

ORDERING INFORMATION

Device	Temperature Range	Package
MC1748G	-55°C to +125°C	Metal Can
MC1748U	-55°C to +125°C	Ceramic DIP
MC1748CG	0°C to +70°C	Metal Can
MC1748CP1	0°C to +70°C	Plastic DIP
MC1748CU	0°C to +70°C	Ceramic DIP

T-79-05-10

MC1748 MC1748C

HIGH PERFORMANCE OPERATIONAL AMPLIFIER

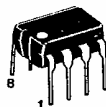
... designed for use as a summing amplifier, integrator, or amplifier with operating characteristics as a function of the external feedback components.

- Noncompensated MC1741
- Single 30 pF Capacitor Compensation Required For Unity Gain
- Short-Circuit Protection
- Offset Voltage Null Capability
- Wide Common-Mode and Differential Voltage Ranges
- Low-Power Consumption
- No Latch Up

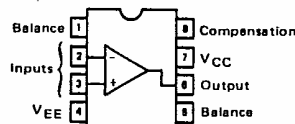
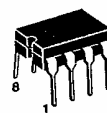
OPERATIONAL AMPLIFIER

SILICON MONOLITHIC INTEGRATED CIRCUIT

P1 SUFFIX
PLASTIC PACKAGE
CASE 626-05
(MC1748C Only)



U SUFFIX
CERAMIC PACKAGE
CASE 693-02



G SUFFIX
METAL PACKAGE
CASE 601-04

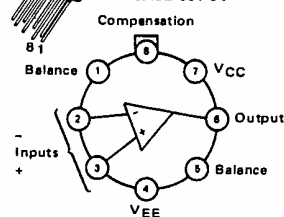
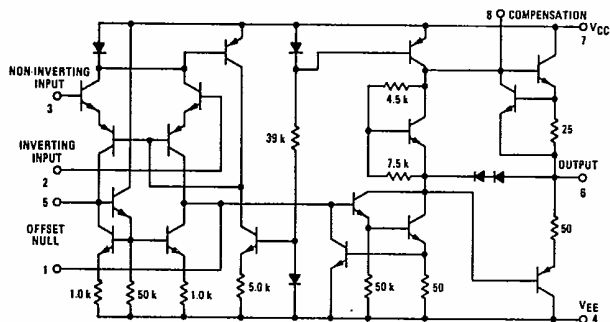


FIGURE 1 - CIRCUIT SCHEMATIC



TYPICAL COMPENSATION CIRCUITS

FIGURE 2 - OFFSET ADJUST AND
FREQUENCY COMPENSATION

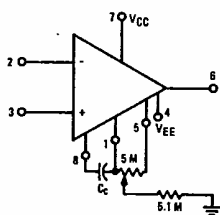


FIGURE 3 - SINGLE-POLE COMPENSATION

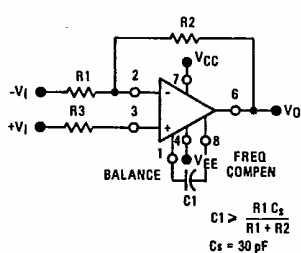
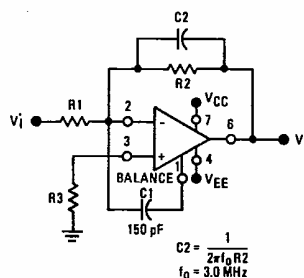


FIGURE 4 - FEEDFORWARD COMPENSATION



MAXIMUM RATINGS ($T_A = +25^{\circ}\text{C}$ unless otherwise noted)

Rating	Symbol	MC1748	MC1748C	Unit
Power Supply Voltage	V_{CC} V_{EE}	+22 -22	+18 -18	Vdc
Differential Input Signal	V_{in}	± 30		Volts
Common-Mode Input Swing ①	V_{ICR}	± 15		Volts
Output Short Circuit Duration	t_s	Continuous		
Power Dissipation (Package Limitation) Derate above $T_A = +25^{\circ}\text{C}$	P_D	680 4.6		mW mW/ $^{\circ}\text{C}$
Operating Temperature Range	T_A	-55 to +125	0 to +70	$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	-65 to +150	-65 to +150	$^{\circ}\text{C}$

ELECTRICAL CHARACTERISTICS ($V_{CC} = +15\text{ Vdc}$, $V_{EE} = -15\text{ Vdc}$, $T_A = +25^{\circ}\text{C}$ unless otherwise noted.)

Characteristics	Symbol	MC1748			MC1748C			Unit
		Min	Typ	Max	Min	Typ	Max	
Input Bias Current $T_A = +25^{\circ}\text{C}$ $T_A = T_{low}$ to T_{high} ②	I_{IB}	—	0.08 0.3	0.5 1.5	—	0.08 —	0.5 0.8	μAdc
Input Offset Current $T_A = +25^{\circ}\text{C}$ $T_A = T_{low}$ to T_{high}	$ I_{IO} $	—	0.02 0.08	0.2 0.5	—	0.02 —	0.2 0.3	μAdc
Input Offset Voltage ($R_S \leq 10\text{ k}\Omega$) $T_A = +25^{\circ}\text{C}$ $T_A = T_{low}$ to T_{high}	$ V_{IO} $	—	1.0 —	5.0 6.0	—	1.0 —	6.0 7.5	mVdc
Differential Input Impedance (Open-Loop, $f = 20\text{ Hz}$)								
Parallel Input Resistance	R_p	0.3	2.0	—	0.3	2.0	—	Megohm
Parallel Input Capacitance	C_p	—	1.4	—	—	1.4	—	pF
Common-Mode Input Impedance ($f = 20\text{ Hz}$)	z_{in}	—	200	—	—	200	—	Megohms
Common-Mode Input Voltage Swing	V_{ICR}	± 12	± 13	—	± 12	± 13	—	Vpk
Common-Mode Rejection Ratio ($f = 100\text{ Hz}$)	CMRR	70	90	—	70	90	—	dB
Open-Loop Voltage Gain, ($V_O = \pm 10\text{ V}$, $R_L = 2.0\text{ k}\Omega$) $T_A = +25^{\circ}\text{C}$ $T_A = T_{low}$ to T_{high}	A_{vol}	50,000 25,000	200,000 —	— —	20,000 15,000	200,000 —	— —	V/V
Step Response ($V_{in} = 20\text{ mV}$, $C_C = 30\text{ pF}$, $R_L = 2\text{ k}\Omega$, $C_L = 100\text{ pF}$)								
Rise Time	t_r	—	0.3	—	—	0.3	—	μs
Overshoot Percentage		—	5.0	—	—	5.0	—	%
Slew Rate	dV_{out}/dt	—	0.8	—	—	0.8	—	V/ μs
Output Impedance ($f = 20\text{ Hz}$)	z_o	—	75	—	—	75	—	ohms
Short-Circuit Output Current	I_{sc}	—	25	—	—	25	—	mA
Output Voltage Swing ($R_L = 10\text{ k}\Omega$) $R_L = 2\text{ k}\Omega$ ($T_A = T_{low}$ to T_{high})	V_O	± 12 ± 10	± 14 ± 13	— —	± 12 ± 10	± 14 ± 13	— —	Vpk
Power Supply Sensitivity $V_{EE} = \text{constant}$, $R_S < 10\text{ k}\Omega$ $V_{CC} = \text{constant}$, $R_S < 10\text{ k}\Omega$	S^+ S^-	— —	30 30	150 150	— —	30 30	150 150	$\mu\text{V/V}$
Power Supply Current	I_{D^+} I_{D^-}	— —	1.67 1.67	2.83 2.83	— —	1.67 1.67	2.83 2.83	mA
DC Quiescent Power Dissipation ($V_O = 0$)	P_D	—	50	85	—	50	85	mW

① For supply voltages less than $\pm 15\text{ V}$, the Maximum Input Voltage is equal to the Supply Voltage.

② T_{low} : 0°C for MC1748C
 -55°C for MC1748
 T_{high} : $+70^{\circ}\text{C}$ for MC1748C
 $+125^{\circ}\text{C}$ for MC1748

TYPICAL CHARACTERISTICS

($V_{CC} = +15\text{ V}$, $V_{EE} = -15\text{ V}$, $T_A = +25^\circ\text{C}$ unless otherwise noted.)

FIGURE 5 — MINIMUM INPUT VOLTAGE RANGE

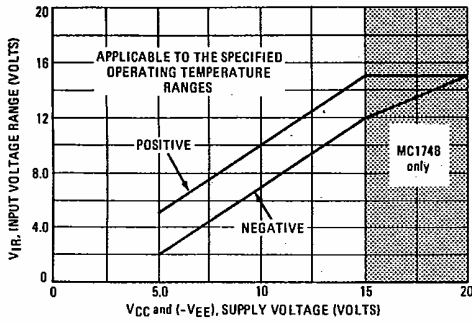


FIGURE 6 — MINIMUM OUTPUT VOLTAGE SWING

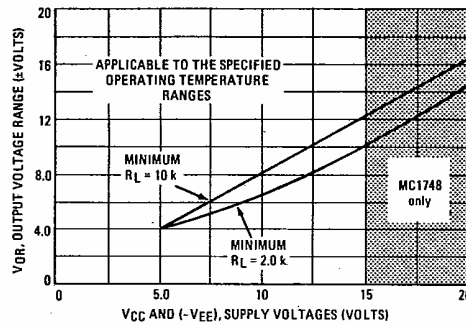


FIGURE 7 — MINIMUM VOLTAGE GAIN

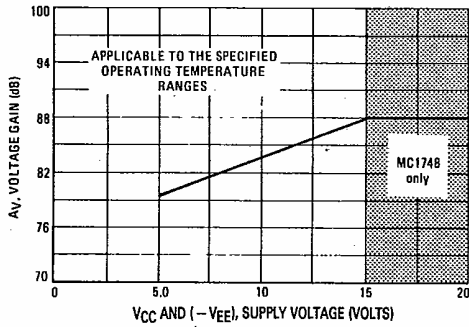


FIGURE 8 — TYPICAL SUPPLY CURRENTS

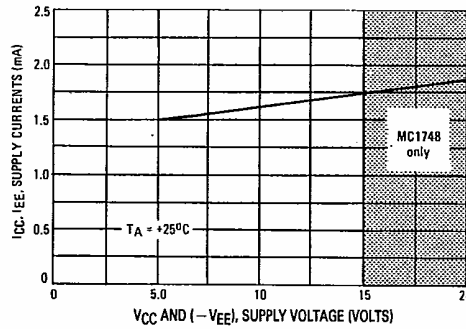


FIGURE 9 — OPEN-LOOP FREQUENCY RESPONSE

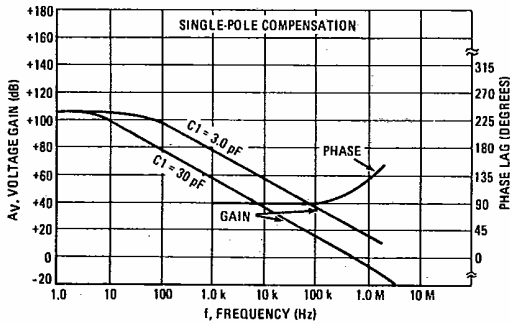
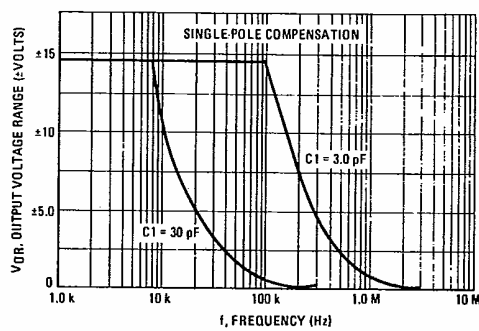


FIGURE 10 — LARGE-SIGNAL FREQUENCY RESPONSE



TYPICAL CHARACTERISTICS (continued)

($V_{CC} = +15\text{ V}$, $V_{EE} = -15\text{ V}$, $T_A = +25^\circ\text{C}$ unless otherwise noted.)

FIGURE 11 – VOLTAGE FOLLOWER PULSE RESPONSE

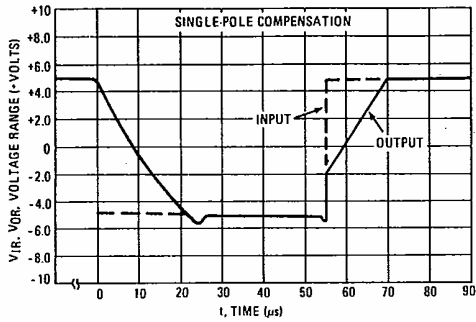


FIGURE 12 – OPEN-LOOP FREQUENCY RESPONSE

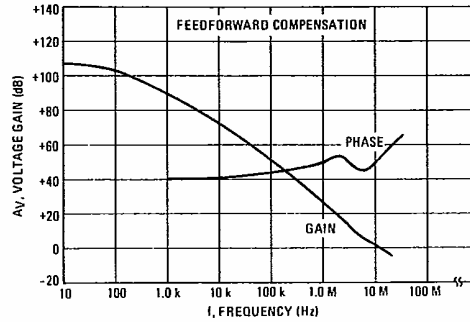


FIGURE 13 – LARGE-SIGNAL FREQUENCY RESPONSE

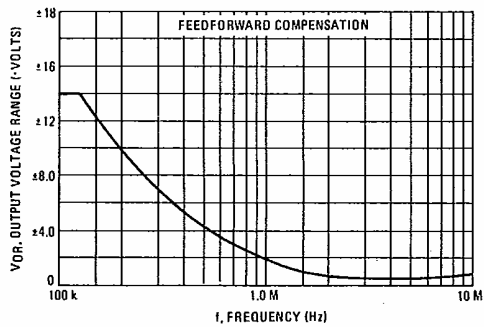


FIGURE 14 – INVERTER PULSE RESPONSE

