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MOTOROLA

MC1741C

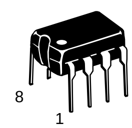
Internally Compensated, High Performance Operational Amplifier

OPERATIONAL AMPLIFIER

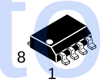
SEMICONDUCTOR TECHNICAL DATA

The MC1741C was 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



P1 SUFFIX
PLASTIC PACKAGE
CASE 626



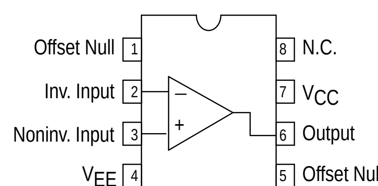
D SUFFIX
PLASTIC PACKAGE
CASE 751
(SO–8)

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Power Supply Voltage	V_{CC}, V_{EE}	±18	Vdc
Input Differential Voltage	V_{ID}	±30	V
Input Common Mode Voltage (Note 1)	V_{ICM}	±15	V
Output Short Circuit Duration (Note 2)	t_{SC}	Continuous	
Operating Ambient Temperature Range	T_A	0 to +70	°C
Storage Temperature Range	T_{stg}	–55 to +125	°C

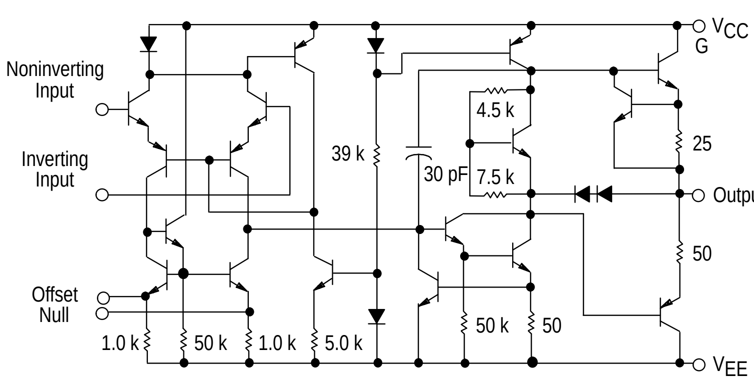
NOTES: 1. For supply voltages less than +15 V, the absolute maximum input voltage is equal to the supply voltage.
2. Supply voltage equal to or less than 15 V.

PIN CONNECTIONS



(Top View)

Equivalent Circuit Schematic
(1/4 of Circuit Shown)



ORDERING INFORMATION

Device	Alternate	Operating Temperature Range	Package
MC1741CD	–	T_A = 0° to +70°C	SO–8
MC1741CP1	LM741CN µA741TC		Plastic DIP

 Rev 5

ELECTRICAL CHARACTERISTICS (V_{CC} = +15 V, V_{EE} = –15 V, T_A = 25°C, unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Input Offset Voltage (R_S ≤ 10 k)	V_{IO}	–	2.0	6.0	mV
Input Offset Current	I_{IO}	–	20	200	nA
Input Bias Current	I_{IB}	–	80	500	nA
Input Resistance	r_i	0.3	2.0	–	MΩ
Input Capacitance	C_i	–	1.4	–	pF
Offset Voltage Adjustment Range	V_{IOR}	–	±15	–	mV
Common Mode Input Voltage Range	V_{ICR}	±12	±13	–	V
Large Signal Voltage Gain (V_O = ±10 V, R_L ≥ 2.0 k)	A_{VOL}	20	200	–	V/mV
Output Resistance	r_o	–	75	–	Ω
Common Mode Rejection (R_S ≤ 10 k)	CMR	70	90	–	dB
Supply Voltage Rejection (R_S ≤ 10 k)	PSR	75	–	–	dB
Output Voltage Swing (R_L ≥ 10 k) (R_L ≥ 2.0 k)	V_O	 ±12 ±10	 ±14 ±13	 – –	V
Output Short Circuit Current	I_{SC}	–	20	–	mA
Supply Current	I_D	–	1.7	2.8	mA
Power Consumption	P_C	–	50	85	mW
Transient Response (Unity Gain, Noninverting) (V_I = 20 mV, R_L ≥ 2.0 k, C_L ≤ 100 pF) Rise Time (V_I = 20 mV, R_L ≥ 2.0 k, C_L ≤ 100 pF) Overshoot (V_I = 10 V, R_L ≥ 2.0 k, C_L ≤ 100 pF) Slew Rate	 t_{TLH} os SR	 – – –	 0.3 15 0.5	 – – –	 µs % V/µs

ELECTRICAL CHARACTERISTICS (V_{CC} = +15 V, V_{EE} = –15 V, T_A = T_{low} to T_{high}, unless otherwise noted.)*

Characteristic	Symbol	Min	Typ	Max	Unit
Input Offset Voltage (R_S ≤ 10 kΩ)	V_{IO}	–	–	7.5	mV
Input Offset Current (T_A = 0° to +70°C)	I_{IO}	–	–	300	nA
Input Bias Current (T_A = 0° to +70°C)	I_{IB}	–	–	800	nA
Supply Voltage Rejection (R_S ≤ 10 k)	PSR	75	–	–	dB
Output Voltage Swing (R_L ≥ 2.0 k)	V_O	±10	±13	–	V
Large Signal Voltage Gain (R_L ≥ 2.0 k, V_O = ±10 V)	A_{VOL}	15	–	–	V/mV

* T_{low} = 0°C T_{high} = 70°C

Figure 1. Burst Noise versus Source Resistance

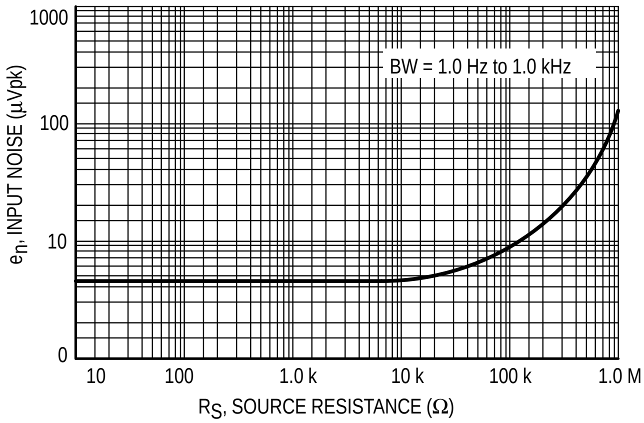


Figure 2. RMS Noise versus Source Resistance

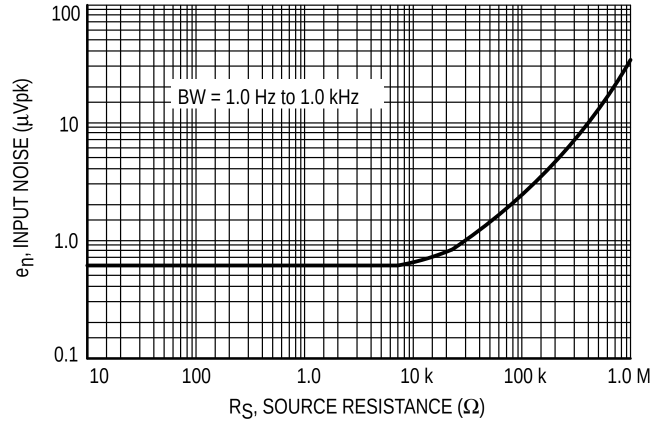


Figure 3. Output Noise versus Source Resistance

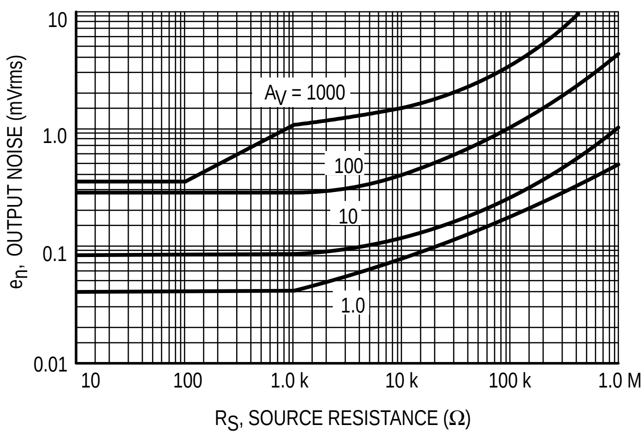


Figure 4. Spectral Noise Density

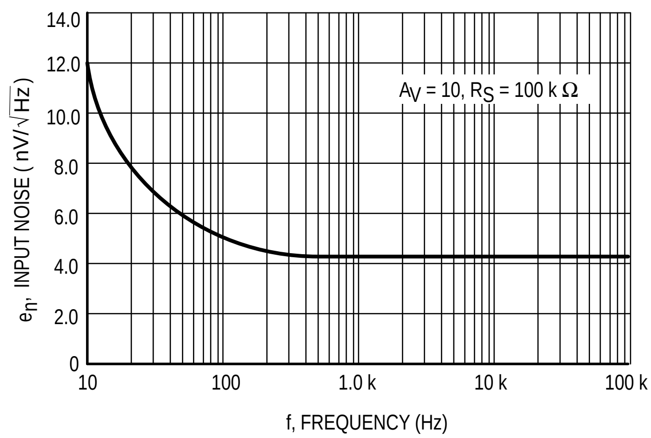
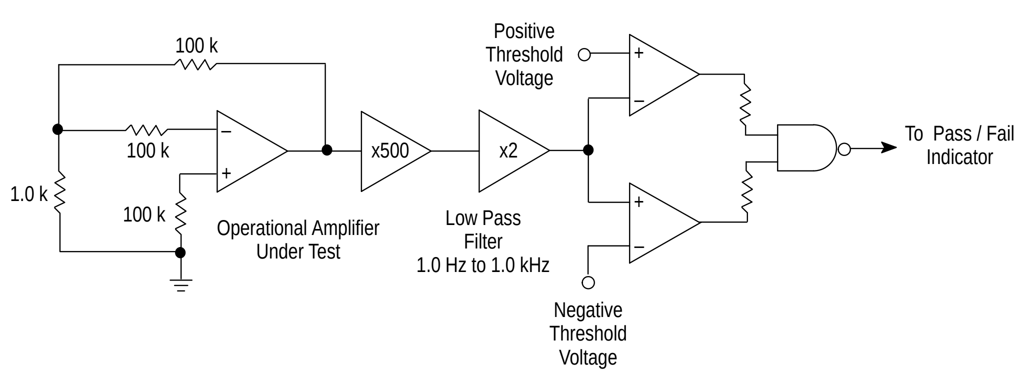


Figure 5. Burst Noise Test Circuit



Unlike conventional peak reading or RMS meters, this system was especially designed to provide the quick response time essential to burst (popcorn) noise testing.

The test time employed is 10 sec and the 20 mV peak limit refers to the operational amplifier input thus eliminating errors in the closed loop gain factor of the operational amplifier.

Figure 6. Power Bandwidth (Large Signal Swing versus Frequency)

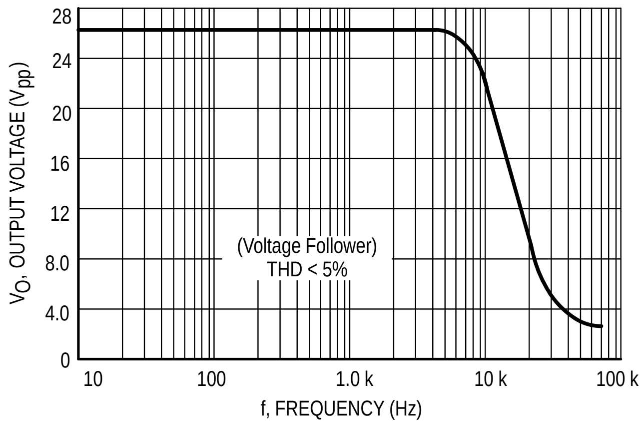


Figure 7. Open Loop Frequency Response

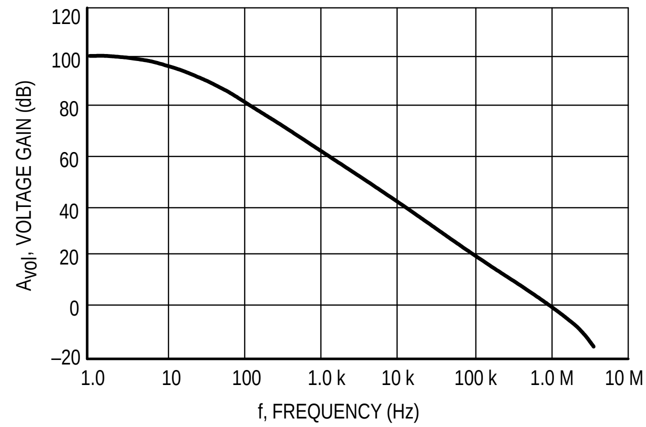


Figure 8. Positive Output Voltage Swing versus Load Resistance

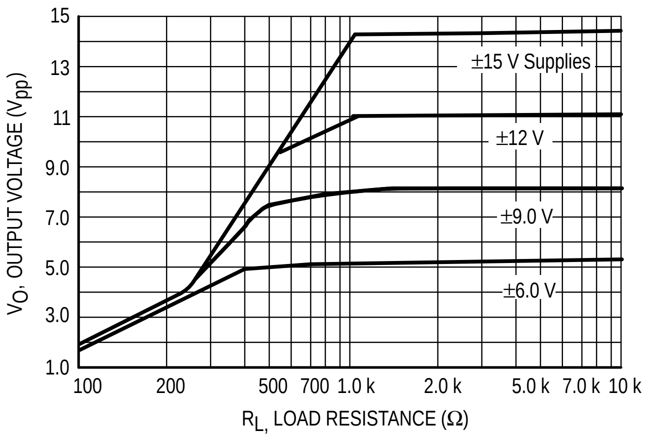


Figure 9. Negative Output Voltage Swing versus Load Resistance

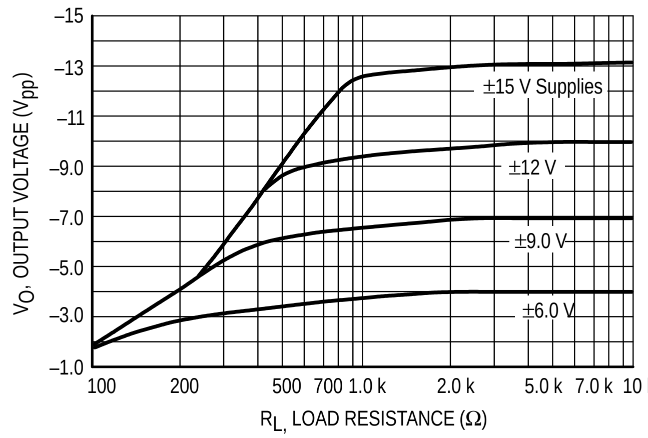


Figure 10. Output Voltage Swing versus Load Resistance (Single Supply Operation)

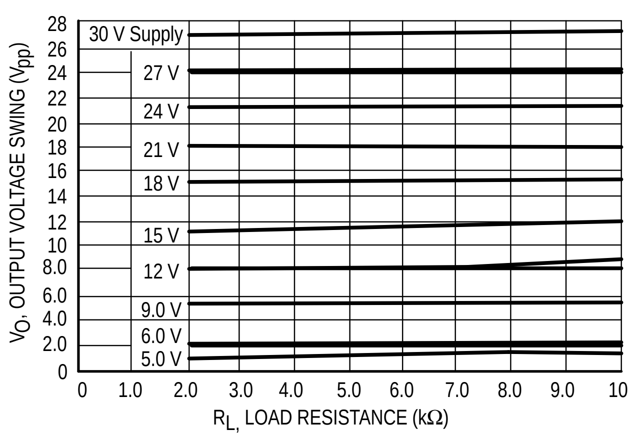


Figure 11. Single Supply Inverting Amplifier

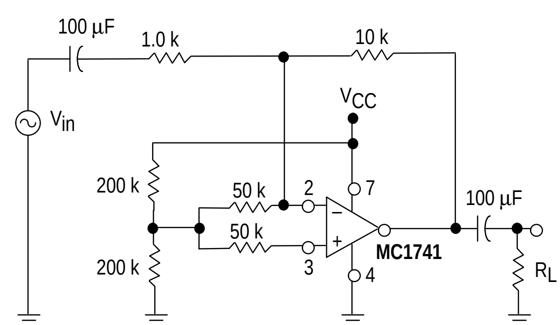


Figure 12. Noninverting Pulse Response

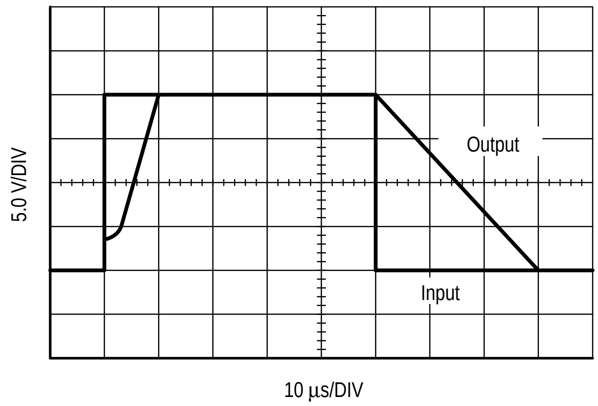


Figure 13. Transient Response Test Circuit

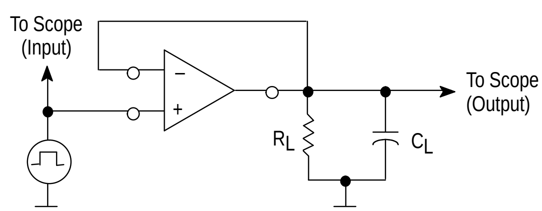
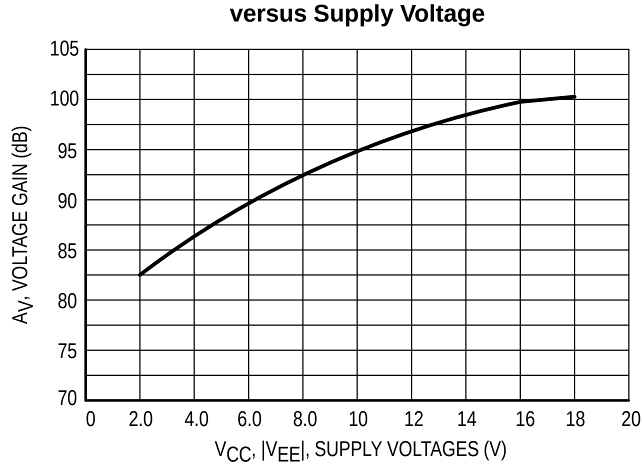
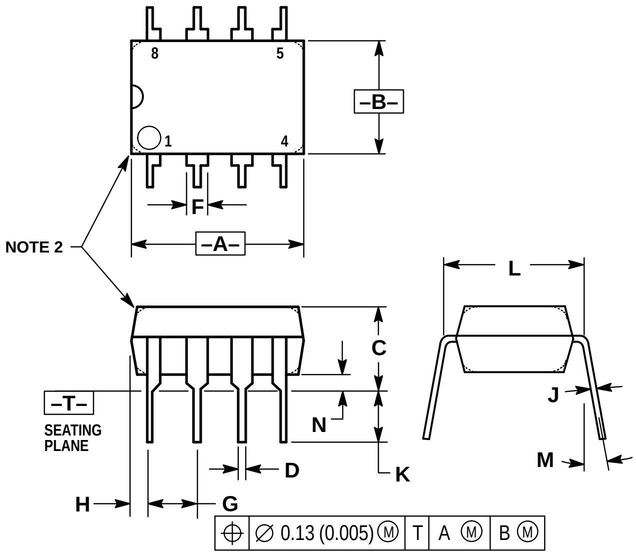


Figure 14. Open Loop Voltage Gain versus Supply Voltage



OUTLINE DIMENSIONS

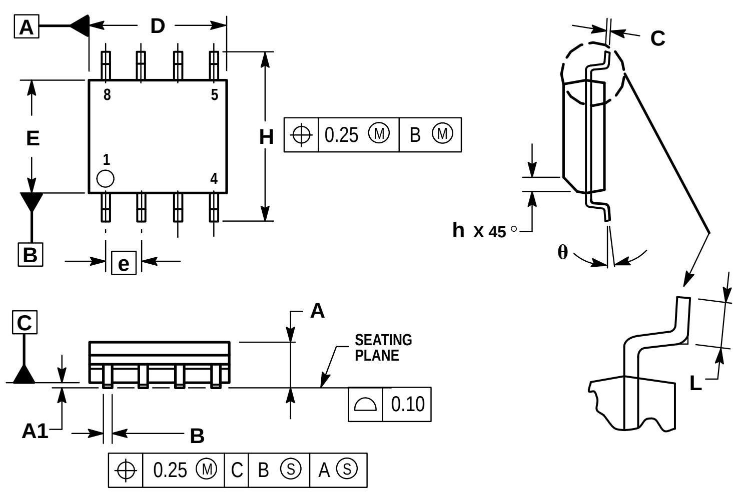
P1 SUFFIX
PLASTIC PACKAGE
CASE 626–05
ISSUE K



NOTES:
1. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
2. PACKAGE CONTOUR OPTIONAL (ROUND OR SQUARE CORNERS).
3. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	9.40	10.16	0.370	0.400
B	6.10	6.60	0.240	0.260
C	3.94	4.45	0.155	0.175
D	0.38	0.51	0.015	0.020
F	1.02	1.78	0.040	0.070
G	2.54 BSC		0.100 BSC	
H	0.76	1.27	0.030	0.050
J	0.20	0.30	0.008	0.012
K	2.92	3.43	0.115	0.135
L	7.62 BSC		0.300 BSC	
M	—	10°	—	10°
N	0.76	1.01	0.030	0.040

D SUFFIX
PLASTIC PACKAGE
CASE 751–05
(SO–8)
ISSUE R



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. DIMENSIONS ARE IN MILLIMETERS.
3. DIMENSION D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE MOLD PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 TOTAL IN EXCESS OF THE B DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS	
DIM	MIN	MAX
A	1.35	1.75
A1	0.10	0.25
B	0.35	0.49
C	0.18	0.25
D	4.80	5.00
E	3.80	4.00
e	1.27 BSC	
H	5.80	6.20
h	0.25	0.50
L	0.40	1.25
θ	0°	7°

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