To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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RENESAS

BIPOLAR ANALOG INTEGRATED CIRCUIT

μPC1297

INTEGRATED CIRCUIT FOR DOLBY HX PRO SYSTEM

DESCRIPTION

The μPC1297 is a monolithic integrated circuit specifically designed to realize the Dolby HX PRO system.

Dolby HX PRO optimizes the recording process by adjusting the level of applied ultrasonic bias in accordance with the self-biasing effect of program material, thus maintaining a constant level of effective bias.

The IC is encapsulated in 18 pin shrink dual-in-line plastic package. Available only to licensees of Dolby Laboratories Licensing Corporation, San Francisco, from whom licensing and application information must be obtained.

"Dolby", the Double-D symbol, and "HX PRO" are trade marks of Dolby Laboratories Licensing Corporation.

FEATURES

- Wide operating voltage. V_{CC} = 8 to 15 to 18 V
- 2ch. system requires only one chip.
- Low 2nd harmonic distortion. −70 dB TYP.
- Independent of variations in erase voltage.
- Regulated voltage for VCA is provided internally.
- Internal thermal protection circuit.

ORDERING INFORMATION

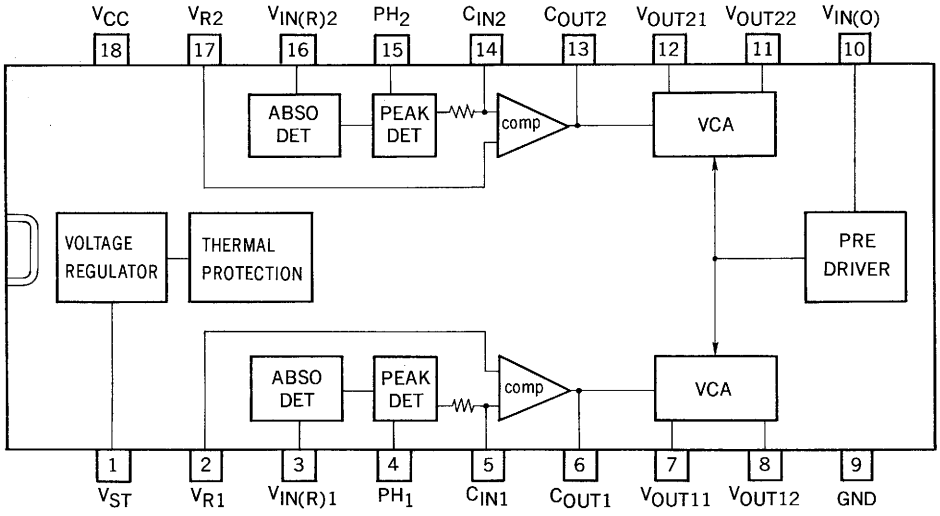
PART NUMBER	PACKAGE	QUALITY GRADE
μPC1297CA	18 PIN PLASTIC SHRINK DIP (300 mil)	Standard

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.

Document No. IC−1612B
(O.D.No. IC−6551B)
Date Published August 1993 M
Printed in Japan

The mark ★ shows revised points.

BLOCK DIAGRAM



CONNECTION DIAGRAM

NO.	CONNECTION
1	VOLTAGE REGULATOR
2	COMP REF_1
3	SIGNAL $INPUT_1$
4	PEAK $HOLD_1$
5	COMP $INPUT_1$
6	COMP $OUTPUT_1$
7	VCA $OUTPUT_{11}$
8	VCA $OUTPUT_{12}$
9	GND
10	BIAS OSC INPUT
11	VCA $OUTPUT_{21}$
12	VCA $OUTPUT_{22}$
13	COMP $OUTPUT_2$
14	COMP $INPUT_2$
15	PEAK $HOLD_2$
16	SIGNAL $INPUT_2$
17	COMP REF_2
18	V_{CC}

ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

Supply Voltage	V_{CC}	20	V
Power Dissipation	P_D	500*	mW
Operating Temperature Range	T_{opt}	−25 to +75	°C
Storage Temperature Range	T_{stg}	−40 to +125	°C

* Value at T_a = 75 °C

RECOMMENDED OPERATING CONDITIONS (T_a = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{CC}	8	15	18	V
Bias OSC Input Voltage	$V_{in\ (o)}$	0.4	0.8	4.0	V_{p-p}
Signal Input Voltage	$V_{in\ (R)}$	0.2	–	4.0	V_{p-p}

ELECTRICAL CHARACTERISTICS (T_a = 25 °C, V_{CC} = 15 V, f_{BIAS} = 100 kHz, $V_{in(o)}$ = 800 mV_{p-p})

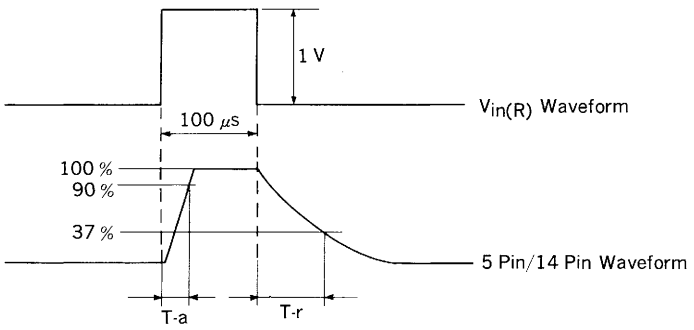
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Supply Current	I_{CC}		7		mA	$I_{b1} = I_{b2} = 0$
Bias Current	I_{BIAS1}			10	μA	$V_{ref} = 0$
	I_{BIAS2}	12	16	20	mA	$V_{ref} = V_{st}$
2nd Harmonic Distortion	2nd Harm		−70	−46	dB	$V_{ref} = V_{st}$
Attack Time	t-a		2.6	5.0	μs	C_1 = 22 nf ± 1 % (Note 1)
Release Time	t-r	0.4	0.7	1.1	ms	C_1 = 22 nf ± 1 % (Note 1)
Step Response	Ts	0.8	1.3	1.7	ms	V_{ref} = 1/3, 2/3 V_{st} (Note 1)
Stabilized Voltage	V_{st}	4.1	4.4	4.7	V	Pin 1
Temperature Characteristic	dV_{st}/dt_a	−1	0	+1	mV/°C	Pin 1, t_a = −25 to +75 °C
Output Current	I_{out}	3			mA	Form V_{st} Pin
Comparator Input Bias Current	I_{b1}	−0.5	−	0	μA	
Input Resistance	R_{in}	2.3	3.3	4.3	kΩ	Pin 10

Note 1 t-a, t-r : approx. +0.28 %/°C
T_s : approx. +0.56 %/°C

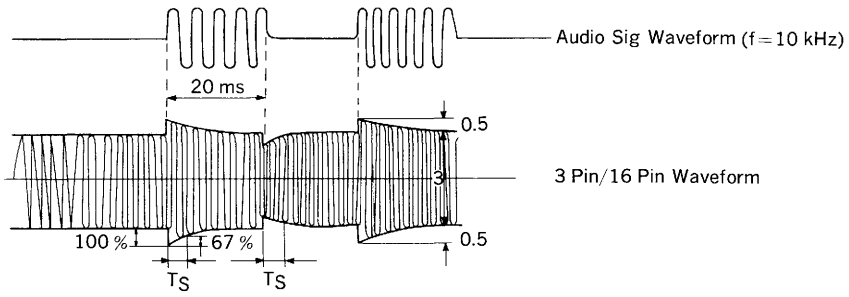
Note 2 Attack and Release Time characteristics are tested by circuit 2, and other characteristics are tested by circuit 1.

TIMING CHART

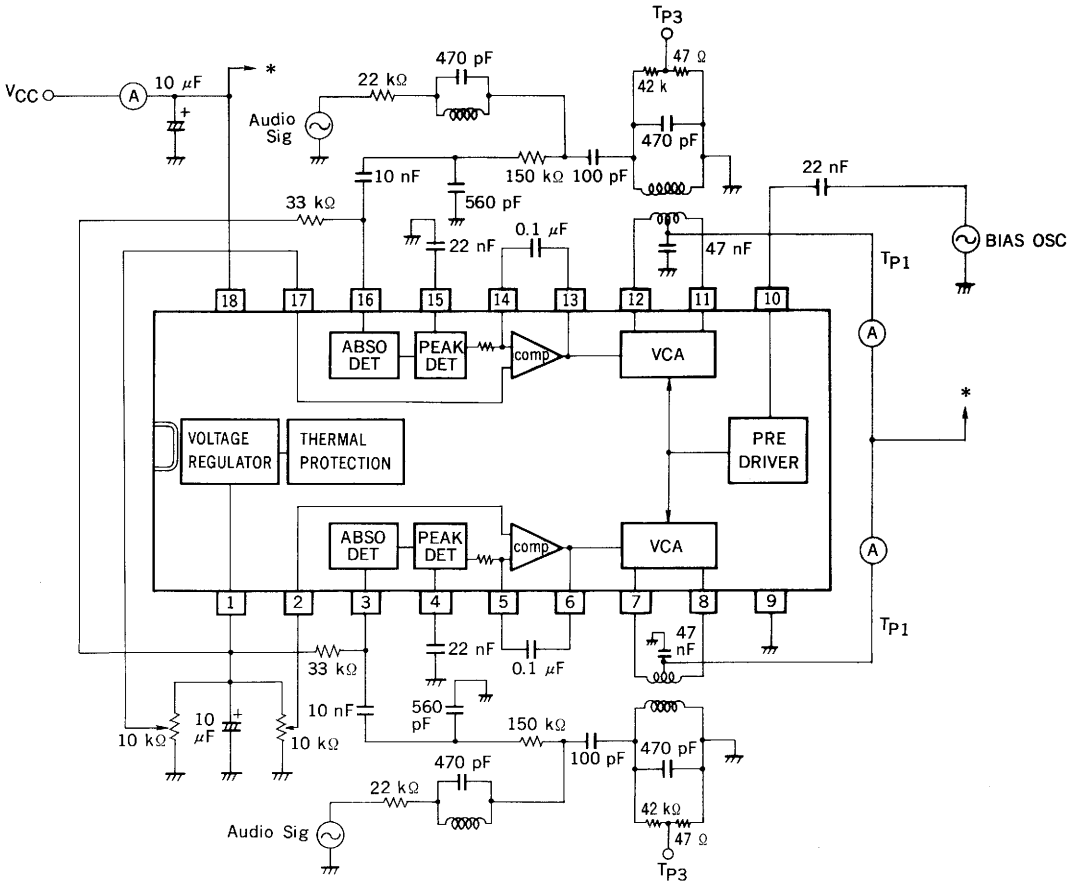
(1) t-a, t-r



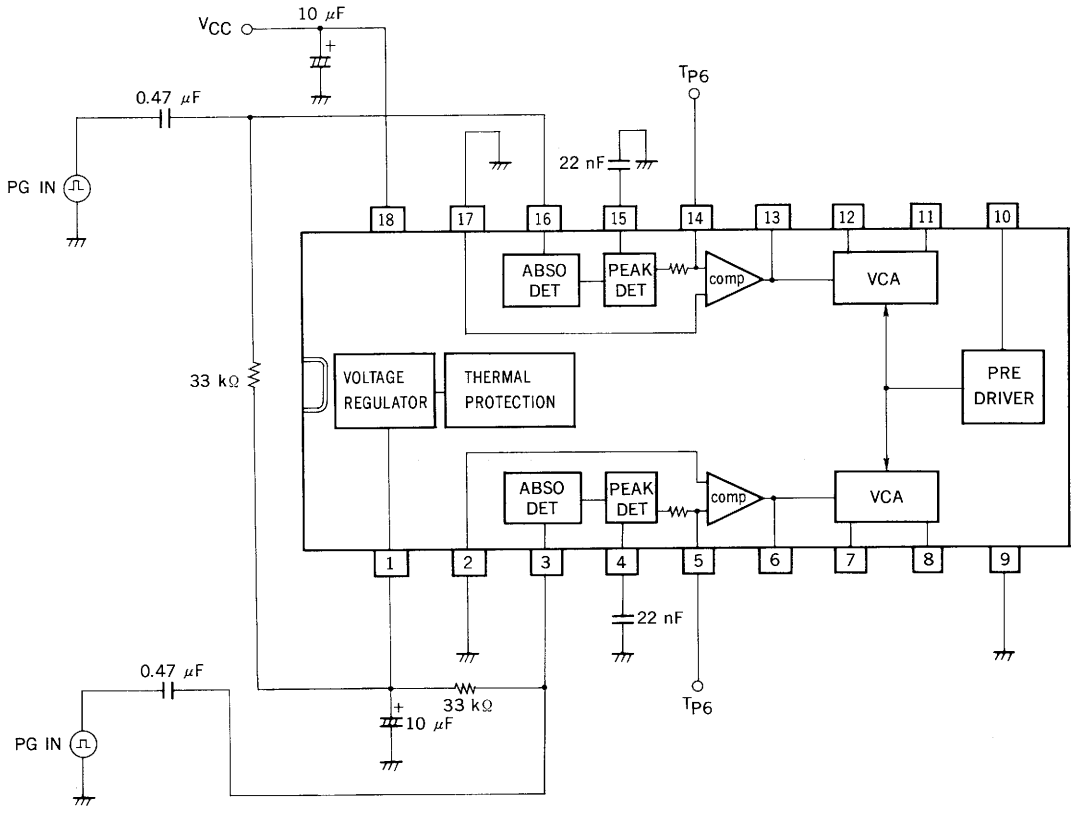
(2) T_s



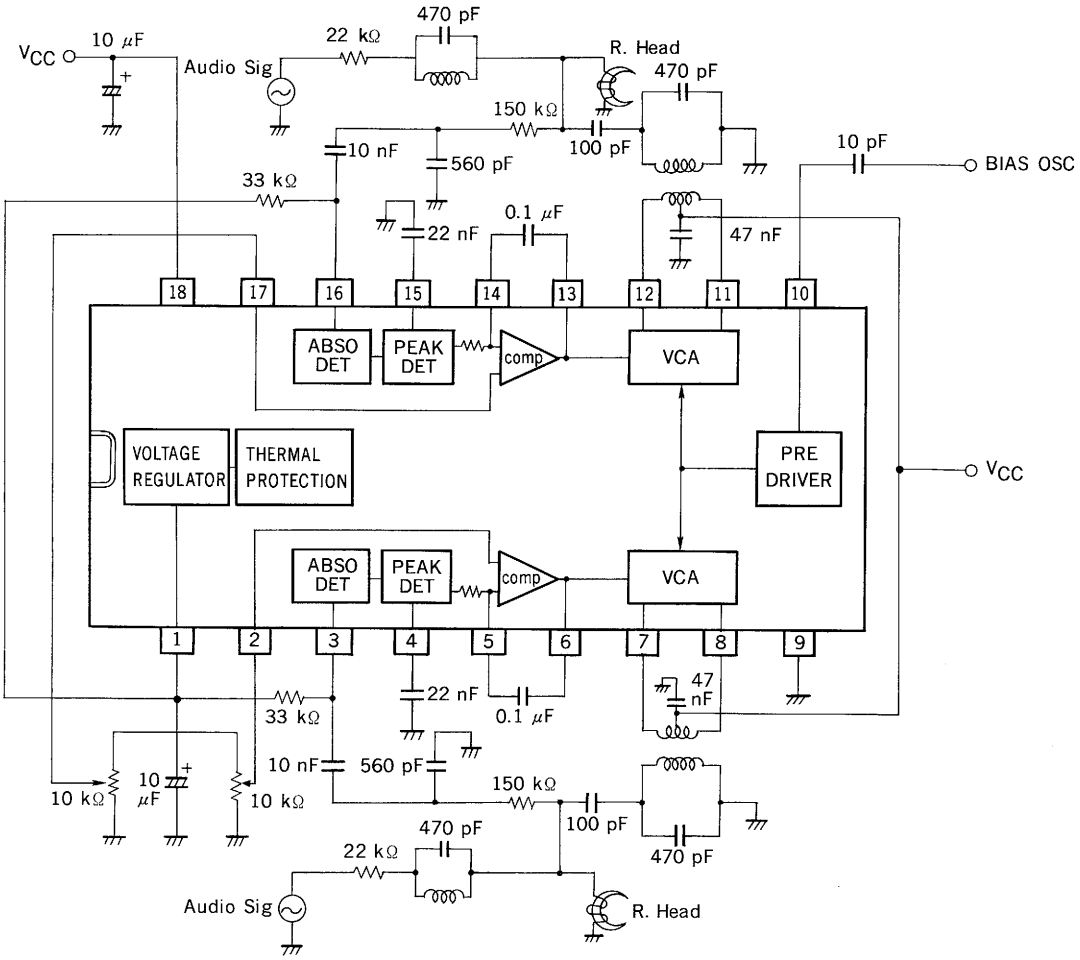
TEST CIRCUIT 1



TEST CIRCUIT 2

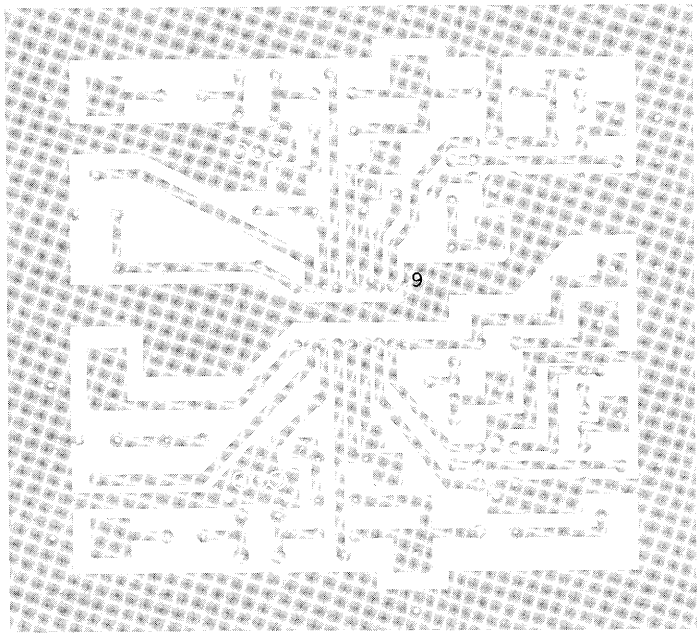


Application Circuit

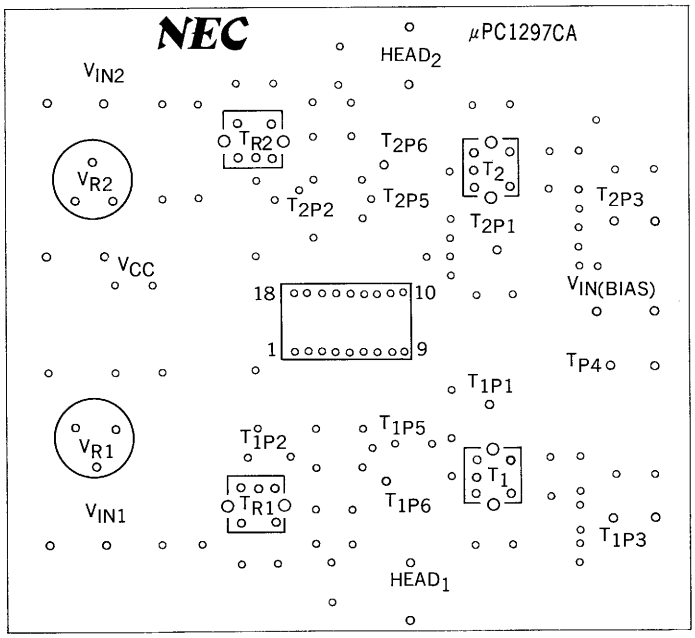


Coil (TOKO, INC)
126ANS-6750ACM

PRINTED CIRCUIT BOARD (Copper foil side)

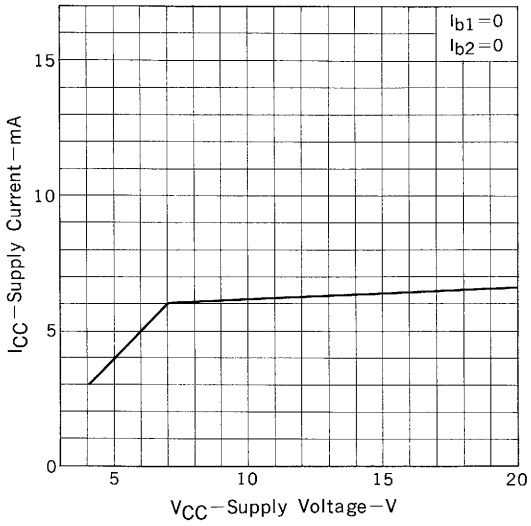


COMPONENT LAYOUT (Component layout side)

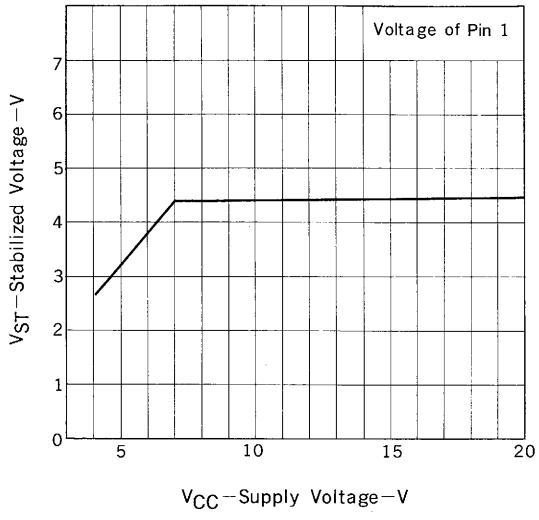


TYPICAL CHARACTERISTICS

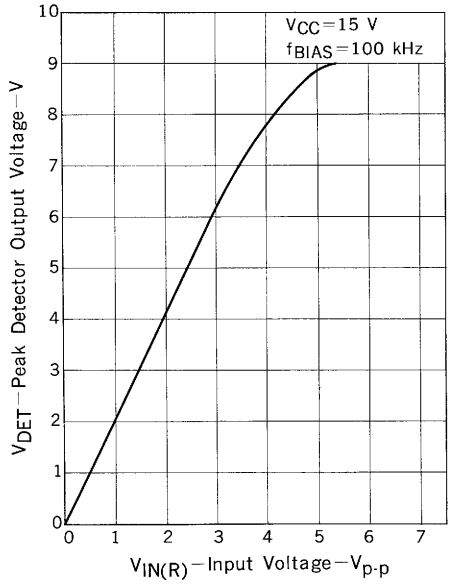
I_{CC} vs. V_{CC}



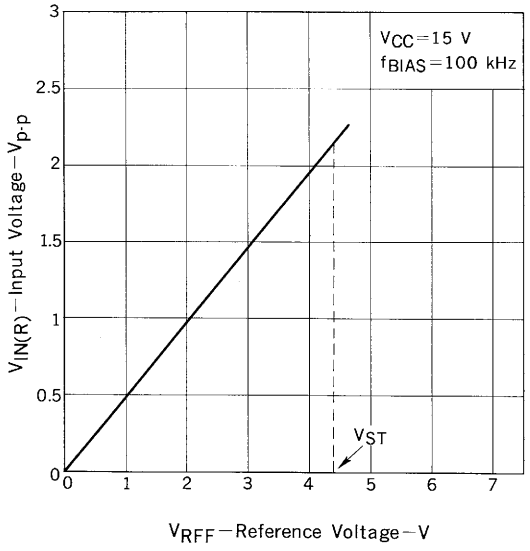
V_{ST} vs. V_{CC}



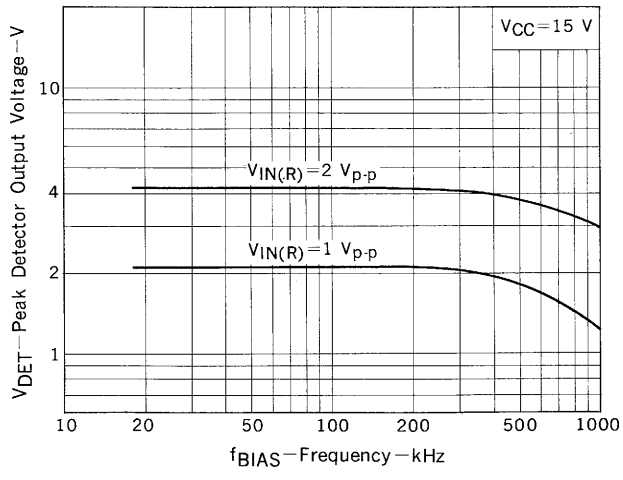
V_{DET} vs. $V_{IN(R)}$



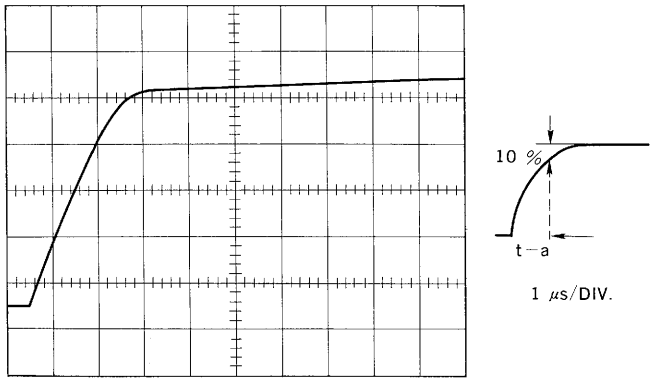
$V_{IN(R)}$ vs. V_{REF}



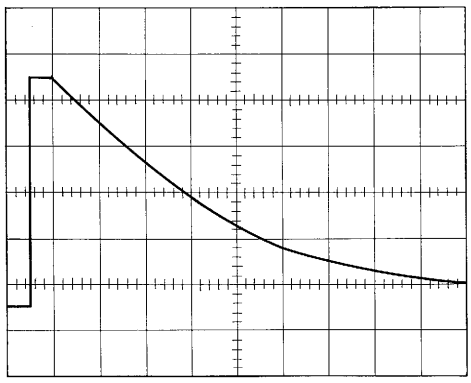
V_{DET} vs. f_{BIAS}

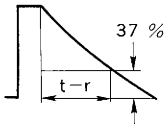


ATTACK TIME t-a



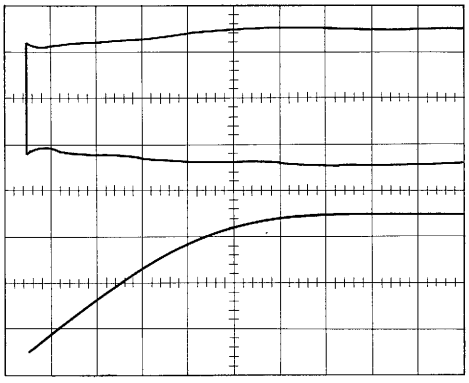
RELEASE TIME t-r

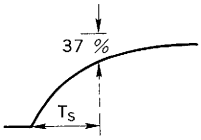




0.2 ms/DIV.

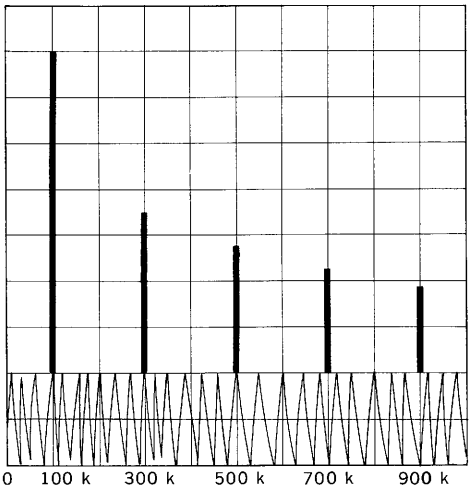
STEP RESPONCE T_s





0.5 ms/DIV.

2ND HARMONIC DISTORTION



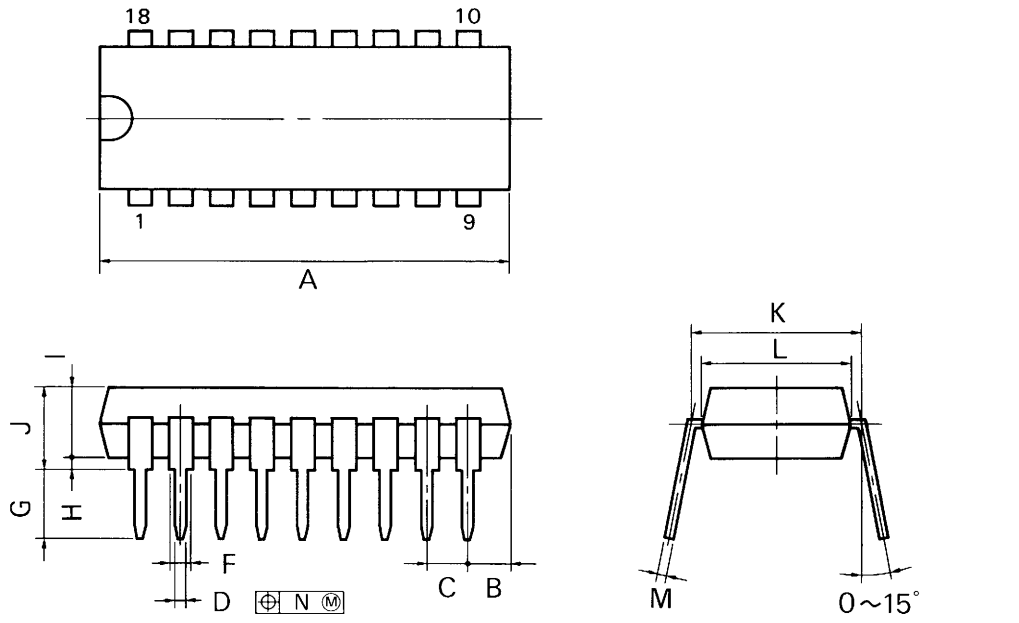
RBW=300 Hz
VBW=300 Hz
10 dB/DIV.

f—Frequency—Hz

Note for use

- μPC1297 was designed with the help of Bang and Olufsen and Dolby Laboratories Licensing Corporation.
- If you plan to use the μPC1297 for applications other than Dolby HX PRO, please inform NEC as soon as possible.
- NEC cannot assume any responsibility for any circuits shown or represent that are free from patent infrigement.

18PIN PLASTIC SHRINK DIP (300 mil)



P18C-70-300B

NOTES

1) Each lead centerline is located within 0.17 mm (0.007 inch) of its true position (T.P.) at maximum material condition.

2) Item "K" to center of leads when formed parallel.

ITEM	MILLIMETERS	INCHES
A	19.57 MAX.	0.771 MAX.
B	2.67 MAX.	0.106 MAX.
C	1.778 (T.P.)	0.070 (T.P.)
D	$0.50^{+0.10}$	$0.020^{+0.004}_{-0.005}$
F	0.85 MIN.	0.033 MIN.
G	$3.2^{\pm 0.3}$	$0.126^{\pm 0.012}$
H	0.51 MIN.	0.020 MIN.
I	4.31 MAX.	0.170 MAX.
J	5.08 MAX.	0.200 MAX.
K	7.62 (T.P.)	0.300 (T.P.)
L	6.5	0.256
M	$0.25^{+0.10}_{-0.05}$	$0.010^{+0.004}_{-0.003}$
N	0.17	0.007

★ RECOMMENDED SOLDERING CONDITIONS

The following conditions (see table below) must be met when soldering this product.

For more details, refer to our document **"SEMICONDUCTOR DEVICE MOUNTING TECHNOLOGY MANUAL" (IEI-1207)**.

Please consult with our sales offices in case other soldering process is used, or in case soldering is done under different conditions.

Type of Through Hole Device

μPC1297CA: 18 pin plastic shrink DIP (300 mil)

Soldering Process	Soldering Conditions
Wave Soldering (For leads only)	Solder temperature: 260 °C or lower. Flow time: 10 seconds or less.
Partial Heating Method	Pin temperature: 260 °C or lower. Time: 10 seconds or less.

Caution: Do not jet molten solder on the surface of package.

[MEMO]

[MEMO]

The application circuits and their parameters are for references only and are not intended for use in actual design-in's.

M4 92.6