

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

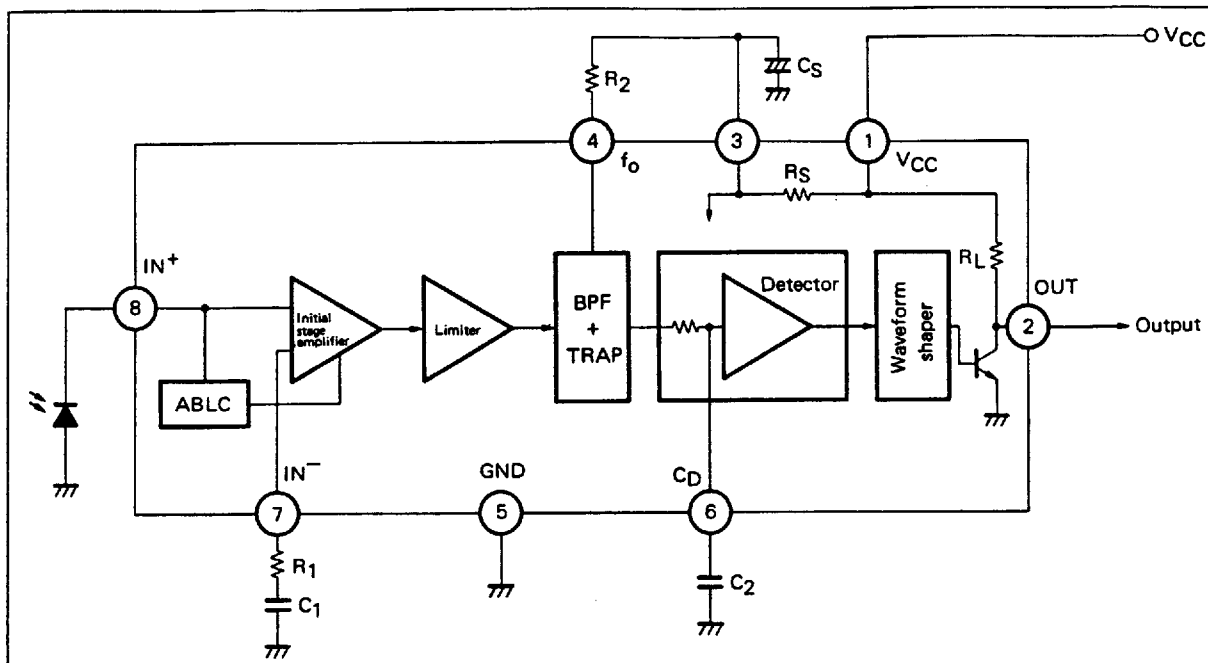
- Less chances of malfunction associated with a high-frequency lighting fluorescent lamp
Internal trap circuit
- Internal band-pass filter
The central frequency can be varied with an external resistance:
 $f_0 = 30$ to 80 kHz.
 f_0 trimming reduces central frequency variance.
- Few external parts
Internal 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

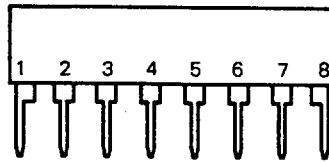
Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

BLOCK DIAGRAM

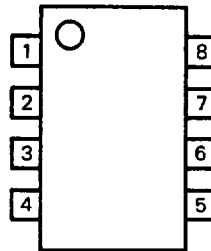


PIN CONFIGURATION

SIP



SOP



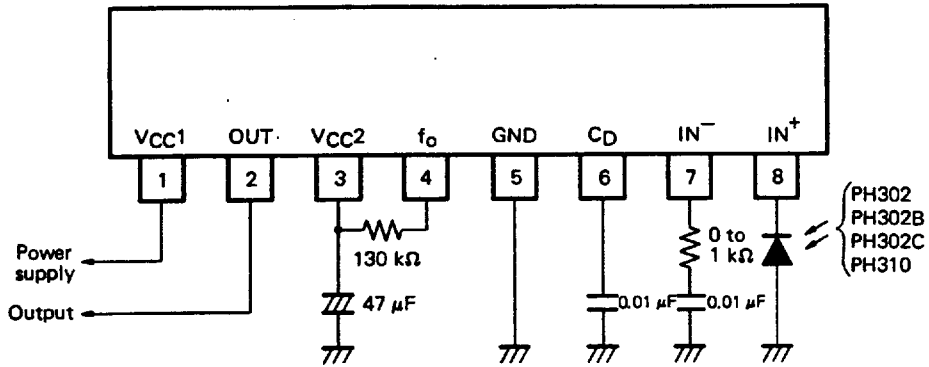
No.	Designation	Pin function
1	V _{CC1}	Power input pin
2	OUT	Output pin
3	V _{CC2}	Power output pin
4	f _o	Band-pass filter frequency setup pin
5	GND	Ground pin
6	C _D	Detection capacitor connection pin
7	IN ⁻	Initial amplifier gain setup pin
8	IN ⁺	Input pin

PIN FUNCTIONS

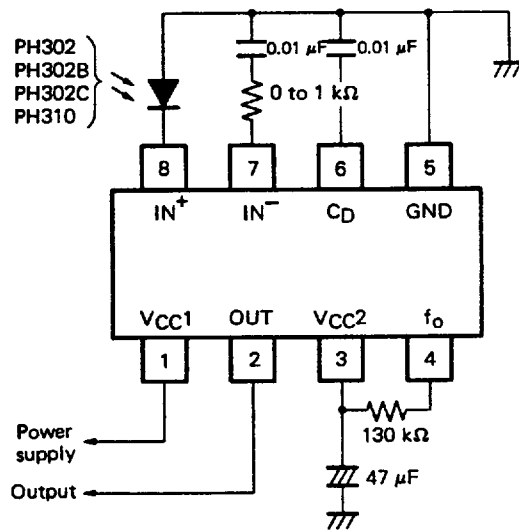
- Power supply pins (V_{CC1}: pin 1, V_{CC2}: pin 3, GND: pin 5)
Apply a voltage of 5 V ±10 % to pin 1. As the power is output to pin 3 through the internal power filter resistance, connect an electrolytic capacitor to pin 3.
- Input pin (IN⁺: pin 8)
With an internal impedance of 90 kΩ (typ.), pin 8 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 °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	°C
Storage temperature	T _{stg}	-40 to +125	°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

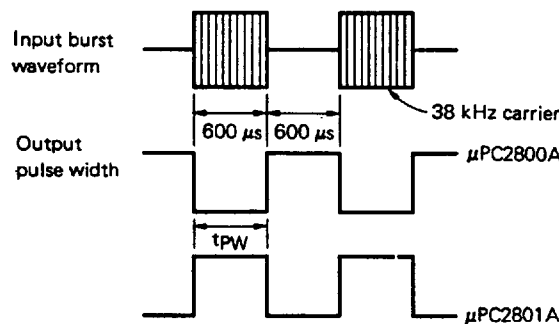
ELECTRICAL CHARACTERISTICS (T_a = 25 °C, V_{CC} = 5.0 V)

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 μA
Voltage gain	A _V	74	78	82	dB	f _{IN} = 38 kHz CW, V _{IN} = 30 μVp.p
BPF bandwidth	f _{BW}	2.0	2.5	3.0	kHz	-3 dB bandwidth, V _{IN} = 30 μVp.p
Input internal resistance	r _{IN}	60	90	140	kΩ	f _{IN} = 38 kHz CW, V _{IN} = 0.2 Vp.p (Note 1)
Output pulse width 1	tpw1	440		770	μs	f _{IN} = 38 kHz burst wave, V _{IN} = 500 μVp.p (Note 2)
Output pulse width 2	tpw2	440		770	μs	f _{IN} = 38 kHz burst wave, V _{IN} = 50 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

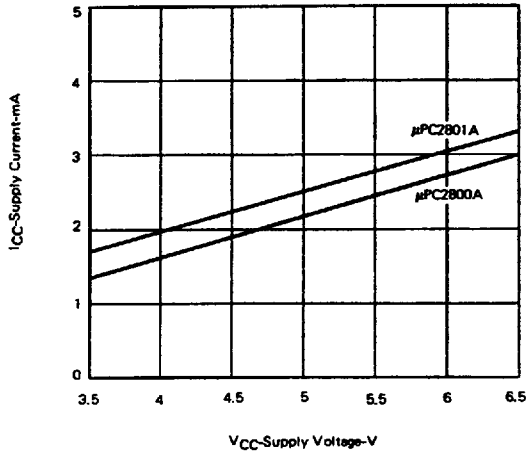
$$r_{IN} = \frac{90}{V_{IN}/V_X - 1} \text{ (k}\Omega\text{)}$$

2:

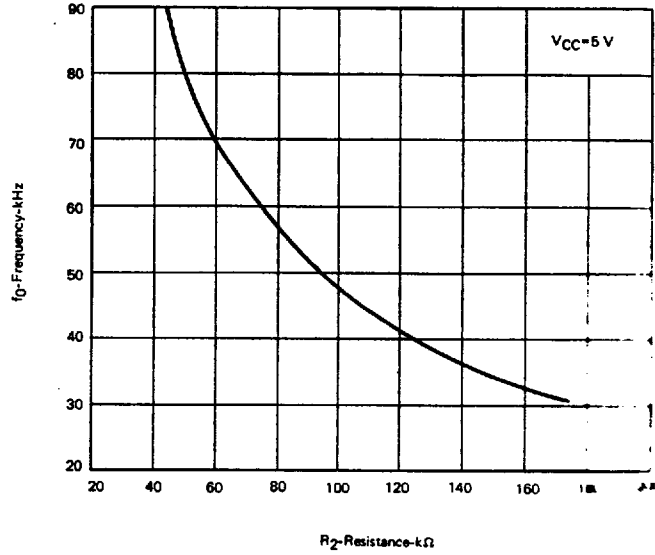


TYPICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

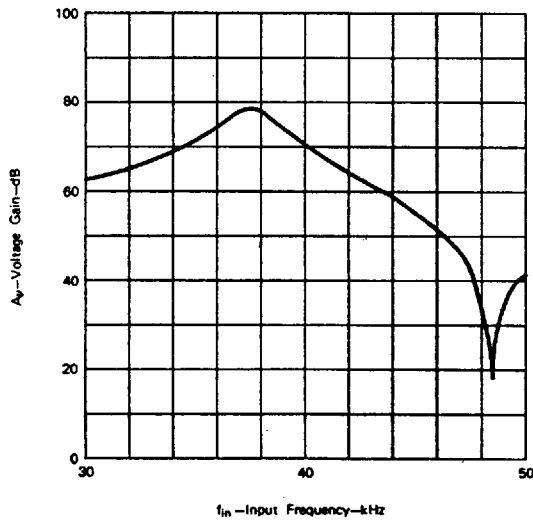
Supply Current vs. Supply Voltage



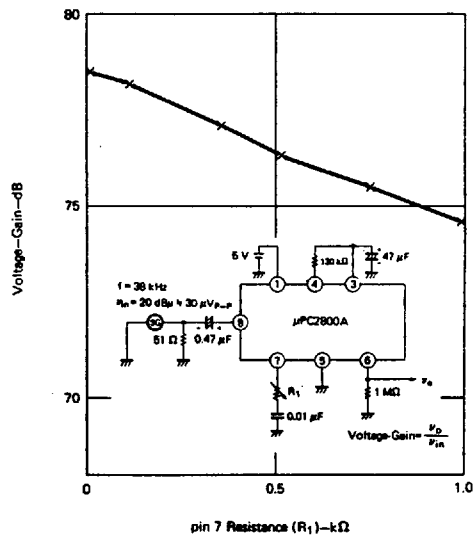
Frequency vs. Resistance (R_2)



$A_v - f_{in}$



Voltage vs. Resistance (R_1)

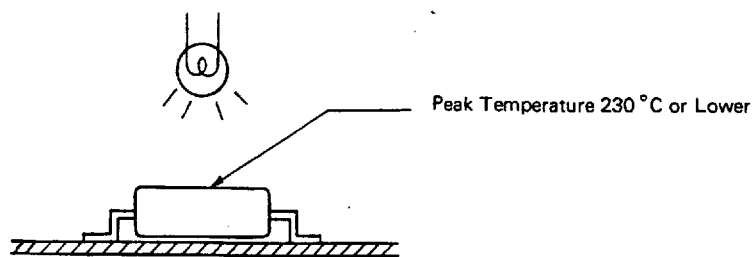
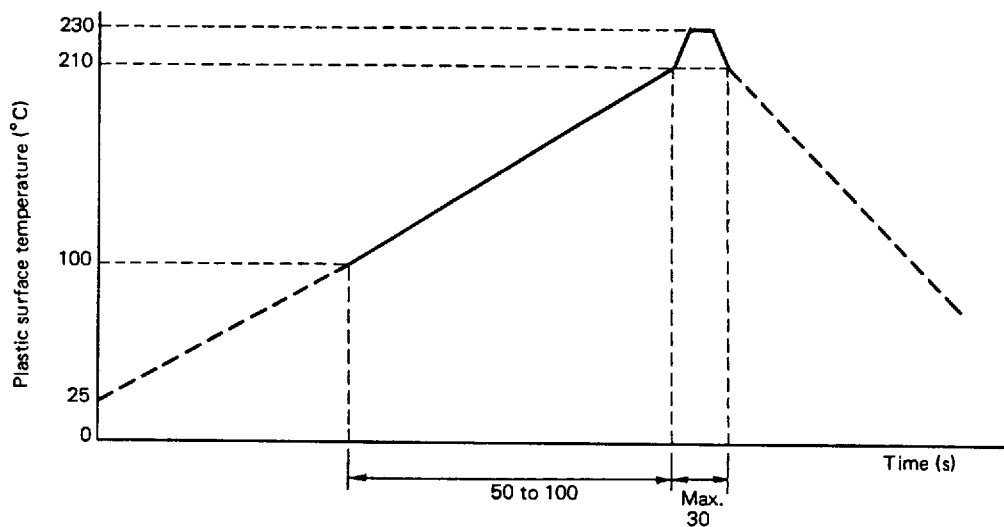


SOLDERING PRECAUTION

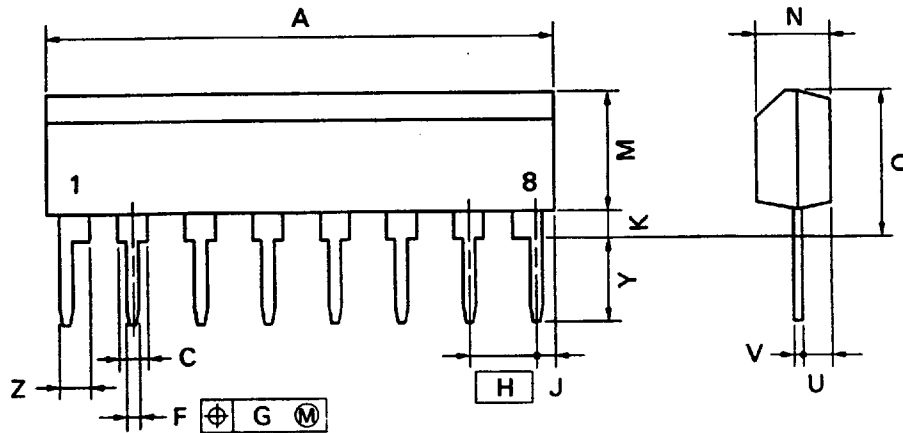
(1) Infrared reflow soldering

- 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



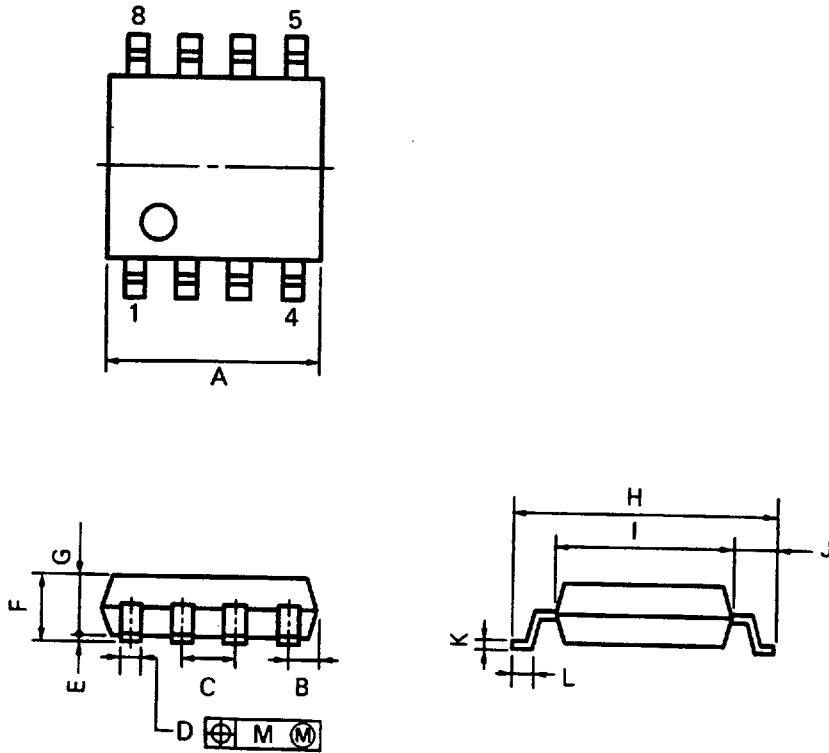
NOTE

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 ^{±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} _{-0.003}
L	0.6 ^{±0.2}	0.024 ^{+0.008} _{-0.008}
M	0.12	0.005

DEVICES FOR REMOTE CONTROL

