MC1733
MC1733C

MONOLITHIC DIFFERENTIAL VIDEO AMPLIFIER

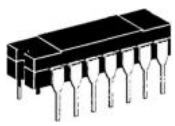
. . . a wideband amplifier with differential input and differential output. Gain is fixed at 10, 100, or 400 without external components or, with the addition of one external resistor, gain becomes adjustable from 10 to 400.

- Bandwidth – 120 MHz typical @ A_{vd} = 10
- Rise Time – 2.5 ns typical @ A_{vd} = 10
- Propagation Delay Time – 3.6 ns typical @ A_{vd} = 10

DIFFERENTIAL VIDEO WIDEBAND AMPLIFIER

MONOLITHIC SILICON INTEGRATED CIRCUIT

G SUFFIX
METAL PACKAGE
CASE 603-02
TO-100



L SUFFIX
CERAMIC PACKAGE
CASE 632
TO-116

FIGURE 1 – BASIC CIRCUIT

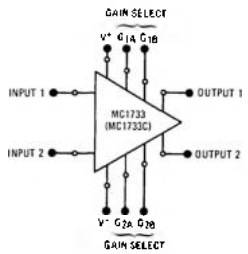


FIGURE 2 – VOLTAGE GAIN ADJUST CIRCUIT

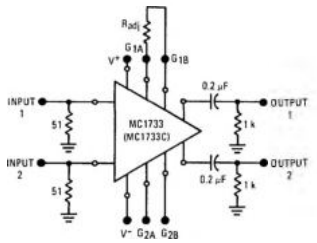
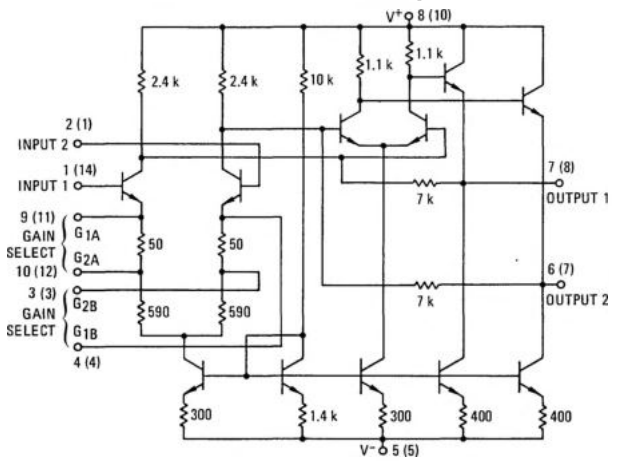
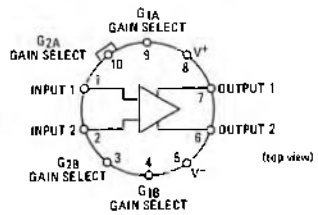


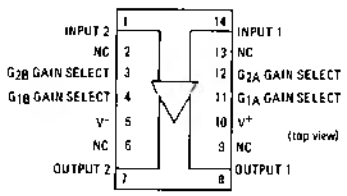
FIGURE 3 – CIRCUIT SCHEMATIC



CONNECTION DIAGRAMS



G SUFFIX, METAL PACKAGE
Pin 5 connected to case.



L SUFFIX, CERAMIC PACKAGE

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

Rating	Symbol	Value	Unit
Power Supply Voltage	V^+ V^-	+8.0 -8.0	Volts
Differential Input Voltage	V_{in}	±5.0	Volts
Common-Mode Input Voltage	CMV_{in}	±6.0	Volts
Output Current	I_o	10	mA
Internal Power Dissipation (Note 1) Metal Can Package Ceramic Dual In-Line Package	P_D	 500 500	mW
Operating Temperature Range MC1733C MC1733	T_A	0 to +75 -55 to +125	°C
Storage Temperature Range	T_{stg}	-65 to +150	°C

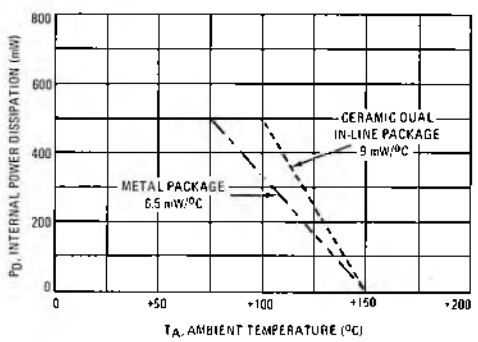
ELECTRICAL CHARACTERISTICS (V^+ = +6.0 Vdc, V^- = -6.0 Vdc, at T_A = +25°C unless otherwise noted)

		MC1733			MC1733C			
Characteristic	Symbol	Min	Typ	Max	Min	Typ	Max	Units
Differential Voltage Gain Gain 1 (Note 2) Gain 2 (Note 3) Gain 3 (Note 4)	A_{vd}	 300 90 9.0	 400 100 10	 500 110 11	 250 80 8.0	 400 100 10	 600 120 12	
Bandwidth (R_s = 50 Ω) Gain 1 Gain 2 Gain 3	BW	 – – –	 40 90 120	 – – –	 – – –	 40 90 120	 – – –	MHz
Rise Time (R_s = 50 Ω, V_o = 1 Vp-p) Gain 1 Gain 2 Gain 3	t_r	 – – –	 10.5 4.5 2.5	 – 10 –	 – – –	 10.5 4.5 2.5	 – 12 –	ns
Propagation Delay (R_s = 50 Ω, V_o = 1 Vp-p) Gain 1 Gain 2 Gain 3	t_{pd}	 – – –	 7.5 6.0 3.6	 – 10 –	 – – –	 7.5 6.0 3.6	 – 10 –	ns
Input Resistance Gain 1 Gain 2 Gain 3	R_{in}	 – 20 –	 4.0 30 250	 – – –	 – 10 –	 4.0 30 250	 – – –	kΩ
Input Capacitance (Gain 2)	C_{in}	–	2.0	–	–	2.0	–	pF
Input Offset Current	$\|I_{io}\|$	–	0.4	3.0	–	0.4	5.0	μA
Input Bias Current	I_b	–	9.0	20	–	9.0	30	μA
Input Noise Voltage (R_s = 50 Ω, BW = 1 kHz to 10 MHz)	V_n	–	12	–	–	12	–	μV(rms)
Input Voltage Range	V_{in}	±1.0			±1.0	–	–	V
Common-Mode Rejection Ratio Gain 2 (V_{CM} = ±1 V, f ≤ 100 kHz) Gain 2 (V_{CM} = ±1 V, f = 5 MHz)	CM_{rej}	 60 –	 86 60	 – –	 60 –	 86 60	 – –	dB
Supply Voltage Rejection Ratio Gain 2 (ΔV_s = ±0.5 V)	S^+, S^-	 50	 70	 –	 50	 70	 –	dB
Output Offset Voltage Gain 1 Gain 2 and Gain 3	V_{oo}	 – –	 0.6 0.35	 1.5 1.0	 – –	 0.6 0.35	 1.5 1.5	V
Output Common-Mode Voltage	CMV_o	2.4	2.9	3.4	2.4	2.9	3.4	V
Output Voltage Swing	V_o	3.0	4.0	–	3.0	4.0	–	Vp-p
Output Sink Current	I_o	2.5	3.6	–	2.5	3.6	–	mA
Output Resistance	R_{out}	–	20	–	–	20	–	Ω
Power Supply Current	I_D	–	18	24	–	18	24	mA

NOTES

Note 1: Derate metal package at 6.5 mW/°C for operation at ambient temperatures above 75°C and dual in-line package at 9 mW/°C for operation at ambient temperatures above 100°C (see Figure 4). If operation at high ambient temperatures is required (MC1733) a heatsink may be necessary to limit maximum junction temperature to 150°C. Thermal resistance, junction-to-case, for the metal package is 69.4°C per Watt.
Note 2: Gain Select pins G_{1A} and G_{1B} connected together.
Note 3: Gain Select pins G_{2A} and G_{2B} connected together.
Note 4: All Gain Select pins open.

FIGURE 4 – MAXIMUM ALLOWABLE POWER DISSIPATION



TYPICAL CHARACTERISTICS

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

FIGURE 5 – SUPPLY CURRENT versus TEMPERATURE

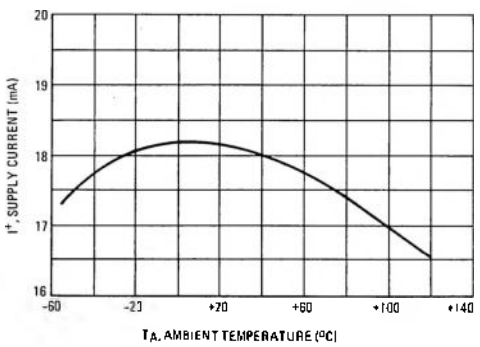
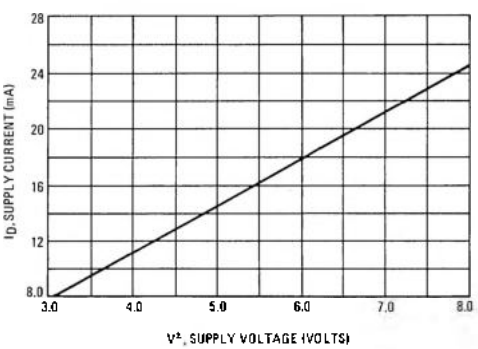


FIGURE 6 – SUPPLY CURRENT versus SUPPLY VOLTAGE



TYPICAL CHARACTERISTICS (continued)

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

FIGURE 7 – GAIN versus TEMPERATURE

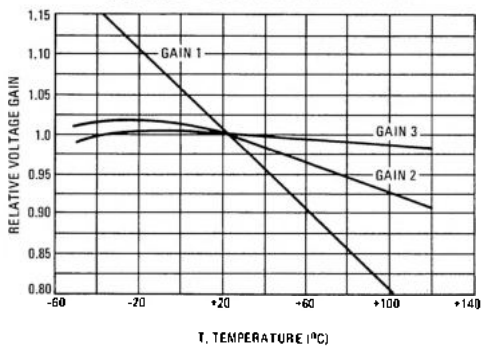


FIGURE 8 – GAIN versus FREQUENCY

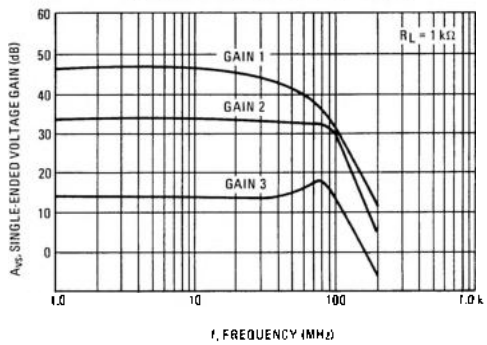


FIGURE 9 – GAIN versus SUPPLY VOLTAGE

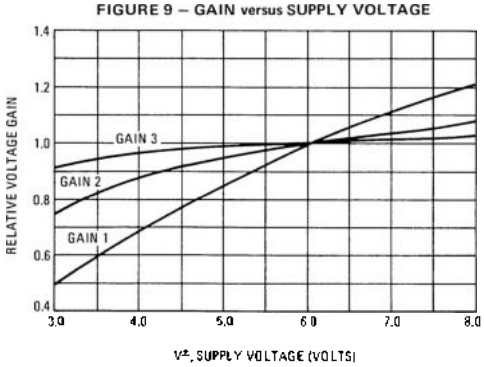


FIGURE 10 – GAIN versus R_{ADJUST}

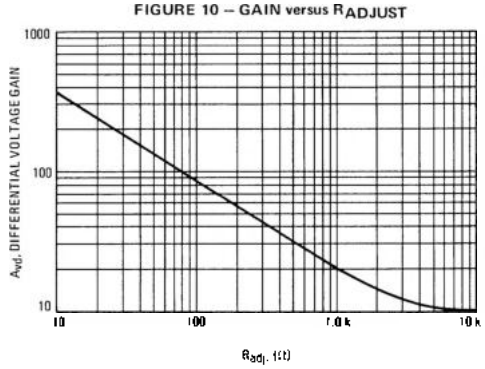


FIGURE 11 – GAIN versus FREQUENCY and SUPPLY VOLTAGE

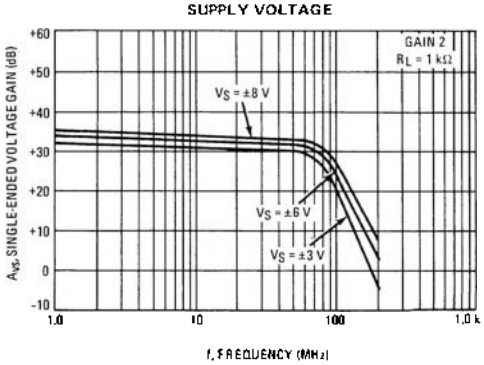
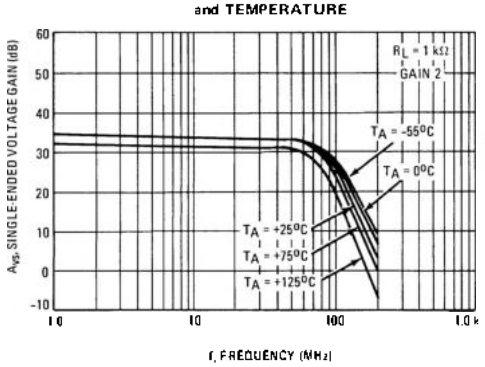


FIGURE 12 – GAIN versus FREQUENCY and TEMPERATURE



TYPICAL CHARACTERISTICS (continued)

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

FIGURE 13 – PULSE RESPONSE versus GAIN

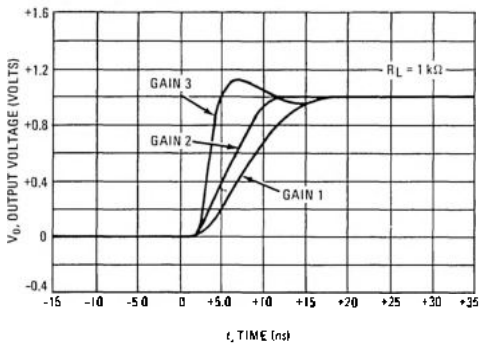


FIGURE 14 – PULSE RESPONSE versus SUPPLY VOLTAGE

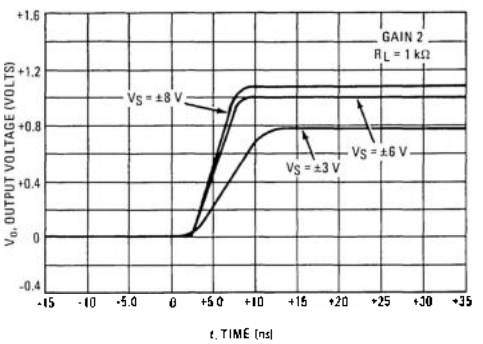


FIGURE 15 – PULSE RESPONSE versus TEMPERATURE

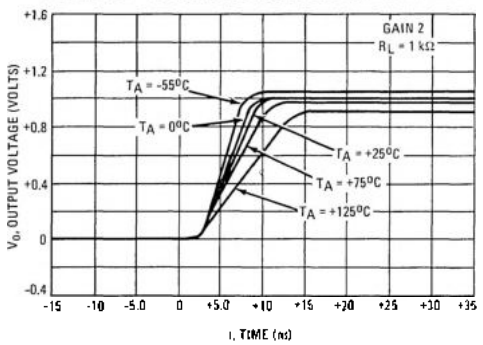


FIGURE 16 – DIFFERENTIAL OVERDRIVE RECOVERY TIME

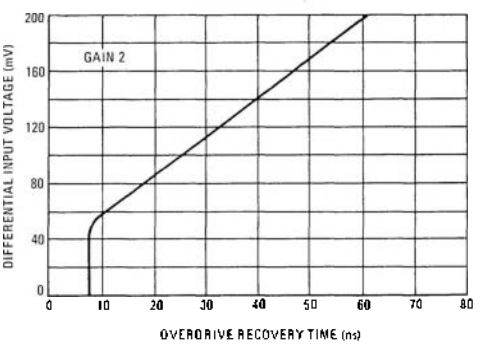


FIGURE 17 – PHASE SHIFT versus FREQUENCY

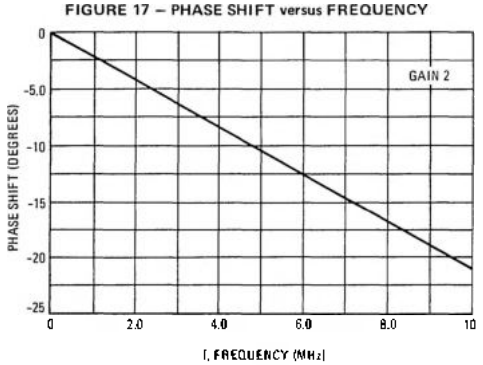
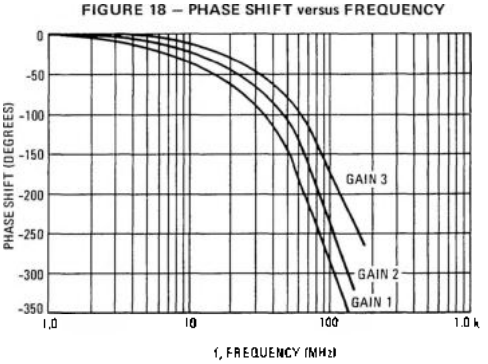


FIGURE 18 – PHASE SHIFT versus FREQUENCY



TYPICAL CHARACTERISTICS (continued)

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

FIGURE 19 – INPUT RESISTANCE versus TEMPERATURE

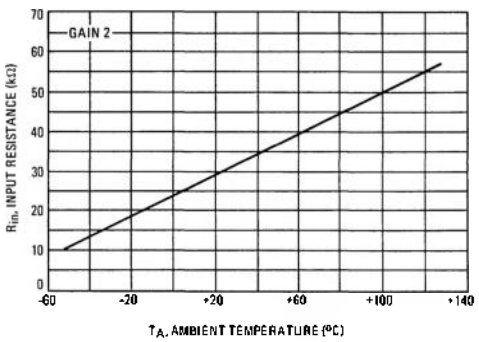


FIGURE 20 – INPUT NOISE VOLTAGE

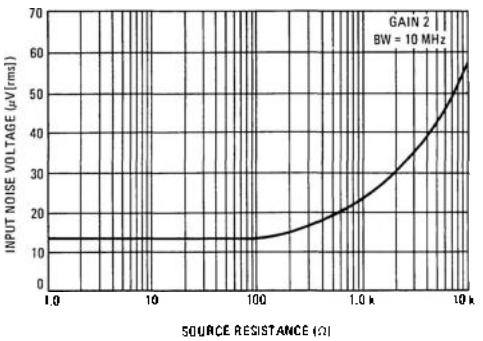


FIGURE 21 – OUTPUT VOLTAGE SWING and SINK CURRENT versus SUPPLY VOLTAGE

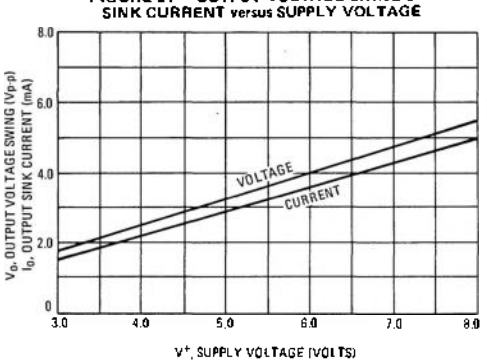


FIGURE 22 – OUTPUT VOLTAGE SWING versus LOAD RESISTANCE

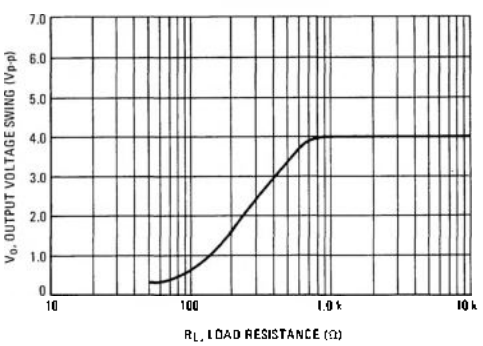


FIGURE 23 – OUTPUT VOLTAGE SWING versus FREQUENCY

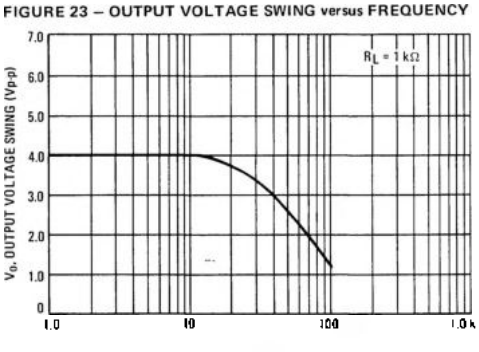


FIGURE 24 – COMMON-MODE REJECTION RATIO