MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

MC4741
MC4741C

2

(Quad MC1741)
Operational Amplifiers

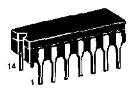
The MC4741,C is a true quad MC1741. Integrated on a single monolithic chip are four independent, low power operational amplifiers which have been designed to provide operating characteristics identical to those of the industry standard MC1741, and can be applied with no change in circuit performance.

The MC4741,C can be used in applications where amplifier matching or high packing density is important. Other applications include high impedance buffer amplifiers and active filter amplifiers.

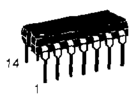
- Each Amplifier is Functionally Equivalent to the MC1741
- Class AB Output Stage Eliminates Crossover Distortion
- True Differential Inputs
- Internally Frequency Compensated
- Short Circuit Protection
- Low Power Supply Current (0.6 mA/Amplifier)

(QUAD MC1741)
DIFFERENTIAL INPUT OPERATIONAL AMPLIFIERS

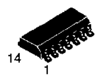
SILICON MONOLITHIC INTEGRATED CIRCUIT



L SUFFIX
CERAMIC PACKAGE
CASE 632

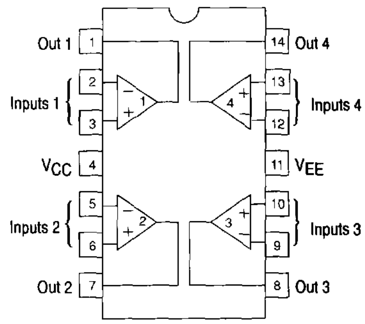


P SUFFIX
PLASTIC PACKAGE
CASE 646



D SUFFIX
PLASTIC PACKAGE
CASE 751A
(SO-14)

PIN CONNECTIONS

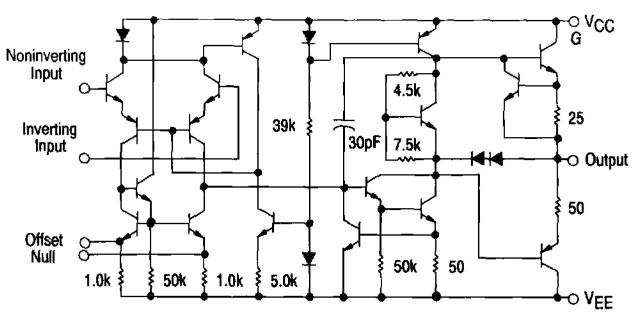


(Top View)

ORDERING INFORMATION

Device	Temperature Range	Package
MC4741L	−55° to +125°C	Ceramic DIP
MC4741CD MC4741CL MC4741CP	0° to +70°C	SO-14 Ceramic DIP Plastic DIP

EQUIVALENT CIRCUIT SCHEMATIC
(1/4 of Circuit Shown)



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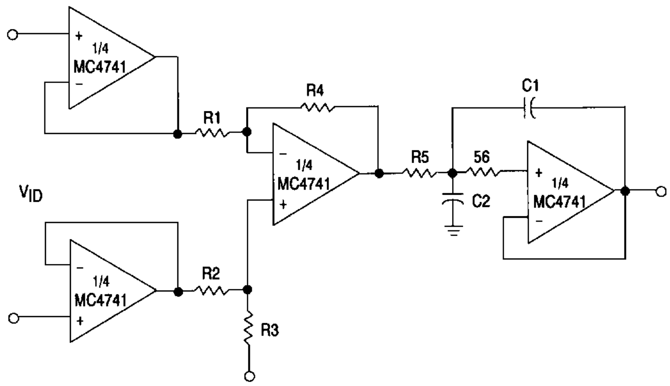
MAXIMUM RATINGS (T_A = +25°C, unless otherwise noted.)

Rating	Symbol	MC4741	MC4741C	Unit
Power Supply Voltage	V_{CC} V_{EE}	+22 −22	+18 −18	Vdc
Input Differential Voltage	V_{ID}	±44	±36	V
Input Common Mode Voltage	V_{ICM}	±22	±18	V
Output Short Circuit Duration	t_{SC}	Continuous		
Operating Ambient Temperature Range	T_A	−55 to +125	0 to +70	°C
Storage Temperature Range Ceramic Package Plastic Package	T_{stg}	 −65 to +150 −55 to +125		°C
Junction Temperature Ceramic Package Plastic Package	T_J	 175 150		°C

High Impedance Instrumentation Buffer/Filter



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

Characteristics	Symbol	MC4741 Min	MC4741 Typ	MC4741 Max	MC4741C Min	MC4741C Typ	MC4741C Max	Unit
Input Offset Voltage (R_S ≤ 10 k)	V_{IO}	—	1.0	5.0	—	2.0	6.0	mV
Input Offset Current	I_{IO}	—	20	200	—	20	200	nA
Input Bias Current	I_{IB}	—	80	500	—	80	500	nA
Input Resistance	r_i	0.3	2.0	—	0.3	2.0	—	MΩ
Input Capacitance	C_i	—	1.4	—	—	1.4	—	pF
Offset Voltage Adjustment Range	V_{IOR}	—	±15	—	—	±15	—	mV
Common Mode Input Voltage Range	V_{ICR}	±12	±13	—	±12	±13	—	V
Large Signal Voltage Gain (V_O = ±10 V, R_L ≥ 2.0 k)	A_v	50	200	—	20	200	—	V/mV
Output Resistance	r_o	—	75	—	—	75	—	Ω
Common Mode Rejection (R_S ≤ 10 k)	CMR	70	90	—	70	90	—	dB
Supply Voltage Rejection Ratio (R_S ≤ 10 k)	PSRR	—	30	150	—	30	150	µV/V
Output Voltage Swing	V_O							V
(R_L ≥ 10 k)		±12	±14	—	±12	±14	—	
(R_L ≥ 2 k)		±10	±13	—	±10	±13	—	
Output Short Circuit Current	I_{SC}	—	20	—	—	20	—	mA
Supply Current — (All Amplifiers)	I_D	—	2.4	4.0	—	3.5	7.0	mA
Power Consumption (All Amplifiers)	P_C	—	72	120	—	105	210	mW
Transient Response (Unity Gain — Non-Inverting)								
(V_I = 20 mV, R_L ≥ 2 kΩ, C_L ≤ 100 pF) Rise Time	t_{TLH}	—	0.3	—	—	0.3	—	µs
(V_I = 20 mV, R_L ≥ 2 kΩ, C_L ≤ 100 pF) Overshoot	os	—	15	—	—	15	—	%
(V_I = 10 V, R_L ≥ 2 kΩ, C_L ≤ 100 pF) Slew Rate	SR	—	0.5	—	—	0.5	—	V/µs

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

Characteristics	Symbol	MC4741 Min	MC4741 Typ	MC4741 Max	MC4741C Min	MC4741C Typ	MC4741C Max	Unit
Input Offset Voltage (R_S ≤ 10 kΩ)	V_{IO}	—	1.0	6.0	—	—	7.5	mV
Input Offset Current	I_{IO}							nA
(T_A = 125°C)		—	7.0	200	—	—	—	
(T_A = −55°C)		—	85	500	—	—	—	
(T_A = 0° to + 70°C)		—	—	—	—	—	300	
Input Bias Current	I_{IB}							nA
(T_A = 125°C)		—	30	500	—	—	—	
(T_A = −55°C)		—	300	1500	—	—	—	
(T_A = 0° to + 70°C)		—	—	—	—	—	800	
Common Mode Input Voltage Range	V_{ICR}	±12	±13	—	—	—	—	V
Large Signal Voltage Gain (R_L ≥ 2k, V_{OUT} = ±10 V)	A_V	25	—	—	15	—	—	V/mV
Common Mode Rejection (R_S ≤ 10 k)	CMR	70	90	—	—	—	—	dB
Supply Voltage Rejection Ratio (R_S ≤ 10 k)	PSRR	—	30	150	—	—	—	µV/V
Output Voltage Swing	V_O							V
(R_L ≥ 10 k)		±12	±14	—	—	—	—	
(R_L ≥ 2 k)		±10	±13	—	±10	±13	—	
Supply Currents — (All Amplifiers)	I_D							mA
(T_A = 125°C)		—	2.4	3.4	—	—	—	
(T_A = −55°C)		—	3.6	5.0	—	—	—	
Power Consumption (T_A = +125°C)	P_C	—	72	102	—	—	—	mW
(T_A = −55°C)		—	108	150	—	—	—	

* T_{high} = 125°C for MC4741 and 70°C for MC4741C.
T_{low} = −55°C for MC4741 and 0°C for MC4741C.

Figure 1. Power Bandwidth (Large Signal Swing versus Frequency)

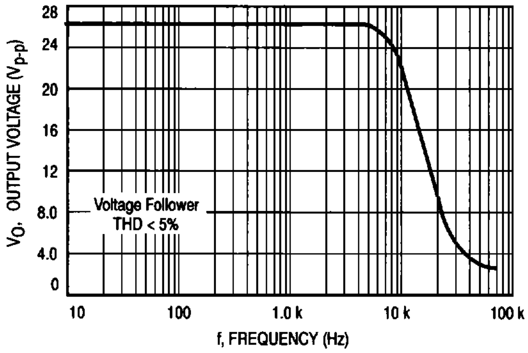

Figure 2. Open-Loop Frequency Response

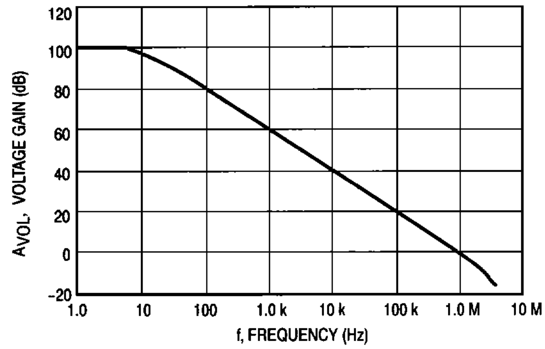

Figure 3. Positive Output Voltage Swing versus Load Resistance

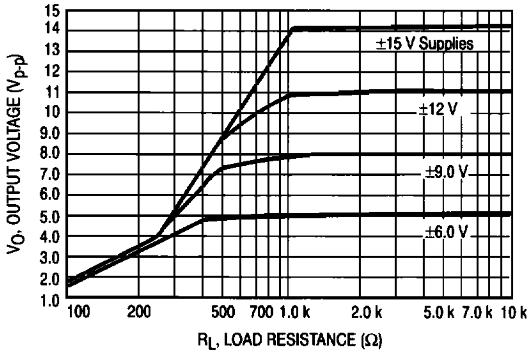

Figure 4. Negative Output Voltage Swing versus Load Resistance

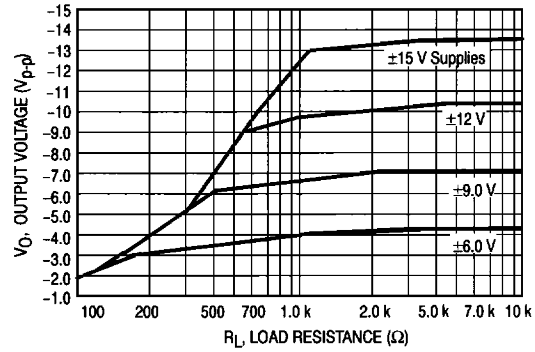

Figure 5. Output Voltage Swing versus Load Resistance (Single Supply Operation)

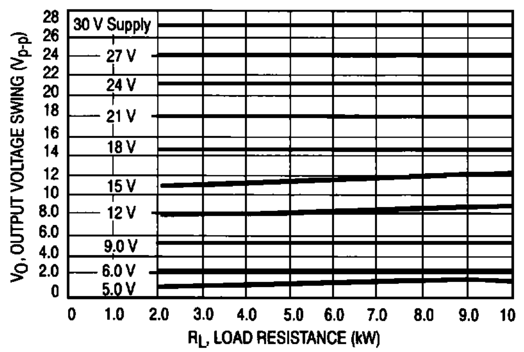

Figure 6. Noninverting Pulse Response

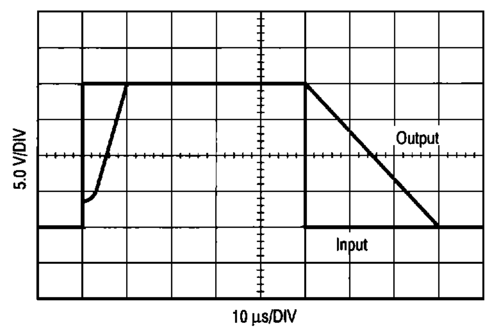

Figure 7. Bi-Quad Filter

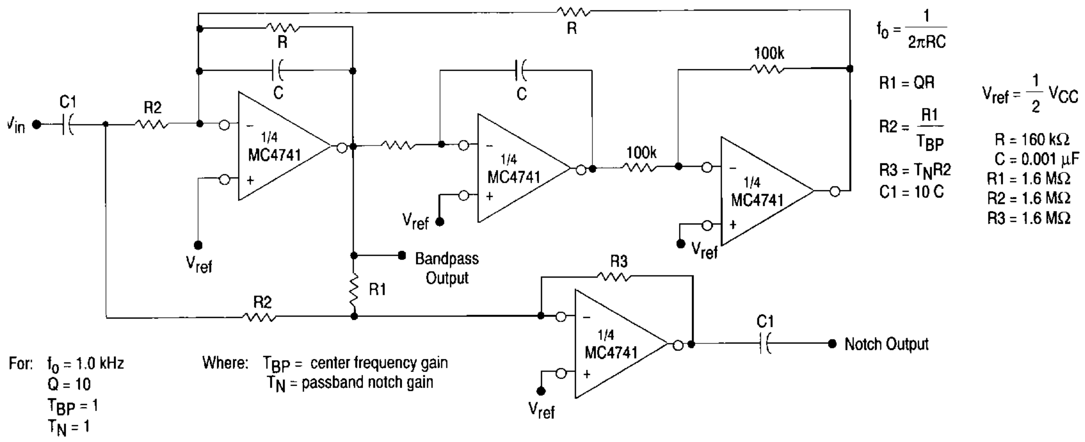

Figure 8. Open-Loop Voltage Gain versus Supply Voltage

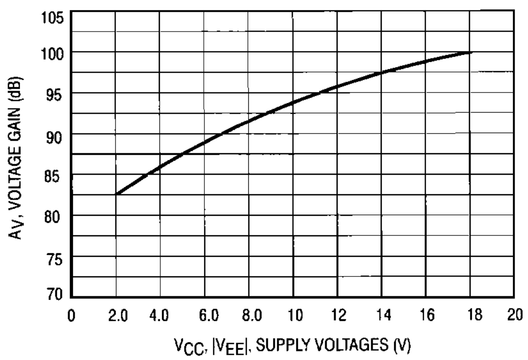

Figure 9. Transient Response Test Circuit

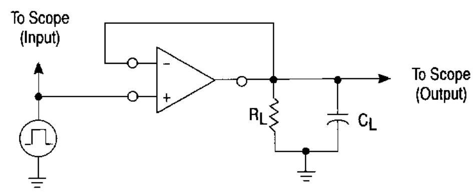

Figure 10. Absolute Value DVM Front End