
B	DIL 24 ; auto insertable ; R	1,8W/3W	single/dual	111
BW2	DIL 24 ; wide input auto insert. 1:2 ; R	3W	single	112
CU	DIP24 ; standard ; U	1,8W/3W	single/dual	113
C	DIP24 ; standard ; R	1,8W/3W	single/dual	114/115
CW2	DIP24 ; wide input 1:2 ; R	3W - 8W	single/dual/isol. Output	116-121
CW4	DIP24 ; wide input 1:4 ; R	2W - 5W	single/dual	122/123
E	50,8x25,4 ; R	4,5W	single/dual	124
EW2	50,8x25,4 ; wide input 1:2 ; R	10W / 15W	single/dual	125/126
EW4	50,8x25,4 ; wide input 1:4 ; R	10W	single/dual	127/128
D	50,8x50,8 ; R	6W/10W	single/dual	129
DW2	50,8x50,8 ; wide input 1:2 ; R	6W - 40W	single/dual	130
DW2-xyy/B	50,8x50,8 ; wide input 1:2 ; R	20W - 40W	single/dual	131
DW4	50,8x50,8 ; wide input 1:4 ; R	6W/10W/15W	single/dual	132

**R = Regulated**  
**U = Unregulated**

## INDUSTRIAL & AUTOMOTIVE DC/DC Converters

For applications where ambient- / roomtemperature may reach  
 $+71^{\circ}\text{C}$  or  $+85^{\circ}\text{C}$

while converter operating temperature may pass  
 $+100^{\circ}\text{C}$



Lowest Ripple & Noise is a must in A/D conversion systems.

**DIP24**  
 Single, Dual & Triple Output

**50,8mm x 50,8mm**  
 $\pm 10\%$  or wide input range  
 any Uout available

Beside these professional converters we offer low cost commercial converters too.

## INDUSTRIAL & AUTOMOTIVE DC/DC Converters

DIW2 - DIW5 - DAW2 - DAW5 - DLIW2 specification

size - 50,8mm x 50,8mm

PCB - mount / potted with UL / CSA approved material

Metal shielded - 5 sides

All datas given at zero/full load at 23°C ambient or room temperature

### INPUT SPECIFICATION

DIW2, DAW2 wide input range 1:2 4,5V - 9V / 8V - 18V / 34V - 75V

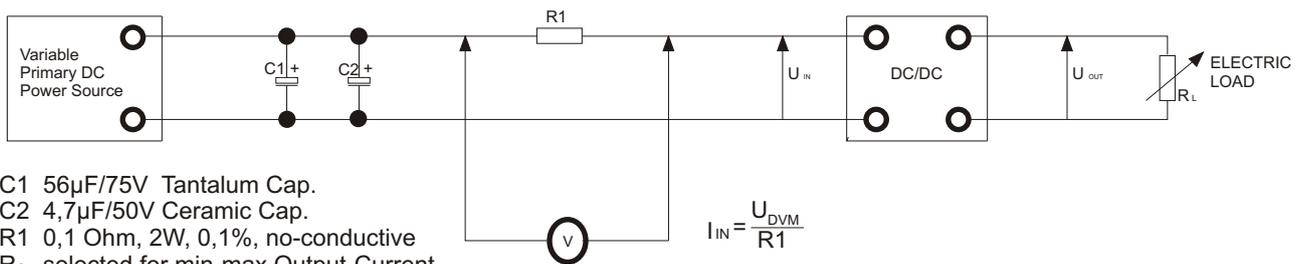
DIW5, DAW5 wide input range 1:5 8V - 40V / 16V - 80V

Input pi-filtered

### OUTPUT SPECIFICATION

Switching frequency	>150kHz
Isolation primary / secondary	>1000V DC min. / optional 3kV AC rms
Isolation resistance	>10 GOhm
Isolation capacitance	<12nF; varies from series to series
Ambient temperature	-40°C to +71°C no derating or -55°C to +85°C no derating
Operating temperature	>100°C
Storage temperature	-55°C to +125°C

### TEST CIRCUITRY & DEFINITIONS



C1 56µF/75V Tantalum Cap.

C2 4,7µF/50V Ceramic Cap.

R1 0,1 Ohm, 2W, 0,1%, no-conductive

R<sub>L</sub> selected for min-max Output-Current

**LINE REGULATION:** The change in output of a regulated converter in percent as the input voltage is varied from nominal to high line and from nominal to low line. Output load & ambient temperature are hold constant.

$$\text{Line regulation} = \frac{U_{\text{out max}} - U_{\text{out min}}}{U_{\text{in max}} - U_{\text{in min}}} \times 100$$

**EFFICIENCY:** Ratio of the output power to the input power in percent at nominal input & output levels, at full load conditions.

$$\text{Efficiency} = \frac{U_{\text{out}} \times I_{\text{out}}}{U_{\text{in}} \times I_{\text{in}}} \times 100$$

**INPUT REFLECTED RIPPLE:** Tested with scope 20MHz bandwidth. Testprobe RG174 COAX, 50 Ohm, AC-coupled, Multiply by 2 to obtain p-p value, Measured at input-side.

**OUTPUT RIPPLE & NOISE:** Same test equipment as before all noise measurements 20 Hz - 20MHz bandwidth. Measured at output-side.

**LOAD REGULATION:** The max. deviation of the output voltage in percent, as the load is changed from minimum to maximum rated load, while input voltage is nominal and ambient temperature is constant, Variation output current from min. - max.

$$\text{Load regulation} = \frac{U_{\text{out max}} - U_{\text{out min}}}{U_{\text{out nom.}}} \times 100$$

**Unregulated  
 Single output  
 Case style: SIP 4**

**INDUSTRIAL  
 DC/DC Converters  
 Unregulated**

**1Watt  
 Series: S4U**

**Electrical specifications:**

Input voltage range: +/- 10%  
 Output voltage accuracy: +/- 5% @ 50% Load  
 Line regulation of Vin: +/- 1% / +/- 1%  
 Load regulation: +/- 10%  
 Ambient temperature: -40°C up to 71°C  
 Operating temperature: max. +95°C  
 no derating required

Efficiency: min. 65%  
 Output Ripple & Noise: typ. 150mVp-p  
 Short circuit protection: none  
 Isolation voltage: min. 1000V DC  
 Output voltage: @ zero Load; approx. 10% above nominal  
 Optional: Part-Nr. /1 0,1W output power  
 Part-Nr. /2 0,25W output power  
 Part-Nr. /5 0,5 W output power

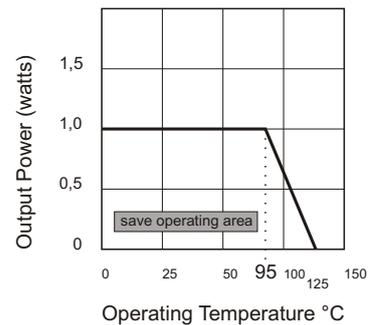
**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part - No. DC	Input Voltage DC	Output Voltage DC	Output current mA
S4U-0303	3V	3V	333mA
S4U-0305		5V	200mA
S4U-0503	5V	3V	333mA
S4U-0505		5V	200mA
S4U-0509		9V	110mA
S4U-0512		12V	83mA
S4U-0515		15V	66mA
S4U-1203	12V	3V	333mA
S4U-1205		5V	200mA
S4U-1209		9V	110mA
S4U-1212		12V	83mA
S4U-1215		15V	66mA
S4U-1503	15V	3V	333mA
S4U-1505		5V	200mA
S4U-1509		9V	110mA
S4U-1512		12V	83mA
S4U-1515		15V	66mA
S4U-2403	24V	3V	333mA
S4U-2405		5V	200mA
S4U-2409		9V	110mA
S4U-2412		12V	83mA
S4U-2415		15V	66mA
S4U-2424		24V	42mA

**S4U-05yyL 1W**

input current  
 no load = ca. 35mA  
 full load = ca. 270mA

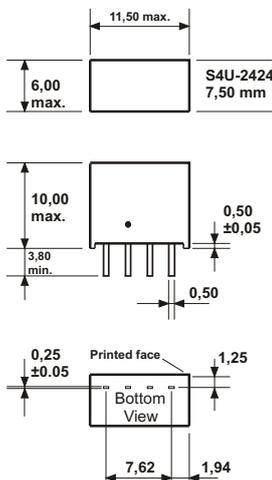
L - Version  
 no load = ca. 20mA  
 full load = ca. 260mA



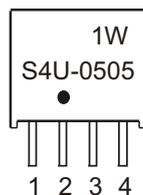
**Additional output capacitor  
 of 4,7µF will reduce ripple  
 significantly, but is not demanded.**

**Any other output voltages available**

Additional output Capacitor of 4,7µF will reduce ripple significantly, but is not demanded.



**PIN CONNECTION:**



- 1 = GND
- 2 = Vcc
- 3 = 0V
- 4 = +Vout

**ALL DIMENSIONS IN MM  
 MILLIMETERS +/-0,25mm  
 All pins on a 2,54mm pitch  
 Dot denotes +IN**

**Input capacitor 4,7µF - 10µF is a must.**

**Unregulated  
 Single output  
 Case style: SIP 4**

## INDUSTRIAL DC/DC Converters SHORT CIRCUIT PROOF

**1Watt/1,5Watt  
 Series: FS4U**

**Electrical specifications:**

Input voltage range: +/- 10%  
 Output voltage accuracy: +/- 5% @ 50% Load  
 Line regulation of Vin: +/- 1% / +/- 1%  
 Load regulation: +/- 10%  
 Ambient temperature: -40°C up to 71°C  
 Operating temperature: max. +95°C  
 no derating required

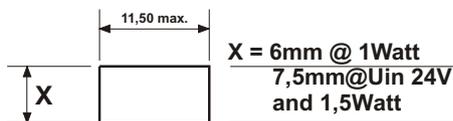
Efficiency: min. 65%  
 Output Ripple & Noise: typ. 150mVp-p  
 Short circuit protection: continuous  
 Isolation voltage: min. 1500V AC rms  
 Output voltage: @ zero Load; approx. 15% above nominal  
 Part-No.: /2 0,25W output power  
 Part-No.: /5 0,5W output power

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

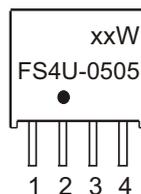
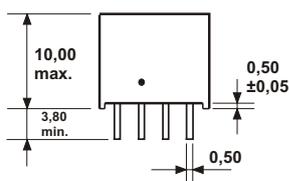
Part - No. DC	Input Voltage DC	Output Voltage DC	1Watt	1,5Watt
			Output current mA	Output current mA
FS4U-0505	5V	5V	200mA	300mA
FS4U-0509		9V	110mA	
FS4U-0512		12V	83mA	
FS4U-0515		15V	66mA	
FS4U-1205	12V	5V	200mA	300mA
FS4U-1209		9V	110mA	
FS4U-1212		12V	83mA	
FS4U-1215		15V	66mA	
FS4U-1505	15V	5V	200mA	300mA
FS4U-1509		9V	110mA	
FS4U-1512		12V	83mA	
FS4U-1515		15V	66mA	
FS4U-2405	24V	5V	200mA	
FS4U-2409		9V	110mA	
FS4U-2412		12V	83mA	
FS4U-2415		15V	66mA	

**Any other output voltages available**

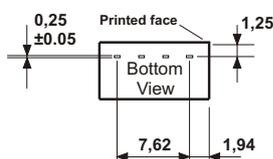
Additional output Capacitor of 4,7µF will reduce ripple significantly, but is not demanded.



**PIN CONNECTION:**



**ALL DIMENSIONS IN MM  
 MILLIMETERS +/-0,25mm  
 All pins on a 2,54mm pitch  
 Dot denotes +IN**



- 1 = GND**
- 2 = Vcc**
- 3 = 0V**
- 4 = +Vout**

**Input capacitor 4,7µF - 10µF is a must.**

Unregulated  
Case Style: SIP 7

## INDUSTRIAL DC/DC Converters SHORT CIRCUIT PROOF

1Watt / 2 Watt  
Series: FS7U

### Electrical specifications:

Input voltage range: +/- 10%  
Output voltage accuracy: +/- 10%  
Line regulation of Vin: +/- 1% / +/-1%  
Load regulation: +/- 15%  
Efficiency: min. 66%  
Output Ripple & Noise: 1W: 150mVp-p // 2W: 200mVp-p  
Temperature: 1W: Ambient -40°C to +71°C no derating  
2W: Ambient -40°C to +71°C no derating  
Ambient 0°C to 71°C  
Operating temperature max. 105°C

Short circuit Protection: continuous  
Isolation voltage: min. 2000V DC  
1000V AC partial discharge free ( TE-frei )

Optional:  
Part-Nr. /0 no short circuit protection  
Part-Nr. /H Isolation voltage optional 3000V DC min.  
\*\*Part-Nr. /3: Test voltage optional 3000V AC rms min.  
Part-Nr. /8: asymmetric load

L - Version:

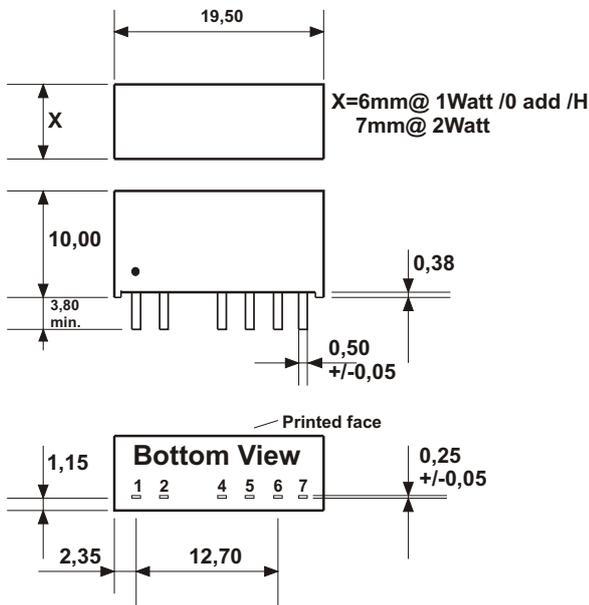
**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Single Output			1 Watt	2 Watt**	Dual Output			1 Watt	2 Watt**
Part - No.	Input Voltage	Output Voltage	Output current	Output current	Part - No.	Input Voltage	Output Voltage	Output current	Output current
FS7U-0505	5V	5V	200mA	400mA	FS7U-0505D	5V	+/- 5V	+/-100mA	+/-200mA
FS7U-0512		12V	83mA	166mA	FS7U-0512D		+/-12V	+/- 41mA	+/- 83mA
FS7U-0515		15V	66mA	132mA	FS7U-0515D*		+/-15V	+/- 33mA	+/- 66mA
FS7U-1205	12V	5V	200mA	400mA	FS7U-1205D	12V	+/- 5V	+/-100mA	+/-200mA
FS7U-1212		12V	83mA	166mA	FS7U-1212D		+/-12V	+/- 41mA	+/- 83mA
FS7U-1215		15V	66mA	132mA	FS7U-1215D		+/-15V	+/- 33mA	+/- 66mA
FS7U-1505	15V	5V	200mA	400mA	FS7U-1505D	15V	+/- 5V	+/-100mA	+/-200mA
FS7U-1512		12V	83mA	166mA	FS7U-1512D		+/-12V	+/- 41mA	+/- 83mA
FS7U-1515		15V	66mA	132mA	FS7U-1515D		+/-15V	+/- 33mA	+/- 66mA
FS7U-2405	24V**	5V	200mA	400mA	FS7U-2405D	24V**	+/- 5V	+/-100mA	+/-200mA
FS7U-2412		12V	83mA	166mA	FS7U-2412D		+/-12V	+/- 41mA	+/- 83mA
FS7U-2415		15V	66mA	132mA	FS7U-2415D		+/-15V	+/- 33mA	+/- 66mA
FS7U-2424		24V	41mA	82mA					

Any other output voltages available

**L - Version** 1W: lin (no load) ~ 14mA \*  
2W: lin (no load) ~ 22mA \*

\*\* X = 7mm @ 2Watt; Uin 24V 1W; /3;



**Input capacitor 4,7µF - 10µF is a must.**

PIN CONNECTION					
PIN	SINGLE	SINGLE A*	SINGLE /3* SINGLE /H*	DUAL	DUAL /3* DUAL /H*
1	VCC	VCC	VCC	VCC	VCC
2	GND	GND	GND	GND	GND
3	NP	NP	NP	NP	NP
4	NC	-Vout	NP	-Vout	NP
5	-Vout	NC	-Vout	COM	-Vout
6	+Vout	+Vout	NC	+Vout	COM
7	NP	NP	+Vout	NP	+Vout

\* For other pinning add "A" or "/3" or "/H" to the end of Partnumber, for example: FS7U-0505A, FS7U-0505/3

ALL DIMENSIONS IN MM  
MILLIMETERS +/- 0,25mm  
All pins on a 2,54mm pitch  
**Note:** NP = No pin; NC = No connection;  
Dot denotes pin 1

Unregulated  
 Case Style: SIP 7

## INDUSTRIAL DC/DC Converters SHORT CIRCUIT PROOF

1Watt / 2 Watt  
 Series: FS7U

### Electrical specifications:

Input voltage range: +/- 10%  
 Output voltage accuracy: +/- 10%  
 Line regulation of Vin: +/- 1% / +/-1%  
 Load regulation: +/- 15%  
 Efficiency: min. 70%  
 Output Ripple & Noise: 1W: 150mVp-p // 2W: 200mVp-p

Short circuit Protection: continuous  
 Isolation voltage: min. 2000V DC  
 Temperature: 1W: Ambient -40°C to +71°C no derating  
 2W: Ambient -40°C to +71°C no derating  
 Operating temperature max. +100°C

#### 1 Watt

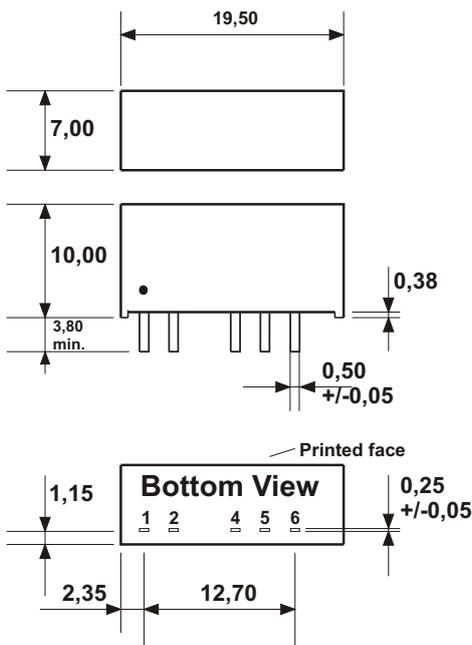
DUAL Output Part - No.	Input Voltage	Output Voltage 1	Output current 1	Output Voltage 2	Output current 2
FS7U-241505	24V	+15V	50mA	-5V	50mA

#### 2 Watt

DUAL Output Part - No.	Input Voltage	Output Voltage 1	Output current 1	Output Voltage 2	Output current 2
FS7U-241505	24V	+15V	100mA	-5V	100mA

Any other output voltages available

Input capacitor 4,7µF - 10µF is a must.



PIN CONNECTION	
PIN	DUAL
1	VCC
2	GND
4	-Vout
5	COM
6	+Vout

ALL DIMENSIONS IN MM  
 MILLIMETERS +/- 0,25mm  
 All pins on a 2,54mm pitch  
**Note:** NP = No pin; NC = No connection;  
 Dot denotes pin 1

# MEDICAL - INDUSTRIAL DC/DC Converters

Stand: 06/04

1Watt

Unregulated  
Case Style: SIP 7

SHORT CIRCUIT PROOF

Series:  
MED-FS7U

**EN60601-1 / UL60601-1**

### Electrical specifications:

Input voltage range: +/- 10%  
Output voltage accuracy: +/- 10%  
Line regulation of Vin: +/- 1% / +/-1%  
Load regulation: +/- 15%  
Efficiency: min. 66%  
Output Ripple & Noise: 150mVp-p

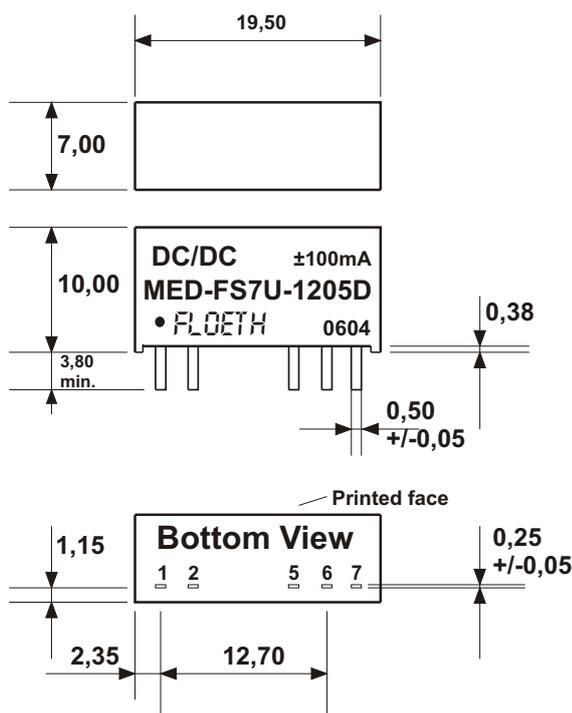
Temperature: Ambient -40°C to +71°C no derating  
Operating temperature max. 105°C  
Short circuit Protection: continuous  
Isolation voltage: min. 4kV AC rms Base isolation / supplement  
Optional: Part-No.: /5 0,5W output power  
Part-No.: /7 0,75W output power  
Part-No.: /R Reinforced / double isolation

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part - No. Single Output	Input Voltage	Output Voltage	Output current	Part - No. Dual Output	Input Voltage	Output Voltage	Output current
MED-FS7U-0505	5V	5V	200mA	MED-FS7U-0505D	5V	+/- 5V	+/-100mA
MED-FS7U-0512		12V	83mA	MED-FS7U-0512D		+/-12V	+/- 41mA
MED-FS7U-0515		15V	66mA	MED-FS7U-0515D		+/-15V	+/- 33mA
MED-FS7U-1205	12V	5V	200mA	MED-FS7U-1205D	12V	+/- 5V	+/-100mA
MED-FS7U-1212		12V	83mA	MED-FS7U-1212D		+/-12V	+/- 41mA
MED-FS7U-1215		15V	66mA	MED-FS7U-1215D		+/-15V	+/- 33mA
MED-FS7U-1505	15V	5V	200mA	MED-FS7U-1505D	15V	+/- 5V	+/-100mA
MED-FS7U-1512		12V	83mA	MED-FS7U-1512D		+/-12V	+/- 41mA
MED-FS7U-1515		15V	66mA	MED-FS7U-1515D		+/-15V	+/- 33mA
MED-FS7U-2405	24V	5V	200mA	MED-FS7U-2405D	24V	+/- 5V	+/-100mA
MED-FS7U-2412		12V	83mA	MED-FS7U-2412D		+/-12V	+/- 41mA
MED-FS7U-2415		15V	66mA	MED-FS7U-2415D		+/-15V	+/- 33mA

Any other output voltages available

Input capacitor 4,7µF - 10µF is a must.



PIN CONNECTION			
PIN	SINGLE standard	SINGLE / R	DUAL standard
1	VCC	VCC	VCC
2	GND	GND	GND
3	NP	NP	NP
4	NP	NP	NP
5	-Vout	NP	-Vout
6	NP	-Vout	COM
7	+Vout	+Vout	+Vout

ALL DIMENSIONS IN MM  
MILLIMETERS +/- 0,25mm  
All pins on a 2,54mm pitch  
**Note:** NP = No pin; NC = No connection;  
Dot denotes pin 1

Regulated  
 Case Style: SIP 7

## INDUSTRIAL DC/DC Converters

1 Watt  
 Series: FS7R

### Electrical specifications:

Input voltage range: +/- 10%  
 $U_{in}=5V - 5\% / +10\%$   
 Output voltage accuracy: +/- 5%  
 Line regulation of  $V_{in}$ : +/- 0,5%  
 Load regulation: +/- 1%  
 Efficiency: min. 60%  
 Isolation voltage: min. 2000V DC  
 Output Ripple & Noise: typ. 50mVp-p  
 Short circuit protection: continuous

Short circuit input-current: 100mA  
 Ambient temperature: -40°C to +71°C  
 Switching frequency: 50kHz  
 Optional: Part - Nr. / 3 min. 3kV AC rms  
 Optional: Part - Nr. / 5 0,5W output power  
 Optional: Part - Nr. / 7 0,75W output power

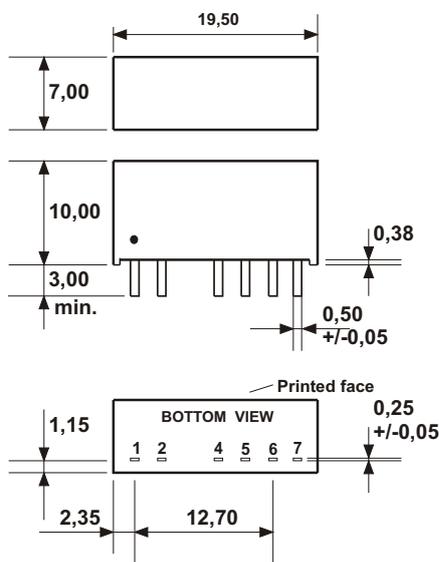
Optional: Part - Nr. / 9 -55°C to +85°C  
 only 0,5W version Ambient temperature

CAUTION: NO INPUT POLARITY CHANGE ALLOWED!

Single Output			0,5 Watt	0,75 Watt	1 Watt
Part - No.	Input Voltage	Output Voltage	Output current	Output current	Output current
FS7R-0503,3	5V	3,3	152mA	227mA	303mA
FS7R-0505		5	100mA	150mA	200mA
FS7R-0512		12	42mA	63mA	83mA
FS7R-0515		15	33mA	50mA	67mA
FS7R-1203,3	12V	3,3	152mA	227mA	303mA
FS7R-1205		5	100mA	150mA	200mA
FS7R-1212		12	42mA	63mA	83mA
FS7R-1215		15	33mA	50mA	67mA
FS7R-1503,3	15V	3,3	152mA	227mA	303mA
FS7R-1505		5	100mA	150mA	200mA
FS7R-1512		12	42mA	63mA	83mA
FS7R-1515		15	33mA	50mA	67mA
FS7R-2403,3	24V	3,3	152mA	227mA	303mA
FS7R-2405		5	100mA	150mA	200mA
FS7R-2412		12	42mA	63mA	83mA
FS7R-2415		15	33mA	50mA	67mA

Input capacitor 4,7µF - 10µF is a must.

### Mechanical Dimensions & Schematic



PIN CONNECTION		
PIN	SINGLE	SINGLE B*
1	VCC	VCC
2	GND	GND
3	NP	NP
4	-Vout	NP
5	NC	-Vout
6	+Vout	NP
7	NP	+Vout

\* For other pinning add "B" to the end of partnumber: FS7R-0505B 1W

ALL DIMENSIONS IN MM  
 MILLIMETERS +/- 0,25mm  
 All pins on a 2,54mm pitch  
 NC = No connection; NP = No pin  
 Note: Dot denotes pin 1

# INDUSTRIAL DC/DC Converters

**1 Watt**  
**Series: FS7R**

**Regulated**  
**Case Style: SIP 7**

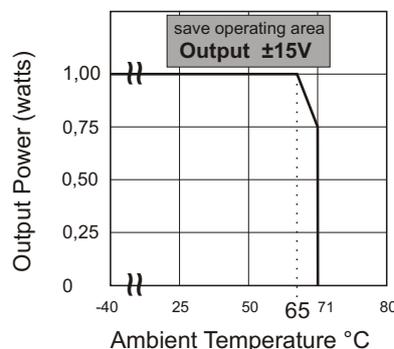
**Electrical specifications:**

Input voltage accuracy: +/- 10%  
 U<sub>in</sub> = 5V : - 5% / +10%  
 Output voltage accuracy: +/- 5%  
 Line regulation of Vin: +/- 0,5%  
 Load regulation: +/- 1%  
 Efficiency: min. 58%

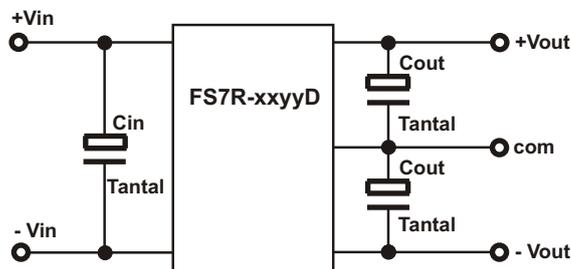
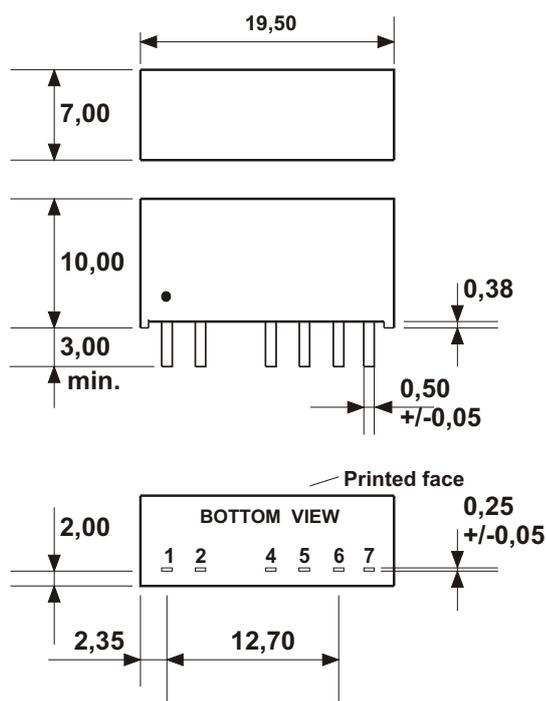
Short circuit protection: continuous  
 Ambient temperature: -40°C to 71°C  
 Switching frequency: 40kHz  
 Isolation voltage: min. 1000V DC  
 Output Ripple & Noise: typ. 50mVp-p

CAUTION NO INPUT POLARITY CHANGE ALLOWED!

Part - No.	Input Voltage	Output Voltage	Output current
FS7R-0505D FS7R-0512D FS7R-0515D	5V	+/- 5V +/- 12V +/- 15V	+/-100mA +/- 42mA +/- 33mA
FS7R-1205D FS7R-1212D FS7R-1215D	12V	+/- 5V +/- 12V +/- 15V	+/-100mA +/- 42mA +/- 33mA



**Mechanical Dimensions & Schematic**



Input Voltage	Capacitance <b>is a must</b>	
	C <sub>in</sub>	C <sub>out</sub>
5V	4,7 - 10µF	4,7µF/35V

PIN CONNECTION	
PIN	DUAL
1	VCC
2	GND
3	NP
4	-Vout
5	COM
6	+Vout
7	NP

ALL DIMENSIONS IN MM  
 MILLIMETERS +/- 0,25mm  
 All pins on a 2,54mm pitch  
 NC = No connection; NP = No pin  
 Note: Dot denotes pin 1

# AUTOMOTIVE DC/DC Converters

PWM - regulated

Stand: 07/04

2 Watt

Series: S7W2

Wide input range 1:2  
Case Style: SIP 7

### Electrical specifications:

Input voltage:	wide 1:2
Output voltage accuracy:	+/- 2%
Line regulation:	+/- 0,2%
Load regulation:	+/- 1%
Efficiency:	min. 65%
Output Ripple & Noise:	typ. 150mVp-p
short circuit protection:	fully protected
Ambient temperature:	-55°C to +85°C
Operating temperature:	max. +115°C
Isolation voltage:	min. 1500V DC; min. 500V AC rms
Optional: Part-Nr. /H	Alternate pin configuration
Part-Nr. /5	External -IN & -OUT/COM connection allowed

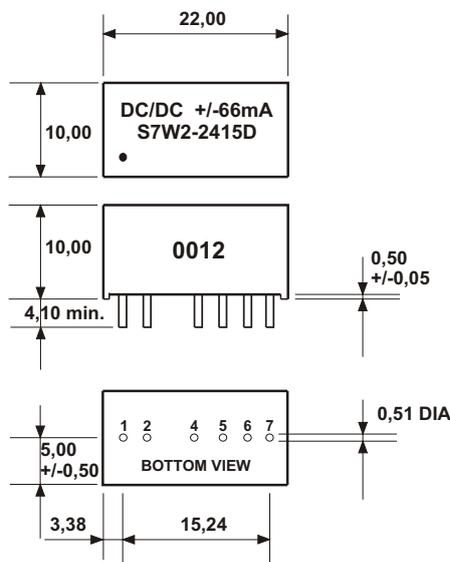
**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part - No. Single	Input Voltage	Output Voltage	Output current	Part - No. Dual	Input Voltage	Output Voltage	Output current
S7W2-1205	9 - 18V	5V	400mA	S7W2-1205D	9 - 18V	+/- 5V	+/-200mA
S7W2-1212		12V	166mA	S7W2-1212D		+/-12V	+/- 83mA
S7W2-1215		15V	133mA	S7W2-1215D		+/-15V	+/- 66mA
S7W2-1224		24V	83mA	S7W2-1224D		+/-24V	+/- 42mA
S7W2-2405	16 - 36V	5V	400mA	S7W2-2405D	16 - 36V	+/- 5V	+/-200mA
S7W2-2412		12V	166mA	S7W2-2412D		+/-12V	+/- 83mA
S7W2-2415		15V	133mA	S7W2-2415D		+/-15V	+/- 66mA
S7W2-2424		24V	83mA	S7W2-2424D		+/-24V	+/- 42mA
S7W2-4805	36 - 72V	5V	400mA	S7W2-4805D	36 - 72V	+/- 5V	+/-200mA
S7W2-4812		12V	166mA	S7W2-4812D		+/-12V	+/- 83mA
S7W2-4815		15V	133mA	S7W2-4815D		+/-15V	+/- 66mA
S7W2-4824		24V	83mA	S7W2-4824D		+/-24V	+/- 42mA

### Any other output voltages available

Example: 3,3V; 5,3V; 8V; 9V

### Output capacitor is a must.



PIN CONNECTION					
PIN	SINGLE	SINGLE A*	SINGLE /H*	DUAL	DUAL /H*
1	VCC	VCC	VCC	VCC	VCC
2	GND	GND	GND	GND	GND
3	NP	NP	NP	NP	NP
4	NC	-Vout	NP	-Vout	NP
5	-Vout	NC	-Vout	COM	-Vout
6	+Vout	+Vout	NC	+Vout	COM
7	NP	NP	+Vout	NP	+Vout

\* For other pinning add "A" or "H" to the end of partnumber for example: S7W2-2405A, S7W2-2415D

ALL DIMENSIONS IN MM  
MILLIMETERS +/- 0,25mm  
All pins on a 2,54mm pitch  
**Note:** NP = No pin; NC = No connection;  
Dot denotes pin 1  
Input capacitor 4,7µF - 10µF is a must.

# AUTOMOTIVE DC/DC Converters PWM - regulated

Stand 05/05

Wide input range 1:2  
 Case Style: SIP 7

1 - 1,6 Watt  
 Series: S7W2

**Electrical specifications:**

Input voltage: wide 1:2  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 0,2%  
 Load regulation: +/- 1% for regulated  
 Efficiency: approx. 70%  
 Output Ripple & Noise: typ. 150mVp-p

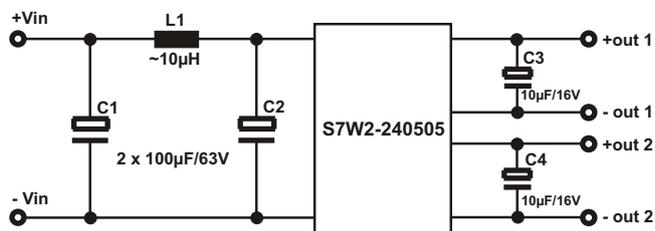
short circuit protection: fully protected  
 Ambient temperature: -55°C to +85°C  
 Operating temperature max.: +115°C  
 Isolation voltage: min. 1500V DC; min. 500V AC rms  
 Part-No.: /2 Separate Dual outputs min. 500V DC

**CAUTION NO INPUT POLARITY CHANGE ALLOWED!**

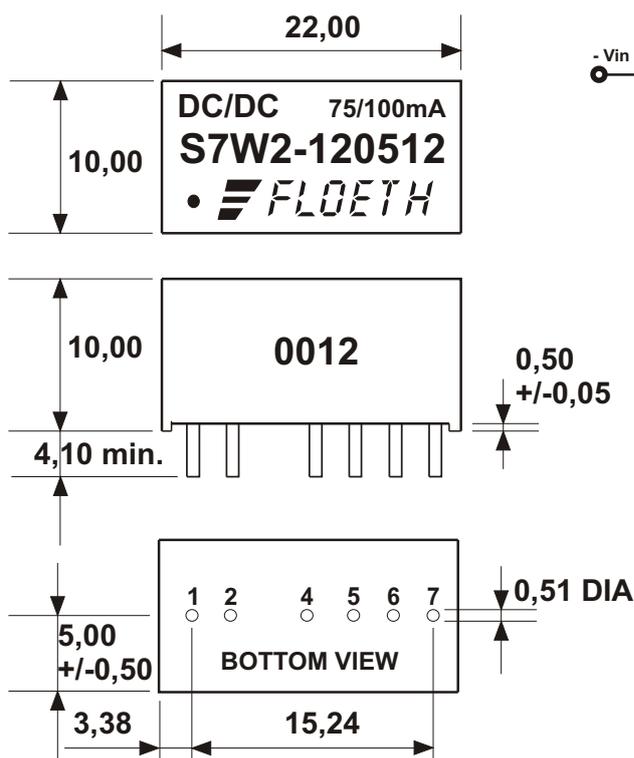
Part - No. Dual	Input Voltage	Output 1 Voltage	Output 1 current	Output 2 Voltage	Output 2 current
S7W2-120512 **	9 - 18V	5V regulated	75mA	12V unregulated	100mA
S7W2-240505	18 - 36V	5V regulated	200mA	5V unregulated	50mA

**\*\*Input capacitor 4,7µF - 10µF is a must**

**\*\*Output capacitor 5V / 22µF/16V Tantal // 12V / 10µF/25V Tantal is a must**



**S7W2-240505 output 1 ground load: 70mA is a must**



PIN CONNECTION		
PIN	DUAL	* DUAL /2
1	VCC	VCC
2	GND	GND
3	NP	NP
4	+12V	- OUT2
5	COM	+OUT2
6	+5V	- OUT1
7		+OUT1

\* For other pinning:  
 Add "/2" to the end of Partnumber  
 For example S7W2-120512/2 1,6W

ALL DIMENSIONS IN MM  
 MILLIMETERS +/- 0,25mm  
 All pins on a 2,54mm pitch  
 Note: NP = No pin; NC = No connection;  
 Dot denotes pin 1

# MEDICAL - INDUSTRIAL

Stand: 05/05

1 - 2 Watt

Unregulated  
 Case Style: SIP 12

## DC/DC Converters REINFORCED ISOLATION single / dual output

Series:  
**MED-FS12U**

**EN 60601**

### Electrical specifications:

Input voltage accuracy: +/-10%  
 U<sub>in</sub>=5V -5% + 10%  
 Output voltage accuracy: +/- 5% @ 50% load  
 Line regulation: +/- 1% / +/- 1%  
 Load regulation: +/-10%  
 Ambient temperature: -40°C to + 71°C  
 Operating temperature: -40°C to +105°C  
 Storage temperature: -55°C to +125°C

Ripple:  
 Temperature coefficient:  
 Isolation voltage:  
 Efficiency:  
 short circuit protection:  
 overload:  
 couple capacitance:  
 creepage distance

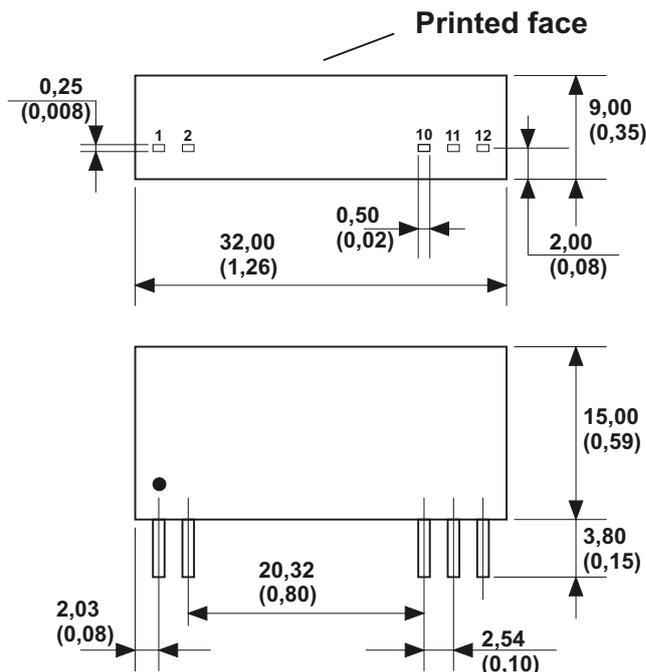
typ. 150mVp-p  
 +/-0,02% / °C  
 4kV AC rms continuous  
 min. 70%  
 continuous  
 max. 30%  
 ~10pF  
 15mm min.

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part No.: SINGLE	Input voltage	Output voltage	1 Watt		2 Watt		Part No.: DUAL	Input voltage	Output voltage	1 Watt		2 Watt	
			Output current	Output current	Output current	Output current							
MED-FS12U-0505 MED-FS12U-0512 MED-FS12U-0515	5V DC	5V DC	200mA	400mA	83mA	166mA	MED-FS12U-0505D MED-FS12U-0512D MED-FS12U-0515D	5V DC	± 5V DC	±100mA	±200mA	± 42mA	± 83mA
MED-FS12U-1205 MED-FS12U-1212 MED-FS12U-1215	12V DC	5V DC	200mA	400mA	83mA	166mA	MED-FS12U-1205D MED-FS12U-1212D MED-FS12U-1215D	12V DC	± 5V DC	±100mA	±200mA	± 42mA	± 83mA
MED-FS12U-1505 MED-FS12U-1512 MED-FS12U-1515	15V DC	5V DC	200mA	400mA	83mA	166mA	MED-FS12U-1505D MED-FS12U-1512D MED-FS12U-1515D	15V DC	± 5V DC	±100mA	±200mA	± 42mA	± 83mA
MED-FS12U-2405 MED-FS12U-2412 MED-FS12U-2415	24V DC	5V DC	200mA	400mA	83mA	166mA	MED-FS12U-2405D MED-FS12U-2412D MED-FS12U-2415D	24V DC	± 5V DC	±100mA	±200mA	± 42mA	± 83mA

Any other in & output voltages available.

Input capacitor 6,8 - 10µF is a must.



PIN CONNECTION		
PIN	single	dual
1	+ IN	+ IN
2	- IN	- IN
9	NP	NP
10	+ Vout	+ Vout
11	NC	- Vout
12	- Vout	COM

ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,50mm  
 (INCHES +/- 0,02")  
 All pins on a 2,54mm pitch  
 Note: NC = No connection; NP = No pin  
 Dot denote pin 1

**MEDICAL - INDUSTRIAL**  
**DC/DC Converters**  
**REINFORCED ISOLATION**  
**triple output**

Stand: 39/04  
**1 - 2 Watt**

**Series:**  
**MED-FS12U**

**Unregulated**  
**Case Style: SIP 12**

**EN 60601**

**Electrical specifications:**

Input voltage accuracy: +/-10%  
 U<sub>in</sub>=5V -5% +10%  
 Output voltage accuracy: +/- 5%@50%load  
 Line regulation: +/- 1% / +/- 1%  
 Load regulation: +/-10%  
 Ambient temperature: -40°C to + 71°C  
 Operating temperature: -40°C to +105°C  
 Storage temperature: -55°C to +125°C

Ripple:  
 Temperature coefficient:  
 Isolation voltage:  
 Efficiency:  
 short circuit protection:  
 overload:  
 couple capacitance:  
 creepage distance

typ. 150mVp-p  
 +/-0,02% / °C  
 4kV AC rms  
 min. 70%  
 continuous  
 max. 30%  
 ~10pF  
 15mm min.

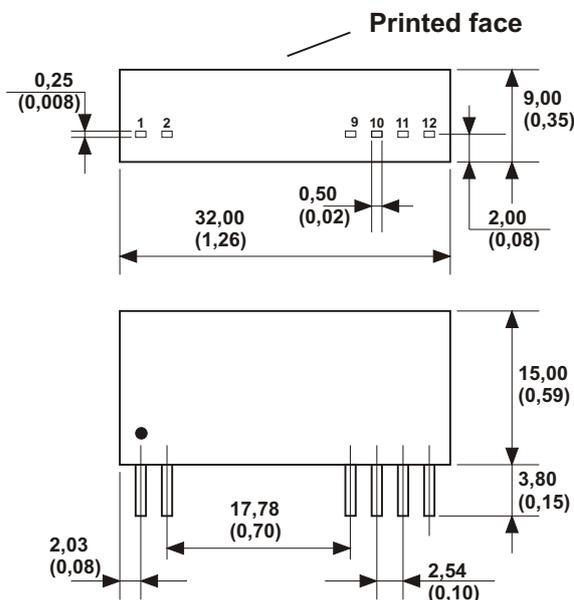
**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

**any voltage available & current combination available**

Part No.: triple	Input voltage DC	Output voltage DC 1&2	Triple Output voltage DC 3	Output current 1&2	Output current 3
MED-FS12U-0505Dzz MED-FS12U-0512Dzz MED-FS12U-0515Dzz	5V	± 5V ±12V ±15V	zzV zzV zzV	± 75mA	150mA
MED-FS12U-1205Dzz MED-FS12U-1212Dzz MED-FS12U-1215Dzz	12V	± 5V ±12V ±15V	zzV zzV zzV	±125mA	150mA
MED-FS12U-1505Dzz MED-FS12U-1512Dzz MED-FS12U-1515Dzz	15V	± 5V ±12V ±15V	zzV zzV zzV	current partition on request	current partition on request
MED-FS12U-2405Dzz MED-FS12U-2412Dzz MED-FS12U-2415Dzz	24V	± 5V ±12V ±15V	zzV zzV zzV	current partition on request	current partition on request

**\*\*DC 3 xx any voltage & current combination available.**

**Input capacitor 6,8 - 10µF is a must.**



PIN CONNECTION	
PIN	triple
1	+ IN
2	- IN
9	+ Vout U3
10	+ Vout U1
11	- Vout U2
12	COM

ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,50mm  
 (INCHES +/- 0,02")  
 All pins on a 2,54mm pitch  
**Note:** NC = No connection; NP = No pin  
 Dot denote pin 1

Unregulated  
 Case style: DIP 8

## INDUSTRIAL DC/DC Converters

0,25 - 1 Watt  
 Series: FMD8

### Electrical specifications:

Input voltage range: +/- 10%  
 Output voltage accuracy: +/- 10%  
 Output voltage @ zero Load: approx. 20% above nominal  
 Line regulation: +/- 1% / +/- 1%  
 Load regulation: +/- 10%  
 Efficiency: min. 65%  
 Output Ripple & Noise: 250mVp-p

Short circuit protection: continuous  
 Ambient temperature: -40°C to +71°C  
 Operating temperature: max. +95°C  
 Isolation voltage: min. 1000V DC

Optional:  
 Part-Nr. /2 0,25W ; /5 0,5W ; /7 0,75W output power

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part - No. Single Output	Input Voltage	Output Voltage	0,25W	0,5W	0,75W	1W
			Output Current	Output Current	Output Current	Output Current
FMD8-0505	5V	5V	50mA			200mA
FMD8-0512		12V	21mA			83mA

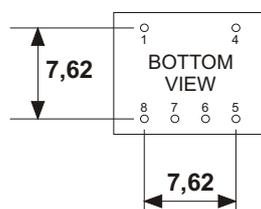
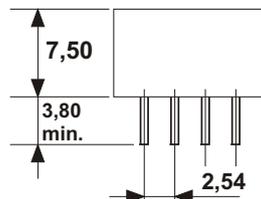
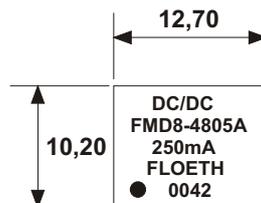
Part - No. Dual Output	Input Voltage	Output Voltage	0,25W	0,5W	0,75W	1W
			Output Current	Output Current	Output Current	Output Current
FMD8-0507D	5V	± 7V	± 18mA			

Any other input and output voltages available

**Note:** Input capacitor  
 4,7µF - 10µF is a must

### Output Ripple U<sub>in</sub> 5V:

capacitor recommended  
 10µF Tantal = R. 100mVp-p  
 10µF Tantal & 100µF Elko  
 Ripple = 50mVp-p



### PIN CONNECTION:

PIN	SINGLE	SINGLE A*	Dual
1	- IN	- IN	- IN
4	+ IN	+ IN	+ IN
5	+ Vout	+ Vout	+ Vout
6	NC	NP	COM
7	NP	- Vout	NP
8	- Vout	NP	- Vout

\*

Add "A" to the end of partnumber.  
 For example FMD8-0505A

ALL DIMENSIONS IN MM  
 MILLIMETERS +/- 0.25mm  
 All pins on a 2,54mm pitch.  
 Pin size is 0,5mm ( 0,020 inch ) DIA  
 NC = No connection; NP = No pin

Dot denotes pin 1

# INDUSTRIAL DC/DC Converters

Stand: 14/05

1 Watt

Unregulated  
 Case style: DIP 8

ISOLATED OUTPUTS

Series: FMD8

### Electrical specifications:

Input voltage range: +/- 10%  
 Output voltage accuracy: +/- 10%  
 Line Regulation: +/- 1% / +/- 1%  
 Load Regulation: +/- 10%  
 Efficiency: min. 70%  
 Output Ripple & Noise: 150mVp-p

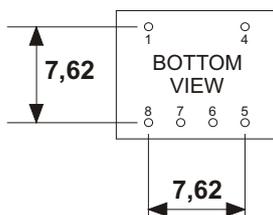
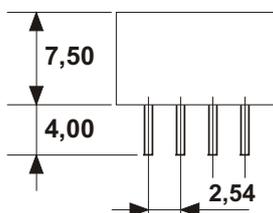
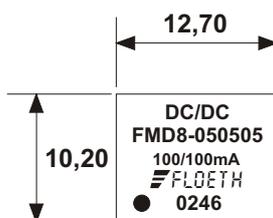
Short circuit protection: continuous  
 Ambient temperature: -40°C to +71°C  
 Isolation voltage: I/O min. 1000V DC  
 O/O min. 1000V DC

Output voltage: @ zero Load: approx. 15% above nominal  
**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Model Number Dual Output	Input Voltage DC	Output Voltage			Output Current	
		OUT 1	DC	OUT 2	OUT 1	OUT 2
FMD8-050505	5V	5V		5V	100mA	100mA

Any other input and output voltages available

**Note:** Input capacitor  
 4,7µF - 10µF is a must



### PIN CONNECTION:

PIN	Dual
1	- IN
4	+ IN
5	+ OUT 1
6	- OUT 1
7	- OUT 2
8	+ OUT 2

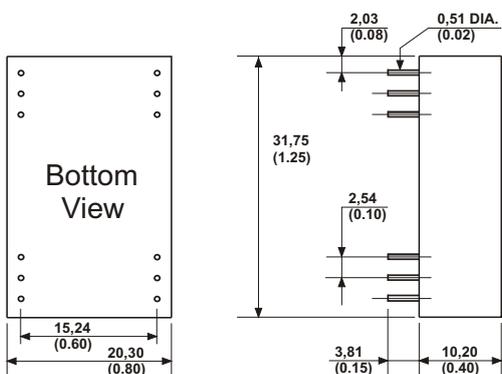
MILLIMETERS XXXX +/- 0.25  
 All Dimensions in mm  
 All Pins on a 2,54mm pitch.  
 Pin size is 0,5mm ( 0,020 inch ) DIA  
 NC = No connection; NP = No pin

Dot denotes pin 1

# INDUSTRIAL DC/DC Converters

2,4 / 3 Watt  
Series: CFU

Unregulated  
Case style: DIP24



ALL DIMENSIONS IN MM (INCHES)  
MILLIMETERS +/- 0,25mm / INCHES +/- 0,01"

## Electrical specifications:

Input voltage range:	+/- 10% @U <sub>in</sub> =5V -5%/+10%
Output voltage accuracy:	+/- 10%
Line regulation:	+/- 1% // +/- 1%
Load regulation:	+/- 10%
Efficiency:	min. 70%
Output Ripple & Noise:	typ. 100mVp-p
Short circuit protection:	continuous / autorestart
Ambient temperature:	-40°C to +71°C
Operating temperature:	max. +105°C
Isolation voltage:	min. 1000V DC
Case material:	black polycarbonate

- Optional: Part-Nr. /3 metal case  
Part-Nr. /2 4kV AC rms isolation voltage  
Part-Nr. /7 3kV DC isolation voltage  
Part-Nr. /5 External -IN & -OUT/COM connection allowed  
Part-Nr. /9 Ambient temperature -55°C to +85°C

CAUTION: NO INPUT POLARITY CHANGE ALLOWED!

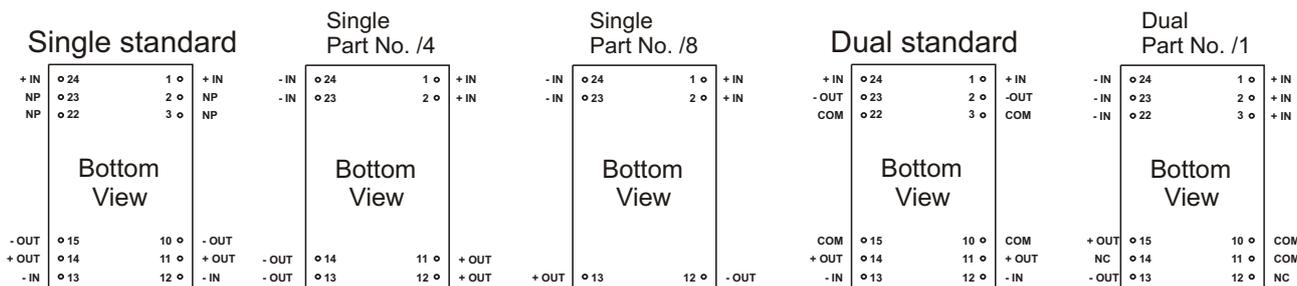
Part - No. Single	Input Voltage	Output Voltage	Output Current	Part - No. Dual	Input Voltage	Output Voltage	Output Current
CFU-03,301,6 CFU-03,306	3,3V	1,6V 6,0V	2000mA 400mA				
CFU-0505 CFU-0509 CFU-0512 CFU-0515	5V	5V 9V 12V 15V	600mA 330mA 250mA 200mA	CFU-0505D CFU-0512D CFU-0515D	5V	+/- 5V +/-12V +/-15V	+/-300mA +/-125mA +/-100mA
CFU-1205 CFU-1209 CFU-1212 CFU-1215	12V	5V 9V 12V 15V	600mA 330mA 250mA 200mA	CFU-1205D CFU-1212D CFU-1215D	12V	+/- 5V +/-12V +/-15V	+/-300mA +/-125mA +/-100mA
CFU-2405 CFU-2412 CFU-2415	24V	5V 12V 15V	600mA 250mA 200mA	CFU-2405D CFU-2412D CFU-2415D	24V	+/- 5V +/-12V +/-15V	+/-300mA +/-125mA +/-100mA
CFU-4805 CFU-4812 CFU-4815	48V	5V 12V 15V	600mA 250mA 200mA	CFU-4805D CFU-4812D CFU-4815D	48V	+/- 5V +/-12V +/-15V	+/-300mA +/-125mA +/-100mA

Any other output voltages available.

## PIN CONNECTION:

All pins on a 2,54mm pitch;  
NP = No Pin, NC = No connection

U<sub>in</sub> 3,3V: - Eff. min 60%  
- Output Ripple & Noise: max. 200mVp-p



# INDUSTRIAL

## DC/DC Converters

### Unregulated

4x1W = 4W  
 Series: CF4U

QUADRUPLE Output  
 Case Style: Dip24

Short Circuit Proof

#### Electrical specifications:

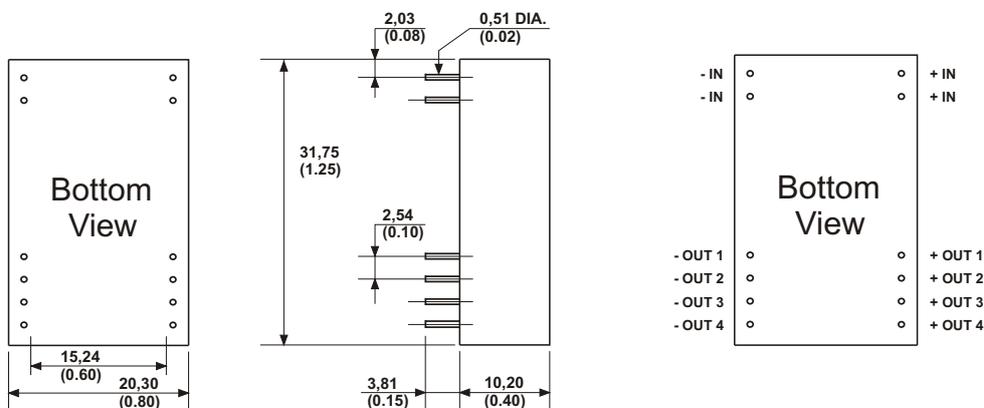
Input voltage range: +/- 10% // @U<sub>in</sub>=5V -5% / -10%  
 other input voltage: +/- 10%  
 Output voltage accuracy: unregulated  
 Short circuit protection: continuous  
 Ambient temperature: -40°C to +71°C  
 Operating temperature: max. +105°C.  
 Isolation voltage: I / O min. 1000V DC  
 O1/O2/O3/O4 min. 500V DC  
 Case material: black polycarbonate

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part - No.	Input Voltage DC	Output Voltage DC	Output current mA	Efficiency
CF4U-0303	2,85V - 3,15V	3V / 3V / 3V / 3V	160mA / 160mA / 160mA / 160mA	72%
CF4U-0505	4,75V - 5,5V	5V / 5V / 5V / 5V	200mA / 200mA / 200mA / 200mA	68%
CF4U-1205	10,8V - 13,2V	5V / 5V / 5V / 5V	200mA / 200mA / 200mA / 200mA	72%
CF4U-1505	13,5V - 16,5V	5V / 5V / 5V / 5V	200mA / 200mA / 200mA / 200mA	75%
CF4U-2405	21,6V - 26,4V	5V / 5V / 5V / 5V	200mA / 200mA / 200mA / 200mA	75%
CF4U-4805	43,2V - 52,8V	5V / 5V / 5V / 5V	200mA / 200mA / 200mA / 200mA	76%

**Additional Input & Output Capacitors recommended**  
**Ripple & Noise depend on Load & external Capacitors**

#### PIN CONNECTION:

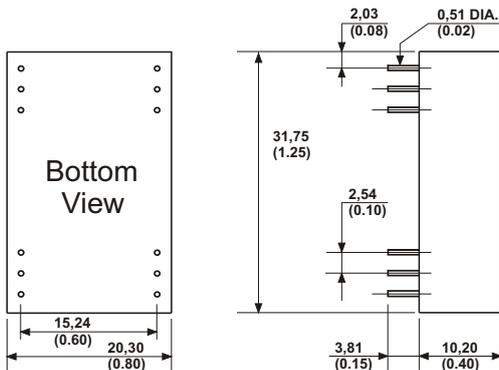


ALL DIMENSIONS IN MM; (INCHES)  
 MILLIMETERS +/- 0,5mm  
 (INCHES +/- 0,02")  
 All pins on a 2,54mm pitch.

# INDUSTRIAL DC/DC Converters

Stand: 24/01  
**3 Watt**  
**Series: CF**

Superb quality & reasonable cost  
 Regulated  
 Case style: DIP24



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,25mm / INCHES +/- 0,01"

## Electrical specifications:

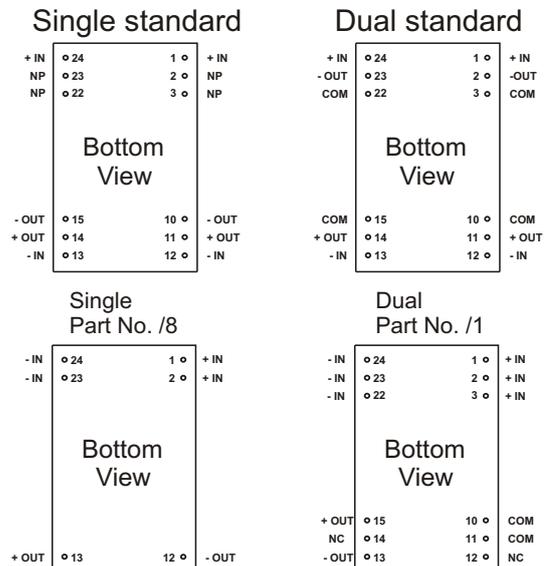
- Input voltage range: +/- 10% / @U<sub>in</sub>=5V -5%/+10%
- Output voltage accuracy: +/- 5%
- Line regulation: +/- 0,5%
- Load regulation: +/- 0,5%
- Efficiency: 54% - 70%
- Output Ripple & Noise: typ. 100mVp-p
- Short circuit protection: continuous / autorestart
- Ambient temperature: -40°C to +71°C
- Operating temperature: max. +105°C
- Isolation voltage: min. 1000V DC
- Case material: black polycarbonate
- Optional: Part-Nr. /3 metalcase  
 Part-Nr. /2 4kV AC rms isolation voltage @ P. -Nr. /1 & /8  
 Part-Nr. /7 3kV DC isolation voltage @ P. -Nr. /1 & /8  
 Part-Nr. /4 4kV DC isolation voltage  
 Part-Nr. /5 External -IN & -OUT/COM connection allowed  
 Part-Nr. /9 Automotiv -55°C to +85°C

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part - No. Single	Input Voltage	Output Voltage	Output Current	Part - No. Dual	Input Voltage	Output Voltage	Output Current
CF - 0505	5V	5V	600mA	CF - 0505D	5V	+/- 5V	+/-300mA
CF - 0509		9V	330mA	CF - 0512D		+/-12V	+/-125mA
CF - 0512		12V	250mA	CF - 0515D		+/-15V	+/-100mA
CF - 0515		15V	200mA				
CF - 1205	12V	5V	600mA	CF - 1205D	12V	+/- 5V	+/-300mA
CF - 1209		9V	330mA	CF - 1212D		+/-12V	+/-125mA
CF - 1212		12V	250mA	CF - 1215D		+/-15V	+/-100mA
CF - 1215		15V	200mA				
CF - 2405	24V	5V	600mA	CF - 2405D	24V	+/- 5V	+/-300mA
CF - 2412		12V	250mA	CF - 2412D		+/-12V	+/-125mA
CF - 2415		15V	200mA	CF - 2415D		+/-15V	+/-100mA
CF - 4805	48V	5V	600mA	CF - 4805D	48V	+/- 5V	+/-300mA
CF - 4812		12V	250mA	CF - 4812D		+/-12V	+/-125mA
CF - 4815		15V	200mA	CF - 4815D		+/-15V	+/-100mA

## PIN CONNECTION:

All pins on a 2,54mm pitch;  
 NP = No Pin, NC = No connection



## INDUSTRIAL & AUTOMOTIVE DC/DC Converters

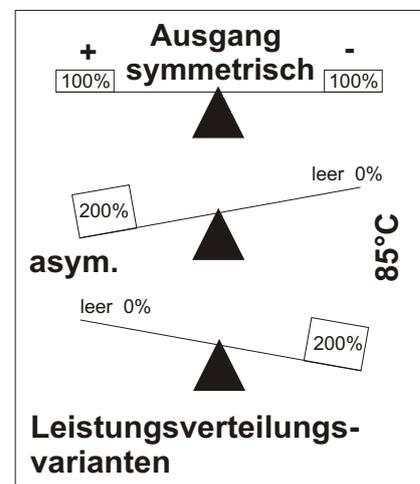
### HIFLEX - POWER SERIE 3Watt

Specials made to fit up to 100°C ambient temperature

Dual - In - Line Gehäuse DIP 24  
ca. 31 x 20 x 10mm

- a) Standard im Kunststoffgehäuse ( Polycarbonat ) Serie CSK
- b) Metallgehäuse schwarz Serie CMK ( CMKA )

1. Die Serien CSK und CMK ( CMKA ) können "asymmetrisch" belastet werden, siehe Bild.
2. Standard Leistung 3W erlaubt Umgebungstemperaturen bis 71°C ohne Leistungsabschlag ( ohne Derating ). Dabei können unsere Wandler eine Arbeitstemperatur von bis zu +105°C erreichen.
3. Wandler für Umgebungstemperaturen bis +85°C
4. PI - Filter in den Ausgängen dämpfen Rauschen und Restwelligkeit auf 30mVss.
5. PI - Filter im Eingang mindern die Rückschlagimpulse auf die Eingangsspannung auf angemessene Werte, so daß Ihre vorgelagerten Schaltkreise keine negative Beeinflussung erfahren.
6. Ausgangsspannungstoleranz beträgt Standard +/-3%, linear geregelt, 2% oder 1% auch möglich.
7. Die Eingangsspannungstoleranz beträgt +/-10% bei 5V eingeschränkt -5% / +10%. Zur Optimierung der Leistung und des Wirkungsgrades können alle Parameter gemäß den Anforderungen verschoben werden.
8. Thermischer Überlastschutz ist gegeben.
9. Elektronische Kurzschlußsicherung, schaltet im Kurzschlußfall den Lastkreis voll ab und schützt somit Ihre Schaltkreise. Reset durch AUS - EIN der Eingangsspannung.



### TRANSFORMATION - ISOLIERUNG - KURZSCHLUßSCHUTZ

Umgebungstemp. = Ambient Temp.  
CSK/CMK: -40°C bis +71°C  
CMKA: -55°C bis +85°C

- a) Standard polycarbonate package, molded acc. UL 94V - 0 series CSK
- b) Black anodized metal case series CMK ( CMKA )

1. Both CSK and CMK ( CMKA ) can be charged asymmetricly up to 200%
2. Standard 3W can be operated at 71°C ambient temperature without any derating while operating temperature may reach 103°C
3. -55°C to +85°C for automotive applications.
4. Both outputs are pi-filtered, ripple & noise average 30mV
5. Input pi-filter applied to reduce reflected ripple & noise to none-harming values acc. to input voltage size.
6. Standard output tolerance 3% linear regulated, 2% and 1% tol. on request.
7. Input voltage tolerance +/-10% -5 / +10% at 5V input only. All parameters can be shifted to your specific demands.
8. Thermal protection is given.
9. Electronic fuse integrated to give 100% short circuit protection. Reset by switching input voltage OFF / ON

**CSK : High power, high ambient temperature, industrial use**  
**CMK: High or low power, high ambient temperature, low EMI**  
as required for A/D and D/A converter applications

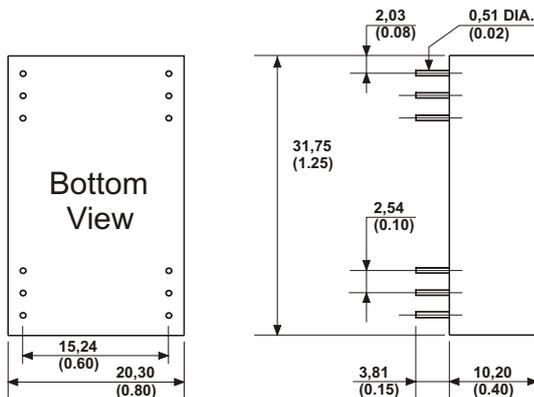
## INDUSTRIAL & AUTOMOTIVE

Stand: 24/01

Regulated  
Case style: DIP24

## DC/DC Converters

3 Watt  
Series: CSK/  
CMK/CMKA



### Allg. Spezifikation / Electrical specifications:

Ausgangsspannungstoleranz / Output voltage accuracy: +/- 3%  
Versorgungsnachregelung / Line regulation: +/- 0,3%  
Lastnachregelung / Load regulation: +/- 0,5%  
Rauschen & Restwelligkeit / Ripple & Noise: typ. 50mVp-p  
Kurzschlußabschaltung / Short circuit switch-off  
Überlastabschaltung / Over load protection  
Thermische Abschaltung / Thermal shut down  
Wirkungsgrad / Efficiency: 50% min.  
Rel. Feuchte / rel. humidity: 93% / 40°C  
Schockfest / Shock proof acc. IEC 68-2-34  
Feuerfestigkeit / Flameability UL - 94V -0  
Isolationfestigkeit / Isolation voltage: min. 1000V DC  
Part-Nr. /3 isolation optional 3000V AC rms ( only CSK )  
Operating temperature max. +105°C @ Ta = +71°C  
+118°C @ Ta = +85°C

CAUTION: NO INPUT POLARITY CHANGE ALLOWED!

ALL DIMENSIONS IN MM (INCHES)

TOLERANCE: MILLIMETERS +/- 0,25mm / INCHES +/- 0,01"

Umgebungstemperaturen ohne Leistungsminderung / ambient temperature without DERATING

CSK / CMK -40°C to +71°C  
CMKA -55°C to +85°C & up to 100°C

Part - No. Single and Dual	Input voltage	Input Voltage	Output Voltage	Output Current	Overcurrent Short circuit cut off <sup>2</sup>
CSK/CMK/CMKA05-3-0505D-3	-5% / +10%	5V	+/- 5V*	+/-300mA	120 %
CSK/CMK/CMKA05-3-0512D-3	-5% / +10%		+/-12V	+/-125mA	120 %
CSK/CMK/CMKA05-3-0515D-3	-5% / +10%		+/-15V	+/-100mA	120 %
CSK/CMK/CMKA10-3-1205D-3	+/-10%	12V	+/- 5V*	+/-300mA	120 %
CSK/CMK/CMKA10-3-1212D-3	+/-10%		+/-12V	+/-125mA	120 %
CSK/CMK/CMKA10-3-1215D-3	+/-10%		+/-15V	+/-100mA	120 %
CSK/CMK/CMKA10-3-1505D-3	+/-10%	15V	+/- 5V*	+/-300mA	120 %
CSK/CMK/CMKA10-3-1512D-3	+/-10%		+/-12V	+/-125mA	120 %
CSK/CMK/CMKA10-3-1515D-3	+/-10%		+/-15V	+/-100mA	120 %
CSK/CMK/CMKA10-3-2405D-3	+/-10%	24V	+/- 5V*	+/-300mA	120 %
CSK/CMK/CMKA10-3-2412D-3	+/-10%		+/-12V	+/-125mA	120 %
CSK/CMK/CMKA10-3-2415D-3	+/-10%		+/-15V	+/-100mA	120 %

Gehäusematerial: CSK Polycarbonat CMK / CMKA: Metall  
Case material: CSK polycarbonat CMK / CMKA: metal

**Achtung:** - kein Eingangsverpolschutz  
- \* bei unsymmetrischer Belastung der 5V - Ausgangstypen max. 2,4 Watt Ausgangsleistung  
- <sup>2</sup> nur bei CSK / CMK / CMKA

**Attention:** - don't change input polarity!  
- \* at unbalanced load of 5V - output types max. 2,4 Watt output power  
- <sup>2</sup> only CSK / CMK / CMKA

Pinbelegung auf der nächsten Seite // pinconnection - options see next page

Special request: 1 CSK / 1CMK / 1CMKA short circuit proof & autorestart available.

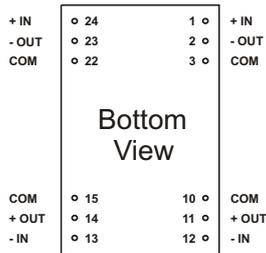
# INDUSTRIAL & AUTOMOTIVE

## DC/DC Converters

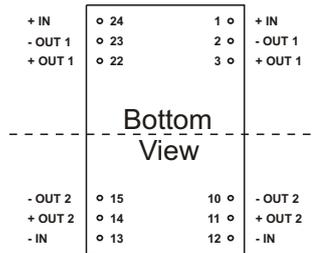
Series: CSK/  
 CMK/CMKA

### Connection options:

#### Standard Dual

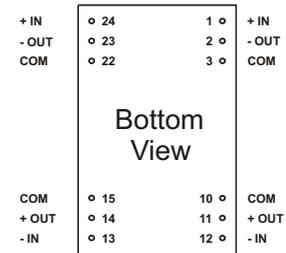


#### Part-Nr. /2



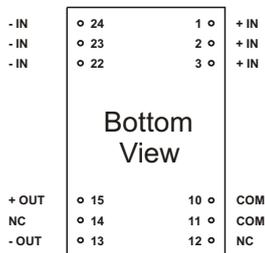
Output 1 isolated  
 from output 2.

#### Part-Nr. /5



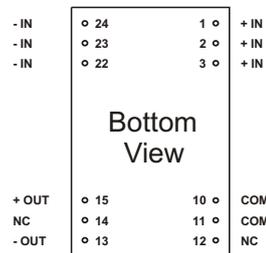
External - IN & - OUT/COM  
 connection allowed.  
 /1 /5 also possible

#### Part-Nr. /1



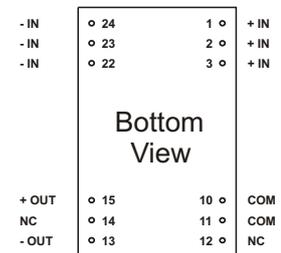
Isolation 1000V DC

#### Part-Nr. /3



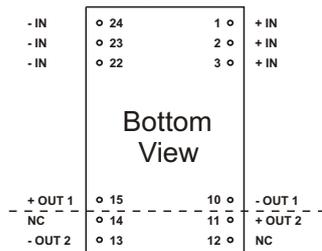
Isolation 3000V AC rms  
 Low noise

#### Part-Nr. /6



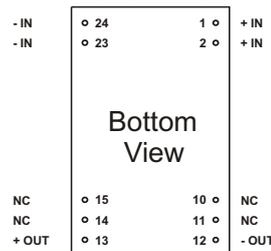
Isolation 3000 V AC rms  
 Isolation capacity 20pF  
 Low noise

#### Part-Nr. /4



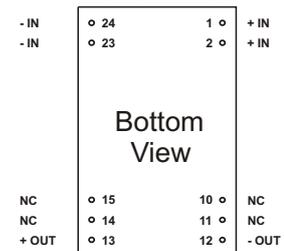
Output 1 isolated  
 from output 2

#### Part-Nr. /7



Isolation 3000V AC rms  
 Single output

#### Part-Nr. /8



Isolation 1000V DC  
 Single output

# INDUSTRIAL & AUTOMOTIVE DC/DC Converters

Stand: 24/01

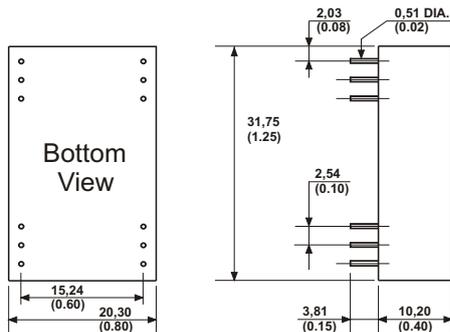
3 Watt

Series: CSK/  
CMK/CMKA

Regulated  
Case style: DIP24; triple output / drei Ausgänge  
Application: A/D conversion  
Zielrichtung: A/D Wandlerkarten

### Allg. Spezifikation / Electrical specifications:

Eingangsspannungstoleranz // Input voltage range: -5%/+10%  $U_{in} = 5V$   
Ausgangsspannungstoleranz // Output voltage accuracy: +/- 10%  $U_{in} = 12V, 15V$  u.  $24V$   
+/- 3% @  $U_{out} 1\&2$   
Versorgungsnachregelung / Line regulation: +/- 0,3%  
Lastnachregelung / Load regulation: +/- 0,5%  
Rauschen & Restwelligkeit / Ripple & Noise: typ. 50mVp-p  
Kurzschlußabschaltung / Short circuit switch-off  
Überlastabschaltung / Over load protection  
Thermische Abschaltung / Thermal shut down  
Wirkungsgrad / Efficiency: min. 68%  
Überlast / Kurzschlußabschaltung // 120%  
Over current / Short circuit cut off:  
Rel. Feuchte / rel. humidity: 93% / 40°C  
Schockfest / Shock proof acc. IEC 68-2-34  
Feuerfestigkeit / Flameability UL - 94V -0  
Isolationsfestigkeit / Isolation voltage: min. 1000V DC  
Operating temperature max. +105°C @  $T_a = +71°C$   
+118°C @  $T_a = +85°C$   
Part-Nr. /5 External -IN & -OUT/COM connection allowed  
**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**



ALL DIMENSIONS IN MM (INCHES)  
TOLERANCE: MILLIMETERS +/- 0,25mm  
(INCHES +/- 0,01")

Umgebungstemperaturen ohne Leistungsminderung / ambient temperature without DERATING

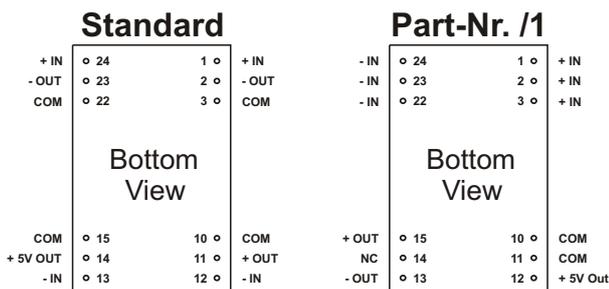
CSK / CMK -40°C to +71°C  
CMKA -55°C to +85°C & up to 100°C  $T_a$

Special request: 1CSK/ 1CMK/ 1CMKA Short circuit proof & autorestart available.

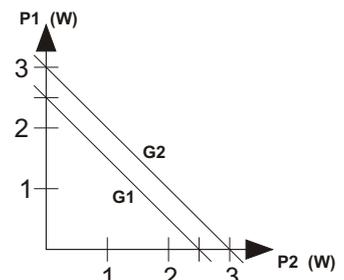
Part - No. Triple	Input Voltage	Output Voltage 1&2	max. Output Current 1&2	Output Voltage 3	max. Output Current 3
CSK/CMK/CMKA05-3-0512D05	5V	+/-12V	+/-125mA	5V	100mA
CSK/CMK/CMKA05-3-0515D05		+/-15V	+/-100mA		
CSK/CMK/CMKA10-3-1212D05	12V	+/-12V	+/-125mA	5V	100mA
CSK/CMK/CMKA10-3-1215D05		+/-15V	+/-100mA		
CSK/CMK/CMKA10-3-1512D05	15V	+/-12V	+/-125mA	5V	100mA
CSK/CMK/CMKA10-3-1515D05		+/-15V	+/-100mA		
CSK/CMK/CMKA10-3-2412D05	24V	+/-12V	+/-125mA	5V	100mA
CSK/CMK/CMKA10-3-2415D05		+/-15V	+/-100mA		

**Achtung:** kein Eingangsverpolschutz / **Attention:** don't change input polarity

**NOTE:** Output voltage 3 is unregulated, without load  $U_{out3} \text{ max.} = 6,5V$ .



Output 1 = P1 0 - 3W  
Output 2 = P2 0 - 3W  
Output 3 = P3 0W } G2  
Output 1 = P1 0 - 2,5W  
Output 2 = P2 0 - 2,5W  
Output 3 = P3 0,5W } G1



# INDUSTRIAL DC/DC Converters RCC / PWM - regulated LOW NOISE

Stand: 07/05

3 Watt

Series: CRW2  
 CRMW2

Case style: DIP24

### Electrical specifications:

Input voltage range:	wide 1:2 : $U_{in} = 5V \pm 10\%$	short circuit protection:	fully protected
Output voltage accuracy:	$\pm 3\%$	Ambient temperature:	$-40^{\circ}C$ to $+71^{\circ}C$
Line regulation:	$\pm 0,2\%$	Operating temperature:	max. $+105^{\circ}C$
Load regulation:	$\pm 1\%$	Isolation voltage:	min. 1000V DC
Efficiency:	min. 65%	Case material:	polycarbonate
Output Ripple & Noise:	50mVp-p	Part-Nr. /5 External -In & -OUT/COM connection allowed	
		Part-Nr. /7 1500V DC Isolation	
		CRMW2 Case material:	metal

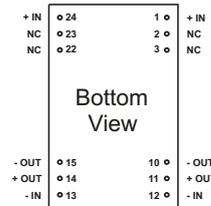
**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part No. Single	Input Voltage DC	Output Voltage DC	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
CRW2-0505 CRW2-0512 CRW2-0515	4,5 - 5,5V	5V 12V 15V	600mA 250mA 200ma	CRW2-0505D CRW2-0512D CRW2-0515D	4,5 - 5,5V	$\pm 5V$ $\pm 12V$ $\pm 15V$	$\pm 300mA$ $\pm 125mA$ $\pm 100ma$
CRW2-1205 CRW2-1212 CRW2-1215	9 - 18V	5V 12V 15V	600mA 250mA 200mA	CRW2-1205D CRW2-1212D CRW2-1215D	9 - 18V	$\pm 5V$ $\pm 12V$ $\pm 15V$	$\pm 300mA$ $\pm 125mA$ $\pm 100mA$
CRW2-2405 CRW2-2412 CRW2-2415	16 - 36V	5V 12V 15V	600mA 250mA 200mA	CRW2-2405D CRW2-2412D CRW2-2415D	16 - 36V	$\pm 5V$ $\pm 12V$ $\pm 15V$	$\pm 300mA$ $\pm 125mA$ $\pm 100mA$

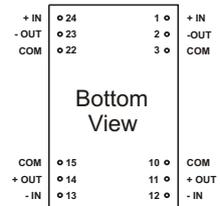
Other output voltages available.

### PIN CONNECTION:

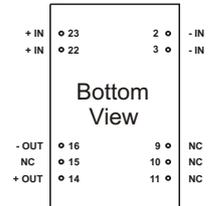
#### Single standard



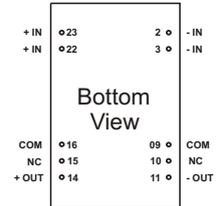
#### Dual standard



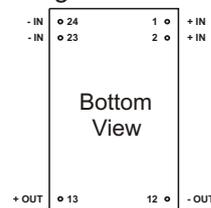
#### Single Part No. /0



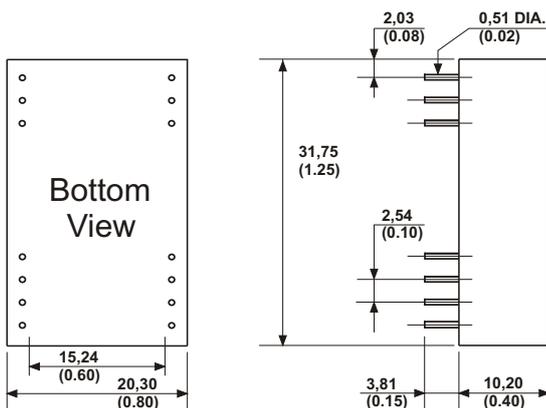
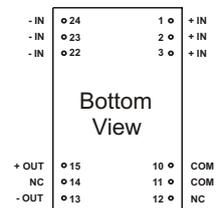
#### Dual Part No. /0



#### Single Part No. /8



#### Dual Part No. /1



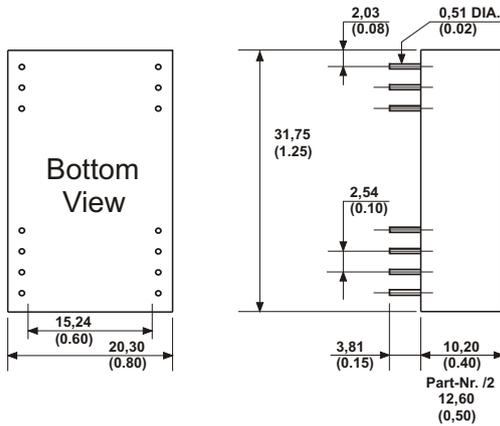
ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS  $\pm 0,25mm$   
 (INCHES  $\pm 0,01''$ )  
 All pins on a 2,54mm pitch. NP = No pin. NC = No connection

Stand: 06/05

Wide input range 1:3  
 Case style: DIP24

# INDUSTRIAL DC/DC Converters RCC / PWM - regulated LOW NOISE

**3 Watt  
 Series: CRW3**



### Electrical specifications:

Input voltage:	wide input 1:3
Output voltage accuracy:	+/- 3%
Line regulation:	+/- 0,2%
Load regulation:	+/- 1%
Efficiency:	min. 65%
Output Ripple & Noise:	typ. 50mVp-p
short circuit protection:	fully protected
Ambient temperature:	-40°C to +71°C
Operating temperature:	max. +105°C
Isolation voltage:	min. 1000V DC
Case material:	polycarbonate
Part-Nr. /4 Output Power 4Watt	
Part-Nr. /5 External -In & -OUT/COM connection allowed	
Part-Nr. /7 1500V DC min. isolation voltage	
Part-Nr. /2 3000V DC min. isolation voltage	

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part - No. Single	Input Voltage DC	Output Voltage DC	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
CRW3-1205	6V - 18V	5V	600mA	CRW3-1205D	6V - 18V	± 5V	±300mA
CRW3-1212		12V	250mA	CRW3-1212D		±12V	±125mA
CRW3-1215		15V	200mA	CRW3-1215D		±15V	±100mA
CRW3-2405	16V - 48V	5V	600mA	CRW3-2405D	16V - 48V	± 5V	±300mA
CRW3-2412		12V	250mA	CRW3-2412D		±12V	±125mA
CRW3-2415		15V	200mA	CRW3-2415D		±15V	±100mA
CRW3-4805	33V - 100V	5V	600mA	CRW3-4805D	33V - 100V	± 5V	±300mA
CRW3-4812		12V	250mA	CRW3-4812D		±12V	±125mA
CRW3-4815		15V	200mA	CRW3-4815D		±15V	±100mA

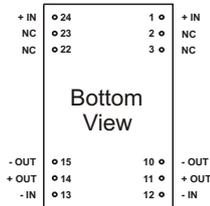
Other output voltages available.

- Main features:**
1. Very low input-current in zero load operations
  2. Very low R&N on both sides

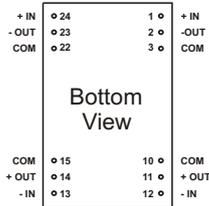
Output capacitor 220µF is a must

### PIN CONNECTION:

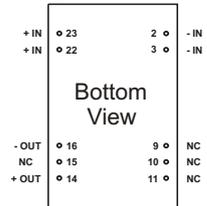
Single standard



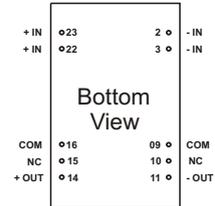
Dual standard



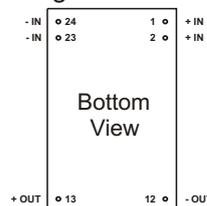
Single Part No. /0



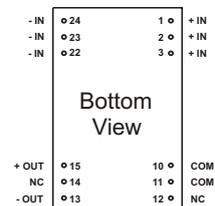
Dual Part No. /0



Single Part No. /8



Dual Part No. /1



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,25mm  
 (INCHES +/- 0,01")  
 All pins on a 2,54mm pitch. NP = No pin. NC = No connection

# INDUSTRIAL DC/DC Converters RCC / PWM - regulated LOW NOISE

3 Watt

Series: CRW4

Wide input range 1:4  
 Case style: DIP24

### Electrical specifications:

Input voltage: wide 1 : 4  
 Output voltage accuracy: +/- 3%  
 Line regulation: +/- 0,3%  
 Load regulation: +/- 1%  
 Efficiency: min. 65%  
 Output Ripple & Noise: typ. 50mVp-p / typ. 250mVp-p

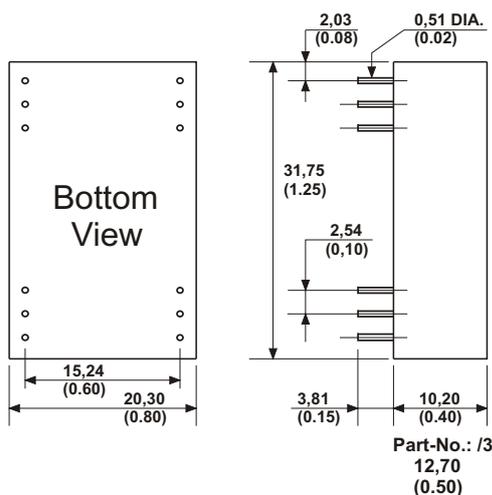
Short circuit protection: fully protected  
 Ambient temperature: -40°C to +71°C  
 Operating temperature: max. +105°C  
 Isolation voltage: min. 1000V DC  
 Part-No.: /3 min. 3000V AC rms  
 Case material: polycarbonate  
 Part-No. /5 External -IN & -OUT/COM connection allowed  
**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Single Model Nr.	Input Voltage DC	Output Voltage DC	Output Current	Dual Model Nr.	Input Voltage DC	Output Voltage DC	Output Current
CRW4-2405 CRW4-2412 CRW4-2415	10 - 40V	5V 12V 15V	600mA 250mA 200mA	CRW4-2415D	10 - 40V	+/-15V	+/-100mA

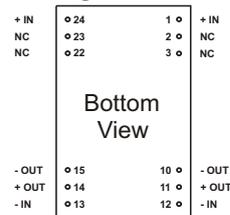
Other output voltages available.

Additional 22µF input capacitor recommended for Part-No.: /3

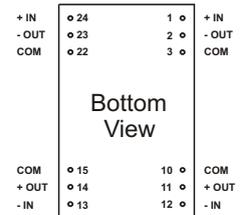
### PIN CONNECTION:



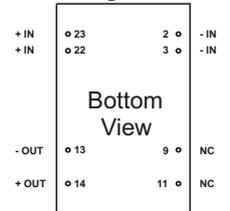
Single standard



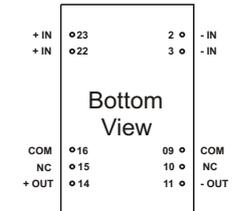
Dual standard



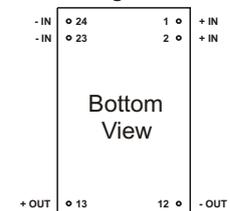
Single /0



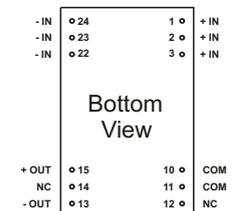
Dual Part No. /0



Single /8



Dual /1



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS xxxx +/- 0,25mm  
 (INCHES xxxx +/- 0,01")  
 All Pins on a 2,54mm pitch.  
 NP = No pin. NC = No connection

# INDUSTRIAL DC/DC Converters

Stand: 44/02

**3 Watt**  
**3,75 Watt**  
**4 Watt**

**Wide input range 1:2**  
**Case style: DIP24**

**PWM - regulated**

**Series: CFW2/CMW2**

**Electrical specifications:**

Input voltage: wide 1:2  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 0,2%  
 Load regulation: +/- 1%  
 Efficiency: min. 65%  
 Output Ripple & Noise: typ. 150mVp-p  
 short circuit protection: fully protected

Ambient temperature: -40°C to +71°C  
 Operating temperature: max. +105°C  
 Isolation voltage: min. 1000V DC  
 - optional 3kV AC rms Part-Nr. /3  
 Part-Nr. /6 3,75W Part-Nr. /2 4W  
 Case material: CFW2 - polycarbonat / CMW2 - metal  
 Part-No. /5 External -IN & -OUT / COM connection allowed  
 Part-No. /7 3kV DC isolation voltage @ P-No. /1 & /8

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

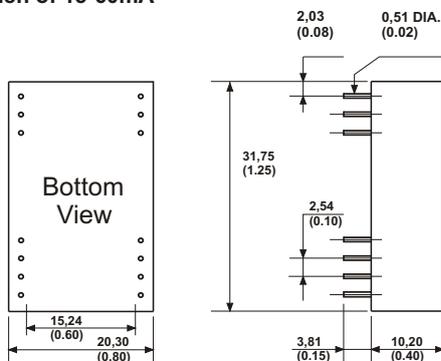
Part - No. Single	Input Voltage DC	Output Voltage DC	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
CFW2-1203	9-18V*	3V	1000mA	CFW2-1203D	9-18V*	+/- 3V	+/-500mA
CFW2-1205		5V	600mA	CFW2-1205D		+/- 5V	+/-300mA
CFW2-1212		12V	250mA	CFW2-1212D		+/-12V	+/-125mA
CFW2-1215		15V	200mA	CFW2-1215D		+/-15V	+/-100mA
CFW2-1218		18V	166mA	CFW2-1218D		+/-18V	+/- 83mA
CFW2-1224		24V	125mA	CFW2-1224D		+/-24V	+/- 62mA
CFW2-1228		28V	107mA	CFW2-1228D		+/-28V	+/- 54mA
CFW2-2403	16-36V	3V	1000mA	CFW2-2403D	16-36V	+/- 3V	+/-500mA
CFW2-2405		5V	600mA	CFW2-2405D		+/- 5V	+/-300mA
CFW2-2412		12V	250mA	CFW2-2412D		+/-12V	+/-125mA
CFW2-2415		15V	200mA	CFW2-2415D		+/-15V	+/-100mA
CFW2-2418		18V	166mA	CFW2-2418D		+/-18V	+/- 83mA
CFW2-2424		24V	125mA	CFW2-2424D		+/-24V	+/- 62mA
CFW2-2428		28V	107mA	CFW2-2428D		+/-28V	+/- 54mA
CFW2-4803	34-75V	3V	1000mA	CFW2-4803D	34-75V	+/- 3V	+/-500mA
CFW2-4805		5V	600mA	CFW2-4805D		+/- 5V	+/-300mA
CFW2-4812		12V	250mA	CFW2-4812D		+/-12V	+/-125mA
CFW2-4815		15V	200mA	CFW2-4815D		+/-15V	+/-100mA
CFW2-4818		18V	166mA	CFW2-4818D		+/-18V	+/- 83mA
CFW2-4824		24V	125mA	CFW2-4824D		+/-24V	+/- 62mA
CFW2-4828		28V	107mA	CFW2-4828D		+/-28V	+/- 54mA

\* Attention: Initial start-up requires U<sub>in</sub> min. 10V, then U<sub>in</sub> can drop down to min. 9V without leaving output tolerance.

We can produce any other requested output voltage!

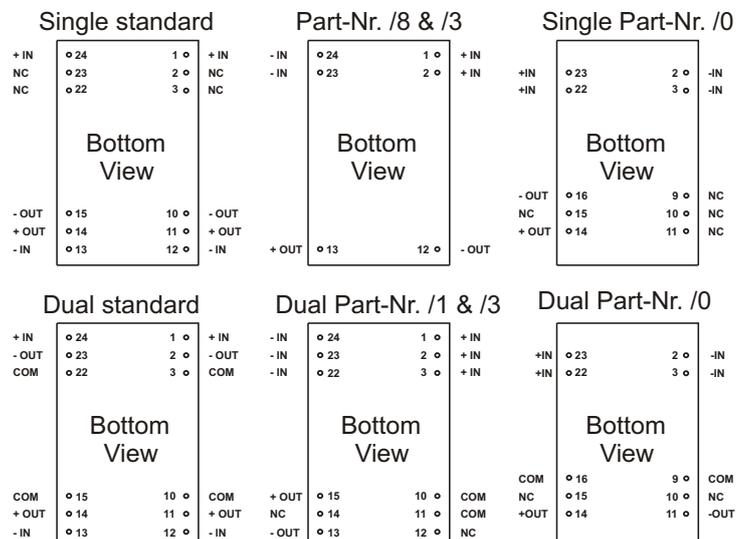
Example: 3,3V; 5,3V; 8V; 9V

All 3V and 5V output types require a permanent burden of 15-60mA



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,5mm  
 ((INCHES +/- 0,02"))  
 All pins on a 2,54mm pitch.

**PIN CONNECTION:**

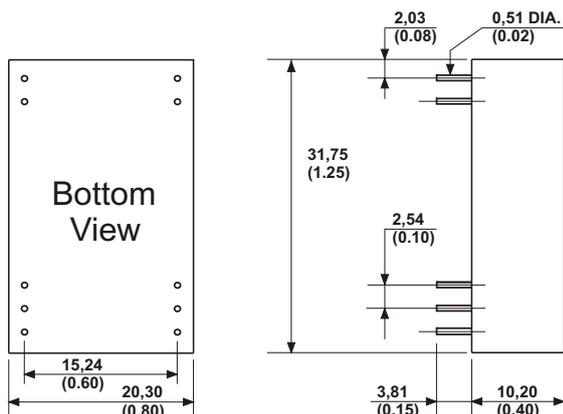


# INDUSTRIAL DC/DC Converters PWM - regulated Triple output

3 Watt Plus

Series: CFW2/  
 CMW2

Wide input range 1:2  
 Case style: DIP24



### Electrical specifications:

Input voltage:	wide 1:2
Output voltage accuracy:	+/- 2% U <sub>out</sub> = 1&2
Line regulation:	+/- 0,2%
Load regulation:	+/- 1%
Efficiency:	min. 65%
Output Ripple & Noise:	typ. 150mVp-p
short circuit protection:	fully protected
Ambient temperature:	-40°C to +71°C
Operating temperature:	max. +105°C
Isolation Voltage:	min. 1000V DC
Optional Part-Nr. /3	min. 3kV AC
Case material:	CFW2 - polycarbonate / CMW2 - metal

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

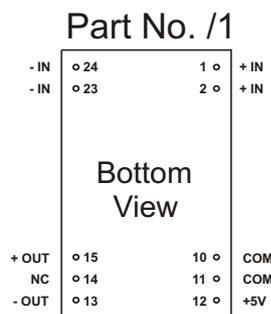
**1nF/1kV ceramic closest way from Pin 10 to 23 necessary to reduce spikes to input and output**

Part - No. Single Output	Input Voltage DC	Output Voltage DC 1 & 2	max. Output Current 1 & 2	Output Voltage DC 3	max. Output Current 3
CFW2-1205D05	9-18V	+/- 5V	+/-300mA	5V	200mA
CFW2-1212D05		+/-12V	+/-125mA	5V	200mA
CFW2-1215D05		+/-15V	+/-100mA	5V	200mA
CFW2-2405D05	16-36V	+/- 5V	+/-300mA	5V	200mA
CFW2-2412D05		+/-12V	+/-125mA	5V	200mA
CFW2-2415D05		+/-15V	+/-100mA	5V	200mA
CFW2-4805D05	36-72V	+/- 5V	+/-300mA	5V	200mA
CFW2-4812D05		+/-12V	+/-125mA	5V	200mA
CFW2-4815D05		+/-15V	+/-100mA	5V	200mA

**We can produce any other requested output voltage!**  
 Example: 3,3V; 5,3V; 8V; 9V

### PIN CONNECTION:

**ALL DIMENSIONS IN MM ( INCHES )**  
 MILLIMETERS +/- 0,25mm  
 (INCHES +/- 0,01")  
 All pins on a 2,54mm pitch. NP = No pin, NC = No connection



Stand: 07/03

# INDUSTRIAL DC/DC Converters PWM - regulated

**3 Watt Plus**  
**Series: CFW2/  
 CMW2**

Wide input range 1:2  
 Case style: DIP24

## Triple output: All outputs regulated

### Electrical specifications:

Input voltage: wide 1:2  
 Output voltage accuracy: +/- 2% for all outputs  
 Line regulation: +/- 0,2% for all outputs  
 Load regulation: +/- 1% for all outputs  
 Efficiency: min. 70%  
 Output Ripple & Noise: typ. 150mVp-p

Short circuit protection: fully protected  
 Ambient temperature: -40°C to +71°C  
 Operating temperature: max. +105°C  
 Isolation Voltage: min. 1000V DC  
 Optional Part-Nr. /3 min. 3kV AC  
 Case material: CFW2 - polycarbonate / CMW2 - metal

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part - No.	Input Voltage DC	Output Voltage DC 1 & 2	max. Output Current 1 & 2	Output Voltage DC 3	max. Output Current 3
CFW2-1205D05	9-18V	+/- 5V	+/-300mA	5V	200mA
CFW2-1212D05		+/-12V	+/-125mA	5V	200mA
CFW2-1215D05		+/-15V	+/-100mA	5V	200mA
CFW2-2405D05	16-36V	+/- 5V	+/-300mA	5V	200mA
CFW2-2412D05		+/-12V	+/-125mA	5V	200mA
CFW2-2415D05		+/-15V	+/-100mA	5V	200mA

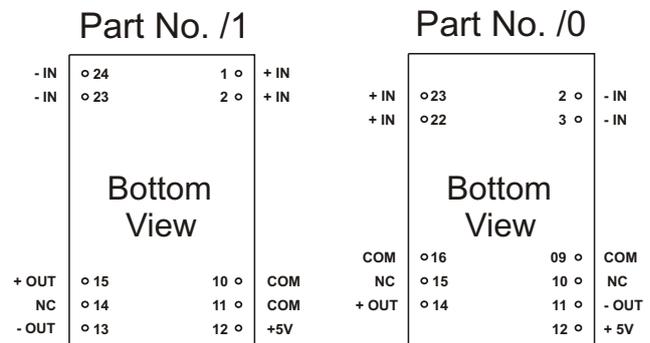
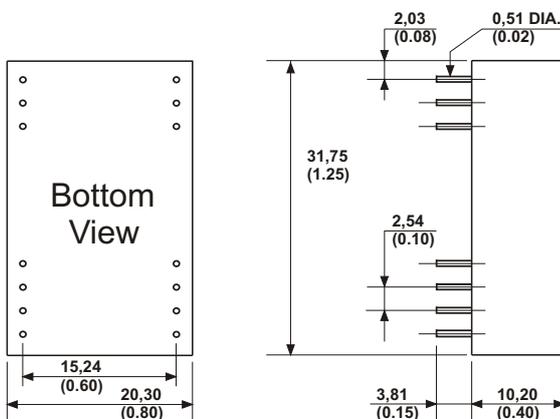
### Any other output voltages available

Max. capacitive load 4,7µF at ± 15V output

We can produce any other requested output voltage!  
 Example: 3,3V; 5,3V; 8V; 9V

Additional 220µF capacitor recommended for 5V output

### PIN CONNECTION:



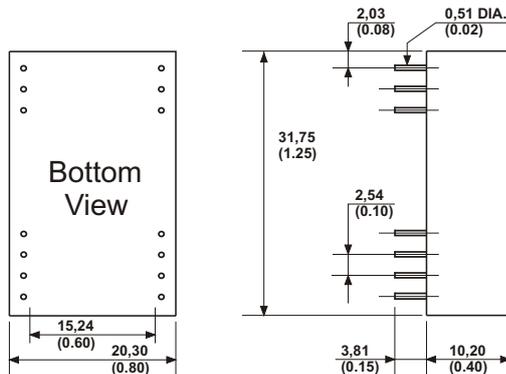
ALL DIMENSIONS IN MM ( INCHES )  
 MILLIMETERS +/- 0,25mm  
 (INCHES +/- 0,01")  
 All pins on a 2,54mm pitch. NP = No pin, NC = No connection

# INDUSTRIAL DC/DC Converters PWM - regulated

Stand: 44/02

**3 Watt**  
**Series: CFW3**  
**CMW3**

Wide input range 1:3  
 Case style: DIP24



### Electrical Specifications:

Input voltage:	wide 1:3
Output voltage accuracy:	+/- 2%
Line regulation:	+/- 0,2%
Load regulation:	+/- 1%
Efficiency:	min. 65%
Output Ripple & Noise:	typ. 150mVp-p
short circuit protection:	fully protected
Ambient temperature:	-40°C to +71°C
Operating temperature:	max. +105°C
Isolation voltage:	min. 1000V DC
- optional 3kV AC rms Part-Nr. /3	
Part-No. /5 External -IN & -OUT / COM connection allowed	
Case material: CFW3- polycarbonate/ CMW3- metal	

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

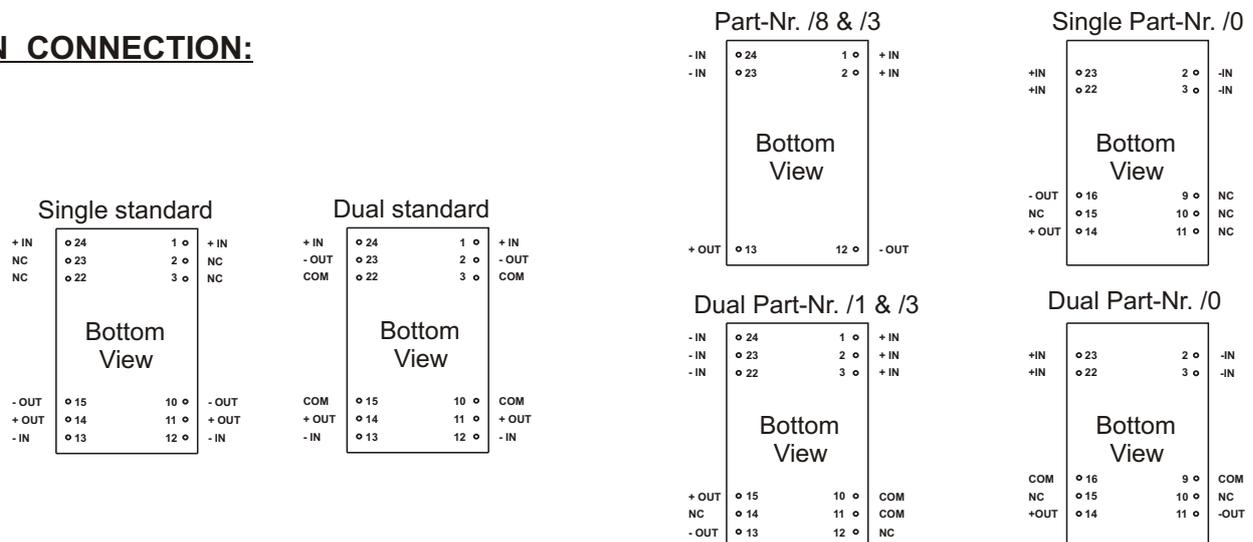
ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,5mm  
 (INCHES +/- 0,02")  
 All pins on a 2,54mm pitch.

All 3V and 5V output types require a permanent burden of 15-60mA

Part - No. Single	Input Voltage DC	Output Voltage DC	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
CFW3-2403	20-60V	3V	1000mA	CFW3-2403D	20-60V	+/- 3V	+/-500mA
CFW3-2405		5V	600mA	CFW3-2405D		+/- 5V	+/-300mA
CFW3-2412		12V	250mA	CFW3-2412D		+/-12V	+/-125mA
CFW3-2415		15V	200mA	CFW3-2415D		+/-15V	+/-100mA
CFW3-2418		18V	166mA	CFW3-2418D		+/-18V	+/- 83mA
CFW3-2420		20V	150mA	CFW3-2420D		+/-20V	+/- 75mA
CFW3-2424		24V	125mA	CFW3-2424D		+/-24V	+/- 62mA
CFW3-2428		28V	107mA	CFW3-2428D		+/-28V	+/- 54mA

Any other output voltages available.

### PIN CONNECTION:



Stand: 44/02

# INDUSTRIAL DC/DC Converters

3 Watt - 4 Watt

Wide input range 1:4  
 Case style: DIP24

PWM - regulated

Series: CFW4/  
 CMW4

### Electrical specifications:

Input voltage: wide 1:4  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 0,2%  
 Load regulation: +/- 1%  
 Efficiency: min. 65%  
 Output Ripple & Noise: typ. 150mVp-p  
 short circuit protection: fully protected

Ambient temperature: -40°C to +71°C  
 Operating temperature: max. +105°C  
 Isolation voltage: min. 1000V DC  
 Part-Nr. /3 3kV AC rms:  
 Part-Nr. /6 3,75W  
 Part-Nr. /2 4W  
 Part-Nr. /5 External -IN & -OUT / COM connection allowed  
 Case material: CFW4- polycarbonate / CMW4- metal

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part - No. Single	Input Voltage DC	Output Voltage DC	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
CFW4-2403	10-40V	3V	1000mA	CFW4-2403D	10-40V	+/- 3V	+/-500mA
CFW4-2405		5V	600mA	CFW4-2405D		+/- 5V	+/-300mA
CFW4-2412		12V	250mA	CFW4-2412D		+/-12V	+/-125mA
CFW4-2415		15V	200mA	CFW4-2415D		+/-15V	+/-100mA
CFW4-2418		18V	166mA	CFW4-2418D		+/-18V	+/- 83mA
CFW4-2420		20V	150mA	CFW4-2420D		+/-20V	+/- 75mA
CFW4-2424		24V	125mA	CFW4-2424D		+/-24V	+/- 62mA
CFW4-2428		28V	107mA	CFW4-2428D		+/-28V	+/- 54mA
CFW4-4803	20-80V	3V	1000mA	CFW4-4803D	20-80V	+/- 3V	+/-500mA
CFW4-4805		5V	600mA	CFW4-4805D		+/- 5V	+/-300mA
CFW4-4812		12V	250mA	CFW4-4812D		+/-12V	+/-125mA
CFW4-4815		15V	200mA	CFW4-4815D		+/-15V	+/-100mA
CFW4-4818		18V	166mA	CFW4-4818D		+/-18V	+/- 83mA
CFW4-4820		20V	150mA	CFW4-4820D		+/-20V	+/- 75mA
CFW4-4824		24V	125mA	CFW4-4824D		+/-24V	+/- 62mA
CFW4-4828		28V	107mA	CFW4-4828D		+/-28V	+/- 54mA

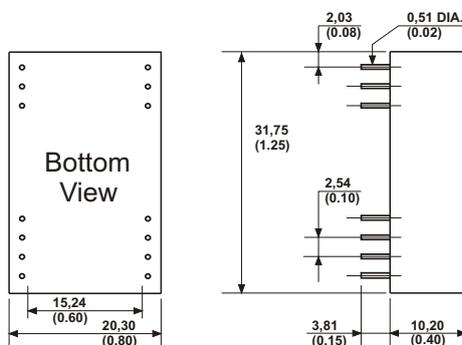
\* Attention: Initial start-up requires U<sub>in</sub> min. 10V, then U<sub>in</sub> can drop down to min. 9V without leaving output tolerance.

We can produce any other requested output voltage!

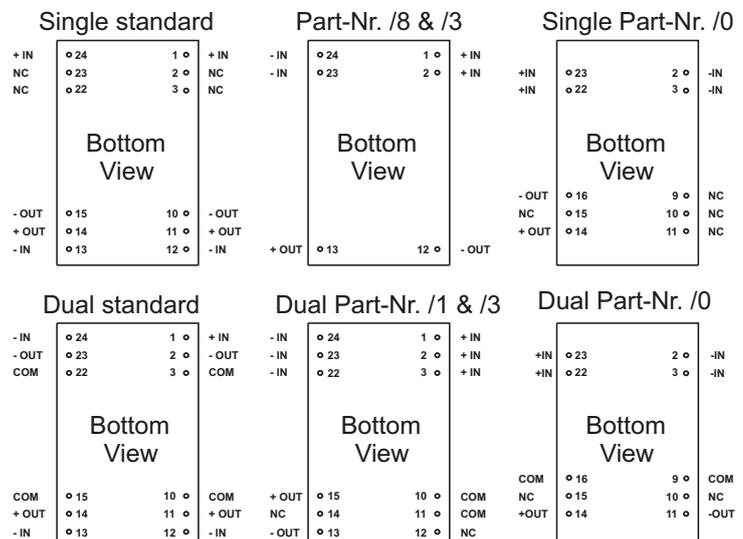
Example: 3,3V; 5,3V; 8V; 9V

All 3V and 5V output types require a permanent burden of 15-60mA

### PIN CONNECTION:



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,5mm  
 (INCHES +/- 0,02")  
 All pins on a 2,54mm pitch.



## INDUSTRIAL

3 Watt Plus

Wide input range 1:4  
 Case style: DIP24

**DC/DC Converters**  
 PWM - regulated

Series: CFW4/  
 CMW4

**Triple output: All outputs regulated**

### Electrical specifications:

Input voltage: wide 1:4  
 Output voltage accuracy: +/- 2% for all outputs  
 Line regulation: +/- 0,2% for all outputs  
 Load regulation: +/- 1% for all outputs  
 Efficiency: min. 70%  
 Output Ripple & Noise: typ. 150mVp-p

Short circuit protection: fully protected  
 Ambient temperature: -40°C to +71°C  
 Operating temperature: max. +105°C  
 Isolation Voltage: min. 1000V DC  
 Case material: CFW4 - polycarbonate / CMW4 - metal

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

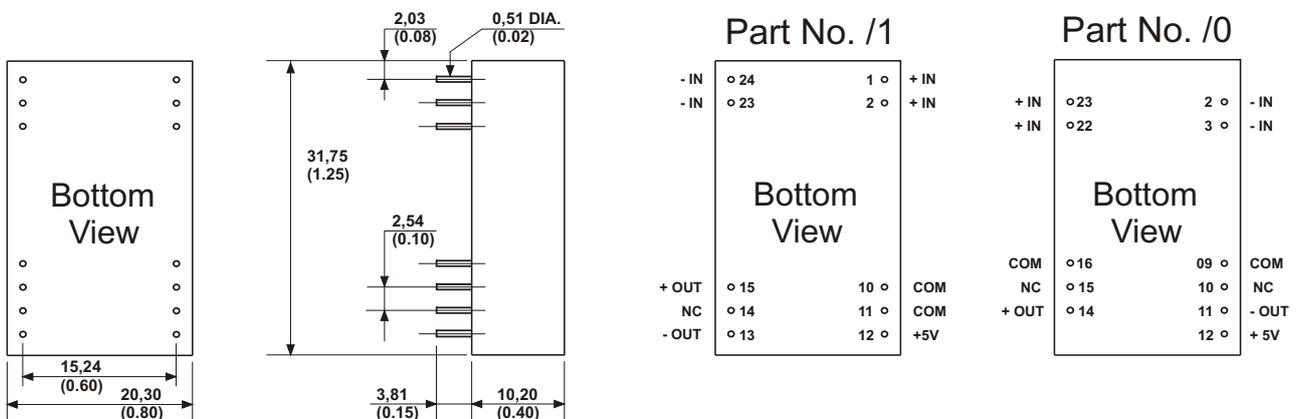
Part - No.	Input Voltage DC	Output Voltage DC 1 & 2	max. Output Current 1 & 2	Output Voltage DC 3	max. Output Current 3
CFW4-2405D05	10-36V	+/- 5V	+/-300mA	5V	100mA
CFW4-2412D05		+/-12V	+/-125mA	5V	100mA
CFW4-2415D05		+/-15V	+/-100mA	5V	100mA

### Any other output voltages available

We can produce any other requested output voltage!  
 Example: 3,3V; 5,3V; 8V; 9V

Additional 220µF capacitor recommended for 5V output  
 Max. capacitive load 4,7µF at ± 15V output

### PIN CONNECTION:



ALL DIMENSIONS IN MM ( INCHES )  
 MILLIMETERS +/- 0,25mm  
 (INCHES +/- 0,01")  
 All pins on a 2,54mm pitch. NP = No pin, NC = No connection

Stand: 30/04

# INDUSTRIAL DC/DC Converters

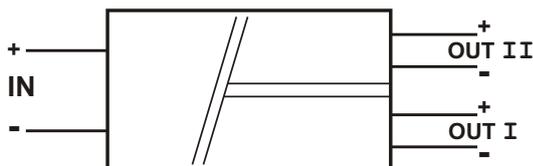
3 Watt

Series: CFGW2/  
 CMGW2

Wide input range 1:2  
 Case style: DIP24

Main Output PWM - regulated  
 & isolated against 2 nd Output

### Isolated-Dual-Output



min. Load at Main  $\geq 110\text{mA}$   
 to supply 2nd Output well

### Electrical specifications:

Input voltage:	wide 1:2
Output voltage accuracy:	+/- 2%
Line regulation:	+/- 0,2%
Load regulation:	+/- 1%
Efficiency:	min. 70%
Output Ripple:	< 50mVp-p
short circuit protection:	fully protected
Ambient temperature:	-40°C to +71°C
Operating temperature:	max. +105°C
Isolation voltage: I / O	min. 1000V DC
O / O	min. 1000V DC
Case material:	CFGW2 - polycarbonat / CMGW2 - metal
Part-No. /5	External -IN & -OUT / COM connection allowed

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part - No. Dual	Input Voltage DC	Output I		Output II	
		Voltage DC	Current	Voltage DC	Current
CFGW2-120505	9-18V*	5V	300mA	5V	300mA
CFGW2-120512			300mA	12V	125mA
CFGW2-120515			300mA	15V	100mA
CFGW2-240505	16-36V	5V	300mA	5V	300mA
CFGW2-240512			300mA	12V	125mA
CFGW2-240515			300mA	15V	100mA
CFGW2-480505	34-75V	5V	300mA	5V	300mA
CFGW2-480512			300mA	12V	125mA
CFGW2-480515			300mA	15V	100mA

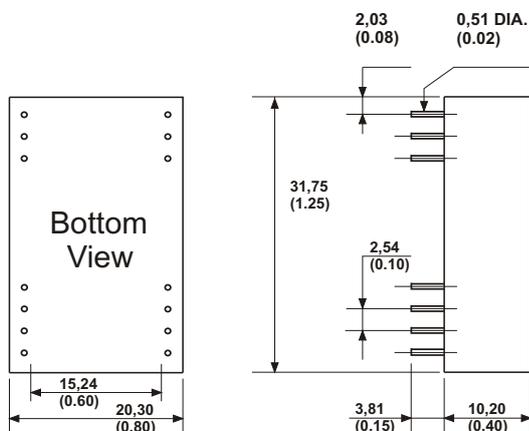
\* Attention: Initial start-up requires  $U_{in}$  min. 10V, then  $U_{in}$  can drop down to min. 9V without leaving output tolerance.

We can produce any other requested output voltage!

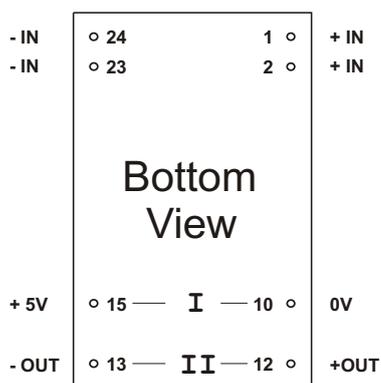
Example: 3,3V; 8V; 15V; 18V etc.

### output capacitor max.

5V = 47 $\mu$ F ; 5V = 10 $\mu$ F/16V Tantal  
 12V = 10 $\mu$ F/35V Tantal  
 15V = 10 $\mu$ F/35V Tantal



### PIN CONNECTION:



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,5mm  
 ((INCHES +/- 0,02"))  
 All pins on a 2,54mm pitch.

Stand: 30/04

## INDUSTRIAL

## DC/DC Converters

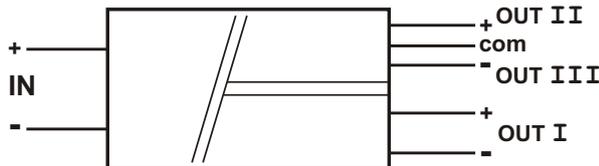
**3 Watt Plus**

**Series: CFGW2/  
CMGW2**

Wide input range 1:2  
Case style: DIP24

Main Output PWM - regulated  
& isolated against Dual outputs

### Isolated-Triple-Output



min. Load at Main  $\geq 110\text{mA}$   
to supply 2nd & 3rd Output well

### Electrical specifications:

Input voltage:	wide 1:2
Output voltage accuracy:	+/- 2%
Line regulation:	+/- 0,2%
Load regulation:	+/- 1%
Efficiency:	min. 70%
Output Ripple:	< 50mVp-p
short circuit protection:	fully protected
Ambient temperature:	-40°C to +71°C
Operating temperature:	max. +105°C
Isolation voltage: I / O	min. 1000V DC
O / O	min. 1000V DC
Case material:	CFGW2 - polycarbonat / CMGW2 - metal
Part-No. /5 External -IN & -OUT / COM connection allowed	

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

### Main Output

Part - No. Triple	Input Voltage DC	Output I		Output II & III	
		Voltage DC	Current	Voltage DC	Current
CFGW2-120505D	9-18V*	5V	300mA	+/- 5V	+/-150mA
CFGW2-120512D		5V	300mA	+/-12V	+/- 62mA
CFGW2-120515D		5V	300mA	+/-15V	+/- 50mA
CFGW2-240505D	16-36V	5V	300mA	+/- 5V	+/-150mA
CFGW2-240512D		5V	300mA	+/-12V	+/- 62mA
CFGW2-240515D		5V	300mA	+/-15V	+/- 50mA
CFGW2-480505D	34-75V	5V	300mA	+/- 5V	+/-150mA
CFGW2-480512D		5V	300mA	+/-12V	+/- 62mA
CFGW2-480515D		5V	300mA	+/-15V	+/- 50mA

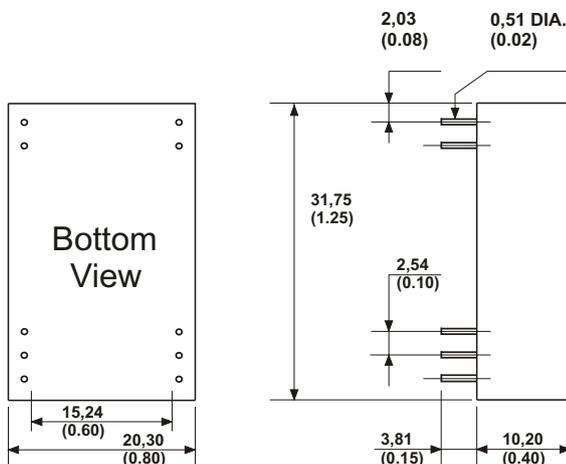
\* Attention: Initial start-up requires U<sub>in</sub> min. 10V, then U<sub>in</sub> can drop down to min. 9V without leaving output tolerance.

We can produce any other requested output voltage!

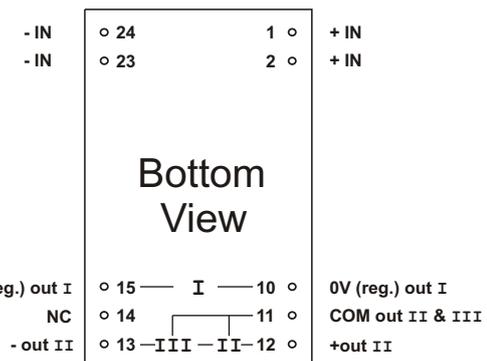
Example: 3,3V; 8V; 15V; 18V etc.

### output capacitor max.

5V = 47µF ; ± 5V = je 10µF/16V Tantal  
± 12V = je 10µF/35V Tantal  
± 15V = je 10µF/35V Tantal



### PIN CONNECTION:



ALL DIMENSIONS IN MM (INCHES)  
MILLIMETERS +/- 0,5mm  
(INCHES +/- 0,02")  
All pins on a 2,54mm pitch.

We can offer EMC - Filter according to EN55011/22 Class B.

Regulated  
 Case Style: SIP 12

## INDUSTRIAL DC/DC Converters

6 Watt  
 Series: FPID

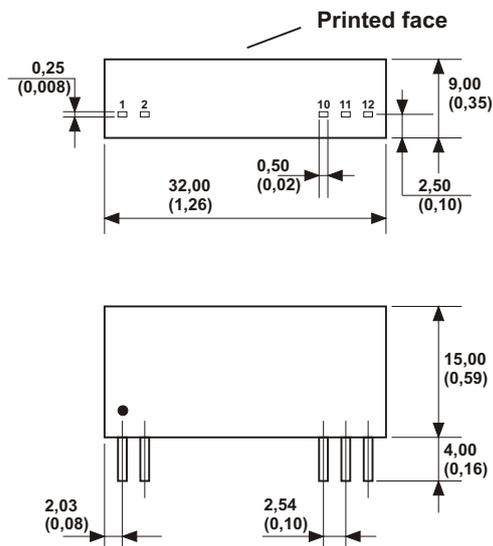
### Electrical specifications:

Input voltage:	wide
Output voltage accuracy:	+/- 2%
Regulation :	+/- 2%
Ripple with additional capacity 220µF:	40mVp-p
Operating temperature:	-40°C to +85°C
Storage temperature:	-40°C to +105°C
Temperature coefficient:	+/-0,02% / °C
Isolation voltage:	none
Efficiency:	85%

CAUTION: NO INPUT POLARITY CHANGE ALLOWED!

Part No.: Single	Input voltage DC	Output voltage DC	Output current mA
FPID/U 5	9 - 32V	5V	500
FPID/U 12	18 - 32V	12V	500
FPID/U 15	21 - 32V	15V	400

Any other in & output voltages available.



PIN CONNECTION	
PIN	Single
1	+ IN
2	- IN
10	GND
11	NC
12	+ Vout

ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,50mm  
 (INCHES +/- 0,02")  
 All pins on a 2,54mm pitch  
 Note: NC = No connection;  
 Dot denote pin 1

**Input capacitor 220µF min. &  
 output capacitor 470µF min. Necessary**

## INDUSTRIAL DC/DC Converters

Stand: 07/04

**7 Watt**

**Series:  
 CSXX-40/YY  
 CSXX-60/YY**

**7 Watt output power in DIP24 package**

### Electrical specifications:

Ambient temperature: -40°C to +71°C  
 Operating temperature: max. +105°C  
 Input voltage: wide input range  
 Output voltage accuracy: +/- 3%  
 Output Ripple & Noise: typ. 200mVp-p

Short circuit protection: limited, 1 minute  
 Overload protection & thermal shut down  
 Isolation: none  
 Case material: black polycarbonate  
 Optional: Part-Nr. /3 metal

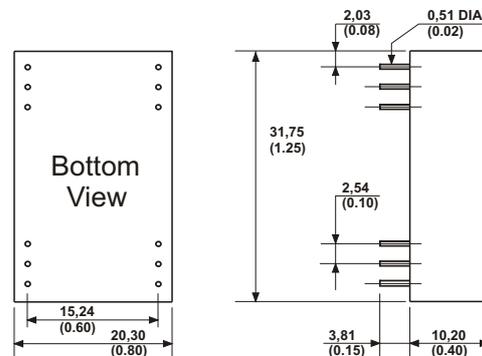
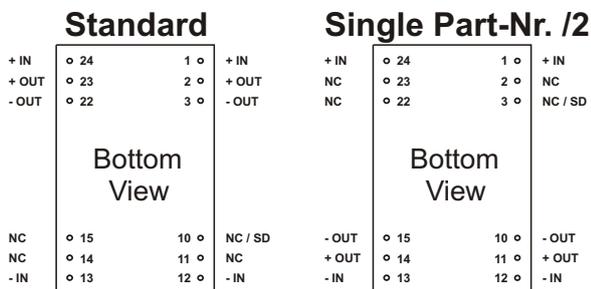
**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part-No. Single	Input Voltage DC	Input Current	Output Voltage DC	Output Current	Eff. %	
CS10-40/01,8	10 - 40V	6mA	1,8V	2800mA	72	
CS10-40/02,5		6mA	2,5V	2800mA	72	
CS10-40/03,3		6mA	3,3V	2121mA	73	
CS10-40/05		6mA	5V	1400mA	76	
CS10-40/05,2		6mA	5,2V	1346mA	77	
CS10-60/01,8		10 - 60V	6mA	1,8V	2800mA	72
CS10-60/02,5			6mA	2,5V	2800mA	72
CS10-60/03,3			6mA	3,3V	2121mA	73
CS10-60/05			6mA	5V	1400mA	76
CS10-60/05,2			6mA	5,2V	1346mA	77
Initial start-up at 8V						
CS10-40/08	10 - 40V	6mA	8V	875mA	84	
CS10-60/08	10 - 60V	6mA	8V	875mA	84	
CS12-40/12	14 - 40V	6mA	12V	580mA	83	
CS12-60/12	14 - 60V	6mA	12V	580mA	83	
CS15-40/15	17 - 40V	6mA	15V	465mA	83	
CS15-60/15	17 - 60V	6mA	15V	465mA	83	
CS24-40/24	26 - 40V	6mA	24V	290mA	83	
CS24-60/24	26 - 60V	6mA	24V	290mA	83	

### Any other requested Uout available.

Input current measured at no load over full input voltage range

**Input capacitor 220µF min. & output capacitor 470µF min. necessary**



Part-Nr. /0 with shut down pin  
 SD = Shut down  
 \*\*\* Shut down voltage 2V - 5,25V (1,4mA at 5V)\*\*\*

ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,25mm  
 (INCHES +/- 0,01")  
 All pins on a 2,54mm pitch  
 NP = No Pin; NC = No Connection

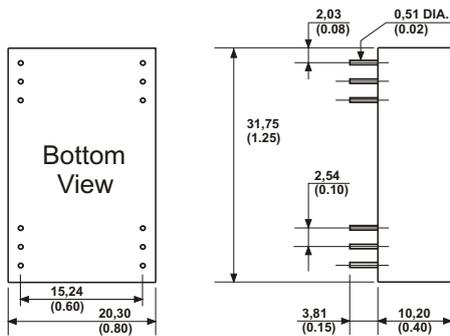
# INDUSTRIAL DC/DC Converters

Stand: 10/02

10 Watt

Series:  
 CSBXX-40/YY  
 CSBXX-60/YY

10 Watt output power in DIP24 package



### Electrical specifications:

Ambient temperature:	-40°C to +71°C
Operating temperature:	max. +105°C
Input voltage:	wide input range
Output voltage accuracy:	+/- 3%
Output Ripple & Noise:	typ. 200mVp-p
Short circuit protection:	limited, 1 minute
Overload protection & thermal shut down:	
Isolation:	none
Case material:	black polycarbonate
Optional:	Part-Nr. /3 metal

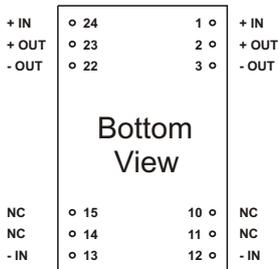
**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part-No. Single	Input Voltage DC	Output Voltage DC	Output Current	Eff. %
CSB10-40/05 CSB10-60/05 Initial start-up at 8V	10 - 40V 10 - 60V	5V 5V	1600mA 1600mA	73 73
CSB12-40/12 CSB12-60/12	14 - 40V 14 - 60V	12V 12V	830mA 830mA	75 75
CSB15-40/15 CSB15-60/15	17 - 40V 17 - 60V	15V 15V	670mA 670mA	78 78
CSB24-40/24 CSB24-60/24	26 - 40V 26 - 60V	24V 24V	420mA 420mA	80 80

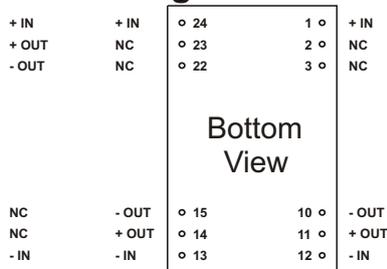
Any other requested Uout available.

Input capacitor 220µF min. &  
 output capacitor 470µF min. necessary

### Standard



### Single Part-Nr. /2



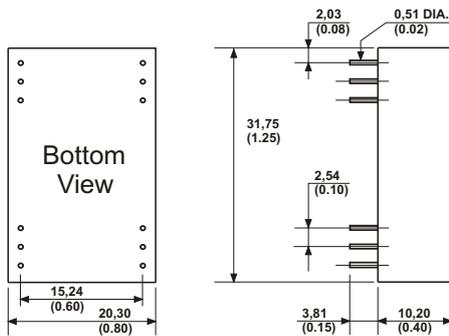
ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,25mm  
 (INCHES +/- 0,01")

All pins on a 2,54mm pitch  
 NP = No Pin; NC = No Connection

# INDUSTRIAL DC/DC Converters

Stand: 10/02  
**7 Watt**  
 Series: CSU-xyyy

## 7 Watt output power in DIP24 package



### Electrical specifications:

Ambient temperature:	-40°C to +71°C
Operating temperature:	max. +105°C
Input voltage:	wide input range
Output voltage:	+/- 3%
Output Ripple & Noise:	typ. 200mVp-p
Line regulation:	+/- 1%
Load regulation:	+/- 1%
Short circuit protection:	1 second
Isolation voltage:	none
Efficiency:	min. 70%
Case material:	black polycarbonate
Optional:	Part-Nr. /3 metal

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part-No. Single	Input Voltage DC	Output Voltage DC	Output Current	Eff. %
CSU-0512	4,5 - 11,5V	12V	580mA	70
CSU-0515		15V	470mA	70
CSU-0524		24V	290mA	70
CSU-1215	9,5 - 14,5V	15V	470mA	70
CSU-1224		24V	290mA	70

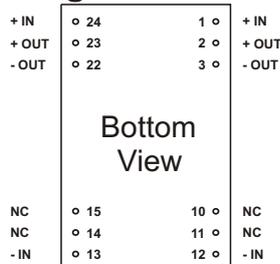
**Any other requested Uout available.**

ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,25mm  
 (INCHES +/- 0,01")

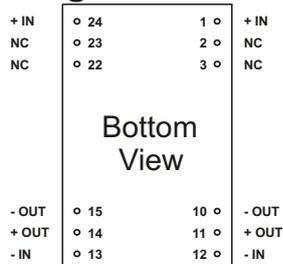
All pins on a 2,54mm pitch  
 NP = No Pin; NC = No Connection

Input capacitor & output capacitor  
 220µF min. necessary

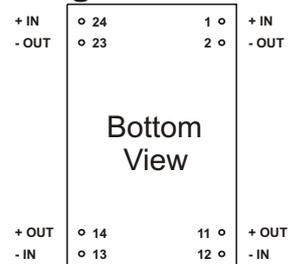
### Single Standard



### Single Part-Nr. /1



### Single Part-Nr. /2



## INDUSTRIAL DC/DC Converters

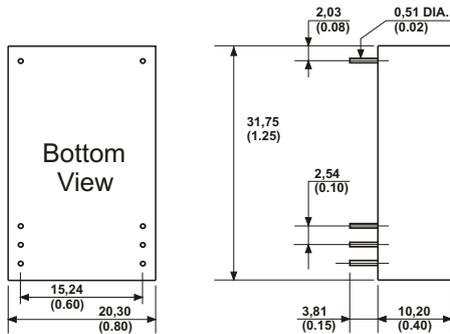
Stand: 24/01

3 Watt

5 Watt

Series: CPN

3 Watt / 5 Watt output power in DIP24 package



### Electrical specifications:

Ambient temperature:	-40°C to +71°C
Operating temperature:	max. +105°C
Input voltage:	wide input range
Output voltage accuracy:	+/- 5%
Output Ripple & Noise:	<200mVp-p with output capacitor
Line regulation:	+/- 1%
Load regulation:	+/- 1%
Short circuit protection:	1 second
Isolation voltage:	none
Case material:	black polycarbonate
Optional: /M	metal

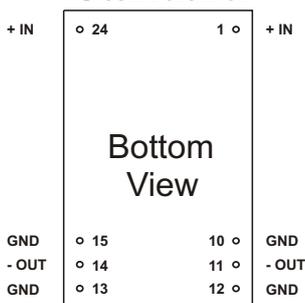
**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part-No. Single	Input Voltage DC	Output Voltage DC	Output Current	Eff. %
CPN-07/-40	7 - 10	- 40	- 130mA	min. 60
CPN-05/-40	4,75 - 10	- 40	- 75mA	min. 50

Any other requested Uout available.

**Input capacitor is necessary**  
 min. values of capacity: 220µF  
**Output capacitor is necessary**  
 min. values of capacity: 470µF

### Standard



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,25mm  
 (INCHES +/- 0,01")

All pins on a 2,54mm pitch

RCC Mode converter  
 Case style: 2" x 1"

## INDUSTRIAL DC/DC Converters

6 Watt  
 Series: ERW2

### Electrical specifications:

Ambient temperature: -40°C to +71°C no derating  
 Operating temperature: max. +115°C  
 Input voltage: 4,5 - 6V  
 Output voltage accuracy: +/- 3%  
 Line regulation: +/- 0,2%  
 Load regulation: +/- 1%  
 Efficiency: min. 60%  
 short circuit protection: fully protected  
 Output Ripple / Noise: typ. 50mV / 150mVp-p

Isolation voltage: min. 1000V DC  
 Part-Nr. /3: min. 3kV AC rms  
 with 3,3V Output voltage/ output wattage  
 reduced to 4 Watt

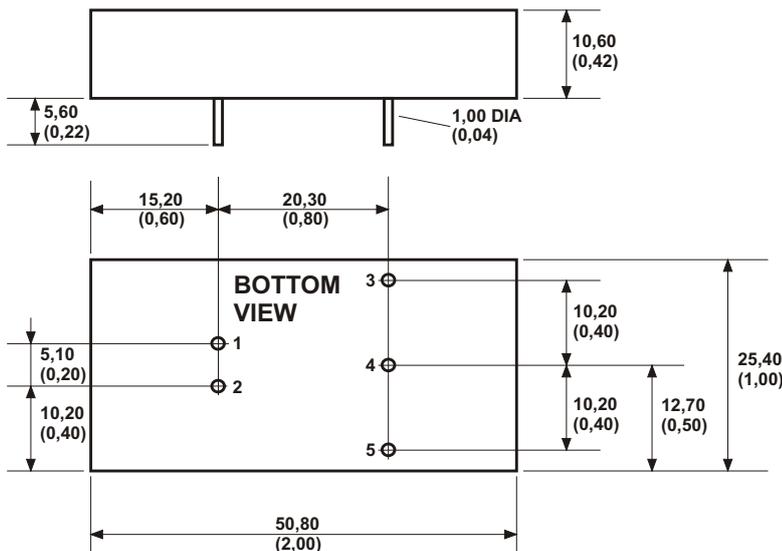
Five sided metal shield  
 Input frequency varies along with input voltage  
 and load between 200kHz - 550kHz  
 Part-No. /5 External -IN & -OUT / COM connection allowed

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

**A MUST: 2000µF Output capacitor (2x1000µF or 4x470µF) for 3,3V and 5V Output**

Part - No. Single	Input Voltage	Output Voltage	Output Current	Part - No. Dual	Input Voltage	Output Voltage	Output Current
ERW2-0503,3	5V DC (4,5-6V)	3,3V	1818mA	ERW2-0505D	5V DC (4,5-6V)	± 5V	±600mA
ERW2-0505		5V	1200mA	ERW2-0512D		±12V	±250mA
ERW2-0512		12V	500mA	ERW2-0515D		±15V	±200mA
ERW2-0515		15V	400mA				

**Other output voltages available.**



PIN	PIN CONNECTION:	
	Single	Dual
1	+ Input	+ Input
2	- Input	- Input
3	+ Output	+ Output
4	NP	Common
5	- Output	- Output

**ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,5mm  
 (INCHES +/- 0,02")**

## INDUSTRIAL DC/DC Converters

6 Watt  
 Series: ERW2

RCC Mode converter  
 Case style: 2" x 1"

### Electrical specifications:

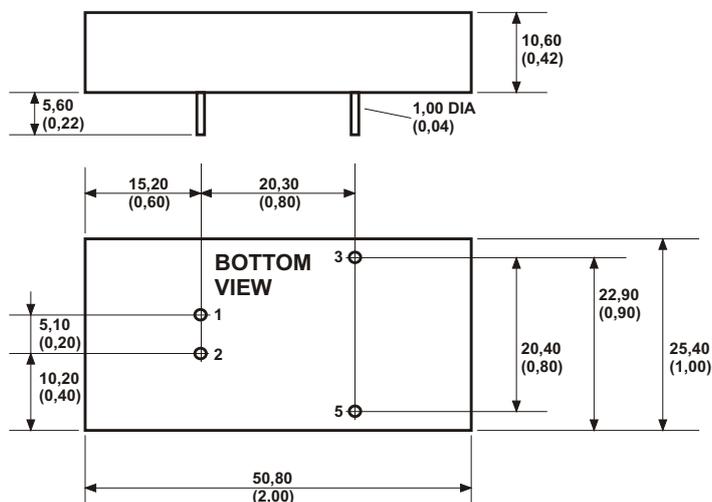
Ambient temperature: -40°C to +71°C no derating  
 Operating temperature: max. +115°C  
 Input voltage: wide 1:2  
 Output voltage accuracy: +/- 3%  
 Line regulation: +/- 0,5%  
 Load regulation: +/-1%  
 Efficiency: min. 60%

short circuit protection: fully protected  
 Output Ripple / Noise: typ. 50mV / 250mVp-p  
 Isolation voltage: min. 3kV AC rms  
 Double Section Transformer  
 Input frequency varies along with input voltage  
 and load between 200kHz - 700kHz  
 Case material: polycarbonate  
**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Input capacitor 4,7µF/100V & output capacitor 220µF/35V **is a must**

Part - No. Single	Input Voltage	Output Voltage	Output Current
ERW2-6024/E	40-80V	24V	250mA

**Any other in & output voltages available.**



PIN	PIN CONNECTION:	
	Single	
1	+ Input	
2	- Input	
3	+ Output	
5	- Output	

ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,5mm  
 (INCHES +/- 0,02")

## INDUSTRIAL

6 Watt

Flyback style converter  
 Wide input range 1:2  
 Case style: 2" x 1"

## DC/DC Converters

Series: ELIW2

PWM - regulated

### Electrical specifications:

Input voltage: wide 1:2  
 Output voltage accuracy: +/- 3%  
 Line regulation: +/- 0,2%  
 Load regulation: +/-1%  
 Efficiency: min. 65%  
 short circuit protection: fully protected  
 Ambient temperature: -40°C to +71°C no derating  
 Operating temperature: max. +105°C

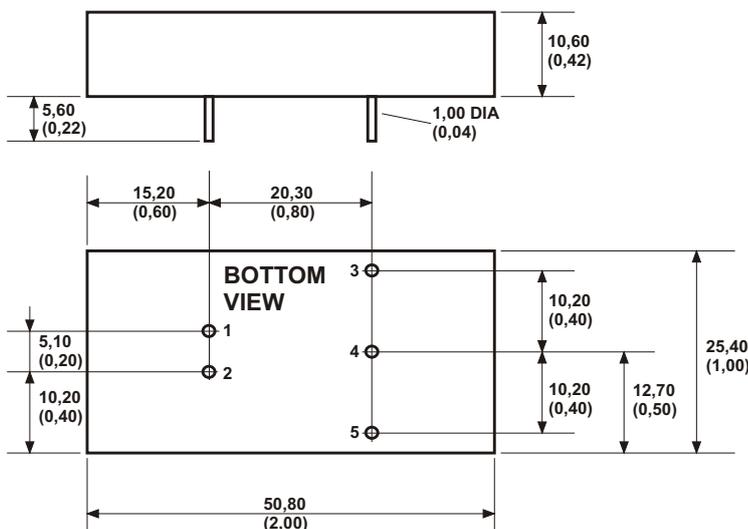
Output Ripple & Noise: typ. 150mVp-p \*\*  
 \*\* With additional electrolytic capacitor 100µF 105°C Output R&N 50mV typ.

Isolation voltage: min. 1000V DC  
 Five sided metal shield  
 Part-No. /5 External -IN & -OUT / COM connection allowed  
 Part-No. /7 = 1,5kV ACmin. black polycarbonate case  
 Part-No. /3 = 3kV AC rms min. acc. to EN 60 950 black polycarbonate case  
 Part-No. /2 = Ambient temperature optional: -55°C to +85°C

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part - No. Single	Input Voltage	Output Voltage	Output Current	Part - No. Dual	Input Voltage	Output Voltage	Output Current
ELIW2-1205	12V DC	5V	1200mA	ELIW2-1205D	12V DC	± 5V	±600mA
ELIW2-1212	(9-18V)	12V	500mA	ELIW2-1212D	(9-18V)	±12V	±250mA
ELIW2-1215		15V	400mA	ELIW2-1215D		±15V	±200mA
ELIW2-2405	24V DC	5V	1200mA	ELIW2-2405D	24V DC	± 5V	±600mA
ELIW2-2412	(16-36V)	12V	500mA	ELIW2-2412D	(16-36V)	±12V	±250mA
ELIW2-2415		15V	400mA	ELIW2-2415D		±15V	±200mA
ELIW2-4805	48V DC	5V	1200mA	ELIW2-4805D	48V DC	± 5V	±600mA
ELIW2-4812	(36-72V)	12V	500mA	ELIW2-4812D	(36-72V)	±12V	±250mA
ELIW2-4815		15V	400mA	ELIW2-4815D		±15V	±200mA

**Any other output voltages available.**



PIN	PIN CONNECTION:	
	Single	Dual
1	+ Input	+ Input
2	- Input	- Input
3	+ Output	+ Output
4	NP	Common
5	- Output	- Output

ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/-0,5mm  
 (INCHES +/- 0,02")

# INDUSTRIAL

## Single ended forward

### DC/DC Converters

Stand: 01/03

**6 Watt**  
**Series: EIW2**

**NO ELCO CAPACITOR INSIDE, LONG-LIFE MTBF 700.000hrs.**  
**Wide input 1:2 EMI acc. drwgs enclosed**  
**Case style: 2" x 1"**

#### Electrical specifications:

Input voltage: 18-36V  
 Output voltage accuracy: +/- 3%  
 Line regulation: +/- 0,3%  
 Load regulation: +/- 0,3%

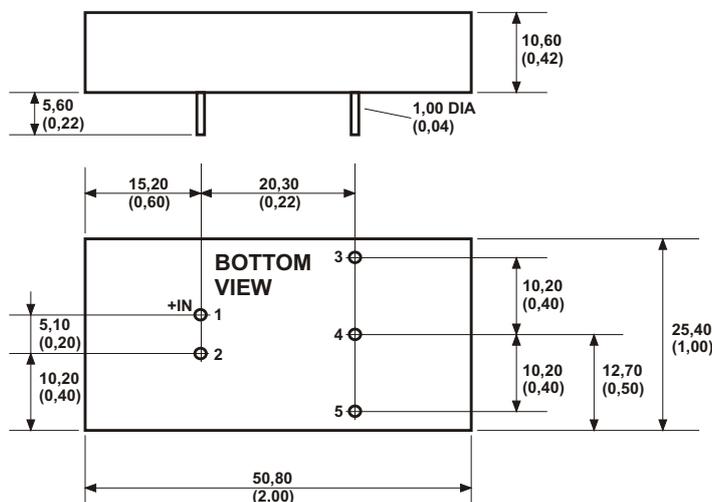
Efficiency: min. 84%  
 Ambient temperature: -40°C to +71°C  
 Output Ripple & Noise: typ. 20mVp-p  
 Isolation voltage: min. 1000V DC  
 Five sided metal shield

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

three measurement points

Part - No.	Input Voltage	Input Current	Output Current	Output Voltage
EIW2-2415D	18V	24,0mA	0mA	+/- 15V
		302,0mA	+/- 150mA	
		361,0mA	+/- 180mA	
		395,0mA	+/- 200mA	
	24V	22,8mA	0mA	
		230,0mA	+/- 150mA	
		275,0mA	+/- 180mA	
		300,0mA	+/- 200mA	
	30V	18,6mA	0mA	
		192,0mA	+/- 150mA	
		220,0mA	+/- 180mA	
		245,0mA	+/- 200mA	

Any other output voltages available.



PIN	PIN CONNECTION:
	Dual
1	+ Input
2	- Input
3	+ Output
4	Common
5	- Output

**ALL DIMENSIONS IN MM (INCHES)**  
**MILLIMETERS +/-0,5mm**  
**(INCHES +/- 0,02")**

## AUTOMOTIVE DC/DC Converters

Wide input range 1:2  
 Case style: 2" x 1"

PWM - regulated

Single ended Forward Converter

### Electrical specifications:

Input voltage: wide 1 : 2  
 Output voltage accuracy: +/- 3%  
 Line regulation: +/- 0,1%  
 Load regulation: +/- 1,3%  
 Efficiency@12Vin: min. 73%

Isolation voltage: min. 1000V DC  
 Short circuit protection: continuous  
 Ambient temperature: -55°C to +85°C  
 Output ripple: 50mVp-p  
 Five sided metal shield

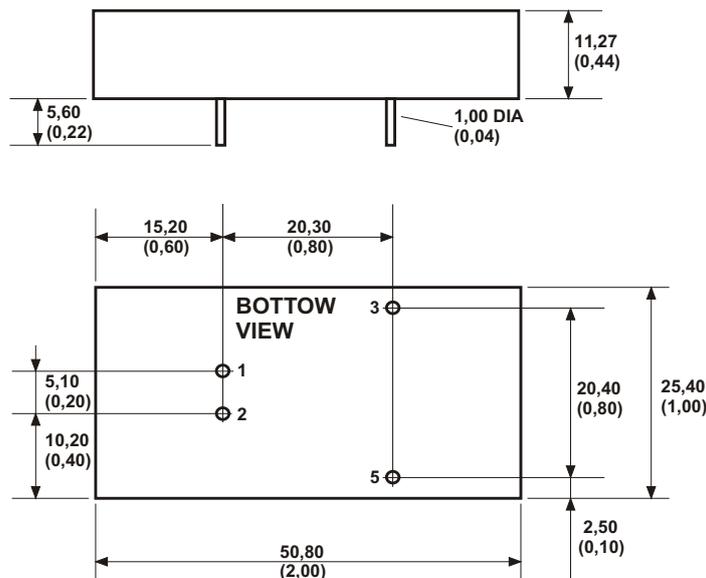
CAUTION: NO INPUT POLARITY CHANGE ALLOWED!

min. load 60mA requested

Part-No.	Input voltage	Output voltage	Output current
EAW2-1203,3	12V ( 9-18V)	3,3V	1800mA

\* Attention: Initial start-up requires Uin min. 10V, then Uin can drop down to min. 9V without leaving output tolerance.

Any other output voltages available.



PIN CONNECTION:	
PIN	Single
1	+ Input
2	- Input
3	+ Output
4	NO PIN
5	- Output

ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/-0,25mm  
 (INCHES +/- 0,01")

# FLYBACK

# INDUSTRIAL DC/DC Converters

# 5/10 Watt Series: DLI

Case style: 2" x 2"

PWM - regulated

### Electrical specifications:

Ambient temperature: -40°C to +71°C no derating  
 Operating temperature: max. +105°C  
 Input voltage range: +/- 10%  
 Output voltage accuracy: +/- 3%  
 Line regulation: +/- 0,2%  
 Load regulation: +/- 1%  
 Efficiency: min. 70%  
 Short circuit protection: full protection

Output Ripple & Noise: typ. 1,0V / 3,0Vp-p  
 @ 1kV isolation voltage  
 min. 1000V DC  
 Isolation voltage: min. 3kV AC rms  
 Isolation voltage Part-Nr. /3:  
 Five sided metal shield  
 Part-No. /5 External -IN & -OUT / COM connection allowed  
 Output Ripple & Noise: 2,0V / 12,0Vp-p

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**  
 Max. capacitive load should not exceed  
 1µF at each output, otherwise no start up

### 5 Watt

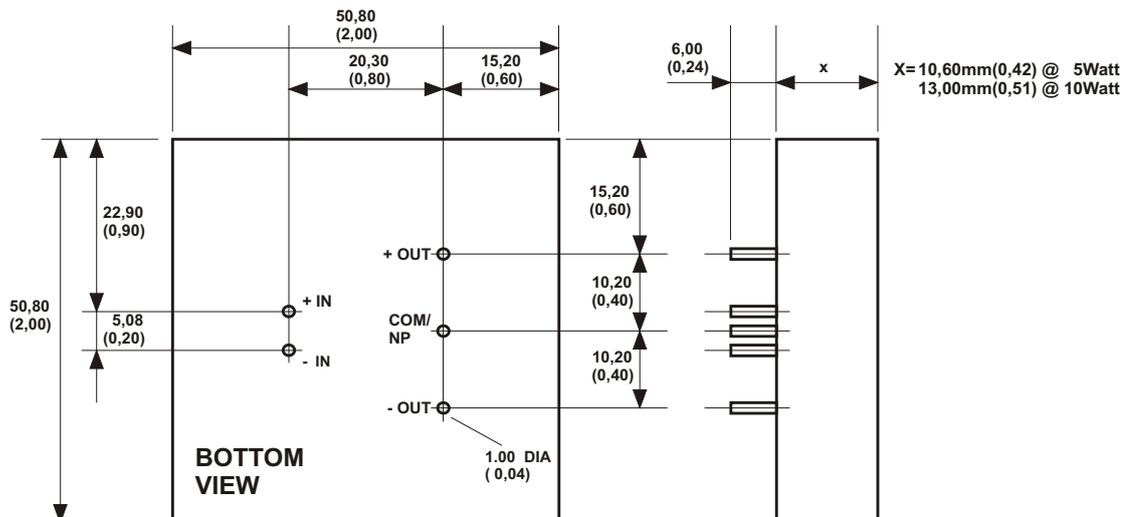
Part - No. Single	Input Voltage DC	Output Voltage DC	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
DLI-12300	12V	300V	16mA	DLI-12150D	12V	+/-150V	+/-16mA
				DLI-12100D**		+/-100V	+/-25mA

### 10 Watt

\*\* each output capacitor of 4,7µF will reduce ripple significantly

Part - No. Single	Input Voltage DC	Output Voltage DC	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
DLI-48600	48V	600V	16mA	DLI-48300D	48V	+/-300V	+/-16mA

Any other input and output voltages available



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/-0,25mm  
 (INCHES +/-0,01")  
 NP (no pin) on single output models  
 COM (common) on dual output models

# INDUSTRIAL

## FLYBACK DC/DC Converters

Case style: 2" x 2" PWM - regulated

Stand: 07/03  
**8 Watt**  
**Series: DLI**

### Electrical specifications:

Ambient temperature: -40°C to +55°C no derating  
 Operating temperature: max. +90°C  
 Input voltage range: +/- 1,0V  
 Output voltage accuracy: +/- 3%  
 Line regulation: +/- 0,2%  
 Load regulation: +/- 0,5%  
 Efficiency: ~ 68%  
 Short circuit protection: 30 sec.

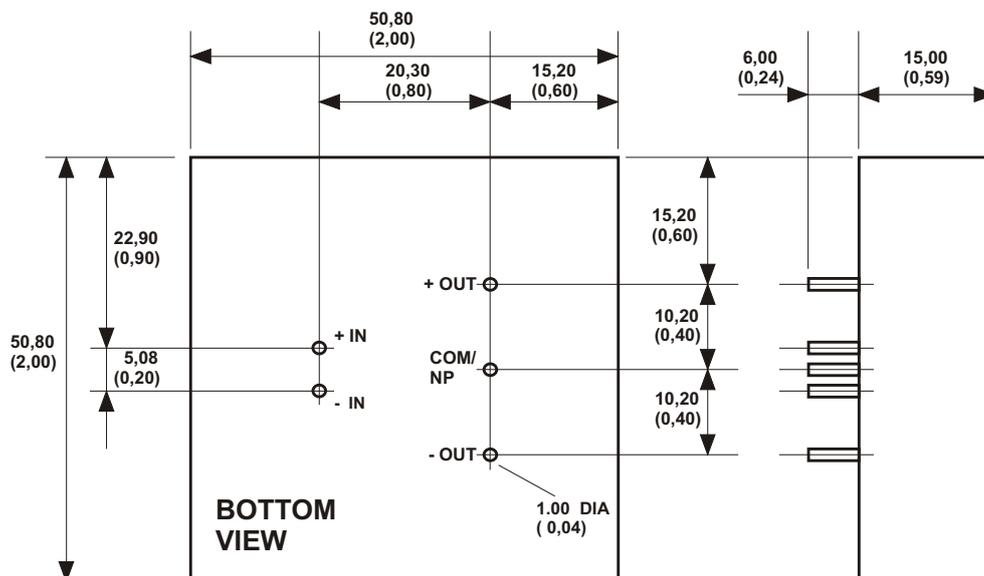
Output Ripple & Noise: typ. 1,0V / 3,0Vp-p @ 1kV isolation voltage  
 Isolation voltage: min. 1000V DC  
 Isolation voltage Part-Nr. /3: min. 3kV AC rms  
 Five sided metal shield  
 Part-No. /5 External -IN & -OUT / COM connection allowed  
 Output Ripple & Noise: 2,0V / 12,0Vp-p

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

### 8 Watt

Input capacitor requested 2x4700µF16V Elco  
 Output capacitor requested max. 2,2µF/350V Elco

Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
DLI-07240D	6-8V	+/-240V	+/-16mA



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/-0,25mm  
 (INCHES +/-0,01")  
 NP (no pin) on single output models  
 COM (common) on dual output models

# FLYBACK

# INDUSTRIAL DC/DC Converters PWM - regulated

6 Watt / 10 Watt  
 Series: DLIW2

Wide input range 1:2  
 Case style: 2" x 2"

### Electrical specifications:

Ambient temperature: -40°C to +71°C no derating  
 Operating temperature: max. +105°C  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 0,2%  
 Load regulation: +/- 1%  
 Efficiency: min. 65%  
 Short circuit protection: full protection

Output Ripple & Noise: typ. 150mVp-p  
 @ 1kV isolation voltage  
 min. 1000V DC  
 Isolation voltage: min. 1000V DC  
 Isolation voltage Part-Nr. /3: min. 3kV AC rms  
 Enable / Disable pin can be provided on request  
 Five sided metal shield  
 Part-No. /5 External -IN & -OUT / COM connection allowed

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

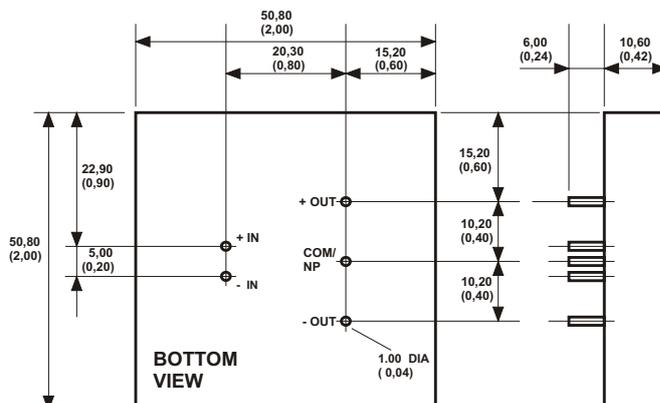
### 6 Watt

Part - No. Single	Input Voltage DC	Output Voltage	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
DLIW2-1205	12V	5V	1200mA	DLIW2-1205D	12V	+/- 5V	+/-600mA
DLIW2-1212	( 9-18V)	12V	500mA	DLIW2-1212D	( 9-18V)	+/-12V	+/-250mA
DLIW2-1215		15V	400mA	DLIW2-1215D		+/-15V	+/-200mA
DLIW2-2405	24V	5V	1200mA	DLIW2-2405D	24V	+/- 5V	+/-600mA
DLIW2-2412	(16-36V)	12V	500mA	DLIW2-2412D	(16-36V)	+/-12V	+/-250mA
DLIW2-2415		15V	400mA	DLIW2-2415D		+/-15V	+/-200mA
DLIW2-4805	48V	5V	1200mA	DLIW2-4805D	48V	+/- 5V	+/-600mA
DLIW2-4812	(36-72V)	12V	500mA	DLIW2-4812D	(36-72V)	+/-12V	+/-250mA
DLIW2-4815		15V	400mA	DLIW2-4815D		+/-15V	+/-200mA

### 10 Watt

Part - No. Single	Input Voltage DC	Output Voltage	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
DLIW2-1205	12V	5V	2000mA	DLIW2-1205D	12V	+/- 5V	+/-1000mA
DLIW2-1212	( 9-18V)	12V	833mA	DLIW2-1212D	( 9-18V)	+/-12V	+/- 416mA
DLIW2-1215		15V	666mA	DLIW2-1215D		+/-15V	+/- 333mA
DLIW2-2405	24V	5V	2000mA	DLIW2-2405D	24V	+/- 5V	+/-1000mA
DLIW2-2412	(16-36V)	12V	833mA	DLIW2-2412D	(16-36V)	+/-12V	+/- 416mA
DLIW2-2415		15V	666mA	DLIW2-2415D		+/-15V	+/- 333mA
DLIW2-4805	48V	5V	2000mA	DLIW2-4805D	48V	+/- 5V	+/-1000mA
DLIW2-4812	(36-72V)	12V	833mA	DLIW2-4812D	(36-72V)	+/-12V	+/- 416mA
DLIW2-4815		15V	666mA	DLIW2-4815D		+/-15V	+/- 333mA

Any other output voltages available.



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/-0,25mm  
 (INCHES +/-0,01")  
 NP (no pin) on single output models  
 COM (common) on dual output models

# INDUSTRIAL FLYBACK DC/DC Converters

6 Watt / 10 Watt  
 Series: DLIW3

Wide input range 1:3  
 Case style: 2" x 2"

PWM - regulated

### Electrical specifications:

Ambient temperature: -40°C to +71°C no derating  
 Operating temperature: max. +105°C  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 0,5%  
 Load regulation: +/- 1%  
 Efficiency: min. 65%  
 Short circuit protection: full protection

Output Ripple & Noise: typ. 150mVp-p  
 @ 1kV isolation voltage  
 min. 1000V DC  
 Isolation voltage: min. 3kV AC rms  
 Part-Nr.: /5 External -IN & -OUT/COM connection allowed  
 Part-Nr.: /6 **NO ISOLATION**  
 enable / disable pin can be provided on request  
 Five sided metal shield

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

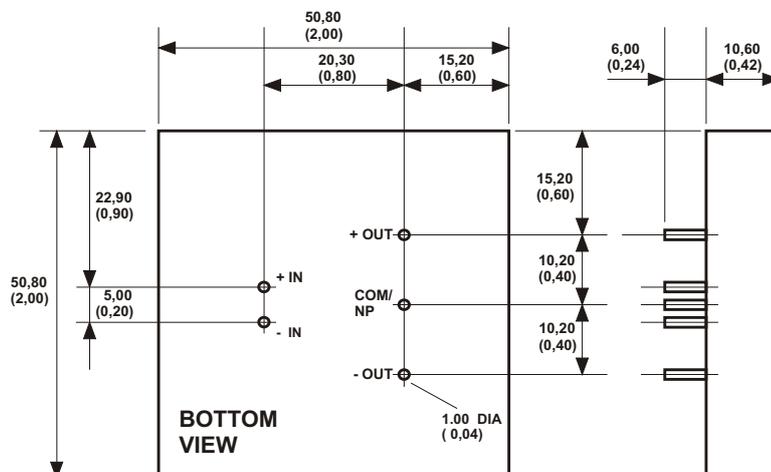
### 6 Watt

Part - No. Single	Input Voltage DC	Output Voltage	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
DLIW3-2405	24V	5V	1200mA	DLIW3-2405D	24V	+/- 5V	+/-600mA
DLIW3-2412	(12-36V)	12V	500mA	DLIW3-2412D	(12-36V)	+/-12V	+/-250mA
DLIW3-2415		15V	400mA	DLIW3-2415D		+/-15V	+/-200mA
DLIW3-2424		24V	250mA				

### 10 Watt

Part - No. Single	Input Voltage DC	Output Voltage	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
DLIW3-2405	24V	5V	2000mA	DLIW3-2405D	24V	+/- 5V	+/-1000mA
DLIW3-2412	(12-36V)	12V	833mA	DLIW3-2412D	(12-36V)	+/-12V	+/- 416mA
DLIW3-2415		15V	666mA	DLIW3-2415D		+/-15V	+/- 333mA
DLIW3-2424		24V	416mA				

Any other output voltages available.



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/-0,25mm  
 (INCHES +/-0,01")  
 NP (no pin) on single output models  
 COM (common) on dual output models

Wide input range 1:2  
 Case style: 2" x 2"

## INDUSTRIAL DC/DC Converters

10 Watt  
 Series: DFW2

PWM - regulated

Single ended Forward Converter

### Electrical specifications:

Input voltage range: wide 1 : 2  
 Output voltage accuracy: +/- 3%  
 Line regulation: +/- 0,1%  
 Load regulation: +/- 1,3%  
 Efficiency@24Vin: min. 73%

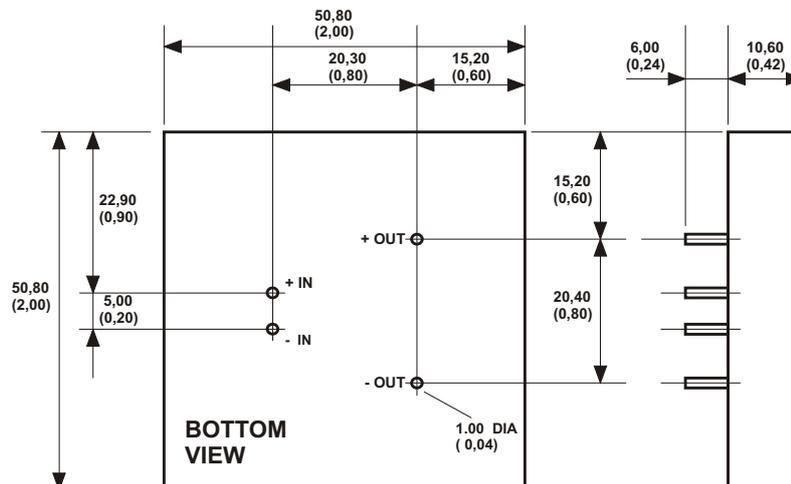
Isolation voltage: min. 1000V DC  
 Short circuit protection: continuous  
 Ambient temperature: -40°C to +71°C  
 Output ripple: 50mV  
 Five sided metal shield

CAUTION: NO INPUT POLARITY CHANGE ALLOWED!

min. load 60mA requested

Part-No.	Input voltage	Output voltage	Output current
DFW2-2403,1	24V (16-36V)	3,1	3220mA

Any other output voltages available.



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/-0,25mm  
 (INCHES +/- 0,01")

# FORWARD

# INDUSTRIAL DC/DC Converters

6 Watt / 10 Watt

Series: DIW2

Wide input range 1:2  
 Case style: 2" x 2"

PWM - regulated

### Electrical specifications:

Ambient temperature: -40°C to +71°C no derating  
 Operating temperature: max. +105°C  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 0,1%  
 Load regulation: +/- 0,5%  
 Efficiency: min. 70%  
 overload & short circuit protection: watchdog & auto - restart

Output Ripple / Noise: typ. 50 / 100mVp-p  
 Isolation voltage: min. 1000V DC  
 Isolation voltage Part-Nr. /3: min. 3kV AC rms  
 Enable / Disable pin can be provided on request  
 U<sub>OUT</sub> adjust pin can be established too  
 Five sided metal shield  
 Part-No. /5 External -IN & -OUT / COM connection allowed

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

### 6 Watt

Part - No. Single	Input Voltage DC	Output Voltage	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
DIW2-0505	5V (4,5-9V)	5V	1200mA	DIW2-0505D	5V (4,5-9V)	+/- 5V	+/-600mA
DIW2-0509		9V	666mA	DIW2-0509D		+/- 9V	+/-333mA
DIW2-0512		12V	500mA	DIW2-0512D		+/-12V	+/-250mA
DIW2-0515		15V	400mA	DIW2-0515D		+/-15V	+/-200mA
DIW2-0518		18V	333mA	DIW2-0518D		+/-18V	+/-166mA
DIW2-0524		24V	250mA	DIW2-0524D		+/-24V	+/-125mA
DIW2-0528		28V	214mA	DIW2-0528D		+/-28V	+/-107mA
DIW2-0548		48V	125mA	DIW2-0548D		+/-48V	+/- 63mA
DIW2-0560		60V	100mA	DIW2-0560D		+/-60V	+/- 50mA

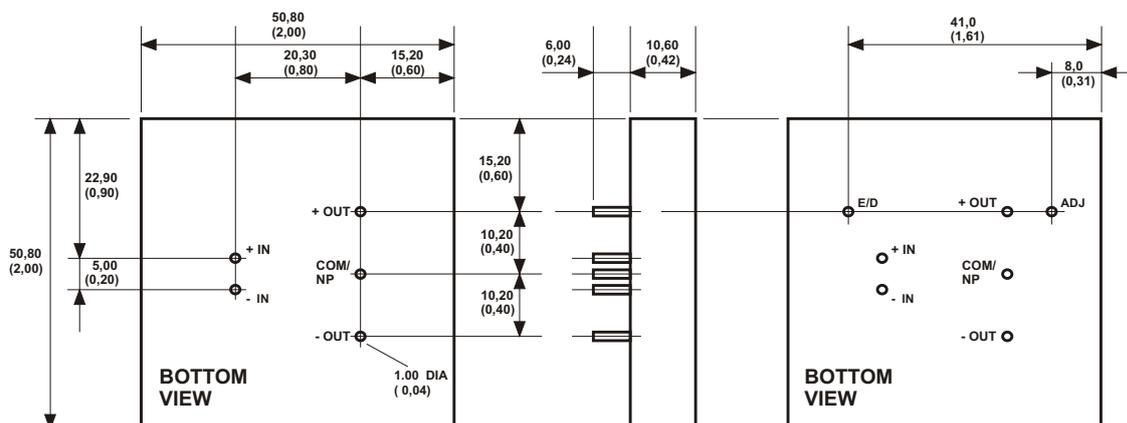
### 10 Watt

Part - No. Single	Input Voltage DC	Output Voltage	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
DIW2-0505	5V (4,5-9V)	5V	2000mA	DIW2-0505D	5V (4,5-9V)	+/- 5V	+/-1000mA
DIW2-0509		9V	1111mA	DIW2-0509D		+/- 9V	+/- 555mA
DIW2-0512		12V	833mA	DIW2-0512D		+/-12V	+/- 416mA
DIW2-0515		15V	666mA	DIW2-0515D		+/-15V	+/- 333mA
DIW2-0518		18V	555mA	DIW2-0518D		+/-18V	+/- 277mA
DIW2-0524		24V	416mA	DIW2-0524D		+/-24V	+/- 208mA
DIW2-0528		28V	357mA	DIW2-0528D		+/-28V	+/- 178mA
DIW2-0548		48V	208mA	DIW2-0548D		+/-48V	+/- 104mA
DIW2-0560		60V	166mA	DIW2-0560D		+/-60V	+/- 83mA

### Any other output voltages available.

ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/-0,25mm  
 (INCHES +/- 0,01")

/0 E / D: Enable / Disable pin  
 /2 ADJ : Adjustable output voltage  
 NP (no pin) on single output models  
 COM (common) on dual output models



# FORWARD

# INDUSTRIAL DC/DC Converters PWM - regulated

## 6 Watt / 10 Watt Series: DIW2

Wide input range 1:2  
 Case style: 2" x 2"

### Electrical specifications:

Ambient temperature: -40°C to +71°C no derating  
 Operating temperature: max. +105°C  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 0,1%  
 Load regulation: +/- 0,5%  
 Efficiency: min. 70%  
 overload & short circuit protection: watchdog & auto - restart

Output Ripple & Noise: typ. 35mVp-p  
 Isolation voltage: min. 1000V DC  
 Isolation voltage Part-Nr. /3: min. 3kV AC rms  
 Enable / Disable pin can be provided on request  
 U<sub>OUT</sub>adjust pin can be established too  
 Five sided metal shield  
 Part-No. /5 External -IN & -OUT / COM connection allowed

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

### 6 Watt

Part - No. Single	Input Voltage DC	Output Voltage	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
DIW2-1205	12V	5V	1200mA	DIW2-1205D	12V	+/- 5V	+/-600mA
DIW2-1212	( 8-18V)	12V	500mA	DIW2-1212D	( 8-18V)	+/-12V	+/-250mA
DIW2-1215		15V	400mA	DIW2-1215D		+/-15V	+/-200mA
DIW2-2405	24V	5V	1200mA	DIW2-2405D	24V	+/- 5V	+/-600mA
DIW2-2412	(16-36V)	12V	500mA	DIW2-2412D	(16-36V)	+/-12V	+/-250mA
DIW2-2415		15V	400mA	DIW2-2415D		+/-15V	+/-200mA
DIW2-4805	48V	5V	1200mA	DIW2-4805D	48V	+/- 5V	+/-600mA
DIW2-4812	(34-75V)	12V	500mA	DIW2-4812D	(34-75V)	+/-12V	+/-250mA
DIW2-4815		15V	400mA	DIW2-4815D		+/-15V	+/-200mA

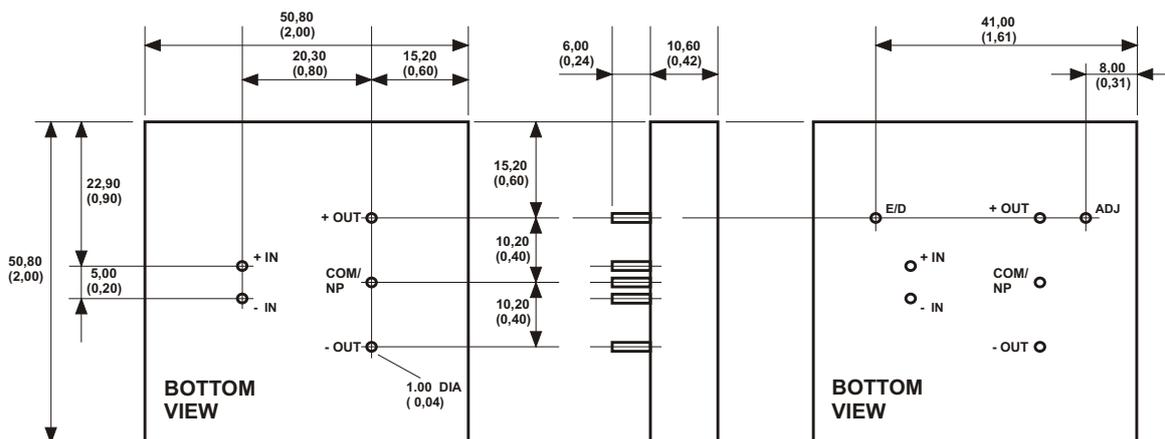
### 10 Watt

Part - No. Single	Input Voltage DC	Output Voltage	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
DIW2-1205	12V	5V	2000mA	DIW2-1205D	12V	+/- 5V	+/-1000mA
DIW2-1212	( 8-18V)	12V	833mA	DIW2-1212D	( 8-18V)	+/-12V	+/- 416mA
DIW2-1215		15V	666mA	DIW2-1215D		+/-15V	+/- 333mA
DIW2-2405	24V	5V	2000mA	DIW2-2405D	24V	+/- 5V	+/-1000mA
DIW2-2412	(16-36V)	12V	833mA	DIW2-2412D	(16-36V)	+/-12V	+/- 416mA
DIW2-2415		15V	666mA	DIW2-2415D		+/-15V	+/- 333mA
DIW2-4805	48V	5V	2000mA	DIW2-4805D	48V	+/- 5V	+/-1000mA
DIW2-4812	(34-75V)	12V	833mA	DIW2-4812D	(34-75V)	+/-12V	+/- 416mA
DIW2-4815		15V	666mA	DIW2-4815D		+/-15V	+/- 333mA

### Any other output voltages available.

ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/-0,25mm  
 (INCHES +/- 0,01")

/0 E / D: Enable / Disable pin  
 /2 ADJ : Adjustable output voltage  
 NP (no pin) on single output models  
 COM (common) on dual output models



# FORWARD

# INDUSTRIAL DC/DC Converters PWM - regulated

6 Watt / 10 Watt  
 Series: DIW5

Wide input range 1:5  
 Case style: 2" x 2"

### Electrical specifications:

Ambient temperature: -40°C to +71°C no derating  
 Operating temperature: max. +105°C  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 0,1%  
 Load regulation: +/- 0,5%  
 Efficiency: min. 70%  
 overload & short circuit protection: watchdog & auto - restart

Output Ripple & Noise: typ. 35mVp-p  
 Isolation voltage: min. 1000V DC  
 Isolation voltage Part-Nr. /3: min. 3kV AC rms  
 Enable / Disable pin can be provided on request  
 U<sub>OUT</sub> adjust pin can be established too  
 Five sided metal shield  
 Part-No. /5 External -IN & -OUT / COM connection allowed

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

### 6 Watt

Part - No. Single	Input Voltage DC	Output Voltage	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
DIW5-2405	24V	5V	1200mA	DIW5-2405D	24V	+/- 5V	+/-600mA
DIW5-2412	( 8-40V)	12V	500mA	DIW5-2412D	( 8-40V)	+/-12V	+/-250mA
DIW5-2415		15V	400mA	DIW5-2415D		+/-15V	+/-200mA
DIW5-4805	48V	5V	1200mA	DIW5-4805D	48V	+/- 5V	+/-600mA
DIW5-4812	(16-80V)	12V	500mA	DIW5-4812D	(16-80V)	+/-12V	+/-250mA
DIW5-4815		15V	400mA	DIW5-4815D		+/-15V	+/-200mA

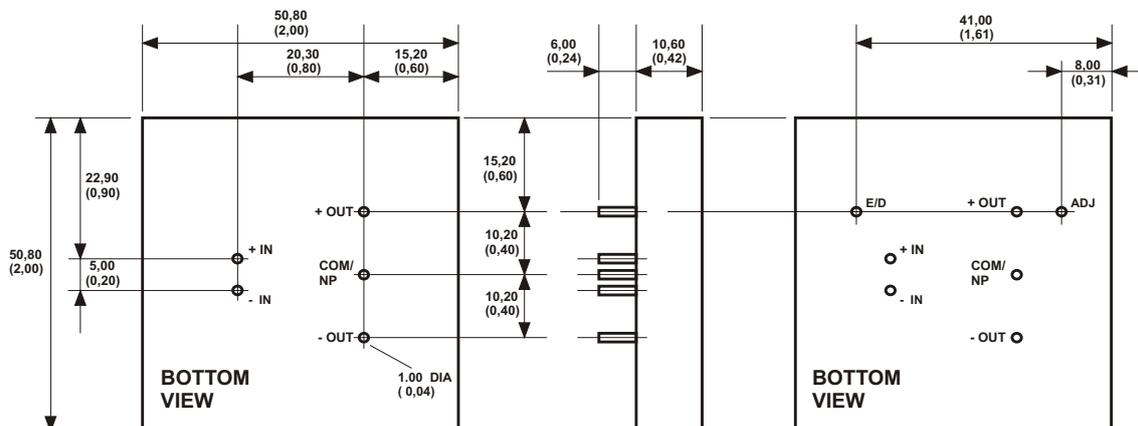
### 10 Watt

Part - No. Single	Input Voltage DC	Output Voltage	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
DIW5-2405	24V	5V	2000mA	DIW5-2405D	24V	+/- 5V	+/-1000mA
DIW5-2412	( 8-40V)	12V	833mA	DIW5-2412D	( 8-40V)	+/-12V	+/- 416mA
DIW5-2415		15V	666mA	DIW5-2415D		+/-15V	+/- 333mA
DIW5-4805	48V	5V	2000mA	DIW5-4805D	48V	+/- 5V	+/-1000mA
DIW5-4812	(16-80V)	12V	833mA	DIW5-4812D	(16-80V)	+/-12V	+/- 416mA
DIW5-4815		15V	666mA	DIW5-4815D		+/-15V	+/- 333mA

### Any other output voltages available.

ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/-0,25mm  
 (INCHES +/- 0,01")

/0 E / D: Enable / Disable pin  
 /2 ADJ: Adjustable output voltage  
 NP (no pin) on single output models  
 COM (common) on dual output models



# FORWARD AUTOMOTIVE DC/DC Converters PWM - regulated

6 Watt / 10 Watt  
 Series: DAW2

Wide input range 1:2  
 Case style: 2" x 2"

### Electrical specifications:

Ambient temperature: -55°C to +85°C no derating  
 Operating temperature: max. +118°C  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 0,1%  
 Load regulation: +/- 0,5%  
 Efficiency: min. 70%  
 overload & short circuit protection: watchdog & auto - restart

Output Ripple & Noise: typ. 35mVp-p  
 Isolation voltage: min. 1000V DC  
 Isolation voltage Part-Nr. /3 min. 3kV AC rms  
 Enable / Disable pin can be provided on request  
 U<sub>out</sub> adjust pin can be established too  
 Five sided metal shield  
 Part-No. /5 External -IN & -OUT / COM connection allowed

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

### 6 Watt

Part - No. Single	Input Voltage DC	Output Voltage	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
DAW2-0505	5V (4,5-9V)	5V	1200mA	DAW2-0505D	5V (4,5-9V)	+/- 5V	+/-600mA
DAW2-0509		9V	666mA	DAW2-0509D		+/- 9V	+/-333mA
DAW2-0512		12V	500mA	DAW2-0512D		+/-12V	+/-250mA
DAW2-0515		15V	400mA	DAW2-0515D		+/-15V	+/-200mA
DAW2-0518		18V	333mA	DAW2-0518D		+/-18V	+/-166mA
DAW2-0524		24V	250mA	DAW2-0524D		+/-24V	+/-125mA
DAW2-0528		28V	214mA	DAW2-0528D		+/-28V	+/-107mA
DAW2-0548		48V	125mA	DAW2-0548D		+/-48V	+/- 63mA
DAW2-0560		60V	100mA	DAW2-0560D		+/-60V	+/- 50mA

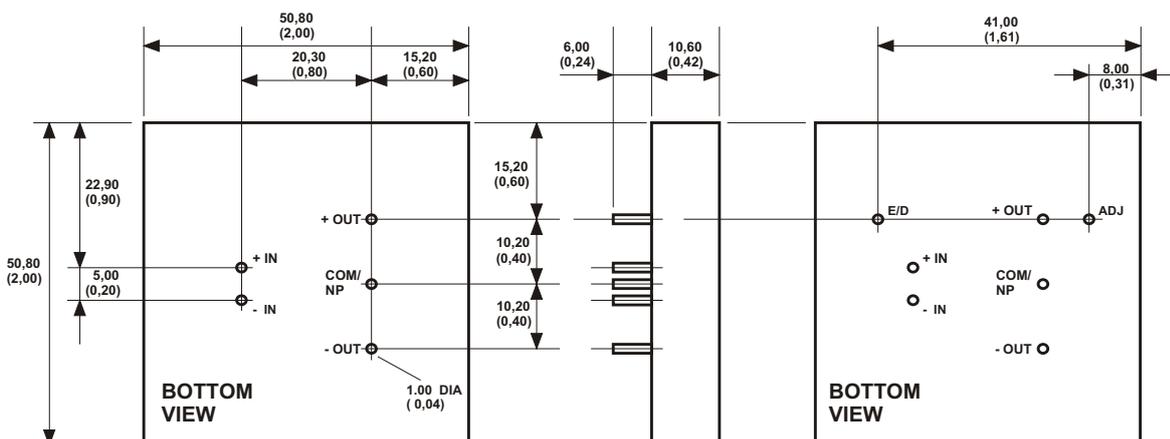
### 10 Watt

Part - No. Single	Input Voltage DC	Output Voltage	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
DAW2-0505	5V (4,5-9V)	5V	2000mA	DAW2-0505D	5V (4,5-9V)	+/- 5V	+/-1000mA
DAW2-0509		9V	1111mA	DAW2-0509D		+/- 9V	+/- 555mA
DAW2-0512		12V	833mA	DAW2-0512D		+/-12V	+/- 416mA
DAW2-0515		15V	666mA	DAW2-0515D		+/-15V	+/- 333mA
DAW2-0518		18V	555mA	DAW2-0518D		+/-18V	+/- 277mA
DAW2-0524		24V	416mA	DAW2-0524D		+/-24V	+/- 208mA
DAW2-0528		28V	357mA	DAW2-0528D		+/-28V	+/- 178mA
DAW2-0548		48V	208mA	DAW2-0548D		+/-48V	+/- 104mA
DAW2-0560		60V	166mA	DAW2-0560D		+/-60V	+/- 83mA

### Any other output voltages available.

ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/-0,25mm  
 (INCHES +/- 0,01")

/0 E / D: Enable / Disable pin  
 /2 ADJ: Adjustable output voltage  
 NP (no pin) on single output models  
 COM (common) on dual output models



# FORWARD

# AUTOMOTIVE

6 Watt / 10 Watt

## DC/DC Converters

Series: DAW2

Wide input range 1:2  
Case style: 2" x 2"

PWM - regulated

### Electrical specifications:

**Ambient temperature:** -55°C to +85°C no derating  
**Operating temperature:** max. +118°C  
**Output voltage accuracy:** +/- 2%  
**Line regulation:** +/- 0,1%  
**Load regulation:** +/- 0,5%  
**Efficiency:** min. 70%  
**overload & short circuit protection:** watchdog & auto - restart

**Output Ripple & Noise:** typ. 35mVp-p  
**Isolation voltage:** min. 1000V DC  
**Isolation voltage Part-Nr. /3:** min. 3kV AC rms  
Enable / Disable pin can be provided on request  
U<sub>OUT</sub> adjust pin can be established too  
Five sided metal shield  
Part-No. /5 External -IN & -OUT / COM connection allowed

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

### 6 Watt

Part - No. Single	Input Voltage DC	Output Voltage	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
DAW2-1205	12V	5V	1200mA	DAW2-1205D	12V	+/- 5V	+/-600mA
DAW2-1212	( 8-18V)	12V	500mA	DAW2-1212D	( 8-18V)	+/-12V	+/-250mA
DAW2-1215		15V	400mA	DAW2-1215D		+/-15V	+/-200mA
DAW2-2405	24V	5V	1200mA	DAW2-2405D	24V	+/- 5V	+/-600mA
DAW2-2412	(16-36V)	12V	500mA	DAW2-2412D	(16-36V)	+/-12V	+/-250mA
DAW2-2415		15V	400mA	DAW2-2415D		+/-15V	+/-200mA
DAW2-4805	48V	5V	1200mA	DAW2-4805D	48V	+/- 5V	+/-600mA
DAW2-4812	(34-75V)	12V	500mA	DAW2-4812D	(34-75V)	+/-12V	+/-250mA
DAW2-4815		15V	400mA	DAW2-4815D		+/-15V	+/-200mA

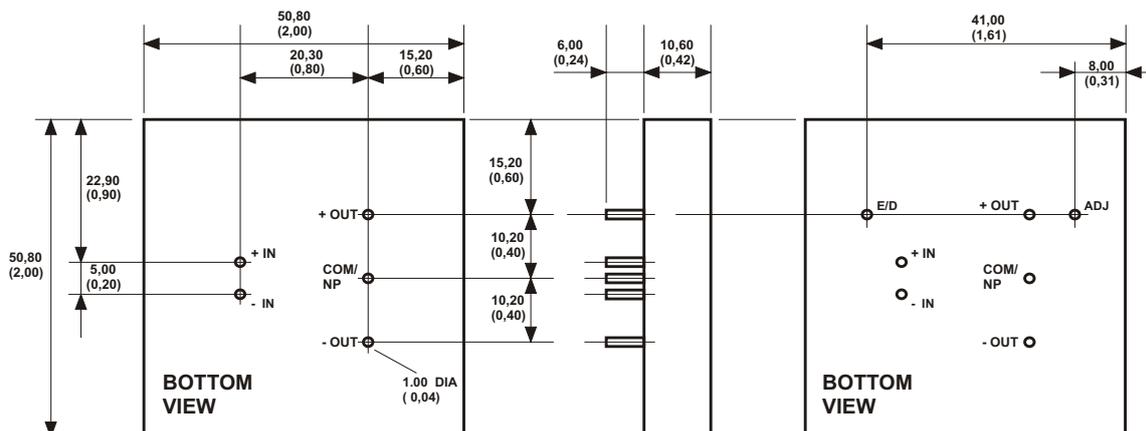
### 10 Watt

Part - No. Single	Input Voltage DC	Output Voltage	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
DAW2-1205	12V	5V	2000mA	DAW2-1205D	12V	+/- 5V	+/-1000mA
DAW2-1212	( 8-18V)	12V	833mA	DAW2-1212D	( 8-18V)	+/-12V	+/- 416mA
DAW2-1215		15V	666mA	DAW2-1215D		+/-15V	+/- 333mA
DAW2-2405	24V	5V	2000mA	DAW2-2405D	24V	+/- 5V	+/-1000mA
DAW2-2412	(16-36V)	12V	833mA	DAW2-2412D	(16-36V)	+/-12V	+/- 416mA
DAW2-2415		15V	666mA	DAW2-2415D		+/-15V	+/- 333mA
DAW2-4805	48V	5V	2000mA	DAW2-4805D	48V	+/- 5V	+/-1000mA
DAW2-4812	(34-75V)	12V	833mA	DAW2-4812D	(34-75V)	+/-12V	+/- 416mA
DAW2-4815		15V	666mA	DAW2-4815D		+/-15V	+/- 333mA

### Any other output voltages available.

ALL DIMENSIONS IN MM (INCHES)  
MILLIMETERS +/-0,25mm  
(INCHES +/- 0,01")

/0 E / D: Enable / Disable pin  
/2 ADJ: Adjustable output voltage  
NP (no pin) on single output models  
COM (common) on dual output models



# FORWARD

# AUTOMOTIVE DC/DC Converters PWM - regulated

Stand: 44/02

6 Watt / 10 Watt  
 Series: DAW5

Wide input range 1:5  
 Case style: 2" x 2"

### Electrical specifications:

Ambient temperature: -55°C to +85°C no derating  
 Operating temperature: max. +118°C  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 0,1%  
 Load regulation: +/- 0,5%  
 Efficiency: min. 70%  
 overload & short circuit protection: watchdog & auto - restart

Output Ripple & Noise: typ. 35mVp-p  
 Isolation voltage: min. 1000V DC  
 Isolation voltage Part-Nr. /3: min. 3kV AC rms  
 Enable / Disable pin can be provided on request  
 U<sub>OUT</sub> adjust pin can be established too  
 Five sided metal shield  
 Part-No. /5 External -IN & -OUT / COM connection allowed

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

### 6 Watt

Part - No. Single	Input Voltage DC	Output Voltage	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
DAW5-2405	24V	5V	1200mA	DAW5-2405D	24V	+/- 5V	+/-600mA
DAW5-2412	( 8-40V)	12V	500mA	DAW5-2412D	( 8-40V)	+/-12V	+/-250mA
DAW5-2415		15V	400mA	DAW5-2415D		+/-15V	+/-200mA
DAW5-4805	48V	5V	1200mA	DAW5-4805D	48V	+/- 5V	+/-600mA
DAW5-4812	(16-80V)	12V	500mA	DAW5-4812D	(16-80V)	+/-12V	+/-250mA
DAW5-4815		15V	400mA	DAW5-4815D		+/-15V	+/-200mA

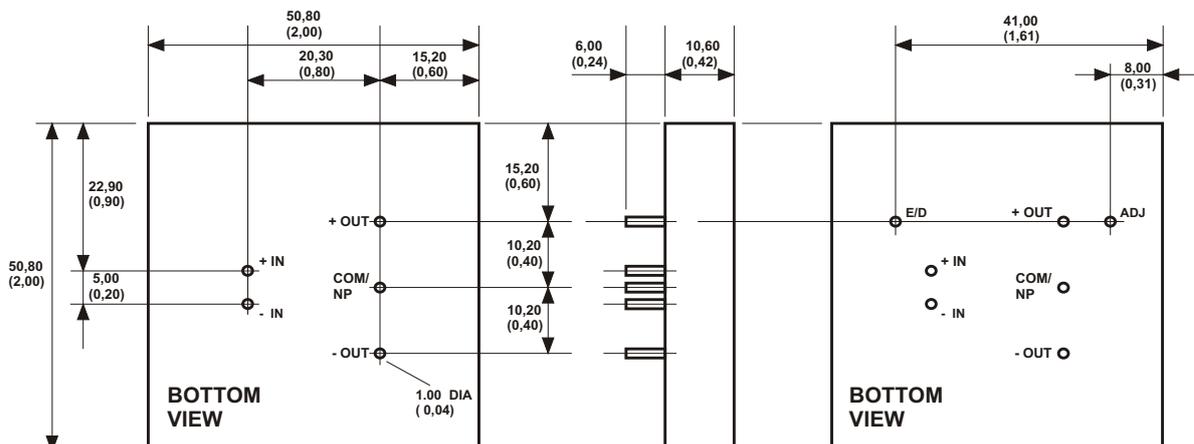
### 10 Watt

Part - No. Single	Input Voltage DC	Output Voltage	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
DAW5-2405	24V	5V	2000mA	DAW5-2405D	24V	+/- 5V	+/-1000mA
DAW5-2412	( 8-40V)	12V	833mA	DAW5-2412D	( 8-40V)	+/-12V	+/- 416mA
DAW5-2415		15V	666mA	DAW5-2415D		+/-15V	+/- 333mA
DAW5-4805	48V	5V	2000mA	DAW5-4805D	48V	+/- 5V	+/-1000mA
DAW5-4812	(16-80V)	12V	833mA	DAW5-4812D	(16-80V)	+/-12V	+/- 416mA
DAW5-4815		15V	666mA	DAW5-4815D		+/-15V	+/- 333mA

### Any other output voltages available.

ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/-0,25mm  
 (INCHES +/- 0,01")

/0 E / D: Enable / Disable pin  
 /2 ADJ: Adjustable output voltage  
 NP (no pin) on single output models  
 COM (common) on dual output models



# FLYBACK

# INDUSTRIAL DC/DC Converters LINE OPERATING

Stand: 35/04

6 Watt

Series: EIH

Case style: 2" x 1"

**With FILTERS - Rectifier + Tank capacitor it can be operated from AC-LINE Voltage!!**

### Electrical specifications:

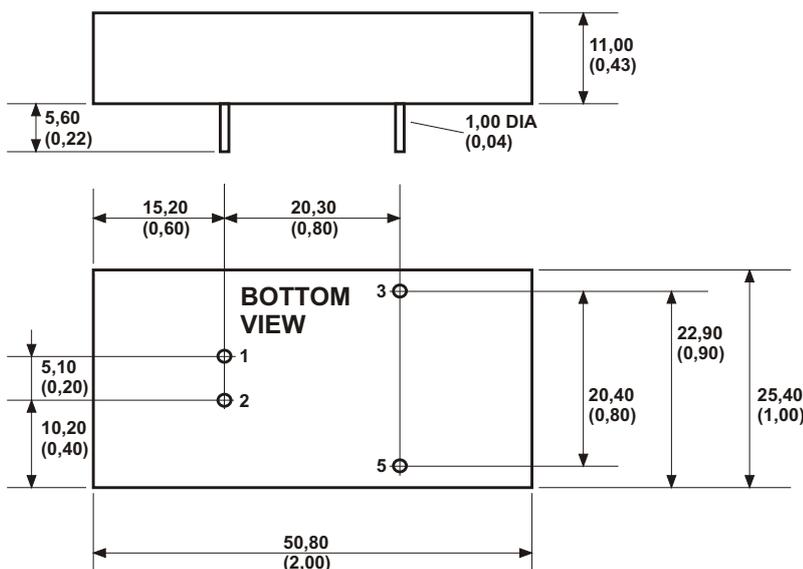
Ambient temperature: -40°C to +71°C no derating  
 Operating temperature: max. +105°C  
 Output voltage accuracy: +/- 3%  
 Line regulation: +/- 0,2%  
 Load regulation: +/- 1%  
 Short circuit protection: full protection

Efficiency: min. 65%  
 Output Ripple & Noise: typ. 500mVp-p\*\*  
 \*\* With additional electrolytic capacitor approx. 105°C Output R&N 50mV typ.  
 Isolation voltage: min. 3000V AC rms  
 SAFETY: EN60950 / EN61010  
 Case material: polycarbonate

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

## 6 Watt

Part - No. Single	Input Voltage DC	Output Voltage	Output Current
EIH-11030	110V (90-190V)	30V	200mA



PIN	PIN CONNECTION:	
	Single	
1	+ Input	
2	- Input	
3	+ Output	
5	- Output	

ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,5mm  
 (INCHES +/- 0,02")

# FLYBACK

# INDUSTRIAL DC/DC Converters LINE OPERATING

Stand: 24/01

6 Watt / 10 Watt  
 Series: DIH

Case style: 2" x 2"

**With FILTERS - Rectifier + Tank capacitor it can be operated from AC-LINE Voltage!!**

### Electrical specifications:

Ambient temperature: -40°C to +71°C no derating  
 Operating temperature: max. +105°C  
 Output voltage accuracy: +/- 3%  
 Line regulation: +/- 0,2%  
 Load regulation: +/- 1%  
 Short circuit protection: full protection

Efficiency: min. 65%  
 Output Ripple & Noise: typ. 500mVp-p\*\*  
 \*\* With additional electrolytic capacitor 100µF 105°C Output R&N 50mV typ.  
 Isolation voltage: min. 3000V AC rms  
 SAFETY: EN60950 / EN61010  
 Five sided metal shield

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

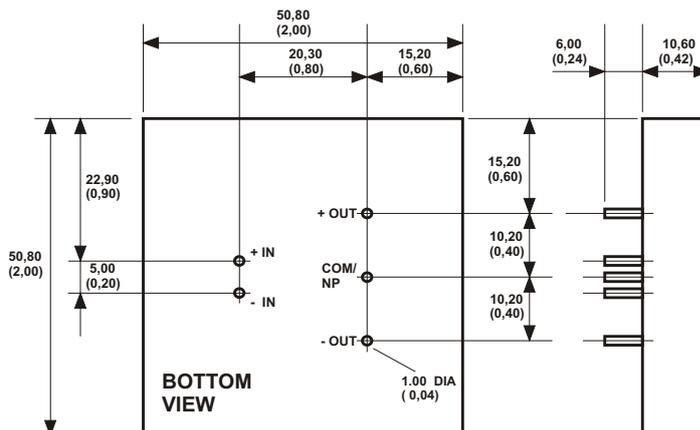
### 6 Watt

Part - No. Single	Input Voltage DC	Output Voltage	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
DIH-11005	110V (90-190V)	5V	1200mA	DIH-11005D	110V (90-190V)	+/- 5V	+/-600mA
DIH-11012		12V	500mA	DIH-11012D		+/-12V	+/-250mA
DIH-11015		15V	400mA	DIH-11015D		+/-15V	+/-200mA
DIH-11024		24V	250mA	DIH-11024D		+/-24V	+/-125mA
DIH-11048		48V	125mA	DIH-11048D		+/-48V	+/- 62mA
DIH-11060		60V	100mA	DIH-11060D		+/-60V	+/- 50mA
DIH-22005	220V (176-380V)	5V	1200mA	DIH-22005D	220V (176-380V)	+/- 5V	+/-600mA
DIH-22012		12V	500mA	DIH-22012D		+/-12V	+/-250mA
DIH-22015		15V	400mA	DIH-22015D		+/-15V	+/-200mA
DIH-22024		24V	250mA	DIH-22024D		+/-24V	+/-125mA
DIH-22048		48V	125mA	DIH-22048D		+/-48V	+/- 62mA
DIH-22060		60V	100mA	DIH-22060D		+/-60V	+/- 50mA

### 10 Watt

Part - No. Single	Input Voltage DC	Output Voltage	Output Current	Part - No. Dual	Input Voltage DC	Output Voltage DC	Output Current
DIH-11005	110V (90-190V)	5V	2000mA	DIH-11005D	110V (90-190V)	+/- 5V	+/-1000mA
DIH-11012		12V	833mA	DIH-11012D		+/-12V	+/- 417mA
DIH-11015		15V	666mA	DIH-11015D		+/-15V	+/- 333mA
DIH-11024		24V	417mA	DIH-11024D		+/-24V	+/- 208mA
DIH-11048		48V	208mA	DIH-11048D		+/-48V	+/- 104mA
DIH-11060		60V	167mA	DIH-11060D		+/-60V	+/- 83mA
DIH-22005	220V (176-380V)	5V	2000mA	DIH-22005D	220V (176-380V)	+/- 5V	+/-1000mA
DIH-22012		12V	833mA	DIH-22012D		+/-12V	+/- 417mA
DIH-22015		15V	666mA	DIH-22015D		+/-15V	+/- 333mA
DIH-22024		24V	417mA	DIH-22024D		+/-24V	+/- 208mA
DIH-22048		48V	208mA	DIH-22048D		+/-48V	+/- 104mA
DIH-22060		60V	167mA	DIH-22060D		+/-60V	+/- 83mA

Any other output voltages available.



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/-0,25mm  
 (INCHES +/-0,01")

NP (no pin) on single output models  
 COM (common) on dual output models

# INDUSTRIAL DC/DC Converters PWM - regulated

Stand: 15/05  
 20 Watt  
 Series: TC

## Electrical specifications:

Input voltage range:	+/- 10%
Output voltage accuracy:	+/- 3%
Line regulation:	+/- 0,2%
Load regulation:	+/- 1%
Efficiency:	min. 65%
Output Ripple & Noise:	150mVp-p
Short circuit protection:	continuous
Ambient temperature:	-40°C to 71°C
Part-No. /9 Ambient temperature optional:	-55°C to 85°C
Operating temperature max. +105°C@Ta=71°C / +118°C@Ta=+85°C	
Isolation voltage:	min. 1000V DC
Case material:	metal

### CAUTION: NO INPUT POLARITY CHANGE ALLOWED!

- Part-No. /0 Enable/Disable
- Part-No. /2 Adjust output voltage
- Part-No. /3 Isolation voltage optional min. 3kV AC rms
- Part-No. /4 Isolation voltage optional min. 4kV AC rms
- Part-No. /5 External -IN & -OUT/COM connection allowed

Part - No. Single Output	Input Voltage DC	Output Voltage DC	Output Current 20W
TC-0505	4,5 - 5,5V	5V	4000mA
TC-0512		12V	1670mA
TC-0515		15V	1330mA
TC-0524		24V	833mA
TC-0528		28V	714mA
TC-0548		48V	417mA
TC-0560		60V	333mA

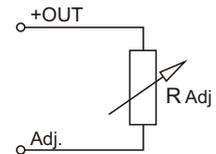
### Part-Nr. /0

Logic compatibility TTL  
**ON:** E/D-Pin open or  
 >=4,6 ... 5,5V

**OFF:** E/D-Pin <=0,6V

Area between  
 0,6V ... 4,6V undefined

### Part-Nr. /2



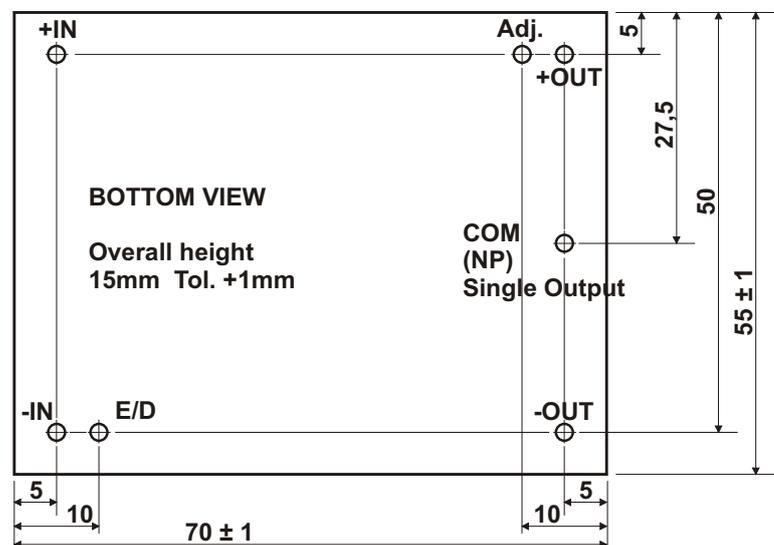
$R_{Adj} \geq xR \leq xR$   
 5V  
 12V 3k 5k  
 15V

Do not use converter  
 without  $R_{Adj}$  !

## Other voltages on request.

ALL DIMENSIONS IN MM  
 MILLIMETERS +/-0,25mm  
 NP (no pin) on single output models  
 COM (common) on dual output models

**Note:** Pin size is 1mm diameter  
 No input polarity change  
 allowed !



# INDUSTRIAL DC/DC Converters

## PWM - regulated - Triple output

Stand: 15/05

7 Watt  
 Series: TC

### Electrical specifications:

Input voltage range:	+/- 10%
Output voltage accuracy:	+/- 3%
Line regulation:	+/- 0,3%
Load regulation:	+/- 0,6%
Efficiency:	min. 65%
Output Ripple & Noise:	150mVp-p
Short circuit protection:	continuous
Ambient temperature::	-40°C to 71°C
Operating temperature max.:	+105°C@Ta=71°C / +118°C@Ta=+85°C
Isolation voltage:	min. 1000V DC
Case material:	metal

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

### Optional:

- Part-No. /0 Enable/Disable
- Part-No. /2 Adjust output voltage
- Part-No. /3 Isolation voltage optional min. 3kV AC rms
- Part-No. /4 Isolation voltage optional min. 4kV AC rms
- Part-No. /5 External -IN & -OUT/COM connection allowed
- Part-No. /9 Ambient temperature -55°C to +85°C

#### Part-Nr. /0

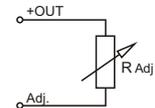
Logic compatibility TTL

**ON:** E/D-Pin open or  
 >=4,6 ... 5,5V

**OFF:** E/D-Pin <=0,6V

Area between  
 0,6V ... 4,6V undefined

#### Part-Nr. /2



$R_{Adj.} \geq xR \leq xR$   
 5V  
 12V 3k 5k  
 15V

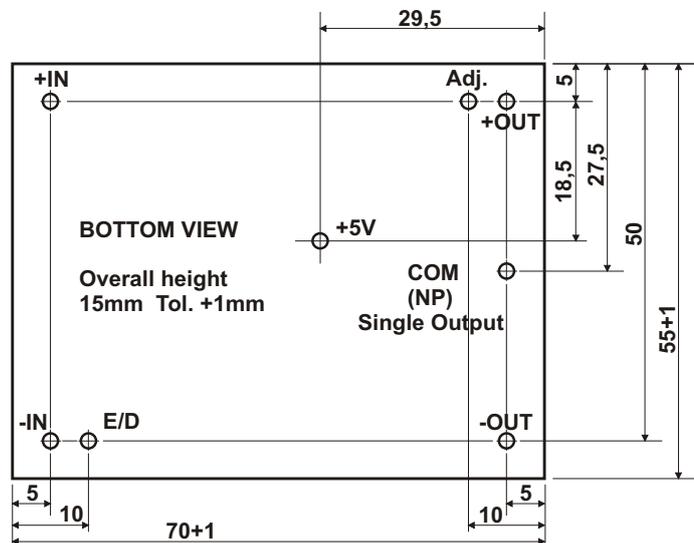
Do not use converter  
 without R<sub>Adj.</sub> !

Part - No. Single Output	Input Voltage DC	Output Voltage DC	Output Current	Output Voltage DC	Output Current
TC-2410D05	21,6 - 26,4V	+/-10V	+/-50mA	5V	1A

### Other voltages on request.

ALL DIMENSIONS IN MM  
 MILLIMETERS +/-0,25mm  
 NP (no pin) on single output models  
 COM (common) on dual output models

**Note:** Pin size is 1mm diameter  
 No input polarity change  
 allowed !



Wide input range 1:2

# INDUSTRIAL DC/DC Converters PWM - regulated

20 Watt  
 25 Watt / 30 Watt  
 Series: TC2

### Electrical specifications:

Input voltage: wide 1:2  
 Output voltage accuracy: +/- 3%  
 Line regulation: +/- 0,2%  
 Load regulation: +/- 1%  
 Efficiency: min. 65%  
 Output Ripple & Noise: 150mVp-p  
 short circuit protection: continuous  
 Isolation voltage: min. 1000V DC  
 Case material: metal epoxy /3; /4

Ambient temperature: -40°C to +71°C  
 Part-No. /9 Ambient temperature optional: -55°C to +85°C  
 Operating temperature max. +105°C @Ta=+71°C / +118°C @Ta +85°C  
 Part-No. /0 Enable/Disable  
 Part-No. /2 Adjust output voltage  
 Part-No. /3 Isolation voltage optional min. 3kV AC rms  
 Part-No. /4 Isolation voltage optional min. 4kV AC rms  
 Part-No. /5 External -IN & -OUT/COM connection allowed  
**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part - No. Single Output	Input Voltage DC	Output Voltage DC	Output Current		
			20W	25W	30W
TC2-1205	9 - 18V	5V	4000mA	5000mA	
TC2-1212		12V	1670mA	2080mA	2500mA
TC2-1215		15V	1330mA	1670mA	2000mA
TC2-1224		24V	833mA	1040mA	1250mA
TC2-1248		48V	417mA	520mA	625mA
TC2-1260		60V	333mA	417mA	500mA
TC2-2405	18 - 36V	5V	4000mA	5000mA	
TC2-2412		12V	1670mA	2080mA	2500mA
TC2-2415		15V	1330mA	1670mA	2000mA
TC2-2424		24V	833mA	1040mA	1250mA
TC2-2448		48V	417mA	520mA	625mA
TC2-2460		60V	333mA	417mA	500mA
TC2-4805	36 - 72V	5V	4000mA	5000mA	
TC2-4812		12V	1670mA	2080mA	2500mA
TC2-4815		15V	1330mA	1670mA	2000mA
TC2-4824		24V	833mA	1040mA	1250mA
TC2-4848		48V	417mA	520mA	625mA
TC2-4860		60V	333mA	417mA	500mA

**Part-Nr. /0**  
 Logic compatibility TTL  
**ON:** E/D-Pin open or >=4,6 ... 5,5V  
**OFF:** E/D-Pin <=0,6V  
 Area between 0,6V ... 4,6V undefined

**Part-Nr. /2**

$R_{Adj} \geq xR \leq xR$   
 5V 5k  
 12V 3k 5k  
 15V

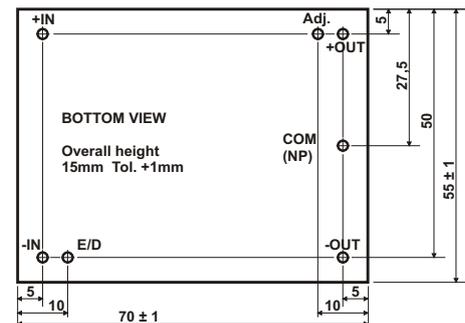
Do not use converter without R<sub>Adj</sub>!

### Other voltages on request.

ALL DIMENSIONS IN MM  
 MILLIMETERS +/-0,25mm  
 NP (no pin) on single output models  
 COM (common) on dual output models

**Note:** Pin size is 1mm diameter  
 No input polarity change allowed!

Part - No. Dual Output	Input Voltage DC	Output Voltage DC	Output Current		
			20W	25W	30W
TC2-1205D	9 - 18V	+/- 5V	+/-2000mA	+/-2500mA	
TC2-1212D		+/-12V	+/- 835mA	+/-1040mA	+/-1250mA
TC2-1215D		+/-15V	+/- 665mA	+/- 835mA	+/-1000mA
TC2-1224D		+/-24V	+/- 417mA	+/- 520mA	+/- 625mA
TC2-1248D		+/-48V	+/- 209mA	+/- 260mA	+/- 313mA
TC2-1260D		+/-60V	+/- 167mA	+/- 209mA	+/- 250mA
TC2-2405D	18 - 36V	+/- 5V	+/-2000mA	+/-2500mA	
TC2-2412D		+/-12V	+/- 835mA	+/-1040mA	+/-1250mA
TC2-2415D		+/-15V	+/- 665mA	+/- 835mA	+/-1000mA
TC2-2424D		+/-24V	+/- 417mA	+/- 520mA	+/- 625mA
TC2-2448D		+/-48V	+/- 209mA	+/- 260mA	+/- 313mA
TC2-2460D		+/-60V	+/- 167mA	+/- 209mA	+/- 250mA
TC2-4805D	36 - 72V	+/- 5V	+/-2000mA	+/-2500mA	
TC2-4812D		+/-12V	+/- 835mA	+/-1040mA	+/-1250mA
TC2-4815D		+/-15V	+/- 665mA	+/- 835mA	+/-1000mA
TC2-4824D		+/-24V	+/- 417mA	+/- 520mA	+/- 625mA
TC2-4848D		+/-48V	+/- 209mA	+/- 260mA	+/- 313mA
TC2-4860D		+/-60V	+/- 167mA	+/- 209mA	+/- 250mA



# INDUSTRIAL DC/DC Converters

## PWM - regulated

Stand: 48/04  
**20 Watt**  
**25 Watt / 30 Watt**  
**Series: TC4**

Ultra wide input range 1:4

### Electrical specifications:

Input voltage: wide 1:4  
Output voltage accuracy: +/- 3%  
Line regulation: +/- 0,2%  
Load regulation: +/- 1%  
Efficiency: min. 65%  
Output Ripple & Noise: 150mVp-p continuous  
Short circuit protection: min. 1000V DC  
Isolation voltage: metal  
Case material: epoxy /3; /4

Ambient temperature: -40°C to +71°C  
Part-No. /9 Ambient temperature optional: -55°C to +85°C  
Operating temperature max. +105°C @Ta=+71°C / +118°C @Ta +85°C  
Part-No. /0 Enable/Disable  
Part-No. /2 Adjust output voltage  
Part-No. /3 Isolation voltage optional min. 3kV AC rms  
Part-No. /4 Isolation voltage optional min. 4kV AC rms  
Part-No. /5 External -IN & -OUT/COM connection allowed

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part - No. Single Output	Input Voltage DC	Output Voltage DC	Output Current																																		
			20W	25W	30W																																
TC4-2405	9 - 36V	5V	4000mA	5000mA																																	
TC4-2412		12V	1670mA	2080mA	2500mA																																
TC4-2415		15V	1330mA	1670mA	2000mA																																
TC4-2424		24V	833mA	1040mA	1250mA																																
TC4-2448		48V	417mA	520mA	625mA																																
TC4-2460	60V	333mA	417mA	500mA		TC4-4805	18 - 72V	5V	4000mA	5000mA		TC4-4812	12V	1670mA	2080mA	2500mA	TC4-4815	15V	1330mA	1670mA	2000mA	TC4-4824	24V	833mA	1040mA	1250mA	TC4-4848	48V	417mA	520mA	625mA	TC4-4860	60V	333mA	417mA	500mA	
TC4-4805	18 - 72V	5V	4000mA	5000mA																																	
TC4-4812		12V	1670mA	2080mA	2500mA																																
TC4-4815		15V	1330mA	1670mA	2000mA																																
TC4-4824		24V	833mA	1040mA	1250mA																																
TC4-4848		48V	417mA	520mA	625mA																																
TC4-4860	60V	333mA	417mA	500mA																																	

Part - No. Dual Output	Input Voltage DC	Output Voltage DC	Output Current		
			20W	25W	30W
TC4-2405D	9 - 36V	+/- 5V	+/-2000mA	+/-2500mA	+/-1250mA
TC4-2412D		+/-12V	+/- 835mA	+/-1040mA	+/-1000mA
TC4-2415D		+/-15V	+/- 665mA	+/- 835mA	+/-1000mA
TC4-2424D		+/-24V	+/- 417mA	+/- 520mA	+/- 625mA
TC4-2448D		+/-48V	+/- 209mA	+/- 260mA	+/- 313mA
TC4-2460D		+/-60V	+/- 167mA	+/- 209mA	+/- 250mA
TC4-4805D	18 - 72V	+/- 5V	+/-2000mA	+/-2500mA	+/-1250mA
TC4-4812D		+/-12V	+/- 835mA	+/-1040mA	+/-1000mA
TC4-4815D		+/-15V	+/- 665mA	+/- 835mA	+/-1000mA
TC4-4824D		+/-24V	+/- 417mA	+/- 520mA	+/- 625mA
TC4-4848D		+/-48V	+/- 209mA	+/- 260mA	+/- 313mA
TC4-4860D		+/-60V	+/- 167mA	+/- 209mA	+/- 250mA

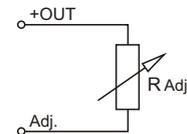
### Part-Nr. /0

Logic compatibility TTL  
**ON:** E/D-Pin open or  
>=4,6 ... 5,5V

**OFF:** E/D-Pin <=0,6V

Area between  
0,6V ... 4,6V undefined

### Part-Nr. /2



$R_{Adj.} \geq xR \leq xR$   
5V  
12V 3k 5k  
15V

Do not use converter  
without  $R_{Adj.}$  !

**Other voltages on request.**

ALL DIMENSIONS IN MM

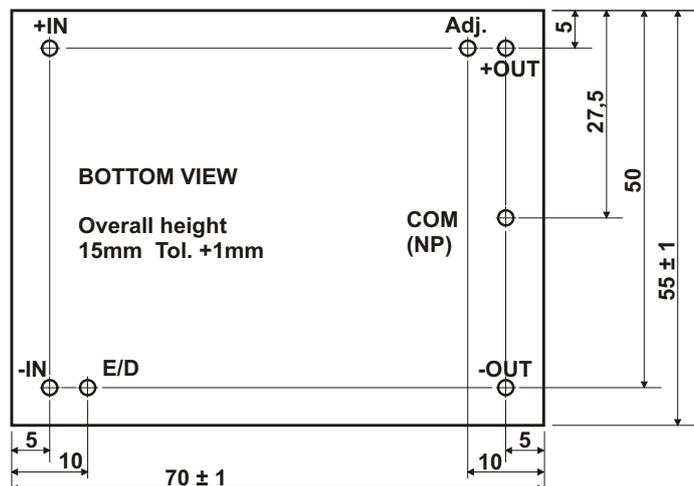
Tolerance +/-0,25mm

NP (no pin) on single output models

COM (common) on dual output models

**Note:** Pin size is 1mm diameter

No input polarity change  
allowed !



# MEDICAL - INDUSTRIAL

## REINFORCED ISOLATION to EN 60601

Stand: 15/05

20W

25W / 30W

Wide input range 1:2  
PWM - regulated

# DC/DC Converters

Series:  
**MED-TC2**

### Electrical specifications:

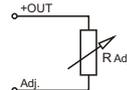
Input voltage:	wide 1:2	Short circuit protection:	continuous
Output voltage accuracy:	+/- 3%	Isolation voltage:	min. 4kV AC rms
Line regulation:	+/- 0,2%	<b>higher isolation voltage on demand</b>	
Load regulation:	+/- 1%	Ambient temperature:	-40°C to +71°C
Efficiency:	min. 65%	Part-No. /9 Ambient temperature optional:	-55°C to +85°C
Output Ripple & Noise:	150mVp-p	Operating temperature max. +105°C @Ta=+71°C / +118°C @Ta +85°C	
Case material:	epoxy	Part-No. /0 Enable/Disable	
Temperature coefficient:	±0,02% / °C	Part-No. /2 Adjust output voltage	

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part - No. Single Output	Input Voltage DC	Output Voltage DC	Output Current		
			20W	25W	30W
MED-TC2-1205	9 - 18V	5V	4000mA	5000mA	--- mA
MED-TC2-1212		12V	1670mA	2080mA	2500mA
MED-TC2-1215		15V	1330mA	1670mA	2000mA
MED-TC2-1224		24V	833mA	1040mA	1250mA
MED-TC2-1248		48V	417mA	520mA	625mA
MED-TC2-1260		60V	333mA	417mA	500mA
---	---	---	---	---	---
MED-TC2-2405	18 - 36V	5V	4000mA	5000mA	--- mA
MED-TC2-2412		12V	1670mA	2080mA	2500mA
MED-TC2-2415		15V	1330mA	1670mA	2000mA
MED-TC2-2424		24V	833mA	1040mA	1250mA
MED-TC2-2448		48V	417mA	520mA	625mA
MED-TC2-2460		60V	333mA	417mA	500mA
---	---	---	---	---	---
MED-TC2-4805	36 - 72V	5V	4000mA	5000mA	--- mA
MED-TC2-4812		12V	1670mA	2080mA	2500mA
MED-TC2-4815		15V	1330mA	1670mA	2000mA
MED-TC2-4824		24V	833mA	1040mA	1250mA
MED-TC2-4848		48V	417mA	520mA	625mA
MED-TC2-4860		60V	333mA	417mA	500mA

**Part-Nr. /0**  
Logic compatibility TTL  
**ON:** E/D-Pin open or  
>=4,6 ... 5,5V  
**OFF:** E/D-Pin <=0,6V  
Area between  
0,6V ... 4,6V undefined

**Part-Nr. /2**

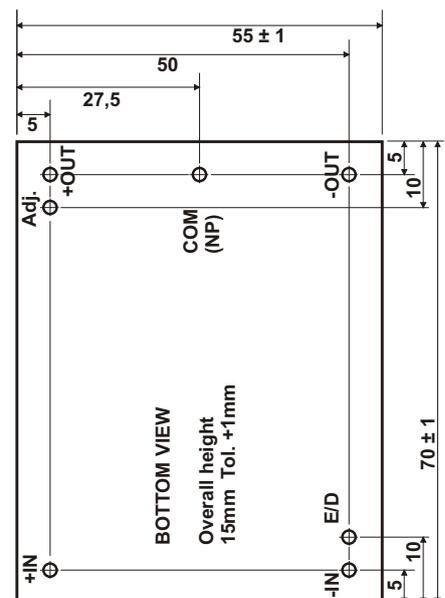


$R_{Adj} \geq xR \leq xR$   
5V  
12V 3k 5k  
15V

Do not use converter  
without R<sub>Adj</sub> !

**Other voltages on request.**

Part - No. Dual Output	Input Voltage DC	Output Voltage DC	Output Current		
			20W	25W	30W
MED-TC2-1205D	9 - 18V	+/- 5V	+/-2000mA	+/-2500mA	+/- - - mA
MED-TC2-1212D		+/-12V	+/- 835mA	+/-1040mA	+/-1250mA
MED-TC2-1215D		+/-15V	+/- 665mA	+/- 835mA	+/-1000mA
MED-TC2-1224D		+/-24V	+/- 417mA	+/- 520mA	+/- 625mA
MED-TC2-1248D		+/-48V	+/- 209mA	+/- 260mA	+/- 313mA
MED-TC2-1260D		+/-60V	+/- 167mA	+/- 167mA	+/- 250mA
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MED-TC2-2405D	18 - 36V	+/- 5V	+/-2000mA	+/-2500mA	+/- - - mA
MED-TC2-2412D		+/-12V	+/- 835mA	+/-1040mA	+/-1250mA
MED-TC2-2415D		+/-15V	+/- 665mA	+/- 835mA	+/-1000mA
MED-TC2-2418D		+/-18V	+/- 555mA	+/- 694mA	+/- 625mA
MED-TC2-2424D		+/-24V	+/- 417mA	+/- 520mA	+/- 313mA
MED-TC2-2448D		+/-48V	+/- 209mA	+/- 260mA	+/- 250mA
MED-TC2-2460D	+/-60V	+/- 167mA	+/- 167mA	+/- 209mA	
---	---	---	---	---	---
MED-TC2-4805D	36 - 72V	+/- 5V	+/-2000mA	+/-2500mA	+/- - - mA
MED-TC2-4812D		+/-12V	+/- 835mA	+/-1040mA	+/-1250mA
MED-TC2-4815D		+/-15V	+/- 665mA	+/- 835mA	+/-1000mA
MED-TC2-4824D		+/-24V	+/- 417mA	+/- 520mA	+/- 625mA
MED-TC2-4848D		+/-48V	+/- 209mA	+/- 260mA	+/- 313mA
MED-TC2-4860D		+/-60V	+/- 167mA	+/- 167mA	+/- 250mA



**Note:** Pin size is 1mm diameter  
No input polarity change  
allowed !

**ALL DIMENSIONS IN MM**  
MILLIMETERS +/-0,25mm  
NP (no pin) on single output models  
COM (common) on dual output models

## AUTOMOTIVE DC/DC Converters

**12 Watt  
 Series: FSD**

Wide input range

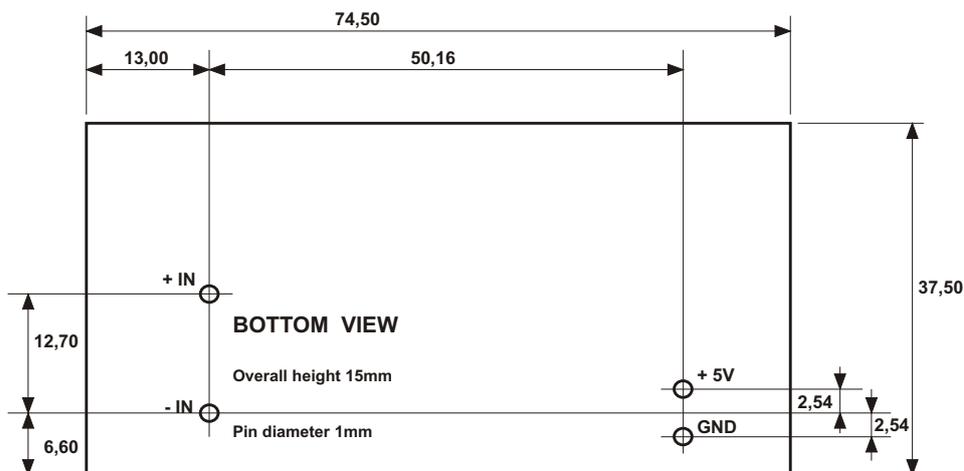
**Step Down**

### Electrical specifications:

Input voltage:	5,5 - 24V
Output voltage accuracy:	+/- 3%
Line regulation:	+/- 0,5%
Load regulation:	+/- 1%
Efficiency:	72%
9,0 ... 24V: Ambient temperature	-40°C to +85°C without derating
5,5 ... 9V: Ambient temperature	-40°C to +60°C without derating
Isolation voltage:	none
Short circuit protection:	continuous
Output ripple & noise:	typ. 50mVp-p
Low Voltage Lockout	

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part-No.	Input voltage		Output voltage	Output current
<b>FSD-1205</b>	12V (5,5 - 24 )	<b>NO ISOLATION</b>	5V	2,5A



**ALL DIMENSIONS IN MM**  
 Tolerance +/- 0,5mm

## AUTOMOTIVE DC/DC Converters Step Down

**10 Watt  
 Series: FSD**

Wide input range

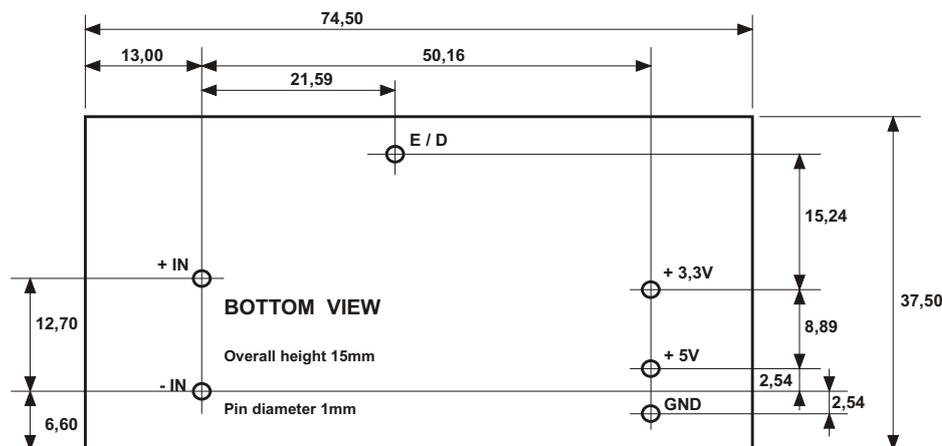
### Electrical specifications:

Input voltage:	5,5 - 24V
Output voltage accuracy:	5V +/- 2,5% ; 3,3V +/- 3,5%
Line regulation:	+/- 1%
Load regulation:	+/- 3%
Efficiency:	60%
Ambient temperature:	-40°C to +85°C without derating
Isolation voltage:	none
Short circuit protection:	continuous
Output ripple & noise:	typ. 50mVp-p
Low Voltage Lockout	

CAUTION: NO INPUT POLARITY CHANGE ALLOWED!

Part-No.	Input voltage		Output voltage	Output current
<b>FSD-120503,3</b>	<b>12V (5,5 - 24 )</b>	<b>NO ISOLATION</b>	<b>5,0V</b>	<b>1,0 A</b>
			<b>3,3V</b>	<b>1,5 A</b>

E/D Pin = Enable / Disable pin  
 on : E/D-pin open 4,6 - 5,5V  
 off : E/D-pin close <= 0,6V area undefined 0,6 till 4,6V



**All dimensions in mm  
 Tolerance +/- 0,5mm**

## INDUSTRIAL DC/DC Converters Step Down

**12,5 Watt**  
**Series: DSSD5**

Wide input range

### Electrical specifications:

Input voltage: wide 1 : 5  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 0,5%  
 Load regulation: +/- 2%  
 Efficiency: min. 75%

Isolation voltage: none  
 Short circuit protection: continuous  
 Ambient temperature: -40°C to +85°C  
 Output ripple & noise: typ. 50mVp-p  
 Case material: black plastic

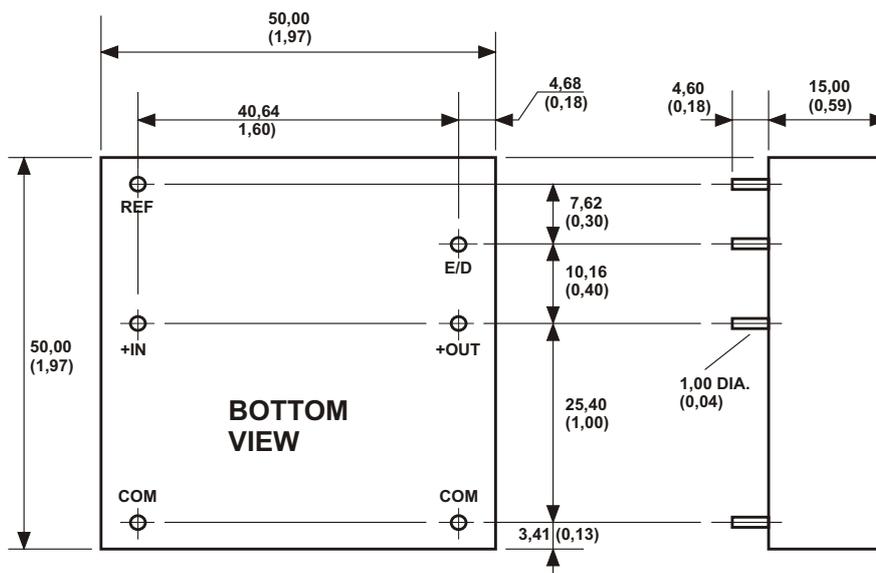
CAUTION: NO INPUT POLARITY CHANGE ALLOWED!

Part-No.	Input voltage	NO ISOLATION	Output voltage	Output current
<b>DSSD5-xyyy</b>	( x - 50 ) standard 60V on request  Input voltage must be 3V above output voltage			5,1V 6,0V 9,0V 12,0V 15,0V 24,0V

Any other output voltages available.

E/D Pin: ON: < 1,5V  
 OFF: > 1,5V

Ref. Pin: Referenz Uin 9V Ref. 4,0V @ 2,3mA  
 Uin 12V Ref. 4,9V @ 2,8mA  
 Uin >15V Ref. 5,0V @ 3,0mA



ALL DIMENSIONS IN MM (INCHES)  
 Tolerance +/- 0,5mm (+/-0,02")

Stand: 07/05

Wide input range

## INDUSTRIAL DC/DC Converters Step Down

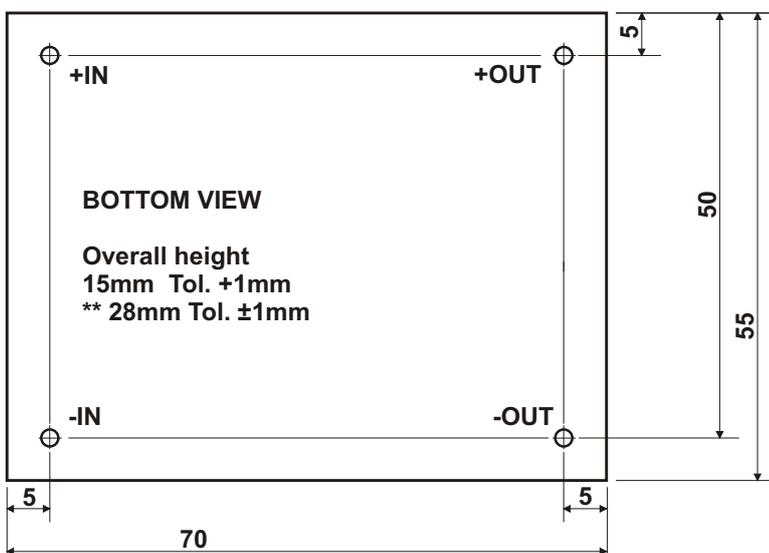
**30 - 50 Watt**  
**Series: TSD2**

### Electrical specifications:

Input voltage:	wide	Ambient temperature:	-40°C to +71°C
Output voltage accuracy:	+/- 3%	Operating temperature:	max. +105°C
Line regulation:	+/- 1%	Isolation voltage:	none
Load regulation:	+/- 3%	Short circuit protection:	continuous
Efficiency:	86%	Output ripple & noise:	max. 100mVp-p
		Low Voltage Lockout	

CAUTION: NO INPUT POLARITY CHANGE ALLOWED!

Part-No.	Input voltage		Output voltage	Output current
<b>TSD2-2412</b>	<b>24V</b> (18 - 36)	<b>NO ISOLATION</b>	<b>12V</b>	<b>3 A</b>
			<small>Other voltages on request</small>	
<b>TSD2-4812**</b>	<b>48V</b> (30 - 72)	<b>NO ISOLATION</b>	<b>12V</b>	<b>3 A</b>
			<small>Other voltages on request</small>	



**NOTE:**  
 Pin size is 1mm diameter.

**ALL DIMENSIONS IN MM**  
 Tolerance +/- 0,5mm

# INDUSTRIAL

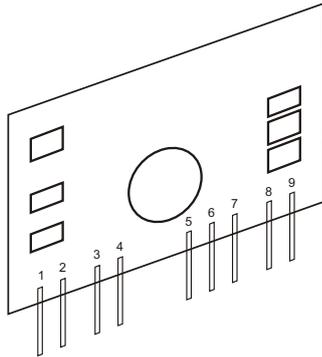
Logic Application

## DC/DC Converters

Stand: 38/01  
**25 Watt**  
**Series: LSD**

Low Voltage / High current

Synchronous switching



### Electrical specifications:

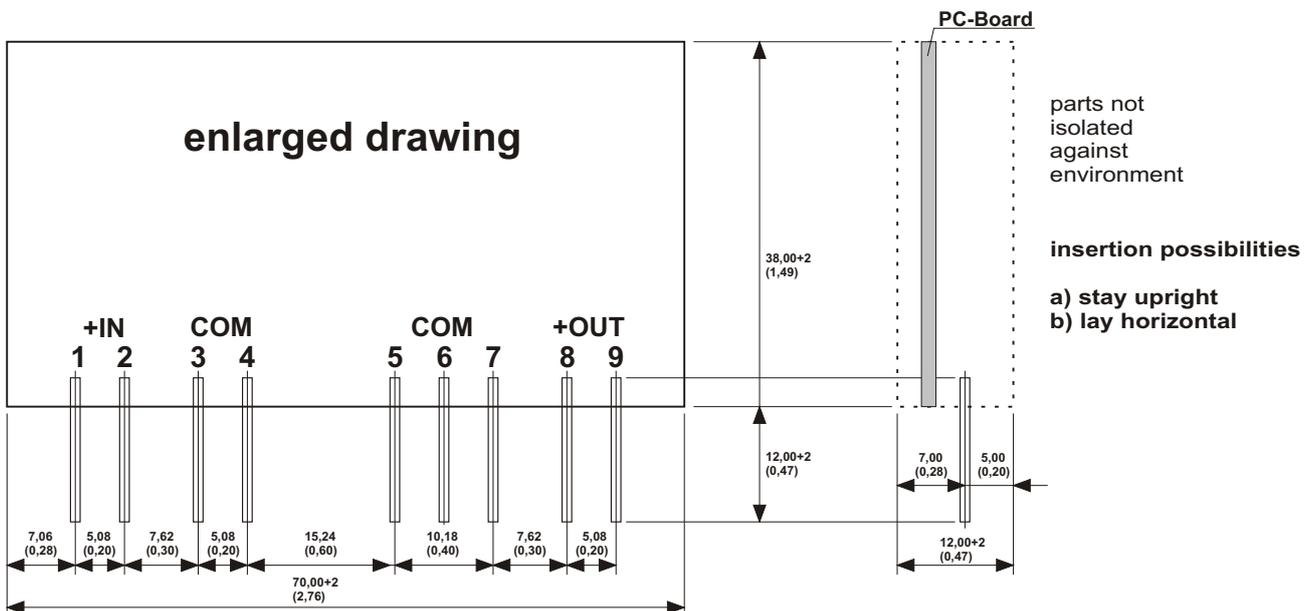
Input voltage:	4,5 - 5,5V
Output voltage accuracy:	+/- 3%
Line regulation:	+/- 0,5%
Load regulation:	+/- 1%
Efficiency:	88%
Ambient temperature:	-40°C to +71°C no derating
Operating temperature:	IC max. +105°C
Isolation voltage:	none
Short circuit protection:	continuous
Output ripple & noise:	max. 200mVp-p
Operating frequency:	~350kHz

CAUTION: NO INPUT POLARITY CHANGE ALLOWED!

Part-No.	Input voltage	NO ISOLATION	Output voltage	Output current
LSD-0503,3	5V 4,5 - 5,5V		3,3V <b>1,2 - 3,6V</b> upon request	7,5 A continuous

parallele configurability total current = 7A x n  
 $\sum I_{out} \leq 7A \times n$       n = number of modules

ALL DIMENSIONS IN MM; (INCHES)  
 MILLIMETERS +/-0,25mm  
 (INCHES +/- 0,01")



# INDUSTRIAL DC/DC Converters Step Up

Stand: 18/01

**20-30 Watt**  
 from 5Vin ~30W  
**Series: TSU3**

Wide input range 1:3

### Important

Input capacitor 20x Elcos with 470µF/10V +150°C  
 Output capacitor 5x Elcos with 330µF/16V +105°C  
 is a must.

Input R&N <300mV

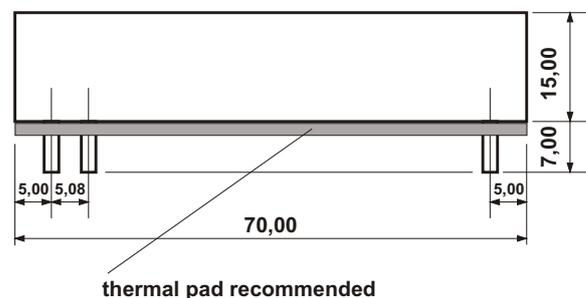
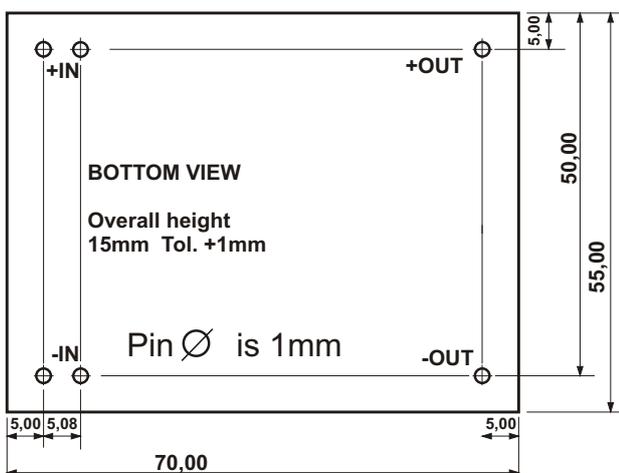
### Electrical specifications:

Input voltage:	3 - 9V
Output voltage accuracy:	+/- 2%
Line regulation:	+/- 1%
Load regulation:	+/- 3%
Efficiency:	73 - 85%
Ambient temperature:	-40°C to +71°C
Operating temperature:	max. +95°C.
Isolation voltage:	none
Short circuit protection:	5 sec
no under voltage Lockout therefore 12A slow fuse recommended	
<b>CAUTION: NO INPUT POLARITY CHANGE ALLOWED!</b>	

max permissible input ripple current without any other external input caps 1,5A

Part-No.	Input voltage	NO ISOLATION	Output voltage	Output current
TSU3-0512	5V (3 - 9)		12V <small>Other voltages on request</small>	1,6-2,5 A

converter can be tested for a short time without input / output capacitor



**ALL DIMENSIONS IN MM**  
 Tolerance +/- 0,5mm

# INDUSTRIAL DC/DC Converters Step Down

Stand: 48/02  
**100 - 300 Watt**  
**Series: HSD2**  
**HSD3**

Wide input range  
 1:2 ; 1:3

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

**Electrical specifications:**

Output voltage accuracy: +/- 3%  
 Line regulation: +/- 1%  
 Load regulation: +/- 3%  
 Efficiency: 91% @48V Vin  
 Ambient temperature: -40°C to +71°C no derating

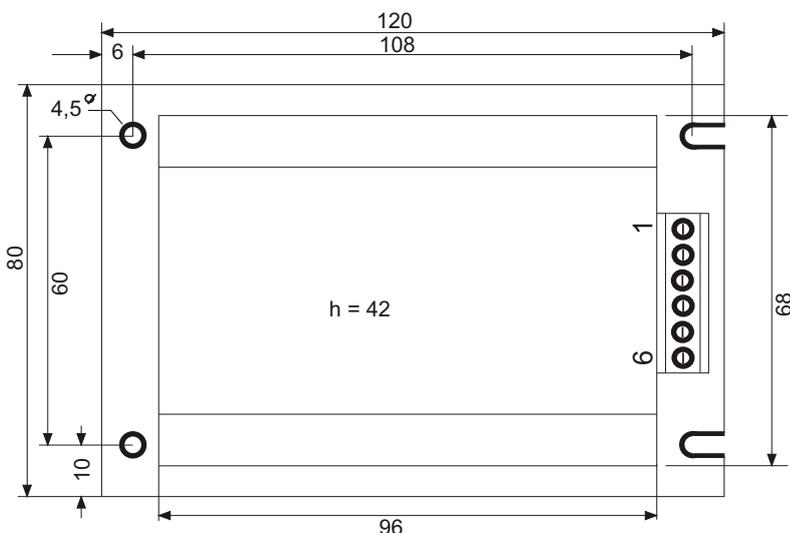
Operating temperature: max. +105°C  
 Isolation Voltage: none  
 Short circuit protection: continuous  
 Output ripple & noise: max. 200mVp-p  
 Low Voltage Lockout

**2200µF / 105°C Elco at Input & Output is a must.**

Part - No.	Input voltage	N O ISOLATION	Output voltage	Output current
HSD2-4524	45V (30- 60V)		Other voltages	24V
HSD2-4524	45V (30- 60V)		24V	12,5A**
HSD3-8024	80V (40-120V)		24V	4,16A / 6,25A / 8,30A*

**\* With heatsink 400cm<sup>2</sup> / 2mm thickness !**

**\*\*with proper heatsink to avoid heatsink temperatures above +85°C**



**Pin Connections**

Pin. NO.	PIN FUNCTION
	SINGLE
1	+ INPUT
2	+ INPUT
3	GND
4	GND
5	+ OUTPUT
6	+ OUTPUT

**ALL DIMENSIONS IN MM**  
 Tolerance +/-0,5mm  
 Heatsink & Fixingplate:  
 Aluminium 3mm

**NOTE:** Pin size is 1mm diameter.  
 No input polarity change allowed !

# INDUSTRIAL DC/DC Converters Step Down

Stand: 17/04

100 Watt

Series: HSD3

Wide input range 1:3

### Electrical specifications:

Output voltage accuracy: +/- 3%  
 Line regulation: +/- 1%  
 Load regulation: +/- 3%  
 Efficiency: 91% @48V Vin  
 Ambient temperature: -40°C to +85°C no derating

### CAUTION: NO INPUT POLARITY CHANGE ALLOWED!

Operating temperature: max. +105°C  
 Isolation Voltage: none  
 Short circuit protection: continuous  
 Output ripple & noise: max. 200mVp-p  
 Low Voltage Lockout  
 Part-No.: /A EN55011 Input Class A  
 Part-No.: /B EN55011 Input Class B

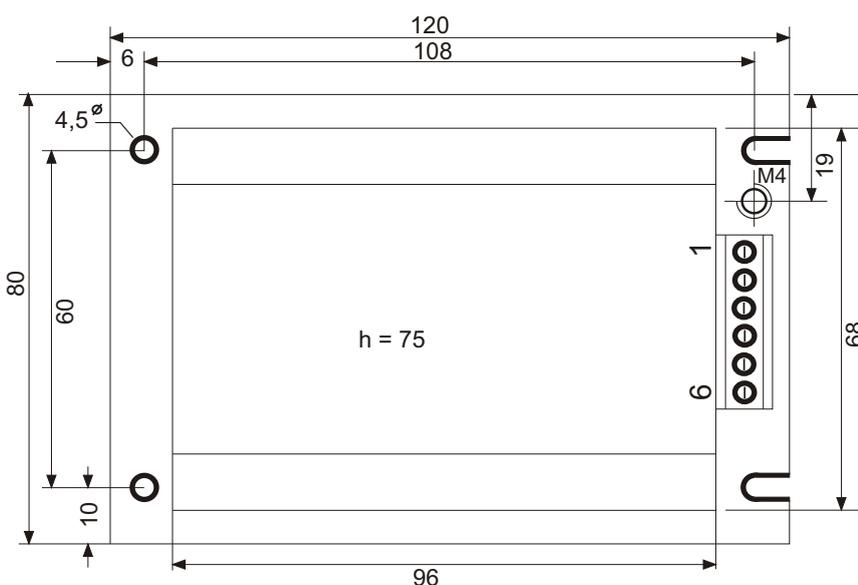
Part - No.	Input voltage	N O ISOLATION	Output voltage	Output current
HSD3-8024/A	80V (40-120V)		Other voltages 24V on request	4,17A

### Pin Connections

Pin. NO.	PIN FUNCTION
	SINGLE
1	+ INPUT
2	+ INPUT
3	- IN
4	- OUT
5	+ OUTPUT
6	+ OUTPUT

ALL DIMENSIONS IN MM  
 Tolerance +/-0,5mm

Heatsink & Fixingplate:  
 Aluminium 3mm



### NOTE:

No input polarity change  
 allowed !

Stand: 14/05

# INDUSTRIAL DC/DC Converters

**2x3W = 6W**  
**Series: LHVI**

**Unregulated**

**High Isolation**  
**4000V AC RMS Continuously**

Applications:  
 - IGBT auxiliary supply  
 - Medical application

**Electrical specifications:**

Output voltage accuracy: unregulated  
 Short circuit protection: continuous  
 Ambient temperature: -40°C to +71°C  
 Isolation voltage: min. 4000V AC rms continuously  
 Primary / Secondary: isolation test voltage 10 kV  
 du/dt...>100kV/μs  
 Secondary 1/ Secondary 2: isolation test voltage 10kV  
 du/dt...>100kV/μs  
 Capacitance Prim/Sec/Sec: typical <15pF  
 Part-No.: /2 partial-discharge 2,3kV AC free ( TE - frei )  
 Part-No.: /5 5kV AC discharge free available

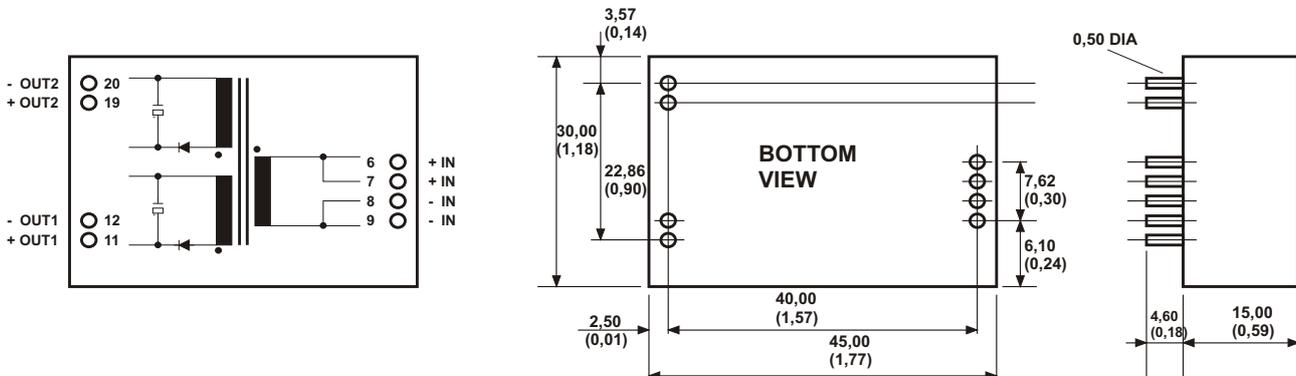
**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

add isolation quality specifier to part-no. e. g. /2

Part-No.	Input Voltage DC	Output Voltage DC	Output current mA	Efficiency
LHVI-051515	4,75V - 5,5V	15V / 15V	200mA / 200mA	75%
LHVI-121515	10,8V - 13,2V	15V / 15V	200mA / 200mA	76%
LHVI-151515	13,5V - 16,5V	15V / 15V	200mA / 200mA	76%
LHVI-241515	21,6V - 26,4V	15V / 15V	200mA / 200mA	76%
LHVI-481515	43,2V - 52,8V	15V / 15V	200mA / 200mA	76%

**any other IN & OUTPUT voltage available also with unequal output voltages**

Additional 220μF Input & Output Capacitors recommended  
 Ripple & Noise depend on load & external capacitors



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,5mm  
 (INCHES +/- 0,02")  
 All pins on a 2,54mm pitch.

# INDUSTRIAL DC/DC Converters

Stand: 15/05

**2x3W = 6W**  
**Series: LHVI / 9**

*imbalanced-outputs*

**High Isolation  
 4000V AC RMS Continuously**

## Unregulated

Applications:  
 - IGBT auxiliary supply  
 - Medical application

### Electrical specifications:

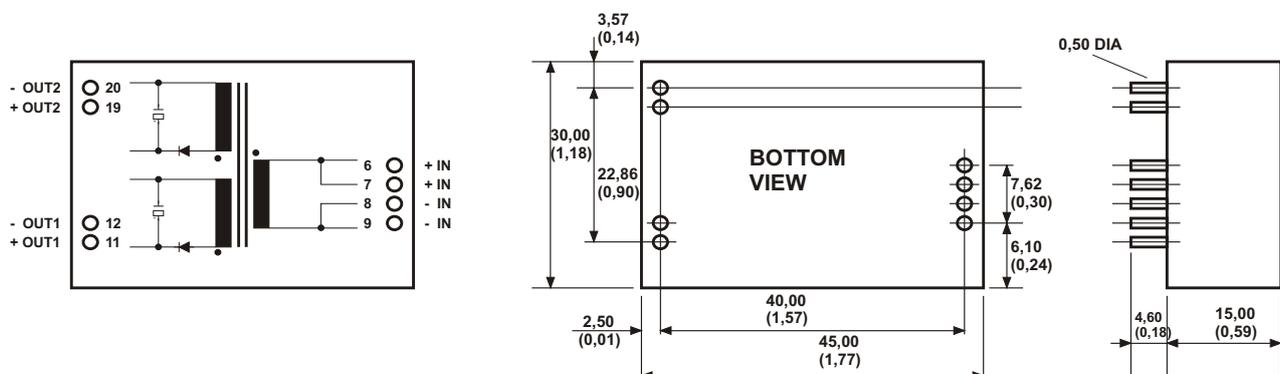
Output voltage accuracy: unregulated  
 Short circuit protection: continuous  
 Ambient temperature: -40°C to +71°C  
 Isolation voltage: min. 4000V AC rms continuously  
 Primary / Secondary: isolation test voltage 10 kV  
 du/dt...>100kV/μs  
 Secondary 1/ Secondary 2: isolation test voltage 10kV  
 du/dt...>100kV/μs  
 Capacitance Prim/Sec/Sec: typical <15pF  
 Part-No.: /2 partial-discharge 2,3kV AC free ( TE - frei )  
 Part-No.: /5 5kV AC discharge free available

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

add isolation quality specifier to part-no. e. g. /2

Part-No.	Input Voltage DC	Output Voltage DC	Output current mA		Zero-Load Condition		Eff. %
			U1	U2			
LHVI-121515/9	10,8V - 13,2V	15V / 15V	380mA 15,2V	20mA 15,8V	18,3V 15,4V ±0,4%	80%	
LHVI-121507/2/9	10,8V - 13,2V	15V / 7V	300mA 15,0V	200mA 7,0V	16,4V 7,4V ±0,4%	80%	
LHVI-151705,6/5/9	13,5V - 16,5V	17V / 5,6V	150mA 17,0V	150mA 5,6V	16,4V 7,4V ±0,4%	80%	

**Additional 220μF Input & Output Capacitors recommended**  
**Ripple & Noise depend on load & external capacitors**



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,5mm  
 (INCHES +/- 0,02")  
 All pins on a 2,54mm pitch.

Stand: 09/03

Unregulated

## INDUSTRIAL DC/DC Converters

6W

Series: LLHVI

High Isolation  
 partial discharge free

### Electrical specifications:

Output voltage accuracy: unregulated  
 Short circuit protection: continuous  
 Ambient temperature: -40°C to +71°C  
 Efficiency: min. 75%

Primary / Secondary: isolation test voltage 10kV  
 du/dt...>100kV/μs

Secondary 1/ Secondary 2: isolation test voltage 10kV  
 du/dt...>100kV/μs

Capacitance Prim/Sec/Sec: typical <11pF

Part-No.: /5 5kV AC partial-discharge free ( TE -frei )

Part-No.: /6 6kV AC partial-discharge free

Part-No.: /7 7kV AC partial-discharge free

add isolation quality specifier to part-no. e. g. /5

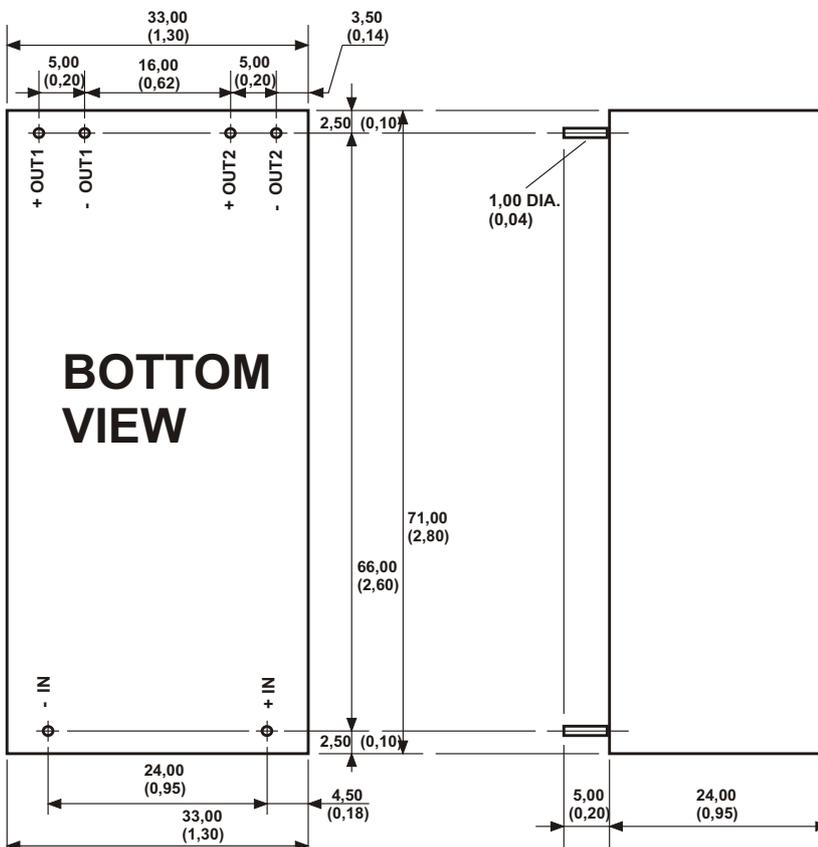
CAUTION: NO INPUT POLARITY CHANGE ALLOWED!

Part-No.	Input Voltage DC	Output Voltage DC	Output power max.
LLHVI-05xxyy	4,75V - 5,5V	xx V / yy V	3W max./ 3W max.
LLHVI-12xxyy	10,8V - 13,2V	xx V / yy V	any configuration possible
LLHVI-15xxyy	13,5V - 16,5V	xx V / yy V	
LLHVI-24xxyy	21,6V - 26,4V	xx V / yy V	
LLHVI-48xxyy	43,2V - 52,8V	xx V / yy V	

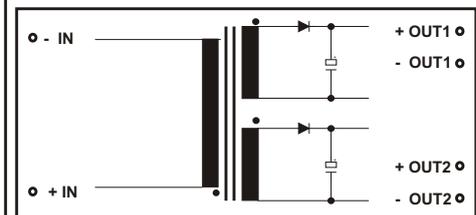
example:  
 LLHVI-121507

any IN & OUTPUT voltage available also with unequal output voltages

Additional 220μF Input & Output Capacitors recommended  
 Ripple & Noise depend on load & external capacitors



up to 10kV partial-discharge ~ 5pC  
 barrier Caps < 11pF



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,5mm  
 (INCHES +/- 0,02")  
 All pins on a 2,54mm pitch.

Stand: 15/05

## INDUSTRIAL DC/DC Converters

2x7,5W = 15W  
 Series: MHVI

Unregulated

High Isolation  
 4000V AC RMS Continuously

Applications:  
 - IGBT auxiliary supply  
 - Medical application

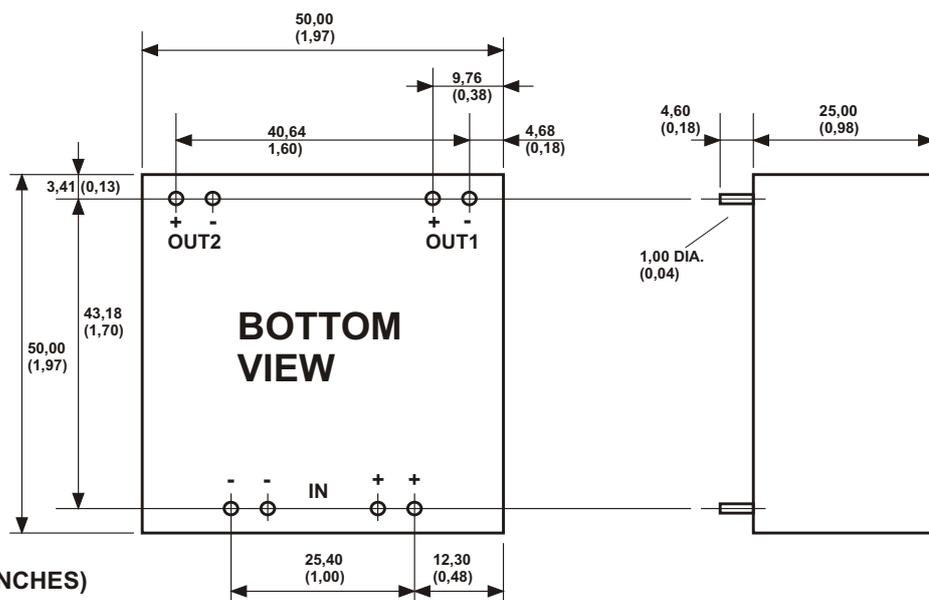
### Electrical specifications:

Output voltage accuracy: unregulated  
 Short circuit protection: continuous  
 Ambient temperature: -40°C to +71°C  
 Isolation voltage: min. 4000V AC rms continuously  
 Primary / Secondary: isolation test voltage 10 kV  
 du/dt...>100kV/μs  
 Secondary 1/ Secondary 2: isolation test voltage 10kV  
 du/dt...>100kV/μs  
 Capacitance Prim/Sec/Sec: typical <15pF  
 Part-Nr.: /2 Partial-discharge 2,3kV AC free ( TE - frei )  
**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

add isolation quality specifier to part-no. e. g. /2

Part - No.	Input Voltage DC	Output Voltage DC	Output current mA	Efficiency
MHVI-051515	4,75V - 5,5V	15V / 15V	500mA / 500mA	75%
MHVI-121515	10,8V - 13,2V	15V / 15V	500mA / 500mA	76%
MHVI-151515	13,5V - 16,5V	15V / 15V	500mA / 500mA	76%
MHVI-241515	21,6V - 26,4V	15V / 15V	500mA / 500mA	76%
MHVI-481515	43,2V - 52,8V	15V / 15V	500mA / 500mA	76%

Additional 470μF input & output capacitors recommended  
 Ripple & Noise depend on load & external capacitors



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,5mm  
 (INCHES +/- 0,02")  
 All pins on a 5,08mm pitch.

# INDUSTRIAL DC/DC Converters

Stand: 49/01

15W

Series: MLHVI

Unregulated

High Isolation  
 4500V partial discharge free

### Electrical specifications:

Output voltage accuracy: unregulated  
 Short circuit protection: continuous  
 Ambient temperature: -40°C to +71°C  
 Efficiency: min. 75%

Primary / Secondary: isolation test voltage 10 kV  
 du/dt...>100kV/μs  
 Secondary 1/ Secondary 2: isolation test voltage 10kV  
 du/dt...>100kV/μs  
 Capacitance Prim/Sec/Sec: typical <12-13pF  
 Partial-discharge 4,5kV AC free ( TE - frei )

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

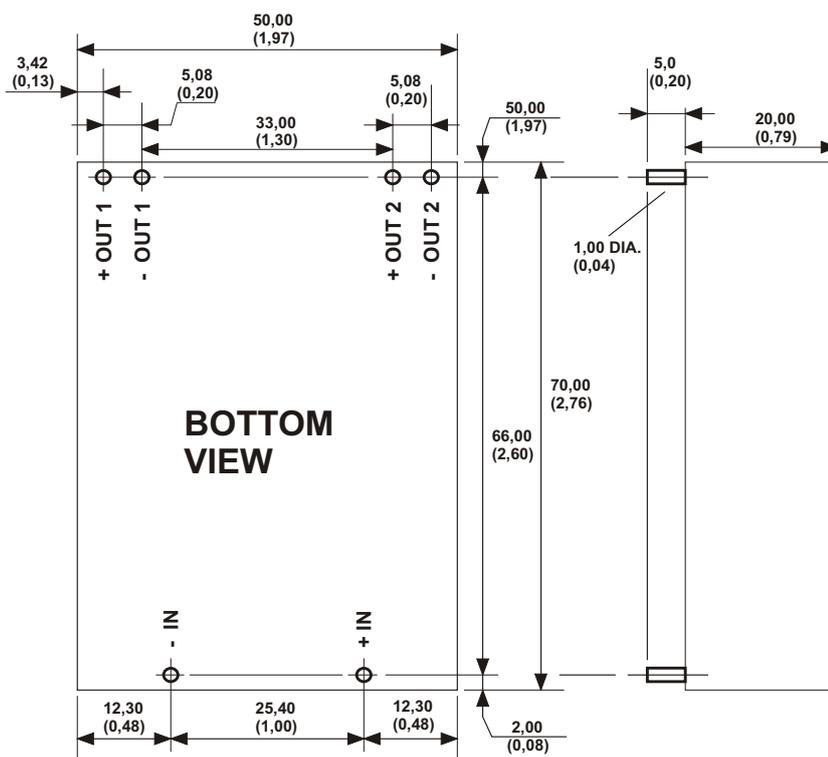
Part - No.	Input Voltage DC	Output Voltage DC	Output power max.
MLHVI-05xxyy	4,75V - 5,5V	xx V / yy V	7,5W max. / 7,5W max.
MLHVI-12xxyy	10,8V - 13,2V	xx V / yy V	any
MLHVI-15xxyy	13,5V - 16,5V	xx V / yy V	configuration
MLHVI-24xxyy	21,6V - 26,4V	xx V / yy V	possible
MLHVI-48xxyy	43,2V - 52,8V	xx V / yy V	

example:  
 MLHVI-121507

unbalanced output voltage & output power to customer demand available

Additional 470μF input & output capacitors recommended

Ripple & Noise depend on load & external capacitors



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,5mm  
 (INCHES +/- 0,02")  
 All pins on a 5,08mm pitch.

## INDUSTRIAL DC/DC Converters

Stand: 39/04

**60 Watt**  
**Series: HVI**

Wide input range 1:2

**High Isolation Barrier**  
**4000V AC RMS continuously**

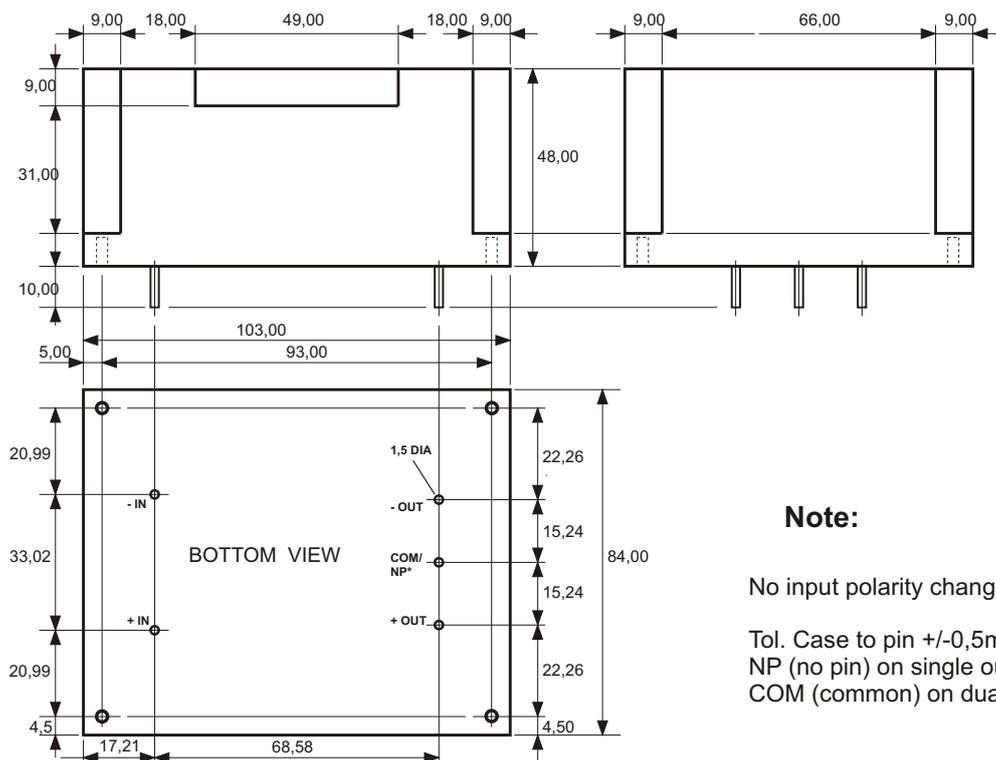
### Electrical specifications:

Ambient temperature: -40°C to +71°C no derating  
 Operating temperature: max. +105°C  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 0,2%  
 Load regulation: +/- 1%  
 Efficiency: 72%  
 Isolation voltage: min. 4kV AC RMS ( Test voltage 10kV )  
 Short circuit protection: continuous  
 Output ripple & noise: 150mVp-p  
**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Applications:  
 - IGBT auxiliary supply  
 - Medical application

Part-No.	Input voltage	4kV AC RMS ISOLATION	Output voltage	Output Power
HVI-12xx(D)	12V ( 9 - 18V)		3,3V to 60V single or dual	60 Watt
HVI-24xx(D)	24V (16 - 36V)			
HVI-48xx(D)	48V (34 - 72V)			
			Other voltages on request	

Order code example: HVI-2415 60W single output  
 HVI-2412D 60W dual output



### Note:

No input polarity change allowed.

Tol. Case to pin +/-0,5mm  
 NP (no pin) on single output models  
 COM (common) on dual output models

## INDUSTRIAL DC/DC Converters

Stand: 38/04  
**60 Watt**  
 Series: HVI4

Wide input range 1:4

High Isolation Barrier  
 4000V AC RMS continuously

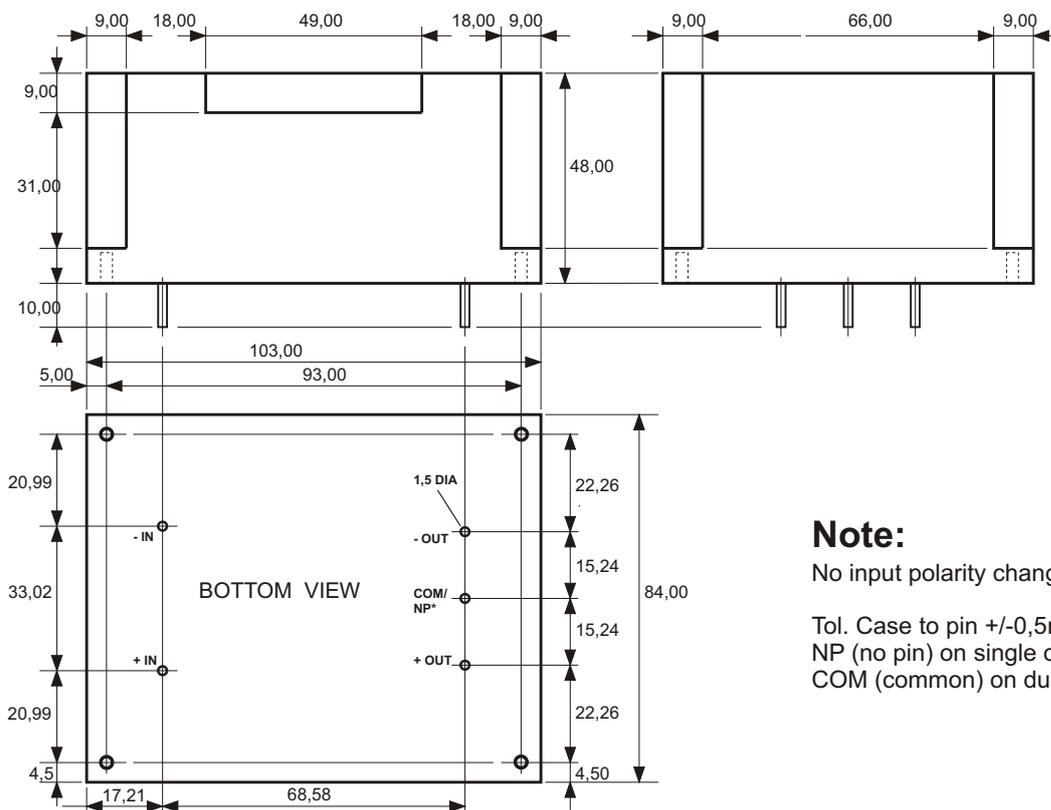
### Electrical specifications:

Ambient temperature: -40°C to +71°C derating (from 50°C 1%/°C)  
 Operating temperature: max. +105°C  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 0,2%  
 Load regulation: +/- 1%  
 Efficiency: 72%  
 Isolation voltage: min. 4kV AC RMS  
 Short circuit protection: continuous  
 Output ripple & noise: 150mVp-p  
**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Applications:  
 - IGBT auxiliary supply  
 - Medical application

Part-No.	Input voltage	4kV AC RMS ISOLATION	Output voltage	Output current
<b>HVI4-2424</b>	<b>24V ( 9 - 36V)</b>		<b>24V</b> Other voltages on request	<b>2,5A</b>

Input capacitor requested 1000µF  
 Output capacitor max. 1000µF



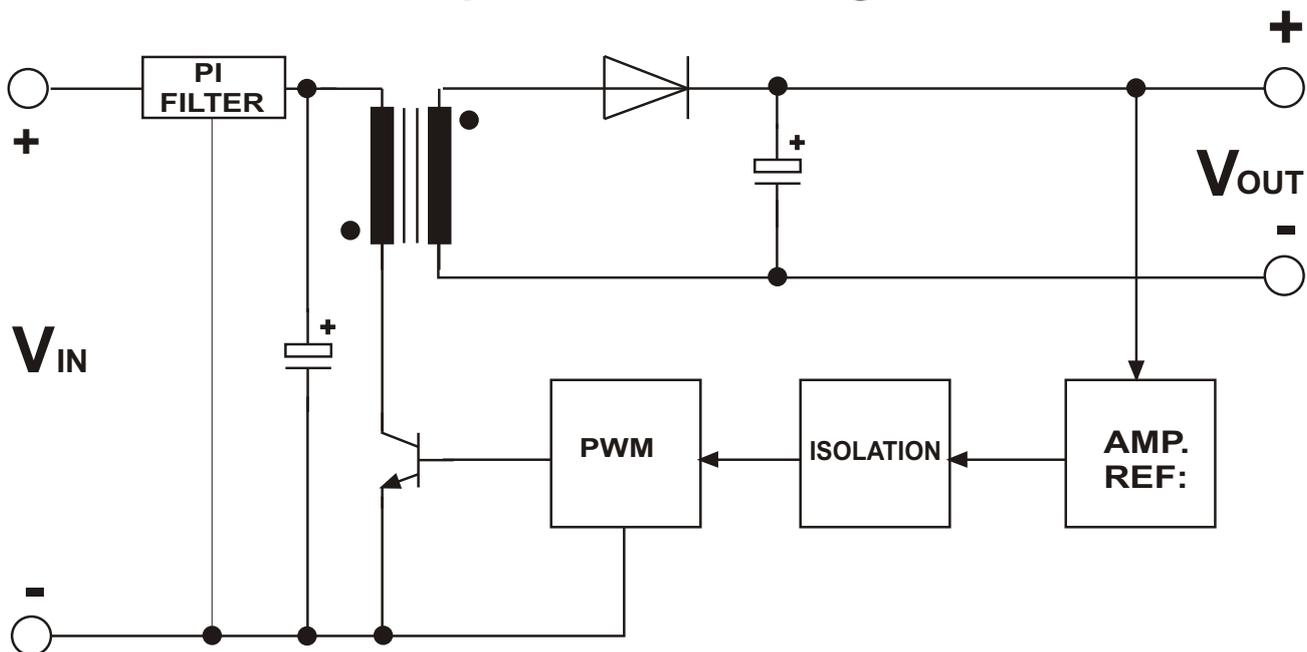
### Note:

No input polarity change allowed.

Tol. Case to pin +/-0,5mm  
 NP (no pin) on single output models  
 COM (common) on dual output models

## COMMERCIAL DC/DC Converters 0,5W to 100W

Operating temperature  
 -25°C up to +71°C regulated  
 -40°C up to +85°C unregulated



### **PC board mounting**

Size: smallest 0,5 x 0,4 x 0,25 inches ( 1 inch = 25,4mm)

Case style, depending on each series.

Case material: non-conductive black plastic, aluminum or brass

### **General specification:**

All datas typical at normal line, full load and 25°C ambient temperature

### **Input specification:**

Voltage accuracy: @ 5V; -5 / +10%; other voltages +/-10%; for wide-input voltage range see data sheets, input capacitor recommended. Input Pi-filtered.

### **Output specification:**

Switching frequency	depends on converter type
Isolation	1000V DC min.
Isolation resistance	10 GOhm
Isolation capacitance	40pF max. average 25pF
Operating temperature	-25°C up to 70°C
Storage temperature	-55°C up to 125°C
Efficiency	regulated converters min. 50% unregulated types min. 60%

Single or dual output available

Short circuit protected, varies from series to series

100% burn in and triple tested, to provide no faulty parts

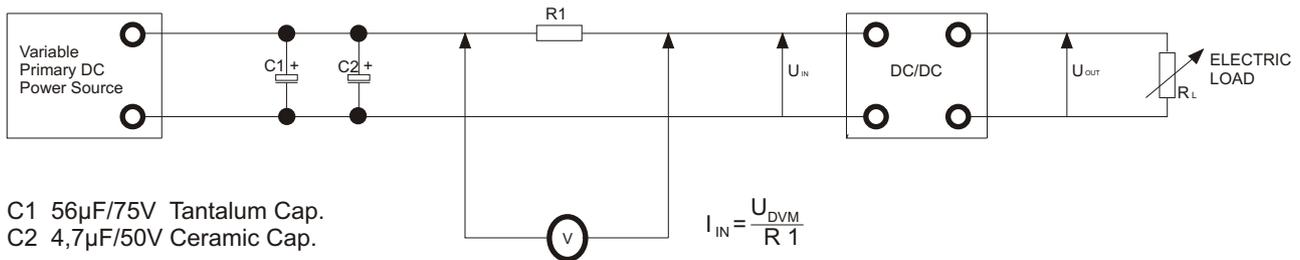
1 year warranty

Very economic price tags

For Ethernet- and Cheapernet applications ask for special datasheets!!

## COMMERCIAL DC/DC Converters

### TEST CIRCUITRY & DEFINITION



C1 56 $\mu$ F/75V Tantalum Cap.  
 C2 4,7 $\mu$ F/50V Ceramic Cap.

R1 0,1 Ohm, 2W, 0,1%, no-conductive  
 R<sub>L</sub> selected for min-max Output-Current

**LINE REGULATION:** The change in output of a regulated converter in percent as the input voltage is varied from nominal to high line and from nominal to low line. Output load & ambient temperature are hold constant.

$$\text{Line regulation} = \frac{U_{\text{out max}} - U_{\text{out min}}}{U_{\text{in max}} - U_{\text{in min}}} \times 100$$

**EFFICIENCY:** Ratio of the output power to the input power in percent at nominal input & output levels, at full load conditions.

$$\text{Efficiency} = \frac{U_{\text{out}} \times I_{\text{out}}}{U_{\text{in}} \times I_{\text{in}}} \times 100$$

**INPUT REFLECTED RIPPLE:** Tested with scope 20MHz bandwidth. Testprobe RG174 COAX, 50 Ohm, AC-coupled, Multiply by 2 to obtain p-p value, measured at input-side.

**OUTPUT RIPPLE & NOISE:** Same test equipment as before all noise measurements 20 Hz - 20MHz bandwidth measured at output-side.

**LOAD REGULATION:** The max. deviation of the output voltage in percent, as the load is changed from minimum to maximum rated load, while input voltage is nominal and ambient temperature is constant, Variation output current from min. - max.

$$\text{Load regulation} = \frac{U_{\text{out max}} - U_{\text{out min}}}{U_{\text{out nom.}}} \times 100$$

**Unregulated  
 Single output  
 Case style: SIP 4**

## COMMERCIAL DC/DC Converters

Stand: 12/05

**1Watt / 2Watt  
 Series: SL4U**

**Electrical specifications:**

Input voltage accuracy: +/- 10%  
 Output voltage accuracy: +/- 5% \*\*  
 Line Voltage Regulation: +/-1,2% / 1% of Vin max,  
 Load Voltage Regulation: 5V output type 15% max.  
 (10% to 100% full load) 9V ~ 24V output types 10% max.  
 Operating temperature: -40°C up to 85°C max.

Efficiency: min. 65%  
 Output Ripple & Noise: typ. 50mVp-p  
 Short circuit protection: 1,0 second  
 Isolation voltage: min. 1000V DC  
 Part-No.: /3 min. 3000V DC isolation  
 Part-No.: /2 0,25W  
 Part-No.: /5 0,5W

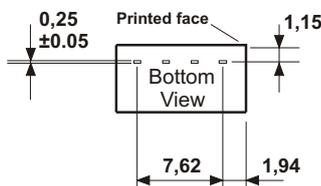
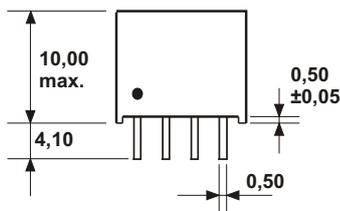
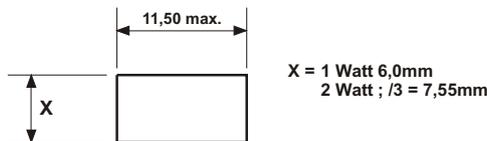
\*\* Note: Measured @25°C with the condition  
 of Vin = nominal and full load

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Model Nummer DC	Input Voltage DC	Output Voltage DC	Output current 1 Watt	Output current 2 Watt
SL4U-0505 SL4U-0509 SL4U-0512 SL4U-0515	5V	5V 9V 12V 15V	200mA 110mA 83mA 66mA	400mA 222mA 166mA 132mA
SL4U-1205 SL4U-1209 SL4U-1212 SL4U-1215	12V	5V 9V 12V 15V	200mA 110mA 83mA 66mA	400mA 222mA 166mA 132mA
SL4U-1505 SL4U-1509 SL4U-1512 SL4U-1515	15V	5V 9V 12V 15V	200mA 110mA 83mA 66mA	400mA 222mA 166mA 132mA
SL4U-2405 SL4U-2409 SL4U-2412 SL4U-2415	24V	5V 9V 12V 15V	200mA 110mA 83mA 66mA	400mA 222mA 166mA 132mA

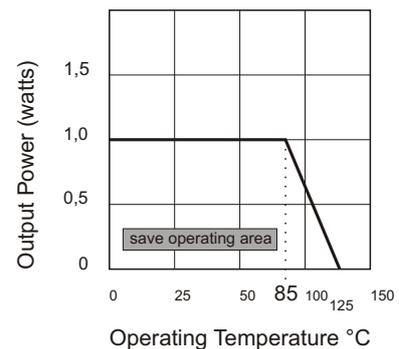
Additional output Capacitor of 4,7µF will reduce ripple significantly, but is not demanded.  
 Input capacitor 4,7µF - 10µF recommended.

**Any other in and output voltages available**

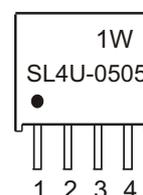


Additional output capacitor  
 of 4,7µF will reduce ripple  
 significantly, but is not demanded.

ALL DIMENSIONS IN MM  
 Tolerance +/-0,25  
 All pins on a 2,54mm pitch  
 Dot denotes Pin 1



**PIN CONNECTION:**



- 1 = GND
- 2 = Vcc
- 3 = 0V
- 4 = +Vout

Unregulated  
 Single output  
 Case style: SIP 4

## COMMERCIAL DC/DC Converters Unregulated

Stand: 12/05

1Watt

Series: SL4UM

### Electrical specifications:

Input voltage accuracy: +/- 10%  
 Output voltage accuracy: +/- 5% \*\*  
 Line Voltage regulation: +/- 1,2% / 1% of Vin max.  
 Load Voltage regulation: 3,3V , 5V output types 15% max.  
 (10% to 100% full load) 9V ~ 24V output types 10% max.

Operating temperature: -40°C up to +85°C  
 Efficiency: min.70%  
 Output Ripple & Noise: max. 100mVp-p  
 Short circuit protection: 1,0 second  
 Isolation voltage: max. 2500V DC

\*\* Note: Measured @25°C with the condition  
 of Vin = nominal and full load

CAUTION: NO INPUT POLARITY CHANGE ALLOWED!

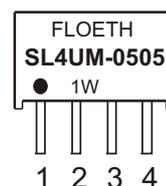
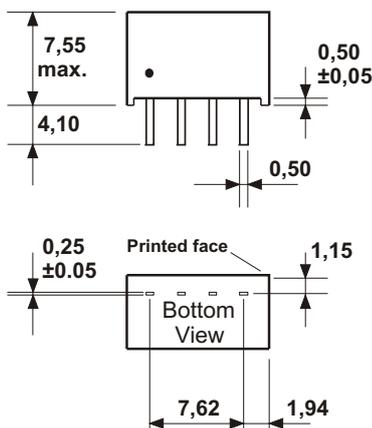
Model Number single	Input Voltage DC	Output Voltage DC	Output current 1 Watt
SL4UM-0503,3 SL4UM-0505 SL4UM-0509 SL4UM-0512 SL4UM-0515	5V	3,3V 5,0V 9,0V 12,0V 15,0V	303mA 200mA 110mA 83mA 66mA
SL4UM-1203,3 SL4UM-1205 SL4UM-1209 SL4UM-1212 SL4UM-1215	12V	3,3V 5,0V 9,0V 12,0V 15,0V	303mA 200mA 110mA 83mA 66mA
SL4UM-1503,3 SL4UM-1505 SL4UM-1509 SL4UM-1512 SL4UM-1515	15V	3,3V 5,0V 9,0V 12,0V 15,0V	303mA 200mA 110mA 83mA 66mA
SL4UM-2403,3 SL4UM-2405 SL4UM-2409 SL4UM-2412 SL4UM-2415	24V	3,3V 5,0V 9,0V 12,0V 15,0V	303mA 200mA 110mA 83mA 66mA

### Any other output voltages available

Additional output Capacitor of 4,7µF will reduce ripple significantly, but is not demanded.

Input capacitor 4,7µF - 10µF recommended.

### PIN CONNECTION:



1 = GND  
 2 = Vcc  
 3 = 0V  
 4 = +Vout

ALL DIMENSIONS IN MM  
 Tolerance +/-0,25  
 All pins on a 2,54mm pitch  
 Dot denotes Pin 1

Stand: 12/05

Unregulated  
 Case Style: SIP 6

## COMMERCIAL DC/DC Converters

1 Watt  
 Series: S6UM

### Electrical specifications:

Input voltage accuracy: +/- 10%  
 Output voltage accuracy: +/- 5% \*\*  
 Line Voltage regulation: +/- 1,2% / 1% of Vin max.  
 Load Voltage regulation: 5V output type 15% max.  
 (10% to 100% full load) 9V ~ 24V output types 10% max.

Efficiency: 70% min.  
 Output Ripple & Noise: 150mVp-p  
 Operating temperature: -40°C to +85°C  
 Isolation voltage: min. 3000V DC

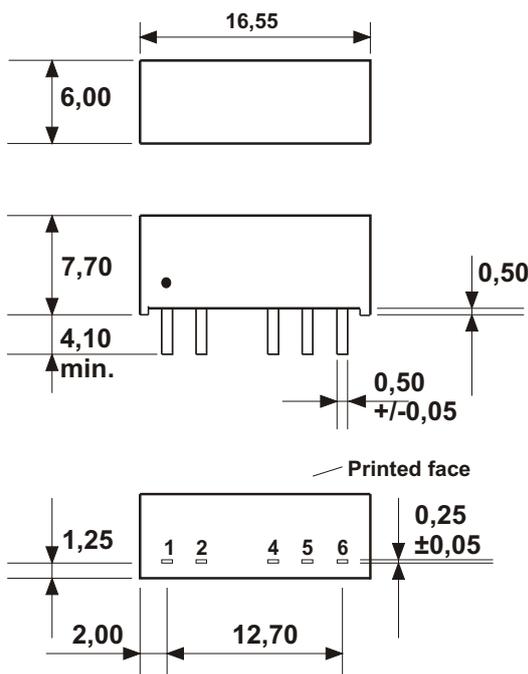
\*\* Note: Measured @25°C with the condition  
 of Vin = nominal and full load

CAUTION NO INPUT POLARITY CHANGE ALLOWED!

Single Output			
Model Nr.:	Input Voltage	Output Voltage	Output current
S6UM-2415	24V	15V	66mA

Any other input & output voltage available.

Input capacitor 4,7µF - 10µF recommended



PIN CONNECTION	
PIN	Single
1	VCC
2	GND
3	NP
4	NC
5	- Vout
6	+Vout

MILLIMETERS XXXX +/- 0,25  
 All pins on a 2,54mm pitch  
 Note: NP = No pin; NC = No connection;  
 Dot denote pin 1

# COMMERCIAL DC/DC Converters

Stand: 12/05

Unregulated  
 Case Style: SIP 7

1Watt / 2 Watt  
 Series: S7U

### Electrical specifications:

Input voltage accuracy: +/- 10%  
 Output voltage accuracy: +/- 5% \*\*  
 Line Voltage regulation: +/- 1,2% / 1% of Vin max.  
 Load Voltage regulation: 5V output type 15% max.  
 (10% to 100% full load) 9V ~ 24V output types 10% max.  
 Output Ripple & Noise: 1W; typ. 50mVp-p  
 2W; typ. 150mVp-p

Efficiency: min. 70%  
 Short circuit protection: 1,0 second  
 Operating temperature: -40°C to +85°C  
 Isolation voltage: min. 1000V DC  
 Isolation optional (Part-Nr. /H): min. 2kV DC at 1Watt Series

Part-Nr. /5 0,50W output power  
 Part-Nr. /7 0,75W output power

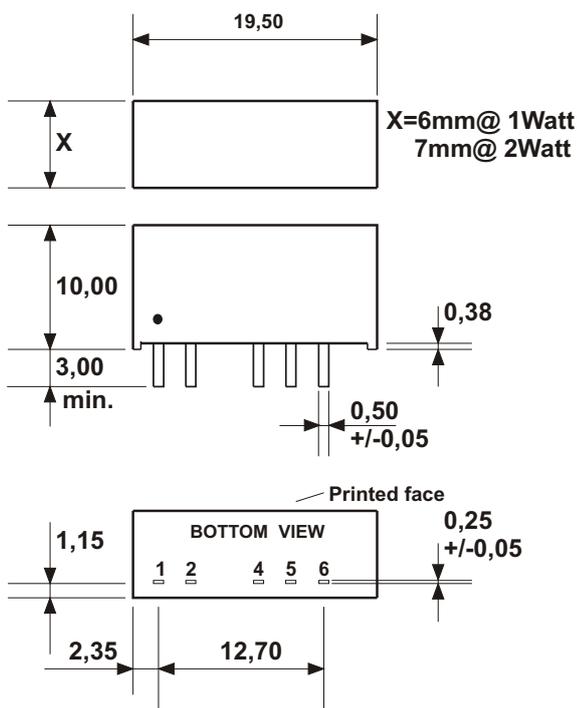
\*\* Note: Measured @25°C with the condition  
 of Vin = nominal and full load

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Single Output			1 Watt	2 Watt	Dual Output			1 Watt	2 Watt
Part-No.	Input Voltage	Output Voltage	Output current	Output current	Part-No.	Input Voltage	Output Voltage	Output current	Output current
S7U-0505	5V	5V	200mA	400mA	S7U-0505D	5V	± 5V	+/-100mA	+/-200mA
S7U-0512		12V	83mA	166mA	S7U-0512D		±12V	+/- 41mA	+/- 83mA
S7U-0515		15V	66mA	132mA	S7U-0515D		±15V	+/- 33mA	+/- 66mA
S7U-1205	12V	5V	200mA	400mA	S7U-1205D	12V	± 5V	+/-100mA	+/-200mA
S7U-1212		12V	83mA	166mA	S7U-1212D		±12V	+/- 41mA	+/- 83mA
S7U-1215		15V	66mA	132mA	S7U-1215D		±15V	+/- 33mA	+/- 66mA
S7U-1505	15V	5V	200mA	400mA	S7U-1505D	15V	± 5V	+/-100mA	+/-200mA
S7U-1512		12V	83mA	166mA	S7U-1512D		±12V	+/- 41mA	+/- 83mA
S7U-1515		15V	66mA	132mA	S7U-1515D		±15V	+/- 33mA	+/- 66mA
S7U-2405	24V	5V	200mA	400mA	S7U-2405D	24V	± 5V	+/-100mA	+/-200mA
S7U-2412		12V	83mA	166mA	S7U-2412D		±12V	+/- 41mA	+/- 83mA
S7U-2415		15V	66mA	132mA	S7U-2415D		±15V	+/- 33mA	+/- 66mA
S7U-2424		24V	41mA						

Any other output voltages available

\* Add "A" to the end of Partnumber.  
 For example S7U-0505A 1Watt



PIN CONNECTION			
PIN	SINGLE	SINGLE A*	DUAL
1	VCC	VCC	VCC
2	GND	GND	GND
4	NC	-Vout	-Vout
5	-Vout	NP	COM
6	+Vout	+Vout	+Vout

ALL DIMENSIONS IN MM  
 Tolerance +/- 0,25mm  
 All pins on a 2,54mm pitch  
 NC = No connection, NP = No pin

**NOTE:** Input and output capacitor  
 4,7µF - 10µF recommended.  
 Dot denotes pin 1  
 2 Watt version less stressable  
 than 1 Watt Version

Stand: 12/05

Unregulated  
 Case Style: SIP 7

# COMMERCIAL DC/DC Converters

1Watt / 2Watt  
 Series: S7U-xyxyB/H

### Electrical specifications:

Input voltage range: +/- 10%  
 Output voltage accuracy: +/- 5% \*\*  
 Line Voltage regulation: +/- 1,2% / 1% of Vin max.  
 Load Voltage regulation: 5V output type 15% max.  
 (10% to 100% full load) 9V ~ 24V output types 10% max.  
 Efficiency: min. 70%

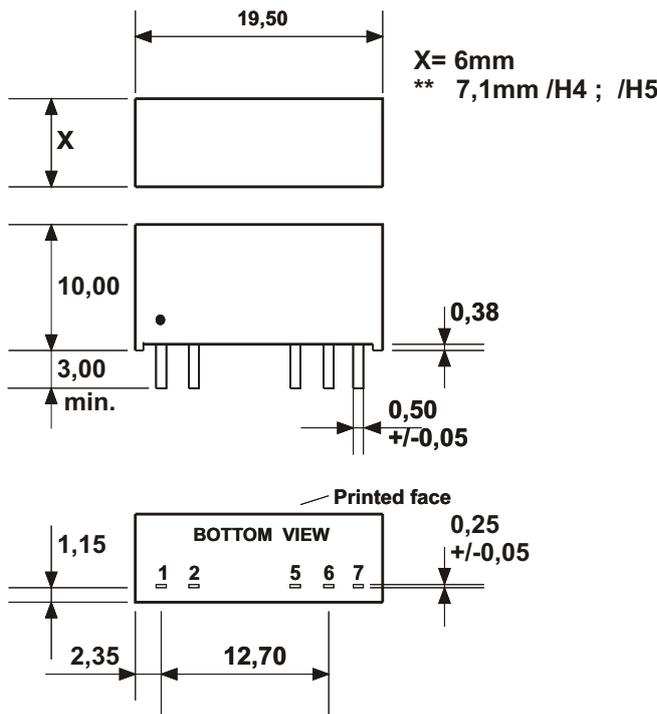
Output Ripple & Noise: typ. 50mVp-p  
 Short circuit protection: 1,0 second  
 Operating temperature: -40°C to +85°C  
 Isolation voltage: min. 3000V DC  
 \*\*Optional Part-No. /H4: 4000V DC  
 \*\*Optional Part-No. /H5: 5200V DC (1Watt output power)

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

\*\* Note: Measured @25°C with the condition  
 of Vin = nominal and full load

			1 Watt	2 Watt				1 Watt	2 Watt
Part-No. Single Output	Input Voltage	Output Voltage	Output current	Output current	Part-No. Dual Output	Input Voltage	Output Voltage	Output current	Output current
S7U-0505B/H	5V	5V	200mA	400mA	S7U-0505DB/H	5V	+/- 5V	+/-100mA	+/-200mA
S7U-0512B/H		12V	83mA	167mA	S7U-0512DB/H		+/-12V	+/- 41mA	+/- 82mA
S7U-0515B/H		15V	66mA	133mA	S7U-0515DB/H		+/-15V	+/- 33mA	+/- 66mA
S7U-1205B/H	12V	5V	200mA	400mA	S7U-1205DB/H	12V	+/- 5V	+/-100mA	+/-200mA
S7U-1212B/H		12V	83mA	167mA	S7U-1212DB/H		+/-12V	+/- 41mA	+/- 82mA
S7U-1215B/H		15V	66mA	133mA	S7U-1215DB/H		+/-15V	+/- 33mA	+/- 66mA
S7U-1505B/H	15V	5V	200mA	400mA	S7U-1505DB/H	15V	+/- 5V	+/-100mA	+/-200mA
S7U-1512B/H		12V	83mA	167mA	S7U-1512DB/H		+/-12V	+/- 41mA	+/- 82mA
S7U-1515B/H		15V	66mA	133mA	S7U-1515DB/H		+/-15V	+/- 33mA	+/- 66mA
S7U-2405B/H	24V	5V	200mA	400mA	S7U-2405DB/H	24V	+/- 5V	+/-100mA	+/-200mA
S7U-2412B/H		12V	83mA	167mA	S7U-2412DB/H		+/-12V	+/- 41mA	+/- 82mA
S7U-2415B/H		15V	66mA	133mA	S7U-2415DB/H		+/-15V	+/- 33mA	+/- 66mA

Any other output voltages available



PIN CONNECTION		
PIN	SINGLE	DUAL
1	VCC	VCC
2	GND	GND
3	NP	NP
4	NP	NP
5	-Vout	-Vout
6	NP	COM
7	+Vout	+Vout

ALL DIMENSIONS IN MM  
 Tolerance +/- 0,25mm  
 All pins on a 2,54mm pitch  
 NC = No connection, NP = No pin

**NOTE:** Input and output capacitor  
 4,7µF - 10µF recommended.  
 Dot denotes pin 1

Stand: 12/05

## COMMERCIAL DC/DC Converters

Isolated outputs

1Watt / 2 Watt  
 Series: S7U

Unregulated  
 Case Style: SIP 7

### Electrical specifications:

Input voltage range: +/- 10%  
 Output voltage accuracy: +/- 5% \*\*  
 Line Voltage regulation: +/- 1,2% / 1% of Vin max.  
 Load Voltage regulation: 5V output type 15% max.  
 (10% to 100% full load) 9V ~ 24V output types 10% max.  
 Efficiency: min. 60%

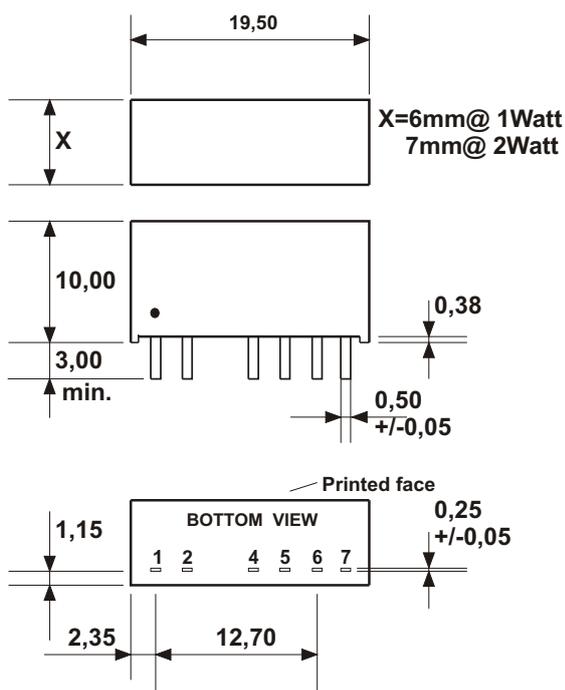
Output Ripple & Noise: 1W; typ. 100mVp-p  
 2W; typ. 150mVp-p  
 Short circuit protection: 1,0 second  
 Operating temperature: -40°C to +85°C  
 Isolation voltage I/O: min. 1000V DC  
 Isolation voltage O/O: min. 500V DC

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

\*\* Note: Measured @25°C with the condition  
 of Vin = nominal and full load

Part-No. Dual output	Input Voltage	Output voltage DC	1 Watt	2 Watt
			Output current	Output current
S7U-050505 S7U-051212 S7U-051515	5V	5V / 5V	100mA / 100mA	200mA / 200mA
		12V / 12V	41mA / 41mA	83mA / 83mA
		15V / 15V	33mA / 33mA	66mA / 66mA
S7U-120505 S7U-121212 S7U-121515	12V	5V / 5V	100mA / 100mA	200mA / 200mA
		12V / 12V	41mA / 41mA	83mA / 83mA
		15V / 15V	33mA / 33mA	66mA / 66mA
S7U-150505 S7U-151212 S7U-151515	15V	5V / 5V	100mA / 100mA	200mA / 200mA
		12V / 12V	41mA / 41mA	83mA / 83mA
		15V / 15V	33mA / 33mA	66mA / 66mA
S7U-240505 S7U-241212 S7U-241515	24V	5V / 5V	100mA / 100mA	200mA / 200mA
		12V / 12V	41mA / 41mA	83mA / 83mA
		15V / 15V	33mA / 33mA	66mA / 66mA

### Any other output voltages available



PIN CONNECTION	
PIN	SINGLE
1	VCC
2	GND
3	NP
4	+ OUT 1
5	- OUT 1
6	+ OUT 2
7	- OUT 2

ALL DIMENSIONS IN MM  
 Tolerance +/- 0,25mm  
 All pins on a 2,54mm pitch  
 NC = No connection, NP = No pin

**NOTE:** Input and output capacitor  
 4,7µF - 10µF recommended.  
 Dot denotes pin 1

Regulated  
 Case Style: SIP 7

## COMMERCIAL DC/DC Converters

1 Watt  
 Series: S7R

### Electrical specifications:

Input voltage range: - 5% / +5%  
 Output voltage accuracy: +/- 5%  
 Line regulation of Vin: max. +/- 1%  
 Load regulation: max. +/- 1%  
 Efficiency: min. 50%

Isolation voltage: min. 1000V DC  
 Output Ripple & Noise: max. 100mVp-p  
 Short circuit protection: 1,0 second  
 Operating temperature: -40°C to +71°C

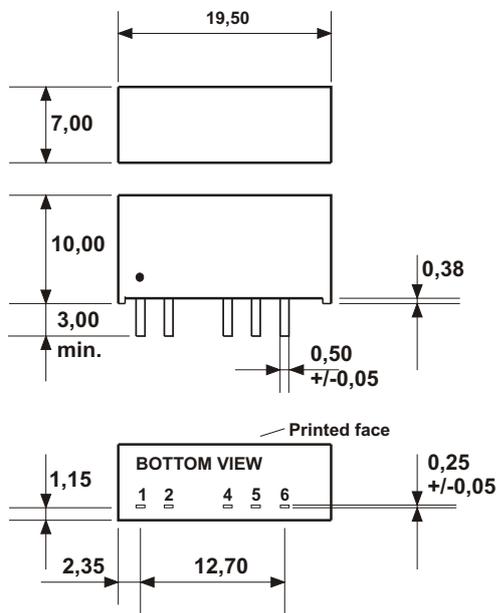
Part - Nr. / 5 0,5W output power  
 Part - Nr. / 7 0,75W output power

CAUTION: NO INPUT POLARITY CHANGE ALLOWED !

Single Output				Dual Output			
Part - No.	Input Voltage	Output Voltage	Output current	Part - No.	Input Voltage	Output Voltage	Output current
S7R-0503,3 S7R-0505 S7R-0512 S7R-0515	5V	3,3V 5V 12V 15V	303mA 200mA 83mA 67mA	S7R-0505D S7R-0512D S7R-0515D	5V	± 5V ±12V ±15V	±100mA ± 42mA ± 33mA
S7R-1203,3 S7R-1205 S7R-1212 S7R-1215	12V	3,3V 5V 12V 15V	303mA 200mA 83mA 67mA	S7R-1205D S7R-1212D S7R-1215D	12V	± 5V ±12V ±15V	±100mA ± 42mA ± 33mA
S7R-1503,3 S7R-1505 S7R-1512 S7R-1515	15V	3,3V 5V 12V 15V	303mA 200mA 83mA 67mA	S7R-1505D S7R-1512D S7R-1515D	15V	± 5V ±12V ±15V	±100mA ± 42mA ± 33mA
S7R-2403,3 S7R-2405 S7R-2412 S7R-2415	24V	3,3V 5V 12V 15V	303mA 200mA 83mA 67mA	S7R-2405D S7R-2412D S7R-2415D	24V	± 5V ±12V ±15V	±100mA ± 42mA ± 33mA

Any other output voltages available

### Mechanical Dimensions & Schematic



PIN CONNECTION			
PIN	SINGLE	SINGLE C*	DUAL
1	VCC	VCC	VCC
2	GND	GND	GND
3	NP	NP	NP
4	-Vout	-Vout	-Vout
5	NC	CTRL	COM
6	+Vout	+Vout	+Vout

\* Add "C" to the end of Partnumber.  
 For example S7R-0505C/5 0,5W

ALL DIMENSIONS IN MM  
 Tolerance +/- 0,25mm  
 All pins on a 2,54mm pitch  
 NC = No connection; NP = No pin

Note: Input and output capacitor  
 4,7µF - 10µF recommended  
 Dot denotes pin 1

# COMMERCIAL DC/DC Converters

Stand 34/04

Regulated  
 Case Style: SIP 7

**2Watt**  
 Series: S7R

### Electrical specifications:

Input voltage accuracy: - 3%  
 + 10%  
 Output voltage accuracy: +/- 5%  
 Line regulation of Vin: +/- 0,5%  
 Load regulation: +/- 1%  
 Efficiency: min. 70%

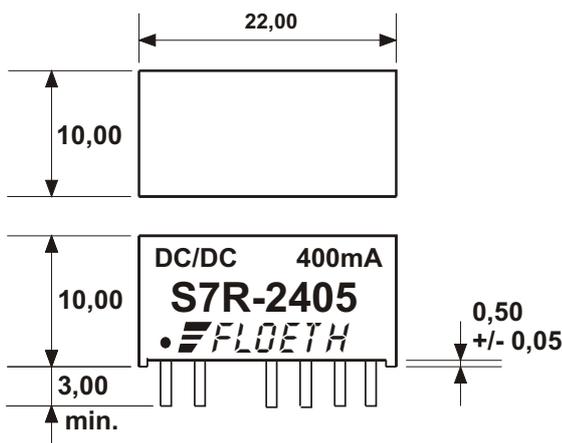
Short circuit protection: none  
 Operating temperature: -40°C to 71°C  
 Switching frequency: 45kHz  
 Isolation voltage: min. 1000V DC  
 Output Ripple & Noise: typ. 50mVp-p

CAUTION NO INPUT POLARITY CHANGE ALLOWED!

			1,5 Watt	2 Watt
Part - No.	Input Voltage	Output Voltage	Output current	Output current
S7R-2405	24V	5V	300mA	400mA

**Input capacitor 4,7µF - 10µF is a must.**

### Mechanical Dimensions & Schematic



PIN CONNECTION		
PIN	SINGLE A	SINGLE B*
1	VCC	VCC
2	GND	GND
3	NP	NP
4	- Vout	NP
5	NP	- Vout
6	+Vout	NP
7	NP	+Vout

\*Add "A" or "B" to the end of Partnumber  
 For example S7R-2405A or (B) 1,5W; 2W

ALL DIMENSIONS IN MM  
 MILLIMETERS +/- 0,25mm  
 All pins on a 2,54mm pitch  
 NC = No connection; NP = No pin  
 Note: Dot denotes pin 1

Regulated  
Case Style: SIP 8

# COMMERCIAL DC/DC Converters

1Watt / 2 Watt  
Series: SL8W2

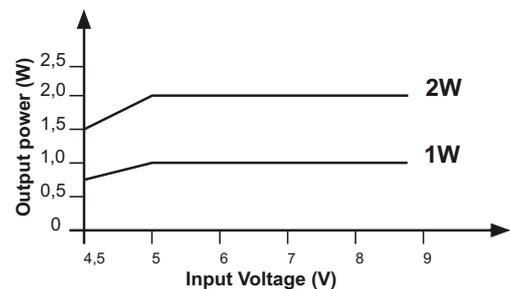
### Electrical specifications:

Input voltage: wide 1:2  
Output voltage accuracy: typ. +/- 1%.  
Line regulation: max. +/- 0,2%  
Load regulation (10% to 100% load): max. +/- 0,5%  
Efficiency: up to +85%

Output Ripple & Noise @ 20MHz BW: max. 50mVp-p  
Short circuit protection: continuous  
Operating temperature: -40°C to +80°C  
Isolation voltage: min. 1000V DC

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

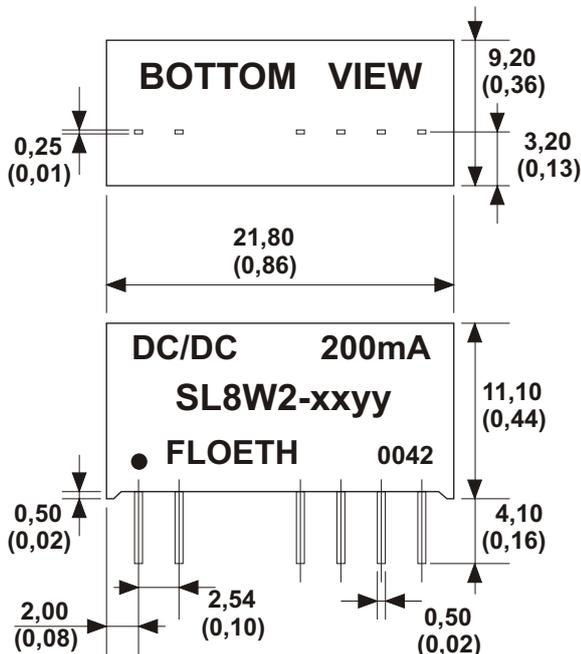
Part - No.	Input Voltage	Output Voltage	1 Watt	2 Watt
			Output current	Output current
SL8W2-0503,3	4,5 - 9V	3,3V	300mA	500mA
SL8W2-0505		5,0V	200mA	400mA
SL8W2-0509		9,0V	111mA	220mA
SL8W2-0512		12,0V	83mA	166mA
SL8W2-0515		15,0V	66mA	133mA
SL8W2-1203,3	9 - 18V	3,3V	300mA	500mA
SL8W2-1205		5,0V	200mA	400mA
SL8W2-1209		9,0V	111mA	220mA
SL8W2-1212		12,0V	83mA	166mA
SL8W2-1215		15,0V	66mA	133mA
SL8W2-2403,3	18 - 36V	3,3V	300mA	500mA
SL8W2-2405		5,0V	200mA	400mA
SL8W2-2409		9,0V	111mA	220mA
SL8W2-2412		12,0V	83mA	166mA
SL8W2-2415		15,0V	66mA	133mA
SL8W2-4803,3	36 - 72V	3,3V	300mA	500mA
SL8W2-4805		5,0V	200mA	400mA
SL8W2-4809		9,0V	111mA	220mA
SL8W2-4812		12,0V	83mA	166mA
SL8W2-4815		15,0V	66mA	133mA



Input Voltage	Capacitance	
	Cin	Cout
5V/12V	10µF/25V	100µF/25V
24V/48V	10µF/100V	



It is necessary to add the Cin and Cout of low ESR capacitors for application and testing.



PIN	CONNECTION
1	- Vin
2	+ Vin
3	NP
4	NP
5	NE
6	+Vout
7	- Vout
8	Cs

#### pin 5 NE

This pin is used internally and must have no external connection

#### pin 8 cs

This pin provides a connection point to the main reservoir capacitor. Additional capacitance can be added from this pin 7. Any low esr capacitor will improve ripple and noise in some measure. The benefit of this access point over simple additional output capacitance is that it precedes the output filter inductor. Maximum values of external capacitance will be dependent on the output voltage / loading of the converter and the desired ripple figure. Starting values can be in the range of 100µF

ALL DIMENSIONS IN MM (INCHES)  
MILLIMETERS +/- 0,25mm  
(INCHES +/- 0,01")

All pins on a 2,54mm pitch

**Note:** NP = No pin; NC = No connection;  
NE = no external connection allowed  
Cs = Optional external capacitor  
Dot denotes pin 1

Stand: 05/05

Regulated  
Case Style: SIP 8

# COMMERCIAL DC/DC Converters

2 Watt  
Series: SL8W2

### Electrical specifications:

Input voltage: wide 1:2  
Output voltage accuracy: typ. +/- 2%  
minimum Load: 10% Note 1.  
Line regulation: max. +/- 0,5%  
Load regulation (10% to 100% load): max. +/- 1%  
Efficiency: up to +81%

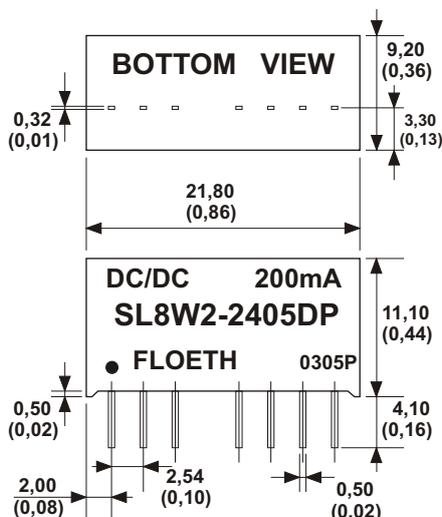
Output Ripple & Noise @ 20MHz BW: max. 50mVp-p  
Short circuit protection: continuous  
Operating temperature: -40°C to +85°C  
Isolation voltage: min. 1000V DC

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Single Part - No.	Input Voltage	Output Voltage	Output current	DUAL Part - No.	Input Voltage	Output Voltage	Output current
SL8W2-0503,3P SL8W2-0505P SL8W2-0509P SL8W2-0512P SL8W2-0515P	4,5 - 9V	3,3V 5,0V 9,0V 12,0V 15,0V	500mA 400mA 220mA 166mA 133mA	SL8W2-0505DP SL8W2-0512DP SL8W2-0515DP	4,5 - 9V	± 5,0V ±12,0V ±15,0V	±200mA ± 83mA ± 67mA
SL8W2-1203,3P SL8W2-1205P SL8W2-1209P SL8W2-1212P SL8W2-1215P	9 - 18V	3,3V 5,0V 9,0V 12,0V 15,0V	500mA 400mA 220mA 166mA 133mA	SL8W2-1205DP SL8W2-1212DP SL8W2-1215DP	9 - 18V	± 5,0V ±12,0V ±15,0V	±200mA ± 83mA ± 67mA
SL8W2-2403,3P SL8W2-2405P SL8W2-2409P SL8W2-2412P SL8W2-2415P	18 - 36V	3,3V 5,0V 9,0V 12,0V 15,0V	500mA 400mA 220mA 166mA 133mA	SL8W2-2405DP SL8W2-2412DP SL8W2-2415DP	18 - 36V	± 5,0V ±12,0V ±15,0V	±200mA ± 83mA ± 67mA
SL8W2-4803,3P SL8W2-4805P SL8W2-4809P SL8W2-4812P SL8W2-4815P	36 - 72V	3,3V 5,0V 9,0V 12,0V 15,0V	500mA 400mA 220mA 166mA 133mA	SL8W2-4805DP SL8W2-4812DP SL8W2-4815DP	36 - 72V	± 5,0V ±12,0V ±15,0V	±200mA ± 83mA ± 67mA

### Input Capacitor recommended to reduce input reflected ripple current

U<sub>in</sub> 5V / 12V 100µF low ESR  
U<sub>in</sub> 24V / 48V 10µF low ESR



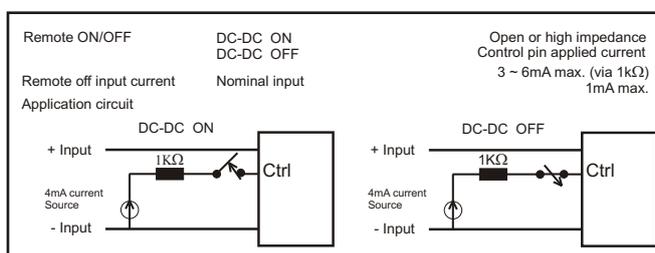
ALL DIMENSIONS IN MM (INCHES)  
MILLIMETERS +/- 0,25mm  
(INCHES +/- 0,01")  
All pins on a 2,54mm pitch

### Note 1.

The SL8W2 series required a minimum 10% loading at the output to maintain specified regulation. Operation under no-load condition will not damage these devices, however they may not meet all listed specification.

PIN CONNECTION		
PIN	SINGLE	DUAL
1	- V <sub>in</sub>	- V <sub>in</sub>
2	+ V <sub>in</sub>	+ V <sub>in</sub>
3	CTRL	CTRL
5	NC	NC
6	+V <sub>out</sub>	+V <sub>out</sub>
7	- V <sub>out</sub>	COM
8	NC	- V <sub>out</sub>

NC = No connection;



Regulated  
 Case Style: SIP 12

## COMMERCIAL DC/DC Converters

1,0-1,8 Watt  
 Series: S12R

### Electrical specifications:

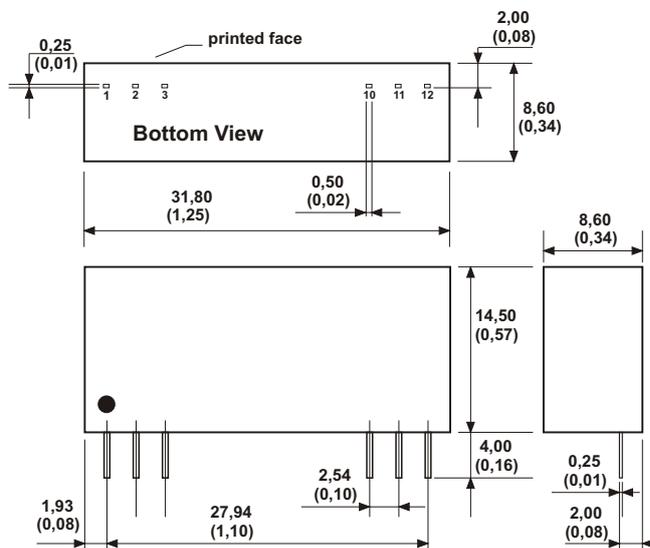
Input voltage range: +/-10%  
 Output voltage accuracy: +/- 5%  
 Line regulation: +/- 0,5%  
 Load regulation : +/- 0,5%  
 Ripple & Noise @ 20MHz BW: max. 50mVp-p

Operating temperature: -25°C to +70°C  
 Storage temperature: -55°C to +125°C  
 Isolation voltage: min. 500V DC  
 Efficiency: min. 50%  
 Operating frequency: min. 20kHz  
 short circuit protection: 1,0 second

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part No.: Single	Input voltage DC	Output voltage DC	Output voltage mA	Efficiency %
S12R-0505	5V	5V	360mA	55
S12R-0509		9V	200mA	58
S12R-0512		12V	150mA	62
S12R-0515		15V	120mA	65
S12R-1205	12V	5V	360mA	55
S12R-1209		9V	200mA	58
S12R-1212		12V	150mA	62
S12R-1215		15V	120mA	65
Part No.: Dual	Input voltage DC	Output voltage DC	Output voltage mA	Efficiency %
S12R-0505D	5V	+/- 5V	+/-100mA	52
S12R-0509D		+/- 9V	+/-100mA	55
S12R-0512D		+/-12V	+/- 75mA	58
S12R-0515D		+/-15V	+/- 60mA	60
S12R-1205D	12V	+/- 5V	+/-100mA	52
S12R-1209D		+/- 9V	+/-100mA	55
S12R-1212D		+/-12V	+/- 75mA	58
S12R-1215D		+/-15V	+/- 60mA	60

Any other in & output voltages available.



PIN CONNECTION		
PIN	Single	Dual
1	+ IN	+ IN
2	NP	- Vout
3	NP	COM
10	- Vout	COM
11	+ Vout	+ Vout
12	- IN	- IN

ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,50mm  
 (INCHES +/- 0,02")  
 All pins on a 2,54mm pitch  
**Note:** NC = No connection;  
 Dot denote pin 1

Stand: 14/05

Unregulated  
Case style: DIP 8

## COMMERCIAL DC/DC Converters

1,25 Watt  
Series: MD8

### Electrical specifications:

Input voltage range: +/- 10%  
Output voltage accuracy: +/- 5% \*\*  
Line Voltage regulation: +/- 1,2% / 1% of Vin max.  
Load Voltage regulation: 5V output type 15% max.  
(10% to 100% full load) 9V ~ 24V output types 10% max.  
Efficiency: min. 70%

Output Ripple & Noise: 1,25W; 50mVp-p  
Short circuit protection: 1.0 second  
Operating temperature: -40°C to +85°C  
Isolation voltage: min. 1000V DC  
Isolation optional (Part-No. /H) min. 2kV DC

Part-Nr. /2 0,25W ; /5 0,5W ; /7 0,75W output power

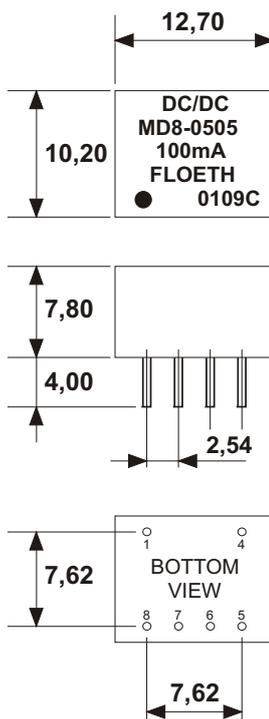
\*\* Note: Measured @25°C with the condition  
of Vin = nominal and full load

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part - No. Single Output	Input Voltage	Output Voltage	Output Current	Part - No. Dual Output	Input Voltage	Output Voltage	Output Current
MD8-0505 MD8-0512 MD8-0515	5V	5V 12V 15V	250mA 104mA 83mA	MD8-0505D MD8-0512D MD8-0515D	5V	+/- 5V +/-12V +/-15V	+/-125mA +/- 52mA +/- 42mA
MD8-1205 MD8-1212 MD8-1215	12V	5V 12V 15V	250mA 104mA 83mA	MD8-1205D MD8-1212D MD8-1215D	12V	+/- 5V +/-12V +/-15V	+/-125mA +/- 52mA +/- 42mA
MD8-1505 MD8-1512 MD8-1515	15V	5V 12V 15V	250mA 104mA 83mA	MD8-1505D MD8-1512D MD8-1515D	15V	+/- 5V +/-12V +/-15V	+/-125mA +/- 52mA +/- 42mA
MD8-2405 MD8-2412 MD8-2415 MD8-2424	24V	5V 12V 15V 24V	250mA 104mA 83mA 50mA	MD8-2405D MD8-2412D MD8-2415D	24V	+/- 5V +/-12V +/-15V	+/-125mA +/- 52mA +/- 42mA

Any other output voltages available

**Note:** Input and output capacitor  
4,7µF - 10µF recommended.



PIN CONNECTION:				
PIN	SINGLE	SINGLE A*	DUAL	DUAL/X
1	- IN	- IN	- IN	- IN
4	+ IN	+ IN	+ IN	+ IN
5	+ Vout	+ Vout	+ Vout	+ Vout
6	NC	NP	COM	NP
7	NP	- Vout	NP	COM
8	- Vout	NP	- Vout	- Vout

Add "A" to the end of partnumber.  
For example MD8-0505A

ALL DIMENSIONS IN MM  
Tolerance +/- 0.25mm  
All pins on a 2,54mm pitch.  
Pin size is 0,5mm ( 0,020 inch ) DIA  
NC = No connection; NP = No pin  
Dot denotes pin 1

## COMMERCIAL DC/DC Converters ISOLATED OUTPUTS

Stand: 15/05

1-1,25 Watt  
 Series: MD8

Unregulated  
 Case style: DIP 8

### Electrical specifications:

Input voltage range: +/- 10%  
 Output voltage accuracy: +/- 5% \*\*  
 Line Voltage regulation: +/- 1,2% / 1% of Vin max.  
 Load Voltage regulation: 5V output type 15% max.  
 (10% to 100% full load) 9V ~ 24V output types 10% max.

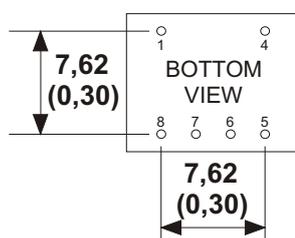
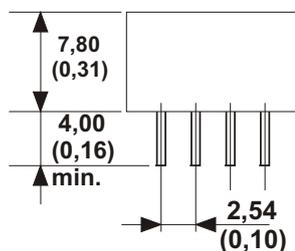
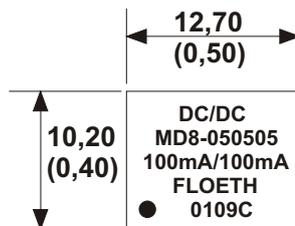
Efficiency: min. 70%  
 Output Ripple & Noise: typ. 75mVp-p  
 Short circuit protection: 1.0 second  
 Operating temperature: -40°C to +85°C  
 Isolation voltage I/O: min. 1000V DC  
 Isolation voltage O/O: min. 1000V DC

\*\* Note: Measured @25°C with the condition  
 of Vin = nominal and full load

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part - No. Dual Output	Input Voltage DC	Output Voltage DC	1 Watt	1,25 Watt
			Output Current	Output Current
MD8-050505 MD8-051212 MD8-051515	5V	5V / 5V	100mA / 100mA	
		12V / 12V	41mA / 41mA	
		15V / 15V	33mA / 33mA	
MD8-120505 MD8-121212 MD8-121515	12V	5V / 5V	100mA / 100mA	52mA / 52mA
		12V / 12V	41mA / 41mA	
		15V / 15V	33mA / 33mA	
MD8-150505 MD8-151212 MD8-151515	15V	5V / 5V	100mA / 100mA	
		12V / 12V	41mA / 41mA	
		15V / 15V	33mA / 33mA	
MD8-181515	18V	15V / 15V	33mA / 33mA	
MD8-240505 MD8-241212 MD8-241515	24V	5V / 5V	100mA / 100mA	
		12V / 12V	41mA / 41mA	
		15V / 15V	33mA / 33mA	

### Any other output voltages available



PIN CONNECTION:	
PIN	DUAL
1	GND
4	VCC
5	+ Vout 1
6	- Vout 1
7	+ Vout 2
8	- Vout 2

ALL DIMENSIONS IN MM (INCHES)  
 Tolerance +/- 0.25mm  
 All pins on a 2,54mm pitch.  
 NC = No connection; NP = No pin

Note: Input and output capacitor  
 4,7µF - 10µF recommended.  
 Dot denotes pin 1

Unregulated  
 Case style: DIP 14

## COMMERCIAL DC/DC Converters

1 Watt / 2 Watt  
 Series: MD14

### Electrical specifications:

Input voltage range: +/- 10%  
 Output voltage accuracy: +/- 5%  
 Line Voltage regulation: +/- 1,2% / 1% of Vin max.  
 Load Voltage regulation: 5V output type 15% max.  
 (10% to 100% full load) 9V ~ 24V output types 10% max.  
 Output Ripple & Noise: 1W: 50mVp-p  
 2W: 150mVp-p

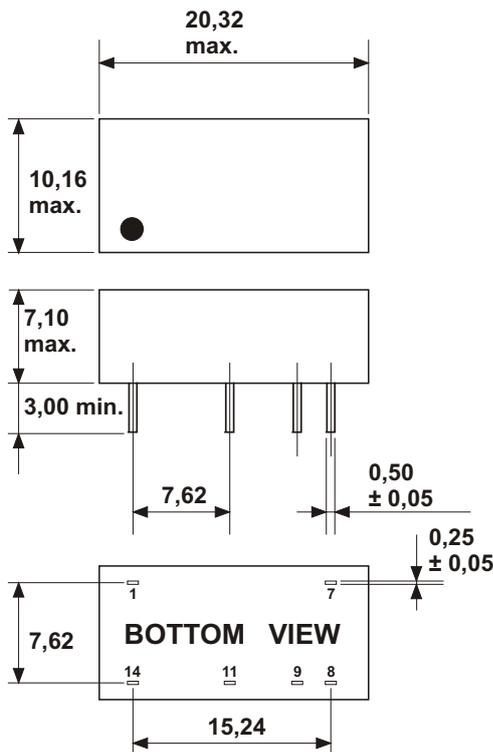
Efficiency: min. 70%  
 Short circuit protection: 1.0 second  
 Operating temperature: -40°C to +85°C  
 Isolation voltage: min. 1000V DC  
 Isolation optional (Part-No. /H): min. 2kV DC for 1Watt Series  
 Case material: black plastic

\*\* Note: Measured @25°C with the condition  
 of Vin = nominal and full load

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

			1 Watt					1 Watt		2 Watt	
Part - No. Single Output	Input Voltage	Output Voltage	Output Current		Part - No. Dual Output	Input Voltage	Output Voltage	Output Current	Output Current		
MD14-0505	5V	5V	200mA		MD14-0505D	5V	+/- 5V	+/-100mA	+/-200mA		
MD14-0512		12V	83mA		MD14-0512D		+/-12V	+/- 41mA	+/- 83mA		
MD14-0515		15V	66mA		MD14-0515D		+/-15V	+/- 33mA	+/- 66mA		
MD14-1205	12V	5V	200mA		MD14-1205D	12V	+/- 5V	+/-100mA	+/-200mA		
MD14-1212		12V	83mA		MD14-1212D		+/-12V	+/- 41mA	+/- 83mA		
MD14-1215		15V	66mA		MD14-1215D		+/-15V	+/- 33mA	+/- 66mA		
MD14-1505	15V	5V	200mA		MD14-1505D	15V	+/- 5V	+/-100mA	+/-200mA		
MD14-1512		12V	83mA		MD14-1512D		+/-12V	+/- 41mA	+/- 83mA		
MD14-1515		15V	66mA		MD14-1515D		+/-15V	+/- 33mA	+/- 66mA		
MD14-2405	24V	5V	200mA		MD14-2405D	24V	+/- 5V	+/-100mA	+/-200mA		
MD14-2412		12V	83mA		MD14-2412D		+/-12V	+/- 41mA	+/- 83mA		
MD14-2415		15V	66mA		MD14-2415D		+/-15V	+/- 33mA	+/- 66mA		
MD14-2424		24V	41mA								

### Any other output voltages available



PIN CONNECTION:			
PIN	SINGLE	SINGLE A*	DUAL
1	- IN	+ IN	- IN
7	NC	+ Vout	NC
8	- Vout	- Vout	COM
9	+ Vout	NC	+ Vout
11	NC	NC	- Vout
14	+ IN	- IN	+ IN

\* For other pinning:  
 Add "A" to the end of Partnumber.  
 For example MD14-0505A 1Watt.

ALL DIMENSIONS IN MM  
 Tolerance +/- 0.25mm  
 All pins on a 2,54mm pitch.  
 NC = No connection; NP = No pin

**Note:** Input and output capacitor  
 4,7µF - 10µF recommended.  
 Dot denotes pin 1

# COMMERCIAL DC/DC Converters

Stand: 12/05

**1 Watt / 2 Watt**  
 Series:  
 MD14-XXyy(D)B/H

Unregulated  
 Case style: DIP 14

### Electrical specifications:

Input voltage range: +/- 10%  
 Output voltage accuracy: +/- 5% \*\*  
 Line Voltage regulation: +/- 1,2% / 1% of Vin max.  
 Load Voltage regulation: 5V output type 15% max.  
 (10% to 100% full load) 9V ~ 24V output types 10% max.  
 Efficiency: min. 70%.

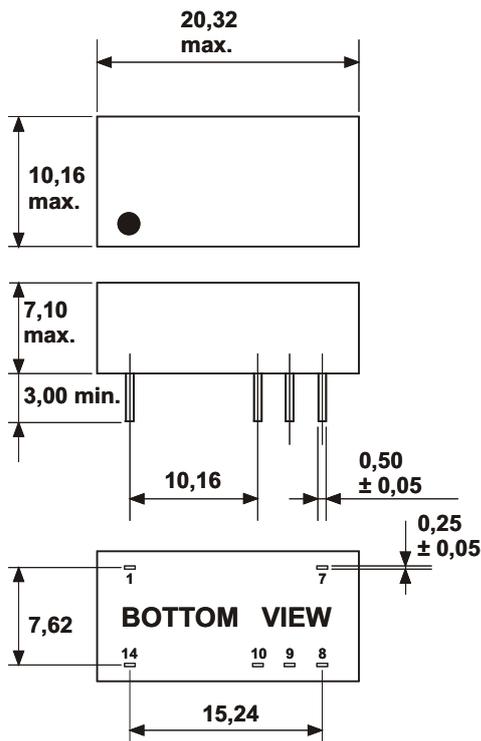
Output Ripple & Noise: 100mVp-p  
 Short circuit protection: 1.0 second  
 Operating Temperature: -40°C to +85°C  
 Isolation voltage: min. 3000V DC  
 Isolation optional (Part-No. /H4): min. 4000V DC  
 Case material: black plastic

\*\* Note: Measured @25°C with the condition  
 of Vin = nominal and full load

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part - No.		1 Watt	2 Watt	Part - No.		1 Watt	2 Watt		
Single Output	Input Voltage	Output Voltage	Output Current	Output Current	Dual Output	Input Voltage	Output Voltage	Output Current	Output Current
MD14-0505B/H	5V	5V	200mA	400mA	MD14-0505DB/H	5V	+/- 5V	+/-100mA	+/-200mA
MD14-0512B/H		12V	83mA	166mA	MD14-0512DB/H		+/-12V	+/- 42mA	+/- 83mA
MD14-0515B/H		15V	66mA	133mA	MD14-0515DB/H		+/-15V	+/- 33mA	+/- 66mA
MD14-1205B/H	12V	5V	200mA	400mA	MD14-1205DB/H	12V	+/- 5V	+/-100mA	+/-200mA
MD14-1212B/H		12V	83mA	166mA	MD14-1212DB/H		+/-12V	+/- 42mA	+/- 83mA
MD14-1215B/H		15V	66mA	133mA	MD14-1215DB/H		+/-15V	+/- 33mA	+/- 66mA
MD14-1505B/H	15V	5V	200mA	400mA	MD14-1505DB/H	15V	+/- 5V	+/-100mA	+/-200mA
MD14-1512B/H		12V	83mA	166mA	MD14-1512DB/H		+/-12V	+/- 42mA	+/- 83mA
MD14-1515B/H		15V	66mA	133mA	MD14-1515DB/H		+/-15V	+/- 33mA	+/- 66mA
MD14-2405B/H	24V	5V	200mA	400mA	MD14-2405DB/H	24V	+/- 5V	+/-100mA	+/-200mA
MD14-2412B/H		12V	83mA	166mA	MD14-2412DB/H		+/-12V	+/- 42mA	+/- 83mA
MD14-2415B/H		15V	66mA	133mA	MD14-2415DB/H		+/-15V	+/- 33mA	+/- 66mA

Any other output voltages available



PIN CONNECTION:		
PIN	SINGLE	DUAL
1	- IN	- IN
7	NC	NC
8	+ Vout	+ Vout
9	NP	GND
10	- Vout	- Vout
14	+ IN	+ IN

ALL DIMENSIONS IN MM  
 Tolerance +/- 0.25mm  
 All pins on a 2,54mm pitch.  
 NC = No connection; NP = No pin

Note: Input and output capacitor  
 4,7µF - 10µF recommended.  
 Dot denotes pin 1

## COMMERCIAL DC/DC Converters ISOLATED OUTPUTS

1 Watt / 2 Watt

Series: MD14

Unregulated  
 Case style: DIP 14

### Electrical specifications:

Input voltage range: +/- 10%  
 Output voltage accuracy: +/- 5% \*\*  
 Line Voltage regulation: +/- 1,2% / 1% of Vin max.  
 Load Voltage regulation: 5V output type 15% max.  
 (10% to 100% full load) 9V ~ 24V output types 10% max.  
 Output Ripple & Noise: 1W:100mVp-p  
 2W:150mVp-p

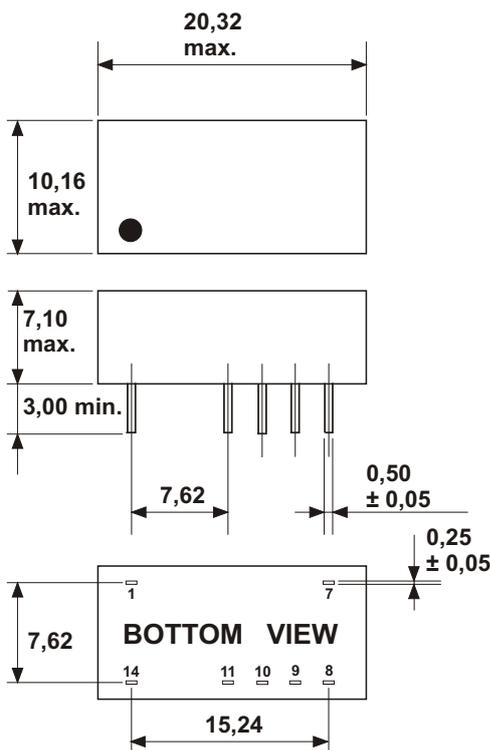
Efficiency: min. 60%  
 Short circuit protection: 1.0 second  
 Operating temperature: -40°C to +85°C  
 Isolation voltage I/O: min. 1000V DC  
 Isolation voltage O/O: min: 500V DC

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

\*\* Note: Measured @25°C with the condition  
 of Vin = nominal and full load

Part - No. Dual Output	Input Voltage DC	Output Voltage DC	1 Watt	2 Watt
			Output Current	Output Current
MD14-050505 MD14-051212 MD14-051515	5V	5V / 5V	100mA / 100mA	200mA / 200mA
		12V / 12V	41mA / 41mA	83mA / 83mA
		15V / 15V	33mA / 33mA	66mA / 66mA
MD14-120505 MD14-121212 MD14-121515	12V	5V / 5V	100mA / 100mA	200mA / 200mA
		12V / 12V	41mA / 41mA	83mA / 83mA
		15V / 15V	33mA / 33mA	66mA / 66mA
MD14-150505 MD14-151212 MD14-151515	15V	5V / 5V	100mA / 100mA	200mA / 200mA
		12V / 12V	41mA / 41mA	83mA / 83mA
		15V / 15V	33mA / 33mA	66mA / 66mA
MD14-240505 MD14-241212 MD14-241515	24V	5V / 5V	100mA / 100mA	200mA / 200mA
		12V / 12V	41mA / 41mA	83mA / 83mA
		15V / 15V	33mA / 33mA	66mA / 66mA

### Any other output voltages available



PIN CONNECTION:	
PIN	DUAL
1	GND
7	NC
8	- Vout 1
9	+ Vout 1
10	- Vout 2
11	+ Vout 2
14	VCC

ALL DIMENSIONS IN MM  
 Tolerance +/- 0.25mm  
 All pins on a 2,54mm pitch.  
 NC = No connection; NP = No pin

Note: Input and output capacitor  
 4,7µF - 10µF recommended.  
 Dot denotes pin 1

# COMMERCIAL

Stand: 07/02

Regulated  
 Case style: DIP 14

## DC/DC Converters

0,5 - 1 Watt  
 Series: MR14

### Electrical specifications:

Input voltage range: +/- 5%  
 Output voltage accuracy: +/- 5%  
 Line Regulation: +/- 1% max.  
 Load Regulation: +/- 1% max.  
 Efficiency: min. 50%

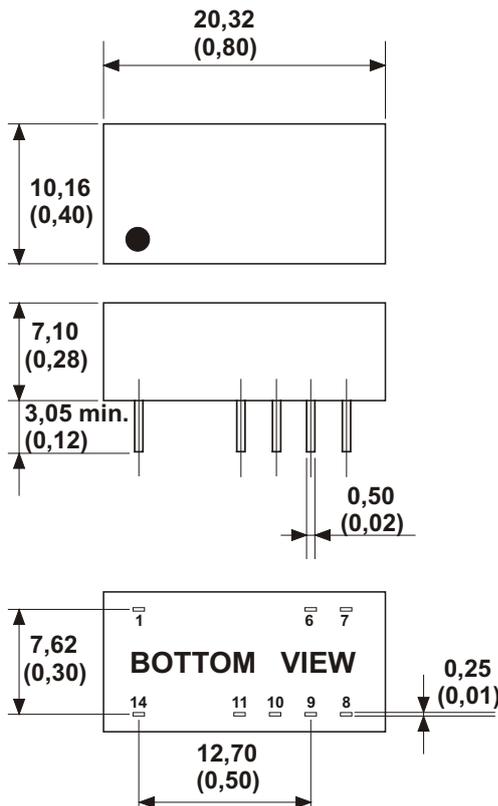
Output Ripple & Noise: typ. 50mVp-p  
 Short circuit protection: 1.0 second  
 Operating Temperature: -25°C to +70°C  
 Isolation voltage: min. 1000V DC  
 Part-No.: /H min. 2000V DC

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part-No. Single Output	Input Voltage DC	Output Voltage DC	0,5 Watt	0,75 Watt	0,9 Watt	1 Watt
			Output Current	Output Current	Output Current	Output Current
MR14-0505 MR14-0509 MR14-0512 MR14-0515	5V	5V 9V 12V 15V	100mA	150mA 83mA	180mA	200mA 111mA 84mA 66mA
MR14-1205 MR14-1209 MR14-1212 MR14-1215	12V	5V 9V 12V 15V		150mA	180mA	200mA 111mA 84mA 66mA
MR14-1505 MR14-1509 MR14-1512 MR14-1515	15V	5V 9V 12V 15V		150mA	180mA	200mA 111mA 84mA 66mA
MR14-2405 MR14-2409 MR14-2412 MR14-2415	24V	5V 9V 12V 15V		150mA	180mA	200mA 111mA 84mA 66mA

Part-No. Dual Output	Input Voltage DC	Output Voltage DC	1 Watt
			Output Current
MR14-0505D MR14-0509D MR14-0512D MR14-0515D	5V	± 5V ± 9V ± 12V ± 15V	± 100mA ± 56mA ± 42mA ± 33mA
MR14-1205D MR14-1209D MR14-1212D MR14-1215D	12V	± 5V ± 9V ± 12V ± 15V	± 100mA ± 56mA ± 42mA ± 33mA
MR14-1505D MR14-1509D MR14-1512D MR14-1515D	15V	± 5V ± 9V ± 12V ± 15V	± 100mA ± 56mA ± 42mA ± 33mA
MR14-2405D MR14-2409D MR14-2412D MR14-2415D	24V	± 5V ± 9V ± 12V ± 15V	± 100mA ± 56mA ± 42mA ± 33mA

Input voltage range ±10% on request



### PIN CONNECTION:

PIN	Single A*	Single	Dual
1	+ IN	- IN	- IN
6	NP	NP	+Vout
7	+ Vout	NP	COM
8	- Vout	NP	-Vout
9	NC	+ Vout	COM
10	NP	CTRL	NP
11	NP	- Vout	NP
14	- IN	+ IN	+ IN

\*Add "A" to the end of partnumber.  
 For example MR14-0512A

ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS = +/- 0,50mm  
 (INCHES = +/- 0,02")  
 All Pins on a 2,54mm pitch.

Note: Input and output capacitor  
 4,7µF - 10µF recommended.  
 Dot denotes pin 1

# COMMERCIAL DC/DC Converters

Stand: 12/05

Unregulated  
 Case style: DIP 16

0,30Watt / 2,25Watt  
 Series: MD16

### Electrical specifications:

Input voltage range: +/- 10%  
 Output voltage accuracy: +/- 5% \*\*  
 Line Voltage regulation: +/- 1,2% / 1% of Vin max.  
 Load Voltage regulation: 5V output type 15% max.  
 (10% to 100% full load) 9V ~ 24V output types 10% max.  
 Efficiency: min. 70%

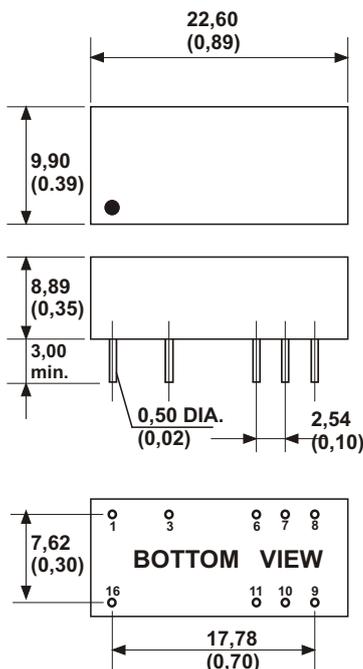
Output Ripple & Noise: typ. 50mVp-p  
 Short circuit protection: 1.0 second  
 Operating temperature: -40°C to +70°C  
 Isolation voltage: min. 1000V DC

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

\*\* Note: Measured @25°C with the condition  
 of Vin = nominal and full load

			0,3 Watt				2,25 Watt
Part - No. Single Output	Input Voltage	Output Voltage	Output Current	Part - No. Single Output	Input Voltage	Output Voltage	Output Current
MD16-0505A	5V	5V	60mA	MD16-0505	5V	5V	450mA
MD16-0509A		9V	33mA	MD16-0509		9V	250mA
MD16-0512A		12V	25mA	MD16-0512		12V	188mA
MD16-0515A		15V	20mA	MD16-0515		15V	150mA
MD16-1205A	12V	5V	60mA	MD16-1205	12V	5V	450mA
MD16-1209A		9V	33mA	MD16-1209		9V	250mA
MD16-1212A		12V	25mA	MD16-1212		12V	188mA
MD16-1215A		15V	20mA	MD16-1215		15V	150mA
MD16-1505A	15V	5V	60mA	MD16-1505	15V	5V	450mA
MD16-1509A		9V	33mA	MD16-1509		9V	250mA
MD16-1512A		12V	25mA	MD16-1512		12V	188mA
MD16-1515A		15V	20mA	MD16-1515		15V	150mA
MD16-2405A	24V	5V	60mA	MD16-2405	24V	5V	450mA
MD16-2409A		9V	33mA	MD16-2409		9V	250mA
MD16-2412A		12V	25mA	MD16-2412		12V	188mA
MD16-2415A		15V	20mA	MD16-2415		15V	150mA

Any other output voltages available



### PIN CONNECTION:

PIN	SINGLE	PIN	SINGLE A*
1 & 16	+ IN	3	- IN
6 & 11	- Vout	8	- Vout
7 & 10	+ Vout	9	+ Vout
8 & 9	- IN	16	+ IN

\* For other pinning:  
 Add "A" to the end of Partnumber.  
 For example MD16-0505A 0,3Watt.

ALL DIMENSIONS IN MM ( INCHES )  
 MILLIMETERS +/- 0,25mm  
 ( INCHES +/- 0,01" )  
 All pins on a 2,54mm pitch.

Note: Input and output capacitor  
 4,7µF - 10µF recommended.  
 Dot denotes pin 1

Unregulated  
 Single output  
 SMD Case: SO14 package

## COMMERCIAL DC/DC Converters

1Watt / 2 Watt  
 Series: SD14

### Electrical specifications:

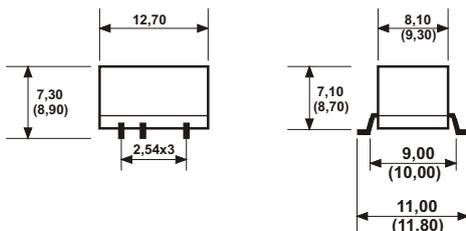
Input voltage range:	+/- 10%	Ripple/Noise @20MHz BW:	max. 100mVp-p
Input filter:	capacitor	Efficiency at full load:	min. 70%
Output voltage accuracy:	+/- 5% **	Isolation voltage:	min.1000V DC
Line Voltage regulation:	+/-1,2% / 1% of Vin max.	Short circuit protection:	1.0 second
Load Voltage regulation:	5V output type 15% max.	Operating temp. range:	-40°C to +85°C
(10% to 100% full load)	9V ~ 24V output types 10% max.	Storage temp. range:	-55°C to +125°C

\*\* Note: Measured @25°C with the condition  
 of Vin = nominal and full load

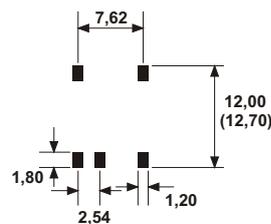
CAUTION: NO INPUT POLARITY CHANGE ALLOWED!

Part - No.	Input Voltage DC	Output Voltage DC	1 Watt	2 Watt
			Output Current	Output Current
SD14-0505	5V	5V	200mA	400mA
SD14-0509		9V	111mA	222mA
SD14-0512		12V	84mA	166mA
SD14-0515		15V	66mA	133mA
SD14-1205	12V	5V	200mA	400mA
SD14-1209		9V	111mA	222mA
SD14-1212		12V	84mA	166mA
SD14-1215		15V	66mA	133mA
SD14-2405	24V	5V	200mA	400mA
SD14-2409		9V	111mA	222mA
SD14-2412		12V	84mA	166mA
SD14-2415		15V	66mA	133mA

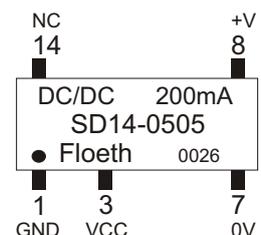
### Mechanical Specifications:



### Footprint:



### PIN CONNECTION:



ALL DIMENSIONS IN MM  
 (x,yy) 2Watt Type  
 Tolerance +/-0,25mm  
 All pins on a 2,54mm pitch.  
 Dot marks Pin 1

## COMMERCIAL DC/DC Converters

Stand: 15/05

1Watt / 2Watt

Series: SD18

Unregulated  
 Dual output  
 SMD Case: SO18 package

### Electrical specifications:

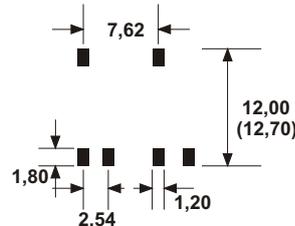
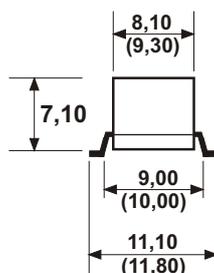
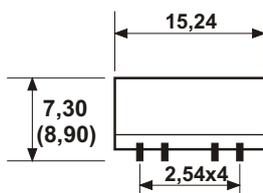
Input voltage range:	+/- 10%	Ripple/Noise @20MHz BW:	max. 75mVp-p
Input filter:	capacitor	Efficiency at full load:	min. 70%
Output voltage accuracy:	+/- 5% **	Isolation voltage:	min. 1000V DC
Line Voltage regulation:	+/-1,2% / 1% of Vin max.	Short circuit protection:	1.0 second
Load Voltage regulation:	5V output type 15% max.	Operating temp. range:	-40°C to +70°C
(10% to 100% full load)	9V ~ 24V output types 10% max.	Storage temp. range:	-55°C to +125°C

\*\* Note: Measured @25°C with the condition  
 of Vin = nominal and full load

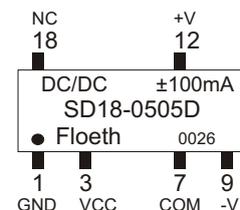
CAUTION: NO INPUT POLARITY CHANGE ALLOWED!

Part - No.	Input Voltage DC	Output Voltage DC	1Watt	2Watt
			Output Current	Output Current
SD18-0505D	5V	+/- 5V	+/-100mA	+/-200mA
SD18-0509D		+/- 9V	+/- 55mA	+/-111mA
SD18-0512D		+/-12V	+/- 42mA	+/- 83mA
SD18-0515D		+/-15V	+/- 33mA	+/- 66mA
SD18-1205D	12V	+/- 5V	+/-100mA	+/-200mA
SD18-1209D		+/- 9V	+/- 55mA	+/-111mA
SD18-1212D		+/-12V	+/- 42mA	+/- 83mA
SD18-1215D		+/-15V	+/- 33mA	+/- 66mA

### Mechanical Specifications:



### PIN CONNECTION:



ALL DIMENSIONS IN MM  
 (x,yy) 2Watt Type  
 Tolerance +/-0,25mm  
 All pins on a 2,54mm pitch.  
 Dot marks Pin 1

# COMMERCIAL DC/DC Converters

Stand: 14/05

**0,5Watt**

**Series: SDR18**

**Regulated  
 Single output  
 SMD Case: SO18 package**

**Electrical specifications:**

Input voltage range: +/- 5%  
 Input filter: capacitor  
 Output voltage accuracy: +/- 5%  
 Line regulation: max. 1.0%  
 Load regulation: max. 1,0 %  
 Ripple/Noise @20MHz BW: max. 50mVp-p

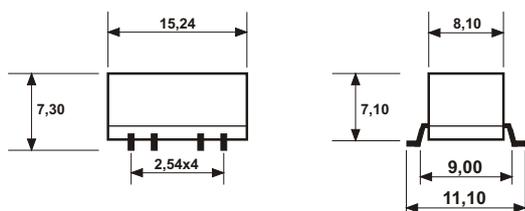
Efficiency at full load: min. 50%  
 Isolation voltage: min. 1000V DC  
 Part-No.: /H min. 2000V DC isol.  
 Short circuit protection: 1.0 second  
 Operating temp. range: -40°C to +70°C  
 Storage temp. range: -55°C to +125°C

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

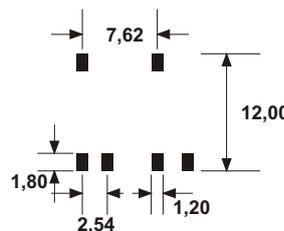
**Note: Measured conditions Ta=25°C, Vin = nominal, full load.**

Part - No.	Input Voltage DC	Output Voltage DC	Output Current	Efficiency %
SDR18-0505	5V	5V	100mA	52
SDR18-0509		9V	55mA	55
SDR18-0512		12V	42mA	58
SDR18-0515		15V	33mA	60
-----				
SDR18-1205	12V	5V	100mA	52
SDR18-1209		9V	55mA	55
SDR18-1212		12V	42mA	58
SDR18-1215		15V	33mA	60

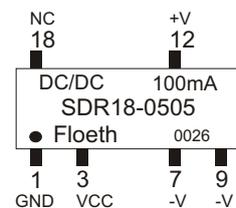
**Mechanical Specifications:**



**Footprint:**



**PIN CONNECTION:**



**ALL DIMENSIONS IN MM  
 Tolerance +/-0,25mm  
 All pins on a 2,54mm pitch.  
 Dot marks Pin 1**

# COMMERCIAL DC/DC Converters

Stand: 15/05  
**1Watt**

**Regulated  
 Single output  
 SMD Case: SO18 package**

**Series: SDR18**

**Electrical specifications:**

Input voltage range: +/- 5%  
 Input filter: capacitor  
 Output voltage accuracy: +/- 5%  
 Line regulation: max. 1.0%  
 Load regulation: max. 1.0%  
 Ripple/Noise @20MHz BW: max. 50mVp-p

Efficiency at full load: min. 50%  
 Isolation voltage: min. 1000V DC  
 optional Part-No.: /H min. 2kV DC  
 Short circuit protection: 1.0 second  
**Part-No.: /S continuous**  
 Operating temp. range: -40°C to +71°C  
 Storage temp. range: -55°C to +125°C

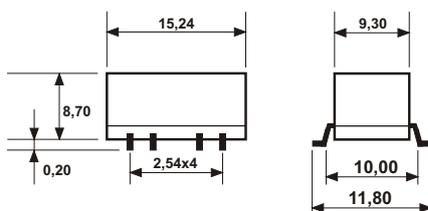
**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

**Note: Measured conditions Ta=25°C, Vin = nominal, full load.**

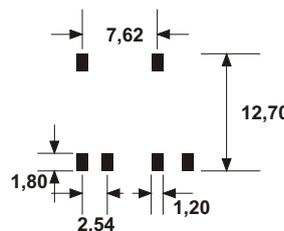
Part - No.	Input Voltage DC	Output Voltage DC	Output Current
SDR18-2405	24V	5V	200mA
SDR18-2409		9V	111mA
SDR18-2412		12V	83mA
SDR18-2415		15V	66mA
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SDR18-3005	30V	5V	200mA
SDR18-3009		9V	111mA
SDR18-3012		12V	83mA
SDR18-3015		15V	66mA

**Any other input voltage (3,3V ~ 30V) and output voltages (3V ~ 15V) available**

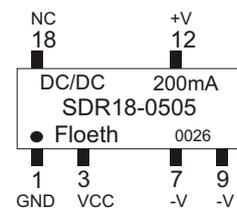
**Mechanical Specifications:**



**Footprint:**



**PIN CONNECTION:**



**ALL DIMENSIONS IN MM  
 Tolerance +/-0,25mm  
 All pins on a 2,54mm pitch.  
 Dot marks Pin 1**

# COMMERCIAL DC/DC Converters AUTO - INSERTABLE

Stand: 07/04

1,8Watt / 3 Watt  
 Series: B

Regulated  
 Case Style: DIL24

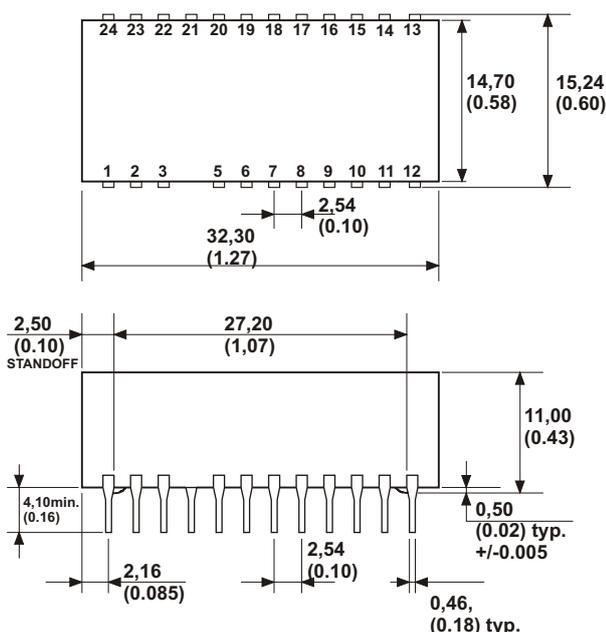
**Electrical specifications:**

Input voltage range: +/- 10%  
 Output voltage accuracy: +/- 5%  
 Line regulation: +/- 0,3%  
 Load regulation: +/- 0,5%  
 Efficiency: min. 50%

Output Ripple & Noise: typ. 50mVp-p  
 Short circuit protection: 1,0 second  
 Operating temperature: -25°C to +70°C  
 Isolation voltage: min. 500V DC

CAUTION: NO INPUT POLARITY CHANGE ALLOWED!

Single Output					1,8 Watt	3 Watt	Dual Output					1,8 Watt	3 Watt	
Part - No.	Input Voltage	Output Voltage	Output current	Output current	Part - No.	Input Voltage	Output Voltage	Output current	Output current	Part - No.	Input Voltage	Output Voltage	Output current	Output current
B-0505	5V	5V	360mA	600mA	B-0505D	5V	+/- 5V	+/-180mA	+/-300mA	B-0505D	5V	+/- 5V	+/-180mA	+/-300mA
B-0509		9V	200mA	330mA	B-0512D		+/-12V	+/- 75mA	+/-125mA	B-0512D		+/-12V	+/- 75mA	+/-125mA
B-0512		12V	150mA	250mA	B-0515D		+/-15V	+/- 60mA	+/-100mA	B-0515D		+/-15V	+/- 60mA	+/-100mA
B-0515		15V	120mA	200mA										
B-1205	12V	5V	360mA	600mA	B-1205D	12V	+/- 5V	+/-180mA	+/-300mA	B-1205D	12V	+/- 5V	+/-180mA	+/-300mA
B-1209		9V	200mA	330mA	B-1212D		+/-12V	+/- 75mA	+/-125mA	B-1212D		+/-12V	+/- 75mA	+/-125mA
B-1212		12V	150mA	250mA	B-1215D		+/-15V	+/- 60mA	+/-100mA	B-1215D		+/-15V	+/- 60mA	+/-100mA
B-1215		15V	120mA	200mA										
B-1505	15V	5V	360mA	600mA	B-1505D	15V	+/- 5V	+/-180mA	+/-300mA	B-1505D	15V	+/- 5V	+/-180mA	+/-300mA
B-1512		12V	150mA	250mA	B-1512D		+/-12V	+/- 75mA	+/-125mA	B-1512D		+/-12V	+/- 75mA	+/-125mA
B-1515		15V	120mA	200mA	B-1515D		+/-15V	+/- 60mA	+/-100mA	B-1515D		+/-15V	+/- 60mA	+/-100mA
B-2405	24V	5V	360mA	600mA	B-2405D	24V	+/- 5V	+/-180mA	+/-300mA	B-2405D	24V	+/- 5V	+/-180mA	+/-300mA
B-2412		12V	150mA	250mA	B-2412D		+/-12V	+/- 75mA	+/-125mA	B-2412D		+/-12V	+/- 75mA	+/-125mA
B-2415		15V	120mA	200mA	B-2415D		+/-15V	+/- 60mA	+/-100mA	B-2415D		+/-15V	+/- 60mA	+/-100mA



PIN CONNECTION		
PIN	SINGLE	DUAL
1 & 24	+ IN	+ IN
2 & 23	NC	-Vout
3 & 22	NC	COM
4	NP	NP
10 & 15	- Vout	COM
11 & 14	+Vout	+Vout
12 & 13	- IN	- IN

ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,25mm  
 (INCHES +/-0,01")  
 All pins on a 2,54mm pitch  
**Note:** NP = No pin; NC = No connection;  
 Dot denotes pin 1

# COMMERCIAL DC/DC Converters AUTO - INSERTABLE

Stand: 07/04

Regulated  
 Case Style: DIL24

3 Watt  
 Series: BW2

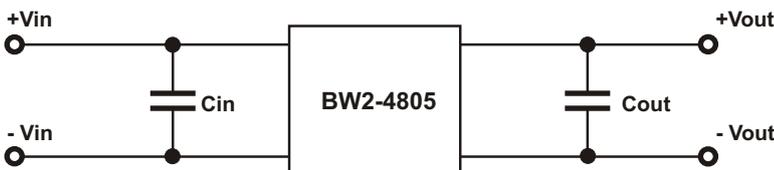
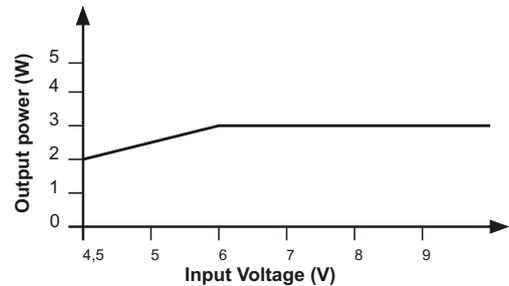
### Electrical specifications:

Input voltage: wide 2:1  
 Output voltage accuracy: typ. +/- 1%  
 Line regulation: typ. +/- 0,1%  
 Load regulation (25% to 100% load): typ. +/- 0,2%  
 Efficiency: up to 82%

Output Ripple & Noise @ 20MHz BW:  
 Vout from 5 to 9 volts: typ. 100mVp-p  
 Vout from 12 to 15 volts: 1% of Vout  
 Short circuit protection: 1,0 second  
 Operating temperature: -40°C to +80°C  
 Isolation voltage: min. 1000V DC

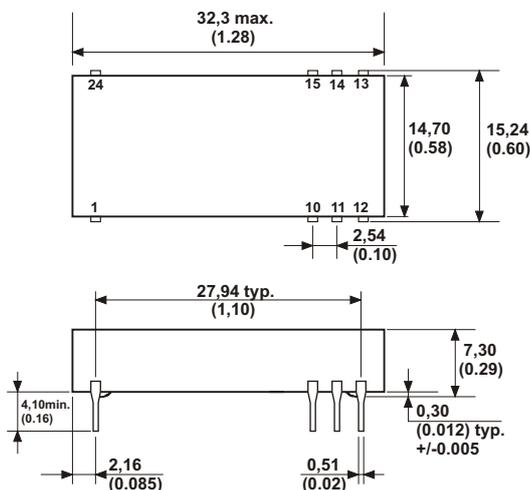
**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part - No.	Input Voltage	Output Voltage	Output current
BW2-0505	4,5- 9V	5V	600mA
BW2-0505,5		5,5V	545mA
BW2-0509		9V	330mA
BW2-0512		12V	250mA
BW2-0515		15V	200mA
BW2-1205	9-18V	5V	600mA
BW2-1209		9V	330mA
BW2-1212		12V	250mA
BW2-1215		15V	200mA
BW2-2405	18-36V	5V	600mA
BW2-2409		9V	330mA
BW2-2412		12V	250mA
BW2-2415		15V	200mA
BW2-4805	36-72V	5V	600mA
BW2-4809		9V	330mA
BW2-4812		12V	250mA
BW2-4815		15V	200mA



Input Voltage	Capacitance	
	Cin	Cout
5V/12V	100µF/25V	100µF/25V
24V/48V	100µF/100V	

It is necessary to add the Cin and Cout of low ESR capacitors for application and testing.



PIN	CONNECTION
1	+ IN
10	-Vout
11	+Vout
12	- IN
13	- IN
14	+Vout
15	- Vout
24	+ IN

ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,25mm  
 (INCHES +/-0,01")  
 All pins on a 2,54mm pitch  
**Note:** NP = No pin; NC = No connection;  
 Dot denotes pin 1

Stand: 07/04

Unregulated  
 Case Style: DIP24

# COMMERCIAL DC/DC Converters

1,8Watt / 3 Watt  
 Series: CU

### Electrical specifications:

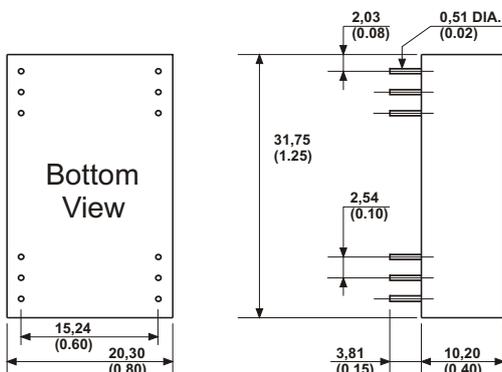
Input voltage range: +/- 10%  
 Output voltage accuracy: +/- 10%  
 Line regulation: +/- 1% / +/-1%  
 Load regulation: +/- 10%

Efficiency: 70% min.  
 Output Ripple & Noise: typ. 100mVp-p  
 Short circuit protection: 1,0 second  
 Operating temperature: -40°C to +75°C  
 Isolation voltage: min. 1000V DC  
 opt. Part-Nr.: /M metal case

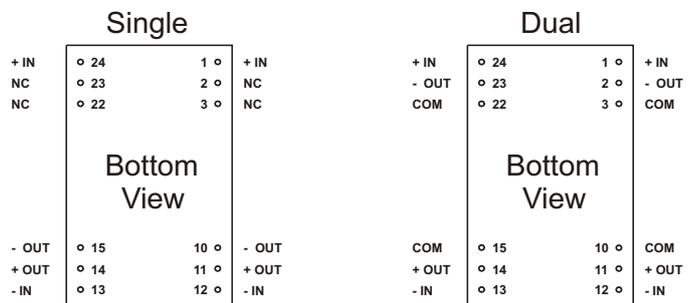
**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Single Output					Dual Output				
Part - No.	Input Voltage	Output Voltage	Output current	Output current	Part - No.	Input Voltage	Output Voltage	Output current	Output current
CU-0505	5V	5V	360mA	600mA	CU-0505D	5V	+/- 5V	+/-180mA	+/-300mA
CU-0509		9V	200mA	330mA	CU-0512D		+/-12V	+/- 75mA	+/-125mA
CU-0512		12V	150mA	250mA	CU-0515D		+/-15V	+/- 60mA	+/-100mA
CU-0515		15V	120mA	200mA	CU-0518D		+/-18V	+/- 50mA	+/- 83mA
CU-1205	12V	5V	360mA	600mA	CU-1205D	12V	+/- 5V	+/-180mA	+/-300mA
CU-1209		9V	200mA	330mA	CU-1212D		+/-12V	+/- 75mA	+/-125mA
CU-1212		12V	150mA	250mA	CU-1215D		+/-15V	+/- 60mA	+/-100mA
CU-1215		15V	120mA	200mA	CU-1220D		+/-20V	+/- 45mA	+/- 75mA
CU-1505	15V	5V	360mA	600mA	CU-1505D	15V	+/- 5V	+/-180mA	+/-300mA
CU-1512		12V	150mA	250mA	CU-1512D		+/-12V	+/- 75mA	+/-125mA
CU-1515		15V	120mA	200mA	CU-1515D		+/-15V	+/- 60mA	+/-100mA
CU-2405	24V	5V	360mA	600mA	CU-2405D	24V	+/- 5V	+/-180mA	+/-300mA
CU-2412		12V	150mA	250mA	CU-2412D		+/-12V	+/- 75mA	+/-125mA
CU-2415		15V	120mA	200mA	CU-2415D		+/-15V	+/- 60mA	+/-100mA

**Any other output voltages available.**



### PIN CONNECTION:



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,25mm  
 (INCHES +/-0,01")

All pins on a 2,54mm pitch

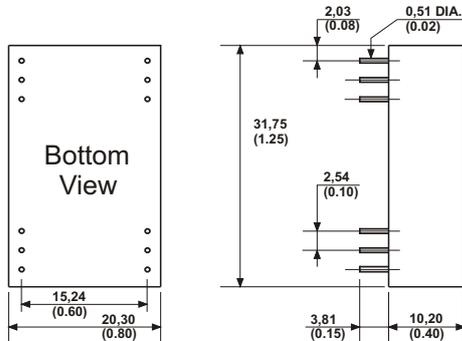
**Note:** NP = No pin; NC = No connection;  
 Dot denotes pin 1

Stand: 07/04

Regulated  
 Case Style: DIP24

# COMMERCIAL DC/DC Converters

1,8Watt / 3 Watt  
 Series: C



### Electrical specifications:

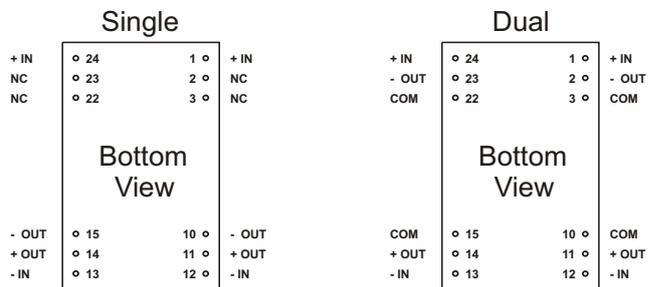
Input voltage range:	+/- 10%
	@ U <sub>in</sub> =5V -5 / +10%
Output voltage accuracy:	+/- 5%
Line regulation:	+/- 0,3%
Load regulation:	+/- 0,5%
Efficiency:	50% min.
Output Ripple & Noise:	typ. 50mVp-p
Short circuit protection:	1,0 second
Operating temperature:	-40°C to +70°C
Isolation voltage:	min. 1000V DC

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

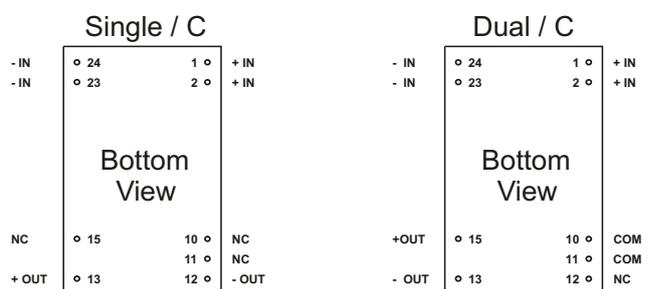
Single Output		1,8 Watt	3 Watt	Dual Output		1,8 Watt	3 Watt		
Part - No.	Input Voltage	Output Voltage	Output current	Output current	Part - No.	Input Voltage	Output Voltage	Output current	Output current
C-0505	5V	5V	360mA	600mA	C-0505D	5V	+/- 5V	+/-180mA	+/-300mA
C-0509		9V	200mA	330mA	C-0512D		+/-12V	+/- 75mA	+/-125mA
C-0512		12V	150mA	250mA	C-0515D		+/-15V	+/- 60mA	+/-100mA
C-0515		15V	120mA	200mA					
C-1205	12V	5V	360mA	600mA	C-1205D	12V	+/- 5V	+/-180mA	+/-300mA
C-1209		9V	200mA	330mA	C-1212D		+/-12V	+/- 75mA	+/-125mA
C-1212		12V	150mA	250mA	C-1215D		+/-15V	+/- 60mA	+/-100mA
C-1215		15V	120mA	200mA					
C-1505	15V	5V	360mA	600mA	C-1505D	15V	+/- 5V	+/-180mA	+/-300mA
C-1512		12V	150mA	250mA	C-1512D		+/-12V	+/- 75mA	+/-125mA
C-1515		15V	120mA	200mA	C-1515D		+/-15V	+/- 60mA	+/-100mA
C-2405	24V	5V	360mA	600mA	C-2405D	24V	+/- 5V	+/-180mA	+/-300mA
C-2412		12V	150mA	250mA	C-2412D		+/-12V	+/- 75mA	+/-125mA
C-2415		15V	120mA	200mA	C-2415D		+/-15V	+/- 60mA	+/-100mA

### PIN CONNECTION:

**Part-No.: /S max. 2Watt**  
**Short circuit protection: continuous**  
**C-4805/S 400mA**



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,25mm  
 (INCHES +/-0,01")  
 All pins on a 2,54mm pitch  
**Note:** NP = No pin; NC = No connection;  
 Dot denotes pin 1



Stand: 07/04

Regulated  
 Case Style: DIP24

# COMMERCIAL DC/DC Converters

2,2Watt / 3 Watt

Series: C

### Electrical specifications:

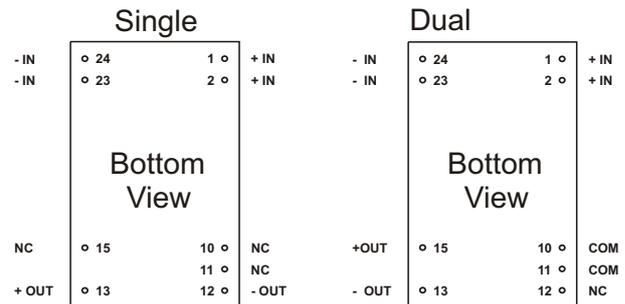
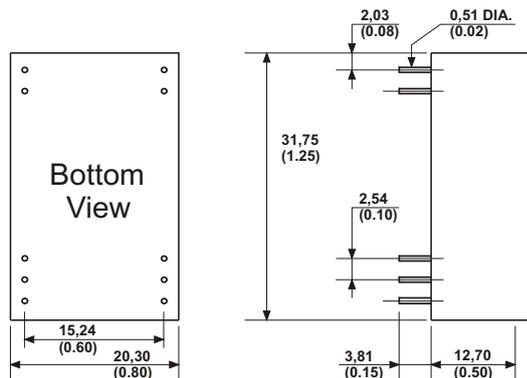
Input voltage range: +/- 10%  
 Output voltage accuracy: +/- 5%  
 Line regulation: +/- 0,5%  
 Load regulation: 10% to 100% +/- 1,0%  
 Efficiency: min. 50%

Output Ripple & Noise: max. 100mVp-p  
 Short circuit protection: continuous  
 Operating temperature: -40°C to +70°C  
 Isolation voltage:  
 /.. Part-No.: H2: min. 2000V DC  
 /.. Part-No.: H3: min. 3000V DC  
 /.. Part-No.: H5: min. 5000V DC

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Single Output			2,2 Watt	3 Watt	Dual Output			2,2 Watt	3 Watt
Part - No.	Input Voltage	Output Voltage	Output current	Output current	Part - No.	Input Voltage	Output Voltage	Output current	Output current
C-0505C/..	5V	5V	400mA	600mA	C-0505DC/..	5V	+/- 5V	+/-100mA	+/-300mA
C-0509C/..		9V	244mA	333mA	C-0509DC/..		+/- 9V	+/-122mA	+/-166mA
C-0512C/..		12V	180mA	250mA	C-0512DC/..		+/-12V	+/- 90mA	+/-125mA
C-0515C/..		15V	150mA	200mA	C-0515DC/..		+/-15V	+/- 75mA	+/-100mA
C-1205C/..	12V	5V	400mA	600mA	C-1205DC/..	12V	+/- 5V	+/-100mA	+/-300mA
C-1209C/..		9V	244mA	333mA	C-1209DC/..		+/- 9V	+/-122mA	+/-166mA
C-1212C/..		12V	180mA	250mA	C-1212DC/..		+/-12V	+/- 90mA	+/-125mA
C-1215C/..		15V	150mA	200mA	C-1215DC/..		+/-15V	+/- 75mA	+/-100mA
C-2405C/..	24V	5V	400mA	600mA	C-2405DC/..	24V	+/- 5V	+/-100mA	+/-300mA
C-2409C/..		9V	244mA	333mA	C-2409DC/..		+/- 9V	+/-122mA	+/-166mA
C-2412C/..		12V	180mA	250mA	C-2412DC/..		+/-12V	+/- 90mA	+/-125mA
C-2415C/..		15V	150mA	200mA	C-2415DC/..		+/-15V	+/- 75mA	+/-100mA

### PIN CONNECTION:



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,25mm  
 (INCHES +/-0,01")

All pins on a 2,54mm pitch

**Note:** NP = No pin; NC = No connection;  
 Dot denotes pin 1

# COMMERCIAL DC/DC Converters PWM - regulated

Wide input range 1:2  
Case Style: DIP24

3 Watt  
Series: CW2

### Electrical specifications:

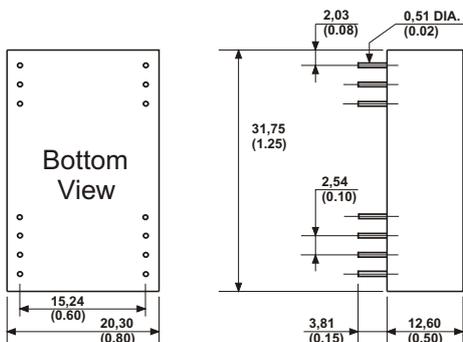
Input voltage: wide 1:2  
Output voltage accuracy: +/- 2%  
Line regulation: +/- 1%  
Load regulation: +/- 1% (10% to 100% Load)  
Efficiency: up to 82%  
Output Ripple & Noise:  
Single: typ. 50mVp-p  
Dual: typ. 100mVp-p

Short circuit protection: continuous  
Operating temperature: -25°C to +70°C  
Isolation voltage: min. 1000V DC  
Part-Nr. /H: min. 1500V DC  
Case material: black plastic  
Part-Nr. /M: metal case

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

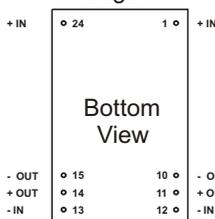
Single Output				3 Watt	Dual Output				3 Watt
Part - No.	Input voltage DC	Output voltage DC		Output current	Part - No.	Input voltage DC	Output voltage DC	Output current	
CW2-1205	9 - 18V	5V		600mA	CW2-1205D	9 - 18V	+/- 5V	+/-300mA	
CW2-1212		12V		250mA	CW2-1212D		+/-12V	+/-125mA	
CW2-1215		15V		200mA	CW2-1215D		+/-15V	+/-100mA	
CW2-2405	18 - 36V	5V		600mA	CW2-2405D	18 - 36V	+/- 5V	+/-300mA	
CW2-2412		12V		250mA	CW2-2412D		+/-12V	+/-125mA	
CW2-2415		15V		200mA	CW2-2415D		+/-15V	+/-100mA	

Input voltage range 48V (36-72V) also available.



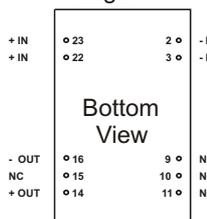
### PIN CONNECTION:

#### Single



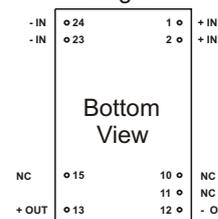
### PIN CONNECTION Optional: Part-No. A

#### Single

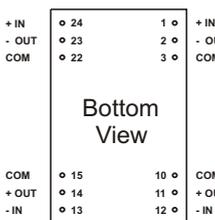


### PIN CONNECTION Optional: Part-No. C

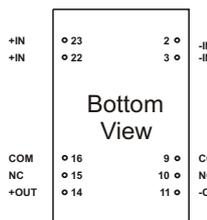
#### Single



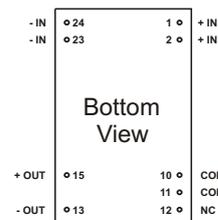
#### Dual



#### Dual



#### Dual



ALL DIMENSIONS IN MM (INCHES)  
MILLIMETERS +/- 0,25mm  
(INCHES +/-0,01")

All pins on a 2,54mm pitch

Note: NP = No pin; NC = No connection;  
Dot denotes pin 1

\* For other pinning:

Add "A" to the end of Partnumber.

For example CW2-2405A 3W

Stand: 09/05

# COMMERCIAL DC/DC Converters PWM - regulated

**3 - 4 Watt  
 Series: CW2**

**Wide input range 1:2  
 Case Style: DIP24**

**Electrical specifications:**

Input voltage: wide 1:2  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 1%  
 Load regulation: +/- 1% (10% to 100% Load)  
 Efficiency: up to 82%  
 Output Ripple & Noise:  
 Single: typ. 50mVp-p  
 Dual: typ. 100mVp-p  
 Short circuit protection: continuous

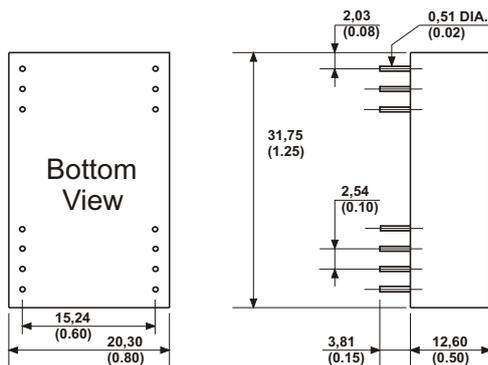
Operating temperature: -25°C to +70°C  
 Isolation voltage: min. 1000V DC  
 Part-Nr. /H: min. 1500V DC  
 Part-Nr. /H2: min. 2000V DC  
 Part-Nr. /H3: min. 3000V DC  
 Part-Nr. /H5: min. 5000V DC  
 Case material: black plastic  
 Part-No.: /M metal case

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Single Output			3 Watt	4 Watt	Dual Output			3 Watt	4 Watt
Part - No.	Input voltage DC	Output voltage DC	Output current	Output current	Part - No.	Input voltage DC	Output voltage DC	Output current	Output current
CW2-0505	4,5 - 9V	5V	600mA	800mA	CW2-0505D	4,5 - 9V	+/- 5V	+/-300mA	+/-400mA
CW2-0512		12V	250mA	333mA	CW2-0512D		+/-12V	+/-125mA	+/-166mA
CW2-0515		15V	200mA	266mA	CW2-0515D		+/-15V	+/-100mA	+/-133mA
CW2-1205	9 - 18V	5V	600mA	800mA	CW2-1205D	9 - 18V	+/- 5V	+/-300mA	+/-400mA
CW2-1212		12V	250mA	333mA	CW2-1212D		+/-12V	+/-125mA	+/-166mA
CW2-1215		15V	200mA	266mA	CW2-1215D		+/-15V	+/-100mA	+/-133mA
CW2-2405	18 - 36V	5V	600mA	800mA	CW2-2405D	18 - 36V	+/- 5V	+/-300mA	+/-400mA
CW2-2412		12V	250mA	333mA	CW2-2412D		+/-12V	+/-125mA	+/-166mA
CW2-2415		15V	200mA	266mA	CW2-2415D		+/-15V	+/-100mA	+/-133mA

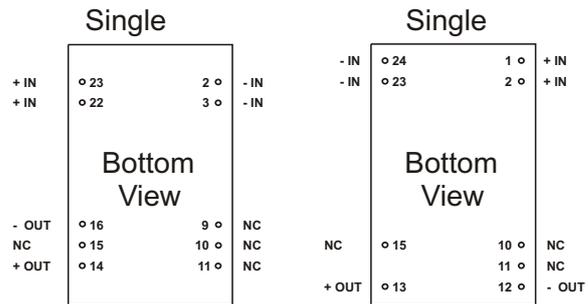
**Input voltage range 48V (36-72V) also available.**

**PIN CONNECTION:**



PIN CONNECTION  
 Optional: Part-No. A

PIN CONNECTION  
 Optional: Part-No. C



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,25mm  
 (INCHES +/-0,01")  
 All pins on a 2,54mm pitch  
**Note:** NP = No pin; NC = No connection;  
 Dot denotes pin 1

\* For other pinning:  
 Add "A" to the end of Partnumber.  
 For example CW2-2405A 3W

## COMMERCIAL DC/DC Converters PWM - regulated

**3 Watt  
 Series: CW2**

**Wide input range 1:2  
 Case style: DIP24**

### Electrical specifications:

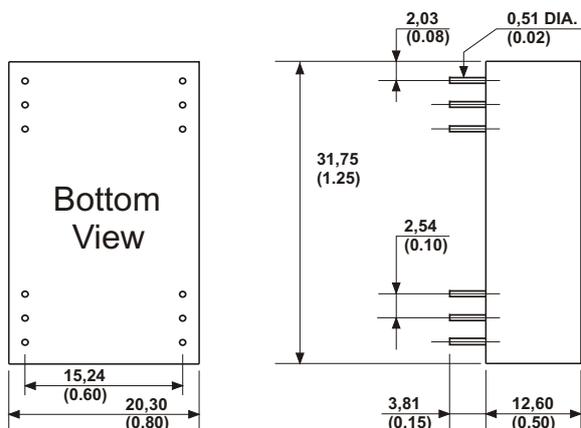
Input voltage: wide 1:2  
 Input filter: Pi type  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 0,2%  
 Load regulation: +/- 2%  
 Voltage balance, dual outputs: +/- 2%  
 Efficiency: up to 80%

Output Ripple & Noise: typ. 50mVp-p  
 Short circuit protection: continuous  
 Operating temperature: -25°C to +71°C  
 Isolation voltage: I/O min. 500V DC  
 O/O min. 500V DC  
 Switching frequency: typ. 300kHz  
 Case material: Nickel-coated-copper Five-sided  
 /P black plastic

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part - No. Dual Output	Input Voltage DC	Output Voltage		Output Current	
		OUT 1	DC	OUT 2	OUT 1 mA
CW2-120505	9-18V	5V	5V	300	300
CW2-121212		12V	12V	125	125
CW2-121515		15V	15V	100	100
CW2-240505	18-36V	5V	5V	300	300
CW2-241212		12V	12V	125	125
CW2-241515		15V	15V	100	100
CW2-480505	36-72V	5V	5V	300	300
CW2-481212		12V	12V	125	125
CW2-481515		15V	15V	100	100

**Input voltage range 48V (36-72V) also available**

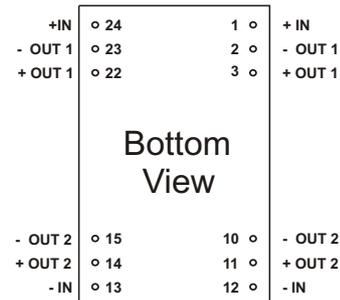


**ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,5mm  
 (INCHES +/- 0,02")  
 All pins on a 2,54mm pitch.**

MODEL No.	max. Capacitive Load
xx0505	2 x 470µF
xx1212	2 x 100µF
xx1515	2 x 68µF

### PIN CONNECTION:

Dual Separate



# COMMERCIAL DC/DC Converters

PWM - regulated

3 Watt  
 Series: CW2

Wide input range 1:2  
 Case style: DIP24  
 Low profile

**Electrical specifications:**

Input voltage: wide 1:2  
 Input filter: Pi Type  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 0,5%  
 Load regulation: Single ±0,2%; Dual±2%  
 Voltage balance, dual outputs: +/-2%  
 Efficiency: up to 80%

Output Ripple & Noise: typ. single 50mVp-p; dual 100mVp-p  
 continuous  
 Short circuit protection: continuous  
 Operating temperature: -25°C to +70°C  
 Isolation voltage: min. 1000V DC  
 Switching frequency: min. 100kHz  
 Case material: Nickel-coated-copper  
 /P black plastic

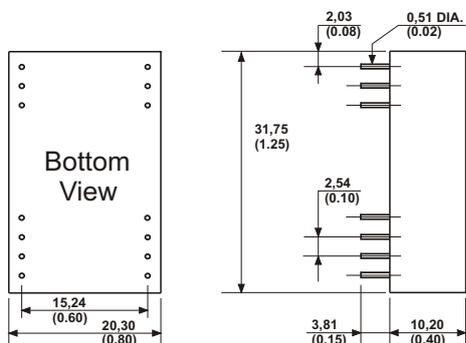
**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part - No. Single Output	Input Voltage DC	Output Voltage DC	Output Current mA
CW2-1205(A)LP	9-18V	5V	600
CW2-1212(A)LP		12V	250
CW2-1215(A)LP		15V	200
CW2-2405(A)LP	18-36V	5V	600
CW2-2412(A)LP		12V	250
CW2-2415(A)LP		15V	200

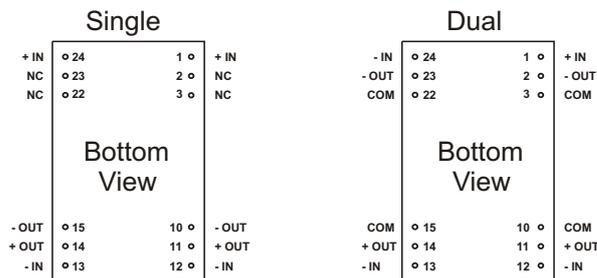
Part - No. Dual Output	Input Voltage DC	Output Voltage DC	Output Current mA
CW2-1205D(A)LP	9-18V	+/- 5V	+/-300
CW2-1212D(A)LP		+/-12V	+/-125
CW2-1215D(A)LP		+/-15V	+/-100
CW2-2405D(A)LP	18-36V	+/- 5V	+/-300
CW2-2412D(A)LP		+/-12V	+/-125
CW2-2415D(A)LP		+/-15V	+/-100

Input voltage range 48V (36-72V) also available

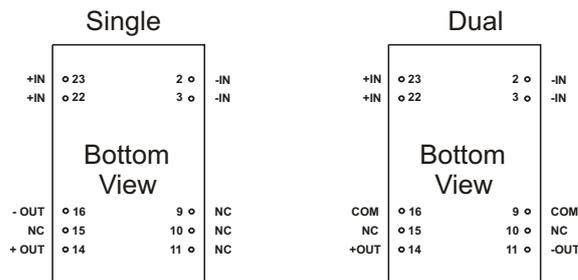
**PIN CONNECTION:**



ALL DIMENSIONS IN MM  
 MILLIMETERS +/- 0,5mm  
 (INCHES +/- 0,02")  
 All pins on a 2,54mm pitch.



PIN CONNECTION Optional: Part-No. A



# COMMERCIAL DC/DC Converters PWM - regulated

**5-6 Watt  
 Series: CW2**

**Wide input range 1:2  
 Case style: DIP24**

**Electrical specifications:**

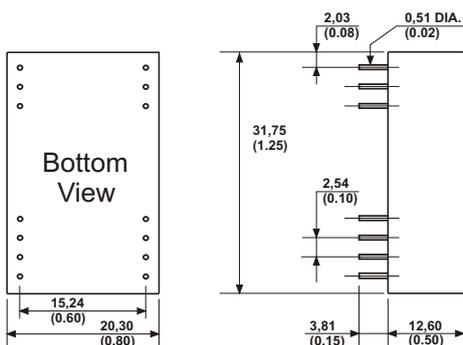
Input voltage: wide 1:2  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 1%  
 Load regulation: +/- 1% (10% to 100% Load)  
 Efficiency: up to 85%  
 Output Ripple & Noise: typ. 100mVp-p

Short circuit protection: continuous  
 Operating temperature: -25°C to +70°C  
 Isolation voltage: min. 1000V DC  
 opt. min. 1500V DC Part-No. /H  
 Case material: black plastic  
 opt. metal case Part-No. /M

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

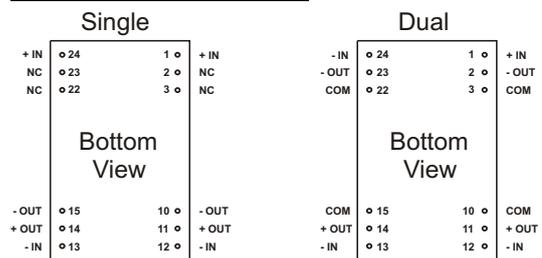
Part - No. Single Output	Input Voltage DC	Output Voltage DC	Output current	Part - No. Single Output	Input Voltage DC	Output Voltage DC	Output current
CW2-0505	4,5 - 9V	5V	1000	CW2-0505D	4,5 - 9V	± 5V	±500mA
CW2-0509		9V	556	CW2-0509D		± 9V	±278mA
CW2-0512		12V	470	CW2-0512D		±12V	±230mA
CW2-0515		15V	400	CW2-0515D		±15V	±200mA
CW2-1205	9-18V	5V	1000	CW2-1205D	9-18V	± 5V	±500mA
CW2-1209		9V	556	CW2-1209D		± 9V	±278mA
CW2-1212		12V	470	CW2-1212D		±12V	±230mA
CW2-1215		15V	400	CW2-1215D		±15V	±200mA
CW2-2405	18-36V	5V	1000	CW2-2405D	18-36V	± 5V	±500mA
CW2-2409		9V	556	CW2-2409D		± 9V±	±278mA
CW2-2412		12V	470	CW2-2412D		±12V	±230mA
CW2-2415		15V	400	CW2-2415D		±15V	±200mA

**Input voltage range 48V (36-72V) also available**

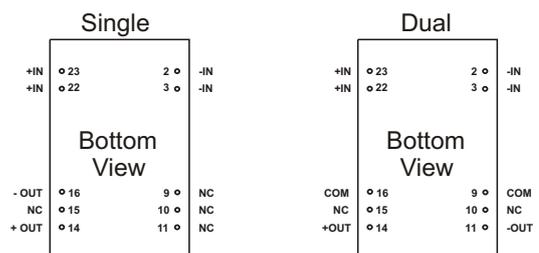


**ALL DIMENSIONS IN MM  
 MILLIMETERS +/- 0,5mm  
 (INCHES +/- 0,02")  
 All pins on a 2,54mm pitch.**

**PIN CONNECTION:**



**PIN CONNECTION Optional: Part-No. A**



# COMMERCIAL DC/DC Converters

PWM - regulated

6,6W / 8W

Series: CW2-xyyyA/LP

Wide input range 1:2  
 Case style: DIP24  
 Low profile

### Electrical specifications:

All specifications typical at nominal input full load and 25°C unless otherwise noted  
 Input voltage: wide 1:2  
 Input filter: Pi Network  
 Output voltage accuracy: +/- 2%  
 Ripple & Noise, 20 MHz BW: 50mVp-p  
 Line regulation: +/- 0,2%  
 Load regulation: Single ±0,2%; Dual ± 1,0%  
 Operating temperature: -25°C to +70°C  
 Case material: Nickel coated copper

### CAUTION: NO INPUT POLARITY CHANGE ALLOWED!

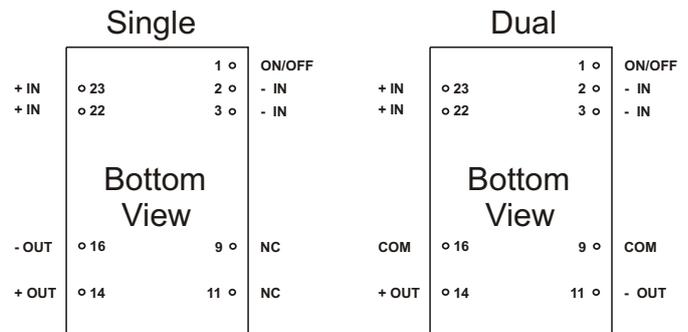
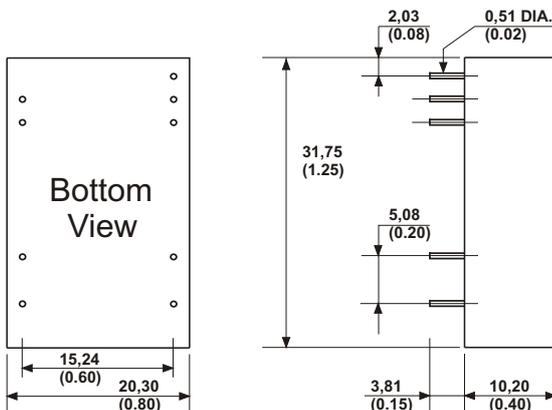
Over current protection: continuous  
 Isolation Voltage: min. 1600V DC  
 Isolation Capacitance: 300pF max.  
 Remote ON / OFF Control:  
 Control Voltage in Referenced to Negative (-) Input  
 Compatibility: CMOS, TTL  
 On - Control: 4,8V min. or open  
 Off - Control: 0,4V max. or short

Part - No. Single Output	Input Voltage	Output Voltage	Output Current	Eff. % typ.	Part - No. Dual Output	Input Voltage	Output Voltage	Output Current	Eff. % typ.
CW2-1203,3A/LP	9-18V DC	3,3V DC	2000mA	80	CW2-1205DA/LP	9-18V DC	+/- 5V DC	+/- 800mA	82
CW2-1205A/LP		5V DC	1500mA	81	CW2-1212DA/LP		+/-12V DC	+/- 333mA	83
CW2-1212A/LP		12V DC	666mA	85	CW2-1215DA/LP		+/-15V DC	+/- 267mA	83
CW2-1215A/LP		15V DC	533mA	82					
CW2-2403,3A/LP	18-36V DC	3,3V DC	2000mA	79	CW2-2405DA/LP	18-36V DC	+/- 5V DC	+/- 800mA	82
CW2-2405A/LP		5V DC	1500mA	83	CW2-2412DA/LP		+/-12V DC	+/- 333mA	84
CW2-2412A/LP		12V DC	666mA	82	CW2-2415DA/LP		+/-15V DC	+/- 267mA	84
CW2-2415A/LP		15V DC	533mA	82					
CW2-4803,3A/LP	36-72V DC	3,3V DC	2000mA	79	CW2-4805DA/LP	36-72V DC	+/- 5V DC	+/- 800mA	83
CW2-4805A/LP		5V DC	1500mA	81	CW2-4812DA/LP		+/-12V DC	+/- 333mA	84
CW2-4812A/LP		12V DC	666mA	83	CW2-4815DA/LP		+/-15V DC	+/- 267mA	84
CW2-4815A/LP		15V DC	533mA	83					

Other output voltages on request

ALL DIMENSIONS IN MM ( INCHES )  
 MILLIMETERS +/- 0,25mm  
 (INCHES +/-0,01")  
 All pins on a 2,54mm pitch.  
 NC = No connection, NP = No pin

### PIN CONNECTION:



# COMMERCIAL DC/DC Converters

Stand: 07/04

2 - 2,2 Watt

Ultra Wide input range 1:4  
 Case style: DIP24

PWM - regulated

Series: CW4-xyyy

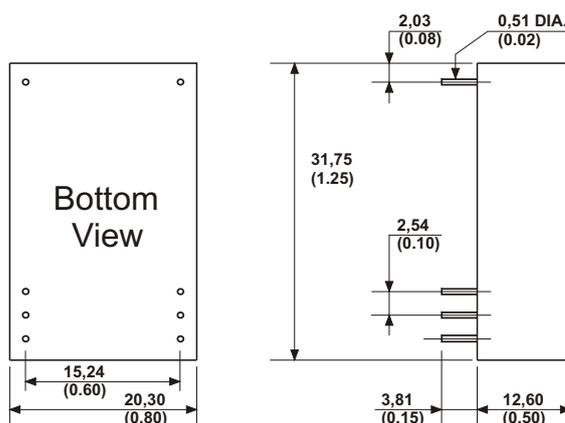
### Electrical specifications:

Input voltage: wide 1:4  
 Output voltage accuracy: +/- 5%  
 Ripple & Noise, 20 MHz BW: max. 50mVp-p  
 Line regulation (10% - 100% Full Load): +/- 0,5%  
 Load regulation (10% - 100% Full Load): +/- 0,5%

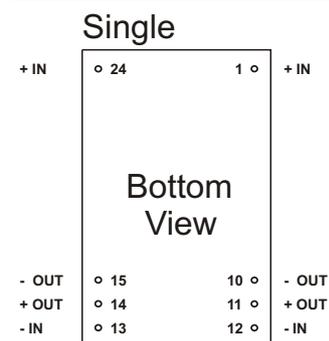
Isolation Voltage: min. 500V DC  
 Short circuit protection: continuous  
 Operating temperature: -25°C to +70°C  
 Case material: black plastic

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part - No. Single Output	Input Voltage DC	Output Voltage DC	Output Current	Eff. %
CW4-2405	9-36V	5V	400mA	70
CW4-2412		12V	180mA	75
CW4-2415		15V	150mA	75
CW4-4805	18-72V	5V	400mA	70
CW4-4812		12V	180mA	75
CW4-4815		15V	150mA	75



### PIN CONNECTION:



ALL DIMENSIONS IN MM ( INCHES )  
 MILLIMETERS +/- 0,25mm  
 (INCHES +/-0,01")  
 All pins on a 2,54mm pitch.  
 NC = No connection, NP = No pin

# COMMERCIAL DC/DC Converters

PWM - regulated

Stand: 05/05

3-5 Watt

Series: CW4

Wide input range 1:4  
 Case Style: DIP24

**Electrical specifications:**

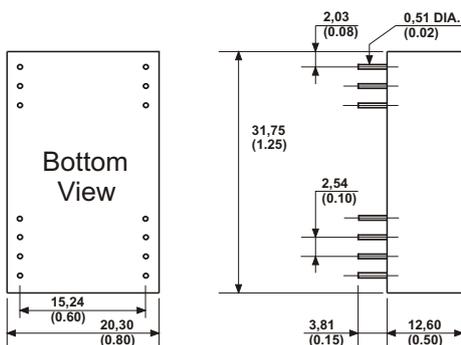
Input voltage: wide 1:4  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 0,5%  
 Load regulation: +/- 0,5% (10% to 100% Load)  
 Efficiency: up to 82%  
 Output Ripple & Noise:  
 Single: typ. 50mVp-p  
 Dual: typ. 100mVp-p

Short circuit protection: continuous  
 Operating temperature: -25°C to +70°C  
 Isolation voltage: min. 1000V DC  
 Part-Nr. /H: min. 1500V DC  
 Case material: black plastic  
 Part-Nr. /M: metal case

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Single Output			3 Watt	5 Watt	Dual Output			3 Watt	5 Watt
Part - No.	Input voltage DC	Output voltage DC	Output current	Output current	Part - No.	Input voltage DC	Output voltage DC	Output current	Output current
CW4-2405	9 - 36V	5V	600mA	1000mA	CW4-2405D CW4-2412D CW4-2415D CW4-2415D	9 - 36V	+/- 5V	+/-300mA	+/-500mA
CW4-2412		12V	250mA	417mA			+/-12V	+/-125mA	+/-208mA
CW4-2415		15V	200mA	333mA			+/-15V	+/-100mA	+/-166mA
CW4-2424		24V	125mA	208mA					

Input voltage range 48V (18-72V) also available.



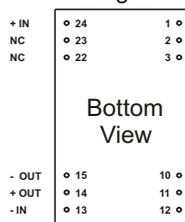
ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,25mm  
 (INCHES +/-0,01")

All pins on a 2,54mm pitch

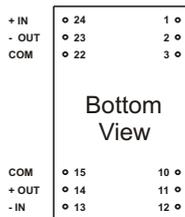
**Note:** NP = No pin; NC = No connection;  
 Dot denotes pin 1

**PIN CONNECTION:**

Single

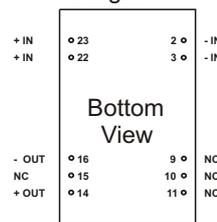


Dual

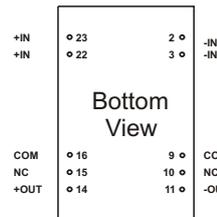


PIN CONNECTION  
 Optional: Part-No. A

Single

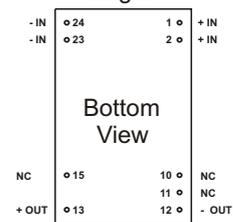


Dual

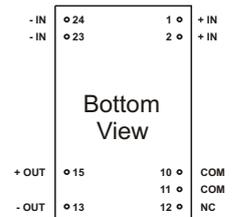


PIN CONNECTION  
 Optional: Part-No. C

Single



Dual



\* For other pinning:  
 Add "A" to the end of Partnumber.  
 For example CW2-2405A 3W

# COMMERCIAL DC/DC Converters

## LOW NOISE

4,5Watt  
 Series: E

Case style: 2" x 1"

### Electrical specifications:

Input voltage accuracy:  $\pm 10\%$   
 Input Pi-Filter: -  
 Output voltage accuracy:  $\pm 2\%$   
 Line regulation:  $\pm 0,2\%$  max.  
 Load regulation:  $\pm 0,5\%$  max.

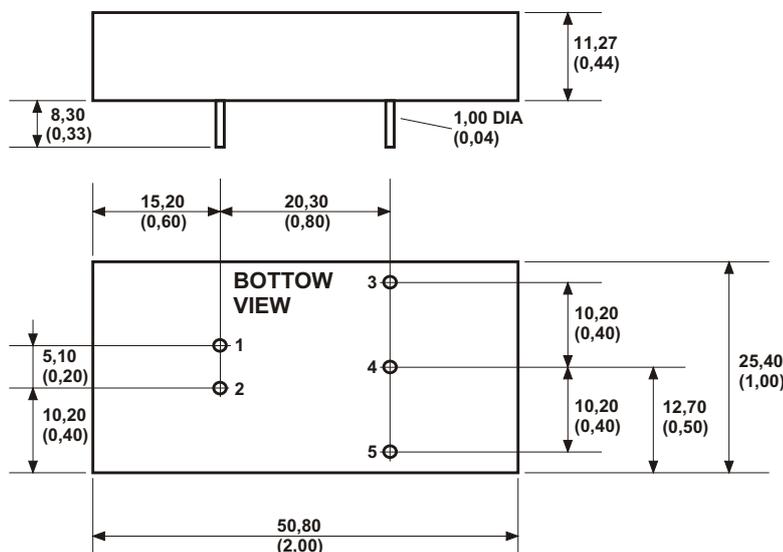
Efficiency: min. 60%  
 Output Ripple & Noise: typ. 100mVp-p(20MHz BW)  
 Short circuit protection: Current Limit Protection  
 Operating temperature:  $-25^{\circ}\text{C}$  to  $+71^{\circ}\text{C}$   
 Isolation voltage: min. 1000V DC  
 Five-sided metal shield

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part - No. Single	Input Voltage	Output Voltage	Output Current	Part - No. Dual	Input Voltage	Output Voltage	Output Current
E-0505	5V DC	5V	800mA	E-0505D	5V DC	+/- 5V	+/- 400mA
E-0512	(4,5-5,5V)	12V	375mA	E-0512D	(4,5-5,5V)	+/-12V	+/- 188mA
E-0515		15V	300mA	E-0515D		+/-15V	+/- 150mA
E-1205	12V DC	5V	800mA	E-1205D	12V DC	+/- 5V	+/- 400mA
E-1212	(10,8-13,2V)	12V	375mA	E-1212D	(10,8-13,2V)	+/-12V	+/- 188mA
E-1215		15V	300mA	E-1215D		+/-15V	+/- 150mA
E-2405	24V DC	5V	800mA	E-2405D	24V DC	+/- 5V	+/- 400mA
E-2412	(21,6-26,4V)	12V	375mA	E-2412D	(21,6-26,4V)	+/-12V	+/- 188mA
E-2415		15V	300mA	E-2415D		+/-15V	+/- 150mA

Other output voltages on request

PIN CONNECTION:		
PIN	Single	Dual
1	+ Input	+ Input
2	- Input	- Input
3	+ Output	+ Output
4	NO PIN	Common
5	- Output	- Output



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS  $\pm 0,5\text{mm}$   
 (INCHES  $\pm 0,02''$ )

**Wide input range 1:2**  
**Case style: 2" x 1"**

**COMMERCIAL**  
**DC/DC Converters**  
**PWM - regulated**

**10Watt / 15Watt**  
**Series: EW2**

**Electrical specifications:**

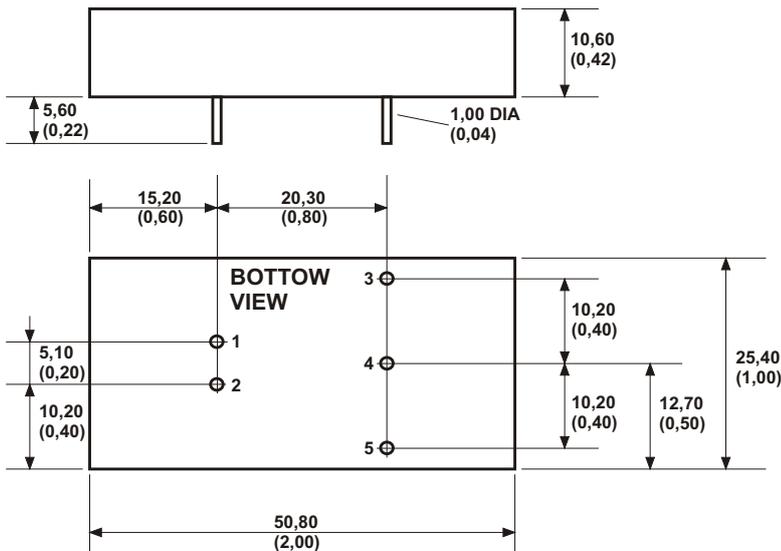
Input voltage: wide 1:2  
Input Pi-Filter: .  
Output voltage accuracy: +/- 2%  
Line regulation: +/- 1%  
Load regulation: +/- 100% to 10% Single +/-1%  
Dual +/-2%

Efficiency: min. 75%  
Output Ripple & Noise: typ. 100mVp-p  
Short circuit protection: continuous  
Operating temperature: -25°C to +70°C  
Isolation voltage: min. 1600V DC  
Five-sided metal shield

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

			10 Watt	15 Watt				10 Watt	15 Watt
Part - No. Single	Input Voltage	Output Voltage	Output Current	Output Current	Part - No. Dual	Input Voltage	Output Voltage	Output Current	Output Current
EW2-1205	12V DC	5V	2000mA	3000mA	EW2-1205D	12V DC	+/- 5V	+/-1000mA	+/-1500mA
EW2-1212	(9-18V)	12V	830mA	1250mA	EW2-1212D	(9-18V)	+/-12V	+/- 416mA	+/- 625mA
EW2-1215		15V	670mA	1000mA	EW2-1215D		+/-15V	+/- 333mA	+/- 500mA
EW2-2405	24V DC	5V	2000mA	3000mA	EW2-2405D	24V DC	+/- 5V	+/-1000mA	+/-1500mA
EW2-2412	(18-36V)	12V	830mA	1250mA	EW2-2412D	(18-36V)	+/-12V	+/- 416mA	+/- 625mA
EW2-2415		15V	670mA	1000mA	EW2-2415D		+/-15V	+/- 333mA	+/- 500mA
EW2-4805	48V DC	5V	2000mA	3000mA	EW2-4805D	48V DC	+/- 5V	+/-1000mA	+/-1500mA
EW2-4812	(36-72V)	12V	830mA	1250mA	EW2-4812D	(36-72V)	+/-12V	+/- 416mA	+/- 625mA
EW2-4815		15V	670mA	1000mA	EW2-4815D		+/-15V	+/- 333mA	+/- 500mA

**Other output voltages on request**



PIN CONNECTION:		
PIN	Single	Dual
1	+ Input	+ Input
2	- Input	- Input
3	+ Output	+ Output
4	NO PIN	Common
5	- Output	- Output

**ALL DIMENSIONS IN MM (INCHES)**  
**MILLIMETERS +/-0,5mm**  
**(INCHES +/- 0,02")**

Wide input range 1:2  
 Case style: 2" x 1"

## COMMERCIAL DC/DC Converters PWM - regulated

10Watt  
 Series: EW2- /G

### Electrical specifications:

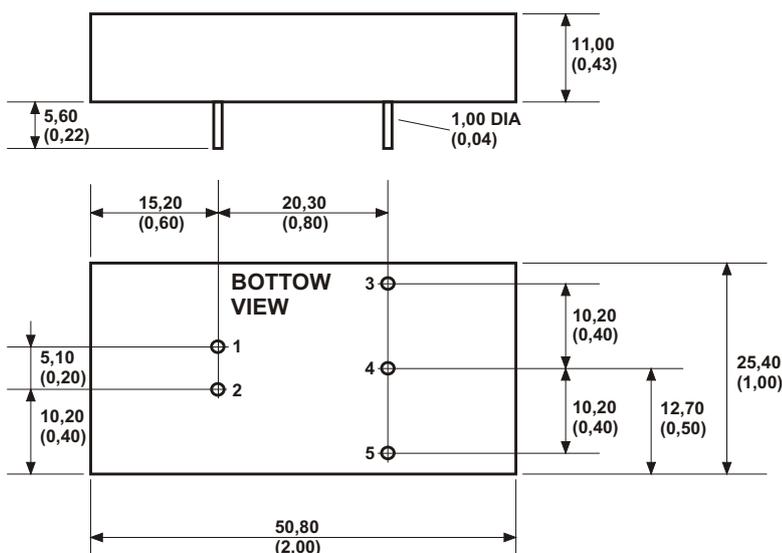
Input voltage: wide 1:2  
 Input Pi-Filter: .  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 0,2%  
 Load regulation: +/- 0,2% (10% to 100% load)

Efficiency: min. 70%  
 Output Ripple & Noise: typ. 100mVp-p  
 Short circuit protection: continuous  
 Operating temperature: -25°C to +71°C  
 Isolation voltage: min. 1000V DC  
 Five-sided metal shield

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

			10 Watt				10 Watt
Part - No. Single	Input Voltage	Output Voltage	Output Current	Part - No. Dual	Input Voltage	Output Voltage	Output Current
EW2-1205/G	12V DC	5V	2000mA	EW2-1205D/G	12V DC	+/- 5V	+/-1000mA
EW2-1212/G	(9-18V)	12V	830mA	EW2-1212D/G	(9-18V)	+/-12V	+/- 416mA
EW2-1215/G		15V	670mA	EW2-1215D/G		+/-15V	+/- 333mA
EW2-2405/G	24V DC	5V	2000mA	EW2-2405D/G	24V DC	+/- 5V	+/-1000mA
EW2-2412/G	(18-36V)	12V	830mA	EW2-2412D/G	(18-36V)	+/-12V	+/- 416mA
EW2-2415/G		15V	670mA	EW2-2415D/G		+/-15V	+/- 333mA
EW2-4805/G	48V DC	5V	2000mA	EW2-4805D/G	48V DC	+/- 5V	+/-1000mA
EW2-4812/G	(36-72V)	12V	830mA	EW2-4812D/G	(36-72V)	+/-12V	+/- 416mA
EW2-4815/G		15V	670mA	EW2-4815D/G		+/-15V	+/- 333mA

Other output voltages on request



PIN CONNECTION:		
PIN	Single	Dual
1	+ Input	+ Input
2	- Input	- Input
3	+ Output	+ Output
4	NO PIN	Common
5	- Output	- Output

ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/-0,5mm  
 (INCHES +/- 0,02")

# COMMERCIAL

## DC/DC Converters

### PWM - regulated

Stand: 07/04

10Watt

Series: EW4

Wide input range 1:4  
 Case style: 2" x 1"

#### Electrical specifications:

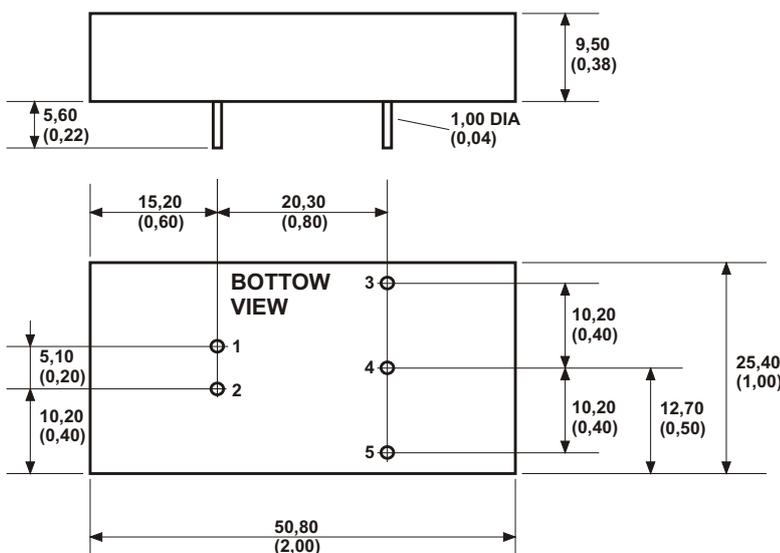
Input voltage range: wide 1:4  
 Input Pi-Filter: .  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 1%  
 Load regulation: +/- 1% Single (100% to 10%)  
 +/- 2% Dual  
 Efficiency: min. 75%

Output Ripple & Noise: 50mVp-p;  
 20MHz BW 75mVp-p  
 Short circuit protection: continuous  
 Operating temperature: -25°C to +71°C  
 Isolation voltage: min. 1600V DC  
 six-sided metal shield

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

			10 Watt				10 Watt
Part - No. Single	Input Voltage	Output Voltage	Output Current	Part - No. Dual	Input Voltage	Output Voltage	Output Current
EW4-2405	24V DC	5V	2000mA	EW4-2405D	24V DC	+/- 5V	+/-1000mA
EW4-2412	( 9-36V)	12V	830mA	EW4-2412D	( 9-36V)	+/-12V	+/- 416mA
EW4-2415		15V	670mA	EW4-2415D		+/-15V	+/- 333mA
EW4-4805	48V DC	5V	2000mA	EW4-4805D	48V DC	+/- 5V	+/-1000mA
EW4-4812	(18-72V)	12V	830mA	EW4-4812D	(18-72V)	+/-12V	+/- 416mA
EW4-4815		15V	670mA	EW4-4815D		+/-15V	+/- 333mA

Other output voltages on request



PIN CONNECTION:		
PIN	Single	Dual
1	+ Input	+ Input
2	- Input	- Input
3	+ Output	+ Output
4	NO PIN	Common
5	- Output	- Output

ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/-0,5mm  
 (INCHES +/- 0,02")

Wide input range 1:4  
 Case style: 2" x 1"

## COMMERCIAL DC/DC Converters PWM - regulated

10Watt  
 Series: EW4- /G

### Electrical specifications:

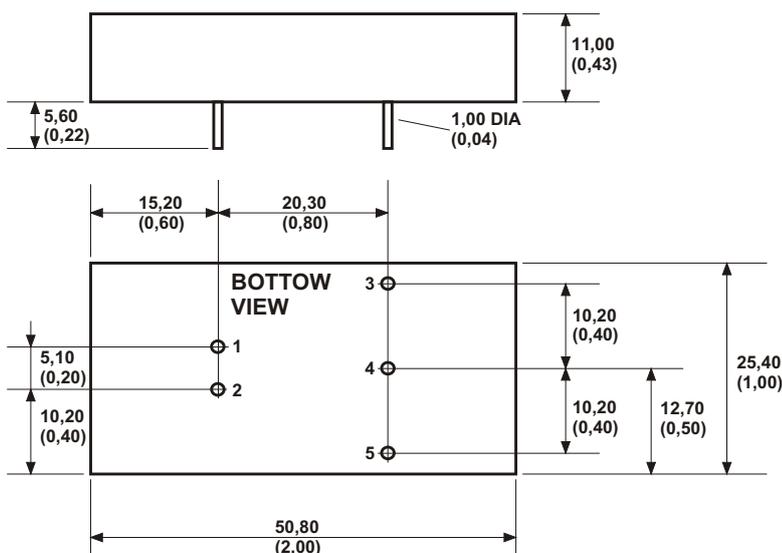
Input voltage: wide 1:4  
 Input Pi-Filter: .  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 0,2%  
 Load regulation: +/- 0,2% (10% to 100% load)

Efficiency: min. 70%  
 Output Ripple & Noise: typ. 100mVp-p  
 Short circuit protection: continuous  
 Operating temperature: -25°C to +71°C  
 Isolation voltage: min. 1000V DC  
 Five-sided metal shield

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

			10 Watt				10 Watt
Part - No. Single	Input Voltage	Output Voltage	Output Current	Part - No. Dual	Input Voltage	Output Voltage	Output Current
EW4-2405/G	24V DC	5V	2000mA	EW4-2405D/G	24V DC	+/- 5V	+/-1000mA
EW4-2412/G	(9-36V)	12V	830mA	EW4-2412D/G	(9-36V)	+/-12V	+/- 416mA
EW4-2415/G		15V	670mA	EW4-2415D/G		+/-15V	+/- 333mA
EW4-4805/G	48V DC	5V	2000mA	EW4-4805D/G	48V DC	+/- 5V	+/-1000mA
EW4-4812/G	(18-72V)	12V	830mA	EW4-4812D/G	(18-72V)	+/-12V	+/- 416mA
EW4-4815/G		15V	670mA	EW4-4815D/G		+/-15V	+/- 333mA

### Other output voltages on request



### PIN CONNECTION:

PIN	Single	Dual
1	+ Input	+ Input
2	- Input	- Input
3	+ Output	+ Output
4	NO PIN	Common
5	- Output	- Output

ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/-0,5mm  
 (INCHES +/- 0,02")

Regulated  
 Case style: 2" x 2"

# COMMERCIAL DC/DC Converters

6 Watt / 10 Watt  
 Series: D

### Electrical specifications:

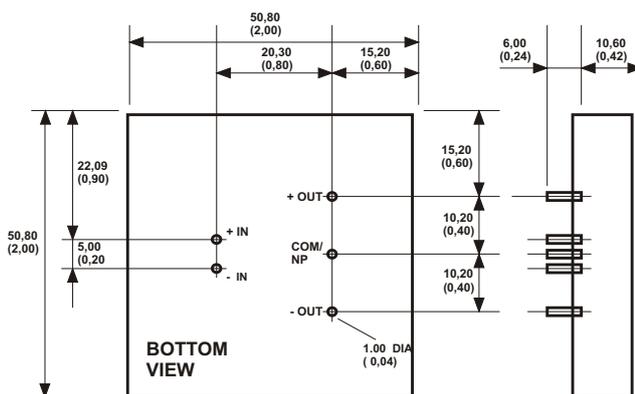
Input voltage range: +/- 10%  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 0,1%  
 Load regulation: +/- 0,5%  
 Efficiency: min. 65%

Output Ripple & Noise: 50mVp-p  
 Short circuit protection: full protection  
 Operating temperature: -25°C to +70°C  
 Isolation voltage: min. 1000V DC  
 Five sided metal shield

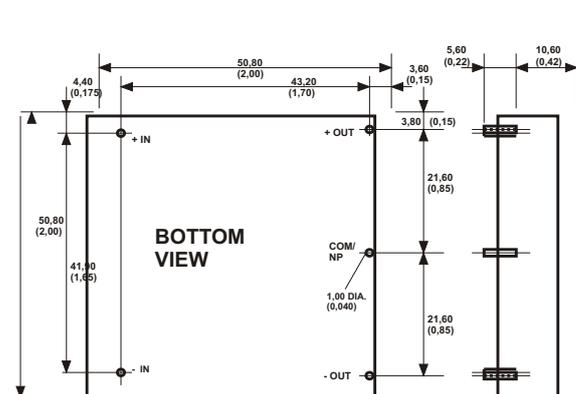
**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

			6 Watt	10 Watt				6 Watt	10 Watt
Part - No. Single	Input Voltage	Output Voltage	Output Current	Output Current	Part - No. Dual	Input Voltage	Output Voltage	Output Current	Output Current
D-0505	5V	5V	1000mA	-----	D-0505D	5V	+/- 5V	+/-600mA	+/-1000mA
D-0512		12V	500mA	833mA	D-0512D		+/-12V	+/-250mA	+/- 417mA
D-0515		15V	400mA	666mA	D-0515D		+/-15V	+/-200mA	+/- 333mA
D-1205	12V	5V	1200mA	2000mA	D-1205D	12V	+/- 5V	+/-600mA	+/-1000mA
D-1212		12V	500mA	833mA	D-1212D		+/-12V	+/-250mA	+/- 417mA
D-1215		15V	400mA	666mA	D-1215D		+/-15V	+/-200mA	+/- 333mA
D-2405	24V	5V	1200mA	2000mA	D-2405D	24V	+/- 5V	+/-600mA	+/-1000mA
D-2412		12V	500mA	833mA	D-2412D		+/-12V	+/-250mA	+/- 417mA
D-2415		15V	400mA	666mA	D-2415D		+/-15V	+/-200mA	+/- 333mA

### Standard pin configuration



### Alternate pin configuration (Suffix/OP)



NP (no pin) on single output models  
 COM (common) on dual output models

ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,5mm  
 (INCHES +/- 0,02")

NOTE: Alternate pin-out version. To order, add suffix "/OP" to the and Partnumber.

# COMMERCIAL DC/DC Converters PWM - regulated

6 / 10 / 15 Watt  
 Series: DW2

wide input range 1:2  
 Case style: 2" x 2"

### Electrical specifications:

Input voltage range: wide  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 0,2%  
 Load regulation: +/- 0,5%  
 Efficiency: min. 65%

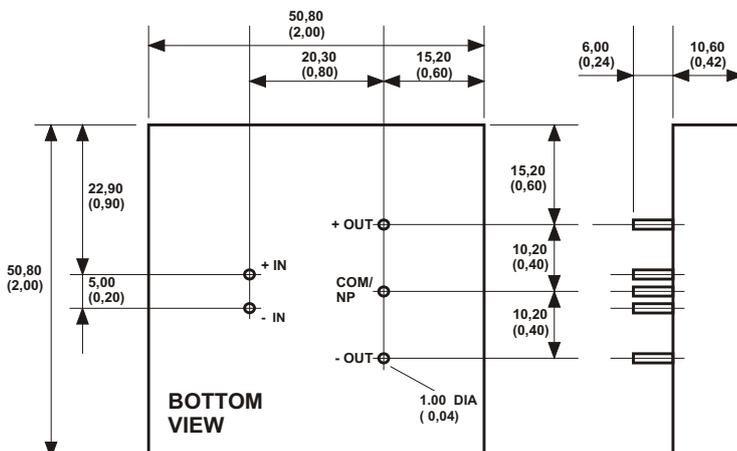
Output Ripple & Noise: 100mVp-p  
 Short circuit protection: full protection  
 Operating temperature: -25°C to +70°C  
 Isolation voltage: min. 1000V DC  
 Five sided metal shield

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

Part - No. Single	Input Voltage	Output Voltage	6 Watt		10 Watt		Part - No. Dual	Input Voltage	Output Voltage	6 Watt		10 Watt	
			Output Current	Output Current	Output Current	Output Current							
DW2-1205	12V ( 9-18)	5V	1200mA	2000mA	DW2-1205D	12V ( 9-18)	+/- 5V +/-12V +/-15V	+/-600mA +/-250mA +/-200mA	+/-1000mA +/- 416mA +/- 333mA				
DW2-1212		12V	500mA	833mA									
DW2-1215		15V	400mA	666mA									
DW2-2405	24V (18-36)	5V	1200mA	2000mA	DW2-2405D	24V (18-36)	+/- 5V +/-12V +/-15V	+/-600mA +/-250mA +/-200mA	+/-1000mA +/- 416mA +/- 333mA				
DW2-2412		12V	500mA	833mA									
DW2-2415		15V	400mA	666mA									
DW2-4805	48V (36-72)	5V	1200mA	2000mA	DW2-4805D	48V (36-72)	+/- 5V +/-12V +/-15V	+/-600mA +/-250mA +/-200mA	+/-1000mA +/- 416mA +/- 333mA				
DW2-4812		12V	500mA	833mA									
DW2-4815		15V	400mA	666mA									

### 15 Watt

Part - No. Single	Input Voltage	Output Voltage	Output Current	Part -No. Dual	Input Voltage	Output Voltage	Output Current
DW2-1205	12V ( 9-18)	5V	3000mA	DW2-1205D	12V ( 9-18)	+/- 5V +/-12V +/-15V	+/-1500mA +/- 625mA +/- 500mA
DW2-1212		12V	1250mA				
DW2-1215		15V	1000mA				
DW2-2405	24V (18-36)	5V	3000mA	DW2-2405D	24V (18-36)	+/- 5V +/-12V +/-15V	+/-1500mA +/- 625mA +/- 500mA
DW2-2412		12V	1250mA				
DW2-2415		15V	1000mA				
DW2-4805	48V (36-72)	5V	3000mA	DW2-4805D	48V (36-72)	+/- 5V +/-12V +/-15V	+/-1500mA +/- 625mA +/- 500mA
DW2-4812		12V	1250mA				
DW2-4815		15V	1000mA				



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,5mm  
 (INCHES 0,02")

NP (no pin) on single output models  
 COM (common) on dual output models

Stand: 09/05

# COMMERCIAL DC/DC Converters

20 - 40 Watt

wide input range 1:2  
 Case style: 2" x 2"

Regulated - single/dual Output

Series: DW2- /B

### Electrical specifications:

Input voltage range: See Model selection guide  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 0,2%  
 Load regulation: +/- 0,2%  
 Efficiency: typ. 80%  
 Minimum Load: 10% of Full Load

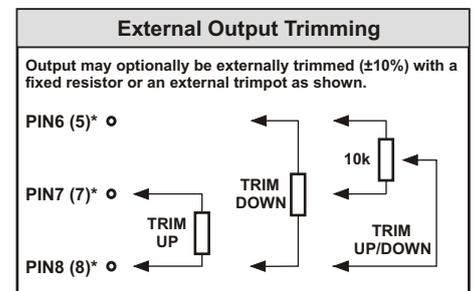
Output Ripple & Noise: max. 100mVp-p  
 Short circuit protection: continuous  
 Operating temperature: -40°C to +71°C  
 Isolation voltage: min. 1000V DC  
 Six-side Shielded Case

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

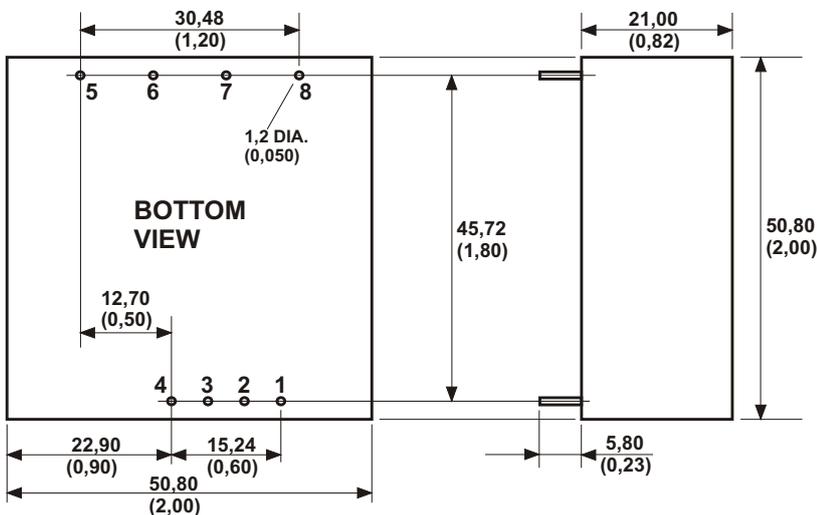
Part - No. Single	Input Voltage	Output Voltage	20 Watt	25-30W	30-40W
			Output Current	Output Current	Output Current
DW2-1205B	12V	5V	4000mA	5000mA	-
DW2-1212B	( 9-18)	12V	1667mA	2500mA	3000mA
DW2-1215B		15V	1333mA	2000mA	2400mA
DW2-2405B	24V	5V	4000mA	5000mA	-
DW2-2412B	(18-36)	12V	1667mA	2500mA	3000mA
DW2-2415B		15V	1333mA	2000mA	2400mA
DW2-4805B	48V	5V	4000mA	5000mA	-
DW2-4812B	(36-72)	12V	1667mA	2500mA	3000mA
DW2-4815B		15V	1333mA	2000mA	2400mA

Remote On/Off Control	
Control Input	PIN1
Control Common	PIN3
Control Voltage	
ON	>+2,5VDC or Open Circuit
OFF	<+0,8VDC or Jumper to PIN 3
Converter Shutdown Idle Current	10mA
Logic Compatibility	CMOS or Open Collector TTL

Part - No. Dual	Input Voltage	Output Voltage	20 Watt	25-30W	30-40W
			Output Current	Output Current	Output Current
DW2-1205DB	12V	± 5V	±2000mA	±2500mA	-
DW2-1212DB	( 9-18)	±12V	± 833mA	±1250mA	-
DW2-1215DB		±15V	± 667mA	±1000mA	-
DW2-2405DB	24V	± 5V	±2000mA	±2500mA	-
DW2-2412DB	(18-36)	±12V	± 833mA	±1250mA	±1680mA
DW2-2415DB		±15V	± 667mA	±1000mA	±1300mA
DW2-4805DB	48V	± 5V	±2000mA	±2500mA	-
DW2-4812DB	(36-72)	±12V	± 833mA	±1250mA	±1680mA
DW2-4815DB		±15V	± 667mA	±1000mA	±1300mA



Other input and output voltages on request



PIN CONNECTION:		
PIN	Single	Dual
1	Remote On/Off	
2	NO PIN	NO PIN
3	- IN	- IN
4	+ IN	+ IN
5	NC	+ OUT
6	+ OUT	COMMON
7	- OUT	- OUT
8	TRIM	TRIM

NP (no pin)  
 NC (no connection)  
 COM (common) on dual output models

ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,5mm  
 (INCHES 0,02")

## COMMERCIAL DC/DC Converters PWM - regulated

6 / 10 / 15 Watt  
 Series: DW4

wide input range 1:4  
 Case style: 2" x 2"

### Electrical specifications:

Input voltage range: wide  
 Output voltage accuracy: +/- 2%  
 Line regulation: +/- 0,2%  
 Load regulation: +/- 0,5%  
 Efficiency: tpy. 75%

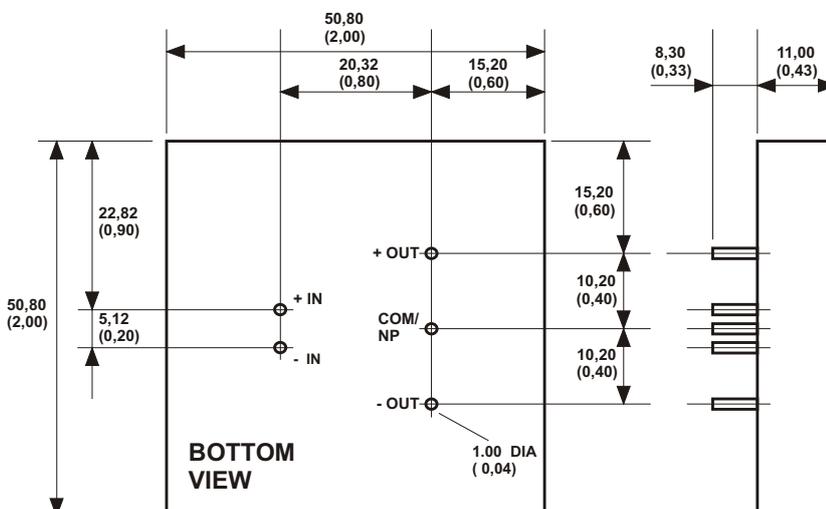
Output Ripple & Noise: 100mVp-p  
 Short circuit protection: continuous  
 Operating temperature: -25°C to +71°C  
 Isolation voltage: min. 1000V DC  
 Five sided metal shield

**CAUTION: NO INPUT POLARITY CHANGE ALLOWED!**

			6 Watt	10 Watt				6 Watt	10 Watt
Part - No. Single	Input Voltage	Output Voltage	Output Current	Output Current	Part - No. Dual	Input Voltage	Output Voltage	Output Current	Output Current
DW4-2405	24V	5V	1200mA	2000mA	DW4-2405D	24V	+/- 5V	+/-600mA	+/-1000mA
DW4-2412	( 9-36)	12V	500mA	833mA	DW4-2412D	( 9-36)	+/-12V	+/-250mA	+/- 416mA
DW4-2415		15V	400mA	666mA	DW4-2415D		+/-15V	+/-200mA	+/- 333mA
DW4-4805	48V	5V	1200mA	2000mA	DW4-4805D	48V	+/- 5V	+/-600mA	+/-1000mA
DW4-4812	(18-72)	12V	500mA	833mA	DW4-4812D	(18-72)	+/-12V	+/-250mA	+/- 416mA
DW4-4815		15V	400mA	666mA	DW4-4815D		+/-15V	+/-200mA	+/- 333mA

### 15 Watt

Part - No. Single	Input Voltage	Output Voltage	Output Current	Part -No. Dual	Input Voltage	Output Voltage	Output Current
DW4-2405	24V	5V	3000mA	DW4-2405D	24V	+/- 5V	+/-1500mA
DW4-2412	( 9-36)	12V	1250mA	DW4-2412D	( 9-36)	+/-12V	+/- 625mA
DW4-2415		15V	1000mA	DW4-2415D		+/-15V	+/- 500mA
DW4-4805	48V	5V	3000mA	DW4-4805D	48V	+/- 5V	+/-1500mA
DW4-4812	(18-72)	12V	1250mA	DW4-4812D	(18-72)	+/-12V	+/- 625mA
DW4-4815		15V	1000mA	DW4-4815D		+/-15V	+/- 500mA



ALL DIMENSIONS IN MM (INCHES)  
 MILLIMETERS +/- 0,5mm  
 (INCHES 0,02")

NP (no pin) on single output models  
 COM (common) on dual output models