MC1741
MC1741C

OPERATIONAL AMPLIFIERS

INTERNALLY COMPENSATED, HIGH PERFORMANCE MONOLITHIC OPERATIONAL AMPLIFIER

. . . designed for use as a summing amplifier, integrator, or amplifier with operating characteristics as a function of the external feedback components.

- No Frequency Compensation Required
- Short-Circuit Protection
- Offset Voltage Null Capability
- Wide Common-Mode and Differential Voltage Ranges
- Low-Power Consumption
- No Latch Up

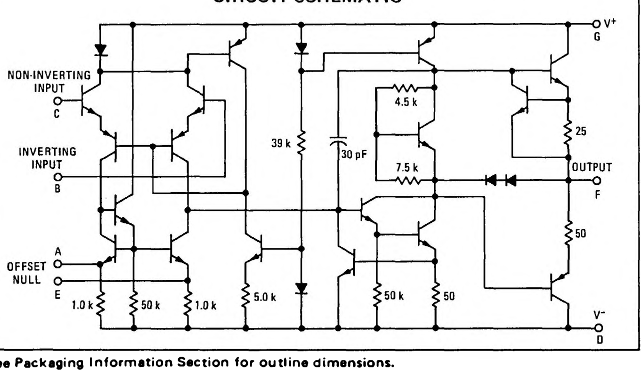
MAXIMUM RATINGS (T_A = +25°C unless otherwise noted)

Rating	Symbol	Value		Unit
		MC1741C	MC1741	
Power Supply Voltage	V^+ V^-	+18 -18	+22 -22	Vdc Vdc
Differential Input Signal	V_{in}	±30		Volts
Common Mode Input Swing (Note 1)	CMV_{in}	±15		Volts
Output Short Circuit Duration (Note 2)	t_S	Continuous		
Power Dissipation (Package Limitation)	P_D			
Metal Can		680		mW
Derate above T_A = +25°C		4.6		mW/°C
Flat Package		500		mW
Derate above T_A = +25°C		3.3		mW/°C
Plastic Dual In-Line Packages		625		mW
Derate above T_A = +25°C		5.0		mW/°C
Ceramic Dual In-Line Package		750		mW/°C
Derate above T_A = +25°C		6.0		mW/°C
Operating Temperature Range	T_A	0 to +75	-55 to +125	°C
Storage Temperature Range	T_{stg}			°C
Metal, Flat and Ceramic Packages		-65 to +150		
Plastic Package		-55 to +125		

Note 1. For supply voltages less than ± 15 V, the absolute maximum input voltage is equal to the supply voltage.

Note 2. Supply voltage equal to or less than 15 V.

CIRCUIT SCHEMATIC

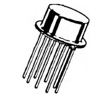


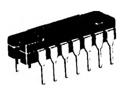
See Packaging Information Section for outline dimensions.

OPERATIONAL AMPLIFIER

MONOLITHIC SILICON INTEGRATED CIRCUIT

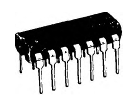
G SUFFIX
METAL PACKAGE
CASE 601
TO-99

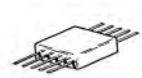




L SUFFIX
CERAMIC PACKAGE
CASE 632
TO-116

P2 SUFFIX
PLASTIC PACKAGE
CASE 605
TO-116
(MC1741C only)





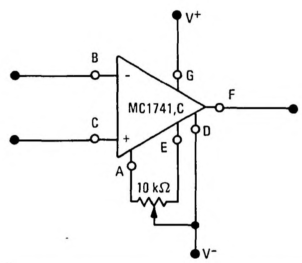
F SUFFIX
CERAMIC PACKAGE
CASE 606
TO-91

P1 SUFFIX
PLASTIC PACKAGE
CASE 626
(MC1741C only)

PIN CONNECTIONS

Schematic	A	B	C	D	E	F	G
"G" & "P1" Packages	1	2	3	4	5	6	7
"F" Package	2	3	4	5	6	7	8
"P2" & "L" Packages	3	4	5	6	9	10	11

FIGURE 1 – OFFSET ADJUST CIRCUIT



ELECTRICAL CHARACTERISTICS (V^+ = +15 Vdc, V^- = 15 Vdc, T_A = +25°C unless otherwise noted)

Characteristic	Symbol	MC1741			MC1741C (4)			Unit
		Min	Typ	Max	Min	Typ	Max	
Open Loop Voltage Gain (R_L = 2.0 kΩ) (V_o = ± 10 V, T_A = +25°C)	A_{VOL}	50,000	200,000	–	20,000	100,000	–	–
(V_o = ± 10 V, T_A = T_{low} (1) to T_{high} (2))		25,000	–	–	15,000	–	–	
Output Impedance (f = 20 Hz)	Z_o	–	75	–	–	75	–	Ω
Input Impedance (f = 20 Hz)	Z_{in}	0.3	1.0	–	0.3	1.0	–	MegΩ
Output Voltage Swing (R_L = 10 kΩ, T_A = +25°C)	V_o	±12	±14	–	±12	±14	–	V_{peak}
(R_L = 2.0 kΩ, T_A = +25°C)		±10	±13	–	±10	±13	–	
(R_L = 2.0 kΩ, T_A = T_{low} (1) to T_{high} (2))		±10	–	–	±10	–	–	
Input Common-Mode Voltage Swing	CMV_{in}	±12	±13	–	±12	±13	–	V_{peak}
Common-Mode Rejection Ratio (f = 20 Hz)	CM_{rej}	70	90	–	70	90	–	dB
Input Bias Current (T_A = +25°C)	I_b	–	0.2	0.5	–	0.2	0.5	µA
(T_A = T_{low} (1))		–	0.5	1.5	–	–	0.8	
Input Offset Current (T_A = +25°C)	$\|I_{io}\|$	–	0.03	0.2	–	0.03	0.2	µA
(T_A = T_{low} (1) to T_{high} (2))		–	–	0.5	–	–	0.3	
Input Offset Voltage (R_S = ≤ 10 kΩ) (T_A = +25°C)	$\|V_{io}\|$	–	1.0	5.0	–	2.0	6.0	mV
(T_A = T_{low} (1) to T_{high} (2))		–	–	6.0	–	–	7.5	
Step Response Gain = 100, R_1 = 1.0 kΩ, R_2 = 100 kΩ, R_3 = 1.0 kΩ	t_f	–	29	–	–	29	–	µs
	t_{pd}	–	8.5	–	–	8.5	–	µs
	dV_{out}/dt (3)	–	1.0	–	–	1.0	–	V/µs
Gain = 10, R_1 = 1.0 kΩ, R_2 = 10 kΩ, R_3 = 1.0 kΩ	t_f	–	3.0	–	–	3.0	–	µs
	t_{pd}	–	1.0	–	–	1.0	–	µs
	dV_{out}/dt (3)	–	1.0	–	–	1.0	–	V/µs
Gain = 1, R_1 = 10 kΩ, R_2 = 10 kΩ, R_3 = 5.0 kΩ	t_f	–	0.6	–	–	0.6	–	µs
	t_{pd}	–	0.38	–	–	0.38	–	µs
	dV_{out}/dt (3)	–	0.8	–	–	0.8	–	V/µs
Average Temperature Coefficient of Input Offset Voltage (R_S = 50 Ω, T_A = T_{low} (1) to T_{high} (2))	$\|TC_{Vio}\|$	–	3.0	–	–	3.0	–	µV/°C
(R_S = 10 kΩ, T_A = T_{low} (1) to T_{high} (2))		–	6.0	–	–	6.0	–	
Average Temperature Coefficient of Input Offset Current (T_A = T_{low} (1) to T_{high} (2))	$\|TC_{Iio}\|$	–	50	–	–	50	–	pA/°C
DC Power Dissipation (Power Supply = ± 15 V, V_o = 0)	P_D	–	50	85	–	50	85	mW
Positive Supply Sensitivity (V^- constant)	S^+	–	30	150	–	30	150	µV/V
Negative Supply Sensitivity (V^+ constant)	S^-	–	30	150	–	30	150	µV/V
Power Bandwidth (A_v = 1, R_L = 2.0 kΩ, THD = 5%, V_o = 20 V_{p-p})	PBW	–	10	–	–	10	–	kHz

(1) T_{low} = 0°C for MC1741C = -55°C for MC1741

(2) T_{high} = +75°C for MC1741C = +125°C for MC1741

(3) dV_{out}/dt = Slew Rate

(4) Plastic package offered in limited temperature range only.

TYPICAL CHARACTERISTICS

(V^+ = +15 Vdc, V^- = -15 Vdc, T_A = +25°C unless otherwise noted)

FIGURE 2 – POWER BANDWIDTH (LARGE SIGNAL SWING versus FREQUENCY)

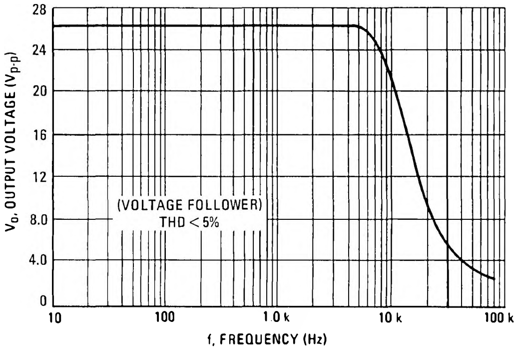


FIGURE 3 – OPEN LOOP FREQUENCY RESPONSE

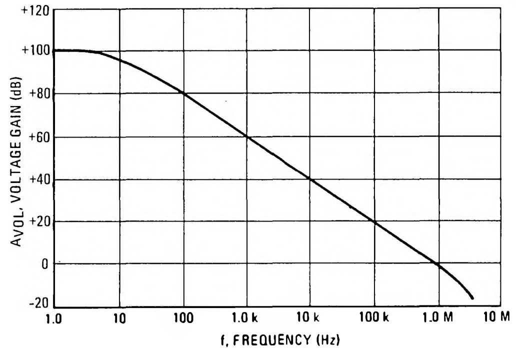


FIGURE 4 – OUTPUT NOISE versus SOURCE RESISTANCE

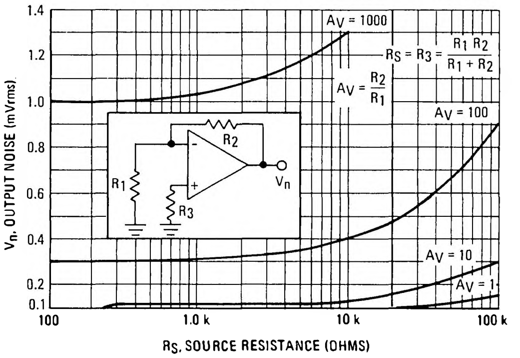


FIGURE 5 – INPUT OFFSET VOLTAGE versus TEMPERATURE

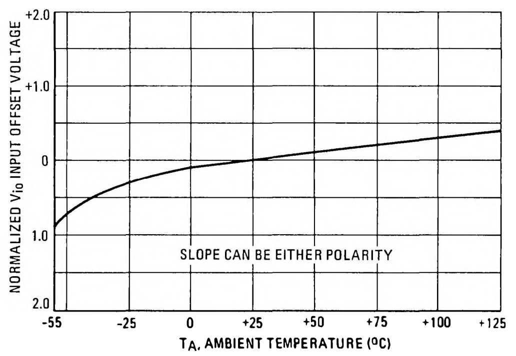


FIGURE 6 – INPUT OFFSET CURRENT versus TEMPERATURE

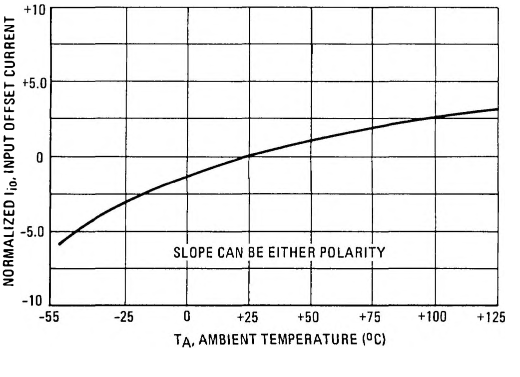


FIGURE 7 – INPUT BIAS CURRENT versus TEMPERATURE

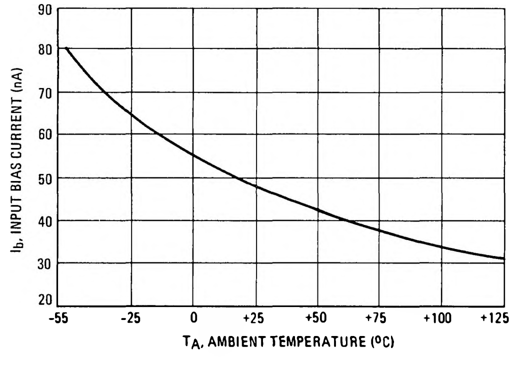


FIGURE 8 – POWER DISSIPATION versus POWER SUPPLY VOLTAGE

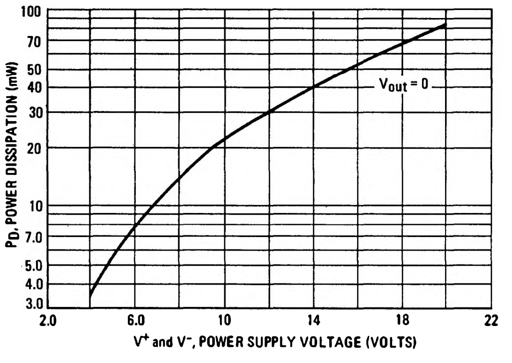


FIGURE 9 – OUTPUT VOLTAGE SWING versus LOAD RESISTANCE

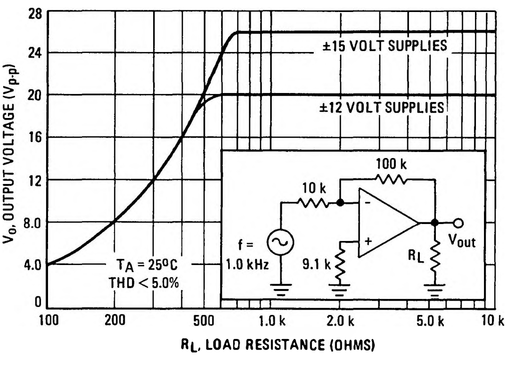
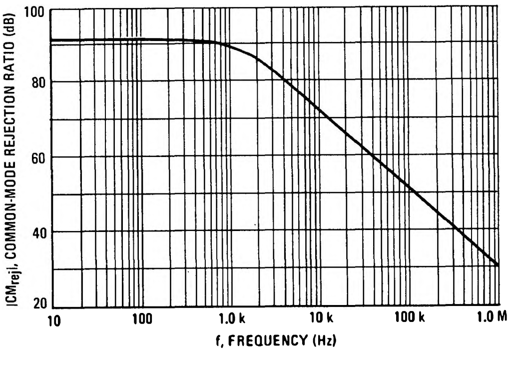


FIGURE 10 – COMMON-MODE REJECTION RATIO versus FREQUENCY



See current MCC1741/1741C data sheet for standard linear chip information.