

# MC10116

## Triple Line Receiver

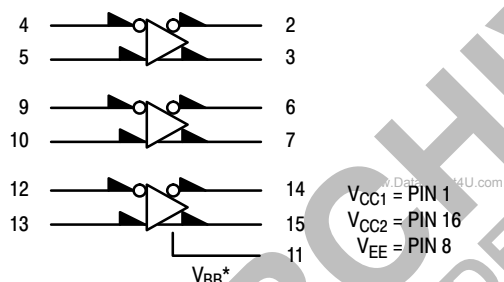
The MC10116 is a triple differential amplifier designed for use in sensing differential signals over long lines. The base bias supply ( $V_{BB}$ ) is made available at pin 11 to make the device useful as a Schmitt trigger, or in other applications where a stable reference voltage is necessary.

Active current sources provide the MC10116 with excellent common mode noise rejection. If any amplifier in a package is not used, one input of that amplifier must be connected to  $V_{BB}$  (pin 11) to prevent upsetting the current source bias network.

Complementary outputs are provided to allow driving twisted pair lines, to enable cascading of several amplifiers in a chain, or simply to provide complement outputs of the input logic function.

- $P_D = 85 \text{ mW typ/pkg (No Load)}$
- $t_{pd} = 2.0 \text{ ns typ}$
- $t_r, t_f = 2.0 \text{ ns typ (20\%–80\%)}$

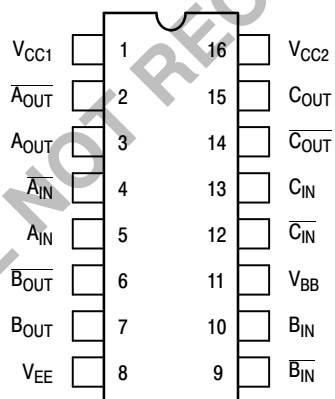
### LOGIC DIAGRAM



\* $V_{BB}$  to be used to supply bias to the MC10116 only and bypassed (when used) with  $0.01 \mu\text{F}$  to  $0.1 \mu\text{F}$  capacitor to ground (0 V).  $V_{BB}$  can source  $< 1.0 \text{ mA}$ .

When the input pin with the bubble goes positive, the output pin with the bubble goes positive.

### DIP PIN ASSIGNMENT



Pin assignment is for Dual-in-Line Package.

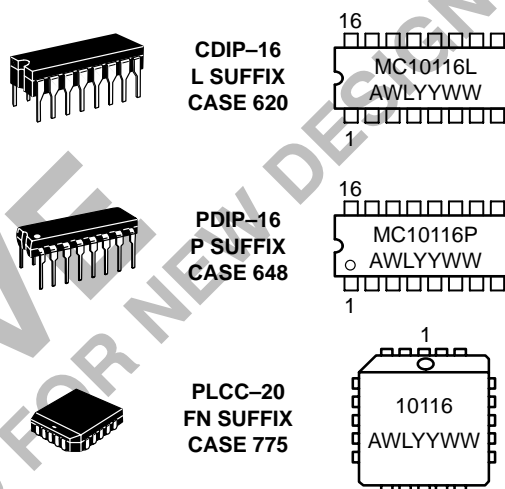
For PLCC pin assignment, see the Pin Conversion Tables on page 18 of the ON Semiconductor MECL Data Book (DL122/D).



ON Semiconductor

<http://onsemi.com>

### MARKING DIAGRAMS



A = Assembly Location  
 WL = Wafer Lot  
 YY = Year  
 WW = Work Week

### ORDERING INFORMATION

Device	Package	Shipping
MC10116L	CDIP-16	25 Units / Rail
MC10116P	PDIP-16	25 Units / Rail
MC10116FN	PLCC-20	46 Units / Rail

## ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Pin Under Test	Test Limits							Unit
			-30°C		+25°C			+85°C		
			Min	Max	Min	Typ	Max	Min	Max	
Power Supply Drain Current	I <sub>E</sub>	8		23		17	21		23	mAdc
Input Current	I <sub>inH</sub>	4		150			95		95	μAdc
	I <sub>CBO</sub>	4		1.5			1.0		1.0	μAdc
Output Voltage      Logic 1	V <sub>OH</sub>	2 3	-1.060 -1.060	-0.890 -0.890	-0.960 -0.960		-0.810 -0.810	-0.890 -0.890	-0.700 -0.700	Vdc
Output Voltage      Logic 0	V <sub>OL</sub>	2 3	-1.890 -1.890	-1.675 -1.675	-1.850 -1.850		-1.650 -1.650	-1.825 -1.825	-1.615 -1.615	Vdc
Threshold Voltage    Logic 1	V <sub>OHA</sub>	2 3	-1.080 -1.080		-0.980 -0.980			-0.910 -0.910		Vdc
Threshold Voltage    Logic 0	V <sub>OLA</sub>	2 3		-1.655 -1.655			-1.630 -1.630		-1.595 -1.595	Vdc
Reference Voltage	V <sub>BB</sub>	11	-1.420	-1.280	-1.350		-1.230	-1.295	-1.150	Vdc
Switching Times (50Ω Load)										ns
Propagation Delay	t <sub>4+2+</sub>	2	1.0	3.1	1.0	2.0	2.9	1.0	3.3	
	t <sub>4-2-</sub>	2	1.0	3.1	1.0	2.0	2.9	1.0	3.3	
	t <sub>4+3-</sub>	3	1.0	3.1	1.0	2.0	2.9	1.0	3.3	
	t <sub>4-3+</sub>	3	1.0	3.1	1.0	2.0	2.9	1.0	3.3	
Rise Time            (20 to 80%)	t <sub>2+</sub>	2	1.1	3.6	1.1	2.0	3.3	1.1	3.7	
	t <sub>3+</sub>	3	1.1	3.6	1.1	2.0	3.3	1.1	3.7	
Fall Time            (20 to 80%)	t <sub>2-</sub>	2	1.1	3.6	1.1	2.0	3.3	1.1	3.7	
	t <sub>3-</sub>	3	1.1	3.6	1.1	2.0	3.3	1.1	3.7	

## ELECTRICAL CHARACTERISTICS (continued)

@ Test Temperature			TEST VOLTAGE VALUES (Volts)						(V <sub>CC</sub> ) Gnd	
			V <sub>IHmax</sub>	V <sub>ILmin</sub>	V <sub>IHAMin</sub>	V <sub>ILAMax</sub>	V <sub>BB</sub>	V <sub>EE</sub>		
			−30°C	−0.890	−1.890	−1.205	−1.500	From Pin 11		−5.2
			+25°C	−0.810	−1.850	−1.105	−1.475			−5.2
			+85°C	−0.700	−1.825	−1.035	−1.440			−5.2
Characteristic	Symbol	Pin Under Test	TEST VOLTAGE APPLIED TO PINS LISTED BELOW						(V <sub>CC</sub> ) Gnd	
			V <sub>IHmax</sub>	V <sub>ILmin</sub>	V <sub>IHAMin</sub>	V <sub>ILAMax</sub>	V <sub>BB</sub>	V <sub>EE</sub>		
Power Supply Drain Current	I <sub>E</sub>	8		4, 9, 12			5, 10, 13	8	1, 16	
Input Current	I <sub>inH</sub>	4	4	9, 12			5, 10, 13	8	1, 16	
	I <sub>CBO</sub>	4		9, 12			5, 10, 13	8,4	1, 16	
Output Voltage      Logic 1	V <sub>OH</sub>	2	4	9, 12			5, 10, 13	8	1, 16	
		3	9, 12	4			5, 10, 13	8	1, 16	
Output Voltage      Logic 0	V <sub>OL</sub>	2	9, 12	4			5, 10, 13	8	1, 16	
		3	4	9, 12			5, 10, 13	8	1, 16	
Threshold Voltage      Logic 1	V <sub>OHA</sub>	2		9, 12	4		5, 10, 13	8	1, 16	
		3	9, 12			4	5, 10, 13	8	1, 16	
Threshold Voltage      Logic 0	V <sub>OLA</sub>	2		9, 12		4	5, 10, 13	8	1, 16	
		3	9, 12		4		5, 10, 13	8	1, 16	
Reference Voltage	V <sub>BB</sub>	11					5, 10, 13	8	1, 16	
Switching Times      (50Ω Load)					Pulse In	Pulse Out		−3.2 V	+2.0 V	
Propagation Delay	t <sub>4+2+</sub>	2			4	2	5, 10, 13	8	1, 16	
	t <sub>4−2−</sub>	2			4	2	5, 10, 13	8	1, 16	
	t <sub>4+3−</sub>	3			4	3	5, 10, 13	8	1, 16	
	t <sub>4−3+</sub>	3			4	3	5, 10, 13	8	1, 16	
Rise Time      (20 to 80%)	t <sub>2+</sub>	2			4	2	5, 10, 13	8	1, 16	
	t <sub>3+</sub>	3			4	3	5, 10, 13	8	1, 16	
Fall Time      (20 to 80%)	t <sub>2−</sub>	2			4	2	5, 10, 13	8	1, 16	
	t <sub>3−</sub>	3			4	3	5, 10, 13	8	1, 16	

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.

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## PACKAGE DIMENSIONS

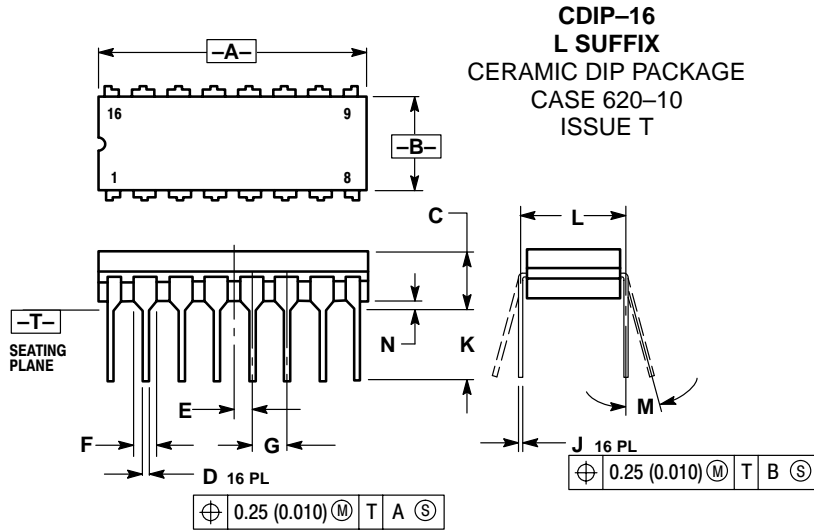
PLCC-20  
FN SUFFIX  
PLASTIC PLCC PACKAGE  
CASE 775-02  
ISSUE C



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	---

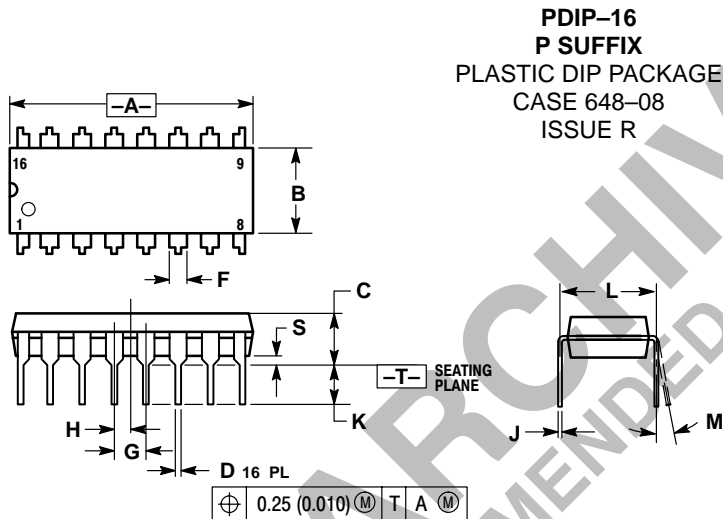
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## PACKAGE DIMENSIONS



- 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



- 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


**Notes**

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