MC1510G
MC1410G

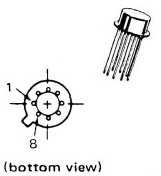
MONOLITHIC WIDEBAND VIDEO AMPLIFIER

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

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

VIDEO AMPLIFIER INTEGRATED CIRCUIT

METAL PACKAGE
CASE 601
TO-99



(bottom view)

FIGURE 1 – VOLTAGE GAIN versus FREQUENCY

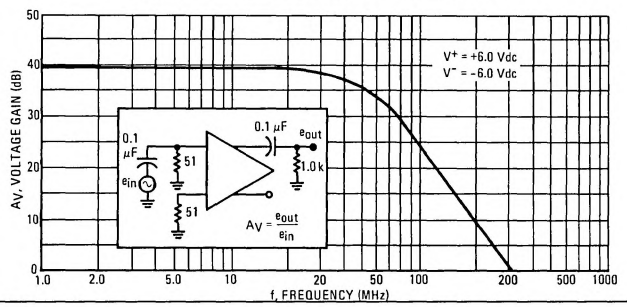
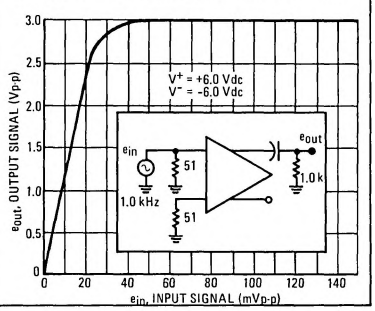
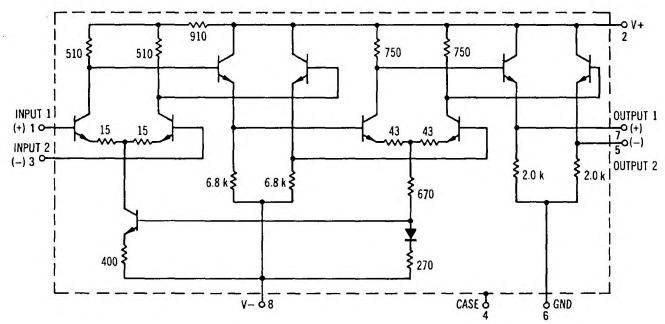


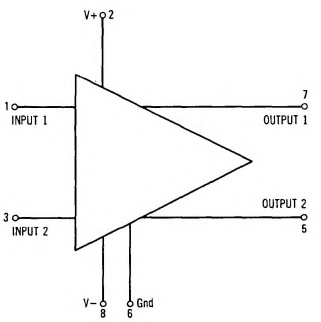
FIGURE 2 – LIMITING CHARACTERISTICS



CIRCUIT SCHEMATIC



EQUIVALENT CIRCUIT



See Packaging Information Section for outline dimensions.

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	P_D	 680 4.6	 mW mW/°C
Operating Temperature Range MC1410 MC1510	T_A	 0 to +75 -55 to +125	°C
Storage Temperature Range	T_{stg}	-65 to +150	°C

ELECTRICAL CHARACTERISTICS (V^+ = +6 Vdc, V^- = -6 Vdc, R_L = 5.0 kohms, T_A = +25°C unless otherwise noted)

		MC1510			MC1410			
Characteristic	Symbol	Min	Typ	Max	Min	Typ	Max	Unit
Single Ended Voltage Gain	$A_{V(se)}$	75	93	110	60	90	120	V/V
Output Impedance (f = 20 kHz)	Z_{out}	–	35	–	–	35	–	Ω
Input Impedance (f = 20 kHz)	Z_{in}	–	6.0	–	–	6.0	–	kΩ
Bandwidth (-3.0 dB)	BW	–	40	–	–	40	–	MHz
Output Voltage Swing (f = 100 kHz)	V_{out}	–	4.5	–	–	4.5	–	Vp-p
Single Ended Output Distortion (e_{in} < 0.2% Distortion)	THD	–	1.5	5.0	–	2.0	–	%
Input Common Mode Voltage Swing	CMV_{in}	–	±1.0	–	–	±1.0	–	V_{peak}
Common Mode Voltage Gain (e_{in} = 0.3 V rms, f = 100 kHz) Common Mode Rejection Ratio	AVCM CM_{rej}	-30 –	-45 85	– –	-20 –	-40 85	– –	dB
Input Bias Current $\left(I_b = \frac{I_1 + I_2}{2}\right)$ Differential Output = 0	$\|I_b\|$	–	20	80	–	50	100	μA
Input Offset Current ($I_{io} = I_1 - I_2$)	$\|I_{io}\|$	–	3.0	20	–	5.0	30	μA
Output Offset Voltage Differential Mode (V_{in} = 0) Common Mode (Differential Output = 0)	$V_{out(DM)}$ $V_{out(CM)}$	– 2.6	0.5 3.1	1.3 3.5	– 2.0	0.5 3.0	2.0 4.0	Vdc
Step Response	t_f t_{pd} t_r	– – –	9.0 9.0 9.0	12 – 12	– – –	10 9.0 10	15 – 15	ns
Average Temperature Coefficient of Input Offset Voltage (R_S = 50 Ω, T_A = T_{low}* to T_{high}**) ($R_S \leq$ 10 k Ω, T_A = T_{low} to T_{high})	TCV_{io}	– –	±3.0 ±6.0	– –	– –	±3.0 ±6.0	– –	μV/°C
DC Power Dissipation (Power Supply = ±6.0 V)	P_D	–	150	220	–	165	220	mW
Equivalent Average Input Noise Voltage (f = 10Hz to 500 kHz) (R_S = 0)	V_n	–	5.0	–	–	5.0	–	μV

*T_{low} = 0°C for MC1410 or −55°C for MC1510

**T_{high} = +75°C for MC1410 or +125°C for MC1510

TYPICAL CHARACTERISTICS

(V^+ = +6.0 Vdc, V^- = -6.0 Vdc, T_A = +25°C unless otherwise noted)

FIGURE 3
POWER DISSIPATION versus SUPPLY VOLTAGE

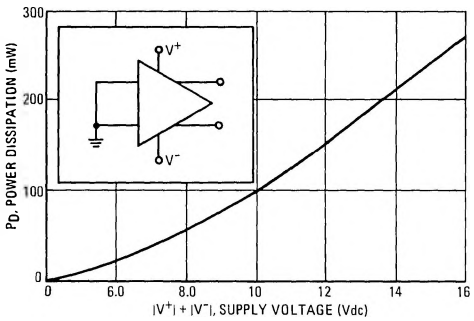


FIGURE 4
VOLTAGE GAIN versus SUPPLY VOLTAGE

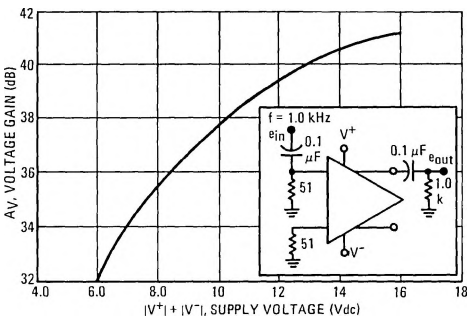


FIGURE 5
VOLTAGE GAIN versus TEMPERATURE

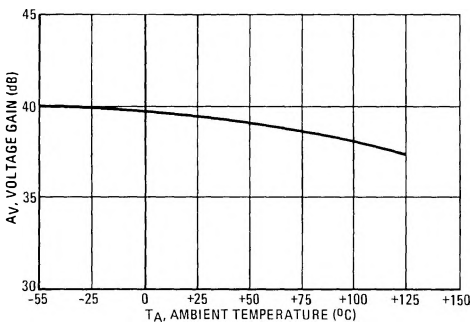


FIGURE 6
DC OUTPUT VOLTAGE versus TEMPERATURE

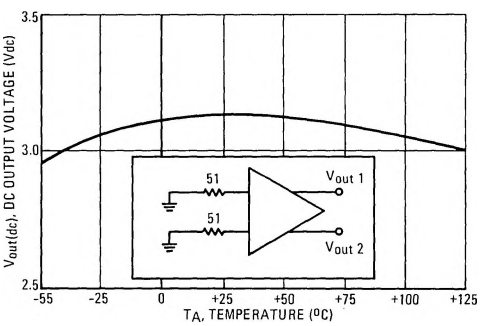


FIGURE 7
INPUT BIAS CURRENT versus TEMPERATURE

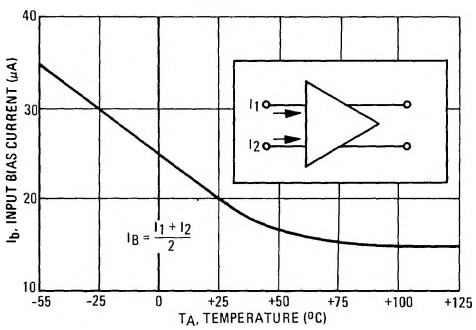
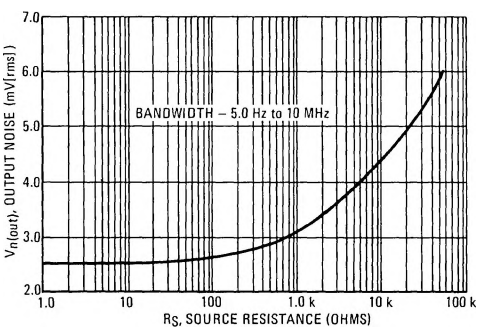


FIGURE 8
OUTPUT NOISE VOLTAGE versus SOURCE IMPEDANCE



TYPICAL APPLICATIONS

FIGURE 9
ENVELOPE DETECTOR

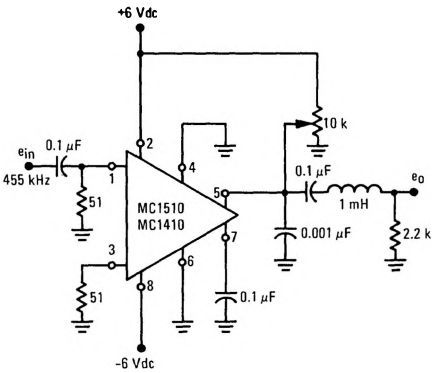


FIGURE 10
TWO STAGE VIDEO AMPLIFIER WITH ADJUSTABLE GAIN

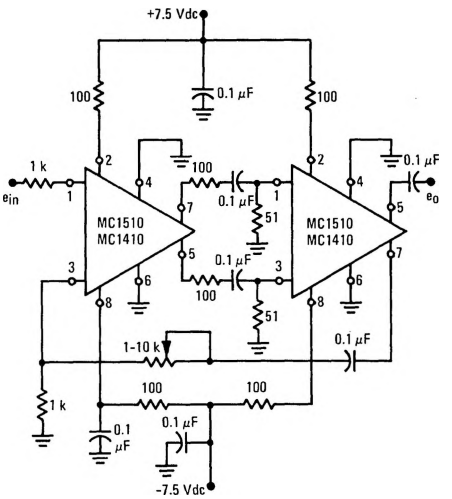


FIGURE 11
SINGLE STAGE WIDEBAND AMPLIFIER

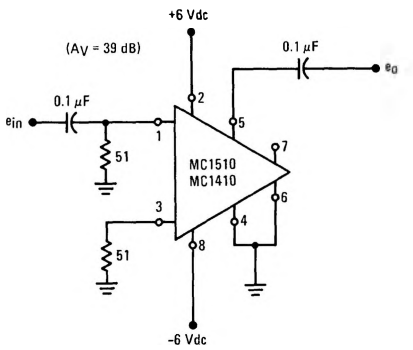


FIGURE 12
WEIN BRIDGE OSCILLATOR