

# Quad MECL to TTL Translator

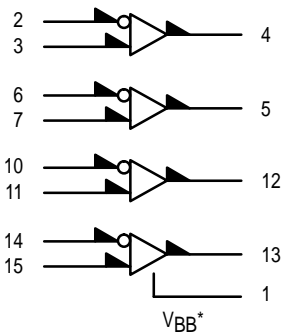
The MC10125 is a quad translator for interfacing data and control signals between the MECL section and saturated logic sections of digital systems. The MC10125 incorporates differential inputs and Schottky TTL "totem pole" outputs. Differential inputs allow for use as an inverting/ non-inverting translator or as a differential line receiver. The  $V_{BB}$  reference voltage is available on pin 1 for use in single-ended input biasing. The outputs of the MC10125 go to a low logic level whenever the inputs are left floating.

Power supply requirements are ground, +5.0 Volts and -5.2 Volts. Propagation delay of the MC10125 is typically 4.5 ns. The MC10125 has fanout of 10 TTL loads. The dc levels are MECL 10,000 in and Schottky TTL, or TTL out. This device has an input common mode noise rejection of  $\pm 1.0$  Volt.

An advantage of this device is that MECL level information can be received, via balanced twisted pair lines, in the TTL equipment. This isolates the MECL logic from the noisy TTL environment. This device is useful in computers, instrumentation, peripheral controllers, test equipment and digital communications systems.

$P_D = 380$  mW typ/pkg (No Load)  
 $t_{pd} = 4.5$  ns typ (50% to + 1.5 Vdc out)  
 $t_r, t_f = 2.5$  ns typ (1.0 V to 2.0 V)

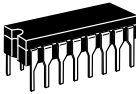
### LOGIC DIAGRAM



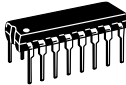
Gnd = PIN 16  
 $V_{CC}$  (+5.0Vdc) = PIN 9  
 $V_{EE}$  (-5.2Vdc) = PIN 8

\* $V_{BB}$  to be used to supply bias to the MC10125 only and bypassed (when used) with 0.01  $\mu$ F to 0.1  $\mu$ F capacitor to ground (0 V).  $V_{BB}$  can source < 1.0 mA.  
When the input pin with the bubble goes positive, the output goes negative.

## MC10125



**L SUFFIX**  
CERAMIC PACKAGE  
CASE 620-10

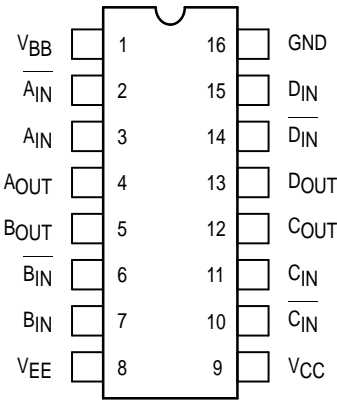


**P SUFFIX**  
PLASTIC PACKAGE  
CASE 648-08



**FN SUFFIX**  
PLCC  
CASE 775-02

### DIP PIN ASSIGNMENT



Pin assignment is for Dual-in-Line Package.  
For PLCC pin assignment, see the Pin Conversion  
Tables on page 6-11 of the Motorola MECL Data  
Book (DL122/D).



## ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Pin Under Test	Test Limits							Unit
			−30°C		+25°C			+85°C		
			Min	Max	Min	Typ	Max	Min	Max	
Negative Power Supply Drain Current	I <sub>E</sub>	8		−44			−40		−44	mAdc
Positive Power Supply Drain Current	I <sub>CCH</sub>	9		52			52		52	mAdc
	I <sub>CCL</sub>	9		39			39		39	mAdc
Input Current	I <sub>inH</sub> <sup>1</sup>	2		180			115		115	μAdc
Input Leakage Current	I <sub>CBO</sub>	2		1.5			1.0		1.0	μAdc
High Output Voltage	V <sub>OH</sub>	4	2.5		2.5			2.5		Vdc
Low Output Voltage	V <sub>OL</sub>	4		0.5			0.5		0.5	Vdc
High Threshold Voltage	V <sub>OHA</sub>	4	2.5		2.5			2.5		Vdc
Low Threshold Voltage	V <sub>OLA</sub>	4		0.5			0.5		0.5	Vdc
Indeterminate Input Protection Tests	V <sub>OLS1</sub>	4		0.5			0.5		0.5	Vdc
	V <sub>OLS2</sub>	4		0.5			0.5		0.5	Vdc
Short Circuit Current	I <sub>OS</sub>	4	40	100	40		100	40	100	mAdc
Reference Voltage	V <sub>BB</sub>	1	−1.420	−1.280	−1.350		−1.230	−1.295	−1.150	Vdc
Common Mode Rejection Tests	V <sub>OH</sub>	4	2.5		2.5			2.5		Vdc
		4	2.5		2.5			2.5		Vdc
	V <sub>OL</sub>	4		0.5			0.5		0.5	Vdc
		4		0.5			0.5		0.5	Vdc
Switching Times (50Ω Load)										ns
Propagation Delay (50% to +1.5Vdc)	t <sub>6+5−</sub>	5	1.0	6.0	1.0	4.5	6.0	1.0	6.0	
	t <sub>6−5+</sub>	5	1.0	6.0	1.0	4.5	6.0	1.0	6.0	
	t <sub>2+4−</sub>	4	1.0	6.0	1.0	4.5	6.0	1.0	6.0	
	t <sub>2−4+</sub>	4	1.0	6.0	1.0	4.5	6.0	1.0	6.0	
Rise Time (+1.0V to 2.0V)	t <sub>4+</sub>	4		3.3			3.3		3.3	
Fall Time (+1.0V to 2.0V)	t <sub>4−</sub>	4		3.3			3.3		3.3	

1. Individually test each output, apply  $V_{IHmax}$  to pin under test.

**ELECTRICAL CHARACTERISTICS** (continued)

@ Test Temperature			TEST VOLTAGE VALUES (Volts)						Gnd	Output Condition
			V <sub>IHmax</sub>	V <sub>ILmin</sub>	V <sub>IHAmin</sub>	V <sub>ILAmax</sub>	V <sub>IHH</sub>	V <sub>ILH</sub>		
			−30°C	−0.890	−1.890	−1.205	−1.500	+0.110	−0.890	
			+25°C	−0.810	−1.850	−1.105	−1.475	+0.190	−0.850	
			+85°C	−0.700	−1.825	−1.035	−1.440	+0.300	−0.825	
Characteristic	Symbol	Pin Under Test	TEST VOLTAGE APPLIED TO PINS LISTED BELOW						Gnd	Output Condition
			V <sub>IHmax</sub>	V <sub>ILmin</sub>	V <sub>IHAmin</sub>	V <sub>ILAmax</sub>	V <sub>IHH</sub>	V <sub>ILH</sub>		
Negative Power Supply Drain Current	I <sub>E</sub>	8							16	
Positive Power Supply Drain Current	I <sub>CCH</sub>	9	2,6,10,14						16	
	I <sub>CCL</sub>	9		2,6,10,14					16	
Input Current	I <sub>inH</sub> <sup>1</sup>	2	2,6,10,14						16	
Input Leakage Current	I <sub>CBO</sub>	2							16	
High Output Voltage	V <sub>OH</sub>	4		2,6,10,14					16	−2.0mA
Low Output Voltage	V <sub>OL</sub>	4	2,6,10,14						16	20mA
High Threshold Voltage	V <sub>OHA</sub>	4		6,10,14		2			16	−2.0mA
Low Threshold Voltage	V <sub>OLA</sub>	4	6,10,14		2				16	20mA
Indeterminate Input Protection Tests	V <sub>OLS1</sub>	4							16	20mA
	V <sub>OLS2</sub>	4							16	20mA
Short Circuit Current	I <sub>OS</sub>	4		2,6,10,14					4, 16	
Reference Voltage	V <sub>BB</sub>	1		2,6,10,14						
Common Mode Rejection Tests	V <sub>OH</sub>	4					3	2	16	−2.0mA
		4							16	−2.0mA
	V <sub>OL</sub>	4					2	3	16	20mA
Switching Times (50Ω Load)	Propagation Delay (50% to +1.5Vdc)		Pulse In	Pulse Out	C <sub>L</sub> (pF)					
		t <sub>6+5−</sub>	5	6	5	25			16	
		t <sub>6−5+</sub>	5	6	5	25			16	
		t <sub>2+4−</sub>	4	2	4	25			16	
		t <sub>2−4+</sub>	4	2	4	25			16	
	Rise Time (+1.0V to 2.0V)	t <sub>4+</sub>	4	2	4	25			16	
	Fall Time (+1.0V to 2.0V)	t <sub>4−</sub>	4	2	4	25			16	

1. Individually test each output, apply V<sub>IHmax</sub> to pin under test.

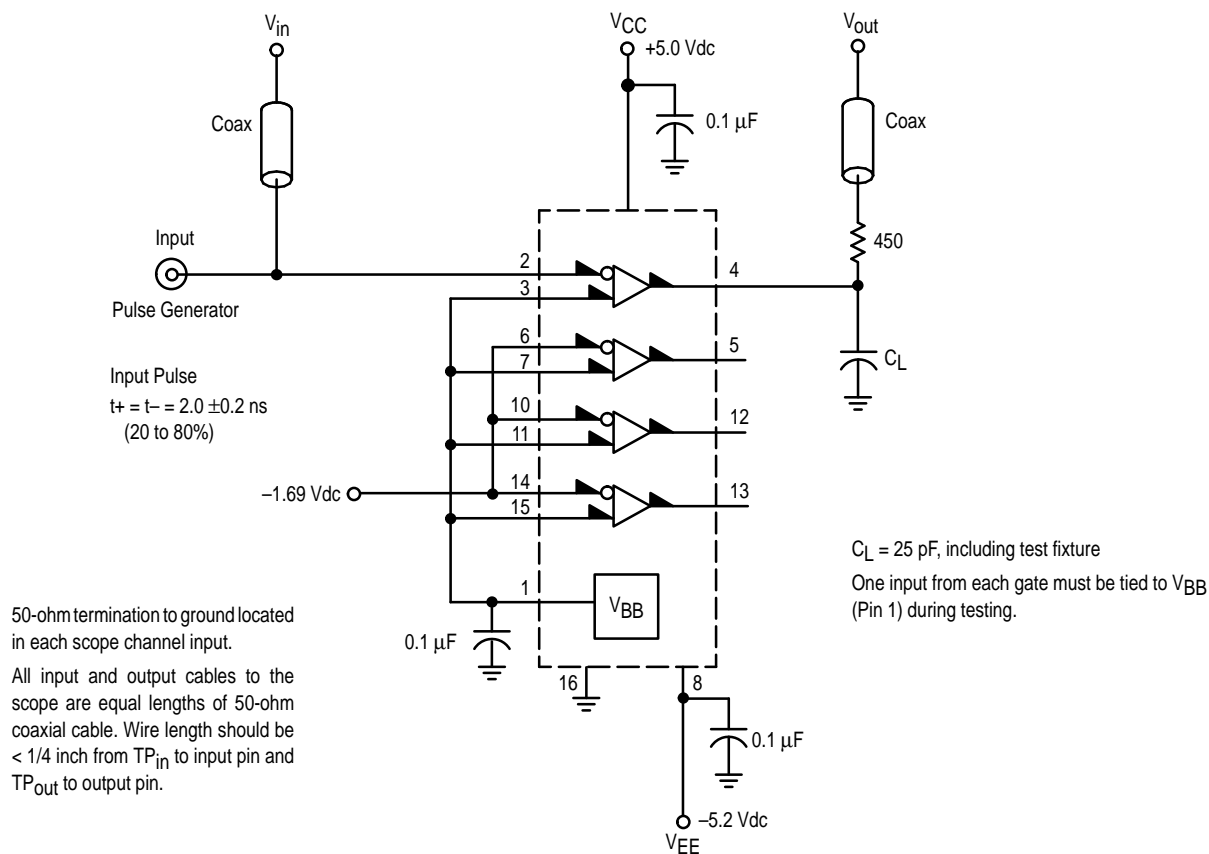
**ELECTRICAL CHARACTERISTICS** (continued)

@ Test Temperature			TEST VOLTAGE VALUES (Volts)							
			V <sub>IHH</sub>	V <sub>ILH</sub>	V <sub>BB</sub>	V <sub>CC</sub>	V <sub>EE</sub>			
			−30°C	−1.890	−2.890	From Pin 1	+5.0			−5.2
			+25°C	−1.810	−2.850		+5.0			−5.2
			+85°C	−1.700	−2.825		+5.0			−5.2
Characteristic	Symbol	Pin Under Test	TEST VOLTAGE APPLIED TO PINS LISTED BELOW					Gnd	Output Condition	
			V <sub>IHH</sub>	V <sub>ILH</sub>	V <sub>BB</sub>	V <sub>CC</sub>	V <sub>EE</sub>			
Negative Power Supply Drain Current	I <sub>E</sub>	8			3,7,11,15	9	8	16		
Positive Power Supply Drain Current	I <sub>CCH</sub>	9			3,7,11,15	9	8	16		
	I <sub>CCL</sub>	9			3,7,11,15	9	8	16		
Input Current	I <sub>inH</sub> <sup>1</sup>	2			3,7,11,15	9	8	16		
Input Leakage Current	I <sub>CBO</sub>	2			3,7,11,15	9	2,6,8,10,14	16		
High Output Voltage	V <sub>OH</sub>	4			3,7,11,15	9	8	16	−2.0mA	
Low Output Voltage	V <sub>OL</sub>	4			3,7,11,15	9	8	16	20mA	
High Threshold Voltage	V <sub>OHA</sub>	4			3,7,11,15	9	8	16	−2.0mA	
Low Threshold Voltage	V <sub>OLA</sub>	4			3,7,11,15	9	8	16	20mA	
Indeterminate Input Protection Tests	V <sub>OLS1</sub>	4				9	2,3,6,7,8, 10,11,14,15	16	20mA	
	V <sub>OLS2</sub>	4				9	8	16	20mA	
Short Circuit Current	I <sub>OS</sub>	4			3,7,11,15	9	8	4, 16		
Reference Voltage	V <sub>BB</sub>	1			3,7,11,15					
Common Mode Rejection Tests	V <sub>OH</sub>	4				9	8	16	−2.0mA	
		4	3	2		9	8	16	−2.0mA	
	V <sub>OL</sub>	4				9	8	16	20mA	
		4	2	3		9	8	16	20mA	
Switching Times (50Ω Load)										
Propagation Delay (50% to +1.5Vdc)	t <sub>6+5−</sub>	5			3,7,11,15	9	8	16		
	t <sub>6−5+</sub>	5			3,7,11,15	9	8	16		
	t <sub>2+4−</sub>	4			3,7,11,15	9	8	16		
	t <sub>2−4+</sub>	4			3,7,11,15	9	8	16		
Rise Time (+1.0V to 2.0V)	t <sub>4+</sub>	4			3,7,11,15	9	8	16		
Fall Time (+1.0V to 2.0V)	t <sub>4−</sub>	4			3,7,11,15	9	8	16		

1. Individually test each output, apply V<sub>IHmax</sub> to pin under test.

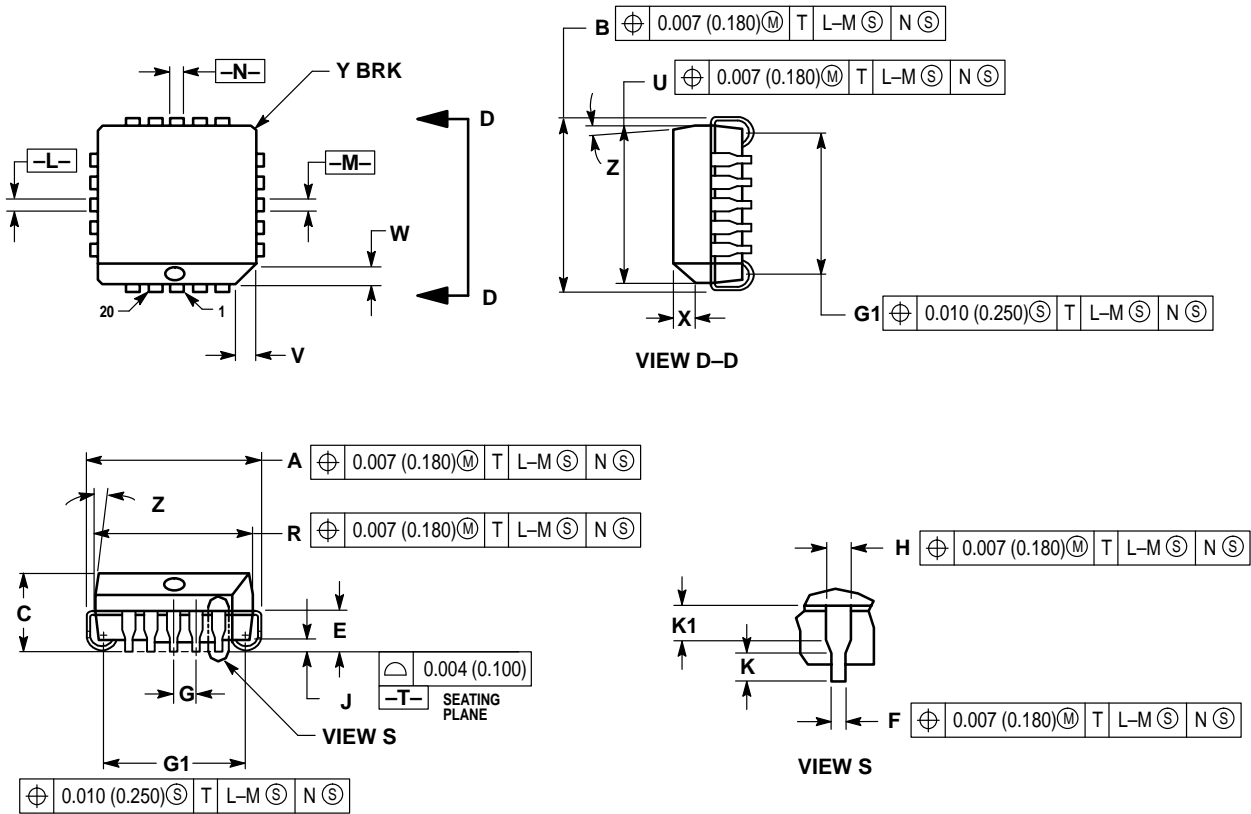
Each MECL 10,000 series circuit has been designed to meet the dc specifications shown in the test table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 linear fpm is maintained. Outputs are terminated through a 50-ohm resistor to −2.0 volts. Test procedures are shown for only one gate. The other gates are tested in the same manner.

## SWITCHING TIME TEST CIRCUIT



OUTLINE DIMENSIONS

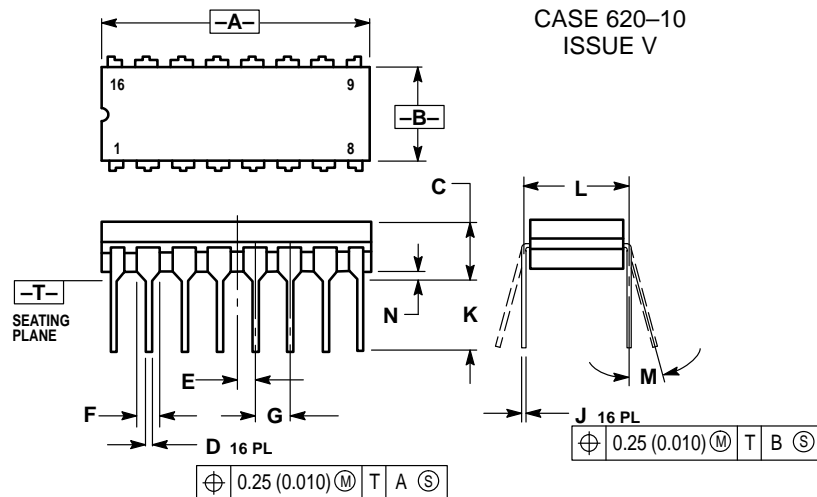
FN SUFFIX  
PLASTIC PLCC PACKAGE  
CASE 775-02  
ISSUE C



- NOTES:
1. DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
  2. DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
  3. DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
  4. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  5. CONTROLLING DIMENSION: INCH.
  6. THE PACKAGE TOP MAY BE SMALLER THAN THE PACKAGE BOTTOM BY UP TO 0.012 (0.300). DIMENSIONS R AND U ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY EXCLUSIVE OF MOLD FLASH, TIE BAR BURRS, GATE BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
  7. DIMENSION H DOES NOT INCLUDE DAMBAR PROTRUSION OR INTRUSION. THE DAMBAR PROTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE GREATER THAN 0.037 (0.940). THE DAMBAR INTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE SMALLER THAN 0.025 (0.635).

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.385	0.395	9.78	10.03
B	0.385	0.395	9.78	10.03
C	0.165	0.180	4.20	4.57
E	0.090	0.110	2.29	2.79
F	0.013	0.019	0.33	0.48
G	0.050 BSC		1.27 BSC	
H	0.026	0.032	0.66	0.81
J	0.020	—	0.51	—
K	0.025	—	0.64	—
R	0.350	0.356	8.89	9.04
U	0.350	0.356	8.89	9.04
V	0.042	0.048	1.07	1.21
W	0.042	0.048	1.07	1.21
X	0.042	0.056	1.07	1.42
Y	—	0.020	—	0.50
Z	2 °	10 °	2 °	10 °
G1	0.310	0.330	7.88	8.38
K1	0.040	—	1.02	—

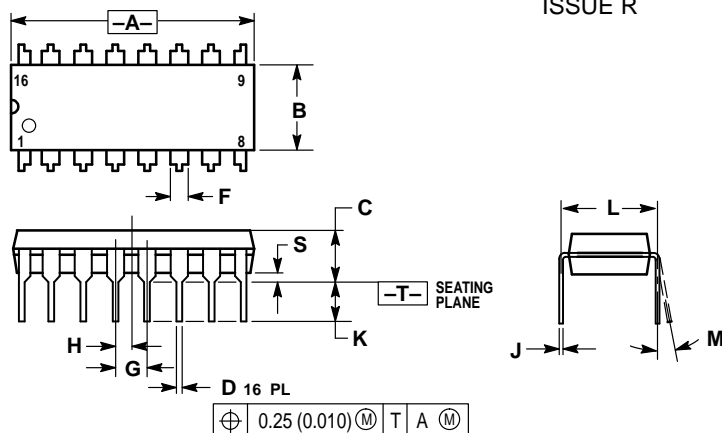
## OUTLINE DIMENSIONS

**L SUFFIX**  
**CERAMIC DIP PACKAGE**  
**CASE 620-10**  
**ISSUE V**


## NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
4. DIMENSION F MAY NARROW TO 0.76 (0.030) WHERE THE LEAD ENTERS THE CERAMIC BODY.


DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.750	0.785	19.05	19.93
B	0.240	0.295	6.10	7.49
C	—	0.200	—	5.08
D	0.015	0.020	0.39	0.50
E	0.050 BSC		1.27 BSC	
F	0.055	0.065	1.40	1.65
G	0.100 BSC		2.54 BSC	
H	0.008	0.015	0.21	0.38
K	0.125	0.170	3.18	4.31
L	0.300 BSC		7.62 BSC	
M	0°	15°	0°	15°
N	0.020	0.040	0.51	1.01

**P SUFFIX**  
**PLASTIC DIP PACKAGE**  
**CASE 648-08**  
**ISSUE R**


## NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.
5. ROUNDED CORNERS OPTIONAL.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.740	0.770	18.80	19.55
B	0.250	0.270	6.35	6.85
C	0.145	0.175	3.69	4.44
D	0.015	0.021	0.39	0.53
F	0.040	0.70	1.02	1.77
G	0.100 BSC		2.54 BSC	
H	0.050 BSC		1.27 BSC	
J	0.008	0.015	0.21	0.38
K	0.110	0.130	2.80	3.30
L	0.295	0.305	7.50	7.74
M	0°	10°	0°	10°
S	0.020	0.040	0.51	1.01

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