

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**

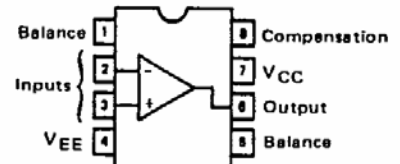
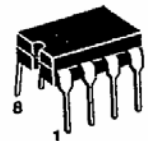
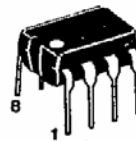
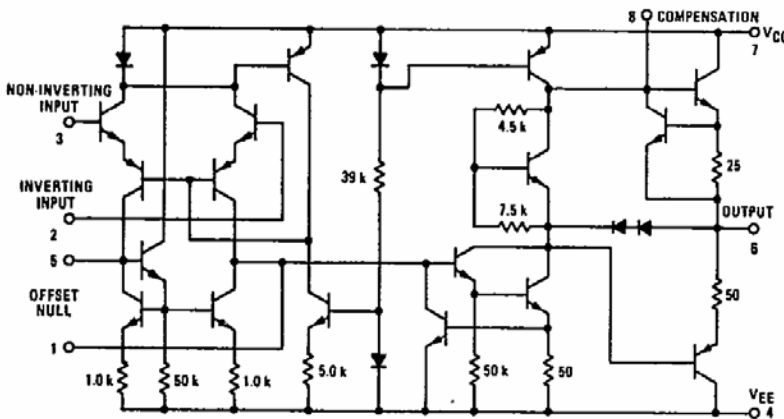
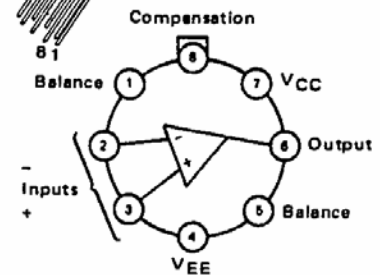


FIGURE 1 - CIRCUIT SCHEMATIC



**G SUFFIX
METAL PACKAGE
CASE 601-04**



TYPICAL COMPENSATION CIRCUITS

**FIGURE 2 - OFFSET ADJUST AND
FREQUENCY COMPENSATION**

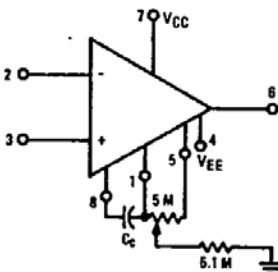


FIGURE 3 - SINGLE-POLE COMPENSATION

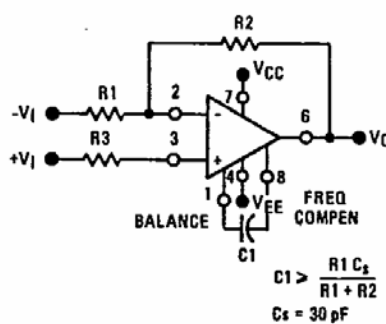
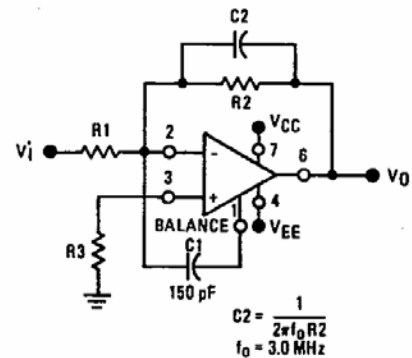


FIGURE 4 - FEEDFORWARD COMPENSATION



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

Rating	Symbol	MC1748	MC1748C	Unit
Power Supply Voltage	V _{CC}	+22	+18	V _{dc}
	V _{EE}	-22	-18	
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°C	P _D	680		mW
		4.6		
Operating Temperature Range	T _A	-55 to +125	0 to +70	°C
Storage Temperature Range	T _{stg}	-65 to +150	-65 to +150	°C

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

Characteristics	Symbol	MC1748			MC1748C			Unit
		Min	Typ	Max	Min	Typ	Max	
Input Bias Current T _A = +25°C T _A = T _{low} to T _{high} ^②	I _{IB}	-	0.08	0.5	-	0.08	0.5	μA _{dc}
		-	0.3	1.5	-	-	0.8	
Input Offset Current T _A = +25°C T _A = T _{low} to T _{high}	I _{IO}	-	0.02	0.2	-	0.02	0.2	μA _{dc}
		-	0.08	0.5	-	-	0.3	
Input Offset Voltage (R _S ≤ 10 k Ω) T _A = +25°C T _A = T _{low} to T _{high}	V _{IO}	-	1.0	5.0	-	1.0	6.0	mV _{dc}
		-	-	6.0	-	-	7.5	
Differential Input Impedance (Open-Loop, f = 20 Hz) Parallel Input Resistance Parallel Input Capacitance	R _p	0.3	2.0	-	0.3	2.0	-	Megohm
	C _p	-	1.4	-	-	1.4	-	pF
Common-Mode Input Impedance (f = 20 Hz)	z _{in}	-	200	-	-	200	-	Megohms
Common-Mode Input Voltage Swing	V _{ICR}	±12	±13	-	±12	±13	-	V _{pk}
Common-Mode Rejection Ratio (f = 100 Hz)	CMRR	70	90	-	70	90	-	dB
Open-Loop Voltage Gain, (V _O = ±10 V, R _L = 2.0 k ohms) T _A = +25°C T _A = T _{low} to T _{high}	A _{vol}	50,000	200,000	-	20,000	200,000	-	V/V
		25,000	-	-	15,000	-	-	
Step Response (V _{in} = 20 mV, C _c = 30 pF, R _L = 2 k Ω, C _L = 100 pF) Rise Time Overshoot Percentage Slew Rate	t _r	-	0.3	-	-	0.3	-	μs
		-	5.0	-	-	5.0	-	%
		-	0.8	-	-	0.8	-	V/μs
Output Impedance (f = 20 Hz)	z _o	-	75	-	-	75	-	ohms
Short-Circuit Output Current	I _{sc}	-	25	-	-	25	-	mA _{dc}
Output Voltage Swing (R _L = 10 k ohms) R _L = 2 k ohms (T _A = T _{low} to T _{high})	V _O	±12	±14	-	±12	±14	-	V _{pk}
		±10	±13	-	±10	±13	-	
Power Supply Sensitivity V _{EE} = constant, R _S < 10 k ohms V _{CC} = constant, R _S < 10 k ohms	S+	-	30	150	-	30	150	μV/V
	S-	-	30	150	-	30	150	
Power Supply Current	I _D ⁺	-	1.67	2.83	-	1.67	2.83	mA _{dc}
	I _D ⁻	-	1.67	2.83	-	1.67	2.83	
DC Quiescent Power Dissipation (V _O = 0)	P _D	-	60	85	-	60	85	mW

^① For supply voltages less than ±15 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°C for MC1748C
+125°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

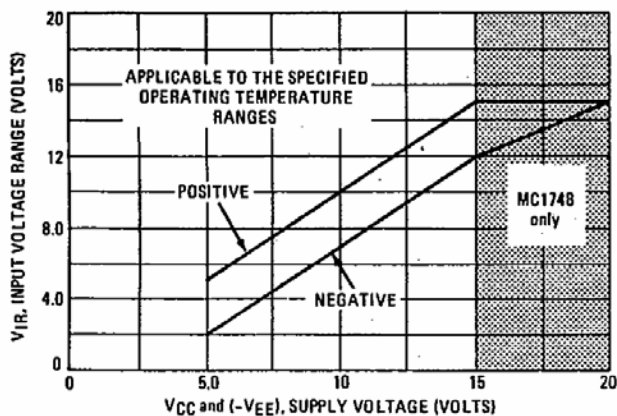


FIGURE 6 – MINIMUM OUTPUT VOLTAGE SWING

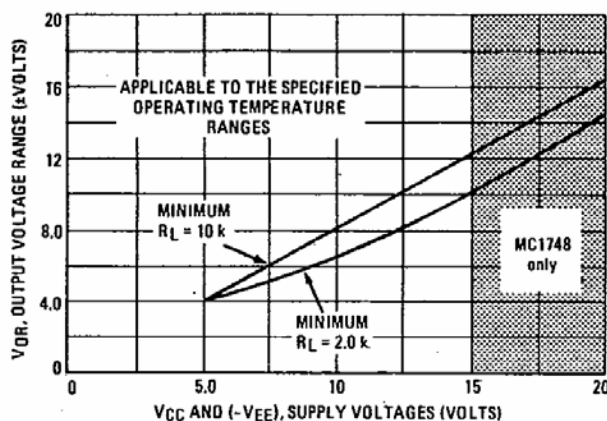


FIGURE 7 – MINIMUM VOLTAGE GAIN

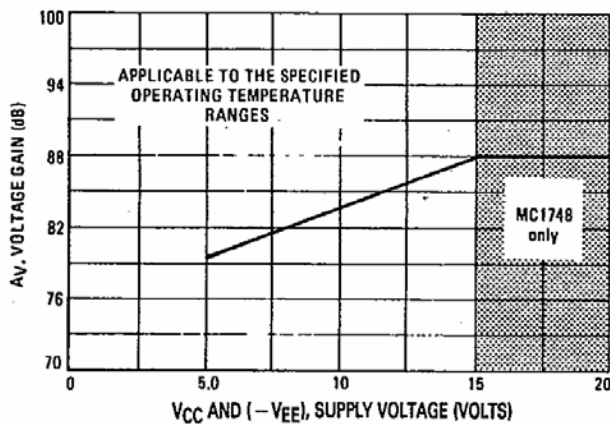


FIGURE 8 – TYPICAL SUPPLY CURRENTS

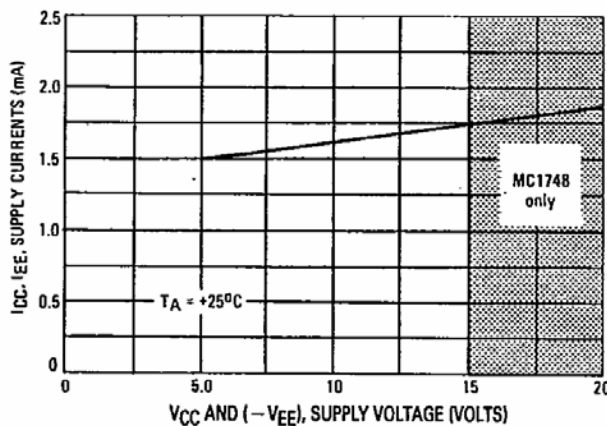


FIGURE 9 – OPEN-LOOP FREQUENCY RESPONSE

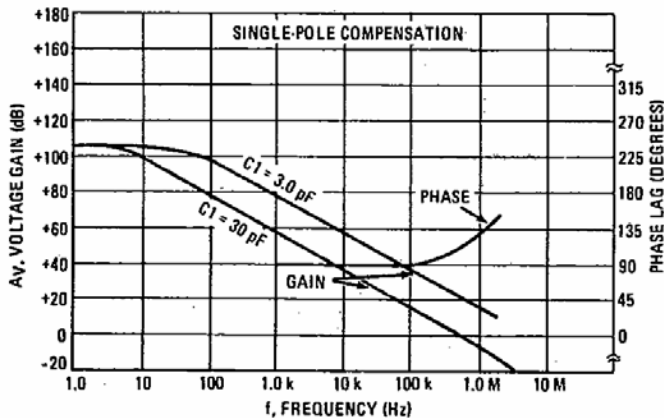
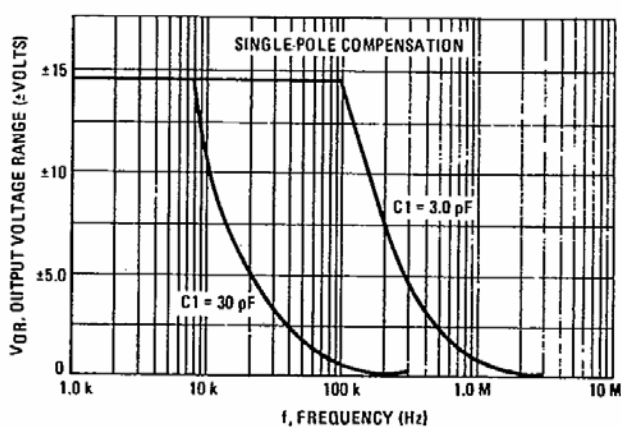


FIGURE 10 – LARGE-SIGNAL FREQUENCY RESPONSE



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

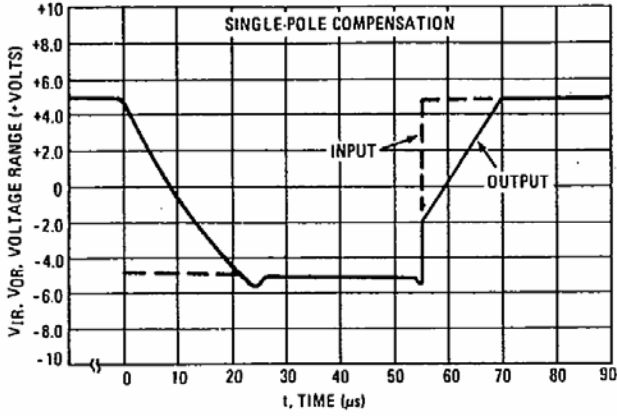


FIGURE 12 – OPEN-LOOP FREQUENCY RESPONSE

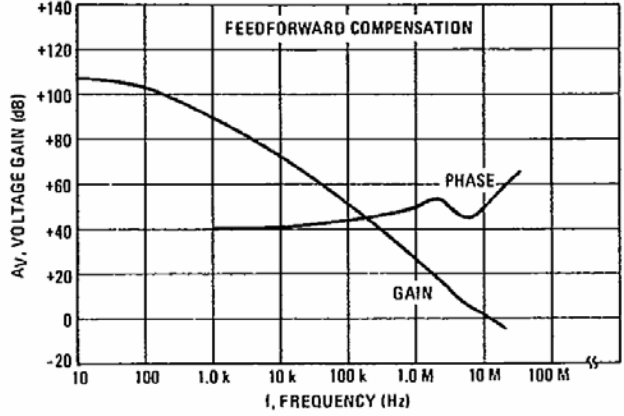


FIGURE 13 – LARGE-SIGNAL FREQUENCY RESPONSE

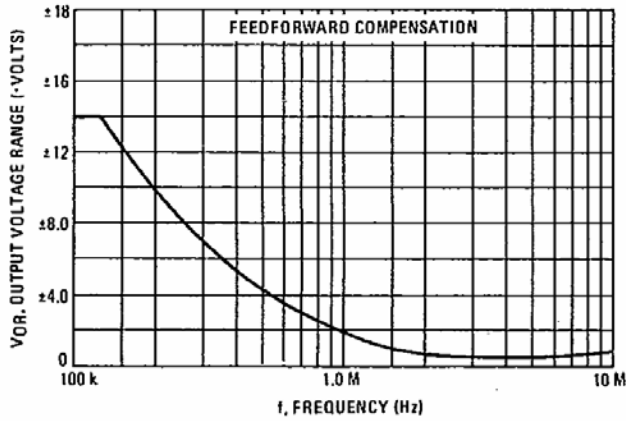


FIGURE 14 – INVERTER PULSE RESPONSE

