



MOTOROLA

Order this document by MCT4558C/D

Dual Wide Bandwidth Operational Amplifier

The MCT4558C combines all of the outstanding features of the MC1458 and, in addition, offers three times the unity gain bandwidth of the industry standard.

- 2.0 MHz Unity Gain Bandwidth Guaranteed
- Internally Compensated
- Short Circuit Protection
- Gain and Phase Match Between Amplifiers
- Low Power Consumption

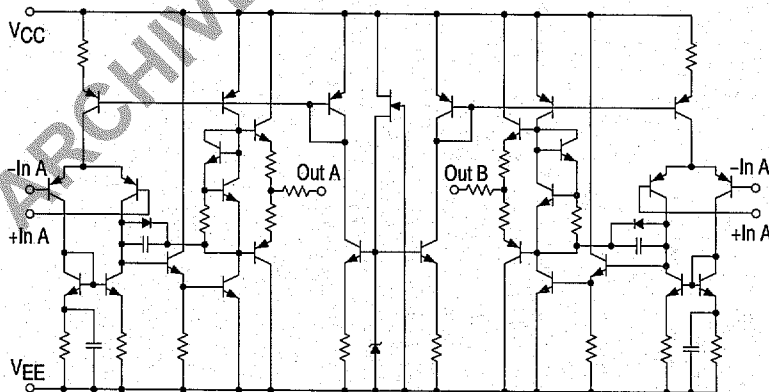
This MCT-prefixed device is intended to be a possible replacement for the similar device with the MC-prefix. Because the MCT device originates from different source material, there may be subtle differences in typical parameter values or characteristic curves. Due to the diversity of potential applications,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

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

Rating	Symbol	Value	Unit
Power Supply Voltages	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	
Ambient Temperature Range	T_A	0 to +70	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55 to +125	$^\circ\text{C}$
Junction Temperature	T_J	150	$^\circ\text{C}$

NOTES: 1. For supply voltages less than ± 15 V, the absolute maximum input voltage is equal to the supply voltage.
2. Short circuit may be to ground or either supply.

Representative Schematic Diagram



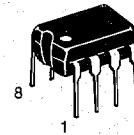
This device contains 29 active transistors.

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-883D. They should be handled using standard ESD prevention methods to avoid damage to the device.

MCT4558C

DUAL WIDE BANDWIDTH OPERATIONAL AMPLIFIER

SEMICONDUCTOR TECHNICAL DATA

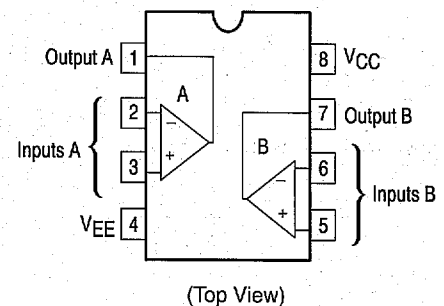


P1 SUFFIX
PLASTIC PACKAGE
CASE 626



D SUFFIX
PLASTIC PACKAGE
CASE 751
(SO-8)

PIN CONNECTIONS



ORDERING INFORMATION

Device	Tested Operating Temperature Range	Package
MCT4558CD	$T_A = 0^\circ \text{ to } +70^\circ\text{C}$	SO-8
MCT4558CPI		Plastic DIP

MCT4558C

FREQUENCY CHARACTERISTICS ($V_{CC} = +15\text{ V}$, $V_{EE} = -15\text{ V}$, $T_A = 25^\circ\text{C}$)

Characteristic	Symbol	Min	Typ	Max	Unit
Unity Gain Bandwidth	BW	2.0	2.8	—	MHz

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

Input Offset Voltage ($R_S \leq 10\text{ k}\Omega$)	V_{IO}	—	2.0	6.0	mV
Input Offset Current	I_{IO}	—	20	200	nA
Input Bias Current (Note 1)	I_{IB}	—	80	500	nA
Common Mode Input Voltage Range	V_{ICR}	± 12	± 13	—	V
Large Signal Voltage Gain ($V_O = \pm 10\text{ V}$, $R_L = 2.0\text{ k}\Omega$)	A_{VOL}	20	200	—	V/mV
Common Mode Rejection ($R_S \leq 10\text{ k}\Omega$)	CMR	70	90	—	dB
Supply Voltage Rejection Ratio ($R_S \leq 10\text{ k}\Omega$)	PSRR	—	30	150	$\mu\text{V/V}$
Output Voltage Swing ($R_L \geq 10\text{ k}\Omega$) ($R_L \geq 2.0\text{ k}\Omega$)	V_O	± 12 ± 10	± 14 ± 13	— —	V
Output Short Circuit Current	I_{SC}	10	20	75	mA
Supply Currents (Both Amplifiers)	I_D	—	4.0	5.6	mA
Power Consumption (Both Amplifiers)	P_C	—	70	170	mW
Transient Response (Unity Gain) ($V_I = 20\text{ mV}$, $R_L \geq 2.0\text{ k}\Omega$, $C_L \leq 100\text{ pF}$) Rise Time ($V_I = 20\text{ mV}$, $R_L \geq 2.0\text{ k}\Omega$, $C_L \leq 100\text{ pF}$) Overshoot ($V_I = 10\text{ V}$, $R_L \geq 2.0\text{ k}\Omega$, $C_L \leq 100\text{ pF}$) Slew Rate	t_{TLH} t_{os} SR	— — 1.0	0.3 15 1.8	— — —	μs % V/ μs

ELECTRICAL CHARACTERISTICS ($V_{CC} = +15\text{ V}$, $V_{EE} = -15\text{ V}$, $T_A = T_{high}$ to T_{low} , [Note 2] unless otherwise noted.)

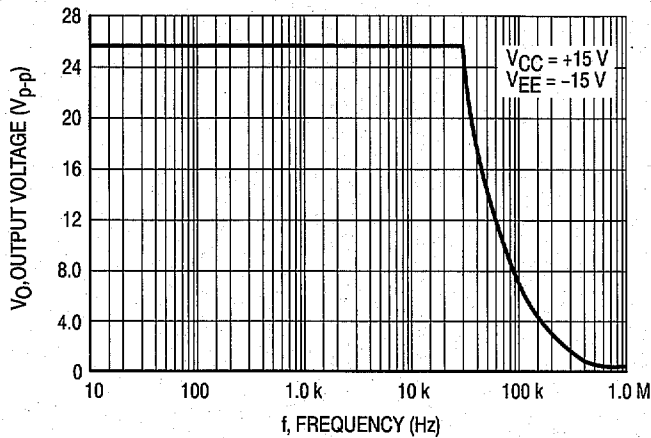
Characteristic	Symbol	Min	Typ	Max	Unit
Input Offset Voltage ($R_S \leq 10\text{ k}\Omega$)	V_{IO}	—	—	7.5	mV
Input Offset Current ($T_A = 0^\circ$ to $+70^\circ\text{C}$)	I_{IO}	—	—	300	nA
Input Bias Current ($T_A = 0^\circ$ to $+70^\circ\text{C}$)	I_{IB}	—	—	800	nA
Large Signal Voltage Gain ($V_O = \pm 10\text{ V}$, $R_L = 2.0\text{ k}\Omega$)	A_{VOL}	15	—	—	V/mV
Output Voltage Swing ($R_L \geq 10\text{ k}\Omega$) ($R_L \geq 2.0\text{ k}\Omega$)	V_O	± 12 ± 10	± 14 ± 13	— —	V
Supply Currents (Both Amplifiers) ($T_A = T_{high}$) ($T_A = T_{low}$)	I_D	— —	— —	5.0 6.7	mA
Power Consumption (Both Amplifiers) ($T_A = T_{high}$) ($T_A = T_{low}$)	P_C	— —	— —	150 200	mW

NOTES: 1. I_{IB} is out of the amplifier due to PNP input transistors.

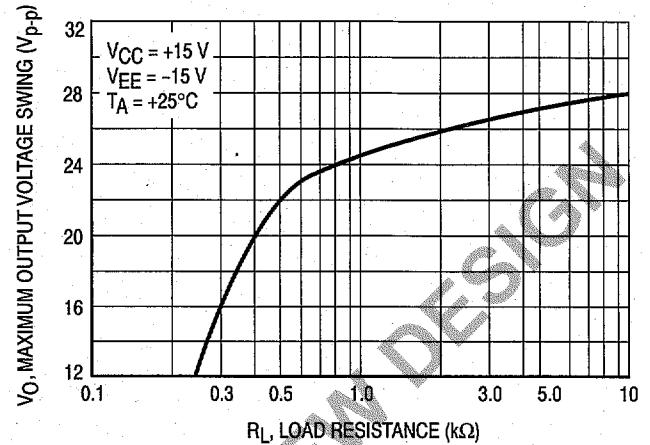
2. $T_{low} = 0^\circ\text{C}$ $T_{high} = +70^\circ\text{C}$

MCT4558C

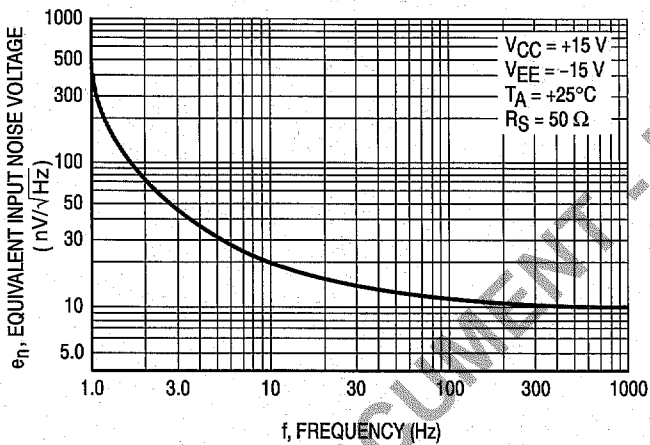
**Figure 1. Power Bandwidth
(Large Signal Swing versus Frequency)**



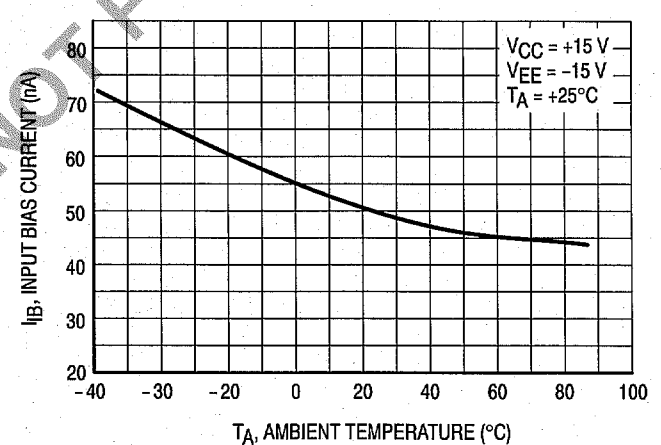
**Figure 2. Maximum Output Voltage Swing
versus Load Resistance**



**Figure 3. Equivalent Input Noise Voltage
versus Frequency**



**Figure 4. Input Bias Current
versus Ambient Temperature**



**Figure 5. Voltage Gain and Phase
versus Frequency**

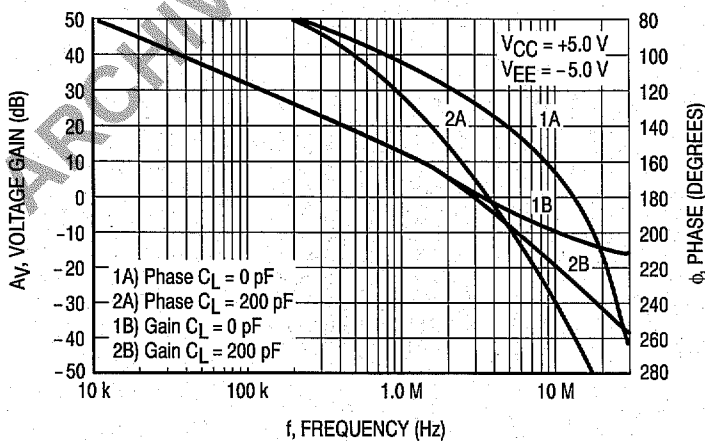
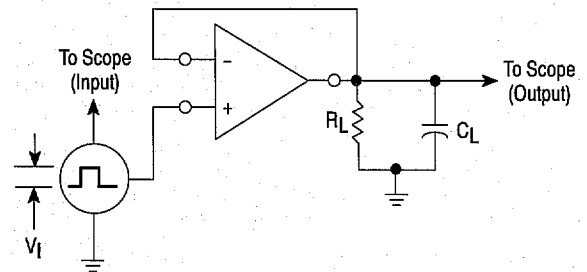


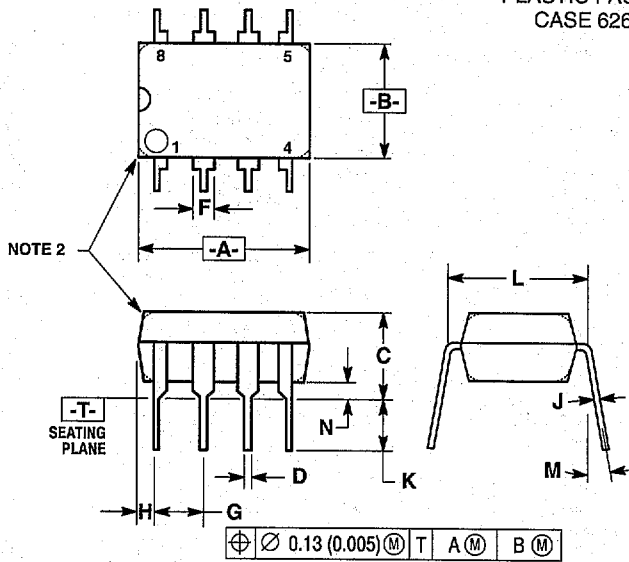
Figure 6. Transient Response Test Circuit



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OUTLINE DIMENSIONS

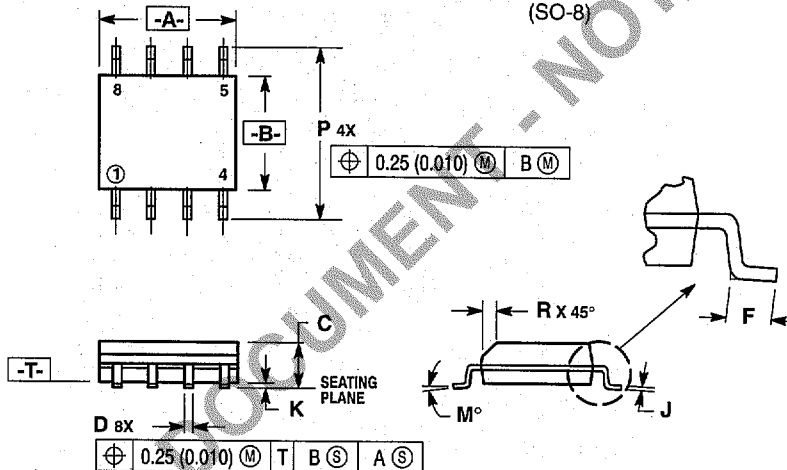
P1 SUFFIX PLASTIC PACKAGE CASE 626-05



- 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.

DIM	MILLIMETERS		INCHES	
	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
E	1.02	1.78	0.040	0.070
F	2.54 BSC	0.100 BSC		
G	0.76	1.27	0.030	0.050
H	0.20	0.30	0.008	0.012
J	2.92	3.43	0.115	0.135
K	7.62 BSC	0.300 BSC		
L	10°	10°		
M	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.

DIM	MILLIMETERS		INCHES	
	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
E	0.40	1.25	0.016	0.049
F	1.27 BSC	0.050 BSC		
G	0.18	0.25	0.007	0.009
H	0.10	0.25	0.004	0.009
J	0°	7°	0°	7°
K	5.80	6.20	0.229	0.244
L	0.25	0.50	0.010	0.019

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