

BIPOLAR ANALOG INTEGRATED CIRCUITS
 μ PC2800A, μ PC2801A**INFRARED REMOTE CONTROL PREAMPLIFIERS**

The μ PC2800A and μ 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

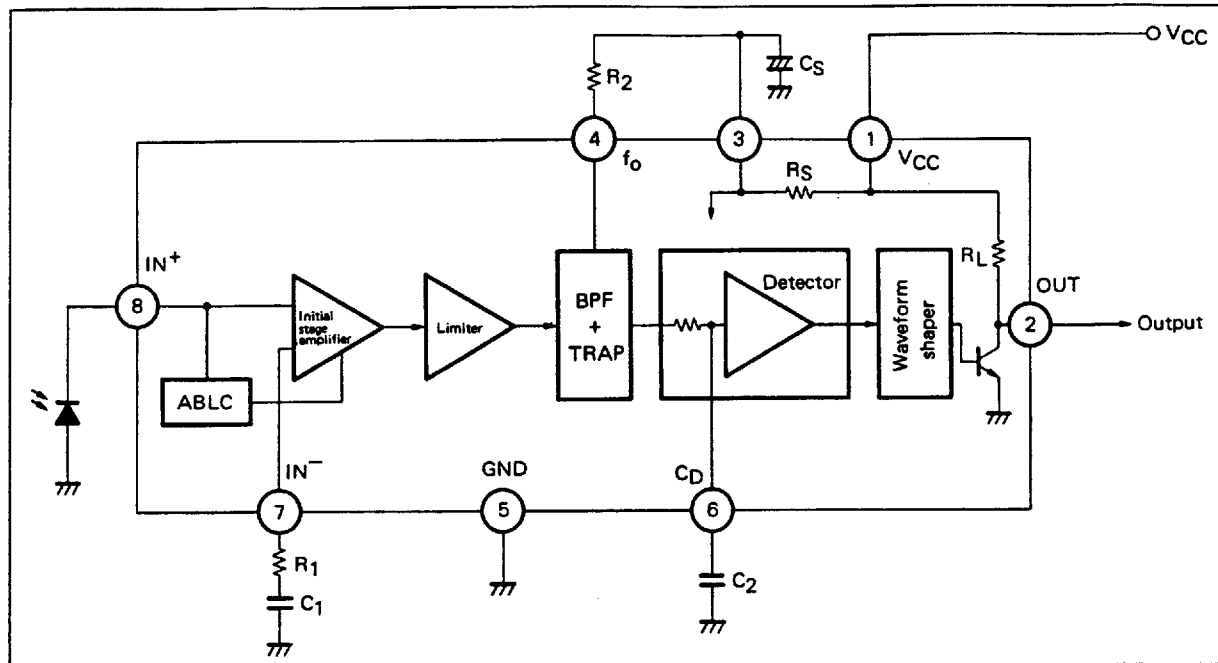
- Less chances of malfunction associated with a high-frequency lighting fluorescent lamp
Internal trap circuit
- Internal band-pass filter
The central frequency can be varied with an external resistance:
 $f_0 = 30$ to 80 kHz.
 f_0 trimming reduces central frequency variance.
- Few external parts
Internal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

ORDERING INFORMATION

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

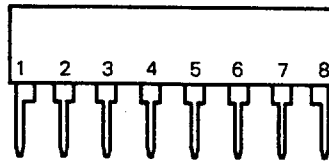
Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

BLOCK DIAGRAM

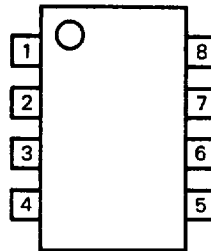


PIN CONFIGURATION

SIP



SOP



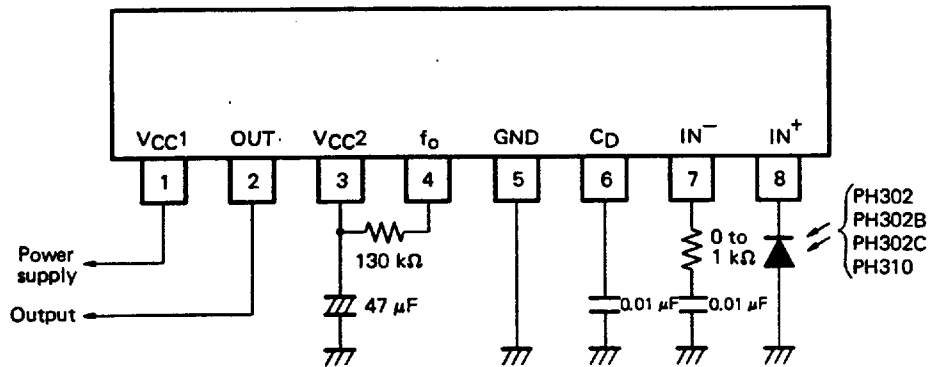
No.	Designation	Pin function
1	V_{CC1}	Power input pin
2	OUT	Output pin
3	V_{CC2}	Power output pin
4	f_o	Band-pass filter frequency setup pin
5	GND	Ground pin
6	C_D	Detection capacitor connection pin
7	IN^-	Initial amplifier gain setup pin
8	IN^+	Input pin

PIN FUNCTIONS

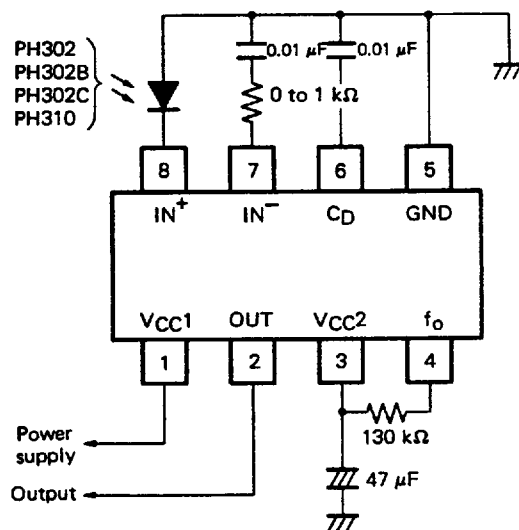
- Power supply pins (V_{CC1} : pin 1, V_{CC2} : pin 3, GND: pin 5)
Apply a voltage of $5\text{ V} \pm 10\%$ to pin 1. As the power is output to pin 3 through the internal power filter resistance, connect an electrolytic capacitor to pin 3.
- Input pin (IN^+ : pin 8)
With an internal impedance of $90\text{ k}\Omega$ (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^- : pin 7)
Initial amplifier differential inverted output. Its gain can be set up with an external impedance.
- Band-pass filter frequency setup pin (f_o : 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_D : 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 μ PC2800A has an active low output, the μ 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 ($T_a = 25^\circ\text{C}$)

Supply voltage	V_{CC}	6.0	V
Output current	I_{OUT}	2.5	mA
Input voltage	V_{IN}	0 to V_{CC}	V
Permissible power dissipation	P_D	270	mW
Operating temperature	T_{opt}	-20 to +75	$^\circ\text{C}$
Storage temperature	T_{stg}	-40 to +125	$^\circ\text{C}$

RECOMMENDED OPERATING RANGE

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply voltage	V_{CC}	4.5	5.0	5.5	V
Input frequency	f_{IN}	30	38	80	kHz

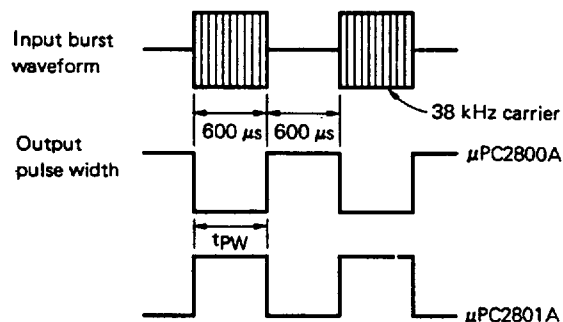
ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$, $V_{CC} = 5.0\text{ V}$)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Supply current	I_{CC}		2.1	2.8	mA	μPC2800A
			2.4	3.1	mA	μPC2801A
Input pin voltage	V_{IN1}	2.0	2.5	3.1	V	$I_{IN} = 0$
Input pin voltage	V_{IN2}	0.6	0.8	1.7	V	$I_{IN} = -300\text{ }\mu\text{A}$
Voltage gain	A_V	74	78	82	dB	$f_{IN} = 38\text{ kHz CW}$, $V_{IN} = 30\text{ }\mu\text{Vp-p}$
BPF bandwidth	f_{BW}	2.0	2.5	3.0	kHz	-3 dB bandwidth, $V_{IN} = 30\text{ }\mu\text{Vp-p}$
Input internal resistance	r_{IN}	60	90	140	$k\Omega$	$f_{IN} = 38\text{ kHz CW}$, $V_{IN} = 0.2\text{ Vp-p}$ (Note 1)
Output pulse width 1	$tpw1$	440		770	μs	$f_{IN} = 38\text{ kHz burst wave}$, $V_{IN} = 500\text{ }\mu\text{Vp-p}$ (Note 2)
Output pulse width 2	$tpw2$	440		770	μs	$f_{IN} = 38\text{ kHz burst wave}$, $V_{IN} = 50\text{ mVp-p}$ (Note 2)
Low-level output voltage	V_{OL}		0.2	0.4	V	
High-level output voltage	V_{OH}	4.8	5.0		V	

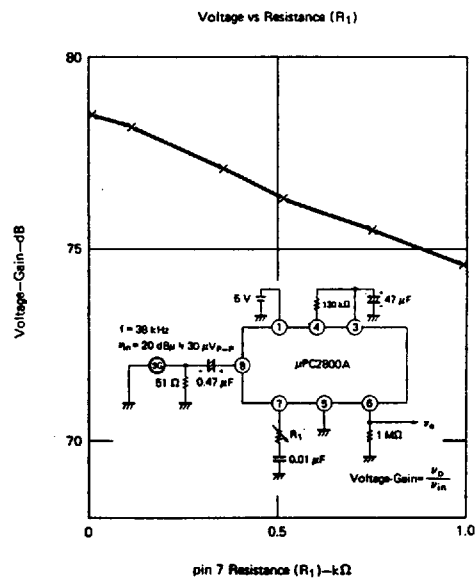
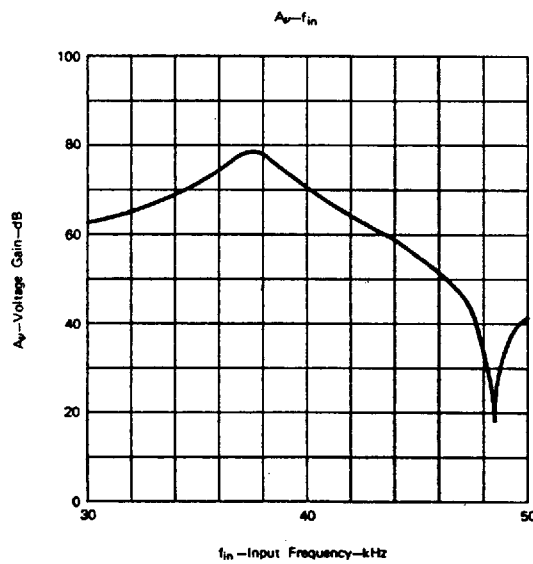
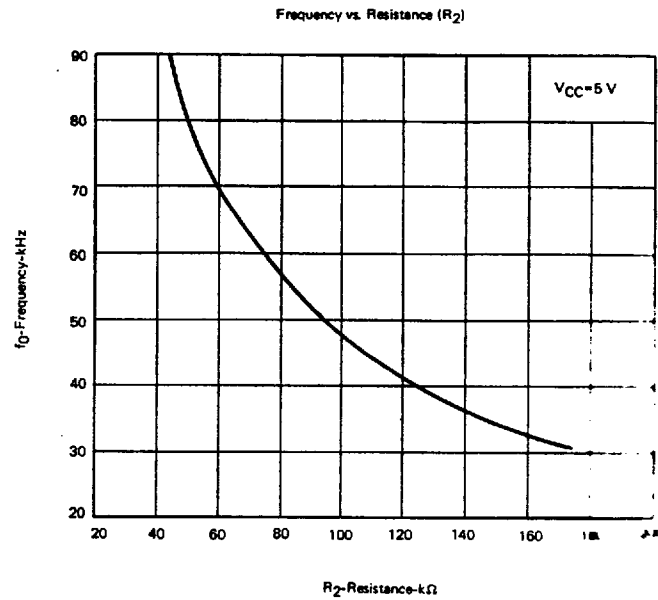
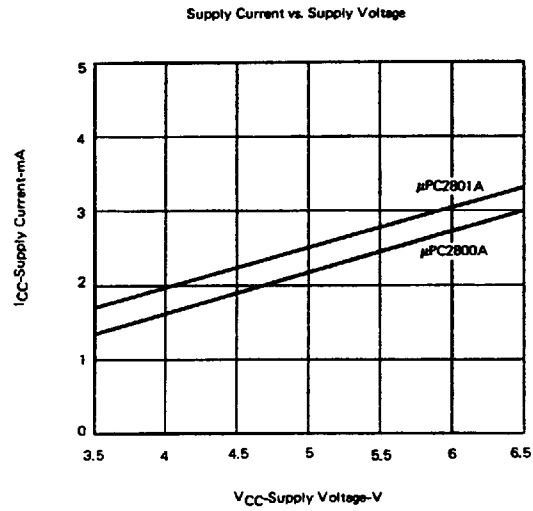
Notes 1: Assuming that the input level is V_{IN} and the measurement is V_X

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

2:



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

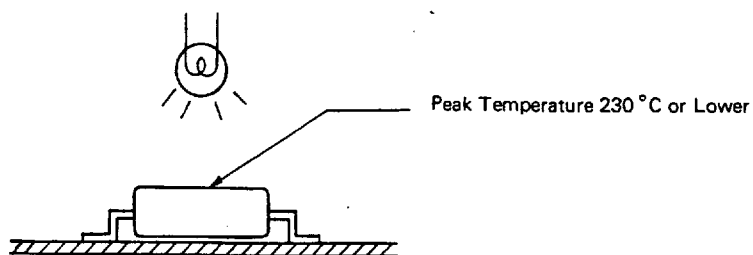
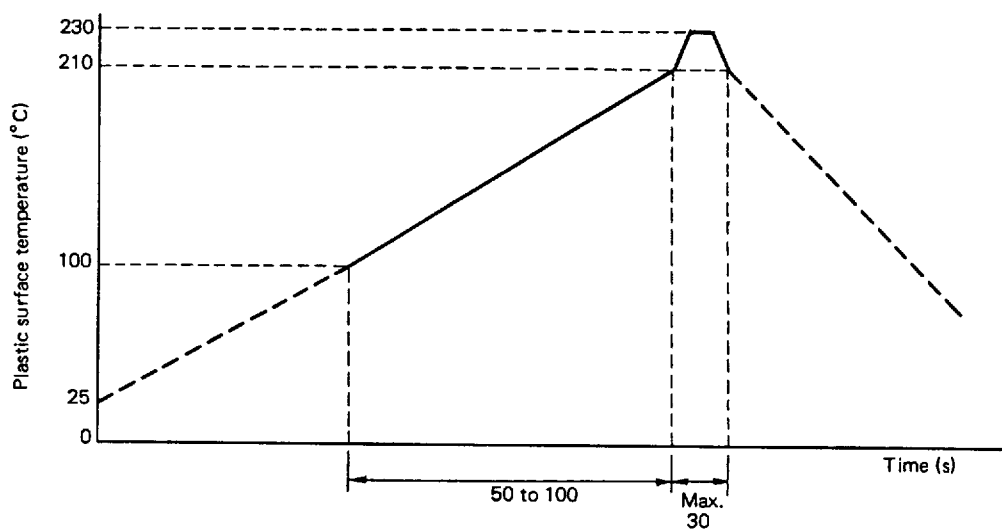


SOLDERING PRECAUTION

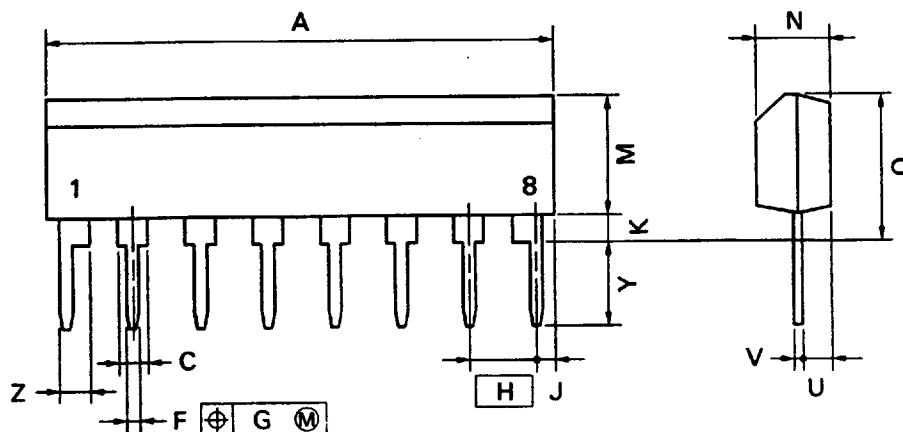
(1) Infrared reflow soldering

- 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



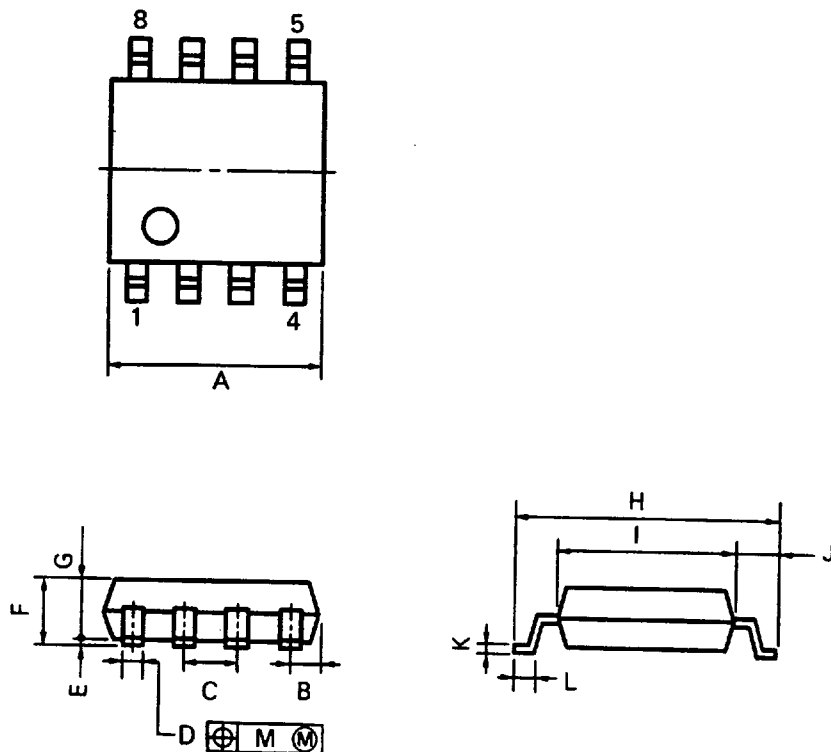
NOTE

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 ^{±0.1}	0.02 ^{±0.004}
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 ^{±0.2}	0.11 ^{±0.008}
Q	5.75 MAX.	0.227 MAX.
U	1.5 MAX.	0.059 MAX.
V	0.25 ^{±0.08}	0.01 ^{±0.003}
Y	3.2 ^{±0.5}	0.126 ^{±0.02}
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 ^{+0.10} _{-0.05}	0.016 ^{+0.004} _{-0.003}
E	0.1 ^{±0.1}	0.004 ^{±0.004}
F	1.8 MAX.	0.071 MAX.
G	1.49	0.059
H	6.5 ^{±0.3}	0.256 ^{±0.012}
I	4.4	0.173
J	1.1	0.043
K	0.15 ^{+0.10} _{-0.05}	0.006 ^{+0.004} _{-0.002}
L	0.6 ^{±0.2}	0.024 ^{+0.008} _{-0.005}
M	0.12	0.005

DEVICES FOR REMOTE CONTROL

