T-74-05-01

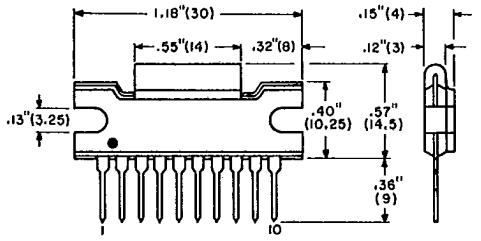
ECG® Semiconductors

ECG1169, ECG1239

5.5 W Audio Power Amplifier

Features

- **High output power**
- **High voltage gain**
- **High input impedance**
- **High hum rejection**



ECG1169 and ECG1239 are monolithic integrated circuits designed for use as a 5.5 W power amplifier for automotive radio and stereo systems. ECG1169 is for use with a load of over four ohms and ECG1239 is suitable for a two-ohm load.

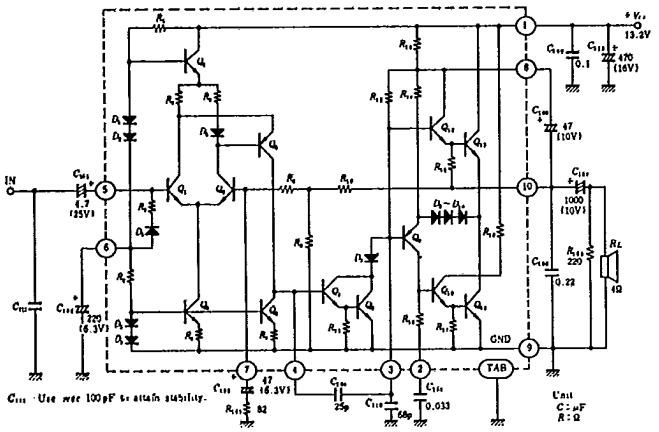
Absolute Maximum Ratings (T_A = 25°C)

Characteristic	Symbol	Ratings	Unit	Note
Supply Voltage	V_{CC}	18	V	
Output Current	I_o(peak)	4.5	A	
Power Dissipation	P_T	6	W	θ_{j-c} = 10°C/W
Storage Temperature	T_{stg}	−55 to +125	°C	
Junction Temperature	T_j	125	°C	
Operating Temperature	T_{opr}	−20 to +70	°C	θf = 8°C/W P_{loss} < 3 W

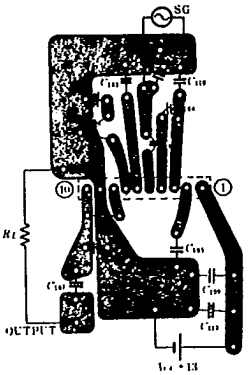
Electrical Characteristics (V_{CC} = 13.2 V, f = 1 kHz, R_g = 600 Ohms, T_A = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Quiescent Current	I_Q		20	50	100	mA
Voltage Gain	G_V	R_{101} = 82 ohms	52	55	58	dB
Output Power	P_{out}	THD ≦ 10%	4.5	5.5	--	W
Total Harmonic Distortion	THD	P_{out} = 0.5 W	--	0.3	1.5	%
Output Noise Voltage	V_N	R_g = 10 kohms, BPF = 70 Hz to 20 kHz	--	--	5.0	mV
Input Resistance	R_{in}		--	36	--	kohms

Circuit Schematic and External Parts



Printed Circuit Board
(Bottom View)



Typical External Parts

(1) C_{101}: Input coupling capacitor. Use the capacitor over 4.7 μF. If use a too small capacitor in C_{101}, output noise will be greater.

(2) C_{102}: It functions as the elimination of supply voltage ripple. Use the capacitor over 220 μF.

(3) C_{103}: Determine C_{103} from the value of a negative feedback resistor R_{101} and a low cutoff frequency f_L as follows:

$$C_{103} = \frac{1}{2 f_L \times R_{101}} \quad (F)$$

In case of the elimination of shock noise at power switch "on", make the capacitor ratio of C_{102} and C_{103} 4 to 1.

(4) C_{104}, C_{105}, C_{106}, C_{110}: Capacitor for use as the prevention of oscillations. C_{105}, C_{106} and C_{110} have no relation to a frequency characteristic, but C_{104} determines a high cutoff frequency f_H. For example, making C_{104} the value shown in Fig. 2 (25 pF), f_H is approximately 30 kHz (−3 dB). C_{106} must be polyester film capacitor.

(5) C_{107}: Output coupling capacitor. A low frequency f_L is 40 Hz at C_{107} = 1000 μF and R_L = 4 ohms.

(6) C_{108}: Boot strap capacitor. Use the capacitor of 47 μF.

(7) C_{109}: It prevents the oscillation due to the resistance of power supply line.

(8) R_{101}: It determines the closed loop voltage gain G_V. As the ECG1169 has an extremely high open loop voltage gain, G_V is determined as follows:

$$G_V = 2 \times \frac{R8 + (R9//R10)}{R_{101}} -$$

(R9//R10 is a parallel resistance of R9 and R10). For example, making R_{101} the value as shown in Fig. 2 (82 ohms), G_V is 55 dB, because of R8 + (R9//R10) = 22.5 kohms. When a high G_V is required, make both R_{101} and C_{101} lower.

If make only R_{101} lower, the total harmonic distortion increases at high frequency.

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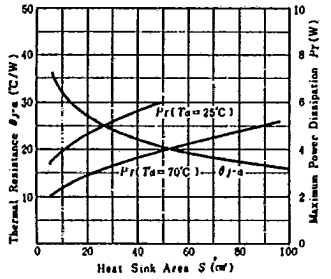
(9) R_{102}: If a speaker is connected with output terminal after the power switch on, a large current flows to charge the output coupling capacitor C_{107}. R_{102} prevents the destruction due to this charging current.

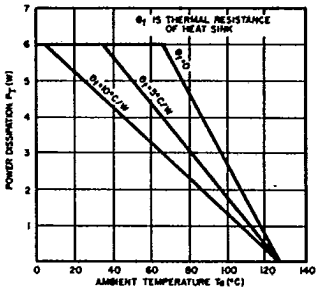
(10) GND: TAB must be grounded. On a printed board, resistance between TAB and 9 pin should be pattern-designed lower than 10 Mohms and TAB should be completely fastened by screws.

Typical Characteristics

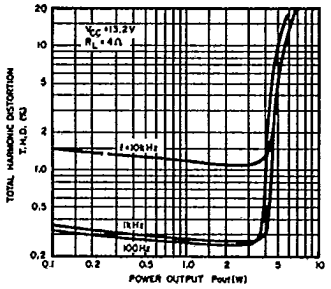
Maximum Power Dissipation and Thermal Resistance vs Heat Sink Area



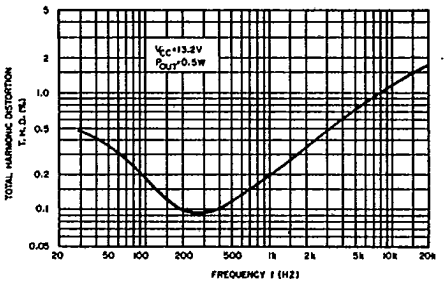
Maximum Power Dissipation Curve



Total Harmonic Distortion vs Power Output



Total Harmonic Distortion vs Frequency



Voltage Gain vs Frequency