

MC1747
MC1747C

(Dual MC1741)
Internally Compensated, High Performance Operational Amplifiers

The MC1747 and MC1747C were designed for use as summing amplifiers, integrators, or amplifiers with operating characteristics as a function of the external feedback components. The MC1747L and MC1747CL are functionally and electrically equivalent to the μ A747 and μ A747C respectively.

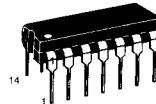
- No Frequency Compensation Required
- Short Circuit Protection
- Wide Common Mode and Differential Voltage Ranges
- Low-Power Consumption
- No Latch Up
- Offset Voltage Null Capability

(DUAL MC1741)
DUAL OPERATIONAL AMPLIFIERS

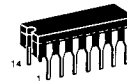
SILICON MONOLITHIC INTEGRATED CIRCUIT



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



P2 SUFFIX
 PLASTIC PACKAGE
 CASE 646



L SUFFIX
 CERAMIC PACKAGE
 CASE 632

Figure 1. High-Impedance, High-Gain Inverting Amplifier

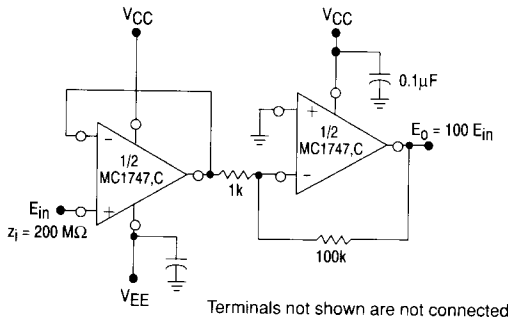
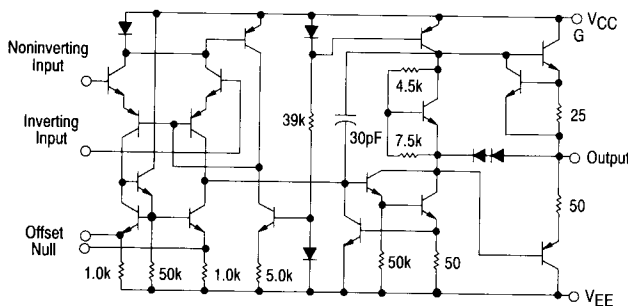
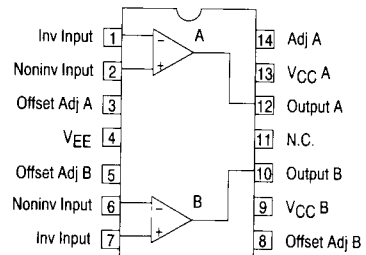


Figure 2. Circuit Schematic



PIN CONNECTIONS



V_{CCA} and V_{CCB} are not connected internally

ORDERING INFORMATION

Device	Temperature Range	Package
MC1747L	-55° to +125°C	Ceramic DIP
MC1747CD		SO-14
MC1747CL	0° to +70°C	Ceramic DIP
MC1747CP2		Plastic DIP

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

Rating	Symbol	MC1747	MC1747C	Unit
Power Supply Voltages	V_{CC} V_{EE}	+22 -22	+18 -18	Vdc
Differential Input Signal Voltages (Note 1)	V_{ID}	±30		V
Common Mode Input Swing Voltage (Note 2)	V_{ICR}	±15		V
Output Short Circuit Duration	t_{SC}	Continuous		
Voltage (Measurement between Offset Null and V_{EE})		±0.5		V
Operating Ambient Temperature Range	T_A	-55 to +125	0 to +70	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-65 to +150	-65 to +150	$^\circ\text{C}$
Junction Temperature Ceramic Package Plastic Package	T_J	175 150		$^\circ\text{C}$

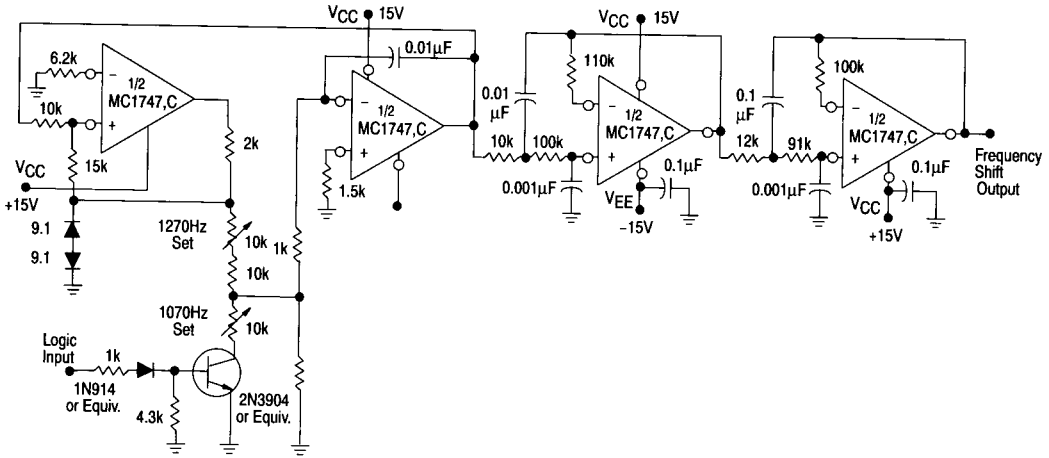
ELECTRICAL CHARACTERISTICS ($V_{CC} = +15\text{ V}$, $V_{EE} = -15\text{ V}$, $T_A = +25^\circ\text{C}$, unless otherwise noted.)

Characteristics	Symbol	MC1747			MC1747C			Unit
		Min	Typ	Max	Min	Typ	Max	
Input Bias Current $T_A = +25^\circ\text{C}$ $T_A = T_{high}$ (Note 3) $T_A = T_{low}$ (Note 3)	I_{IB}	—	80	500	—	80	500	nAdc
Input Offset Current $T_A = +25^\circ\text{C}$ $T_A = T_{high}$ $T_A = T_{low}$	I_{IO}	—	20	200	—	20	200	nAdc
Input Offset Current $T_A = +25^\circ\text{C}$ $T_A = T_{low}$ to $T_A = T_{high}$	V_{IO}	—	1.0	5.0	—	1.0	6.0	mVdc
Offset Voltage Adjustment Range		—	±15	—	—	±15	—	mV
Differential Input Impedance (Open-loop, $f = 20\text{ Hz}$) Parallel Input Resistance Parallel Input Capacitance	r_i C_i	0.3	2.0	—	0.3	2.0	—	M Ω pF
Common Mode Input Voltage Swing $T_{low} \leq T_A \leq T_{high}$	V_{ICR}	±12	±13	—	±12	±13	—	V
Common Mode Rejection ($R_S = 10\text{ k}\Omega$) $T_{low} \leq T_A \leq T_{high}$	CMR	70	90	—	70	90	—	dB
Open-Loop Voltage Gain $T_A = +25^\circ\text{C}$ $T_A = T_{low}$ to $T_A = T_{high}$ ($V_O = \pm 10\text{ V}$, $R_L = 2.0\text{ k}\Omega$)	A_{VOL}	50,000 25,000	200,000 —	— —	25,000 15,000	200,000 —	— —	V
Transient Response (Unity Gain) ($V_{in} = 20\text{ mV}$, $R_L = 2.0\text{ k}\Omega$, $C_L \leq 100\text{ pF}$) Rise Time Overshoot Percentage	t_{PLH}	—	0.3 5.0	— —	—	0.3 5.0	— —	μs %
Slew Rate (Unity Gain)	SR	—	0.5	—	—	0.5	—	V/ μs
Output Impedance	z_o	—	75	—	—	75	—	Ω
Short Circuit Output Current	I_{SC}	—	25	—	—	25	—	mAdc
Channel Separation		—	120	—	—	120	—	dB
Output Voltage Swing ($T_{low} \leq T_A \leq T_{high}$) $R_L = 10\text{ k}\Omega$ $R_L = 2.0\text{ k}\Omega$	V_{OR}	±12 ±10	±14 ±13	— —	±12 ±10	±14 ±13	— —	Vpk
Power Supply Rejection (T_{low} to T_{high}) $V_{EE} = \text{Constant}$, $R_S \leq 10\text{ k}\Omega$ $V_{CC} = \text{Constant}$, $R_S \leq 10\text{ k}\Omega$	PSR+ PSR-	75 75	— —	— —	75 75	— —	— —	dB
Power Supply Current (each amplifier) $T_A = +25^\circ\text{C}$ $T_A = T_{low}$ $T_A = T_{high}$	$I_{CC,IEE}$	— — —	1.7 2.0 1.5	2.8 3.3 2.5	— — —	1.7 2.0 2.0	2.8 3.3 3.3	mAdc
DC Power Consumption (each amplifier) $T_A = +25^\circ\text{C}$ $T_A = T_{low}$ $T_A = T_{high}$	P_C	— — —	50 60 45	85 100 75	— — —	50 60 60	85 100 100	mW

- NOTES:**
- For supply voltages of less than $\pm 15\text{ V}$, the maximum differential input voltage is equal to $\pm(V_{CC} + |V_{EE}|)$.
 - For supply voltages of less than $\pm 15\text{ V}$, the maximum input voltage is equal to the supply voltage ($+V_{CC}$, $-|V_{EE}|$).
 - $T_{low} = 0^\circ\text{C}$ for MC1747CL $T_{high} = +70^\circ\text{C}$ for MC1747CL
 -55°C for MC1747L $+125^\circ\text{C}$ for MC1747L

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Figure 3. Typical Frequency Shift Keyer Tone Generator Test Circuit



Terminals not shown are not connected.

Figure 4. Typical Frequency Shift Keyer Tone Generator

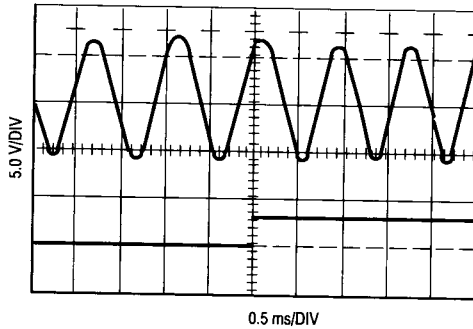


Figure 5. Open-Loop Voltage Gain versus Power-Supply Voltage

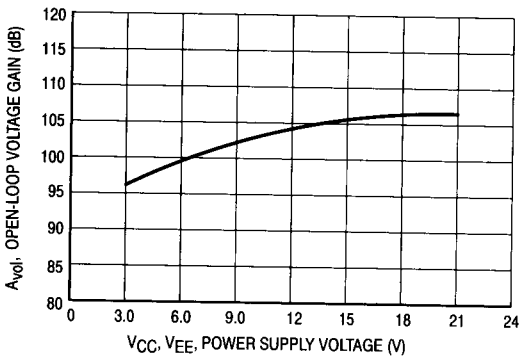
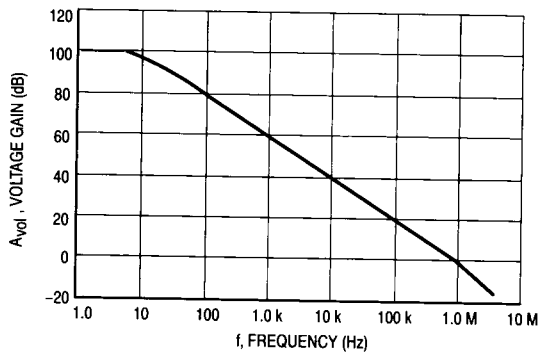
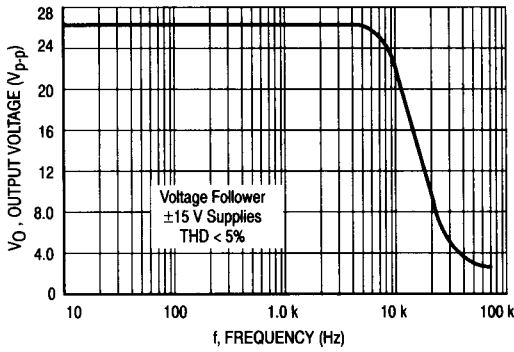


Figure 6. Open-Loop Frequency Response

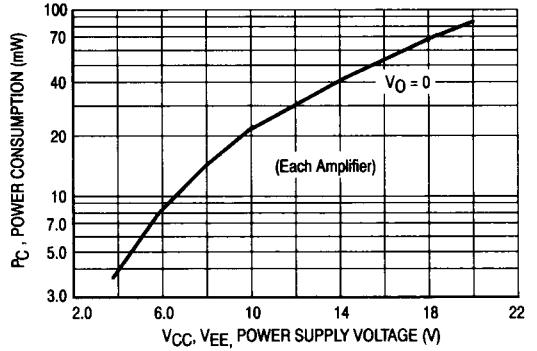


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**Figure 7. Power Bandwidth
(Large Signal Swing versus Frequency)**



**Figure 8. Power Consumption
versus Power Supply Voltage**



**Figure 9. Output Voltage Swing
versus Load Resistance**

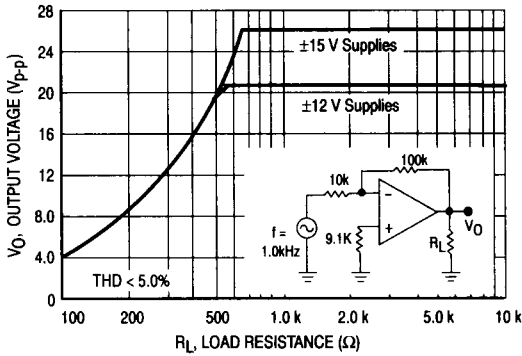


Figure 10. Output Noise versus Source Resistance

