

# Triple Line Receiver

The MC10H116 is a functional/pinout duplication of the MC10116, with 100% improvement in propagation delay and no increase in power— supply current.

- Propagation Delay, 1.0 ns Typical
- Power Dissipation 85 mW Typ/Pkg (same as MECL 10K)
- Improved Noise Margin 150 mV (Over Operating Voltage and Temperature Range)
- Voltage Compensated
- MECL 10K—Compatible

## MAXIMUM RATINGS

Characteristic	Symbol	Rating	Unit
Power Supply ( $V_{CC} = 0$ )	$V_{EE}$	-8.0 to 0	Vdc
Input Voltage ( $V_{CC} = 0$ )	$V_I$	0 to $V_{EE}$	Vdc
Output Current — Continuous — Surge	$I_{out}$	50 100	mA
Operating Temperature Range	$T_A$	0 to +75	°C
Storage Temperature Range — Plastic — Ceramic	$T_{stg}$	-55 to +150 -55 to +165	°C

## ELECTRICAL CHARACTERISTICS ( $V_{EE} = -5.2 V \pm 5\%$ ) (2)

Characteristic	Symbol	0°		25°		75°		Unit
		Min	Max	Min	Max	Min	Max	
Power Supply Current	$I_E$	—	23	—	21	—	23	mA
Input Current High	$I_{inH}$	—	150	—	95	—	95	μA
Input Leakage Current	$I_{CBO}$	—	1.5	—	1.0	—	1.0	μA
Reference Voltage	$V_{BB}$	-1.38	-1.27	-1.35	-1.25	-1.31	-1.19	Vdc
High Output Voltage	$V_{OH}$	-1.02	-0.84	-0.98	-0.81	-0.92	-0.735	Vdc
Low Output Voltage	$V_{OL}$	-1.95	-1.63	-1.95	-1.63	-1.95	-1.60	Vdc
High Input Voltage (1)	$V_{IH}$	-1.17	-0.84	-1.13	-0.81	-1.07	-0.735	Vdc
Low Input Voltage (1)	$V_{IL}$	-1.95	-1.48	-1.95	-1.48	-1.95	-1.45	Vdc
Common Mode Range (3)	$V_{CMR}$	—	—	-2.85 to -0.8		—	—	Vdc
Input Sensitivity (4)	$V_{PP}$	—	—	150 typ		—	—	mV <sub>PP</sub>

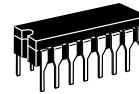
## AC PARAMETERS

Propagation Delay	$t_{pd}$	0.4	1.3	0.4	1.3	0.45	1.45	ns
Rise Time	$t_r$	0.5	1.5	0.5	1.6	0.5	1.7	ns
Fall Time	$t_f$	0.5	1.5	0.5	1.6	0.5	1.7	ns

### NOTES:

1. When  $V_{BB}$  is used as the reference voltage.
2. Each MECL 10H series circuit has been designed to meet the 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.
3. Differential input not to exceed 1.0 Vdc.
4. 150 mV<sub>p-p</sub> differential input required to obtain full logic swing on output.

# MC10H116



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



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

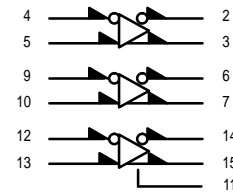


**D SUFFIX**  
PLASTIC SOIC  
CASE 751B-05



**FN SUFFIX**  
PLCC  
CASE 775-02

## LOGIC DIAGRAM



$V_{CC1}$  = Pin 1  
 $V_{CC2}$  = Pin 16  
 $V_{EE}$  = Pin 8

When input pin with bubble goes positive it's respective output pin with bubble goes positive.

\* $V_{BB}$  to be used to supply bias to the MC10H116 only and bypassed (when used) with 0.01 μF to 0.1 μF capacitor to ground (0 V).  $V_{BB}$  can source < 1.0 mA.

The MC10H116 is designed to be used in sensing differential signals over long lines. The bias supply ( $V_{BB}$ ) is made available to make the device useful as a Schmitt trigger, or in other applications where a stable reference voltage is necessary.

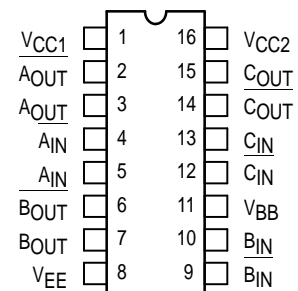
Active current sources provide these receivers with excellent common-mode noise rejection. If any amplifier in a package is not used, one input of that amplifier must be connected to  $V_{BB}$  to prevent unbalancing the current-source bias network.

The MC10H116 does not have internal-input pull-down resistors. This provides high impedance to the amplifier input and facilitates differential connections.

### Applications:

- Low Level Receiver
- Schmitt Trigger
- Voltage Level Interface

## DIP PIN ASSIGNMENT

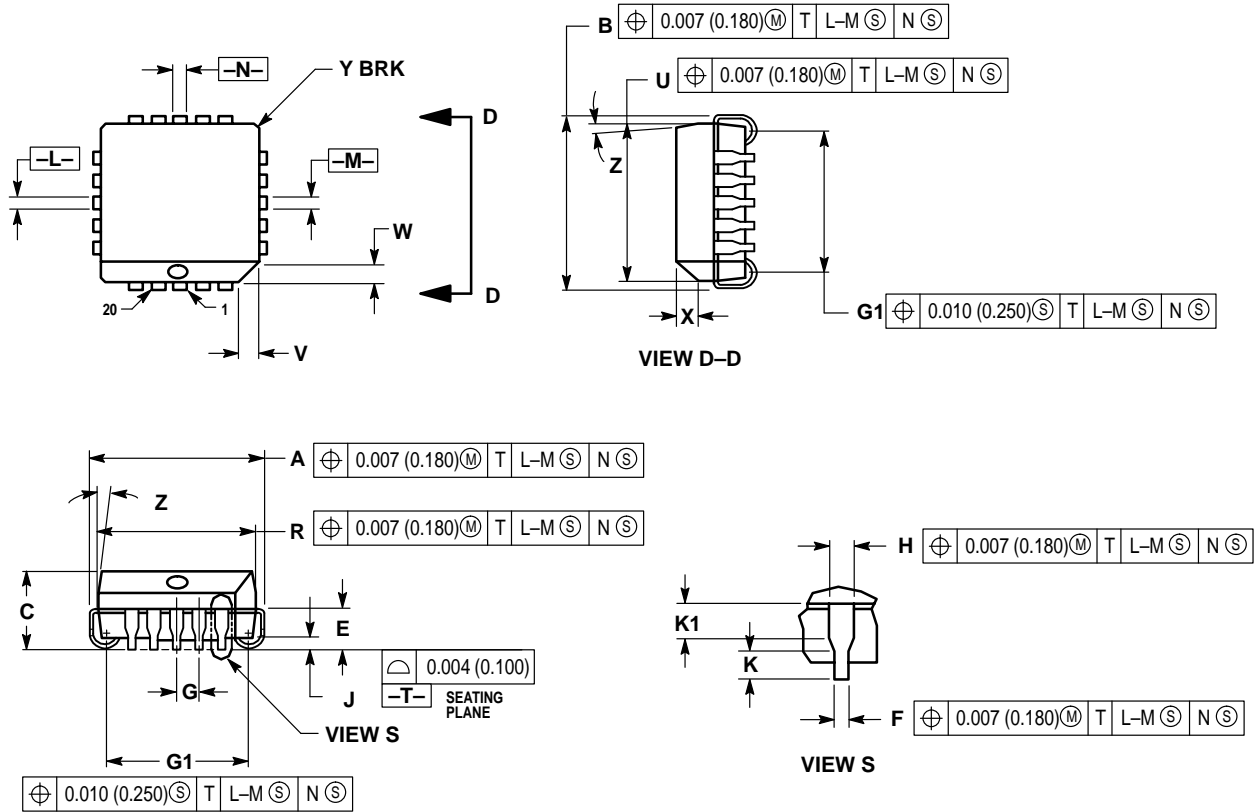


Pin assignment is for Dual-in-Line Package. For PLCC pin assignment, see the Pin Conversion Tables on page 6-11 of the Motorola MECL Data Book (DL122/D).



OUTLINE DIMENSIONS

FN SUFFIX  
 PLASTIC PLCC PACKAGE  
 CASE 775-02  
 ISSUE C



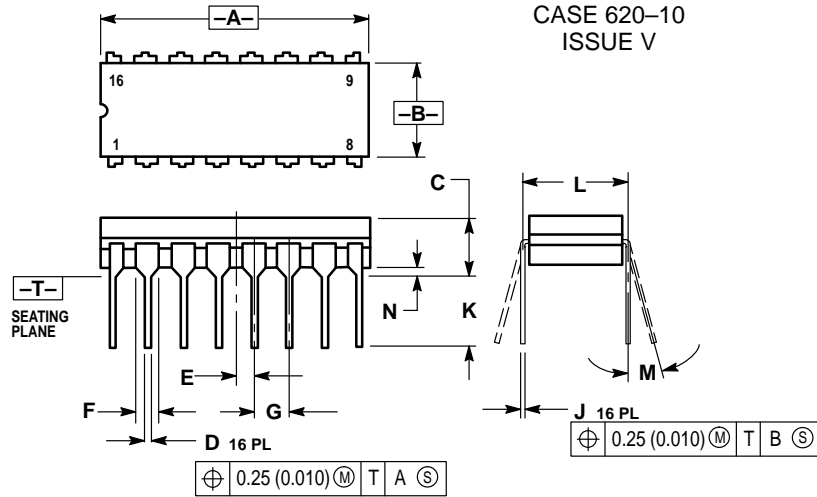
NOTES:

- DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
- DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
- DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- CONTROLLING DIMENSION: INCH.
- 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.
- 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

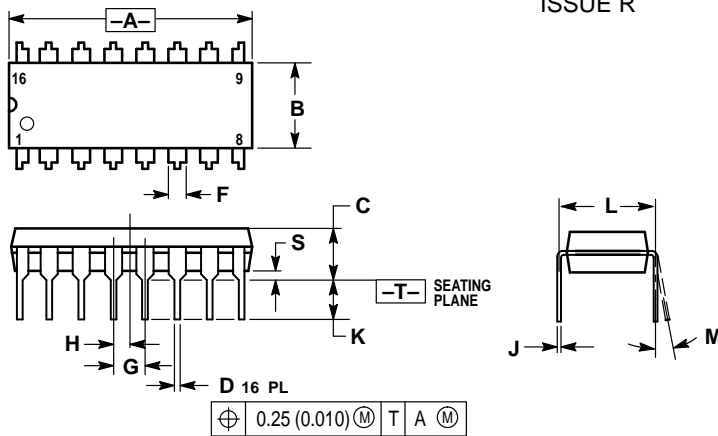
**L SUFFIX**  
**CERAMIC DIP PACKAGE**  
**CASE 620-10**  
**ISSUE V**



- 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**

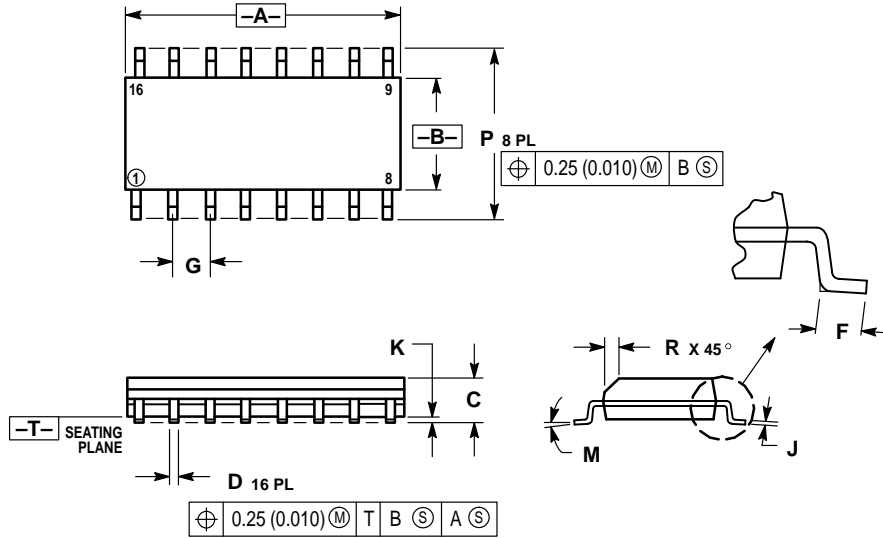


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
  4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.
  5. ROUNDED CORNERS OPTIONAL.

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


OUTLINE DIMENSIONS

D SUFFIX  
PLASTIC SOIC PACKAGE  
CASE 751B-05  
ISSUE J



- 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	9.80	10.00	0.386	0.393
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	0.229	0.244
R	0.25	0.50	0.010	0.019

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