

# MC10114

## Triple Line Receiver

The MC10114 is a triple line receiver designed for use in sensing differential signals over long lines. An active current source and translated emitter follower inputs provide the line receiver with a common mode noise rejection limit of one volt in either the positive or the negative direction. This allows a large amount of common mode noise immunity for extra long lines.

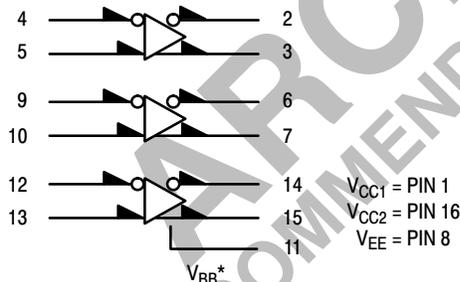
Another feature of the MC10114 is that the OR outputs go to a logic low level whenever the inputs are left floating. The outputs are each capable of driving 50 ohm transmission lines.

This device is useful in high speed central processors, minicomputers, peripheral controllers, digital communication systems, testing and instrumentation systems. The MC10114 can also be used for MOS to MECL interfacing and it is ideal as a sense amplifier for MOS RAM's.

A  $V_{BB}$  reference is provided which is useful in making the MC10114 a Schmit trigger, allowing single-ended driving of the inputs, or other applications where a stable reference voltage is necessary. See MECL Design Handbook (HB205) pages 226 and 228.

- $P_D = 145 \text{ mW typ/pkg}$
- $t_{pd} = 2.4 \text{ ns typ (Single Ended Input)}$
- $t_{pd} = 2.0 \text{ ns typ (Differential Input)}$
- $t_r, t_f = 2.1 \text{ ns typ (20\%–80\%)}$

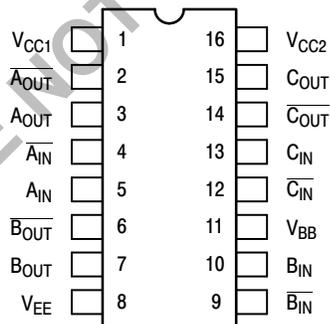
### LOGIC DIAGRAM



\* $V_{BB}$  to be used to supply bias to the MC10114 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 mA.

When the input pin with the bubble goes positive, its respective output pin with 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).



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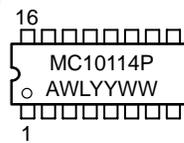


CDIP-16  
L SUFFIX  
CASE 620

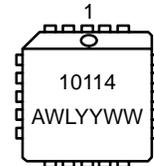
### MARKING DIAGRAMS



PDIP-16  
P SUFFIX  
CASE 648



PLCC-20  
FN SUFFIX  
CASE 775



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

### ORDERING INFORMATION

Device	Package	Shipping
MC10114L	CDIP-16	25 Units / Rail
MC10114P	PDIP-16	25 Units / Rail
MC10114FN	PLCC-20	46 Units / Rail

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## 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	$I_E$	8		39		28	35		39	mAdc
Input Current	$I_{inH}$	4		70			45		45	$\mu$ Adc
	$I_{CBO}$	4		1.5			1.0		1.0	$\mu$ Adc
Output Voltage Logic 1	$V_{OH}$	2	-1.060	-0.890	-0.960		-0.810	-0.890	-0.700	Vdc
		3	-1.060	-0.890	-0.960		-0.810	-0.890	-0.700	
Output Voltage Logic 0	$V_{OL}$	2	-1.890	-1.675	-1.850		-1.650	-1.825	-1.615	Vdc
		3	-1.890	-1.675	-1.850		-1.650	-1.825	-1.615	
Threshold Voltage Logic 1	$V_{OHA}$	2	-1.080		-0.980			-0.910		Vdc
		3	-1.080		-0.980			-0.910		
Threshold Voltage Logic 0	$V_{OLA}$	2		-1.655			-1.630		-1.595	Vdc
		3		-1.655			-1.630		-1.595	
Reference Voltage	$V_{BB}$	11	-1.420	-1.280	-1.350		-1.230	-1.295	-1.150	Vdc
Common Mode Rejection Test	$V_{OH}$	2	-1.060	-0.890	-0.960		-0.810	-0.890	-0.700	Vdc
		3	-1.060	-0.890	-0.960		-0.810	-0.890	-0.700	
$V_{OL}$	2	-1.890	-1.675	-1.850		-1.650	-1.825	-1.615	Vdc	
	3	-1.890	-1.675	-1.850		-1.650	-1.825	-1.615		
Switching Times (50 $\Omega$ Load)			<b>Min</b>	<b>Max</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Min</b>	<b>Max</b>	ns
Propagation Delay	$t_{4+2+}$	2	1.0	4.4	1.0	2.4	4.0	0.9	4.3	
	$t_{4-2-}$	2	1.0	4.4	1.0	2.4	4.0	0.9	4.3	
	$t_{4+3-}$	3	1.0	4.4	1.0	2.4	4.0	0.9	4.3	
	$t_{4-3+}$	3	1.0	4.4	1.0	2.4	4.0	0.9	4.3	
Rise Time (20 to 80%)	$t_{2+}$	2	1.5	3.8	1.5	2.1	3.5	1.5	3.7	
	$t_{3+}$	3	1.5	3.8	1.5	2.1	3.5	1.5	3.7	
Fall Time (20 to 80%)	$t_{2-}$	2	1.5	3.8	1.5	2.1	3.5	1.5	3.7	
	$t_{3-}$	3	1.5	3.8	1.5	2.1	3.5	1.5	3.7	

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## ELECTRICAL CHARACTERISTICS (continued)

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

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## ELECTRICAL CHARACTERISTICS (continued)

@ Test Temperature			TEST VOLTAGE VALUES (Volts)					(V <sub>CC</sub> ) Gnd		
			V <sub>IHH</sub> *	V <sub>ILH</sub> *	V <sub>IHL</sub> *	V <sub>ILL</sub> *	V <sub>EE</sub>			
			-30°C	+0.110	-0.890	-1.890	-2.890			-5.2
			+25°C	+0.190	-0.850	-1.810	-2.850			-5.2
+85°C	+0.300	-0.825	-1.700	-2.825	-5.2					
Characteristic	Symbol	Pin Under Test	TEST VOLTAGE APPLIED TO PINS LISTED BELOW							
			V <sub>IHH</sub> *	V <sub>ILH</sub> *	V <sub>IHL</sub> *	V <sub>ILL</sub> *	V <sub>EE</sub>			
Power Supply Drain Current	I <sub>E</sub>	8					8	1, 16		
Input Current	I <sub>inH</sub>	4					8	1, 16		
	I <sub>inL</sub>	4					8, 4	1, 16		
Output Voltage Logic 1	V <sub>OH</sub>	2					8	1, 16		
		3					8	1, 16		
Output Voltage Logic 0	V <sub>OL</sub>	2					8	1, 16		
		3					8	1, 16		
Threshold Voltage Logic 1	V <sub>OHA</sub>	2					8	1, 16		
		3					8	1, 16		
Threshold Voltage Logic 0	V <sub>OLA</sub>	2					8	1, 16		
		3					8	1, 16		
Reference Voltage	V <sub>BB</sub>	11					8	1, 16		
Common Mode Rejection Test	V <sub>OH</sub>	2	4	5			8	1, 16		
		3			5	4	8	1, 16		
	V <sub>OL</sub>	2			5	4	8	1, 16		
		3	4	5			8	1, 16		
Switching Times (50Ω Load)							<b>-3.2 V</b>	<b>+2.0 V</b>		
Propagation Delay	t <sub>4+2+</sub>	2					8	1, 16		
	t <sub>4-2-</sub>	2					8	1, 16		
	t <sub>4+3-</sub>	3					8	1, 16		
	t <sub>4-3+</sub>	3					8	1, 16		
Rise Time (20 to 80%)	t <sub>2+</sub>	2					8	1, 16		
	t <sub>3+</sub>	3					8	1, 16		
Fall Time (20 to 80%)	t <sub>2-</sub>	2					8	1, 16		
	t <sub>3-</sub>	3					8	1, 16		

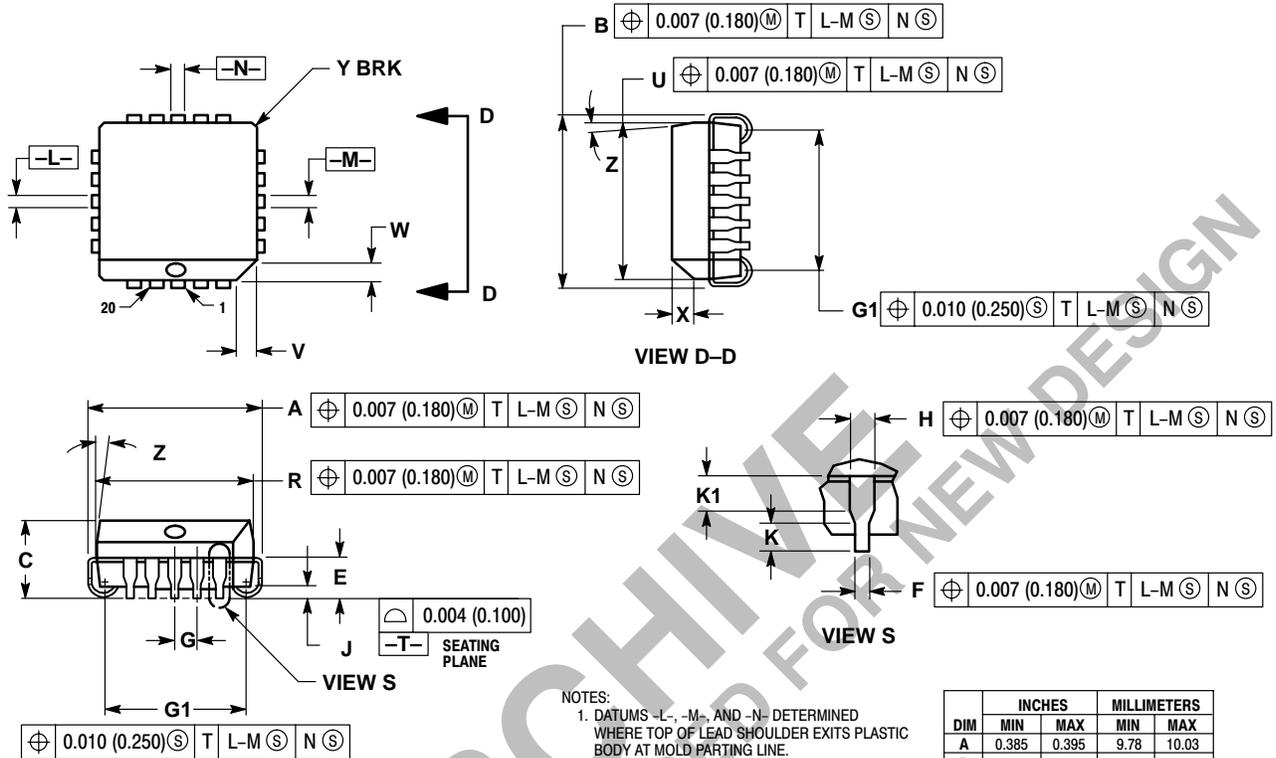
- \* V<sub>IHH</sub> = Input Logic 1 level shifted positive one volt for common mode rejection tests
- V<sub>ILH</sub> = Input Logic 0 level shifted positive one volt for common mode rejection tests
- V<sub>IHL</sub> = Input Logic 1 level shifted negative one volt for common mode rejection tests
- V<sub>ILL</sub> = Input Logic 0 level shifted negative one volt for common mode rejection tests

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



### NOTES:

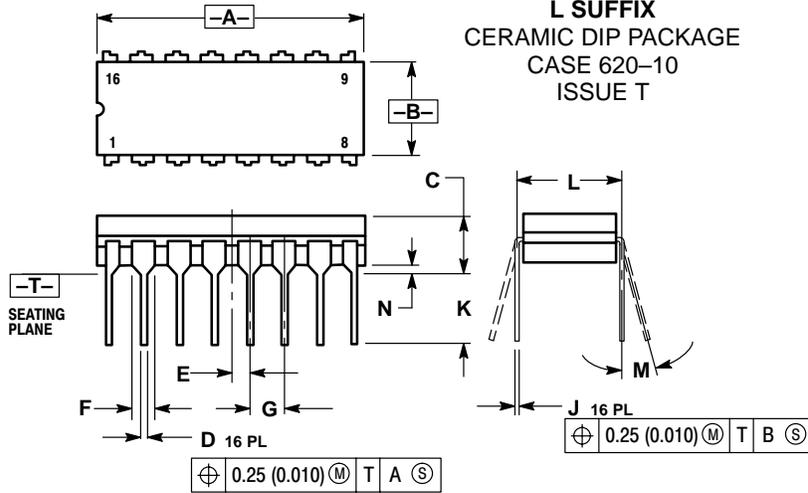
- DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
- DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
- DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
- DIMENSIONING AND TOLERANCING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

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## PACKAGE DIMENSIONS

### CDIP-16 L SUFFIX CERAMIC DIP PACKAGE CASE 620-10 ISSUE T

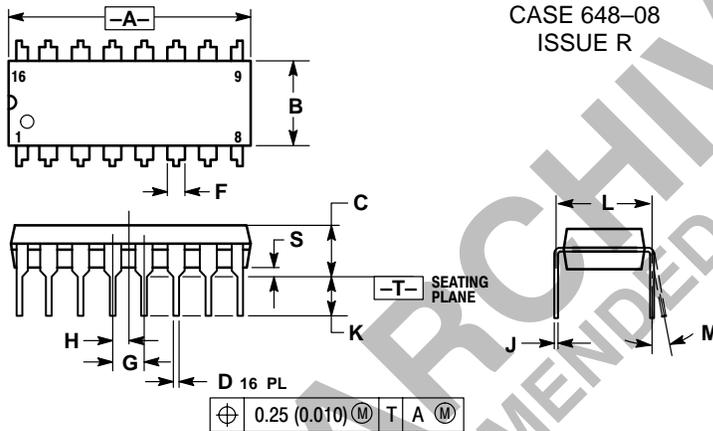


NOTES:

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

### PDIP-16 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

ARCHIVE FOR NEW DESIGN  
DEVICE NOT RECOMMENDED

Notes

ARCHIVE  
DEVICE NOT RECOMMENDED FOR NEW DESIGN

ARCHIVE  
RECOMMENDED FOR NEW DESIGN

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