TA7232P

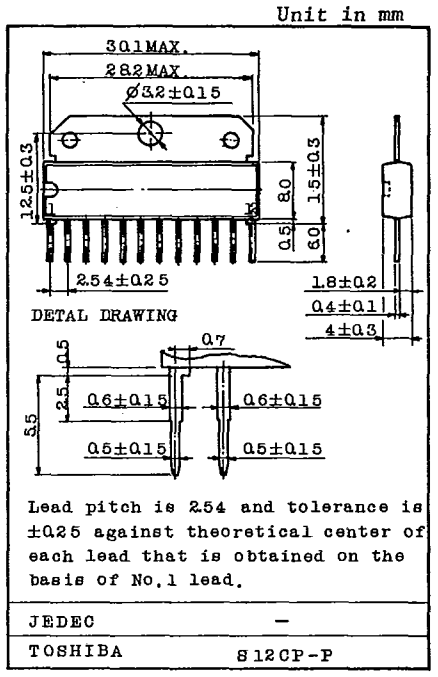
T-74-05-01

DUAL AUDIO POWER AMPLIFIER

The TA7232P is a dual audio power amplifier for consumer applications.
It is suitable for power amplifier of portable stereo radio cassette and stereo receiver etc.

- Capability of Dual and BTL Connection
  Dual Mode : P_{OUT}=2.2W (Typ.)/CH
  at V_{CC}=9V, THD=10%, R_L=4Ω
  BTL Mode : P_{OUT}=5.5W (Typ.)
  at V_{CC}=9V, THD=10%, R_L=4Ω
- Very Few External Parts
- SIP (Single In-line Package) :
  Small Package and Easy Patterning
- Excellent Ripple Rejection Ratio :
  R.R=60dB (Typ.) at R_g=0, f=100Hz
- Wide Operating Supply Voltage Range : V_{CC}=3.5~12V

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

MAXIMUM RATINGS (Ta=25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	16	V
Output Current (Peak/CH)	$I_{O(peak)}$	2	A
Power Dissipation	P_D	12.5	W
Operating Temperature	T_{opr}	-20~75	°C
Storage Temperature	T_{stg}	-55~150	°C

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ELECTRICAL CHARACTERISTICS

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

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current	I_{CCQ}	-	-	-	22	45	mA
Output Power	P_{OUT}	-	THD=10%	1.8	2.2	-	W
			BTL THD=10%	-	5.5	-	
Total Harmonic Distortion	THD	-	P_{OUT}=1W/ch	-	0.2	1.0	%
Closed Loop Voltage Gain	G_V	-	R_f=150Ω	42.5	44.5	46.5	dB
			R_f=0	52.5	55.5	58.5	
Input Resistance	R_{IN}	-	-	-	20	-	kΩ
Output Noise Voltage	V_{NO}	-	R_g=10kΩ BW=50Hz ~ 20kHz	-	0.3	0.8	mV_{rms}
Ripple Rejection Ratio	R.R	-	R_g=0 f_{ripple}=100Hz	-	60	-	dB
Cross Tolk	CT	-	R_g=10kΩ, AMP. 1→2 V_O=0dB, f=1kHz	-	-52	-	dB

OUTPUT POWER TABLE (TYPICAL VALUE)

(THD=10%, f=1kHz, Ta=25°C, 80cm² × 2mm Aℓ Heat Sink)

LOAD \ V_{CC}		6V	7.5V	9V	12V
DUAL	R_L=8Ω	0.6W/ch	1W/ch	1.4W/ch	2.5W/ch
	R_L=4Ω	1W/ch	1.5W/ch	2.2W/ch	3.7W/ch
BTL	R_L=8Ω	1.8W	3W	4.5W	7.6W
	R_L=4Ω	2.4W	3.8W	5.5W	*

* This IC is not available at V_{CC}=12V, R_L=4Ω, BTL connection, because of power dissipation over.

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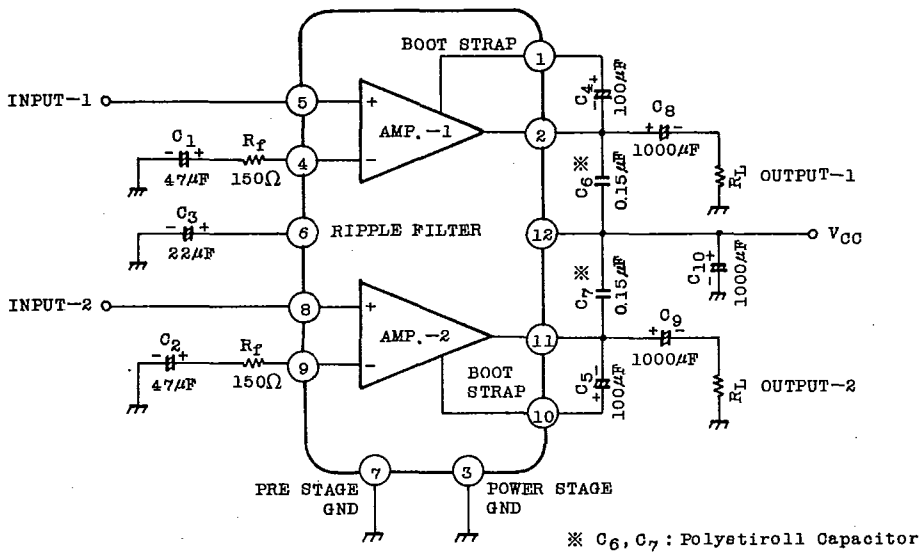
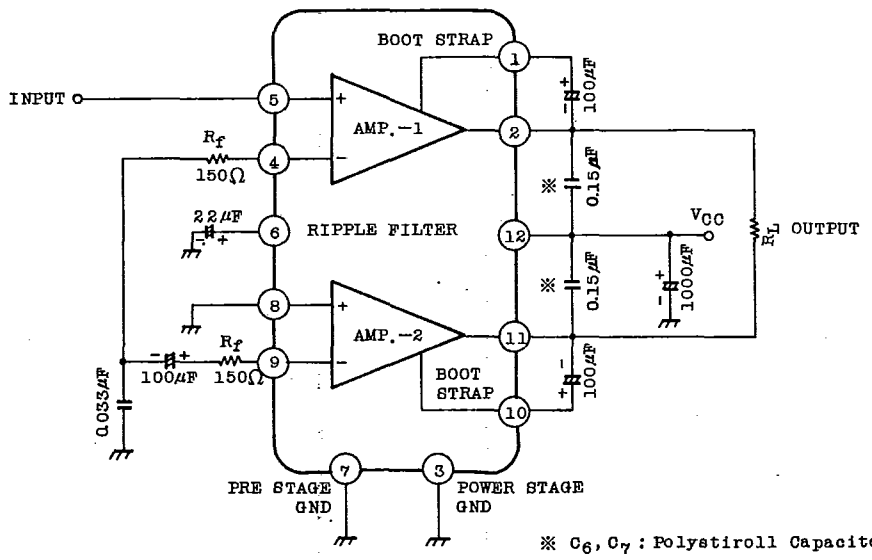
TEST CIRCUIT

. DUAL MODE



. BTL CONNECTION MODE



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APPLICATION INFORMATION

1. GND Pattern

There are two GND terminals in this IC. The pin ⑦ is a input-side GND and the pin ③ is a power transistor GND. It is need to arrange that the GND line so that the common impedance may not exist. An inappropriate GND pattern cause parastic oscillation or increased distortion.

2. Capacitor C_6,C_7

The purpose of capacitor C_6,C_7 is to prevent oscillation. These capacitors need to be small temperature coefficient. These capacitors need also to be arranged near to the terminals of V_{CC} and output.
If this arrangement is impossible, the capacitance is recommended to be large.

3. Voltage Gain

The closed loop voltage gain Gv is determined by the ratio of R_1, R_2 and R_f.

$$G_V = 20 \log \frac{R_2}{R_1 + R_f} \quad (dB)$$

The recommended voltage gain is more than 40dB.
A voltage gain less than 40dB results in a parastic oscillation.

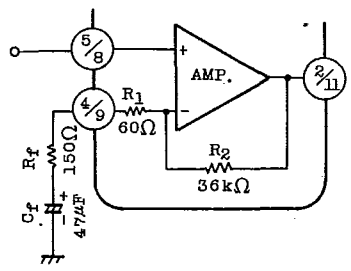

Fig.1

4. Muting Control

Audio muting can be accomplished by connecting PIN ⑥ (ripple filter) to GND as shown in Fig.2.
Amount of muting attenuation is more than 60dB.

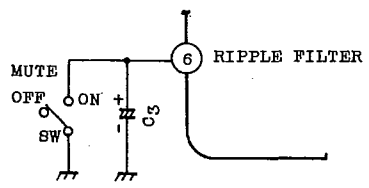

Fig.2

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TYPICAL DC VOLTAGE OF EACH TERMINAL

(V_{CC}=9V, Ta=25°C, DUAL MODE TEST CIRCUIT)

TERMINAL No.	1	2	3	4	5	6	7	8	9	10	11	12
DC Voltage (V)	8.9	4.5	GND	0.55	0.01	5.2	GND	0.01	0.55	8.9	4.5	V_{CC}

EXTERNAL PARTS TABLE AND EXPLANATION (DUAL MODE)

PARTS No.	TYPICAL	PURPOSE	INFLUENCE		NOTE
			SMALLER THAN TYP.	GREATER THAN TYP.	
C_1 C_2	47μF	Feedback Capacitor	Short Rise Time at V_{CC} ON	Long Rise Time at V_{CC} ON	
			Low Frequency Roll Off Point : $C_{1,2} = \frac{1}{2\pi f_L \cdot R_{NF}}$		
C_3	22μF	Ripple Reducing	Short Rise Time at V_{CC} ON	Long Rise Time at V_{CC} ON	
C_4 C_5	100μF	Boot Strap	Low Output Power at Low Frequency	Low POP Noise at V_{CC} ON	
C_6 C_7	0.1μF	Phase Compensation	Unstable for Oscillation at Low Temperature	Stable for Oscillation	Polystiroll Capacitor
C_8 C_9	1000μF	Coupling Capacitor	Low Frequency Roll Off Point : $C_{8,9} = \frac{1}{2\pi f_L \cdot R_L}$		
C_{10}	1000μF	Ripple Filter	Filter for Hum and Ripple Need the Large Capacitance for AC Supply Small Capacitance is OK for Battery		

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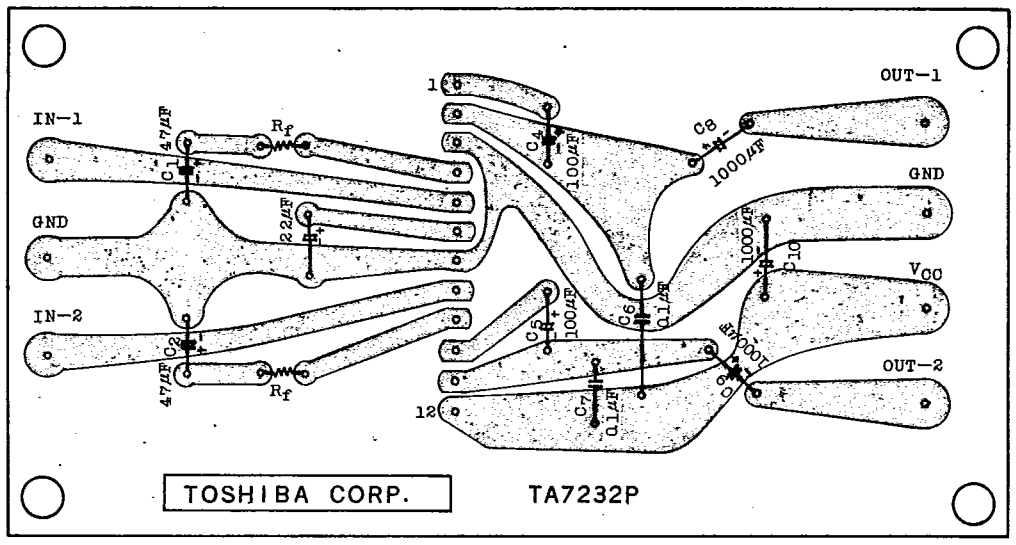
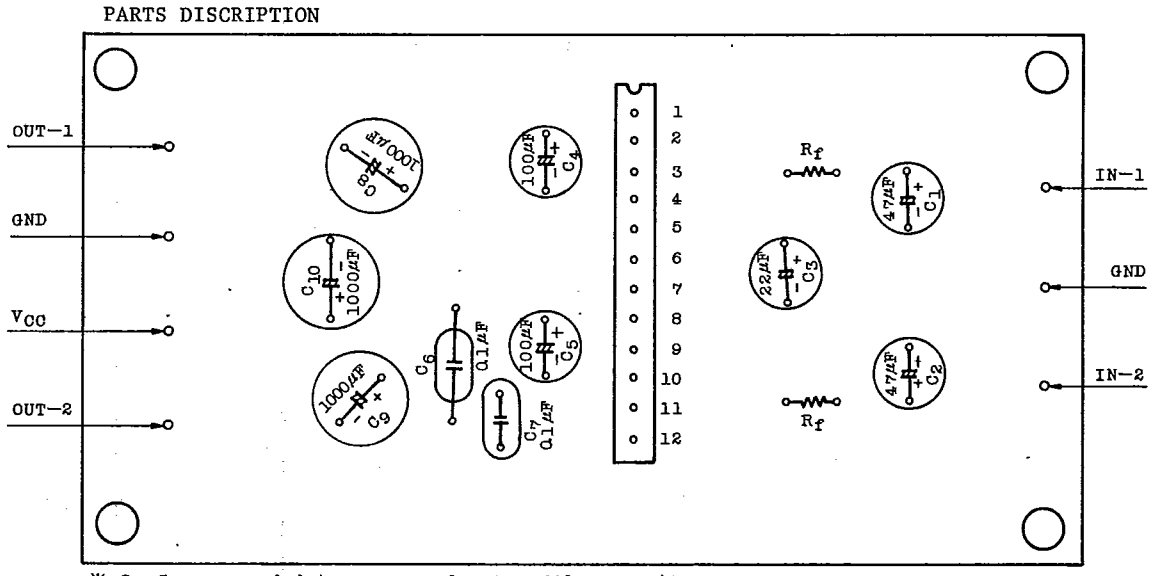
STANDARD PRINT PATTERN

UNDER VIEW



PARTS DISCRIPTION



※ C_6, C_7 are needed to use a polyester film capacitor.

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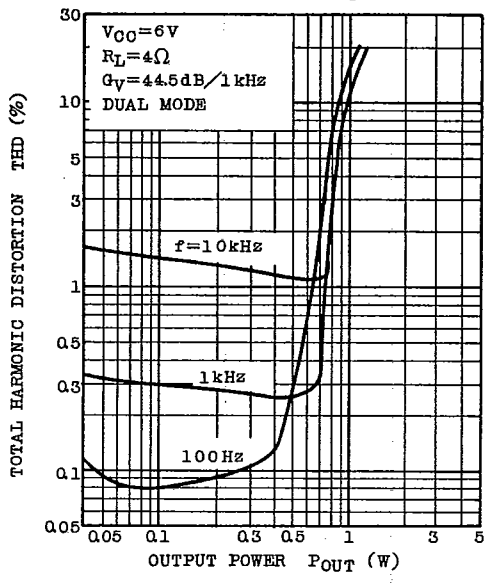
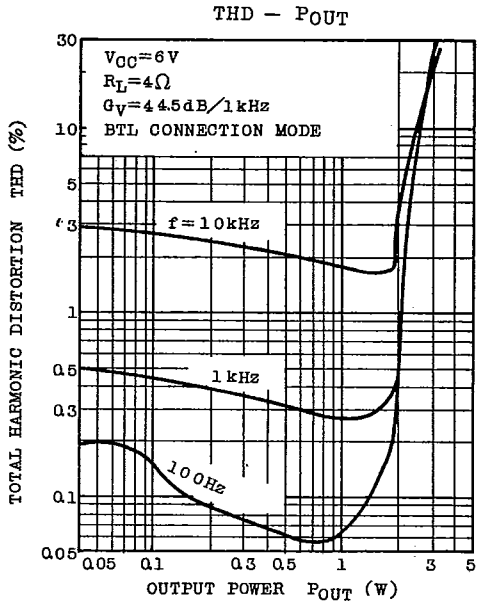
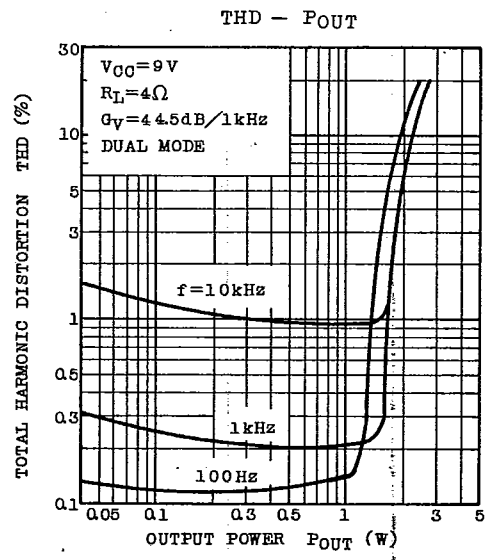
THD – P_{OUT}



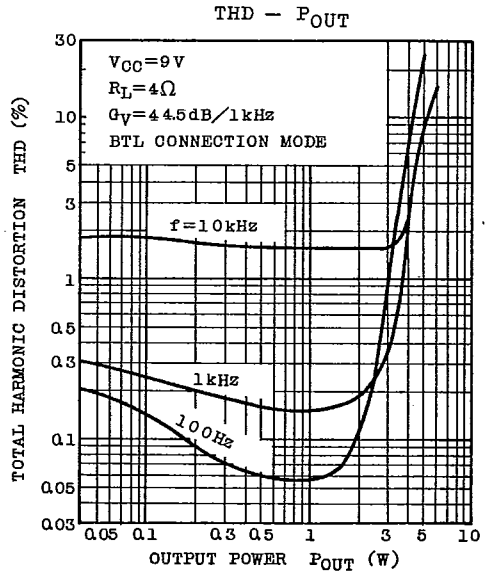
THD – P_{OUT}



THD – P_{OUT}



THD – P_{OUT}



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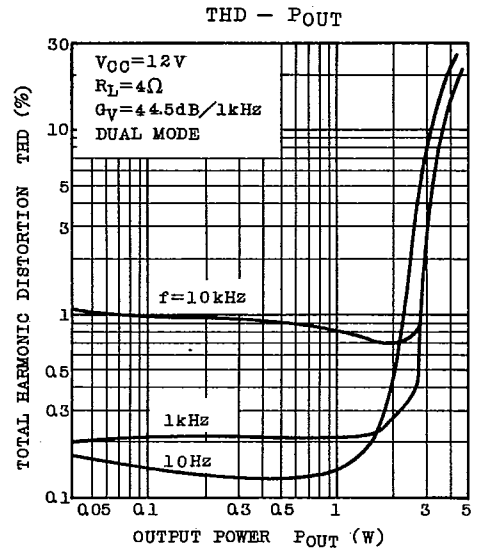
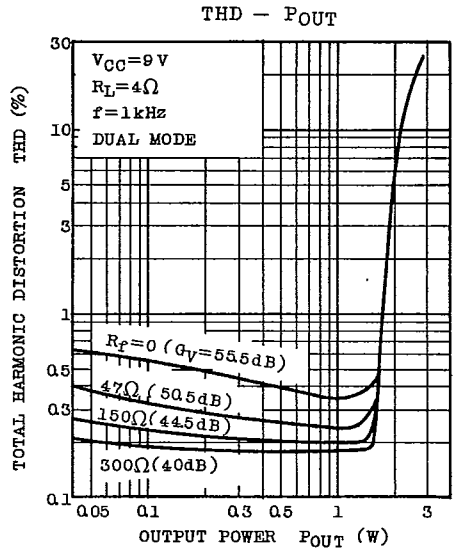
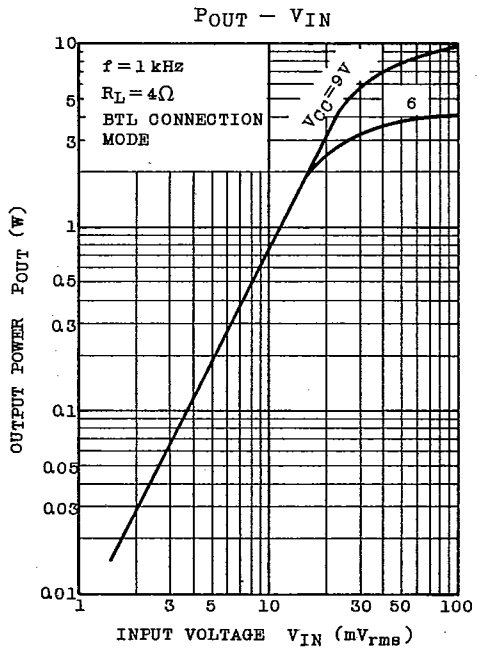
THD – P_{OUT}



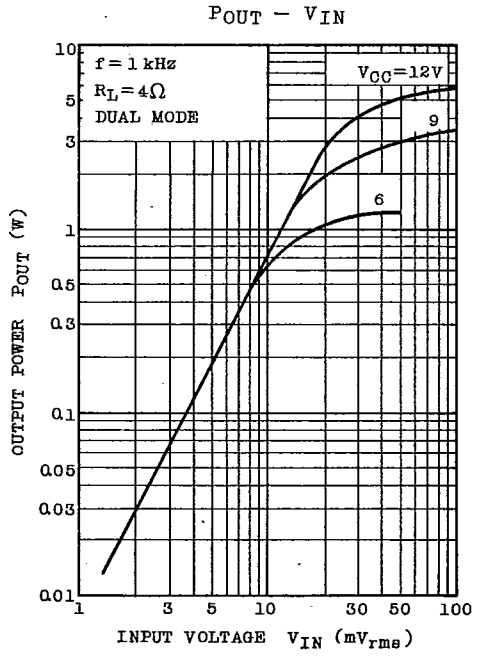
THD – P_{OUT}



P_{OUT} – V_{IN}



P_{OUT} – V_{IN}



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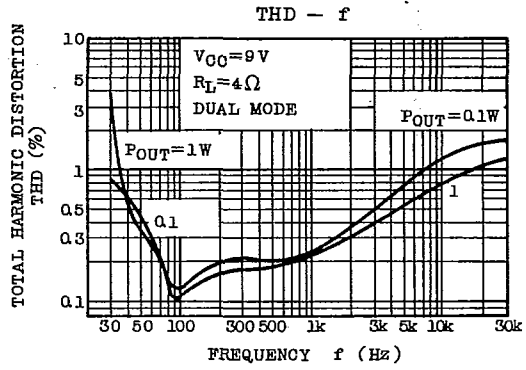
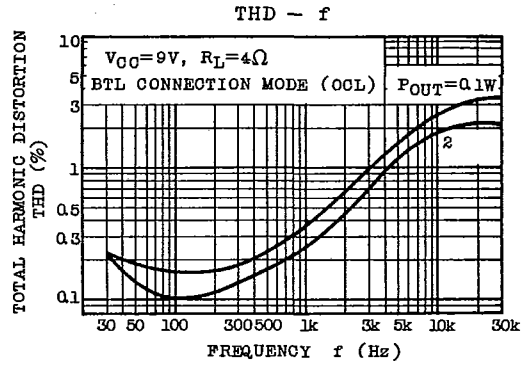
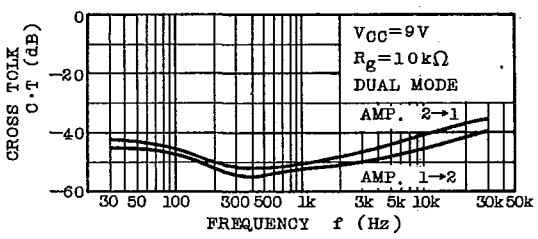
THD — f



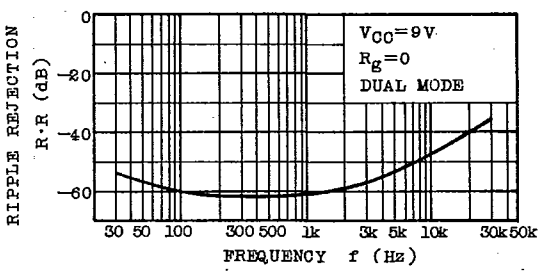
THD — f



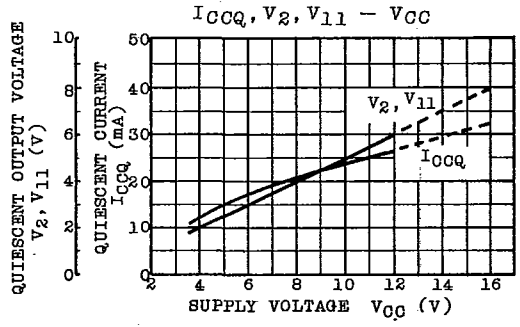
C·T — f



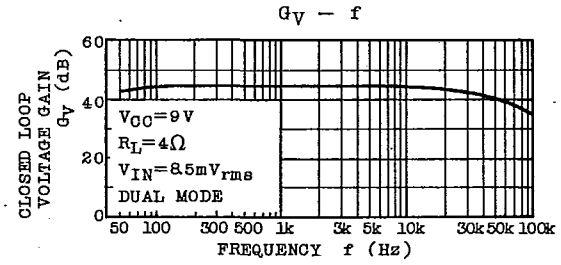
R·R — f



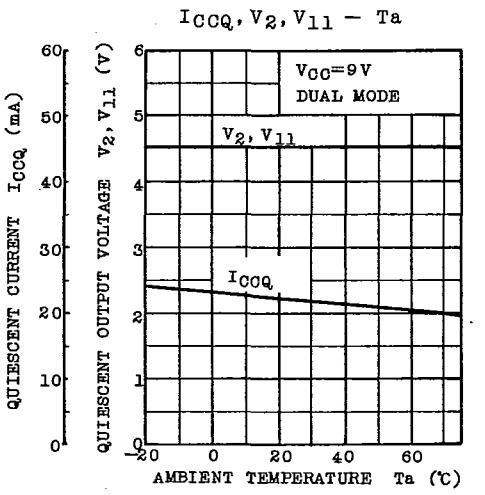
I_{CCQ}, V_2, V_{11} — V_{CC}



G_V — f



I_{CCQ}, V_2, V_{11} — Ta



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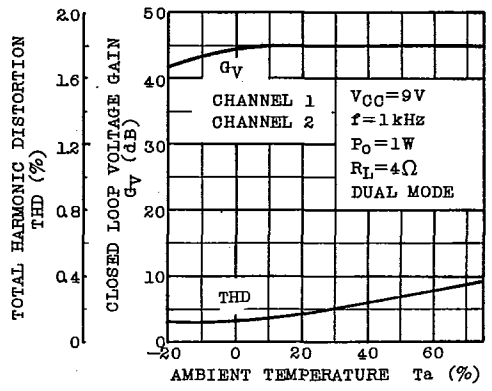
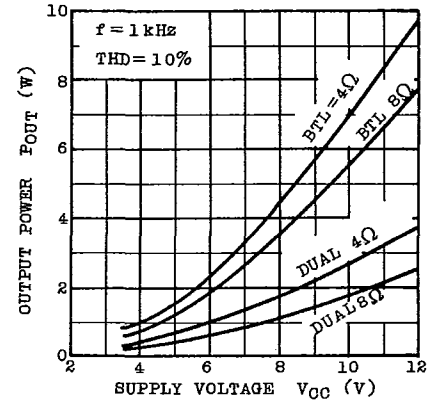
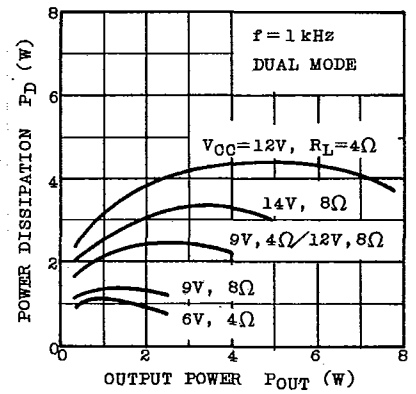
THD, G_V – Ta



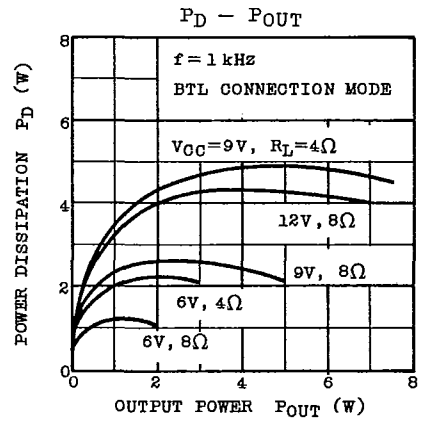
P_{OUT} – V_{CC}



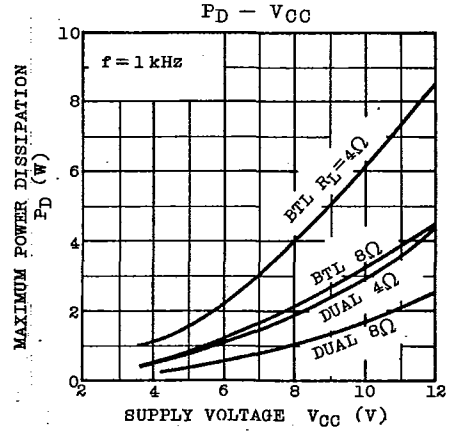
P_D – P_{OUT}



P_D – P_{OUT}



P_D – V_{CC}



P_D MAX – Ta