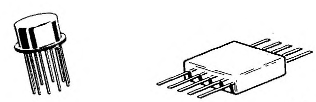
MC1510
MC1509

. . . designed for use as a high-frequency differential amplifier with operating characteristics that provide a flat frequency response from dc to 40 MHz.

Typical Amplifier Features:

- High Gain Characteristics
  A_V = 93 typical
- Wide Bandwidth — dc to 40 MHz
- Large Output Voltage Swing —
  4.5 V p-p typical @ ±6.0 V Supply
- Low Output Distortion —
  THD ≦ 1.5%



Lead 4 connected to case

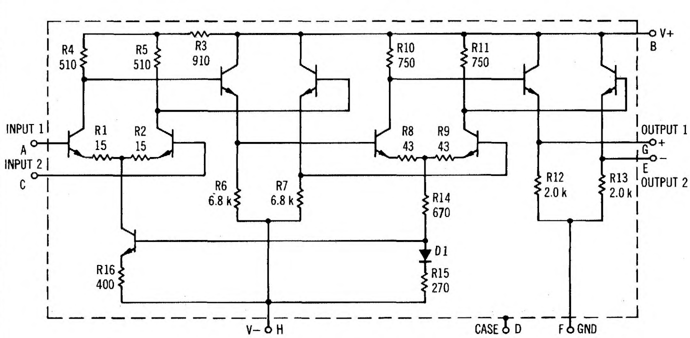
CASE 96
(TO-99)
MC1510G

CASE 73
(TO-90)
MC1510F
MC1509F

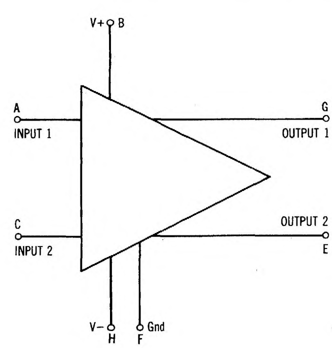
MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Power Supply Voltage	V^+ V^-	+8.0 -8.0	Vdc Vdc
Differential Input Signal	V_{in}	±5.0	Volts
Common Mode Input Swing	CMV_{in}	±6.0	Volts
Load Current	I_L	10	mA
Output Short Circuit Duration	t_S	5.0	s
Power Dissipation (Package Limitation) Metal Can Derate above T_A = 25°C Flat Package Derate above T_A = 25°C	P_D	 680 4.6 500 3.3	 mW mW/°C mW mW/°C
Operating Temperature Range	T_A	-55 to +125	°C
Storage Temperature Range	T_{stg}	-65 to +150	°C

CIRCUIT SCHEMATIC



EQUIVALENT CIRCUIT



PIN CONNECTIONS

Schematic	A	B	C	D	E	F	G	H
MC1510G	1	2	3	4	5	6	7	8
MC1510F	10	9	1	—	4	5	7	8
MC1509F	1	3	5	—	6	7	9	10

ELECTRICAL CHARACTERISTICS (V+ = + 6 Vdc, V− = − 6 Vdc, T_A = 25°C unless otherwise noted)

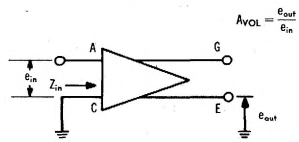
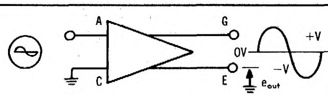
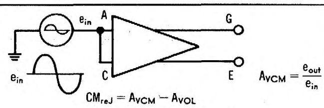
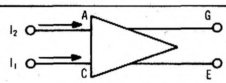
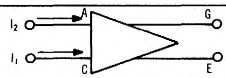
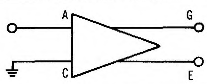
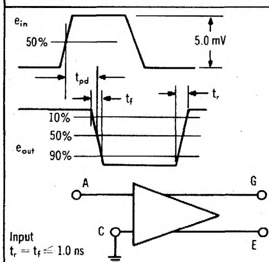
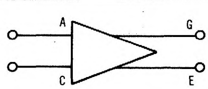
Characteristic Definitions	Characteristic	Symbol	Min	Typ	Max	Unit
	Single Ended Voltage Gain	$A_{V(se)}$	75	93	110	-
	Output Impedance (f = 20 kHz)	Z_{out}	-	35	-	Ω
	Input Impedance (f = 20 kHz)	Z_{in}	-	6.0	-	kΩ
	Bandwidth (-3.0 dB)	BW	-	40	-	MHz
	Output Voltage Swing (R_L = 5.0 kΩ, f = 100 kHz)	V_{out}	-	4.5	-	Vp-p
	Single Ended Output Distortion (e_{in} < 0.2% Distortion)	THD	-	1.5	5.0	%
	Input Common Mode Voltage Swing	CMV_{in}	-	±1.0	-	V_{peak}
	Common Mode Voltage Gain (R_L = 5 kΩ, e_{in} = 0.3 V rms, f = 100 kHz)	AVCM	-30	-45	-	dB
	Common Mode Rejection Ratio	CM_{rej}	-	-85	-	
	Input Bias Current $\left(I_b = \frac{I_1 + I_2}{2}\right)$ Differential Output = 0	I_b	-	20	80	µA
	Input Offset Current ($I_{io} = I_1 - I_2$)	I_{io}	-	3.0	20	µA
	Output Offset Voltage Differential Mode (V_{in} = 0)	$V_{out(DM)}$	-	0.5	1.3	Vdc
	Common Mode (Differential Output = 0)	$V_{out(CM)}$	2.6	3.1	3.5	
	Step Response	t_f	-	9.0	12	ns
		t_{pd}	-	9.0	-	
		t_r	-	9.0	12	
	Average Temperature Coefficient of Input Offset Voltage	TC_{Vio}				µV/°C
	(R_S = 50 Ω, T_A = -55°C to +125°C)		-	3.0	-	
	($R_S \le$ 10 kΩ, T_A = -55°C to +125°C)		-	6.0	-	
	DC Power Dissipation (Power Supply = ± 6.0 V)	P_D	-	150	220	mW
	Input Noise Voltage (f = 5.0 Hz to 10 MHz)	V_n	-	4.5	-	µV

FIGURE 1 — VOLTAGE GAIN versus FREQUENCY

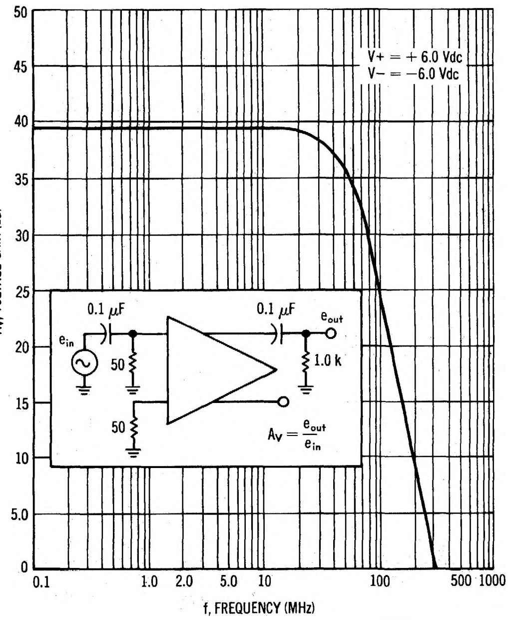


FIGURE 2 — VOLTAGE GAIN versus SUPPLY VOLTAGE

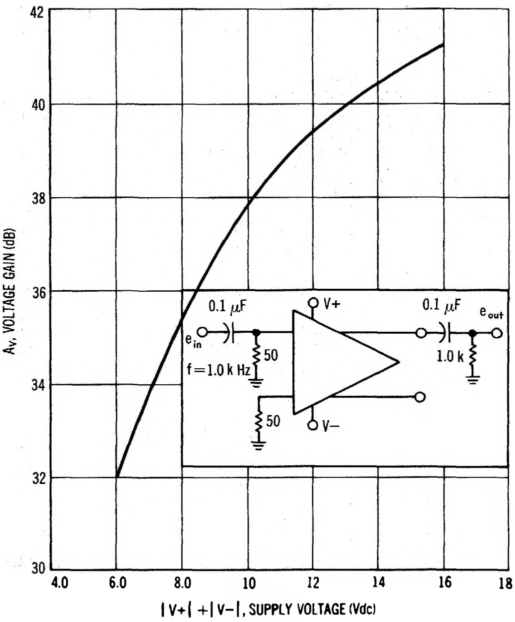


FIGURE 3 — VOLTAGE GAIN versus TEMPERATURE

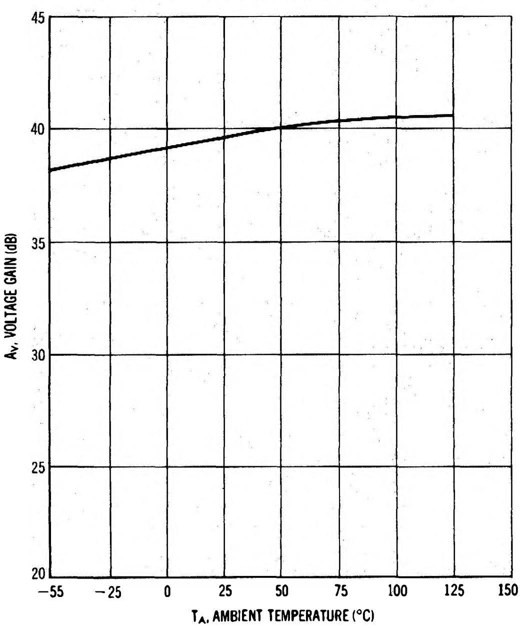


FIGURE 4 — LIMITING CHARACTERISTICS

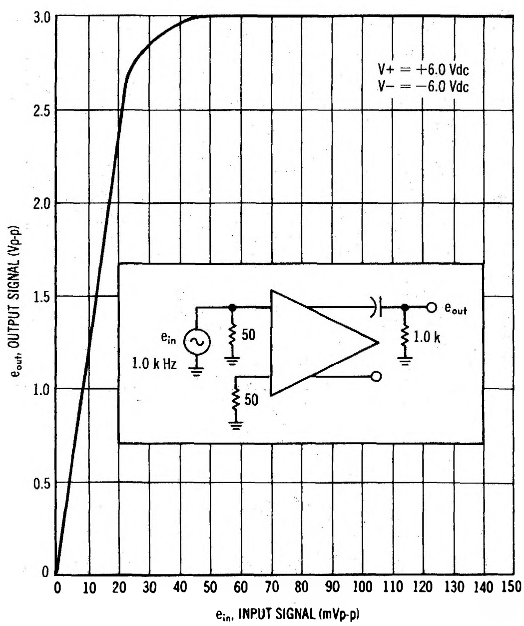


FIGURE 5 — DC OUTPUT VOLTAGE versus TEMPERATURE

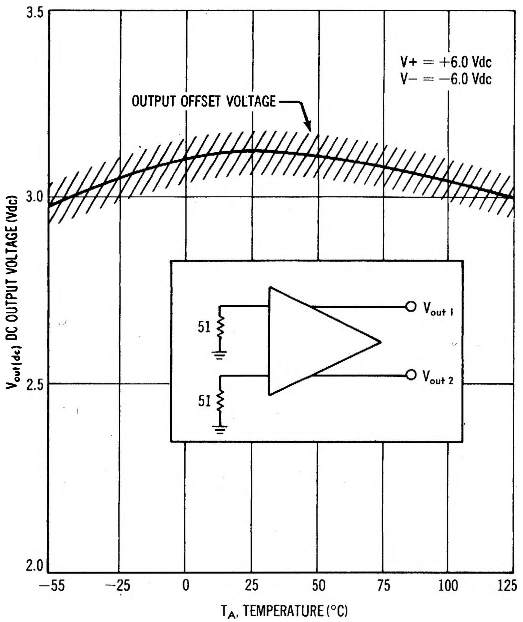


FIGURE 6 — INPUT BIAS CURRENT versus TEMPERATURE

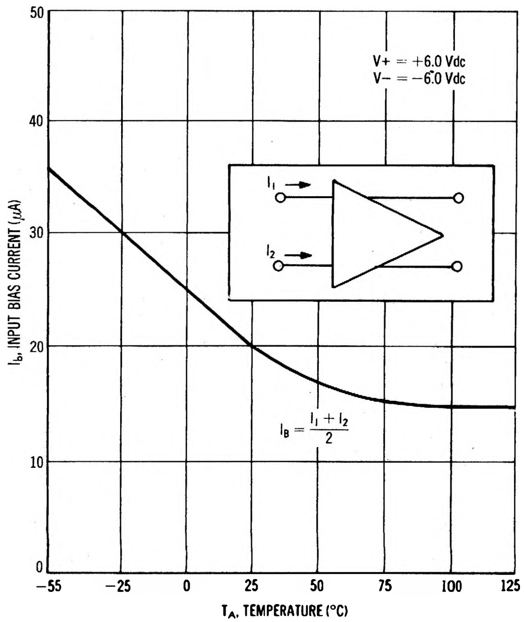


FIGURE 7 — POWER DISSIPATION versus SUPPLY VOLTAGE

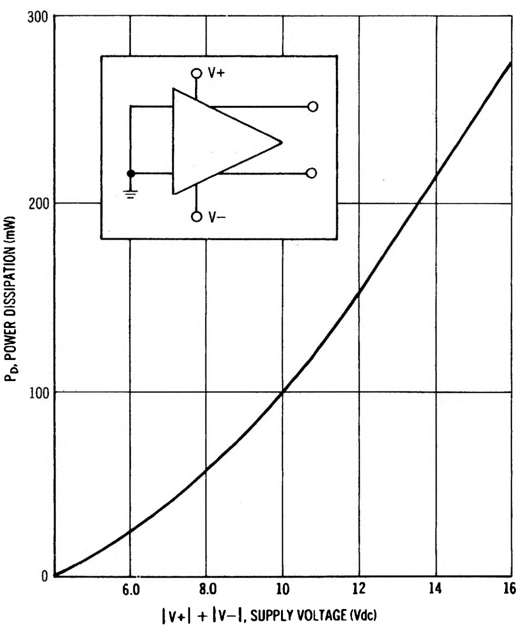


FIGURE 8 — INPUT NOISE VOLTAGE versus SOURCE IMPEDANCE