

**NEC**  
ELECTRON DEVICE

# BIPOLAR ANALOG INTEGRATED CIRCUIT

## $\mu$ PC1473HA

### REMOTE CONTROL PREAMPLIFIER

#### DESCRIPTION

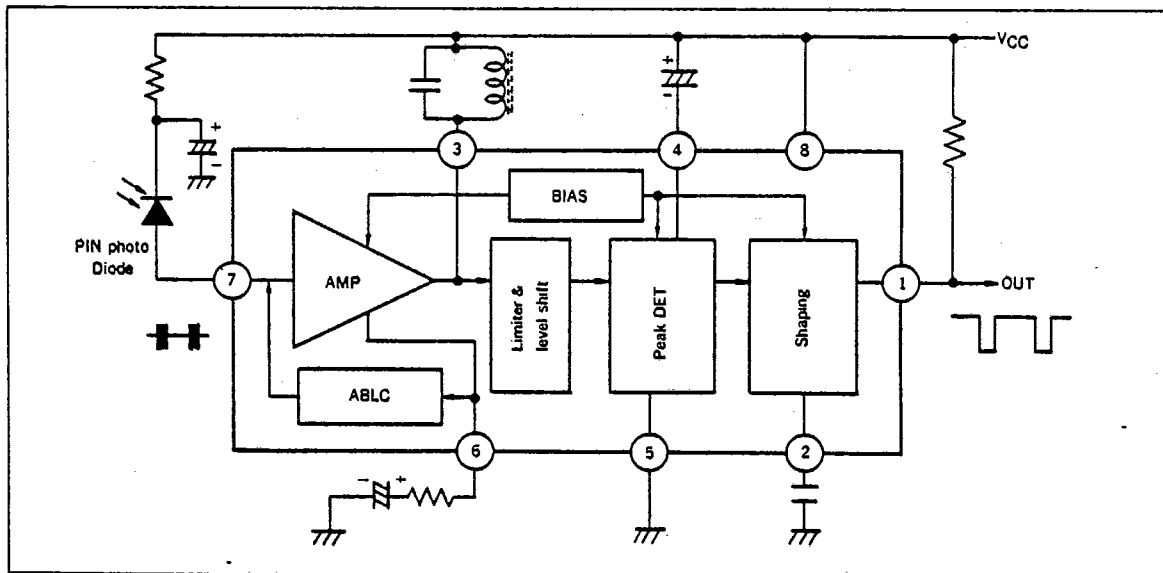
The  $\mu$ PC1473HA is a silicon monolithic integrated circuit designed for a remote control preamplifier of infrared signals. A PIN photo diode can be directly connected to the input terminal.

The  $\mu$ PC1473HA contains a high-gain amplifier, a peak detector and an output wave form shaper which are necessary for a remote control preamplifier.

#### FEATURES

- Operation Voltage:  $V_{CC} = 5 V \pm 10 \%$
- Low Power Consumption:  $I_{CC} = 2.2 \text{ mA TYP.}$
- High Input Sensitivity:  $50 \mu\text{V}_{p-p}$  TYP.
- Peak Detector: The detector level is varied with the input signal level.
- Pin Connection: Pin compatible with the  $\mu$ PC1373H,  $\mu$ PC1373HA.
- OUT Terminal: Open collector output. Active "Low" output.
- Application: Designed for Use with the  $\mu$ PD1913C, 1943G, 6102G Remote Control Transmitter IC.

#### BLOCK DIAGRAM



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

Supply Voltage	$V_{CC}$	8.0	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

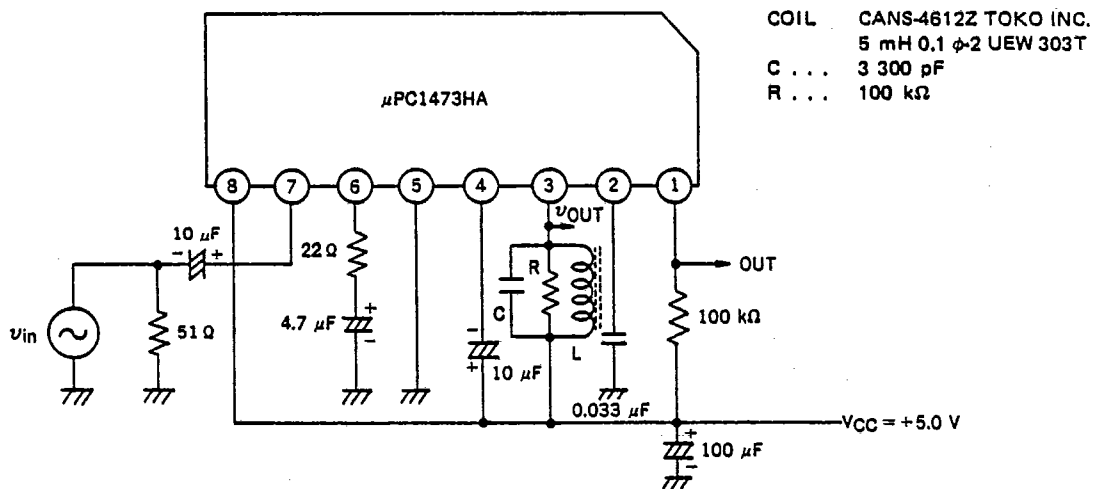
**RECOMENDED OPERATING CONDITIONS**

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Power Supply	$V_{CC}$	4.5	5.0	5.5	V
Input Frequency	$f_{in}$	30		60	kHz
Output Current	$I_{OL}$			0.1	mA

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

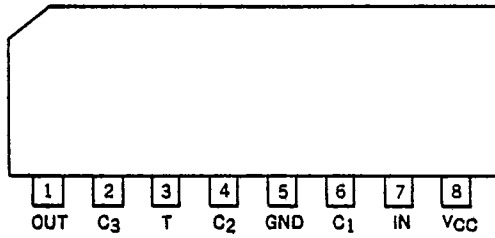
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Supply Current	$I_{CC}$	1.3	2.2	3.5	mA	
Input Terminal Voltage	$V_{IN 1}$	0.95	1.25	1.80	V	
Input Terminal Voltage	$V_{IN 2}$	1.7	2.2	2.7	V	$I_{in} = 40\ \mu\text{A}$
1st Stage Voltage Gain	$A_{vL}$		60		dB	#7-#3, $v_{out} = 500\text{ mV}_{p-p}$
Detection Input Voltage	$v_{in}$		50	100	$\mu\text{V}_{p-p}$	
Input Impedance	$r_{in}$	40	60	80	$\text{k}\Omega$	
Output Voltage	$V_{OL}$			0.5	V	$I_{OL} = 0.1\text{ mA}$ , $v_{in} = 1\text{ mV}_{p-p}$
Output Leak Current	$I_{OH}$			2	$\mu\text{A}$	$V_{OH} = 14.4\text{ V}$

**TEST CIRCUITS**



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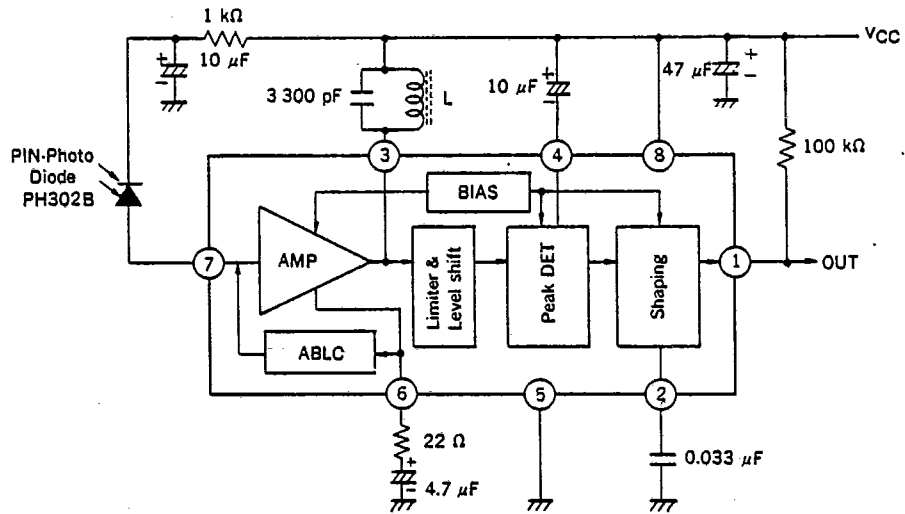
CONNECTION DIAGRAM



TERMINAL

1	.....	OUT	Output
2	.....	C <sub>3</sub>	Integral Capacitor
3	.....	T	Tuning Coil
4	.....	C <sub>2</sub>	Peak Hold Capacitor
5	.....	GND	Ground
6	.....	C <sub>1</sub>	By-pass Capacitor
7	.....	IN	Input
8	.....	VCC	Power Supply

STANDARD APPLICATION



COIL 126LNS-6285Z TOKO INC.  
5 mH 0.08 φ-2 UEW 313T

## PIN FUNCTION

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- Power supply terminal ( $V_{CC}$ : 8 Pin, GND: 5 Pin)

Operation voltage is  $5V \pm 10\%$ .

In case of using a low frequency ripple voltage contained in the power supply, insert a series resistor  $100\ \Omega$  between  $V_{CC}$  and power supply.

- Input terminal (IN: 7 Pin)

This input impedance is  $60\ k\Omega$  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.

- Tuning coil terminal (T: 3 Pin)

- By-pass capacitor terminal ( $C_1$ : 6 Pin)

This amplifier has 60 dB gain in this application circuit and the gain is determined by tuning coil impedance ( $Z_L$ ) and external resistor R6.

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

- Peak hold capacitor terminal ( $C_2$ : 4 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.

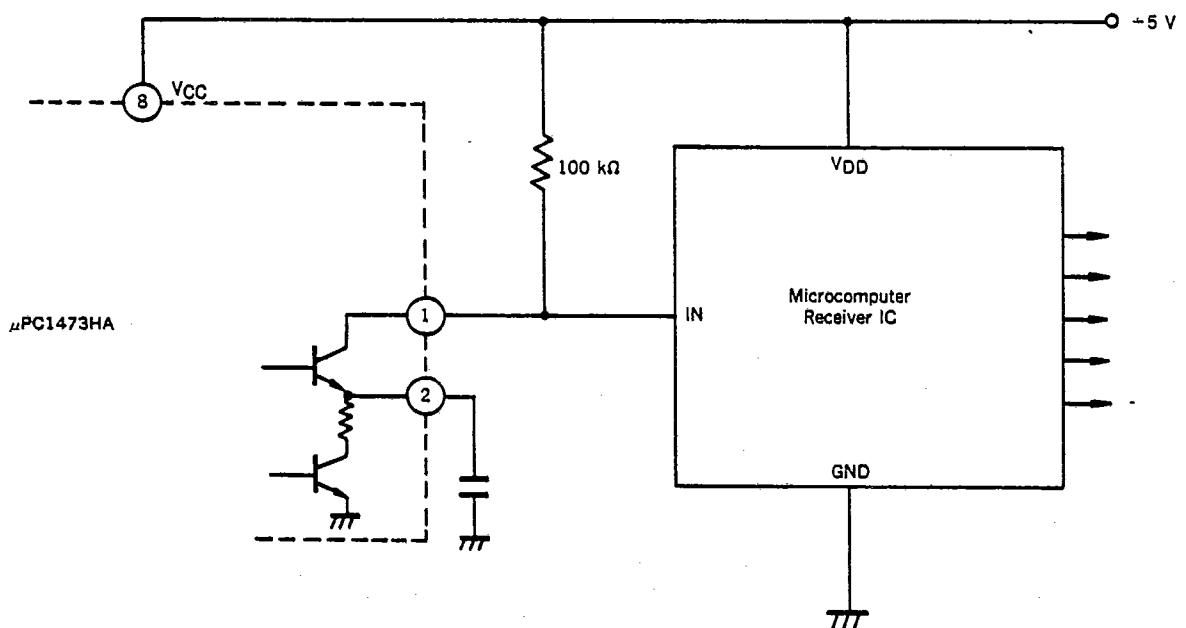
Time constant of peak hold is changed by capacitor  $C_2$ .

- Integral capacitor terminal ( $C_3$ : 2 Pin)

The carrier waveform is deleted by this capacitor  $C_3$ .

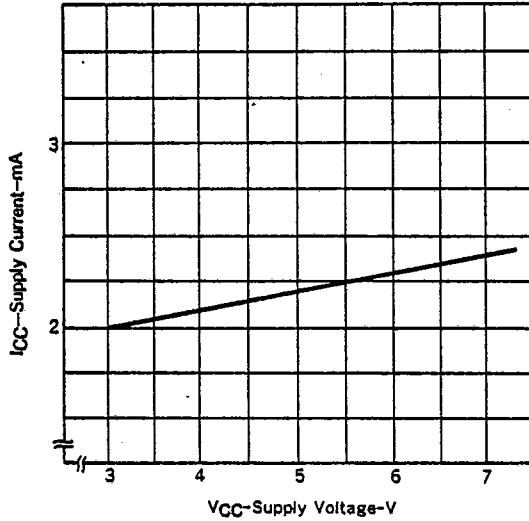
- Output terminal (OUT: 1 Pin)

This Output terminal is open collector transistor. (Active Low output)

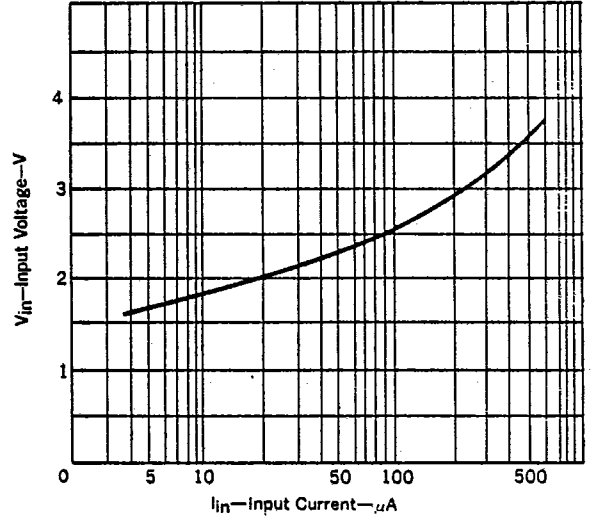


TYPICAL CHARACTERISTIC ( $T_s = 25^\circ\text{C}$ )

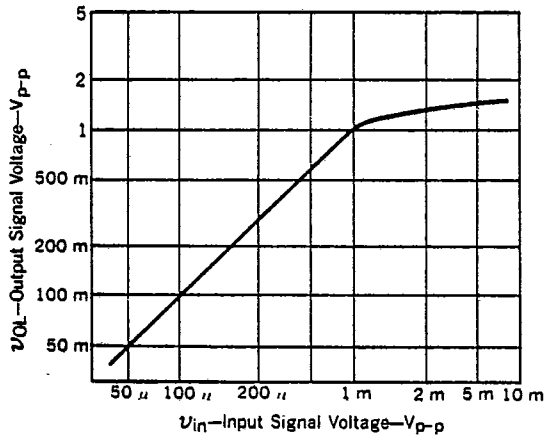
$I_{CC} - V_{CC}$  CHARACTERISTICS



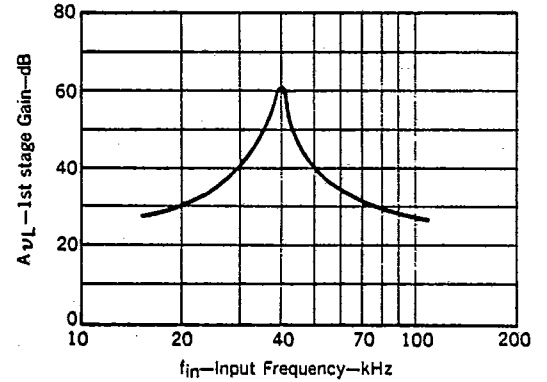
ABL<sub>C</sub>  $I_{in} - V_{in}$  CHARACTERISTICS



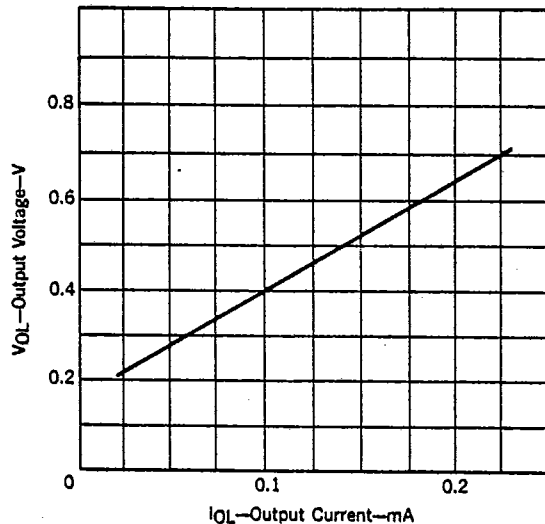
1st Stage  $v_{in} - v_{OL}$  CHARACTERISTICS



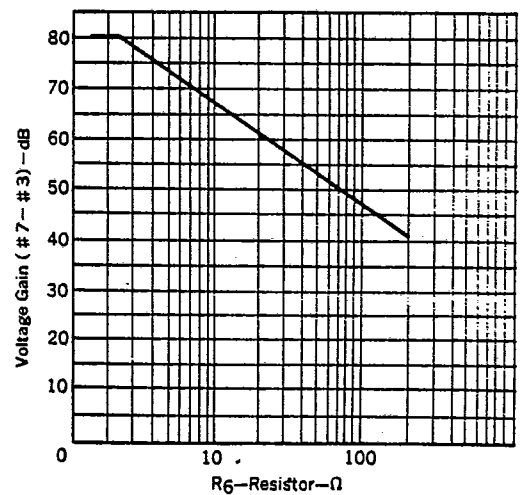
1st Stage  $f_{in} - A_{vL}$  CHARACTERISTICS



Output  $V_{OL} - I_{OL}$  CHARACTERISTICS

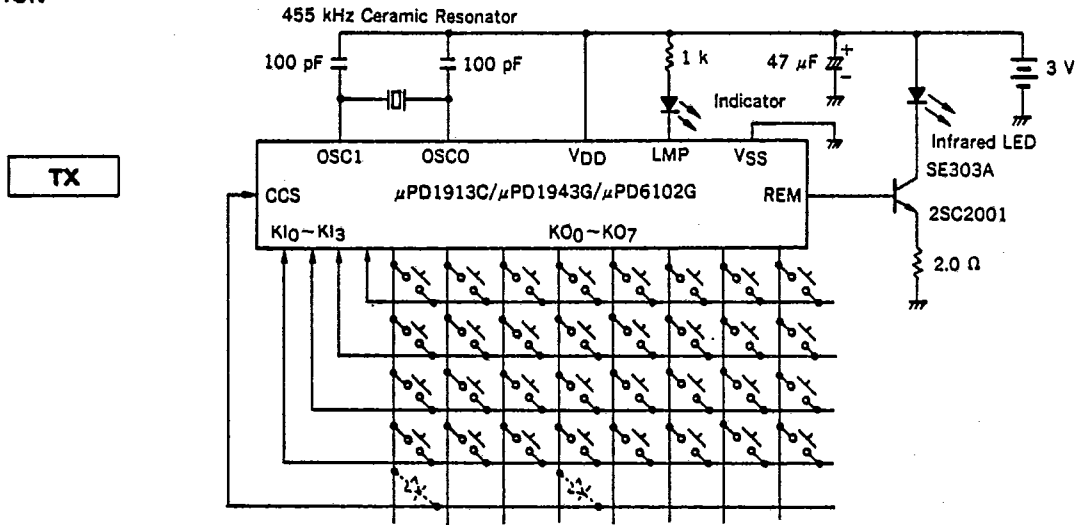


$R_6 - A_{vL}$  CHARACTERISTICS

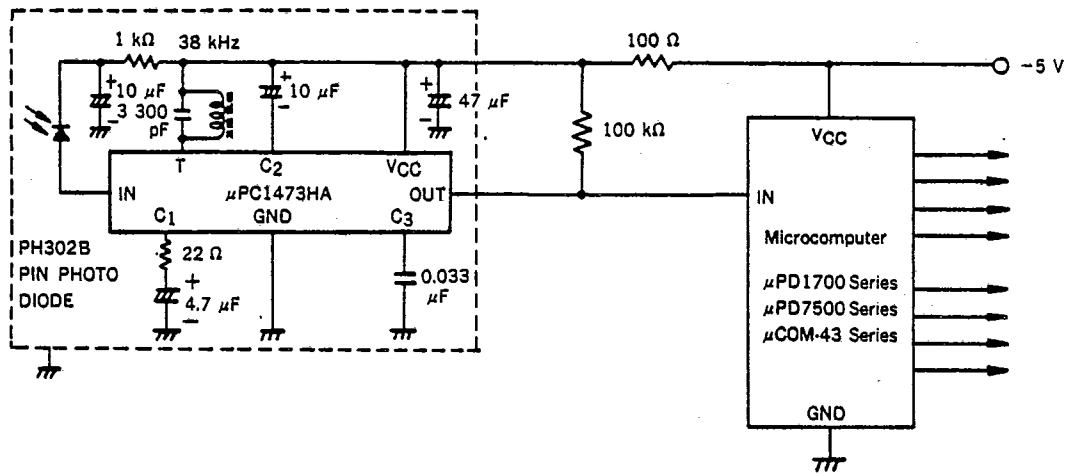


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APPLICATION

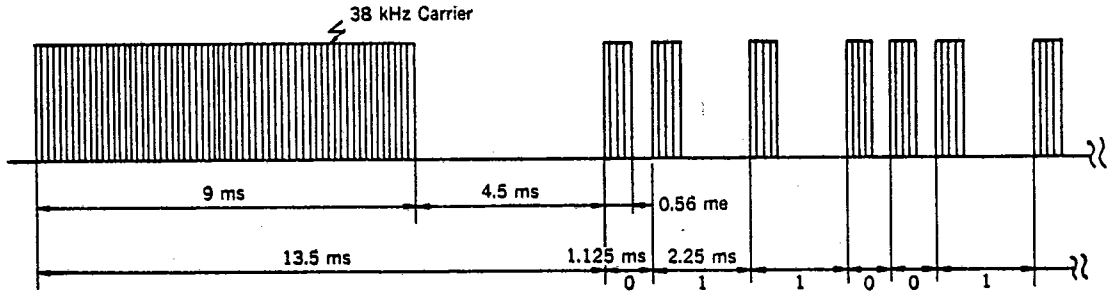


RX

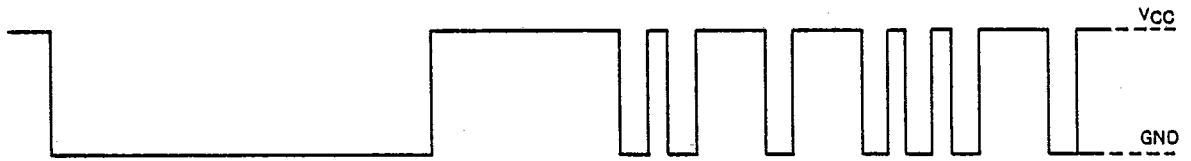


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Transmitter Waveform

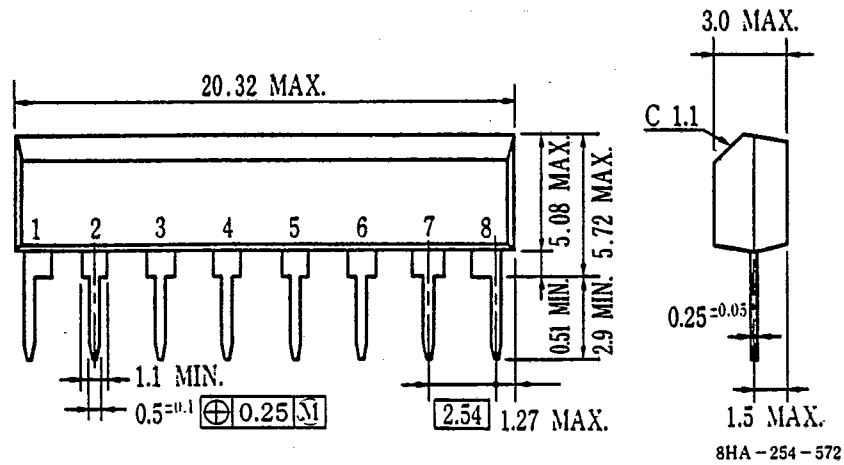


Output Waveform



8 PIN SIP PACKAGE DIMENSIONS (Unit : mm)

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NEC Corporation

INTERNATIONAL ELECTRON DEVICES DIV.  
 SUMITOMO MITA Building, 37-8,  
 Shiba Gochome, Minato-ku, Tokyo 108, Japan  
 Tel: Tokyo 456-3111  
 Telex Address: NECTOK J22686  
 Cable Address: NEC TOKYO

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