

ORDERING INFORMATION

Device	Temperature Range	Package
MC1454G	0°C to +70°C	Metal Can
MC1554G	-55°C to +125°C	Metal Can

MC1454G

MC1554G

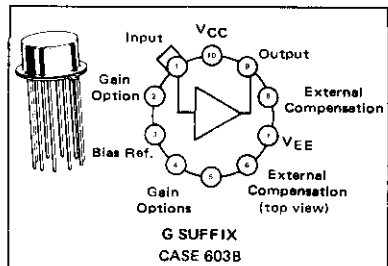
1-WATT POWER AMPLIFIERS

... designed to amplify signals to 300-kHz with 1-Watt delivered to a direct coupled or capacitively coupled load.

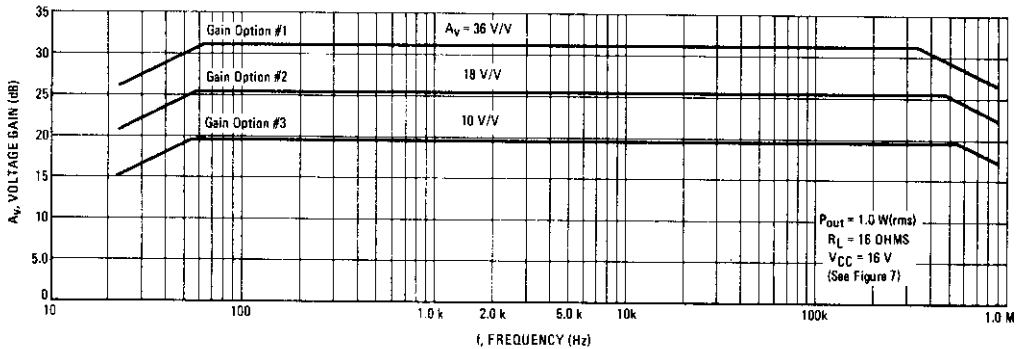
- Low Total Harmonic Distortion – 0.4% (Typ) @ 1 Watt
- Low Output Impedance – 0.2 Ohm
- Excellent Gain – Temperature Stability

1-WATT POWER AMPLIFIER INTEGRATED CIRCUIT

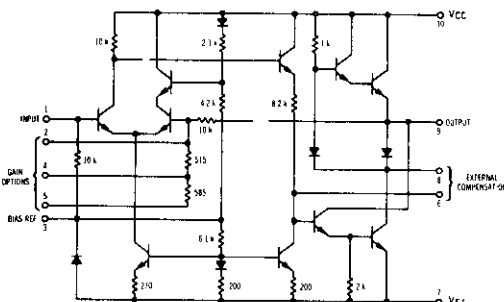
SILICON MONOLITHIC
EPITAXIAL PASSIVATED



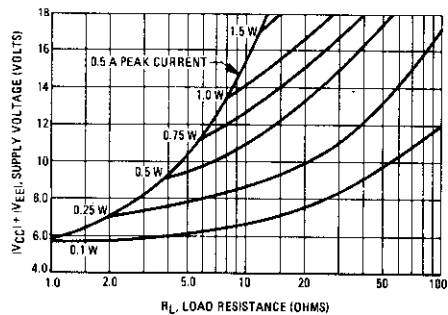
VOLTAGE GAIN versus FREQUENCY ($R_L = 16 \text{ OHMS}$)



CIRCUIT SCHEMATIC



MAXIMUM AVAILABLE OUTPUT POWER (SINE WAVE)



ELECTRICAL CHARACTERISTICS ($T_C = +25^\circ\text{C}$ unless otherwise noted)

Frequency compensation shown in Figures 6 and 7.

Characteristic	Figure	R_L (Ohms)	Gain Option*	Symbol	MC1554 (-55 to +125°C)			MC1454 (0 to +70°C)			Unit	
					Min	Typ	Max	Min	Typ	Max		
Output Power (for $e_{out} < 5.0\%$ THD)	1	16		P_{out}	1.0	1.1	—	—	1.0	—	Watt	
Power Dissipation (@ $P_{out} = 1.0$ W)	1	16	—	P_D	—	0.9	1.2	—	0.9	—	Watt	
Voltage Gain	1	16	10	A_v	8.0	10	12	—	10	—	V/V	
		16	18		—	18	—	18	—			
		16	36		—	36	—	36	—			
Input Impedance	1	—	10	Z_{in}	7.0	10	—	3.0	10	—	$k\Omega$	
Output Impedance	1	—	10	Z_o	—	0.2	—	—	0.4	—	Ω	
Power Bandwidth (for $e_{out} < 5.0\%$ THD)	2	16	10	BW	—	270	—	—	270	—	kHz	
		16	18		—	250	—	250	—			
		16	36		—	210	—	210	—			
Total Harmonic Distortion (for $e_{in} < 0.05\%$ THD, $f = 20$ Hz to 20 kHz)	2			THD							%	
		$P_{out} = 1.0$ Watt (sinewave)	16		10	—	0.4	—	—	0.4		—
		$P_{out} = 0.1$ Watt (sinewave)	16		10	—	0.5	—	—	0.5		—
Zero Signal Current Drain	3	∞	—	I_D	—	11	15	—	11	20	mAdc	
Output Noise Voltage	3	16	10	V_n	—	0.3	—	—	0.3	—	mV(rms)	
Output Quiescent Voltage (Split Supply Operation)	4	16	—	V_O (dc)	—	± 10	± 30	—	± 10	—	mVdc	
Positive Supply Sensitivity (V_{EE} constant)	5	∞	—	S^+	—	-40	—	—	-40	—	mV/V	
Negative Supply Sensitivity (V_{CC} constant)	5	∞	—	S^-	—	-40	—	—	-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

**Characteristic Definitions
(Linear Operation)**

FIGURE 1

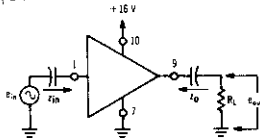


FIGURE 3

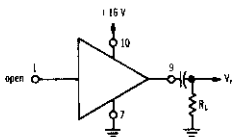


FIGURE 4

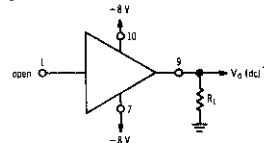


FIGURE 2

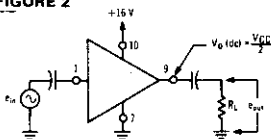
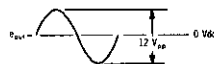
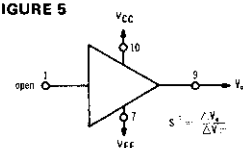


FIGURE 5



MAXIMUM RATINGS ($T_C = +25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit	
Total Power Supply Voltage	$ V_{CC} + V_{EE} $	18	Vdc	
Peak Load Current	I_{out}	0.5	Ampere	
Audio Output Power	P_{out}	1.8	Watts	
Power Dissipation (package limitation) $T_A = +25^\circ\text{C}$ Derate above 25°C	P_D	600	mW	
	$1/\theta_{JA}$	4.8	$\text{mW}/^\circ\text{C}$	
	$T_C = +25^\circ\text{C}$ Derate above 25°C	P_D	1.8	Watts
		$1/\theta_{JC}$	14.4	$\text{mW}/^\circ\text{C}$
Operating Temperature Range	MC1454	T_A	0 to $+70$	
	MC1554		-55 to $+125$	
Storage Temperature Range	T_{stg}	-55 to $+150$	$^\circ\text{C}$	

TYPICAL CONNECTIONS

FIGURE 6 – SPLIT SUPPLY OPERATION VOLTAGE
GAIN (A_V) = 10, $f_{LOW} \approx 26$ Hz

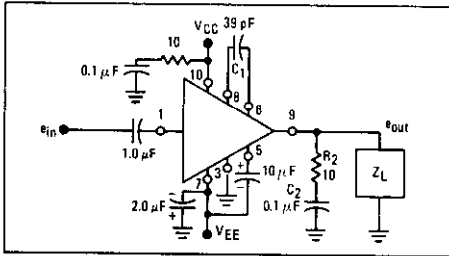
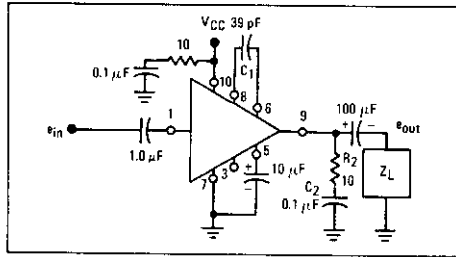


FIGURE 7 – SINGLE SUPPLY OPERATION VOLTAGE
GAIN (A_V) = 10, $f_{LOW} \approx 100$ Hz



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 6 and 7, using short leads, to eliminate local VHF instability caused by lead inductance to the load.
2. Excessive lead inductance from the V_{CC} supply to pin 10 can cause high frequency instability. To prevent this, the V_{CC} -by-pass capacitor should be connected with short leads from the V_{CC} 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 6 and 7.

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 8 – TOTAL HARMONIC DISTORTION
versus LOAD RESISTANCE

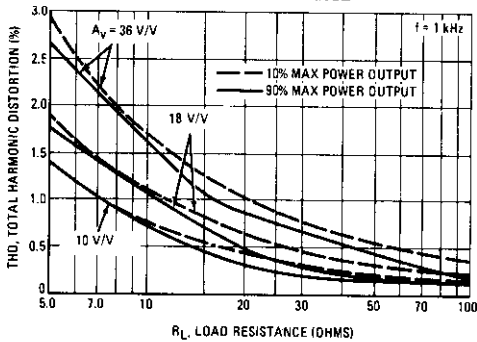
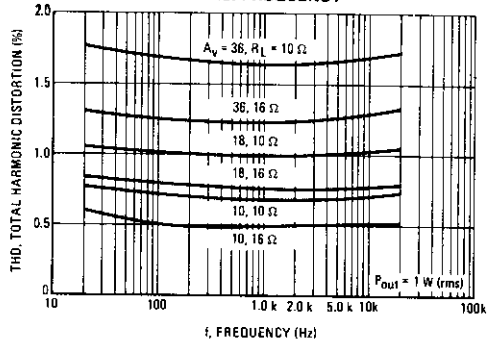


FIGURE 9 – TOTAL HARMONIC DISTORTION
versus FREQUENCY



TYPICAL CHARACTERISTICS (continued)

FIGURE 10 – VOLTAGE GAIN versus TEMPERATURE

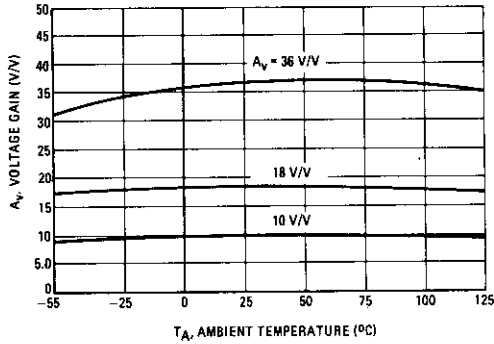


FIGURE 11 – OUTPUT VOLTAGE CHANGE

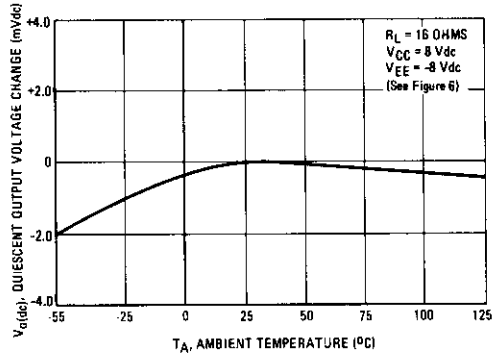


FIGURE 12 – VOLTAGE GAIN versus FREQUENCY ($R_L = \infty$)

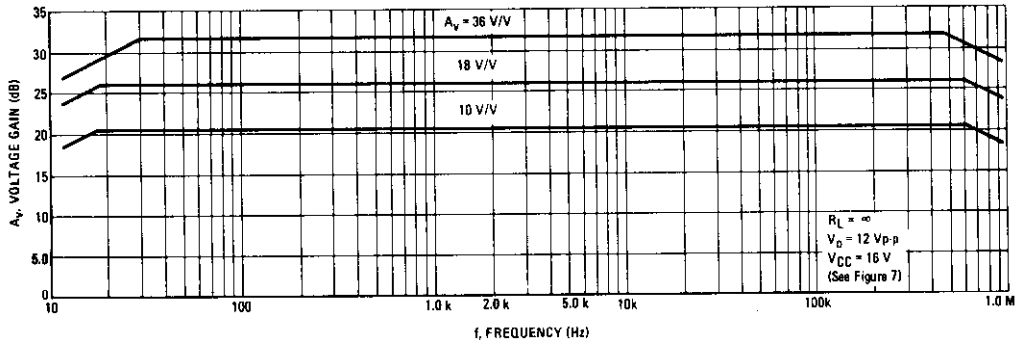


FIGURE 13 – MAXIMUM DEVICE DISSIPATION (SINE WAVE)

