NEC
ELECTRON DEVICE

BIPOLAR ANALOG INTEGRATED CIRCUIT
μPC1298V

50 to 80 W POWER AMPLIFIER DRIVER

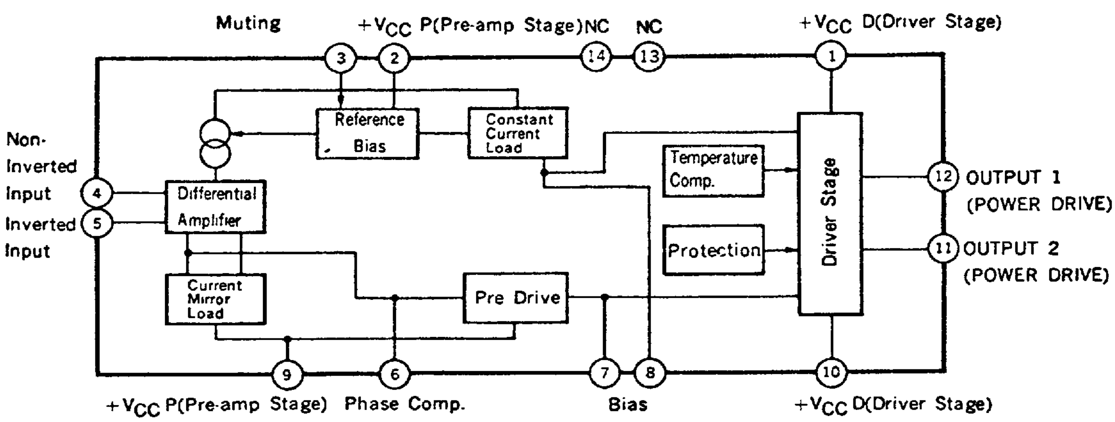
DESCRIPTION

μPC1298V is a integrated monolithic circuit designed for 50 W to 80 W class HiFi audio power amplifier and consists of a input differential amplifier, a predriver circuit, a driver circuit and a over current protection circuit.

FEATURES

- Low Distortion.
  0.002 % TYP. (V_{CC} = ±46 V, f = 1 kHz, A_v = 30 dB, P_O = 50 W, R_L = 8 Ω with Power Transistor)
  0.006 % TYP. (V_{CC} = ±46 V, f = 20 kHz, A_v = 30 dB, P_O = 50 W, R_L = 8 Ω with Power Transistor)
- Wide Frequency Band.
  900 kHz TYP. (–3 dB)
- Wide Power Band Width.
  90 kHz TYP. (P_O = 40 W, THD = 0.1 %)

BLOCK DIAGRAM



NOTE: The built-in over current circuit protects μPC1298V and cannot protect external power transistors.

NEC cannot assume any responsibility for any circuits shown or represent that they are free from patent infringement.

ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

Supply Voltage (Quiescent)	V_{CC1}	±65	V
Supply Voltage (Operational)	V_{CC2}	±60	V
Circuit Current	$I_{CC(peak)}$	250	mA
Allowable Package Dissipation	P_D	7.5*	W
Operational Temperature	T_{opt}	–20 to +75	°C
Storage Temperature	T_{stg}	–40 to +150	°C

* 100 x 100 x 2 mm Al heat sink

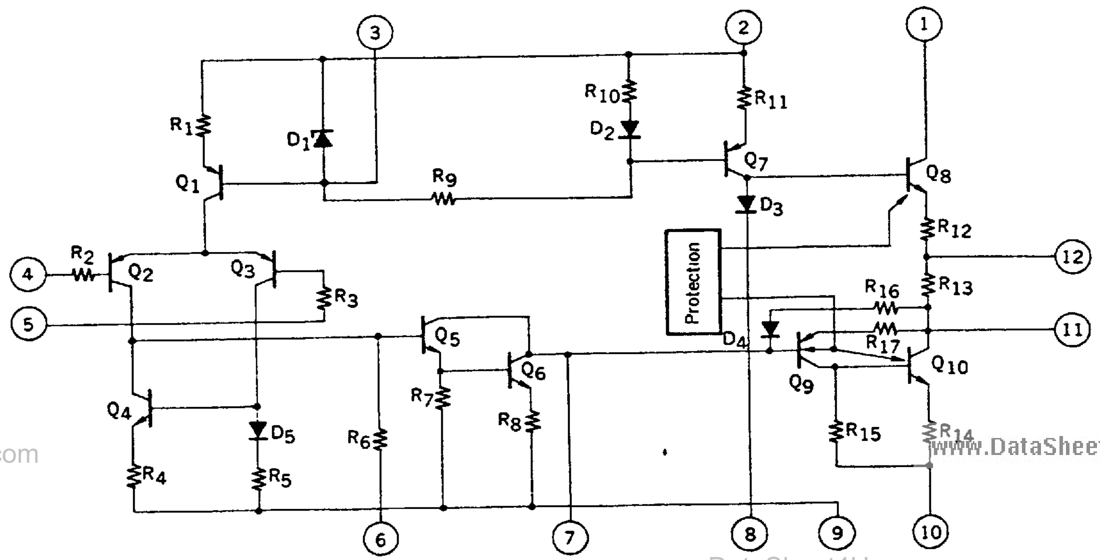
RECOMMENDED OPERATING CONDITION

Supply Voltage (Operational)	V_{CC} = ±20 to ±46 V
Input Bias Resistance	R_{IN} = 1 to 50 to 100 kΩ
Power Transistor h_{FE}	$h_{FE} \geqq 50$ at P_O = 80 W, R_L = 8 Ω, $T_j < 125$ °C
Closed Loop Voltage Gain	A_v = 26 to 30 dB
Junction Temperature	T_j = –20 to 125 °C

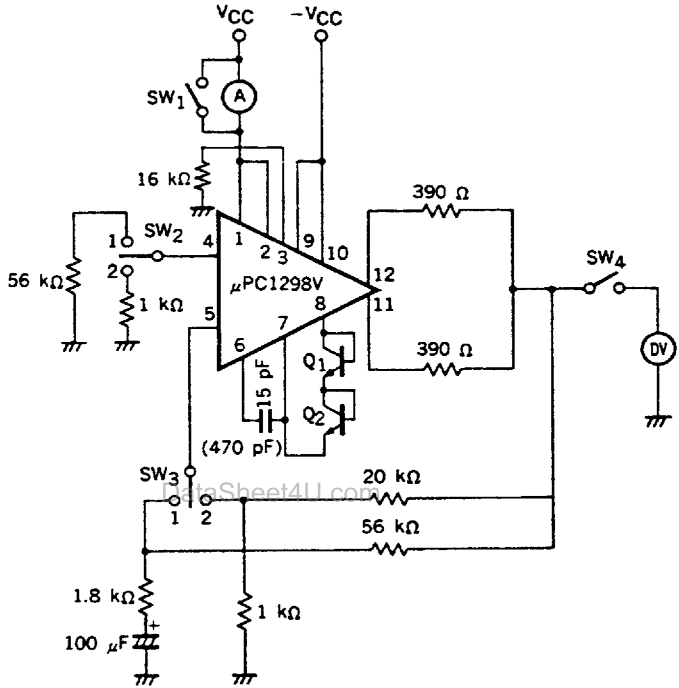
ELECTRICAL CHARACTERISTICS (V_{CC} = ±46 V, A_v = 30 dB, Use Standard Test Circuit, T_a = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITION
Output Offset Voltage	V_{offset}		±5	±50	mV	V_{IN} = 0
Quiescent Circuit Current	I_{CC}		20	40	mA	V_{IN} = 0
Maximum Output Voltage	V_{OM}	25	28		V	THD = 0.05 %, f = 20 Hz to 20 kHz
Open Loop Voltage Gain	A_{vo}	80	95		dB	V_o = 1.5 V, f = 1 kHz
Output Noise Voltage	V_n		0.07	0.14	mV	R_G = 10 kΩ
Rolloff Frequency	f_H		900		kHz	V_o = 1.5 V, –3 dB
Supply Voltage Rejection Ratio	SVR	55	70		dB	R_G = 2.2 kΩ, f_{ripple} = 100 Hz, v_{ripple} = 1 $V_{r.m.s.}$

EQUIVALENT CIRCUIT



TEST CIRCUIT 1 (I_{CC}, V_{OFF})

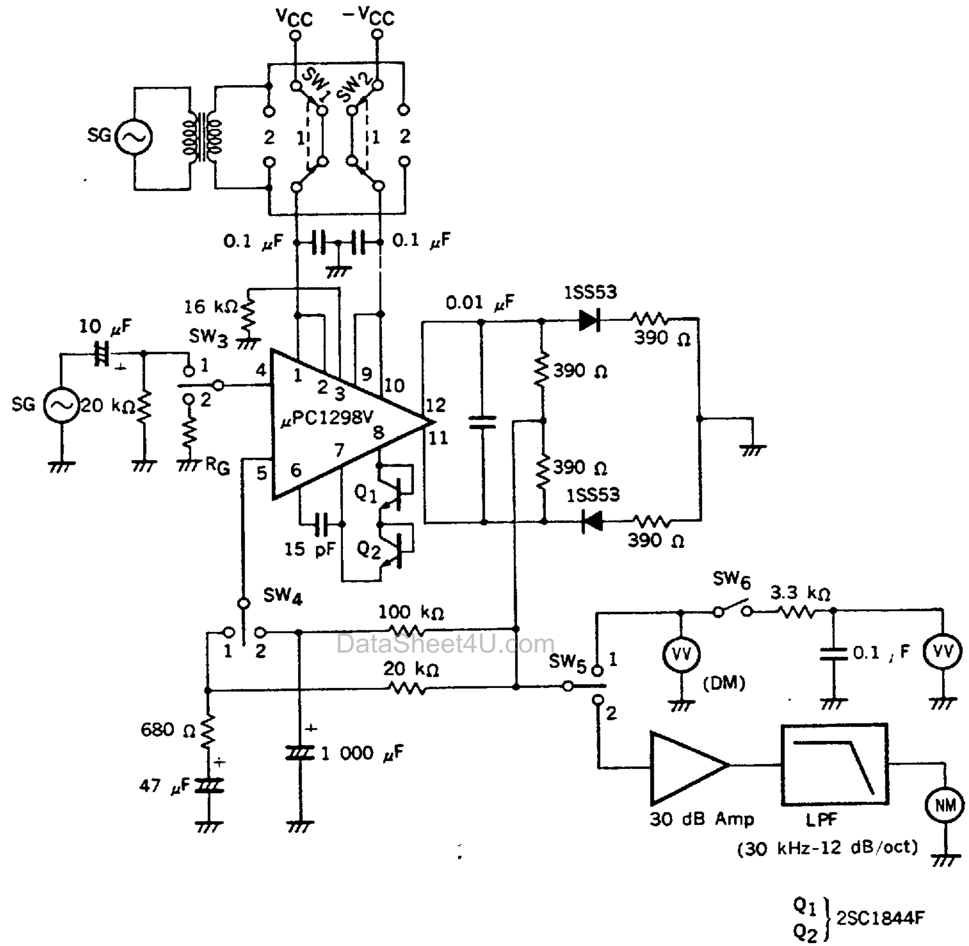


Q_1, Q_2 } 2SC1844F

SWITCH POSITION

	SW_1	SW_2	SW_3	SW_4
I_{CC}	OFF	2	2	OFF
V_{OFF}	ON	1	1	ON

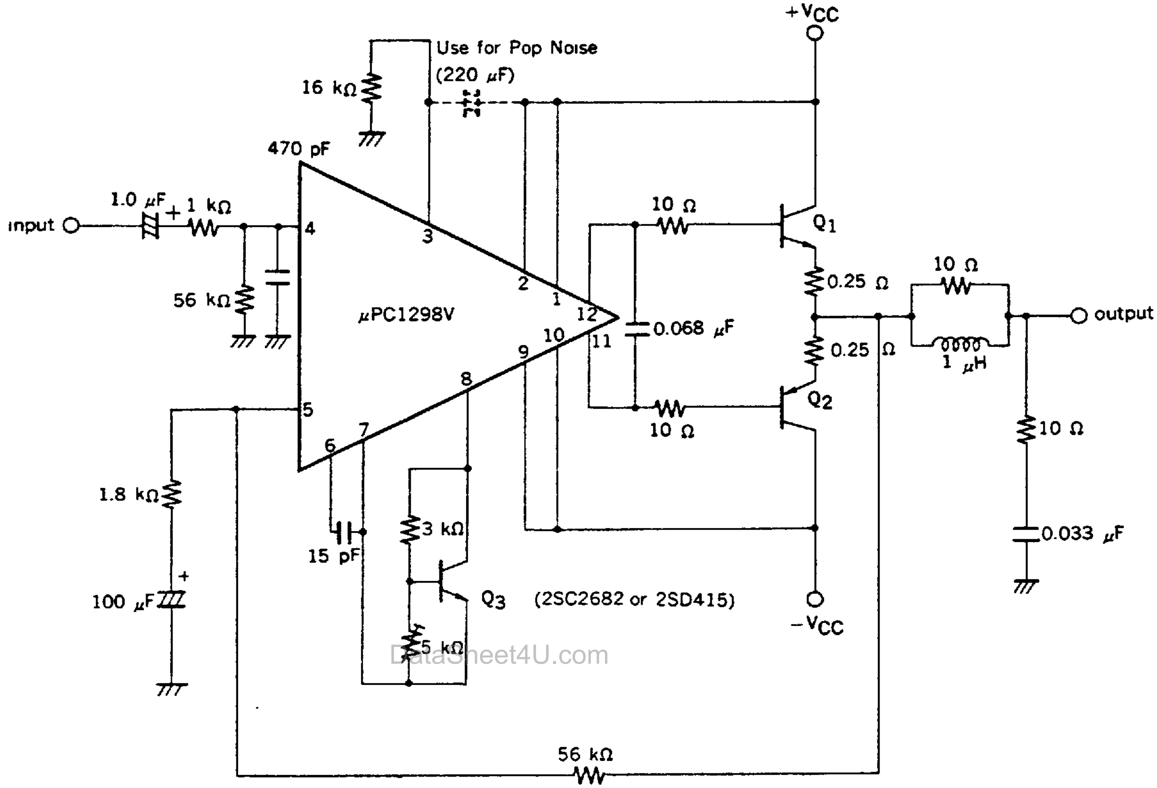
TEST CIRCUIT 2 (V_{OM}, A_{υ}, $A_{\upsilon O}$, V_{NO}, SVR, PBW)



SWITCH POSITION

	SW1	SW2	SW3	SW4	SW5	SW6
V_{OM}	1	1	1	1	1	OFF
A_{υ}	1	1	1	1	1	OFF
$A_{\upsilon O}$	1	1	1	2	1	OFF
V_{NO}	1	1	2	1	2	OFF
SVR	2/1	1/2	2	1	1	ON
PBW	1	1	1	1	1	OFF

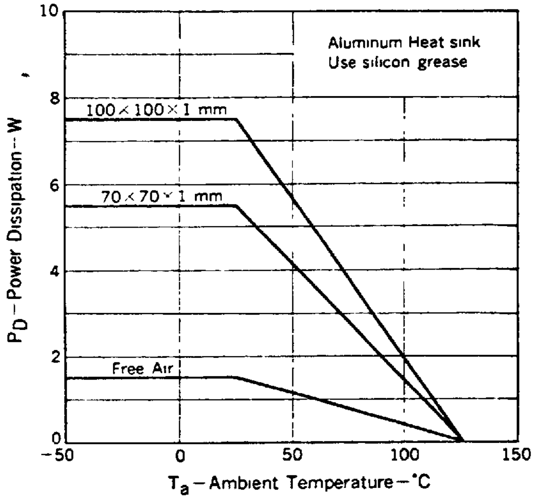
APPLICATION CIRCUIT



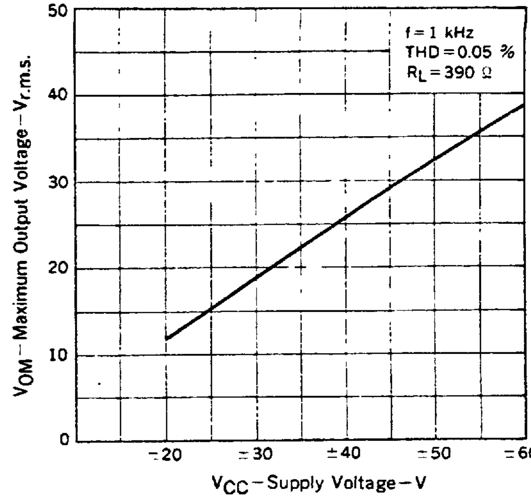
RECOMMENDED POWER TRANSISTOR

P_O	25 to 40 W	45 to 55 W	50 to 70 W	70 to 80 W
Q_1	2SD1288 2SD2013	2SD1289 2SD1977	2SC3012 2SC4267	2SC2987 2SC2987A 2SC4268
Q_2	2SB965 2SB1336	2SB966 2SB1315	2SA1232 2SA1631	2SA1227 2SA1227A 2SA1632

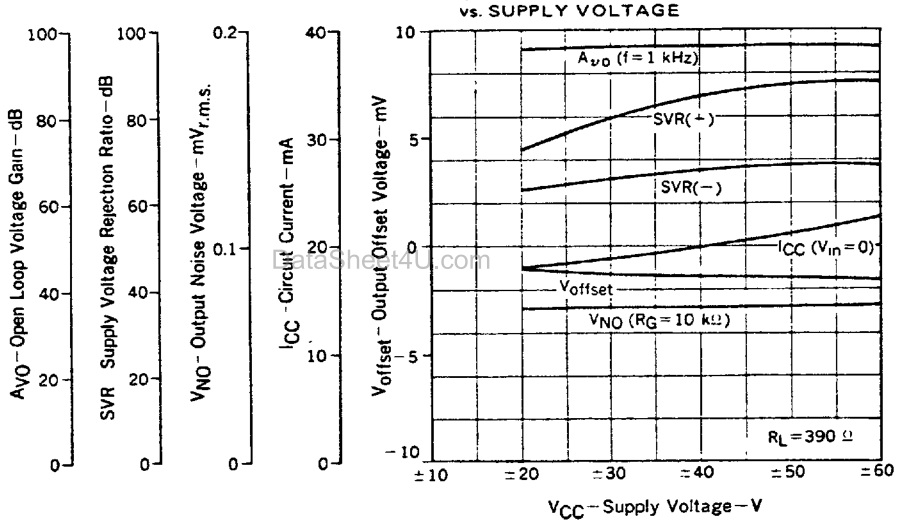
POWER DISSIPATION vs.
AMBIENT TEMPERATURE



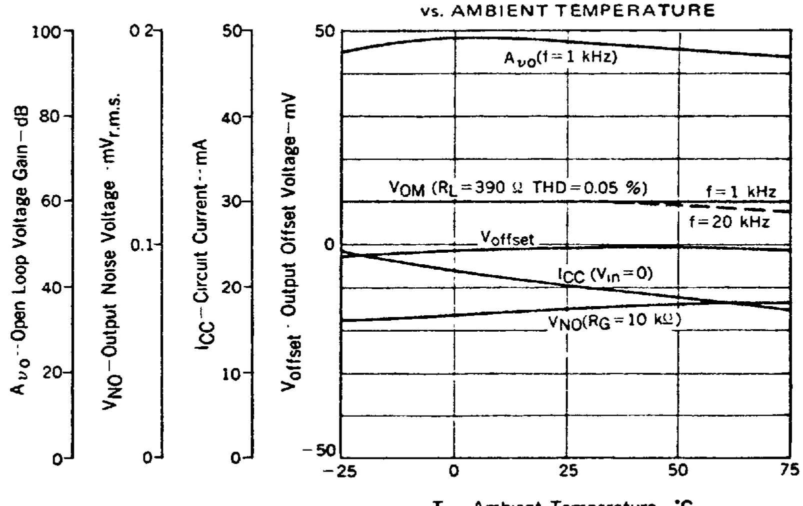
MAXIMUM OUTPUT VOLTAGE
vs. SUPPLY VOLTAGE



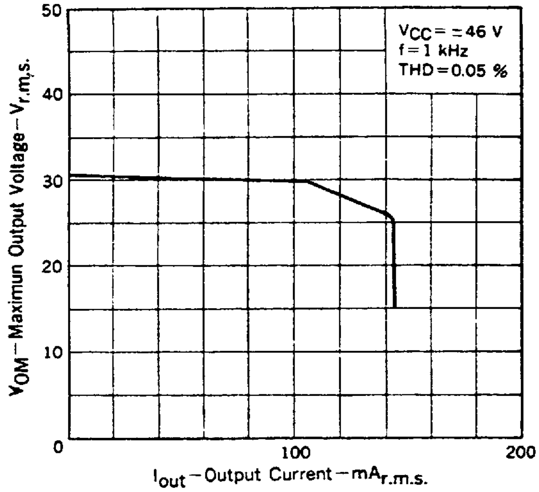
OPEN LOOP VOLTAGE GAIN,
SUPPLY VOLTAGE REJECTION RATIO,
OUTPUT NOISE VOLTAGE,
CIRCUIT CURRENT,
OUTPUT OFFSET VOLTAGE
vs. SUPPLY VOLTAGE



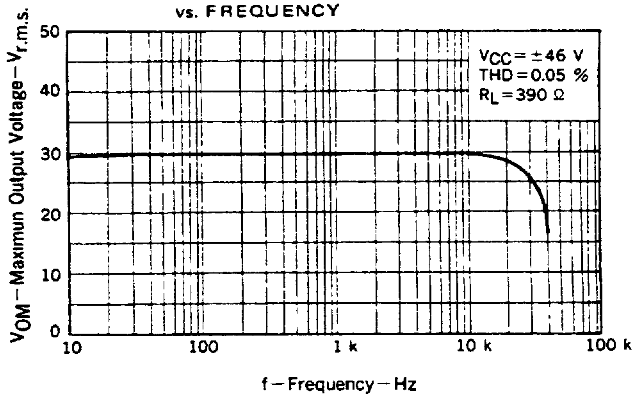
OPEN LOOP VOLTAGE GAIN,
OUTPUT NOISE VOLTAGE,
CIRCUIT CURRENT,
OUTPUT OFFSET VOLTAGE
vs. AMBIENT TEMPERATURE



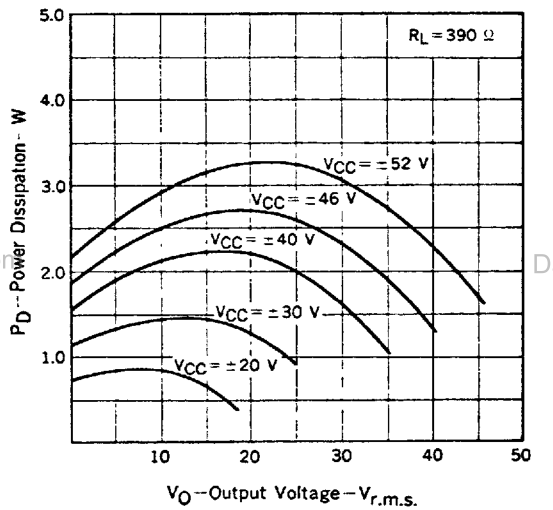
MAXIMUM OUTPUT VOLTAGE vs. OUTPUT CURRENT



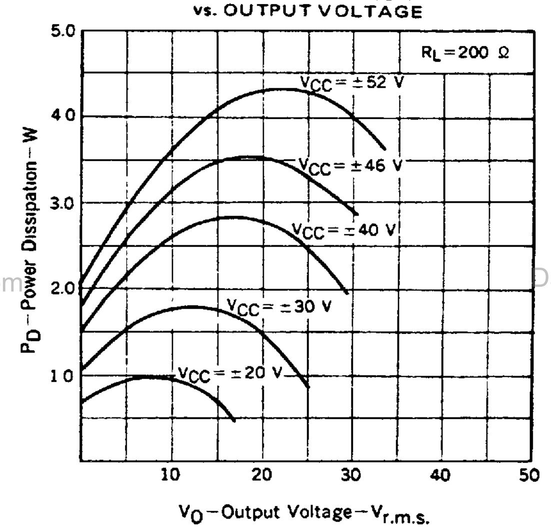
MAXIMUM OUTPUT VOLTAGE vs. FREQUENCY



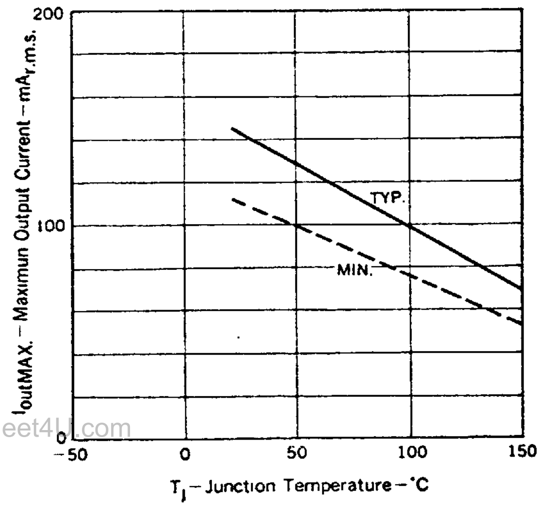
POWER DISSIPATION vs. OUTPUT VOLTAGE



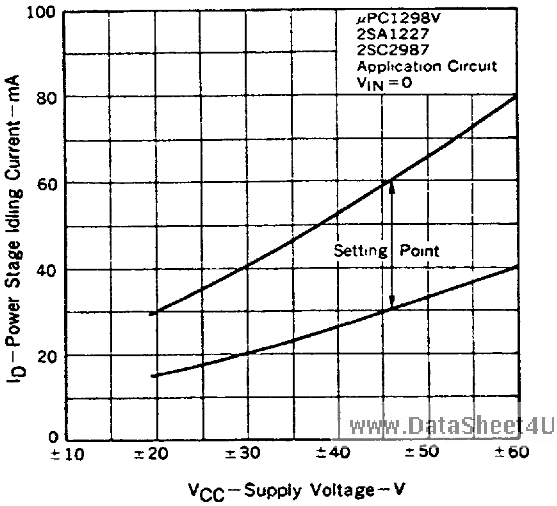
POWER DISSIPATION vs. OUTPUT VOLTAGE



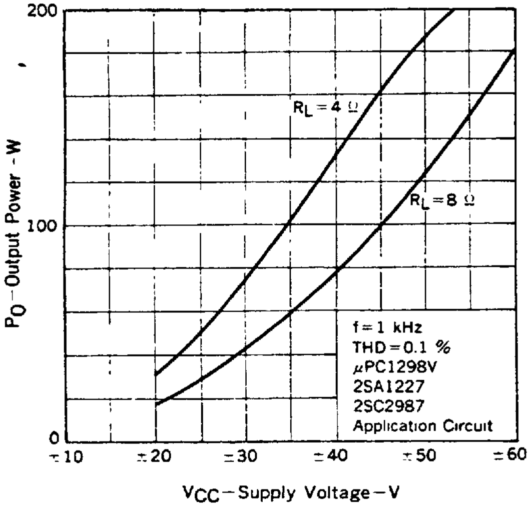
MAXIMUM OUTPUT CURRENT vs. JUNCTION TEMPERATURE



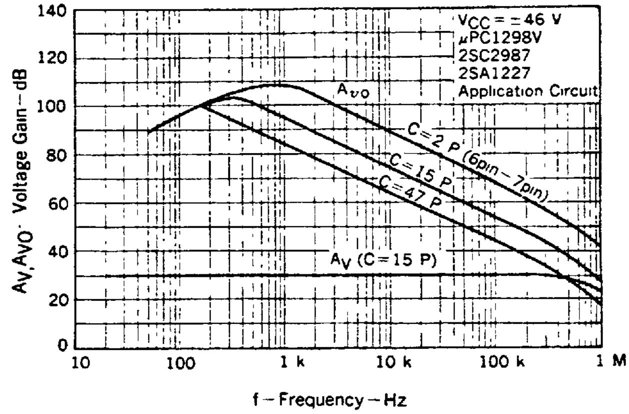
POWER STAGE IDLING CURRENT vs. SUPPLY VOLTAGE



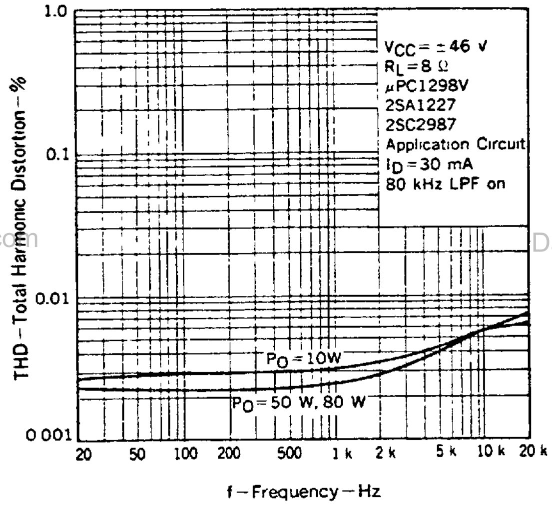
OUTPUT POWER vs. SUPPLY VOLTAGE



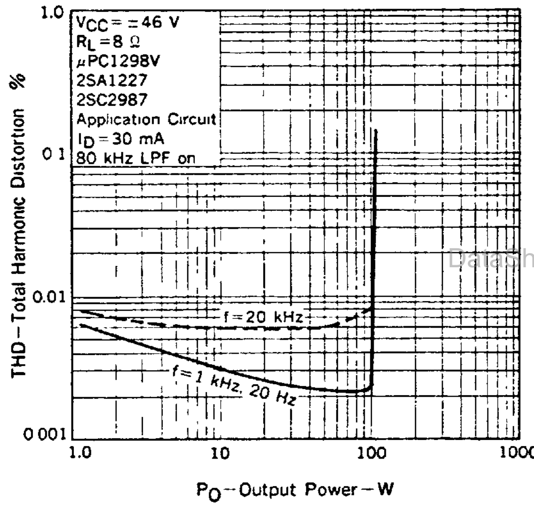
VOLTAGE GAIN vs. FREQUENCY



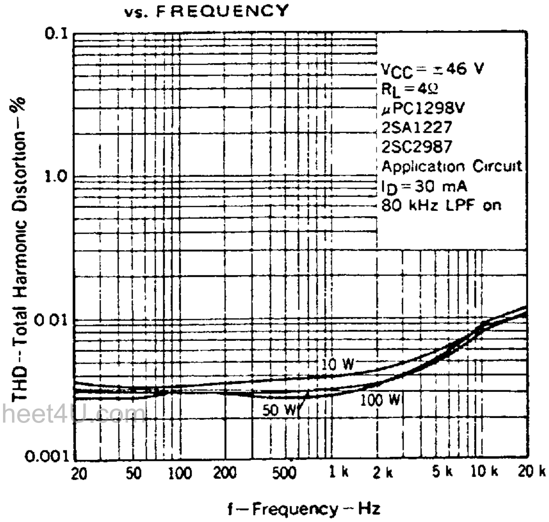
TOTAL POWER DISTORTION vs. FREQUENCY



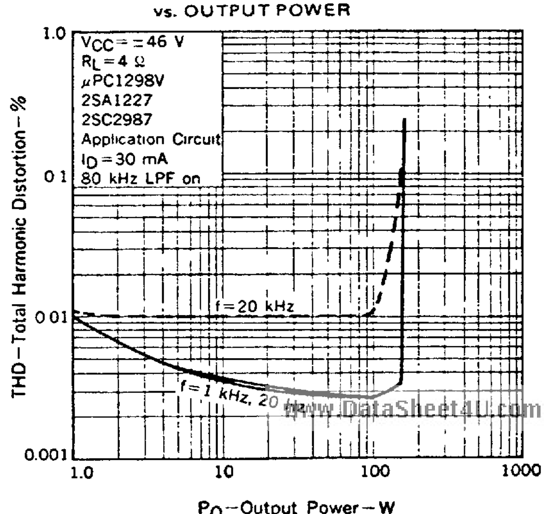
TOTAL POWER DISTORTION vs. OUTPUT POWER



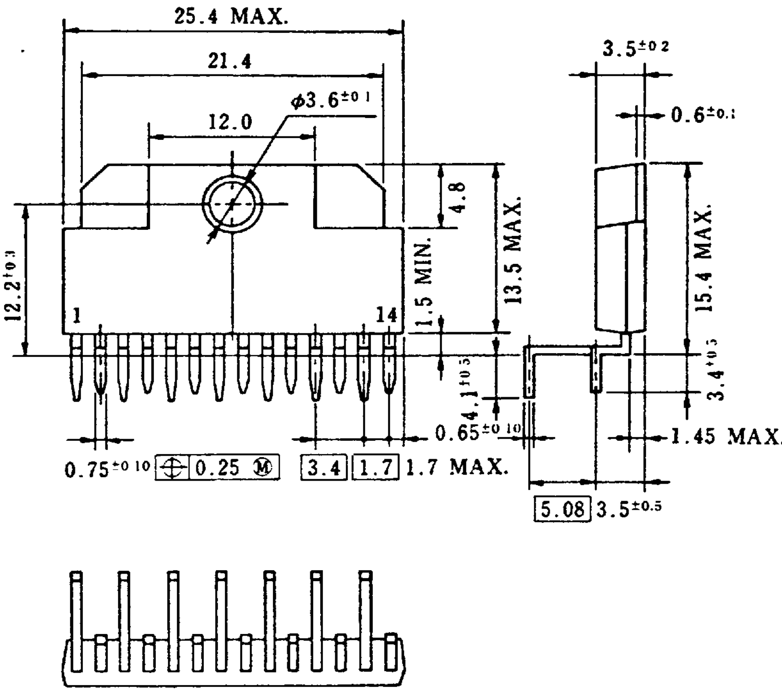
TOTAL HARMONIC DISTORTION vs. FREQUENCY



TOTAL POWER DISTORTION vs. OUTPUT POWER



PACKAGE DIMENSIONS (Unit : mm)



PIN CONNECTION DIAGRAM

PIN No.	PIN CONNECTION
1	$+V_{CCD}$ (for Driver)
2	$+V_{CCP}$ (for Preamp)
3	MUTING
4	INPUT
5	NFB
6	PHASE COMP
7	BIAS
8	BIAS
9	$-V_{CCP}$ (for Preamp)
10	$-V_{CCD}$ (for Driver)
11	LOWER OUTPUT
12	UPPER OUTPUT
13	NC
14	NC