TA7283AP

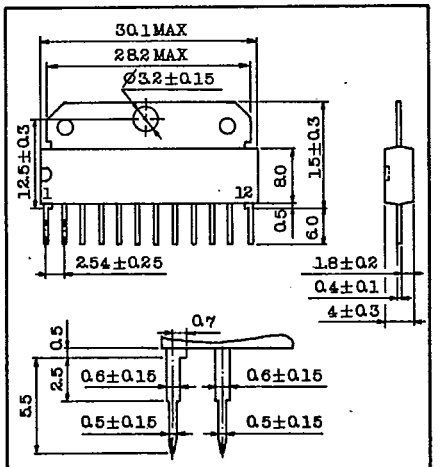
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LOW FREQUENCY POWER AMPLIFIER

TA7283AP is an audio power IC with built-in two channels developed for portable radio cassette type recorder.
Because of the parts reduction and SIP (Single In line Package), space merit is remarkable.
Thermal shut down protection circuit is built in.

- High Power : $P_{OUT(1)}$=2.5W/CH (Typ.)
  (V_{CC}=9V, R_L=4Ω, f=1kHz, THD=10%)
  : $P_{OUT(2)}$=4.6W/CH (Typ.)
  (V_{CC}=12V, R_L=4Ω, f=1kHz, THD=10%)
- Low Popping Noise at Power ON
- Small Quiescent Current
  : I_{CCQ}=19mA(Typ.) (V_{CC}=9V, V_{IN}=0)
- Soft Clip
- Built-in Thermal Shut Down Protection Circuit
- Best for Supply Voltage 9V, 12V
- Operation Supply Voltage Range : V_{CC}=6~15V

Unit in mm



Lead pitch is 2.54 and tolerance is ±0.25 against theoretical center of each lead that is obtained on the basis of No.1 lead.

JEDEC	—
TOSHIBA	S12CP-P

Weight : 3.2g(Typ.)

MAXIMUM RATINGS (Ta=25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	16	V
Output Current (Peak/CH)	$I_{O(peak)}$	2.5	A
Power Dissipation	P_D	12.5	W
Operating Temperature	Topr	-20~75	°C
Storage Temperature	Tstg	-55~150	°C

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ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{CC}=9V, R_L=4Ω, Rg=600Ω, f=1kHz, Ta=25°C)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current	I_{CCQ}	-	V_{in}=0	-	19	45	mA
Output Power	P_{OUT}(1)	-	THD=10%	2.0	2.5	-	W
	P_{OUT}(2)	-	THD=10%, V_{CC}=12V	-	4.6	-	
Total Harmonic Distortion	THD	-	P_{OUT}=1W/CH.	-	0.2	1.0	%
Voltage Gain	G_V(1)	-	Rf=82Ω V_{OUT}=0.775Vrms	43	45	47	dB
	G_V(2)	-	Rf=0, V_{OUT}=0.775Vrms	-	56	-	
Input Resistance	R_{IN}	-	-	-	30	-	kΩ
Output Noise Voltage	V_{NO}	-	Rg=10kΩ BW=20Hz~20kHz	-	0.3	1.0	mVrms
Ripple Rejection Ratio	R.R.	-	Rg=600Ω fripple=100Hz	-	54	-	dB
Cross Talk	C.T.	-	Rg=10kΩ, Ampl ↔2 V_{OUT}=0dBm, f=1kHz	-	60	-	dB
Input Offset Voltage	V_5,V_7	-	-	-	20	60	mV

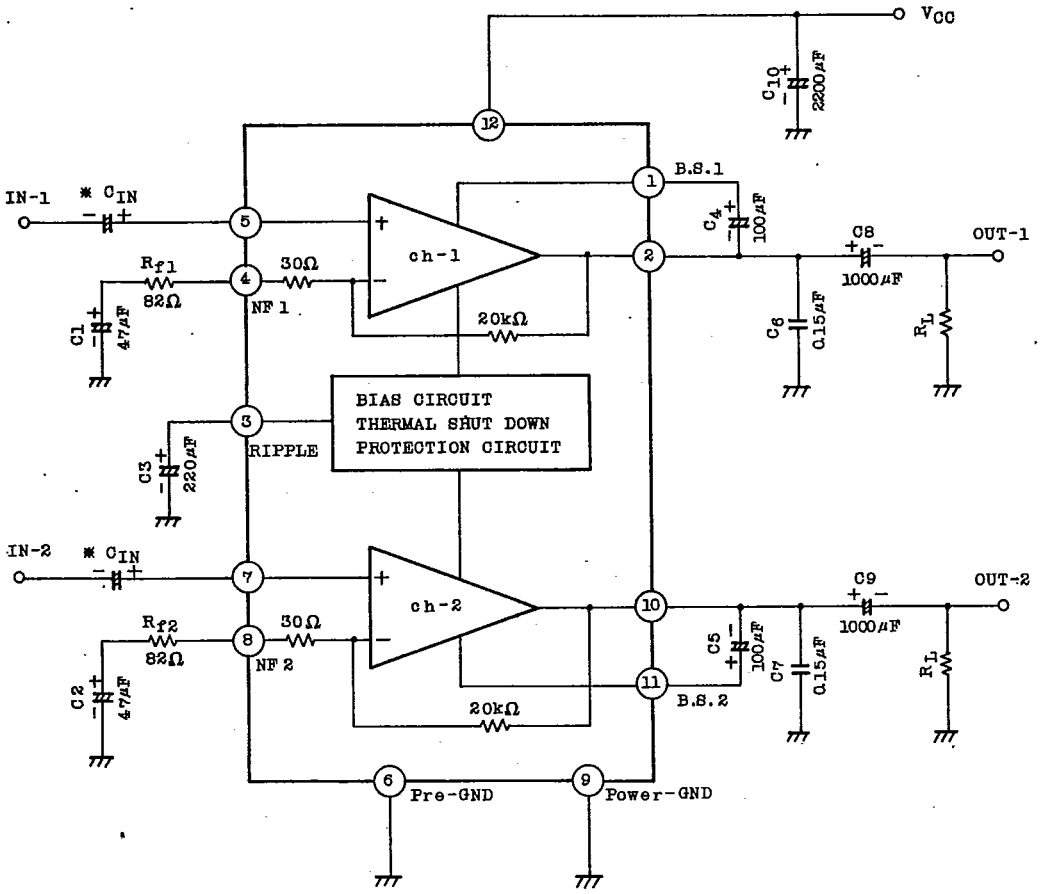
TYPICAL DC VOLTAGE OF EACH TERMINAL (V_{CC}=9V, Ta=25°C)

TERMINAL No.	1	2	3	4	5	6	7	8	9	10	11	12
DC Voltage (V)	8.2	4.5	8.9	0.6	0.01	GND	0.01	0.6	GND	4.5	8.2	V_{CC}

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BLOCK DIAGRAM/TEST CIRCUIT



* This IC can be used without coupling capacitor (C_{in}). If volume slide noise occured by input offset voltage is undesirable, it needs to use the capacitor (C_{in}).

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APPLICATION INFORMATION AND APPLICATION METHOD

1. ADJUSTMENT OF VOLTAGE GAIN

The voltage gain Gv is obtained as follows by R1, R2 and Rf Fig.1.

$$Gv=20\log\frac{Rf+R1+R2}{Rf+R1}$$

When Rf=0 Gv=56dB(Typ.)
When Rf=82Ω, Gv=45dB(Typ.)
By increasing Rf, reduction of Gv is possible. However, since the feedback increase is liable to produce oscillation, it is recommended to use this at 40dB or over.

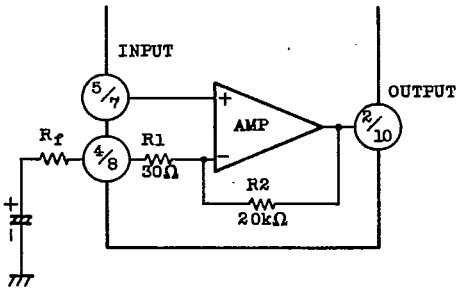


Fig. 1

2. THERMAL SHUT-DOWN CIRCUIT

The thermal shut-down circuit is built in for the purpose of preventing the destruction of IC due to the abnormal temperature rise when the heat radiation is insufficient.
The operation temperature is set at radiation Fin temperature 175°C (Typ.). At this temperature or over the bias is interrupted to prevent the destruction of IC.

3. INPUT STAGE

The input circuit of this IC is as shown in Fig.2. PNP Tr:Q1 is provided in the input circuit so as to make its usage possible without the input coupling capacitor.
However, at pins ⑤ and ⑦, max 60mV offset voltage is produced.

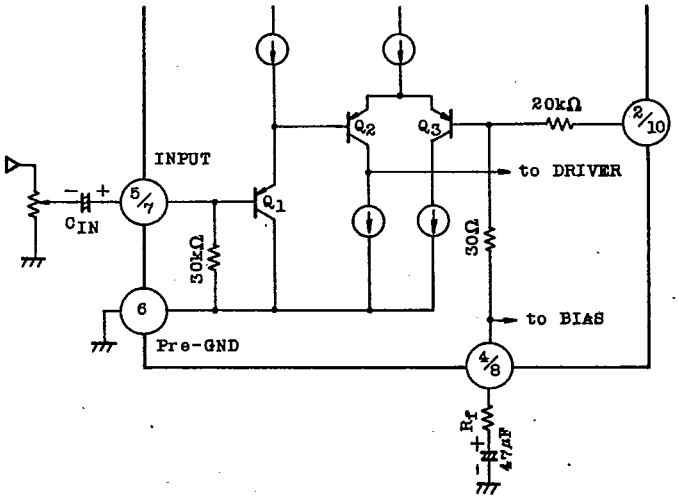


Fig. 2

Application after checking volume slide noise is recommended.
For cutting the volume slide noise, insert the input capacitor:C_{in} in series to interrupt the DC compornent.

4. OSCILLATION PREVENTIVE MEASURES

For oscillation preventive capacitor C6 and C7 between the output terminal and GND, it is recommended to use polyester film capacitor having good characteristics for temperature and for high frequency.
Since the characteristics of the capacitor is liable to be influenced by the temperature, use this capacitor after the temperature test to check the oscillation allowance.
In addition, as the position of the electrolytic capacitor has a remarkable influence on the oscillation, connect C10 to V_{CC} at the nearest possible position from power GND.
At using this application with the voltage gain reduced, oscillation is liable to be produced. Apply the capacitor after cheking enough for its capacity, type and mounting position.

As the oscillation allowance varies according to the printed pattern layout, the standard printed board of TOSHIBA is recommended to be referred to for design it.

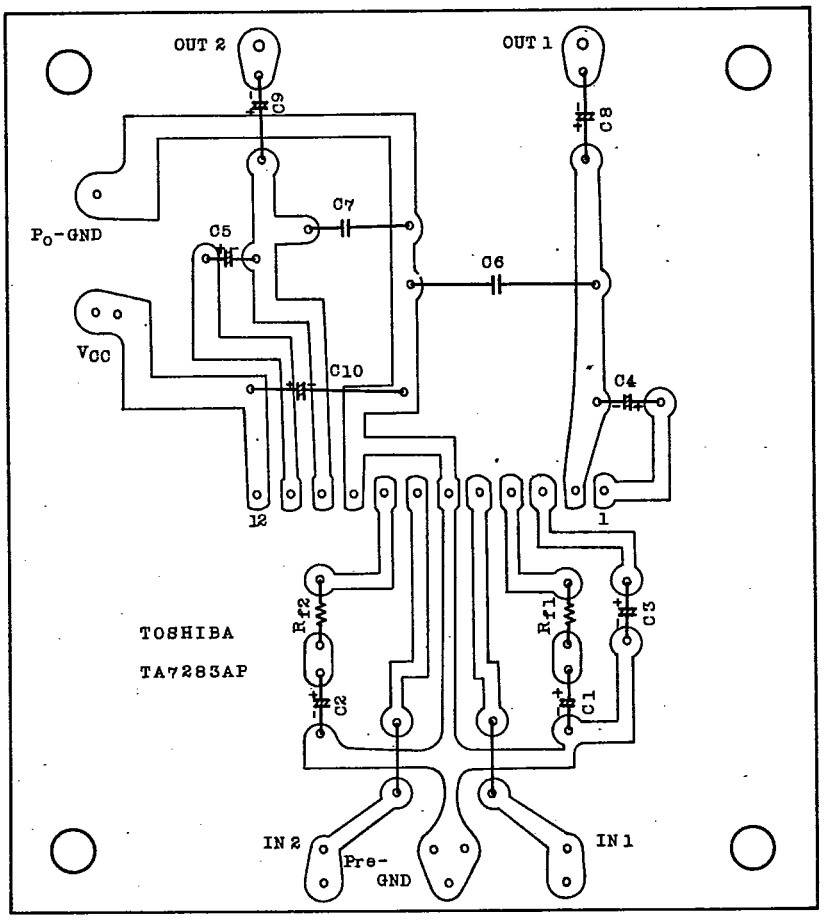
5. INPUT VOLTAGE

When the excessive signal is input, turning-up is produced in the clip waveform. The turning-up point is V_{in}=300mV_{rms}(Typ.):V_{CC}=9V, R_L=4Ω, f=1kHz:Enough care must be taken for this phenomenon.

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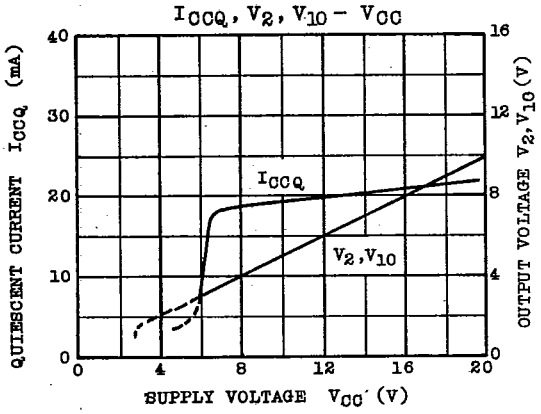
STANDARD PRINT PATTERN



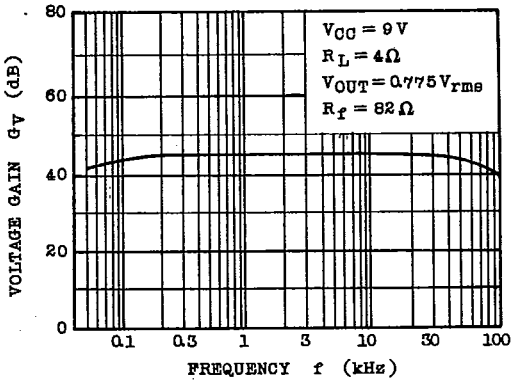
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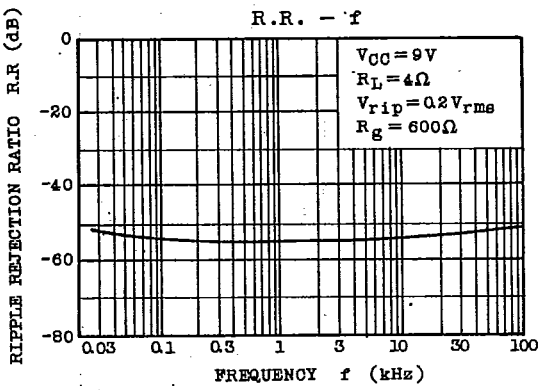
I_{CCQ}, V_2, V_{10} – V_{CC}



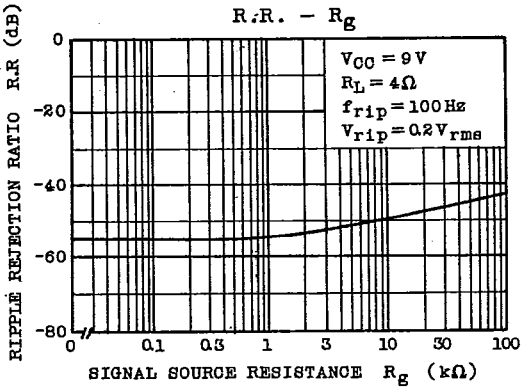
G_V – f



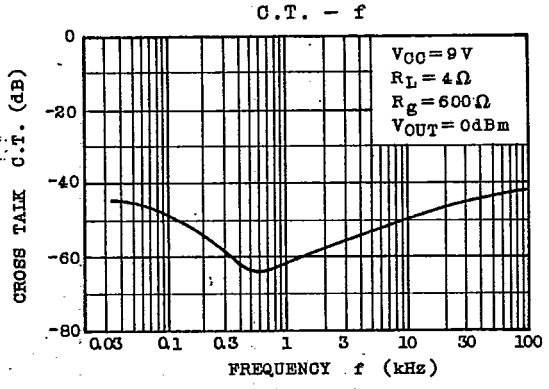
R.R. – f



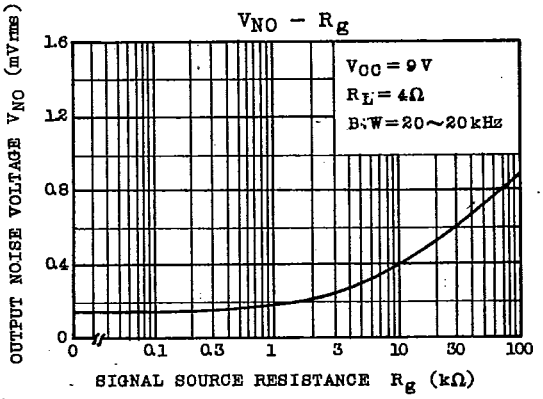
R.R. – R_g



C.T. – f



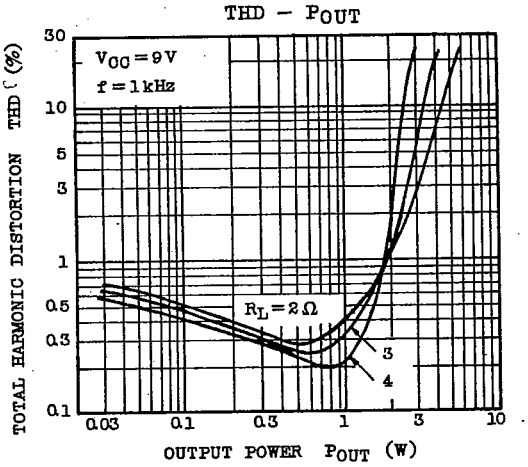
V_{NO} – R_g



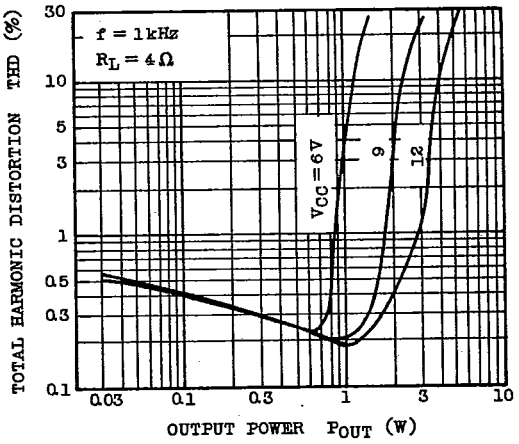
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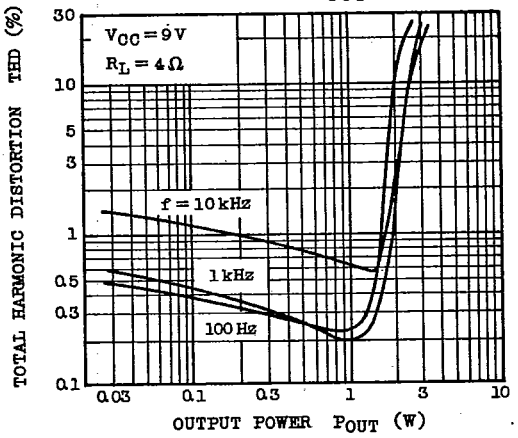
THD – P_{OUT}



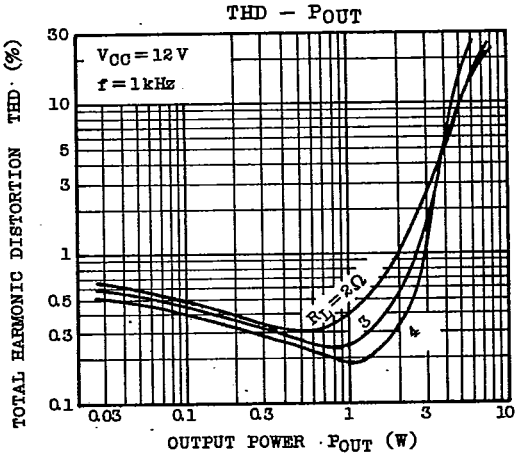
THD – P_{OUT}



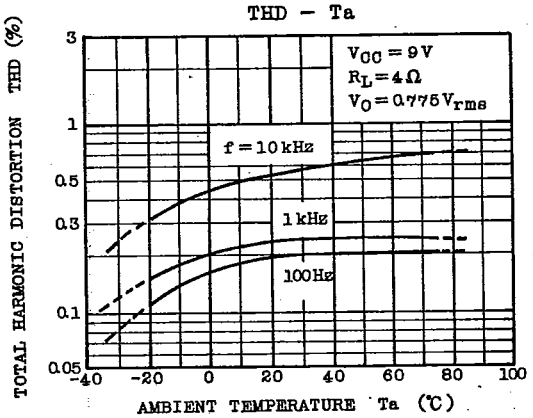
THD – P_{OUT}



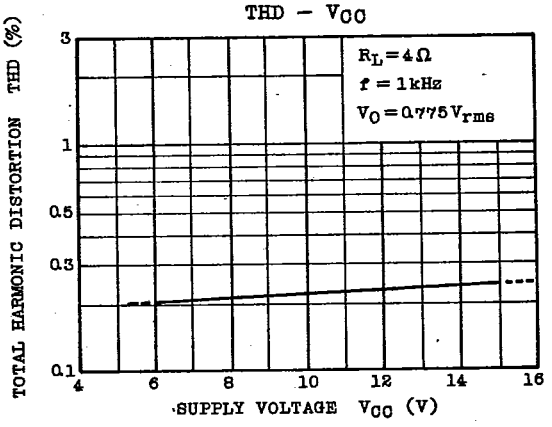
THD – P_{OUT}



THD – Ta



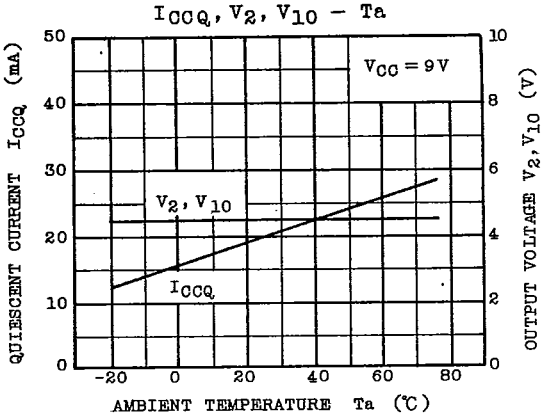
THD – V_{CC}



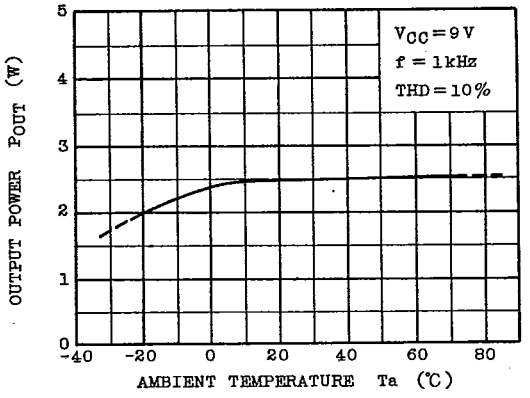
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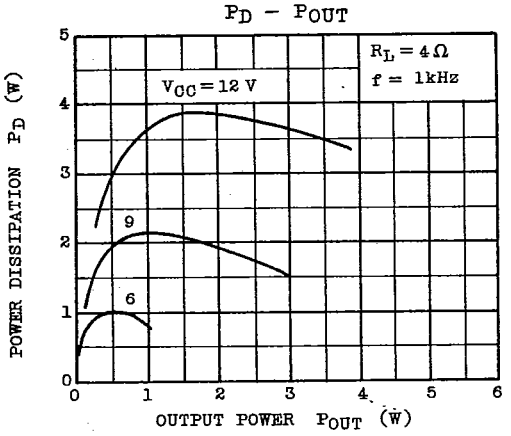
I_{CCQ}, V_2, V_{10} – Ta



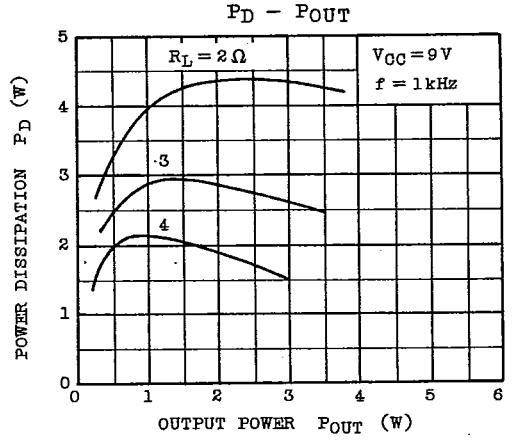
P_{OUT} – Ta



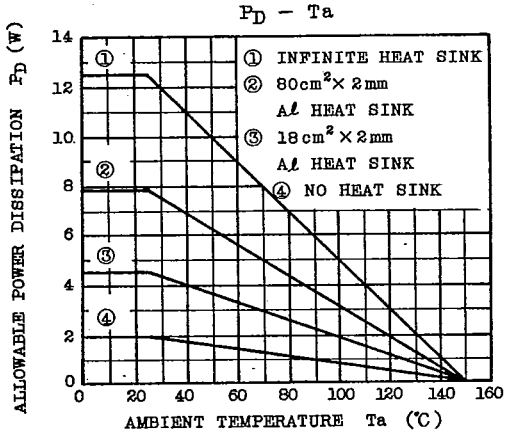
P_D – P_{OUT}



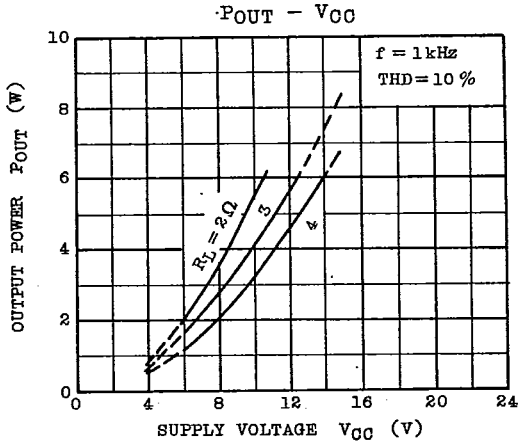
P_D – P_{OUT}



P_D – Ta



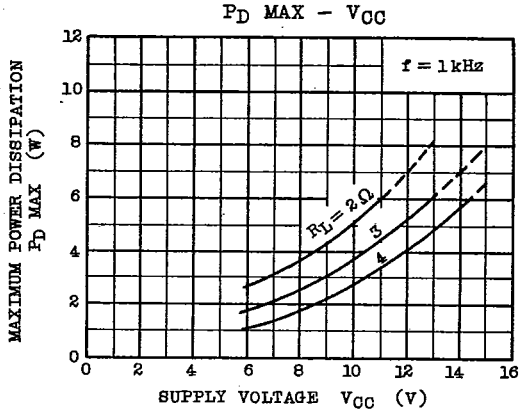
P_{OUT} – V_{CC}



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P_D MAX – V_{CC}



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