



## DATA SHEET

# BIPOLAR ANALOG INTEGRATED CIRCUIT $\mu$ PC1474HA, $\mu$ PC1475HA

## REMOTE CONTROL PREAMPLIFIER

### DESCRIPTION

The  $\mu$ PC1474HA and  $\mu$ PC1475HA are silicon monolithic integrated circuit designed for remote control preamplification of infrared signals. A PIN photo diode can be directly connected to the input terminal.

The  $\mu$ PC1474HA and  $\mu$ PC1475HA contain a high-gain amplifier, a peak detector and an output waveform shaper which are necessary for a remote control preamplifier.

The  $\mu$ PC1474HA and  $\mu$ PC1475HA have improved light interference-rejection characteristics, by use of a two-stage tuning circuit.

The  $\mu$ PC1474HA's output polarity is active "Low" and the  $\mu$ PC1475HA's output polarity is active "High".

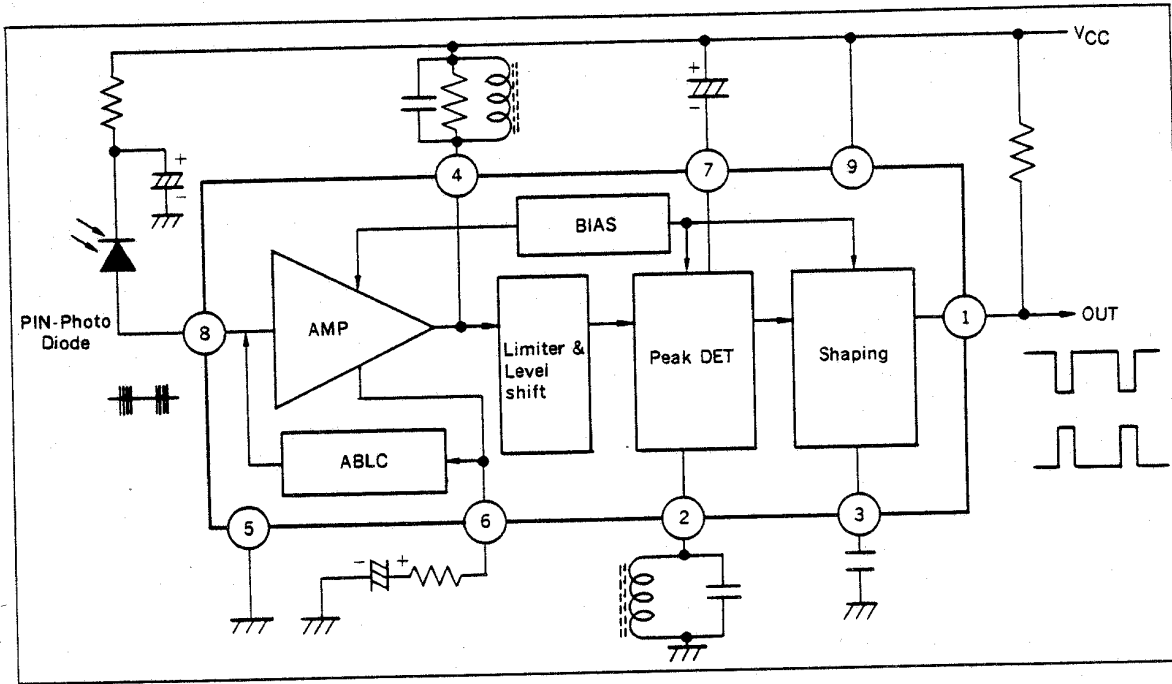
### FEATURES

- Good immunity from light interference: Narrow band width:  $\pm 1.3$  kHz TYP.
- Operation voltage:  $5\text{ V} \pm 10\%$
- Low power consumption: 2.4 mA TYP.
- High input sensitivity:  $50\ \mu\text{V}_{\text{p-p}}$  TYP.
- Peak detector: The detector level is varied with the input signal level.
- Out terminal: Open collector output Easy to interface to other devices.
- Application: Designed for use with the  $\mu$ PD1913C,  $\mu$ PD1943G,  $\mu$ PD6102G remote control transmitter IC.

### ORDERING INFORMATION

Order Code	Package	Output Data
$\mu$ PC1474HA	8-pin plastic SIP	active low
$\mu$ PC1475HA	8-pin plastic SIP	active high

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

Supply Voltage	$V_{CC}$	8	V
Power Dissipation	$P_D$	270	mW
Operating Temperature	$T_{opt}$	-20 to +75	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40 to +125	$^\circ\text{C}$
Output Terminal Voltage	$V_{out}$	15.0	V

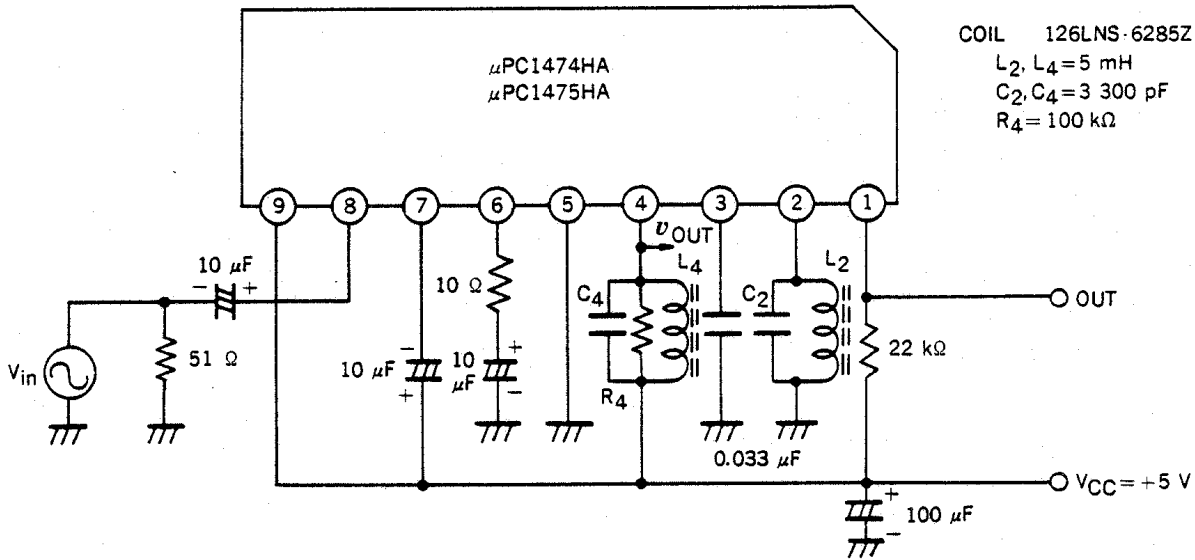
RECOMMENDED OPERATING CONDITION

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Power Supply	$V_{CC}$	4.5	5.0	5.5	V
Input Frequency	$f_{in}$	30		60	kHz

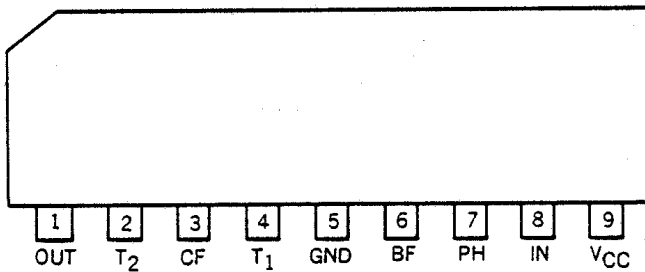
ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 5.0\text{ V}$ ,  $f_{in} = 40\text{ kHz}$ )

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Supply Current	$I_{CC}$	1.6	2.4	3.5	mA	
Input Terminal Voltage	$V_{IN1}$	1.0	1.25	1.45	V	
Input Terminal Voltage	$V_{IN2}$	2.0	2.35	2.5	V	$I_{in} = 30\ \mu\text{A}$
1st Stage Voltage Gain	$A_{vL}$		66		dB	#8 - #4, $v_{out} = 500\text{ mV}_{p-p}$
Detection Input Voltage	$v_{in}$		50	100	$\mu\text{V}$	
Input Impedance	$r_{in}$	40	60	80	$\text{k}\Omega$	
Output Voltage	$V_{OL}$			0.5	V	$I_{OL} = 0.5\text{ mA}$ , $v_{in} = 1\text{ mV}_{p-p}$
Output Leak Current	$I_{OH}$			2	$\mu\text{A}$	$V_{OH} = 14.4\text{ V}$

**TEST CIRCUITS**



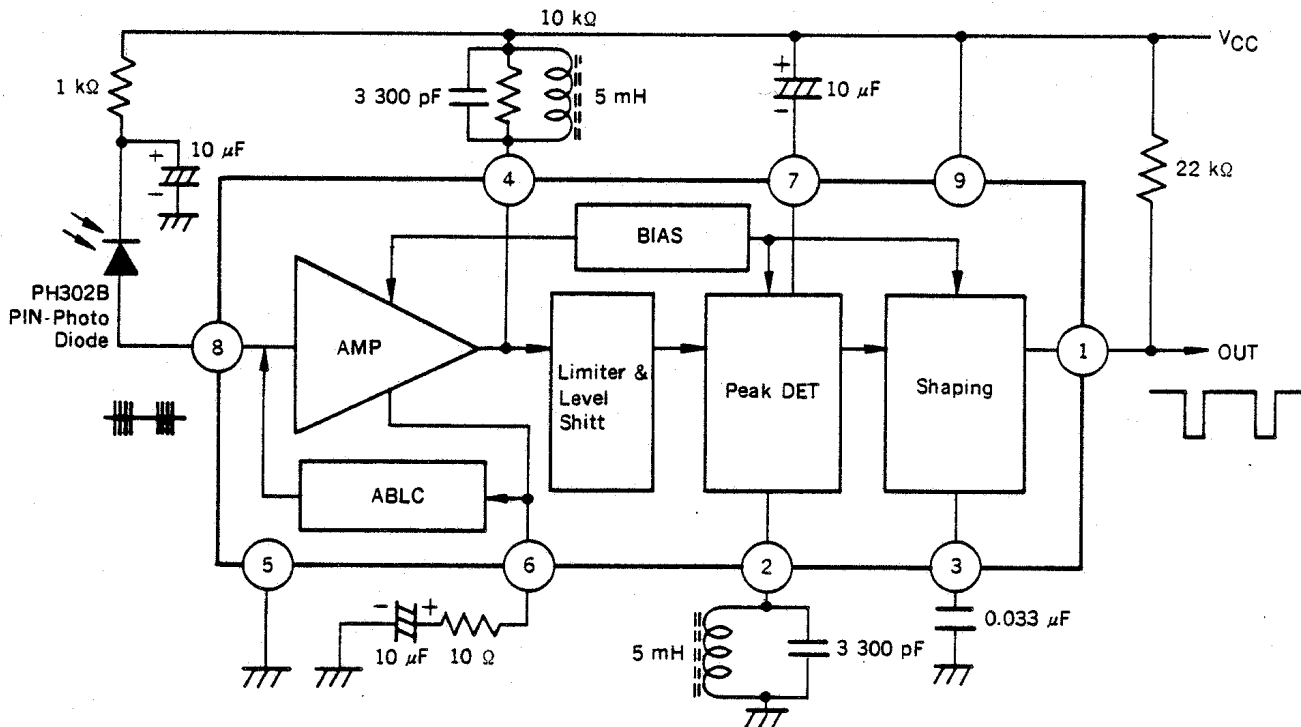
**CONNECTION DIAGRAM DIMENSIONS**



**TERMINAL**

- 1 ..... OUT      Output
- 2 ..... T<sub>2</sub>      2nd stage tuning coil
- 3 ..... CF      Carrier filter
- 4 ..... T<sub>1</sub>      1st stage tuning coil
- 5 ..... GND      Ground
- 6 ..... BF      Bias filter
- 7 ..... PH      Peak hold
- 8 ..... IN      Input
- 9 ..... V<sub>CC</sub>      Power supply

STANDARD APPLICATION



COIL 126LNS-6285Z TOKO INC.  
5 mH 0.08 φ-2 UEW313T

PIN FUNCTION

- **Power supply terminal (V<sub>CC</sub>: 9 Pin, GND: 5 Pin)**  
Operation voltage is 5 V±10 %.  
In case of using a low frequency ripple voltage contained in the power supply, insert a series resistor 100 Ω between V<sub>CC</sub> and power supply.
- **Input terminal (IN: 8 Pin)**  
This input impedance is 60 kΩ TYP.  
A PIN photo diode can be directly connected to this terminal.  
This input has ABLC (Automatic Bias Level Control) circuit for non-saturated by violent light, so this terminal voltage is always fixed.
- **1st Stage tuning coil terminal (T<sub>1</sub>: 4 Pin)**
- **Bias filter terminal (BF: 6 Pin)**  
This front amplifier has 52 dB gain in this application circuit and this gain is determined by tuning coil impedance (Z<sub>L</sub>) and external resistor R6.

$$A_{vL} = \frac{Z_L}{R_{\#6}}$$

When there are much impulse noise, it is better to change 10 kΩ damping resistor (4 Pin) to small one. (ex. 5 kΩ)

- **Peak hold terminal (PH: 7 Pin)**

The signal of tuning coil terminal is detected by peak detector circuit.

In this case, detecting level depend on input signal strength, so noise wave is suppressed.

Time constant of peak hold is changed by capacitor C7.

- **2nd Stage tuning coil terminal ( $T_2$ : 2 Pin)**

The peak detection signal is tuned again by this 2nd stage tuning circuit, so the band width is narrow.

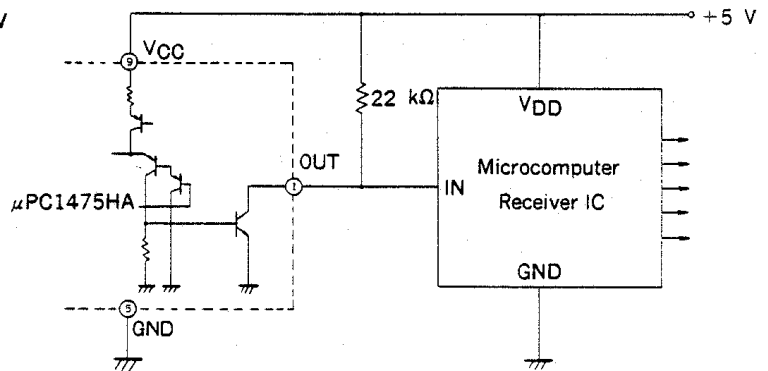
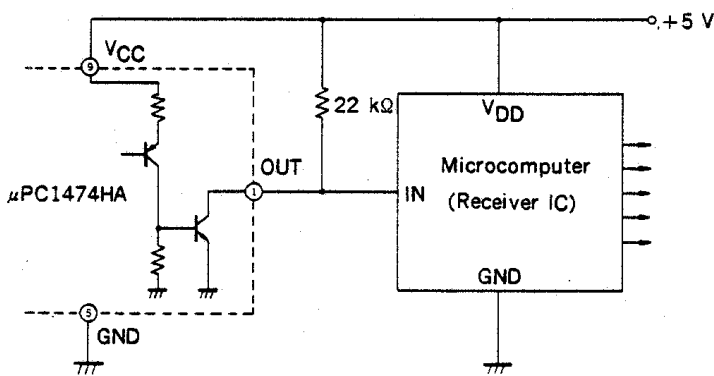
- **Carrier filter terminal (CF: 3 Pin)**

The carrier waveform is deleted by this capacitor C3.

- **Output terminal (OUT: 1 Pin)**

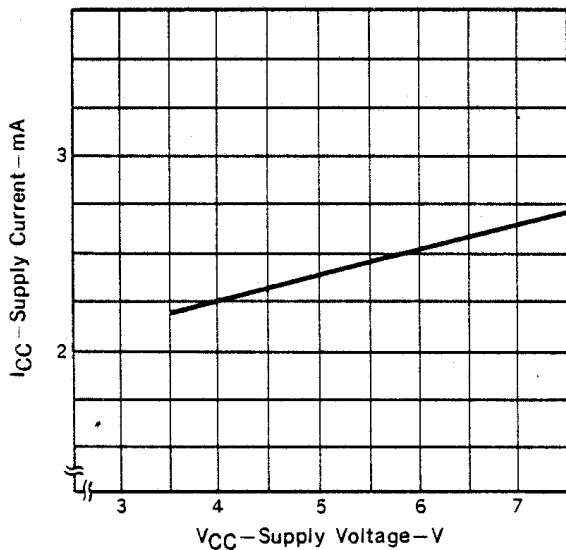
This Output terminal is open collector transistor.

The  $\mu$ PC1474HA is active "Low" output. The  $\mu$ PC1475HA is active "High" output.

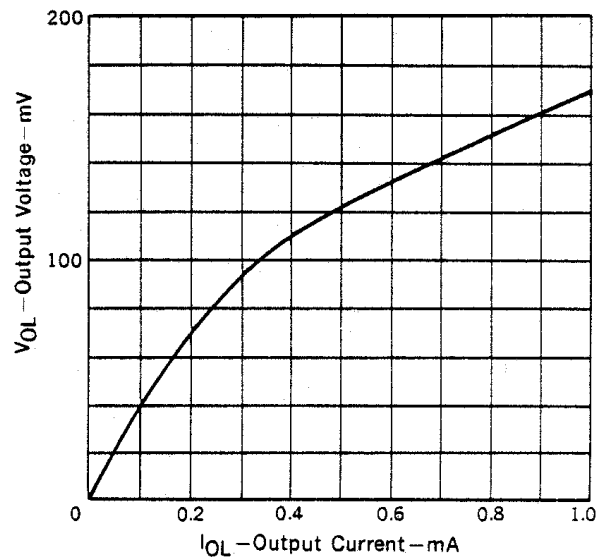


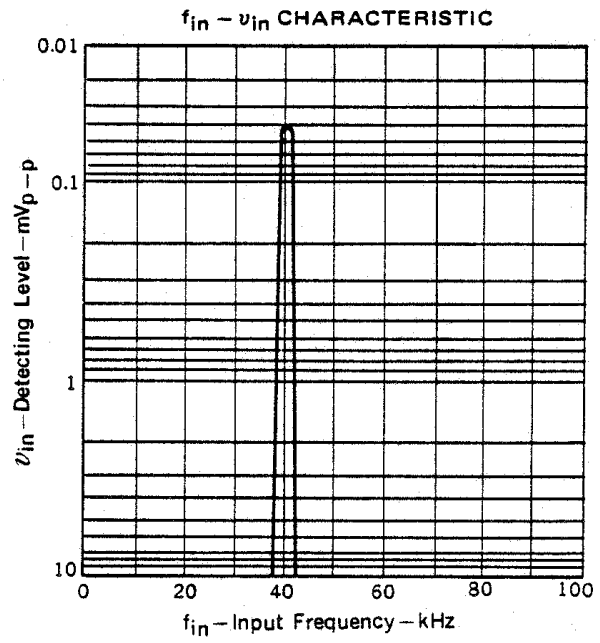
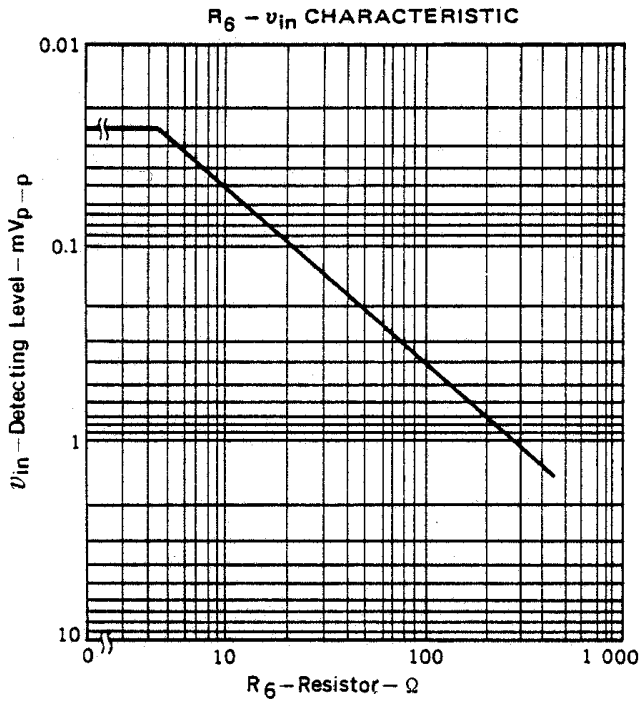
**TYPICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )**

**$V_{CC} - I_{CC}$  CHARACTERISTIC**

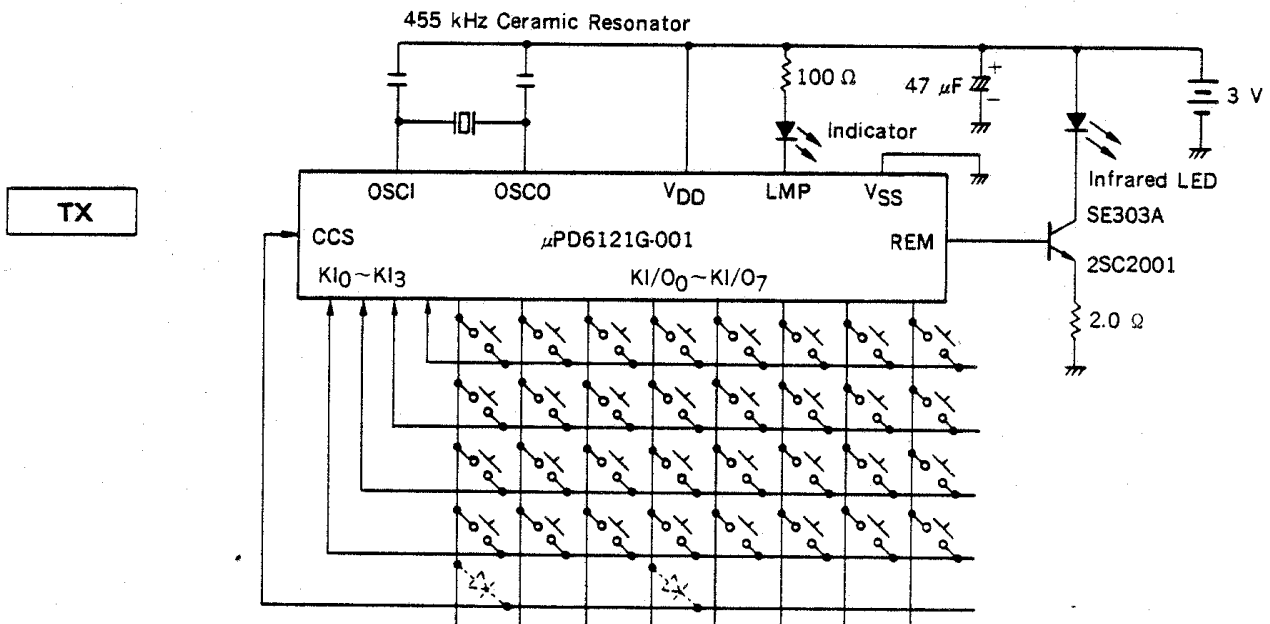


**OUTPUT SATURATION VOLTAGE**

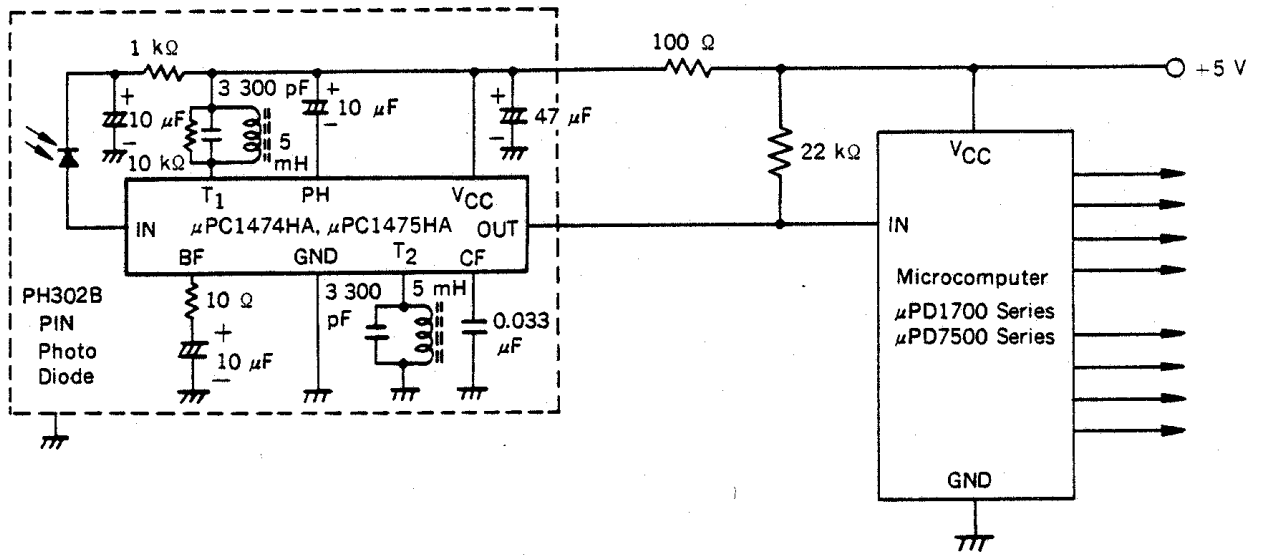




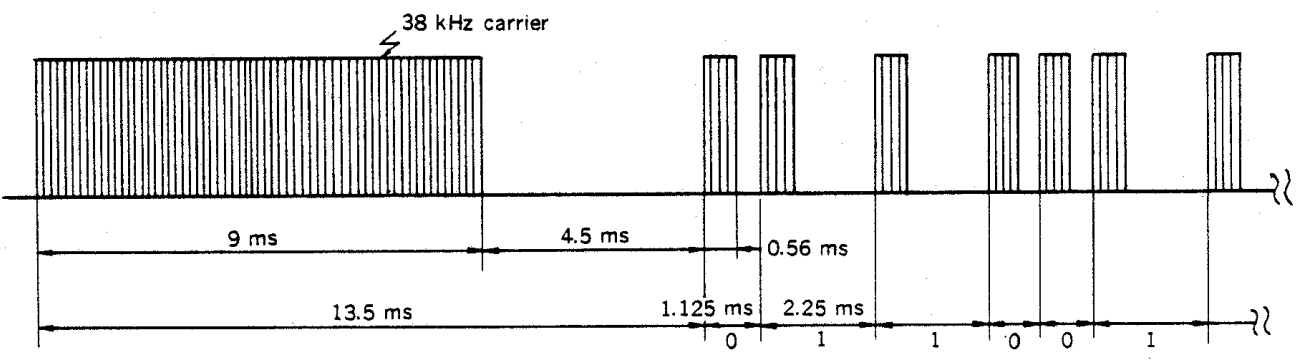
APPLICATION



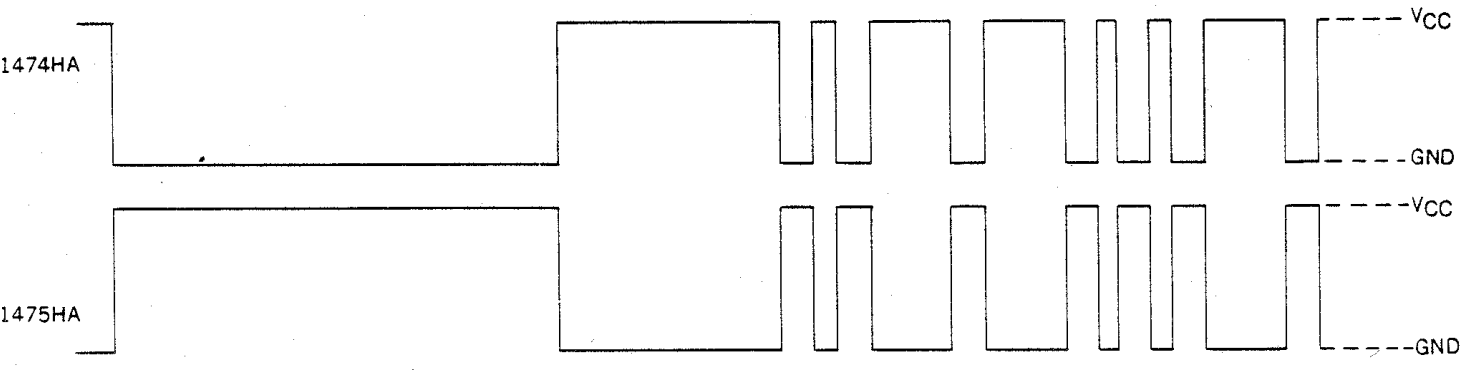
**RX**



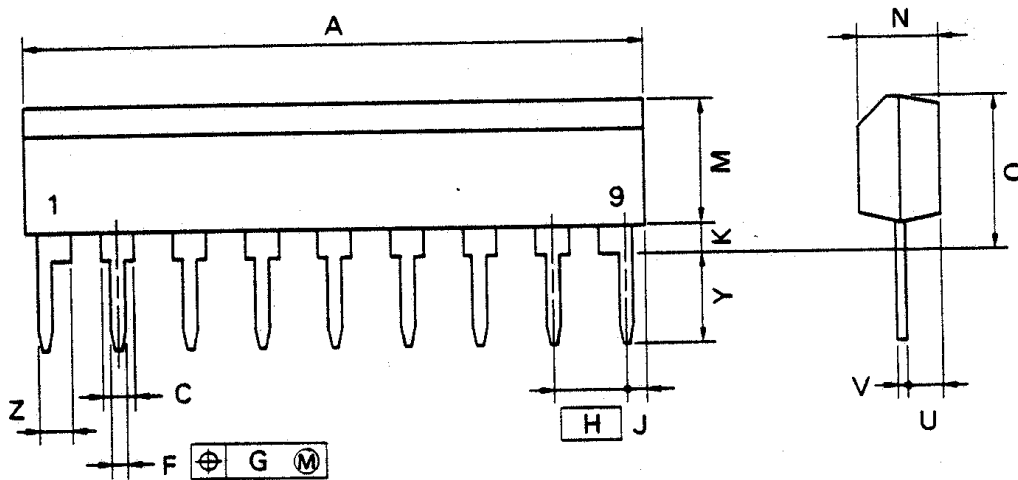
**Transmitter Waveform**



**Output Waveform**



9 PIN SIP PACKAGE DIMENSIONS



**NOTE**

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

P9HA-254B

ITEM	MILLIMETERS	INCHES
A	22.86 MAX.	0.9 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.