SDAS112B - APRIL 1982 - REVISED DECEMBER 1994

 Package Options Include Plastic Small-Outline (D) Packages, Ceramic Chip Carriers (FK), and Standard Plastic (N) and Ceramic (J) 300-mil DIPs

description

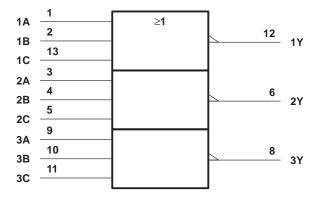
These devices contain three independent 3-input positive-NOR gates. They perform the Boolean functions $Y = \overline{A} \bullet \overline{B} \bullet \overline{C}$ or $Y = \overline{A} + \overline{B} + \overline{C}$ in positive logic.

The SN54ALS27A and SN54AS27 are characterized for operation over the full military temperature range of -55°C to 125°C. The SN74ALS27A and SN74AS27 are characterized for operation from 0°C to 70°C.

FUNCTION TABLE (each gate)

	INPUTS	OUTPUT	
Α	В	С	Y
Н	Х	Χ	L
Х	Н	Χ	L
Х	X	Н	L
L	L	L	Н

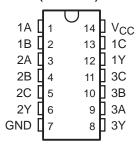
logic symbol†



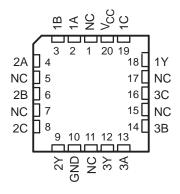
[†] This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

Pin numbers shown are for the D, J, and N packages.

SN54ALS27A, SN54AS27 . . . J PACKAGE SN74ALS27A, SN74AS27 . . . D OR N PACKAGE (TOP VIEW)

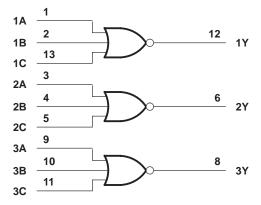


SN54ALS27A, SN54AS27 . . . FK PACKAGE (TOP VIEW)



NC - No internal connection

logic diagram (positive logic)



SN54ALS27A, SN54AS27, SN74ALS27A, SN74AS27 TRIPLE 3-INPUT POSITIVE-NOR GATES

SDAS112B - APRIL 1982 - REVISED DECEMBER 1994

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)[†]

Supply voltage, V _{CC}		 7 V
Input voltage, V _I		 7 V
Operating free-air temperature range, T _A :	SN54ALS27A	 –55°C to 125°C
	SN74ALS27A	 0°C to 70°C
Storage temperature range		_65°C to 150°C

recommended operating conditions

		SN54ALS27A			SN	LINUT		
		MIN	NOM	MAX	MIN	NOM	MAX	UNIT
Vcc	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
VIH	High-level input voltage	2			2			V
.,	Landard Sandards			0.8‡			8.0	.,
VIL	Low-level input voltage			0.7§				V
ІОН	High-level output current			-0.4			-0.4	mA
lOL	Low-level output current			4			8	mA
TA	Operating free-air temperature	-55		125	0		70	°C

[‡] Applies over temperature range –55°C to 70°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

		TEGT COMPLETIONS			7A	SN	74ALS2	7A	
PARAMETER	TEST Co	TEST CONDITIONS				MIN	TYP¶	MAX	UNIT
VIK	$V_{CC} = 4.5 \text{ V},$	$I_{I} = -18 \text{ mA}$			-1.5			-1.5	V
Voн	$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V},$	$I_{OH} = -0.4 \text{ mA}$	V _{CC} -2			V _{CC} -2	2		V
\/ - ·	\\\ 45\\	$I_{OL} = 4 \text{ mA}$		0.25	0.4		0.25	0.4	
V _{OL}	V _{CC} = 4.5 V	I _{OL} = 8 mA					0.35	0.5	V
lį	$V_{CC} = 5.5 V,$	V _I = 7 V			0.1			0.1	mA
lН	$V_{CC} = 5.5 \text{ V},$	V _I = 2.7 V			20			20	μΑ
IĮL	$V_{CC} = 5.5 \text{ V},$	$V_{I} = 0.4 \ V$			-0.1			-0.1	mA
IO [#]	V _{CC} = 5.5 V,	V _O = 2.25 V	-20		-112	-30		-112	mA
ICCH	V _{CC} = 5.5 V,	V _I = 0		0.97	1.8		0.97	1.8	mA
ICCL	V _{CC} = 5.5 V,	V _I = 4.5 V		2	4		2	4	mA

[¶] All typical values are at $V_{CC} = 5 \text{ V}$, $T_A = 25^{\circ}\text{C}$.



[†] Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

[§] Applies over temperature range 70°C to 125°C

[#] The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, IOS.

SN54ALS27A, SN54AS27, SN74ALS27A, SN74AS27 TRIPLE 3-INPUT POSITIVE-NOR GATES

SDAS112B - APRIL 1982 - REVISED DECEMBER 1994

switching characteristics (see Figure 1)

PARAMETER	PARAMETER FROM TO (OUTPUT)				V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R_L = 500 Ω , T_A = MIN to MAX [†] N54ALS27A SN74ALS			C_L = 50 pF, R_L = 500 Ω , T_A = MIN to MAX [†]				
				LS27A	SN74AI	LS27A						
			MIN	MAX	MIN	MAX						
^t PLH	A, B, or C	V	4	26	3	15	ns					
t _{PHL}	А, Б, 01 С	ſ	1	11	1	9	110					

[†] For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)‡

Supply voltage, V _{CC}		 7 V
Input voltage, V _I		 7 V
Operating free-air temperature range, TA: SN		
SI	N74AS27	 0°C to 70°C
Storage temperature range		 -65°C to 150°C

[‡] Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

recommended operating conditions

		SN54AS27 SN74AS27					7	
		MIN	NOM	MAX	MIN	NOM	MAX	UNIT
VCC	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
VIH	High-level input voltage	2			2			V
V_{IL}	Low-level input voltage			8.0			8.0	V
IOH	High-level output current			-2			-2	mA
loL	Low-level output current			20			20	mA
TA	Operating free-air temperature	-55		125	0		70	°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

DADAMETED	TEOT 0	TEST CONDITIONS			7	SI	N74AS2	7	UNIT
PARAMETER	TEST C	ONDITIONS	MIN	TYP§	MAX	MIN	TYP§	MAX	UNII
VIK	V _{CC} = 4.5 V,	$I_{I} = -18 \text{ mA}$			-1.2			-1.2	V
Voн	$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V},$	$I_{OH} = -2 \text{ mA}$	VCC -2	2		V _{CC} -2	<u>!</u>		V
VOL	$V_{CC} = 4.5 V,$	$I_{OL} = 20 \text{ mA}$		0.35	0.5		0.35	0.5	V
lį	$V_{CC} = 5.5 V,$	$V_I = 7 V$			0.1			0.1	mA
lН	$V_{CC} = 5.5 V,$	V _I = 2.7 V			20			20	μΑ
Ι _{ΙL}	$V_{CC} = 5.5 V,$	V _I = 0.4 V			-0.5			-0.5	mA
ΙΟ [¶]	V _{CC} = 5.5 V,	V _O = 2.25 V	-30		-112	-30		-112	mA
ICCH	V _{CC} = 5.5 V,	V _I = 0		4	6.4		4	6.4	mA
ICCL	V _{CC} = 5.5 V,	V _I = 4.5 V		10.6	17.1		10.6	17.1	mA

[§] All typical values are at V_{CC} = 5 V, T_A = 25°C.



The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, IOS.

SN54ALS27A, SN54AS27, SN74ALS27A, SN74AS27 TRIPLE 3-INPUT POSITIVE-NOR GATES

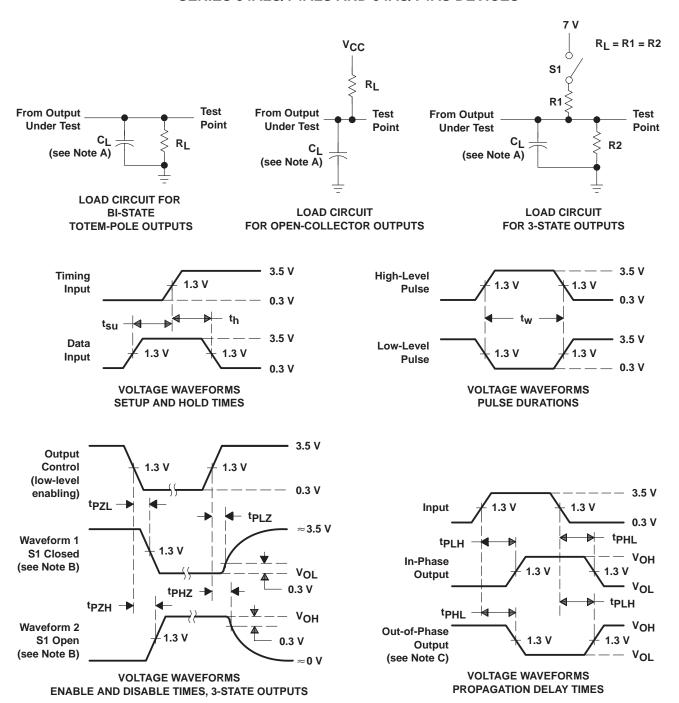
SDAS112B - APRIL 1982 - REVISED DECEMBER 1994

switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	ТО (ОИТРИТ)	C _L R _L T _A	$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$ $C_{L} = 50 \text{ pF},$ $R_{L} = 500 \Omega,$ $T_{A} = \text{MIN to MAX}^{\dagger}$ $SN54AS27 \qquad SN74A$			UNIT
			SN54/	AS27	SN74	AS27	
			MIN	MAX	MIN	MAX	
t _{PLH}	A, B, or C	V	1	6.5	1	5.5	ns
^t PHL	A, B, Ol C	ı	1	5	1	4.5	115

[†] For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

PARAMETER MEASUREMENT INFORMATION SERIES 54ALS/74ALS AND 54AS/74AS DEVICES



NOTES: A. C_I includes probe and jig capacitance.

- B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
- C. When measuring propagation delay items of 3-state outputs, switch S1 is open.
- D. All input pulses have the following characteristics: $PRR \le 1$ MHz, $t_f = t_f = 2$ ns, duty cycle = 50%.
- E. The outputs are measured one at a time with one transition per measurement.

Figure 1. Load Circuits and Voltage Waveforms



25-Jan-2012

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/ Ball Finish	MSL Peak Temp ⁽³⁾	Samples (Requires Login)
5962-86838012A	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Call TI	
5962-8683801DA	ACTIVE	CFP	W	14	1	TBD	Call TI	Call TI	
JM38510/37302B2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	
JM38510/37302BCA	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	
M38510/37302B2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	
M38510/37302BCA	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	
SN54ALS27AJ	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	
SN54AS27J	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	
SN74ALS27AD	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74ALS27ADE4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74ALS27ADG4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74ALS27ADR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74ALS27ADRE4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74ALS27ADRG4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74ALS27AN	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	
SN74ALS27ANE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	
SN74ALS27ANSR	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74ALS27ANSRE4	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74ALS27ANSRG4	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74AS27D	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74AS27DE4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	





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Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/ Ball Finish	MSL Peak Temp ⁽³⁾	Samples (Requires Login)
SN74AS27DG4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74AS27N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	
SN74AS27NE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	
SNJ54ALS27AFK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	
SNJ54ALS27AJ	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	
SNJ54ALS27AW	ACTIVE	CFP	W	14	1	TBD	A42	N / A for Pkg Type	
SNJ54AS27FK	OBSOLETE	LCCC	FK	20		TBD	Call TI	Call TI	
SNJ54AS27J	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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OTHER QUALIFIED VERSIONS OF SN54ALS27A, SN54AS27, SN74ALS27A, SN74AS27:





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● Catalog: SN74ALS27A, SN74AS27

Military: SN54ALS27A, SN54AS27

NOTE: Qualified Version Definitions:

- Catalog TI's standard catalog product
- Military QML certified for Military and Defense Applications

PACKAGE MATERIALS INFORMATION

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B0

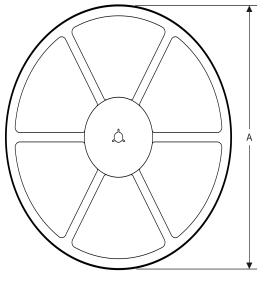
14-Jul-2012 www.ti.com

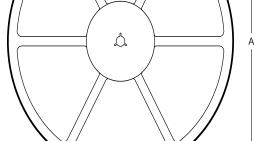
TAPE DIMENSIONS

- K0

TAPE AND REEL INFORMATION

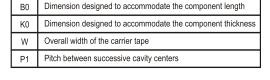
REEL DIMENSIONS





Cavity **◆** A0 **→** Dimension designed to accommodate the component width

 \oplus \oplus



TAPE AND REEL INFORMATION

*All dimensions are nominal

Device	Package Type	Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74ALS27ADR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74ALS27ANSR	SO	NS	14	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1

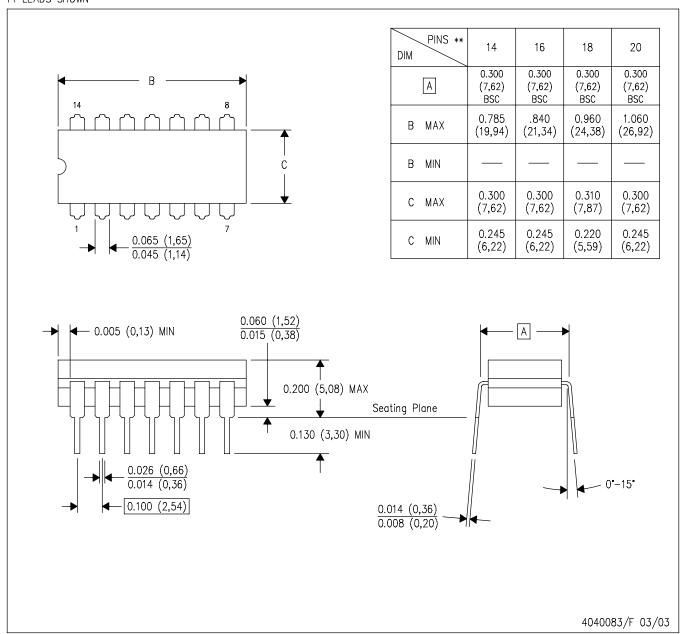
www.ti.com 14-Jul-2012



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74ALS27ADR	SOIC	D	14	2500	367.0	367.0	38.0
SN74ALS27ANSR	SO	NS	14	2000	367.0	367.0	38.0

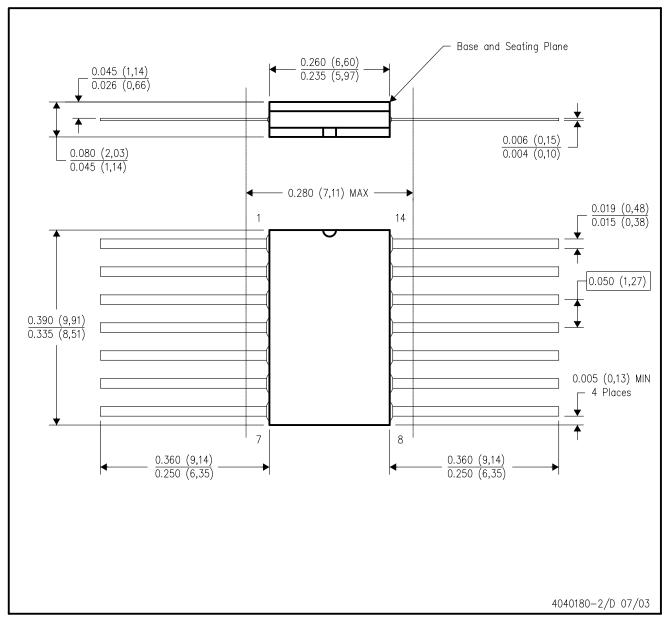
14 LEADS SHOWN



- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. This package is hermetically sealed with a ceramic lid using glass frit.
- D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
- E. Falls within MIL STD 1835 GDIP1-T14, GDIP1-T16, GDIP1-T18 and GDIP1-T20.

W (R-GDFP-F14)

CERAMIC DUAL FLATPACK



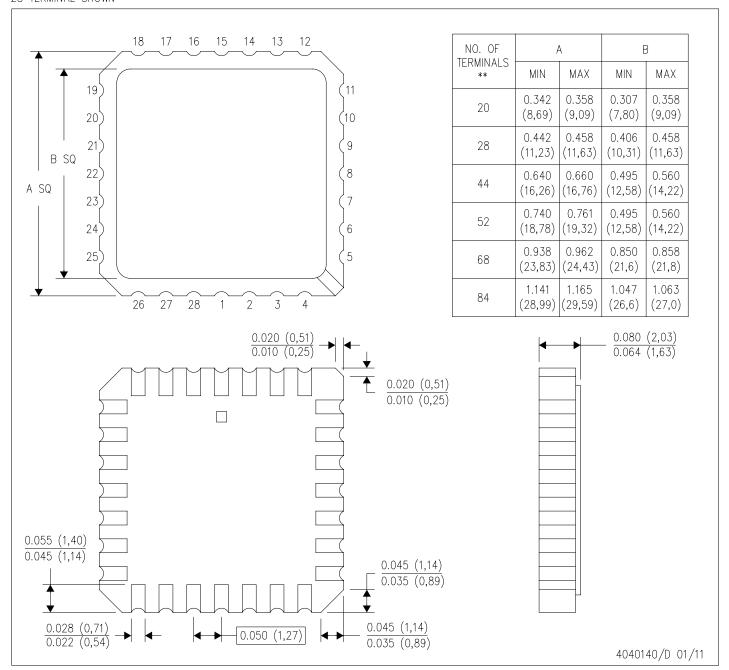
- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. This package can be hermetically sealed with a ceramic lid using glass frit.
- D. Index point is provided on cap for terminal identification only.
- E. Falls within MIL STD 1835 GDFP1-F14 and JEDEC MO-092AB



FK (S-CQCC-N**)

LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN



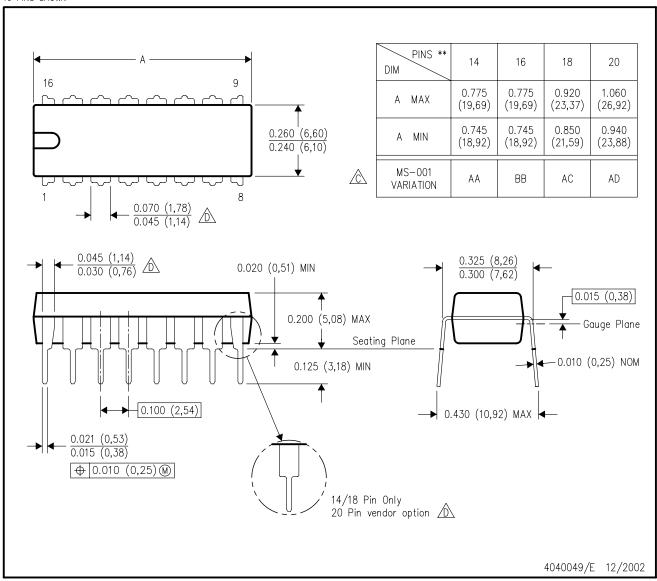
- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. This package can be hermetically sealed with a metal lid.
- D. Falls within JEDEC MS-004



N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN

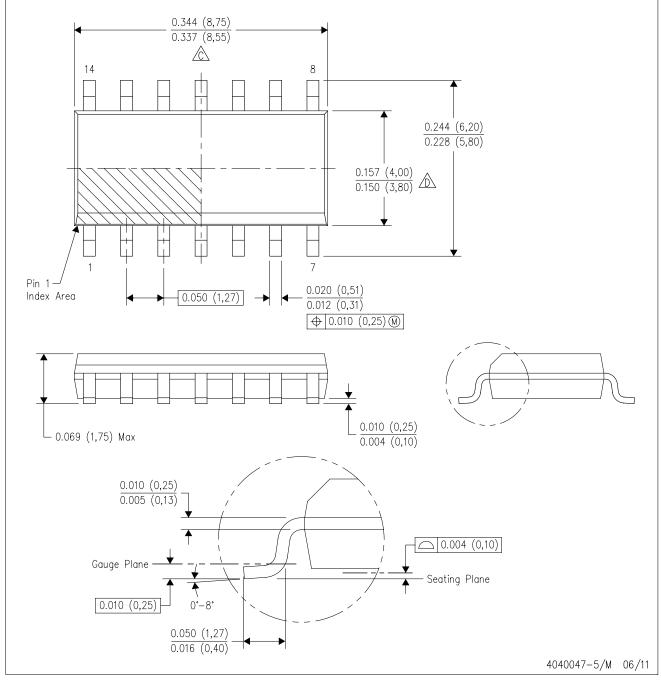


- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
- The 20 pin end lead shoulder width is a vendor option, either half or full width.



D (R-PDSO-G14)

PLASTIC SMALL OUTLINE

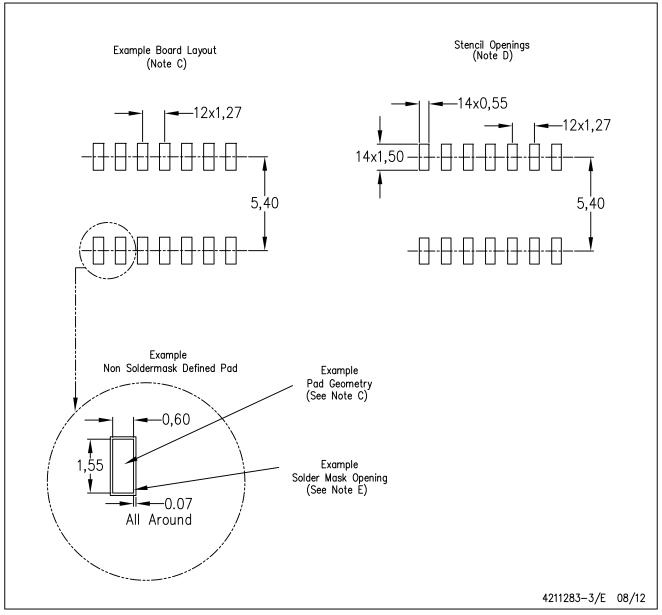


- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
- Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
- E. Reference JEDEC MS-012 variation AB.



D (R-PDSO-G14)

PLASTIC SMALL OUTLINE



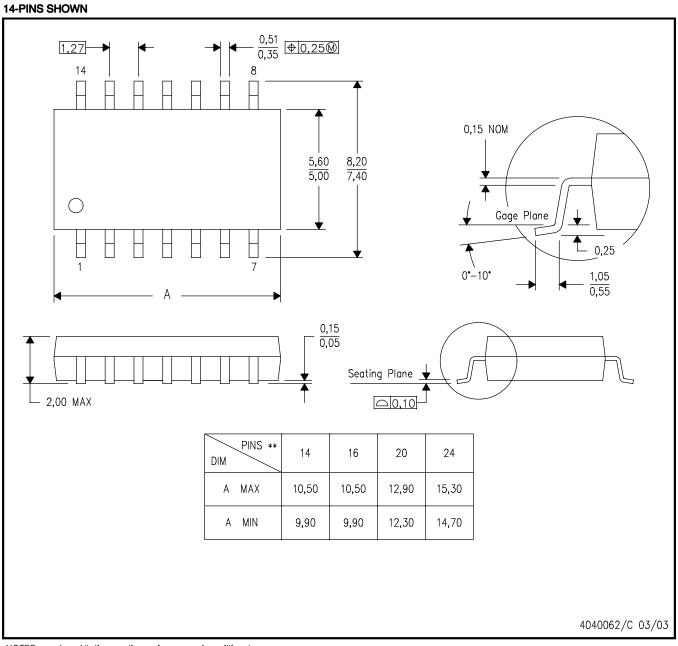
- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Publication IPC-7351 is recommended for alternate designs.
- D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
- E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.



MECHANICAL DATA

NS (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE



- All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.



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