MOTOROLA

Internally Compensated, High Performance Dual Operational Amplifier

MCT1458, C

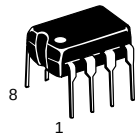
DUAL
OPERATIONAL AMPLIFIER
(DUAL MC1741)

SEMICONDUCTOR
TECHNICAL DATA

The MCT1458, C 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
- Wide Common Mode and Differential Voltage Ranges
- Low Power Consumption
- No Latch-Up

This MCT-prefixed device is intended to be a possible replacement for the similar device with the MC-prefix. Because the MCT device originates from different source material, there may be subtle differences in typical parameter values or characteristic curves. Due to the diversity of potential applications, Motorola can not assure identical performance in all circuits. Motorola recommends that the customer qualify the MCT-prefixed device in each potential application.



P1 SUFFIX
PLASTIC PACKAGE
CASE 626

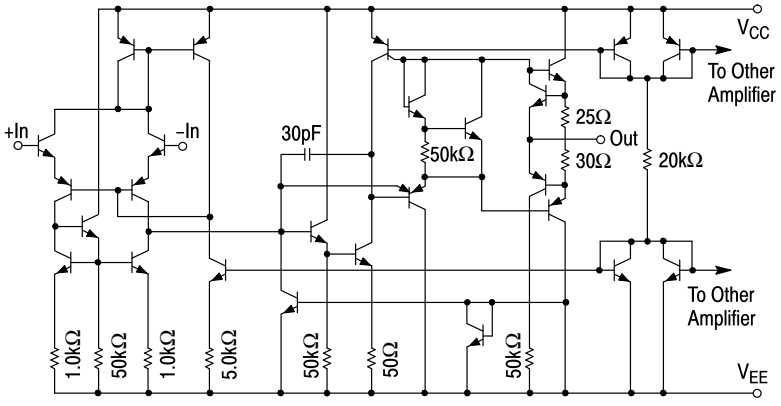
D SUFFIX
PLASTIC PACKAGE
CASE 751
(SO-8)

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

Rating	Symbol	Value	Unit
Power Supply Voltage	V_{CC} V_{EE}	+18 –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
Junction Temperature	T_J	150	°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.

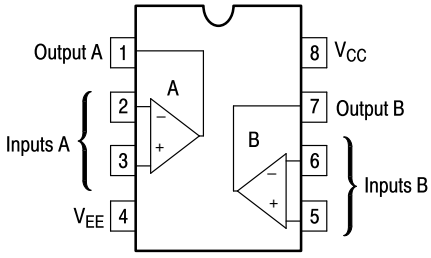
Representative Schematic Diagram



This device contains 46 active transistors.

CAUTION: These devices do not have internal ESD protection circuitry and are rated as CLASS 1 devices per the ESD test method in Mil-Std-833D. They should be handled using standard ESD prevention methods to avoid damage to the device.

PIN CONNECTIONS



(Top View)

ORDERING INFORMATION

Device	Tested Operating Temperature Range	Package
MCT1458CD, D	T_A = 0° to +70°C	SO-8
MCT1458CP1, P1		Plastic

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

Characteristic	Symbol	MCT1458			MCT1458C			Unit
		Min	Typ	Max	Min	Typ	Max	
Input Offset Voltage ($R_S \le 10$ k)	V_{IO}	—	2.0	6.0	—	2.0	10	mV
Input Offset Current	I_{IO}	—	20	200	—	20	300	nA
Input Bias Current	I_{IB}	—	80	500	—	80	700	nA
Input Resistance	r_i	0.3	2.0	—	—	2.0	—	MΩ
Input Capacitance	C_i	—	6.0	—	—	6.0	—	pF
Common Mode Input Voltage Range	V_{ICR}	±12	±13	—	±11	±13	—	V
Large Signal Voltage Gain (V_O = ±10 V, R_L = 2.0 k) (V_O = ±10 V, R_L = 10 k)	A_{VOL}	 20 —	 200 —	 — —	 — 20	 — 200	 — —	V/mV
Output Resistance	r_o	—	75	—	—	75	—	Ω
Common Mode Rejection ($R_S \le 10$ k)	CMR	70	90	—	60	90	—	dB
Supply Voltage Rejection ($R_S \le 10$ k)	PSR	—	30	150	—	30	—	μV/V
Output Voltage Swing ($R_S \le 10$ k) ($R_S \le 2.0$ k)	V_O	 ±12 ±10	 ±14 ±13	 — —	 ±11 ±9.0	 ±14 ±13	 — —	V
Output Short Circuit Current	I_{SC}	—	20	—	—	20	—	mA
Supply Currents (Both Amplifiers)	I_D	—	2.3	5.6	—	2.3	8.0	mA
Power Consumption	P_C	—	70	170	—	70	240	mW
Transient Response (Unity Gain) (V_I = 20 mV, $R_L \ge 2.0$ kΩ, $C_L \le 100$ pF) Rise Time (V_I = 20 mV, $R_L \ge 2.0$ kΩ, $C_L \le 100$ pF) Overshoot (V_I = 10 V, $R_L \ge 2.0$ kΩ, $C_L \le 100$ pF) Slew Rate	 t_{TLH} os SR	 — — —	 0.9 15 0.8	 — — —	 — — —	 0.9 15 0.8	 — — —	 μs % V/μs

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

Characteristic	Symbol	MCT1458			MCT1458C			Unit
		Min	Typ	Max	Min	Typ	Max	
Input Offset Voltage ($R_S \le 10$ kΩ)	V_{IO}	—	—	7.5	—	—	12	mV
Input Offset Current (T_A = 0° to +70°C)	I_{IO}	—	—	300	—	—	400	nA
Input Bias Current (T_A = 0° to +70°C)	I_{IB}	—	—	800	—	—	1000	nA
Output Voltage Swing ($R_s \le 10$ k) ($R_s \le 2$ k)	V_O	 ±12 ±10	 ±14 ±13	 — —	 — ±9.0	 — ±13	 — —	V
Large Signal Voltage Gain (V_O = ±10 V, R_L = 2 k) (V_O = ±10 V, R_L = 10 k)	A_{VOL}	 15 —	 — —	 — —	 — 15	 — —	 — —	V/mV

NOTE: 1. Input pins of an unused amplifier must be grounded for split supply operation or biased at least 3.0 V above V_{EE} for single supply operation.
2. T_{low} = 0°C T_{high} = +70°C

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

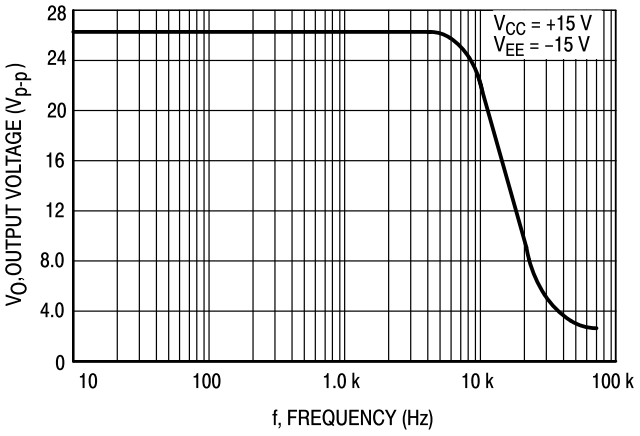


Figure 2. Maximum Output Voltage Swing versus Load Resistance

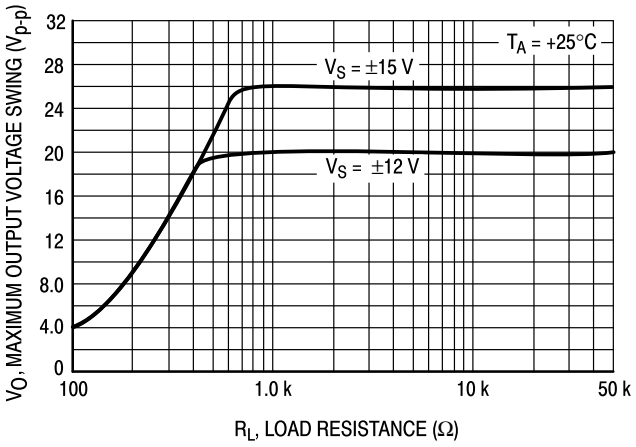


Figure 3. Input Offset Current versus Temperature

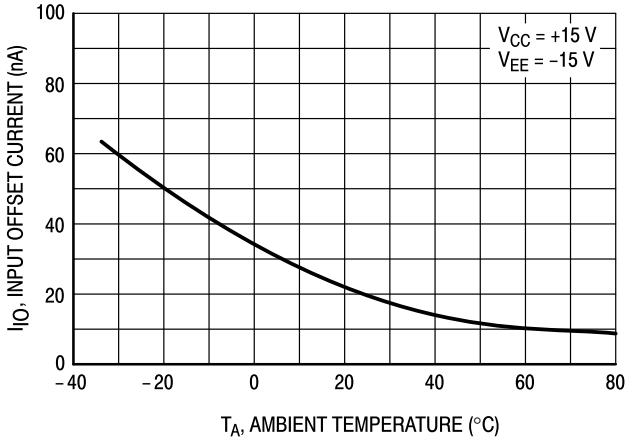


Figure 4. Input Offset Current versus Supply Voltage

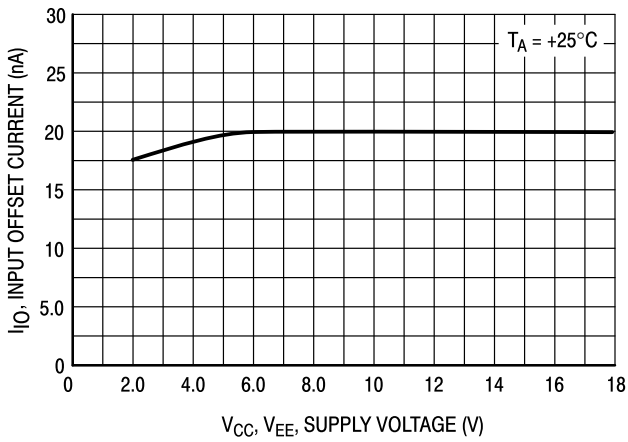


Figure 5. Open-Loop Voltage Gain versus Supply Voltage

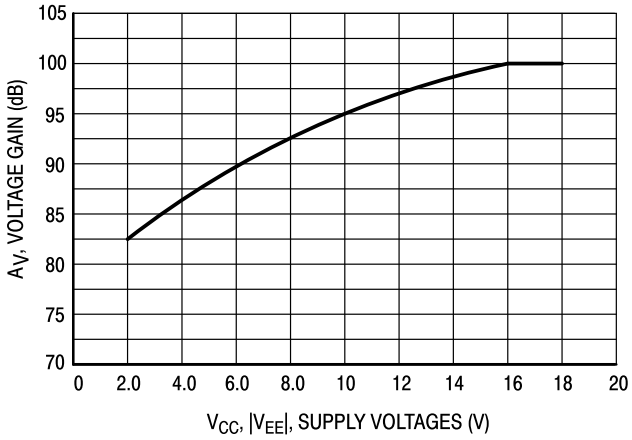
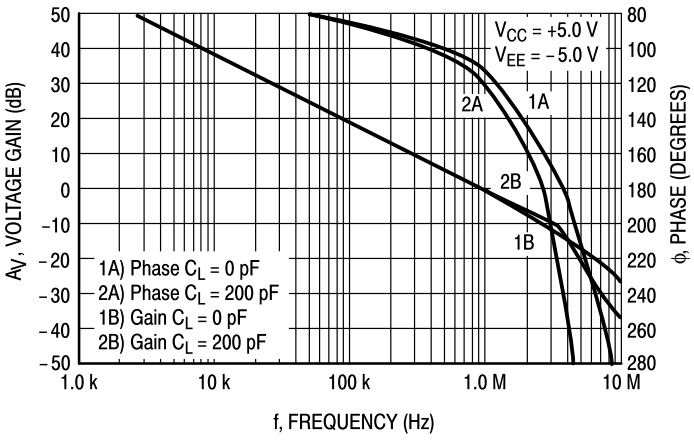


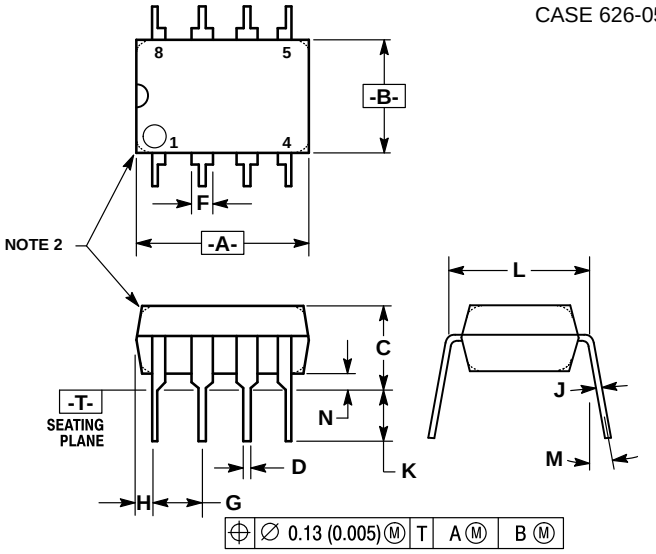
Figure 6. Voltage Gain and Phase versus Frequency



MCT1458

OUTLINE DIMENSIONS

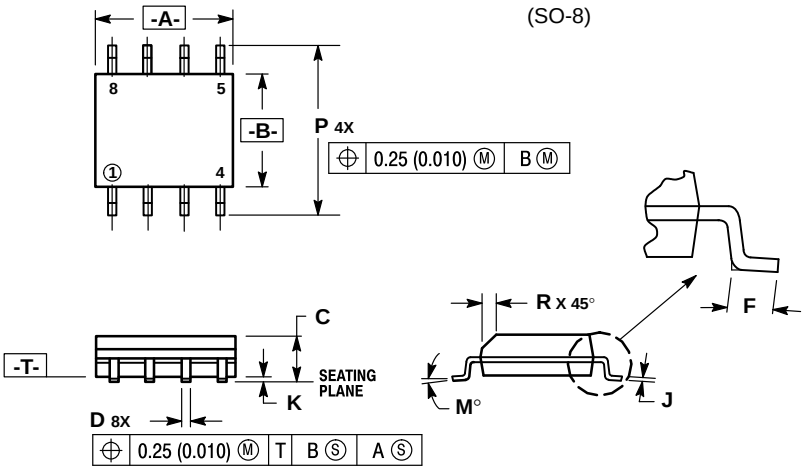
P1 SUFFIX
PLASTIC PACKAGE
CASE 626-05



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)



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.196
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 BSC		0.050 BSC	
J	0.18	0.25	0.007	0.009
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

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