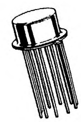
1-WATT POWER AMPLIFIER

MC1554G

. . . designed to amplify signals to 300 kHz with one watt delivered to a direct or capacitively coupled load.



CASE 71

Lead 7 connected to case

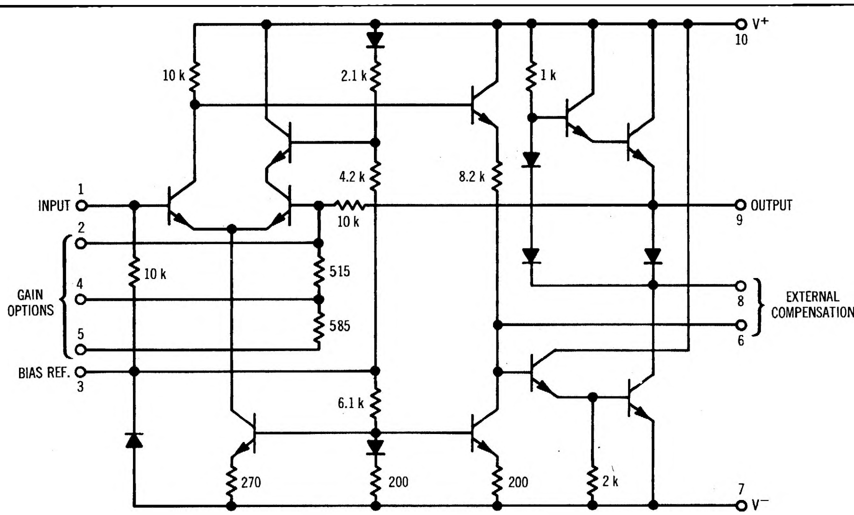
Typical Amplifier Features:

- Low Total Harmonic Distortion — 0.4% typical at 1.0 Watt
- Low Output Impedance — 0.2 ohm
- Excellent Gain — Temperature Stability

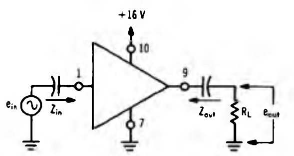
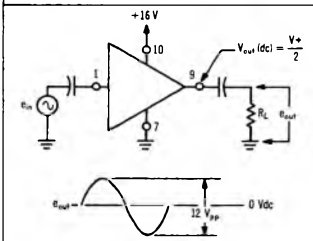
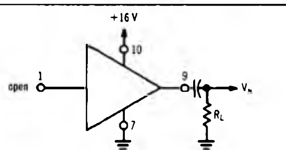
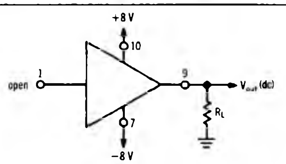
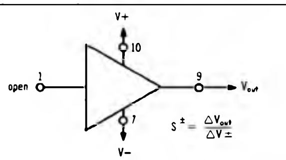
MAXIMUM RATINGS (T_C = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Total Power Supply Voltage	$\lvert V^+\rvert + \lvert V^-\rvert$	18	Vdc
Peak Load Current	I_{out}	0.5	Amp
Audio Output Power	P_{out}	1.8	Watt
Power Dissipation (package limitation) T_A = 25°C Derate above 25°C T_C = 25°C Derate above 25°C	P_D	 600 4.8 1.8 14.4	 mW mW/°C Watts mW/°C
Operating Temperature Range	T_C	-55 to +125	°C
Storage Temperature Range	T_{stg}	-55 to +150	°C

CIRCUIT SCHEMATIC



ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)
Frequency compensation shown in Figures 2 and 3.

Characteristic Definitions	Characteristic	R_L (ohms)	Gain Option*	Symbol	Min	Typ	Max	Unit
	Output Power	16	-	P_{out}	1.0	1.1	-	Watt
	Power Dissipation (@ P_{out} = 1.0 W)	16	-	P_D	-	0.9	1.2	Watt
	Voltage Gain	16 16 16	10 18 36	A_V	8.0 - -	10 18 36	12 - -	V/V
	Input Impedance	-	10	Z_{in}	7.0	10	-	kΩ
	Output Impedance	-	10	Z_{out}	-	0.2	-	Ω
	Power Bandwidth (for e_{out} < 5% THD)	16 16 16	10 18 36		- - -	270 250 210	- - -	kHz
	Total Harmonic Distortion (for e_{in} < 0.05% THD, f = 20 Hz to 20 kHz)			THD				%
	P_{out} = 1.0 Watt (sinewave)	16	10		-	0.4	-	
	P_{out} = 0.1 Watt (sinewave)	16	10		-	0.5	-	
	Zero Signal Current Drain	∞	-	I_D	-	11	15	mAdc
	Output Noise Voltage	16	10	V_n	-	0.3	-	mV RMS
	Output Quiescent Voltage (Split Supply Operation)	16	-	$V_{out}(dc)$	-	±10	±30	mVdc
	Positive Supply Sensitivity (V^- constant)	∞	-	S^+	-	-40	-	mV/V
	Negative Supply Sensitivity (V^+ constant)	∞	-	S^-	-	-40	-	mV/V

* To obtain the voltage gain characteristic desired, use the following pin connections:

Voltage Gain	Pin Connection
10	Pins 2 and 4 open, Pin 5 to ac ground
18	Pins 2 and 5 open, Pin 4 to ac ground
36	Pin 2 connected to Pin 5, Pin 4 to ac ground

TYPICAL CONNECTIONS

FIGURE 2 – SPLIT SUPPLY OPERATION
VOLTAGE GAIN (A_V) = 10, f_{LOW} ≈ 25 Hz

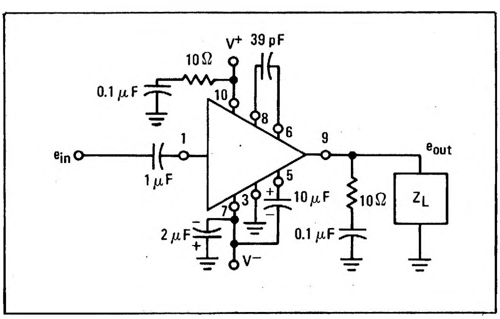
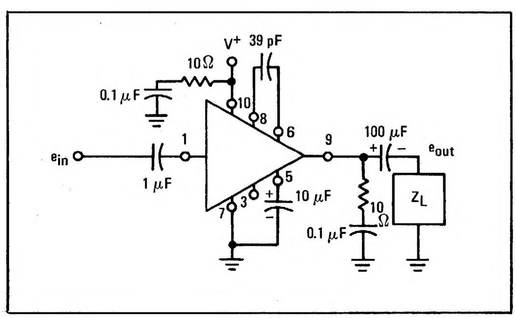


FIGURE 3 – SINGLE SUPPLY OPERATION
VOLTAGE GAIN (A_V) = 10, f_{LOW} ≈ 100 Hz



RECOMMENDED OPERATING CONDITIONS

In order to avoid local VHF instability, the following set of rules must be adhered to:

1. An R-C stabilizing network (0.1 μF in series with 10 ohms) should be placed directly from pin 9 to ground, as shown in Figures 2 and 3, using short leads, to eliminate local VHF instability caused by lead inductance to the load.
2. Excessive lead inductance from the V+ supply to pin 10 can cause high frequency instability. To prevent this, the V+ by-pass capacitor should be connected with short leads from the V+ pin to ground. If this capacitor is remotely located a series R-C network (0.1 μF and 10 ohms) should be used directly from pin 10 to ground as shown in Figures 2 and 3.
3. Lead lengths from the external components to pins 7, 9, and 10 of the package should be as short as possible to insure good VHF grounding for these points.

Due to the large bandwidth of the amplifier, coupling must be avoided between the output and input leads. This can be assured by either (a) use of short leads which are well isolated, (b) narrow-banding the overall amplifier by placing a capacitor from pin 1 to ground to form a low-pass filter in combination with the source impedance, or (c) use of a shielded input cable. In applications which require upper band-edge control the input low-pass filter is recommended.

TYPICAL CHARACTERISTICS

FIGURE 4 — MAXIMUM AVAILABLE OUTPUT POWER (SINE WAVE)

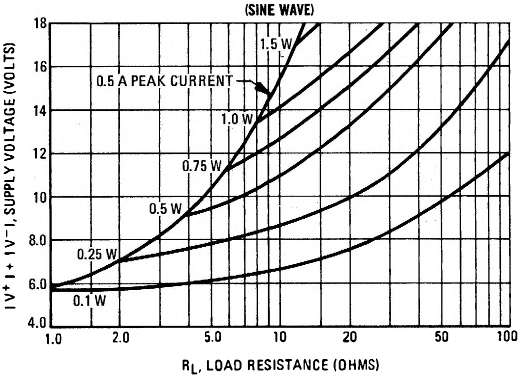


FIGURE 5 — MAXIMUM DEVICE DISSIPATION (SINE WAVE)

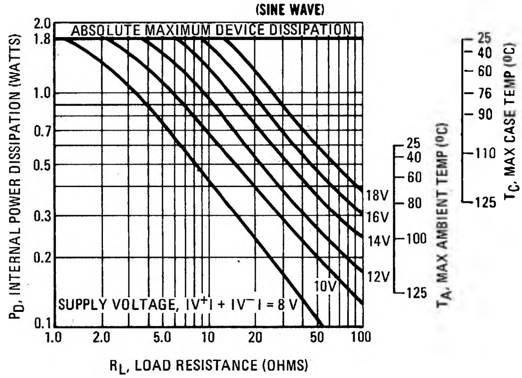


FIGURE 6 — TOTAL HARMONIC DISTORTION versus LOAD RESISTANCE

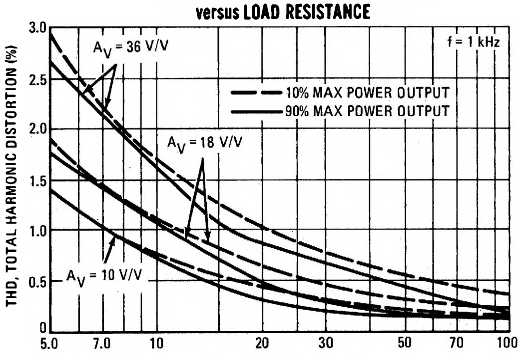
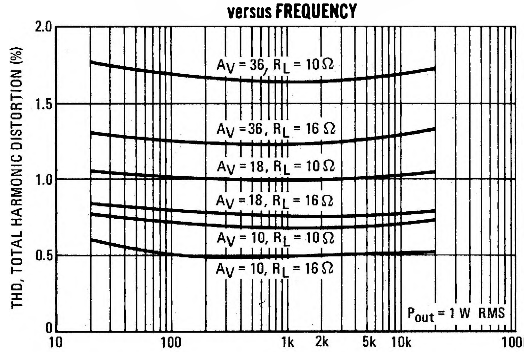


FIGURE 7 — TOTAL HARMONIC DISTORTION versus FREQUENCY



TYPICAL CHARACTERISTICS

FIGURE 8 — VOLTAGE GAIN versus TEMPERATURE

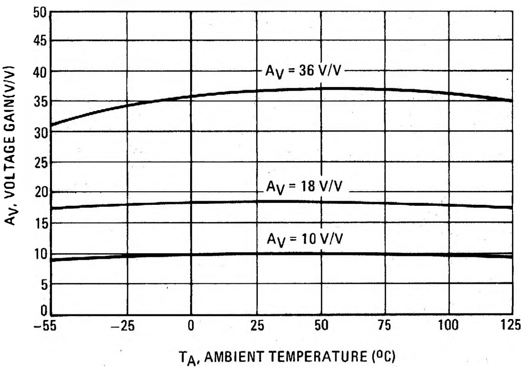


FIGURE 9 — OUTPUT VOLTAGE CHANGE

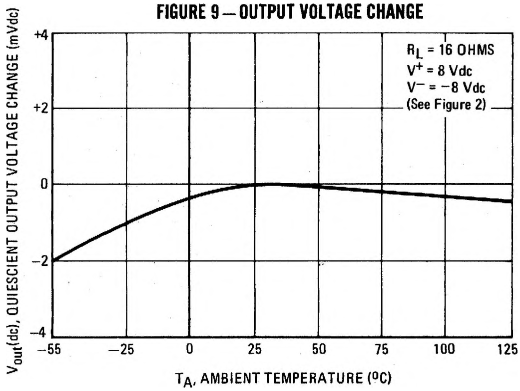


FIGURE 10 — VOLTAGE GAIN versus FREQUENCY (R_L = 16 OHMS)

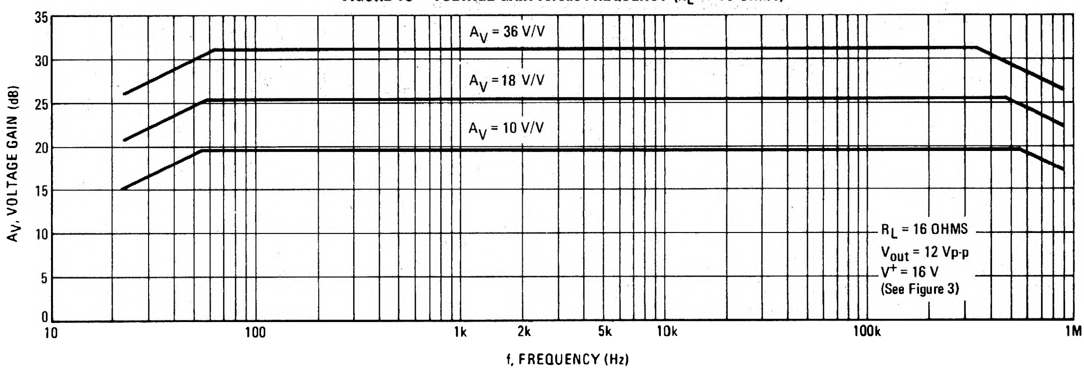


FIGURE 11 — VOLTAGE GAIN versus FREQUENCY ($R_L = \infty$)