

**BIPOLAR ANALOG INTEGRATED CIRCUITS**  
 **$\mu$ PC2800A,  $\mu$ PC2801A**

**INFRARED REMOTE CONTROL PREAMPLIFIERS**

The  $\mu$ PC2800A and  $\mu$ PC2801A are bipolar analog ICs specifically developed for use in infrared remote control system receiving preamplifiers. Capable of accepting a photodiode directly, these ICs house a high-gain initial amplifier, a limiter, a band-pass filter, a detection circuit, and a waveform shaping circuit assembled on a single chip.

**FEATURES**

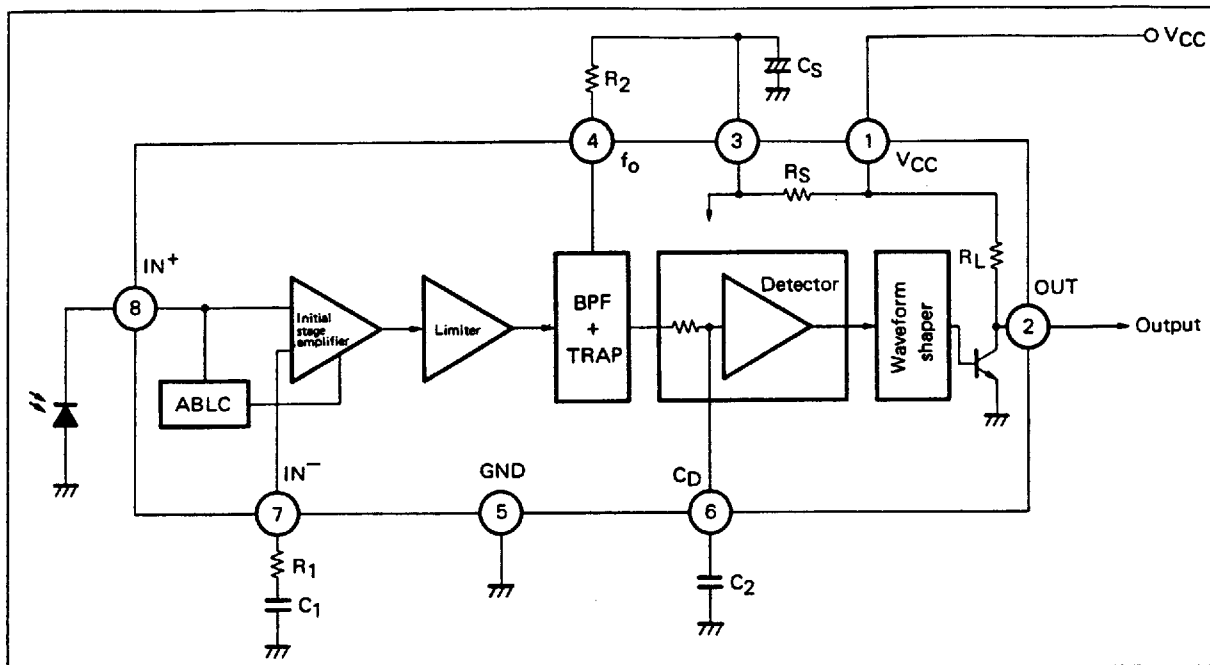
- Less chances of malfunction associated with a high-frequency lighting fluorescent lamp  
Internal trap circuit
- Internal band-pass filter  
The central frequency can be varied with an external resistance:  
 $f_0 = 30$  to  $80$  kHz.  
 $f_0$  trimming reduces central frequency variance.
- Few external parts  
Internal pull-up resistance and power filter resistance.  
Lower-capacitance external capacitor
- Open collector output  
Open collector output with a pull-up resistance  
 $\mu$ PC2800A: Active low output  
 $\mu$ PC2801A: Active high output

**ORDERING INFORMATION**

PART NUMBER	PACKAGE	QUALITY GRADE
$\mu$ PC2800AHA	8-pin plastic slim SIP	Standard
$\mu$ PC2800AGR	8-pin plastic SOP (225 mil)	Standard
$\mu$ PC2801AHA	8-pin plastic slim SIP	Standard
$\mu$ PC2801AGR	8-pin plastic SOP (225 mil)	Standard

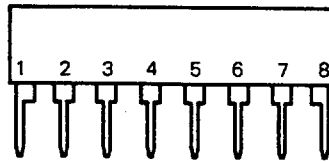
Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

BLOCK DIAGRAM

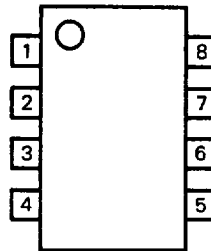


**PIN CONFIGURATION**

SIP



SOP



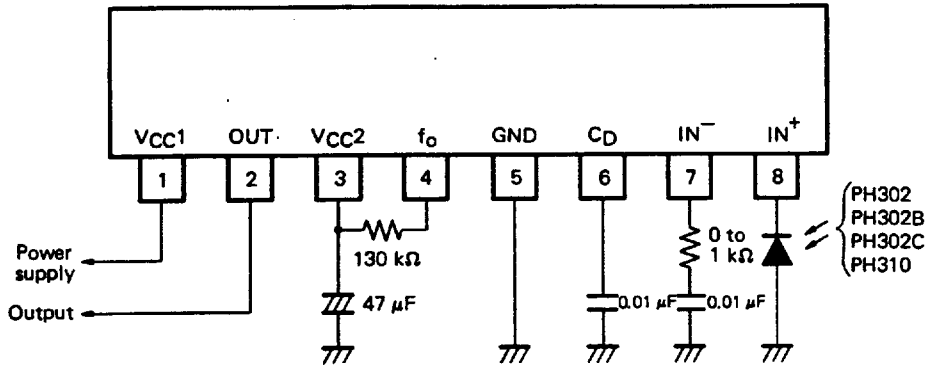
No.	Designation	Pin function
1	V <sub>CC1</sub>	Power input pin
2	OUT	Output pin
3	V <sub>CC2</sub>	Power output pin
4	f <sub>o</sub>	Band-pass filter frequency setup pin
5	GND	Ground pin
6	C <sub>D</sub>	Detection capacitor connection pin
7	IN <sup>-</sup>	Initial amplifier gain setup pin
8	IN <sup>+</sup>	Input pin

**PIN FUNCTIONS**

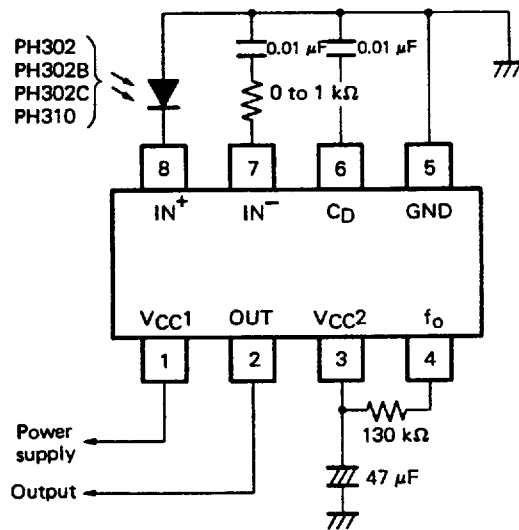
- Power supply pins (V<sub>CC1</sub>: pin 1, V<sub>CC2</sub>: pin 3, GND: pin 5)  
Apply a voltage of 5 V  $\pm$ 10 % to pin 1. As the power is output to pin 3 through the internal power filter resistance, connect an electrolytic capacitor to pin 3.
- Input pin (IN<sup>+</sup>: pin 8)  
With an internal impedance of 90 k $\Omega$  (typ.), pin 8 can accept a PIN photodiode directly. An automatic bias level control (ABLC) circuit prevents the input level from being saturated by external light, assuring bias level stability for the input pin.
- Initial amplifier gain setup pin (IN<sup>-</sup>: pin 7)  
Initial amplifier differential inverted output. Its gain can be set up with an external impedance.
- Band-pass filter frequency setup pin (f<sub>o</sub>: pin 4)  
The central frequency of the band-pass filter can be varied with an external resistance. A built-in trap circuit prevents malfunctions associated with a high-frequency lighting fluorescent lamp.
- Detection capacitor connection (C<sub>D</sub>: pin 6)  
Pin to which a detection capacitor is connected.
- Output pin (OUT: pin 2)  
Open collector output with a pull-up resistance. Its capability to drive a CMOS or TTL makes for easy connection with a receiving microcomputer.  
The  $\mu$ PC2800A has an active low output, the  $\mu$ PC2801A, an active high output.

SAMPLE APPLICATION CIRCUITS

① 8-pin plastic slim SIP



② 8-pin plastic SOP



The sample circuits and circuit constants presented in this leaflet are shown only for reference purposes and are not necessarily intended for volume production.

**ABSOLUTE MAXIMUM RATINGS** (T<sub>a</sub> = 25 °C)

Supply voltage	V <sub>CC</sub>	6.0	V
Output current	I <sub>OUT</sub>	2.5	mA
Input voltage	V <sub>IN</sub>	0 to V <sub>CC</sub>	V
Permissible power dissipation	P <sub>D</sub>	270	mW
Operating temperature	T <sub>opt</sub>	-20 to +75	°C
Storage temperature	T <sub>stg</sub>	-40 to +125	°C

**RECOMMENDED OPERATING RANGE**

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply voltage	V <sub>CC</sub>	4.5	5.0	5.5	V
Input frequency	f <sub>IN</sub>	30	38	80	kHz

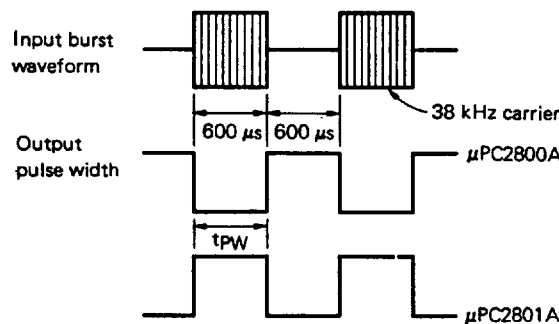
**ELECTRICAL CHARACTERISTICS** (T<sub>a</sub> = 25 °C, V<sub>CC</sub> = 5.0 V)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Supply current	I <sub>CC</sub>		2.1	2.8	mA	μPC2800A
			2.4	3.1	mA	μPC2801A
Input pin voltage	V <sub>IN1</sub>	2.0	2.5	3.1	V	I <sub>IN</sub> = 0
Input pin voltage	V <sub>IN2</sub>	0.6	0.8	1.7	V	I <sub>IN</sub> = -300 μA
Voltage gain	A <sub>V</sub>	74	78	82	dB	f <sub>IN</sub> = 38 kHz CW, V <sub>IN</sub> = 30 μVp.p
BPF bandwidth	f <sub>BW</sub>	2.0	2.5	3.0	kHz	-3 dB bandwidth, V <sub>IN</sub> = 30 μVp.p
Input internal resistance	r <sub>IN</sub>	60	90	140	kΩ	f <sub>IN</sub> = 38 kHz CW, V <sub>IN</sub> = 0.2 Vp.p (Note 1)
Output pulse width 1	tpw1	440		770	μs	f <sub>IN</sub> = 38 kHz burst wave, V <sub>IN</sub> = 500 μVp.p (Note 2)
Output pulse width 2	tpw2	440		770	μs	f <sub>IN</sub> = 38 kHz burst wave, V <sub>IN</sub> = 50 mVp.p (Note 2)
Low-level output voltage	V <sub>OL</sub>		0.2	0.4	V	
High-level output voltage	V <sub>OH</sub>	4.8	5.0		V	

Notes 1: Assuming that the input level is V<sub>IN</sub> and the measurement is V<sub>X</sub>

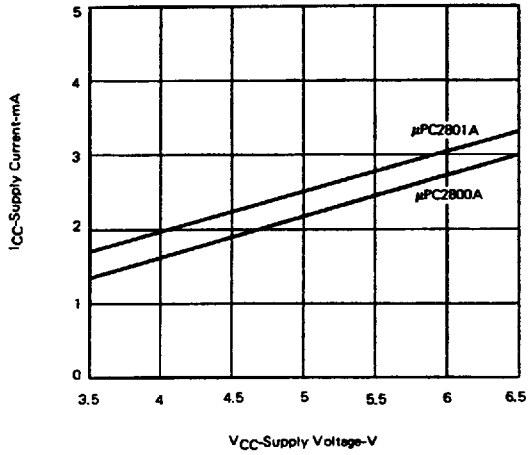
$$r_{IN} = \frac{90}{V_{IN}/V_X - 1} \text{ (k}\Omega\text{)}$$

2:

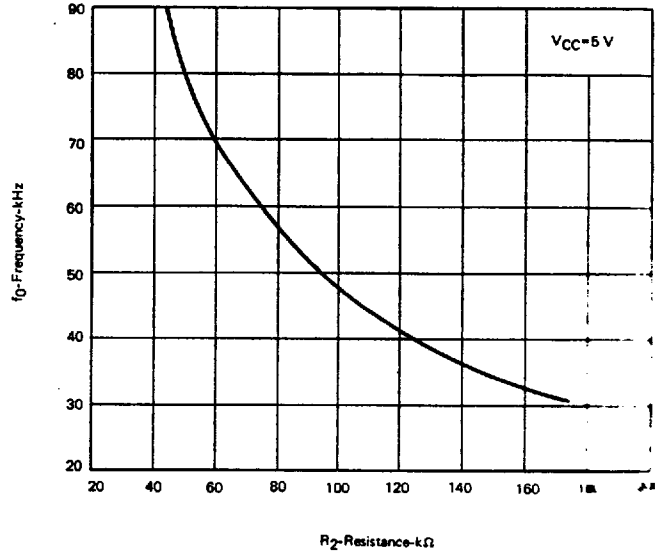


TYPICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

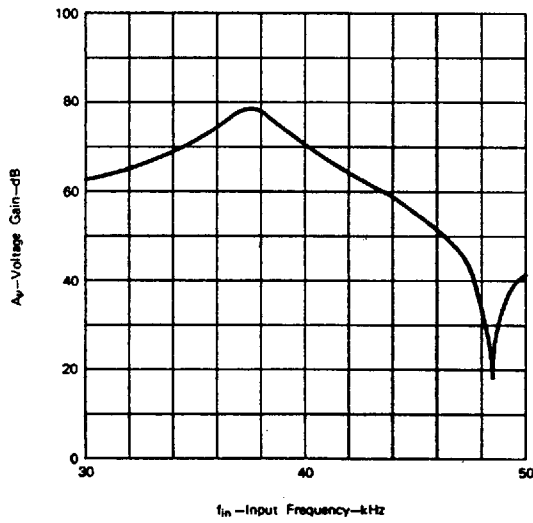
Supply Current vs. Supply Voltage



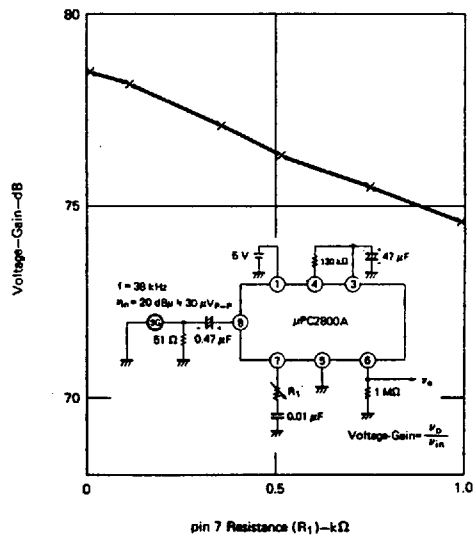
Frequency vs. Resistance ( $R_2$ )



$A_v - f_{in}$



Voltage vs. Resistance ( $R_1$ )

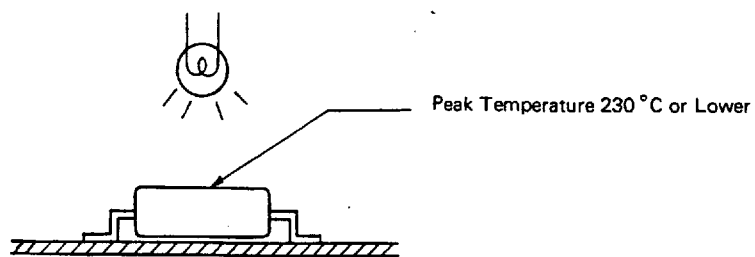
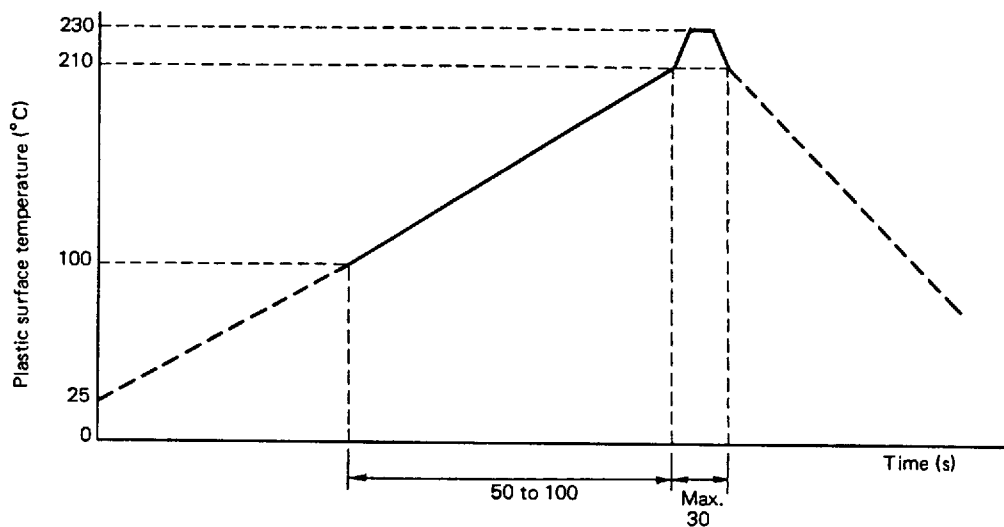


**SOLDERING PRECAUTION**

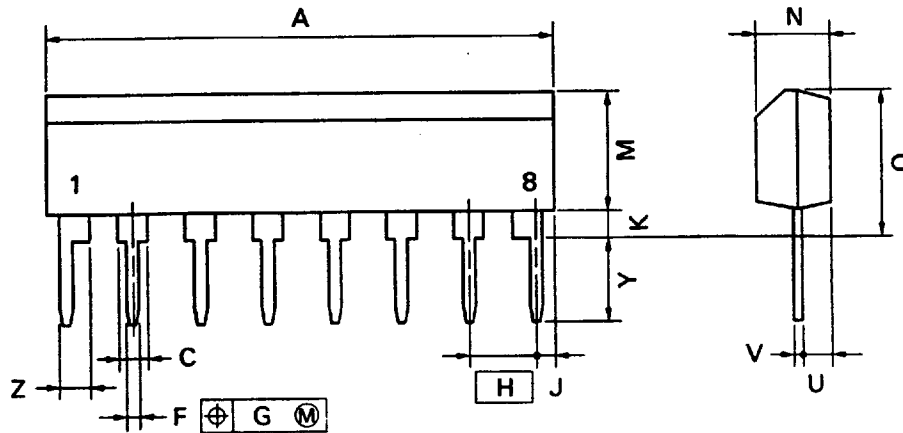
(1) Infrared reflow soldering

- Peak temperature : 230 °C or lower (plastic surface)
- Time : 30 s or less  
(Time during plastic surface temperature overs 210 °C)
- No. of reflow times: 1
- Flux : Rosin-base flux

**Reflow Temperature Profile**



8 PIN PLASTIC SLIM SIP



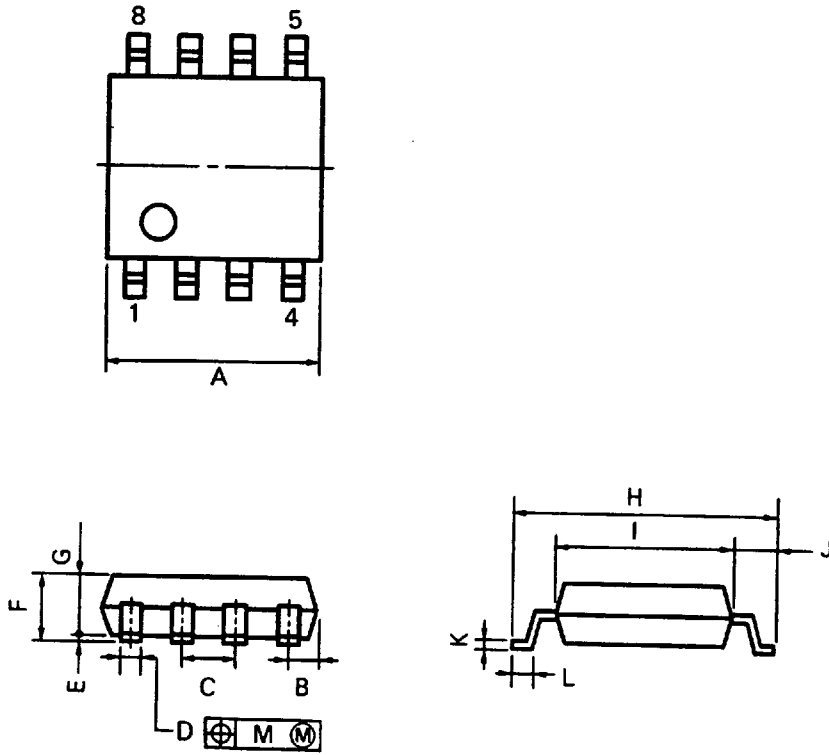
**NOTE**

Each lead centerline is located within 0.25 mm (0.01 inch) of its true position (T.P.) at maximum material condition.

P8HA-254B

ITEM	MILLIMETERS	INCHES
A	20.32 MAX.	0.8 MAX.
C	1.1 MIN.	0.043 MIN.
F	0.5 <sup>±0.1</sup>	0.02 <sup>±0.004</sup>
G	0.25	0.01
H	2.54	0.1
J	1.27 MAX.	0.05 MAX.
K	0.51 MIN.	0.02 MIN.
M	5.08 MAX.	0.2 MAX.
N	2.8 <sup>±0.2</sup>	0.11 <sup>±0.008</sup>
Q	5.75 MAX.	0.227 MAX.
U	1.5 MAX.	0.059 MAX.
V	0.25 <sup>±0.08</sup>	0.01 <sup>±0.003</sup>
Y	3.2 <sup>±0.5</sup>	0.126 <sup>±0.02</sup>
Z	1.1 MIN.	0.043 MIN.

8PIN PLASTIC SOP (225 mil)



NOTE

Each lead centerline is located within 0.12 mm (0.005 inch) of its true position (T.P.) at maximum material condition.

S8GM-50-225B-1

ITEM	MILLIMETERS	INCHES
A	5.37 MAX.	0.212 MAX.
B	0.78 MAX.	0.031 MAX.
C	1.27 (T.P.)	0.050 (T.P.)
D	0.40 <sup>+0.10</sup> <sub>-0.05</sub>	0.016 <sup>+0.004</sup> <sub>-0.003</sub>
E	0.1 <sup>±0.1</sup>	0.004 <sup>±0.004</sup>
F	1.8 MAX.	0.071 MAX.
G	1.49	0.059
H	6.5 <sup>±0.3</sup>	0.256 <sup>±0.012</sup>
I	4.4	0.173
J	1.1	0.043
K	0.15 <sup>+0.10</sup> <sub>-0.05</sub>	0.006 <sup>+0.004</sup> <sub>-0.003</sub>
L	0.6 <sup>±0.2</sup>	0.024 <sup>+0.008</sup> <sub>-0.008</sub>
M	0.12	0.005

DEVICES FOR REMOTE CONTROL

