

MC4741C

Differential Input Operational Amplifier

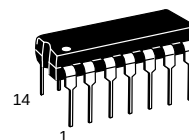
The MC4741C is a true quad MC1741. Integrated on a single monolithic chip are four independent, low power operational amplifiers which have been designed to provide operating characteristics identical to those of the industry standard MC1741, and can be applied with no change in circuit performance.

The MC4741C can be used in applications where amplifier matching or high packing density is important. Other applications include high impedance buffer amplifiers and active filter amplifiers.

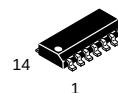
- Each Amplifier is Functionally Equivalent to the MC1741
- Class AB Output Stage Eliminates Crossover Distortion
- True Differential Inputs
- Internally Frequency Compensated
- Short Circuit Protection
- Low Power Supply Current (0.6 mA/Amplifier)

DIFFERENTIAL INPUT OPERATIONAL AMPLIFIER (QUAD MC1741)

SEMICONDUCTOR TECHNICAL DATA

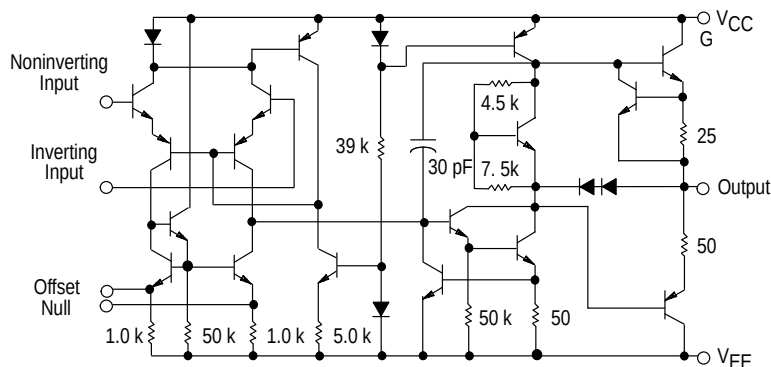


P SUFFIX
PLASTIC PACKAGE
CASE 646

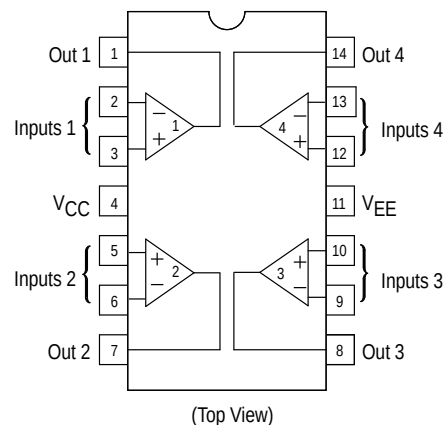


D SUFFIX
PLASTIC PACKAGE
CASE 751A
(SO-14)

Representative Schematic Diagram
(1/4 of Circuit Shown)



PIN CONNECTIONS



ORDERING INFORMATION

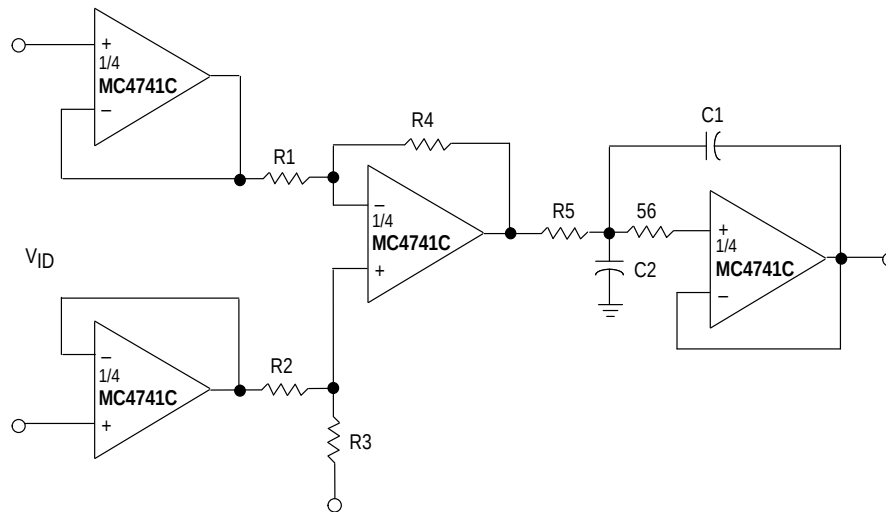
Device	Operating Temperature Range	Package
MC4741CD	$T_A = 0^\circ \text{ to } +70^\circ \text{C}$	SO-14
MC4741CP		Plastic DIP

MC4741C

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

Rating	Symbol	Value	Unit
Power Supply Voltage	V_{CC} V_{EE}	+18 -18	Vdc
Input Differential Voltage	V_{ID}	± 36	V
Input Common Mode Voltage	V_{ICM}	± 18	V
Output Short Circuit Duration	t_{SC}	Continuous	
Operating 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	$^{\circ}\text{C}$

High Impedance Instrumentation Buffer/Filter



MC4741C

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

Characteristic	Symbol	Min	Typ	Max	Unit
Input Offset Voltage ($R_S \leq 10\text{ k}$)	V_{IO}	–	2.0	6.0	mV
Input Offset Current	I_{IO}	–	20	200	nA
Input Bias Current	I_{IB}	–	80	500	nA
Input Resistance	r_i	0.3	2.0	–	M Ω
Input Capacitance	C_i	–	1.4	–	pF
Offset Voltage Adjustment Range	V_{IOR}	–	± 15	–	mV
Common Mode Input Voltage Range	V_{ICR}	± 12	± 13	–	V
Large Signal Voltage Gain ($V_O = \pm 10\text{ V}$, $R_L \geq 2.0\text{ k}$)	A_V	20	200	–	V/mV
Output Resistance	r_o	–	75	–	Ω
Common Mode Rejection ($R_S \leq 10\text{ k}$)	CMR	70	90	–	dB
Supply Voltage Rejection Ratio ($R_S \leq 10\text{ k}$)	PSRR	–	30	150	$\mu\text{V/V}$
Output Voltage Swing ($R_L \geq 10\text{ k}$) ($R_L \geq 2\text{ k}$)	V_O	± 12 ± 10	± 14 ± 13	– –	V
Output Short Circuit Current	I_{SC}	–	20	–	mA
Supply Current – (All Amplifiers)	I_D	–	3.5	7.0	mA
Power Consumption (All Amplifiers)	P_C	–	105	210	mW
Transient Response (Unity Gain – Non-Inverting) ($V_I = 20\text{ mV}$, $R_L \geq 2\text{ k}\Omega$, $C_L \leq 100\text{ pF}$) Rise Time ($V_I = 20\text{ mV}$, $R_L \geq 2\text{ k}\Omega$, $C_L \leq 100\text{ pF}$) Overshoot ($V_I = 10\text{ V}$, $R_L \geq 2\text{ k}\Omega$, $C_L \leq 100\text{ pF}$) Slew Rate	t_{TLH} os SR	– – –	0.3 15 0.5	– – –	μs % V/ μs

ELECTRICAL CHARACTERISTICS ($V_{CC} = +15\text{ V}$, $V_{EE} = -15\text{ V}$, $T_A = * T_{high}$ to T_{low} , 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 ($R_L \geq 2\text{ k}$, $V_{OUT} = \pm 10\text{ V}$)	A_V	15	–	–	V/mV
Output Voltage Swing ($R_L \geq 2\text{ k}$)	V_O	± 10	± 13	–	V

* $T_{high} = 70^\circ\text{C}$ $T_{low} = -0^\circ\text{C}$

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

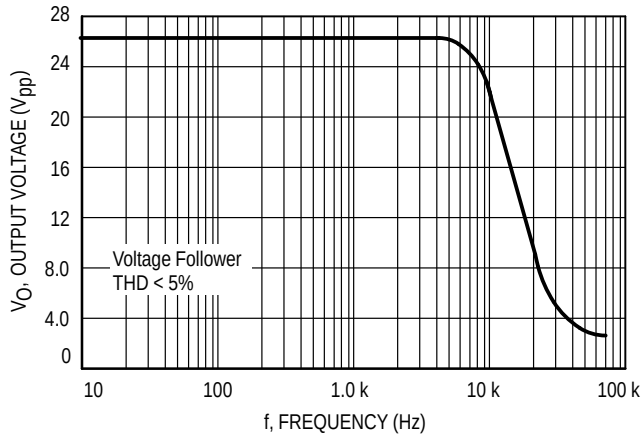
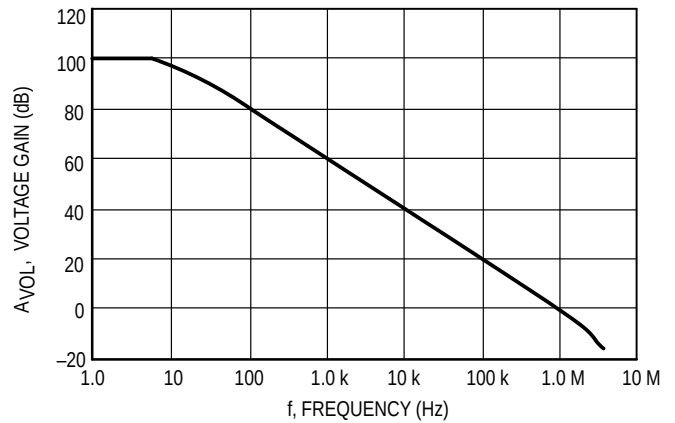
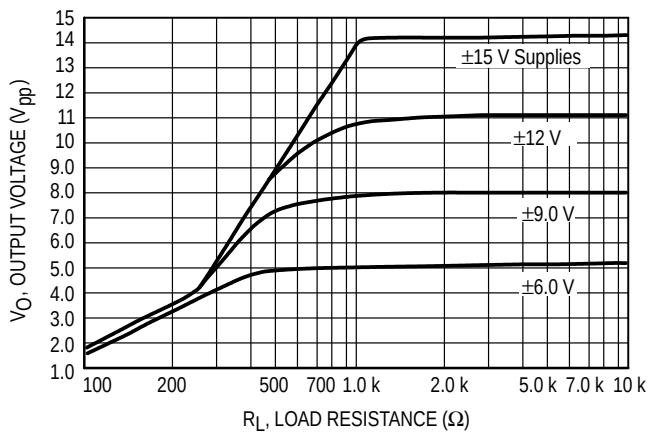


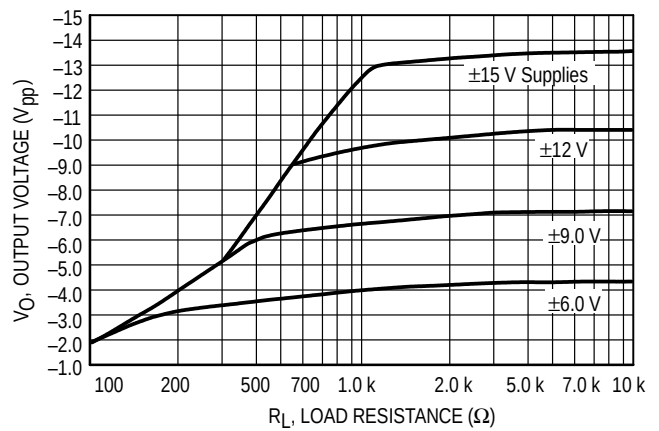
Figure 2. Open Loop Frequency Response



**Figure 3. Positive Output Voltage Swing
versus Load Resistance**



**Figure 4. Negative Output Voltage Swing
versus Load Resistance**



**Figure 5. Output Voltage Swing versus
Load Resistance (Single Supply Operation)**

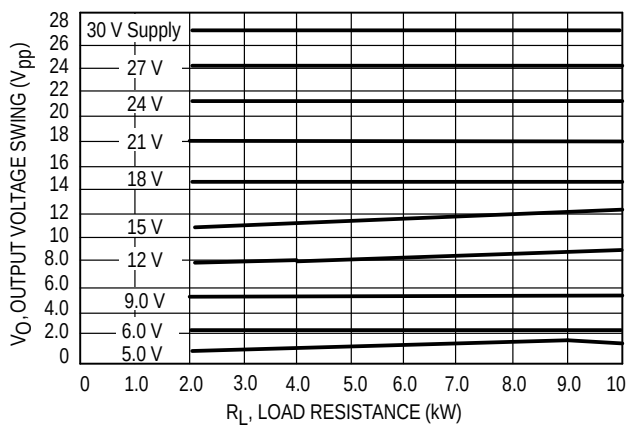
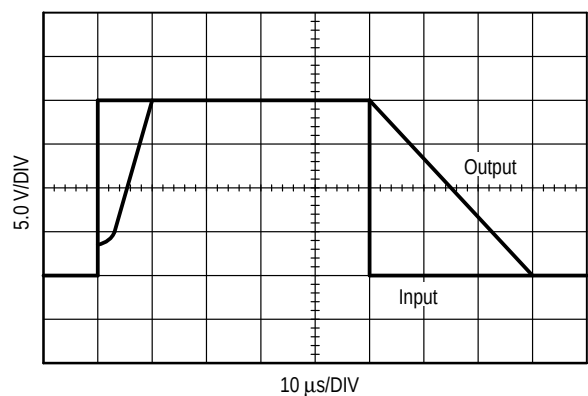


Figure 6. Noninverting Pulse Response



MC4741C

Figure 7. Bi-Quad Filter

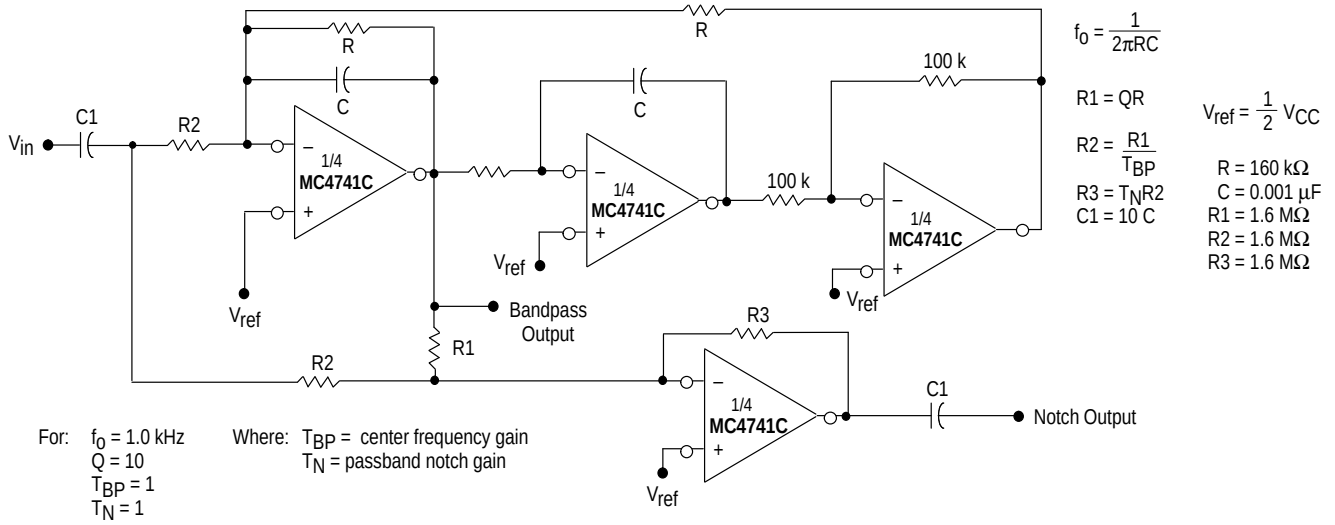


Figure 8. Open Loop Voltage Gain versus Supply Voltage

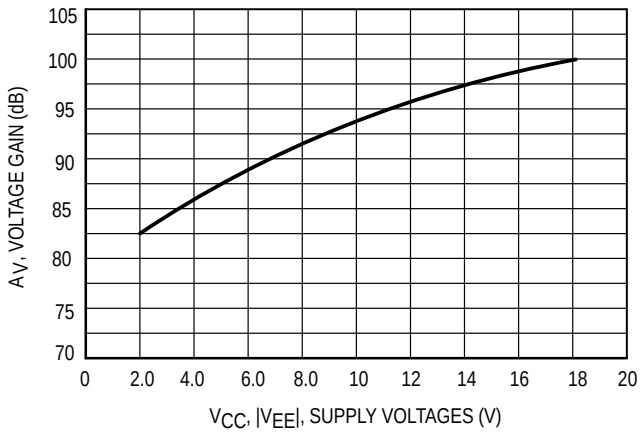


Figure 9. Transient Response Test Circuit

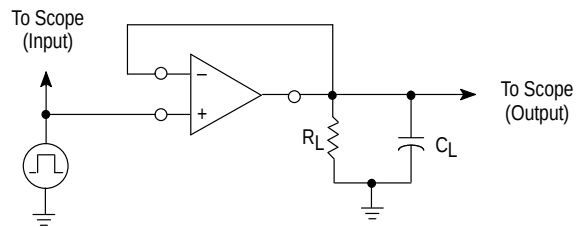
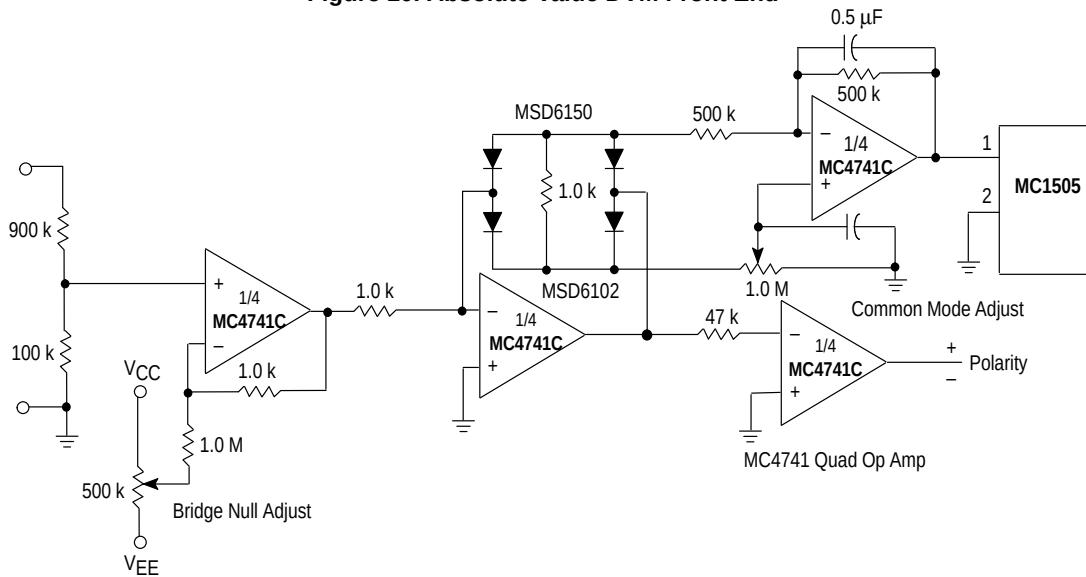


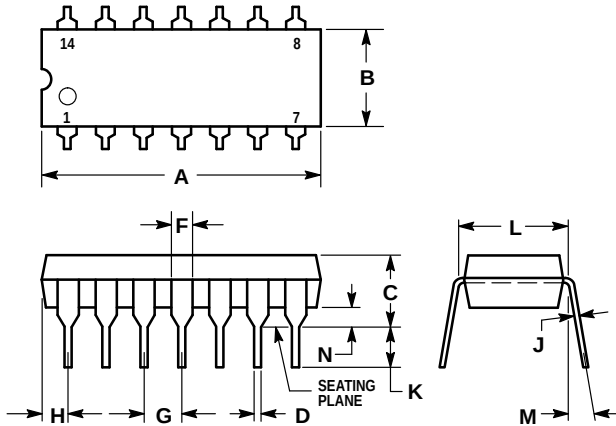
Figure 10. Absolute Value DVM Front End



MC4741C

OUTLINE DIMENSIONS

P SUFFIX PLASTIC PACKAGE CASE 646-06 ISSUE L

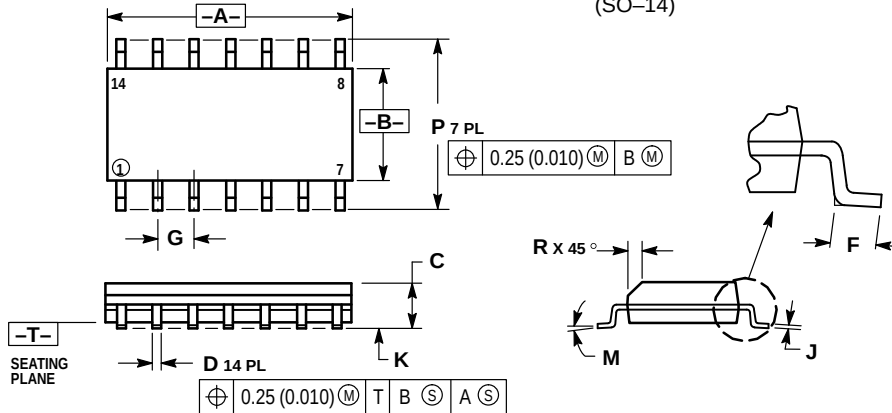


NOTES:

- LEADS WITHIN 0.13 (0.005) RADIUS OF TRUE POSITION AT SEATING PLANE AT MAXIMUM MATERIAL CONDITION.
- DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
- DIMENSION B DOES NOT INCLUDE MOLD FLASH.
- ROUNDED CORNERS OPTIONAL.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.715	0.770	18.16	19.56
B	0.240	0.260	6.10	6.60
C	0.145	0.185	3.69	4.69
D	0.015	0.021	0.38	0.53
F	0.040	0.070	1.02	1.78
G	0.100 BSC		2.54 BSC	
H	0.052	0.095	1.32	2.41
J	0.008	0.015	0.20	0.38
K	0.115	0.135	2.92	3.43
L	0.300 BSC		7.62 BSC	
M	0°	10°	0°	10°
N	0.015	0.039	0.39	1.01

D SUFFIX PLASTIC PACKAGE CASE 751A-03 ISSUE F (SO-14)



NOTES:

- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- CONTROLLING DIMENSION: MILLIMETER.
- DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
- MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
- 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	8.55	8.75	0.337	0.344
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	0.19	0.25	0.008	0.009
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	5.80	6.20	0.228	0.244
R	0.25	0.50	0.010	0.019

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters which may be provided in Motorola data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and  are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

How to reach us:

USA/EUROPE/Locations Not Listed: Motorola Literature Distribution;
P.O. Box 20912; Phoenix, Arizona 85036. 1-800-441-2447 or 602-303-5454

MFAX: RMFA00@email.sps.mot.com – TOUCHTONE 602-244-6609
INTERNET: <http://Design-NET.com>

JAPAN: Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, 6F Seibu-Butsuryu-Center,
3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 03-81-3521-8315

ASIA/PACIFIC: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298

