Toshiba

INTEGRATED CIRCUIT

TECHNICAL DATA

TA7222AP

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT

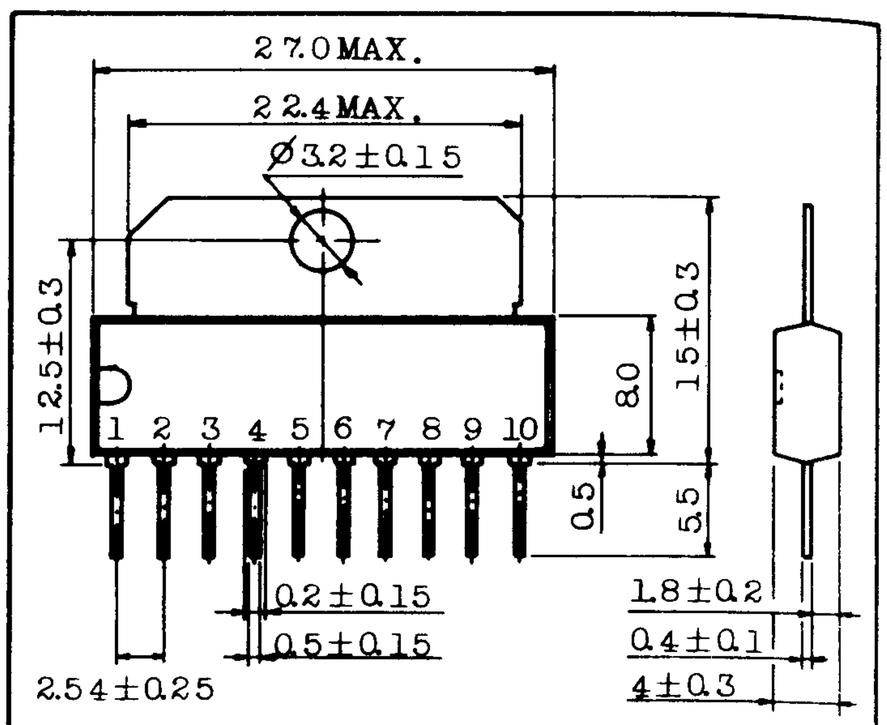
SILICON MONOLITHIC

5.8W AUDIO POWER AMPLIFIER

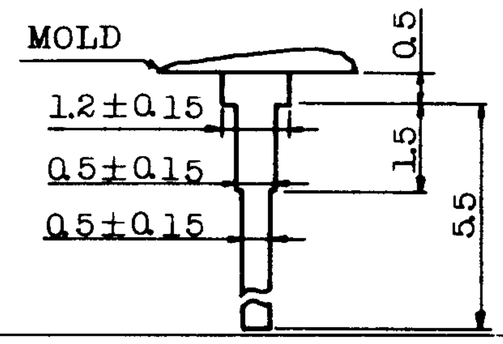
CAR STEREO CAR RADIO AUDIO OUTPUT

- Very Few External Parts (Require 4 PCS Capacitor)
- Adjustable Closed-Loop Gain
- High Sustaining Over Voltage
  (Surge voltage up to 40V for 0.2sec. pin 1 to 8)
- Excellent Ripple Rejection
- High Power and Low Distortion :
  P_{OUT}=5.8W(Typ.) at V_{CC}=13.2V, R_L=4Ω, THD=10%
  THD=0.2%(Typ.)
- Possible to Use for 2Ω Load :
  P_{OUT}=9.3W(Typ.) at V_{CC}=13.2V, THD=10%
- Operating Supply Voltage Range : V_{CC}=8～18V
- Audio Muting Circuit
- Protection Circuit (for Load Short, Excessive Supply Voltage and Thermal Shut-down)

Unit in mm



LEAD DETAIL DRAWING



JEDEC	—
TOSHIBA	5-27G

MAXIMUM RATINGS (Ta=25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Peak Supply Voltage (200ms)	V_{CC} surge	40	V
D.C Supply Voltage	V_{CC}(DC)	25	V
Operating Supply Voltage	V_{CC}(ope)	18	V
Output Current (Peak)	I_{O}(peak)	4.5	A
Power Dissipation (Tc=25°C)	P_D	12.5	W
Operating Temperature	P_{opr}	-30～75	°C
Storage Temperature	Tstg	-55～150	°C

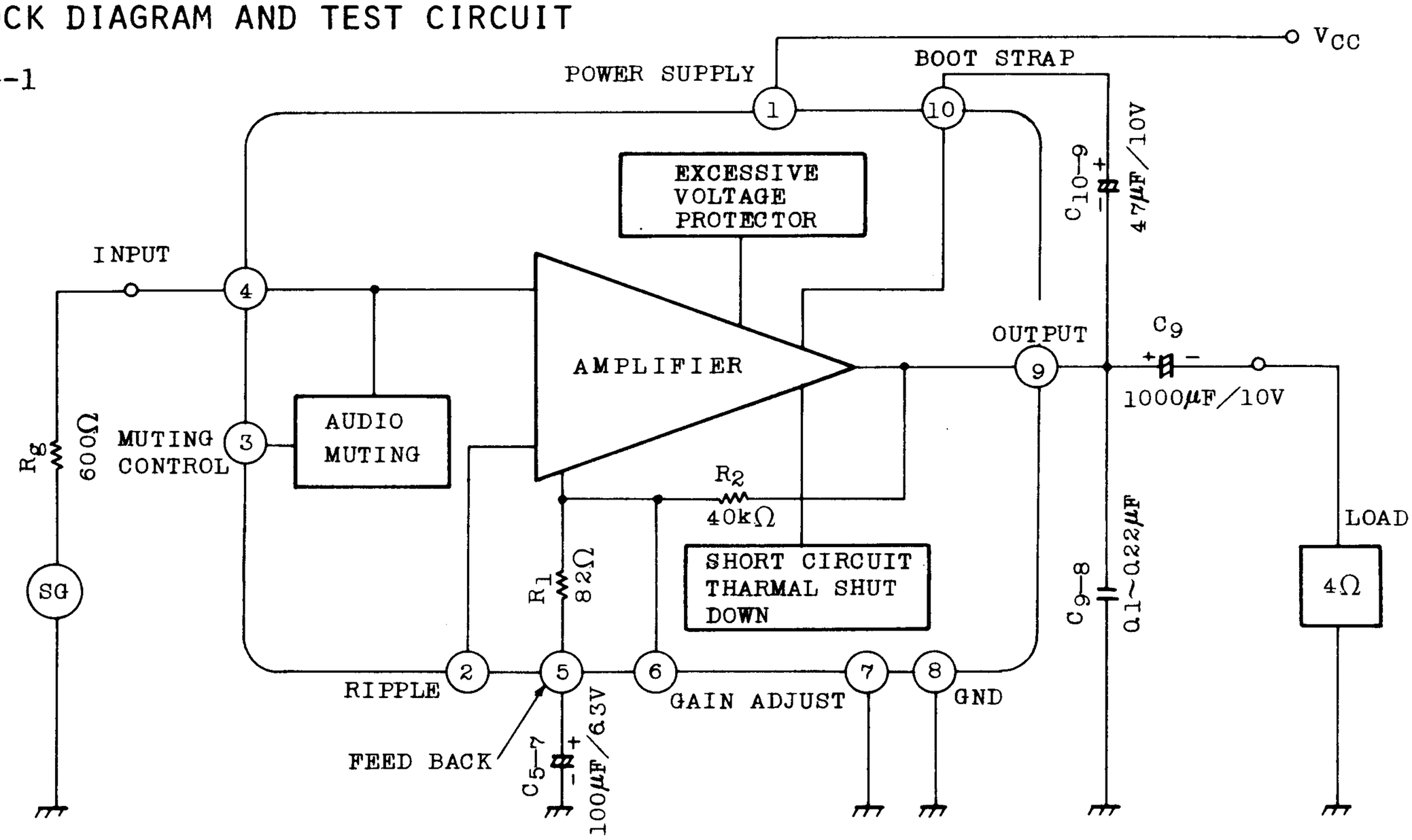
ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{CC}=12.5V, R_L=4Ω, R_g=600Ω, f=1kHz, Ta=25°C)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current	I_{CCQ}	-	-	-	40	80	mA
			V_{CC}=18V	-	45	100	
Output Power	P_{OUT}	-	THD=10%	-	5.2	-	W
			V_{CC}=13.2V, THD=10%	5.0	5.8	-	
			V_{CC}=13.2V, R_L=2Ω, THD=10%	-	9.3	-	
Maximum Output Power	P_{OM}	-	V_{CC}=13.2V, V_{IN}=100mV	-	9.0	-	W
Total Harmonic Distortion	THD	-	P_{OUT}=1W	-	0.2	1.5	%
			P_{OUT}=100mW	-	0.36	1.0	
			P_{OUT}=1W, R_L=2Ω	-	0.5	-	
Voltage Gain	G_V	-	-	51.5	53	54.5	dB
Input Resistance	R_{IN}	-	-	-	34	-	kΩ
Output Noise Voltage	V_{NO}	-	R_g=10kΩ, BW=50～20kHz	-	0.9	2.0	mV

BLOCK DIAGRAM AND TEST CIRCUIT

FIG-1



1. Terminal ⑦ is input stage GND, terminal ⑧ is output stage GND.

2. Closed-loop voltage gain of the amplifier is determined by the ratio ; $(R_1+R_2)/R_1$. TA7222AP is fixed at typically 53.0 dB for designing minimum external components.

   . When higher closed loop gain is desired, the gain can be increased by connecting a resistor between pin ⑤ and pin ⑥ . Open loop gain is obtained by shortening pin ⑤ and pin ⑥ .
   . When lower closed loop gain is desired, the following two ways can be used.
   A. Series connecting a resistor and a capacitor between pin ⑥ and pin ⑨ .
   B. Series adding a resistor to pin ⑤.

Both A and B, lower closed loop gain than 40 dB is not recommended. And also, ripple rejection ratio is decreased by using B configuration in such a case, connecting a capacitor from pin ② to ground is recommended.
(Fig.2,3,4 show these ways.)

3. For applications requiring high ripple rejection ratio, an excellent supply voltage ripple rejection is obtained by connecting a capacitor (recommended value 4.7μF) between pin ② and ground.
   (R.R-f shows these characteristics)

4. Terminal ③ is Audio Muting Control Input.
   . When control input is low state (; open or below 0.3V), muting circuit does not operate, OFF.
   . When control input is high state (; above 1.0V), muting circuit, then, operates, ON. (Refer to Fig.5)

APPLICATION CIRCUIT

HIGHER CLOSED LOOP GAIN CIRCUIT

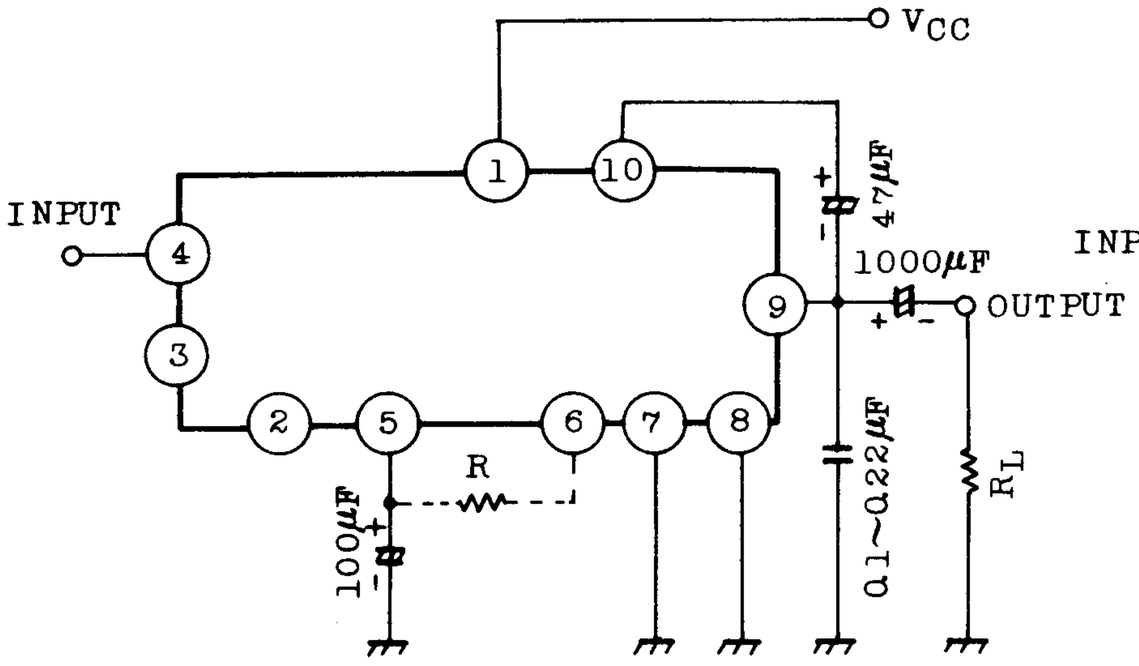


FIG-2

LOWER CLOSED LOOP GAIN CIRCUIT (A)

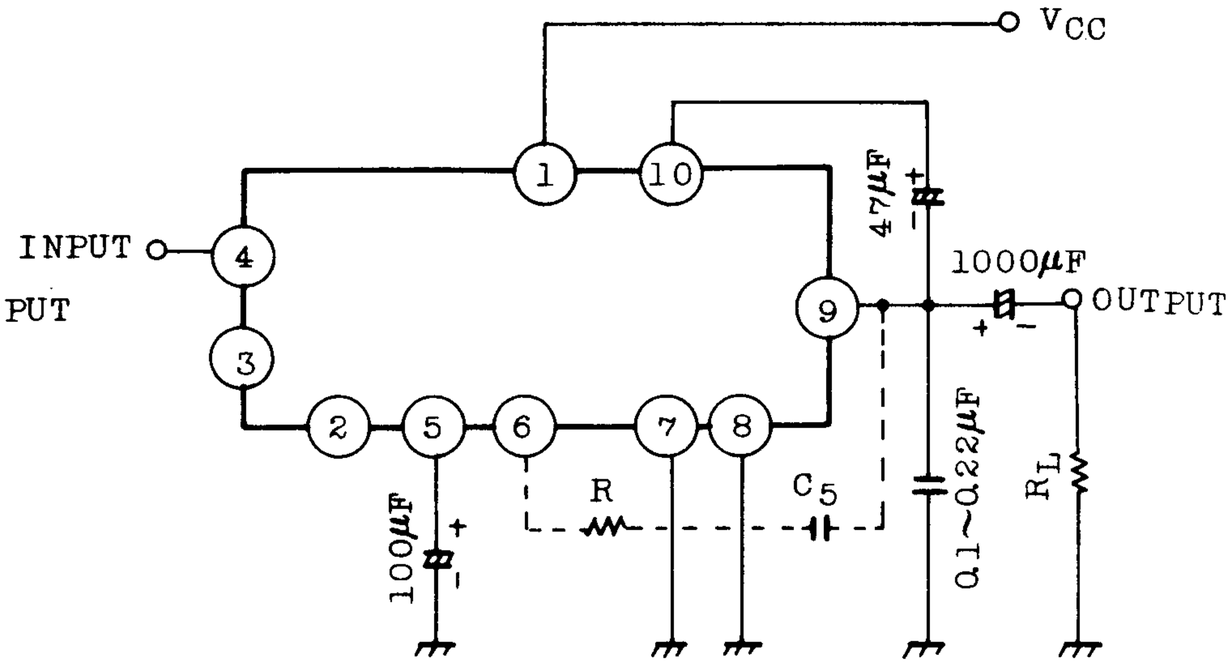
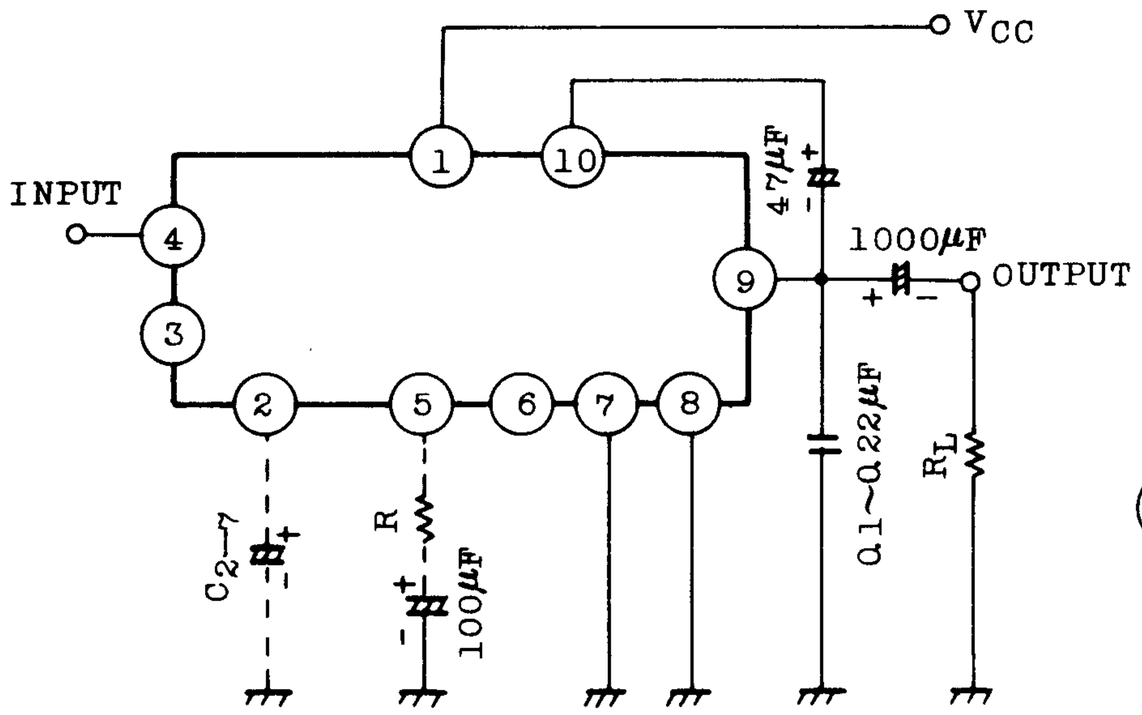


FIG-3

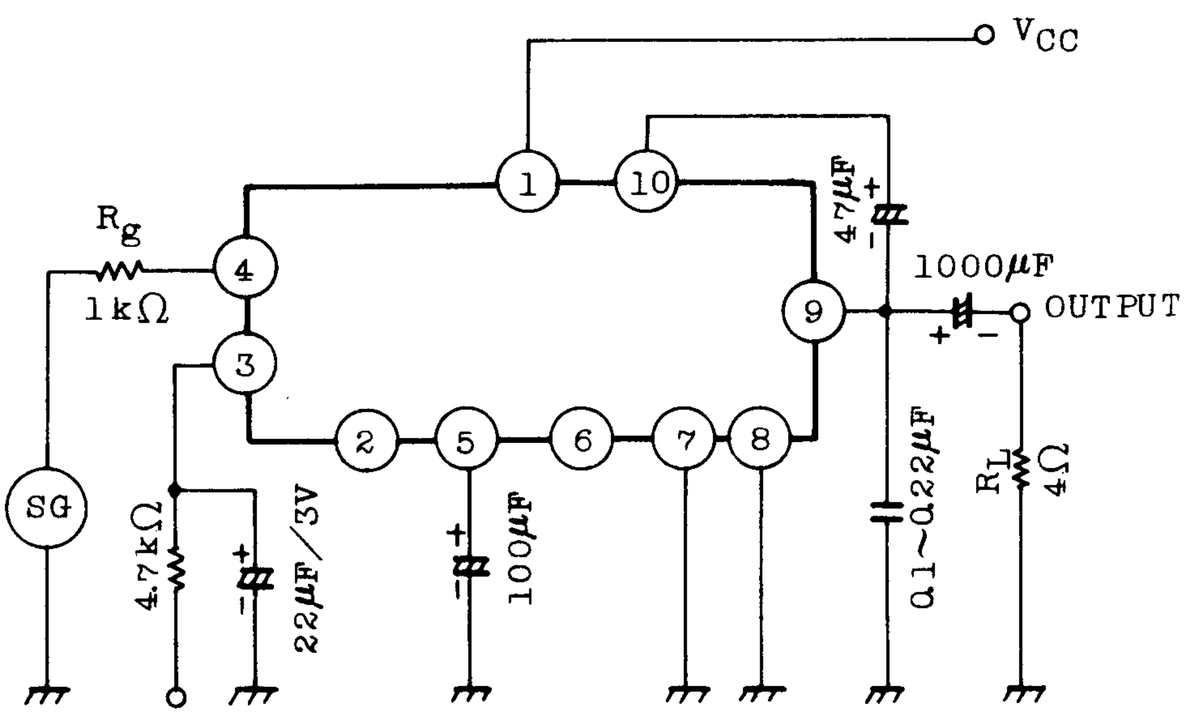
LOWER CLOSED LOOP GAIN CIRCUIT (B)



Note : Capacitor C_{2-7} must be used when high ripple rejection ratio is requested.

FIG-4

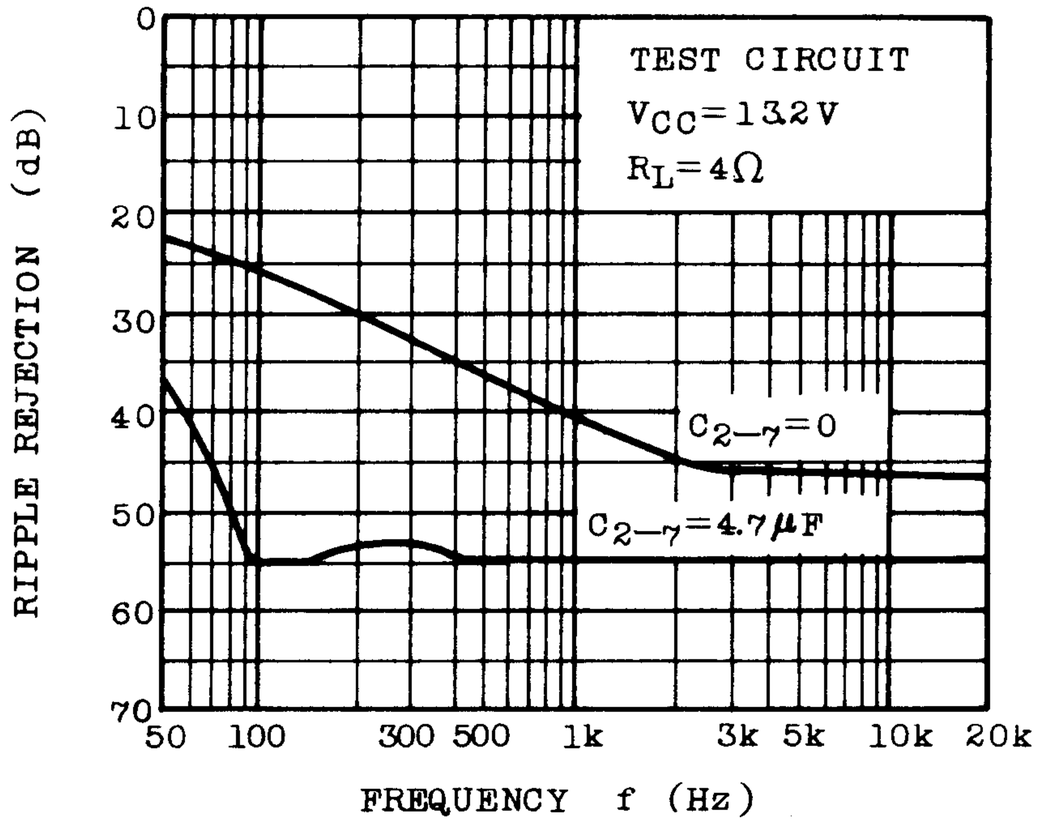
AUDIO MUTING CIRCUIT



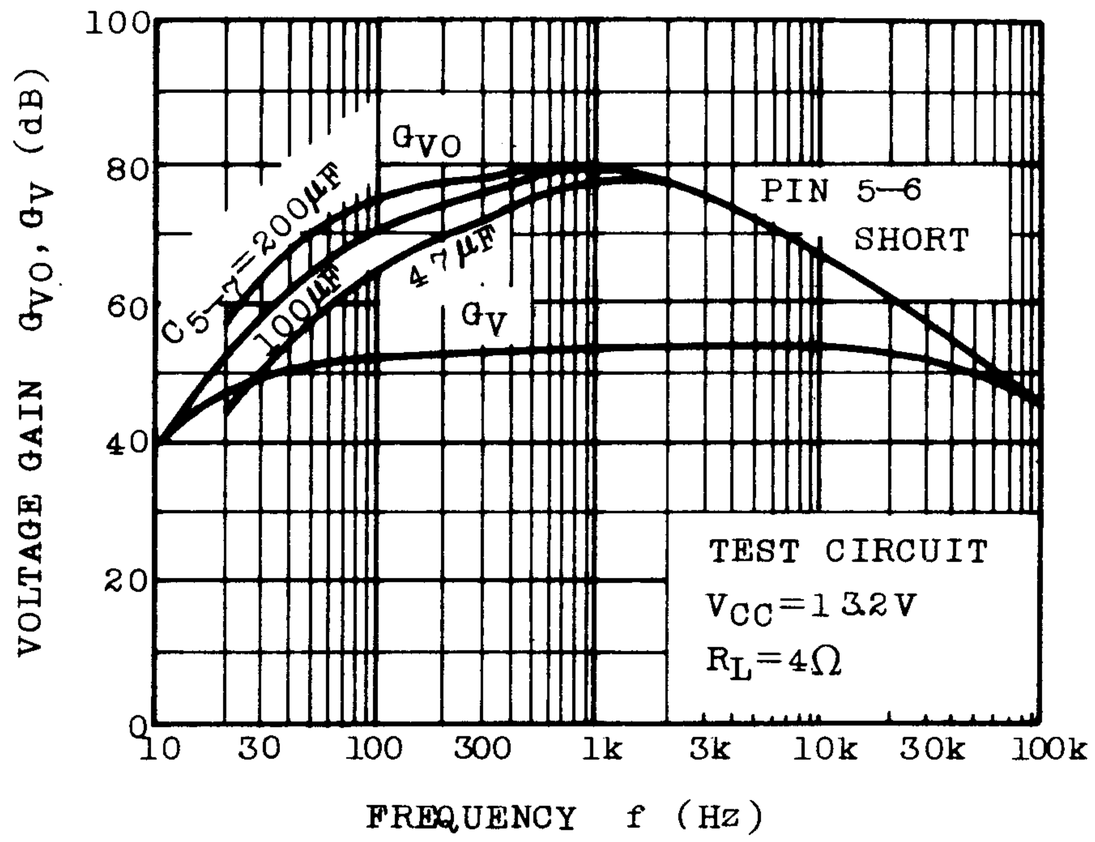
Note : Power output reduction level
-40dB at R_g=1kΩ
-35dB at R_g=0

FIG-5

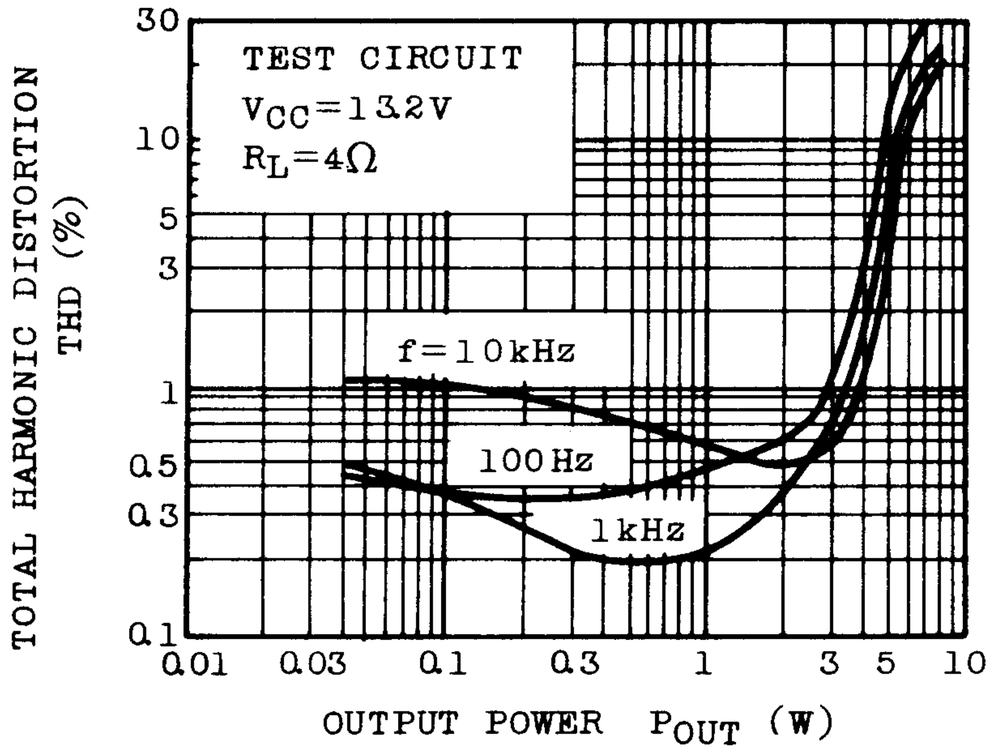
RIPPLE REJECTION — f



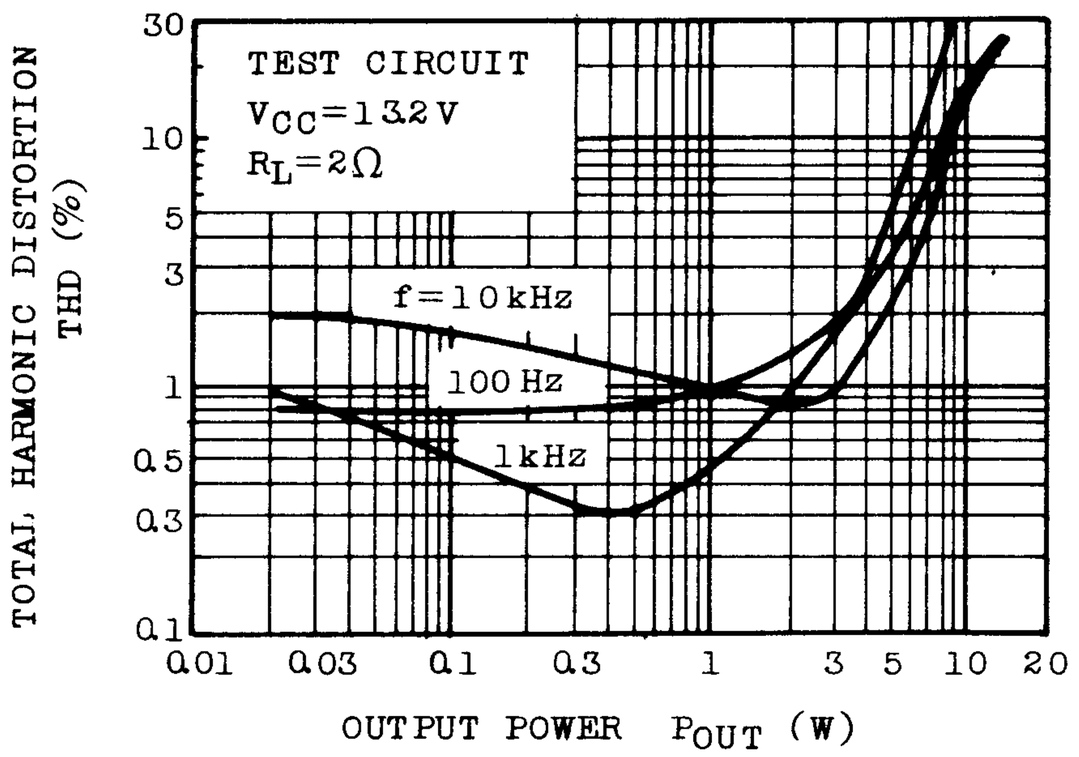
G_{VO}, G_V — f



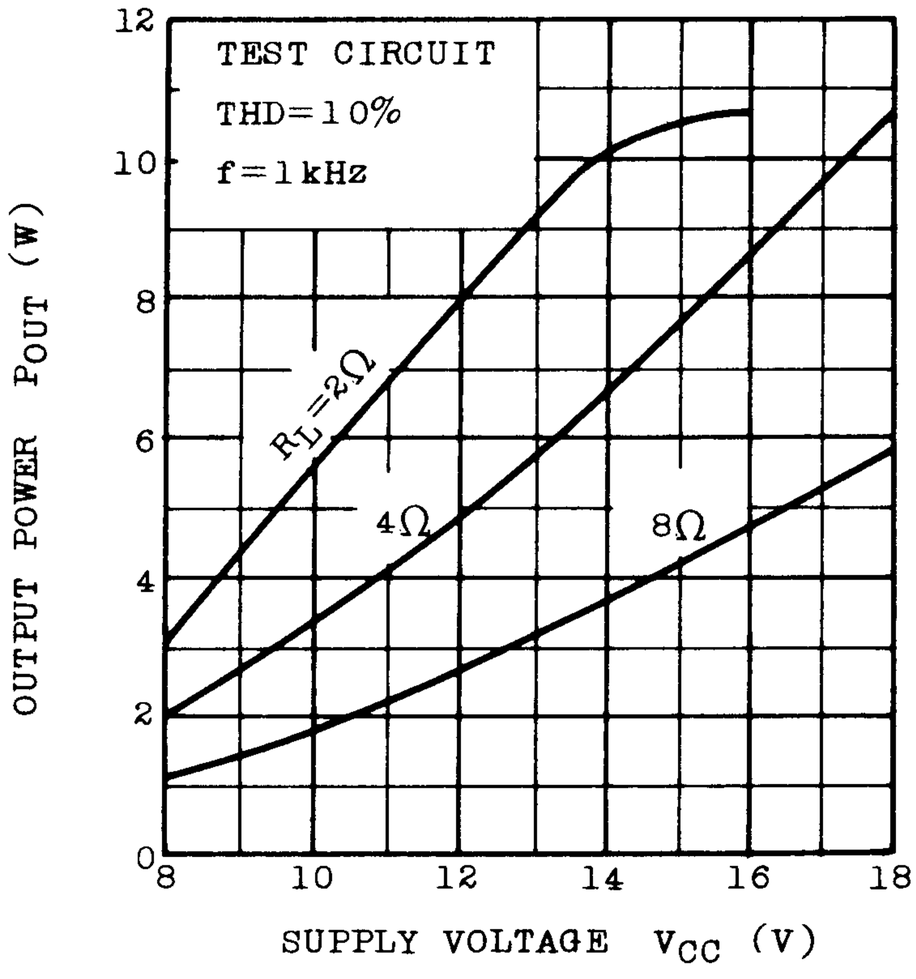
THD — P_{OUT}



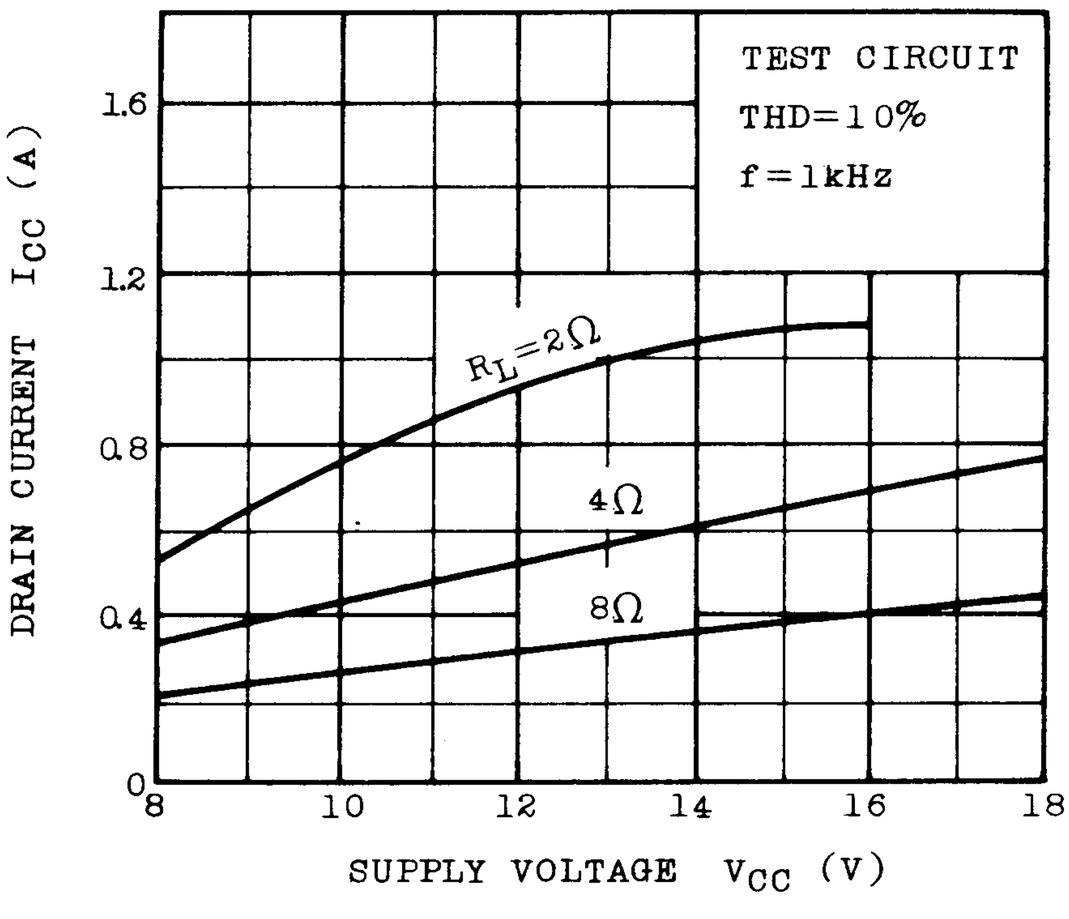
THD — P_{OUT}



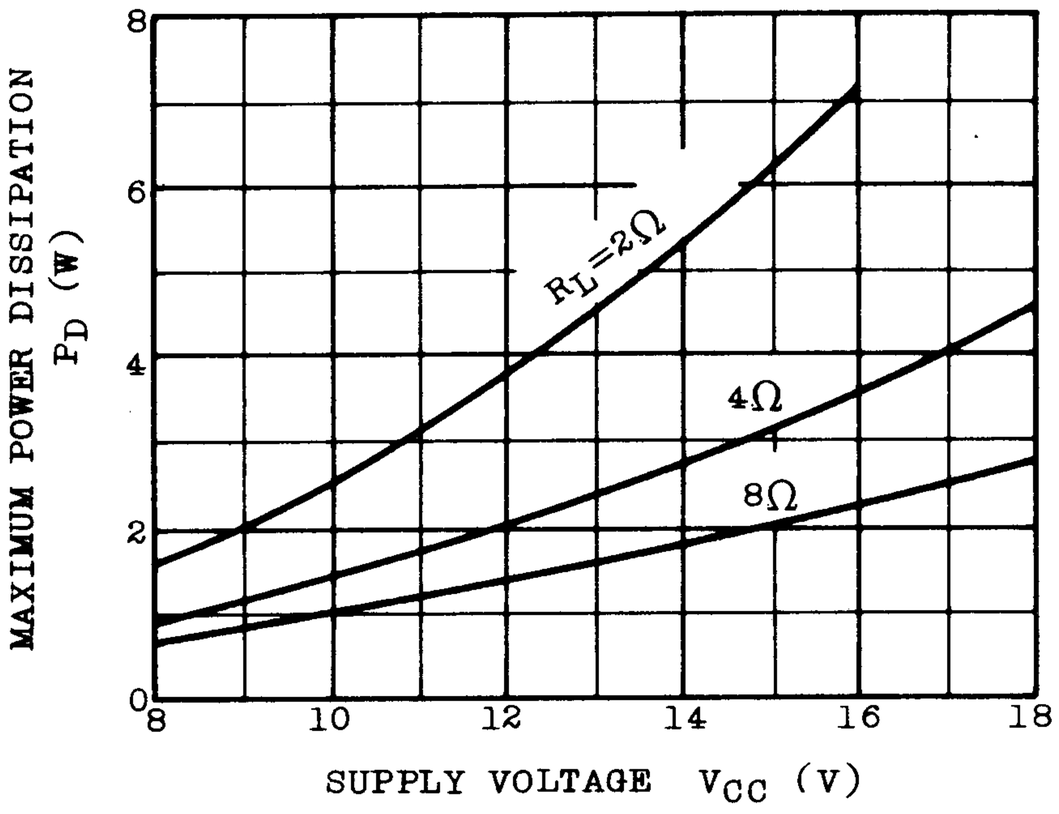
P_{OUT} — V_{CC}



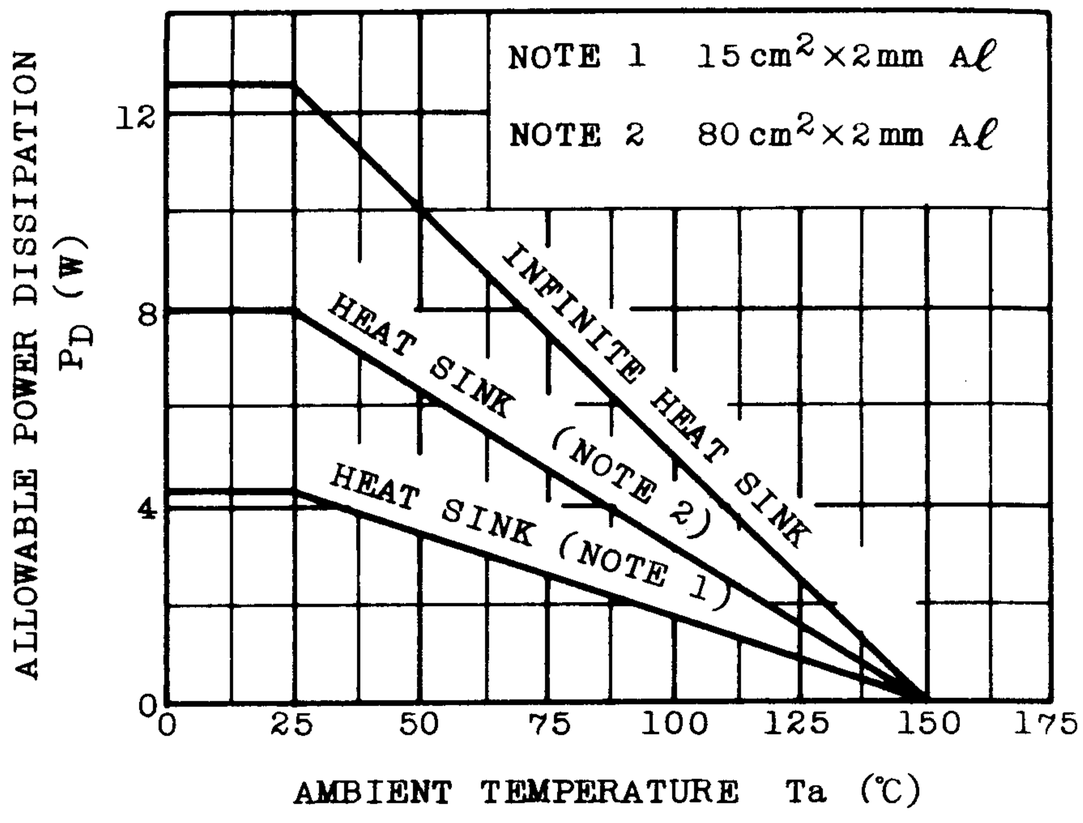
I_{CC} — V_{CC}



$P_D - V_{CC}$


MAXIMUM POWER DISSIPATION P_D (W)
8
6
4
2
0
8
10
12
14
16
18
SUPPLY VOLTAGE V_{CC} (V)
R_L=2Ω
4Ω
8Ω

$P_D - Ta$


NOTE 1 15 cm² × 2mm Aℓ
NOTE 2 80 cm² × 2mm Aℓ
ALLOWABLE POWER DISSIPATION P_D (W)
12
8
4
0
0
25
50
75
100
125
150
175
AMBIENT TEMPERATURE Ta (℃)
INFINITE HEAT SINK
HEAT SINK (NOTE 2)
HEAT SINK (NOTE 1)