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.

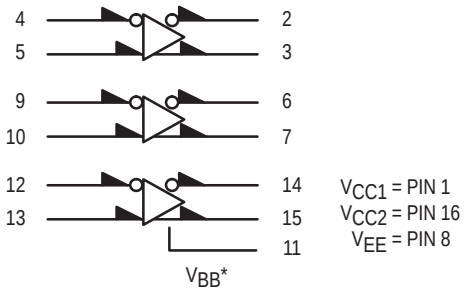
Another feature of the MC10114 is that the OR outputs go to a logic low level whenever the inputs are left floating. The outputs are each capable of driving 50 ohm transmission lines.

This device is useful in high speed central processors, minicomputers, peripheral controllers, digital communication systems, testing and instrumen– tation 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 mW typ/pkg
- t_{pd} = 2.4 ns typ (Single Ended Input)
- t_{pd} = 2.0 ns typ (Differential Input)
- t_r, t_f = 2.1 ns typ (20%–80%)

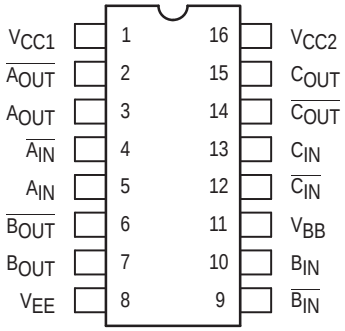
LOGIC DIAGRAM



*V_{BB} to be used to supply bias to the MC10114 only and bypassed (when used) with 0.01 μF to 0.1 μF 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

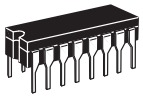


Pin assignment is for Dual–in–Line Package.
For PLCC pin assignment, see the Pin Conversion Tables on page 18 of the ON Semiconductor MECL Data Book (DL122/D).

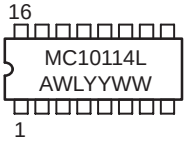
ON Semiconductor

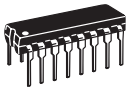
http://onsemi.com

MARKING DIAGRAMS

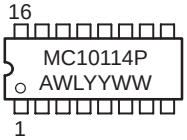


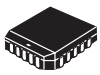
CDIP–16
L SUFFIX
CASE 620





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

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	μAdc
	I_{CBO}	4		1.5			1.0		1.0	μAdc
Output Voltage Logic 1	V_{OH}	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_{OL}	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_{OHA}	2 3	–1.080 –1.080		–0.980 –0.980			–0.910 –0.910		Vdc
Threshold Voltage Logic 0	V_{OLA}	2 3		–1.655 –1.655			–1.630 –1.630		–1.595 –1.595	Vdc
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 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
	V_{OL}	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
Switching Times (50Ω Load)			**Min**	**Max**	**Min**	**Typ**	**Max**	**Min**	**Max**	ns
Propagation Delay	t_{4+2+} t_{4-2-} t_{4+3-} t_{4-3+}	2 2 3 3	1.0 1.0 1.0 1.0	4.4 4.4 4.4 4.4	1.0 1.0 1.0 1.0	2.4 2.4 2.4 2.4	4.0 4.0 4.0 4.0	0.9 0.9 0.9 0.9	4.3 4.3 4.3 4.3	
Rise Time (20 to 80%)	t_{2+} t_{3+}	2 3	1.5 1.5	3.8 3.8	1.5 1.5	2.1 2.1	3.5 3.5	1.5 1.5	3.7 3.7	
Fall Time (20 to 80%)	t_{2-} t_{3-}	2 3	1.5 1.5	3.8 3.8	1.5 1.5	2.1 2.1	3.5 3.5	1.5 1.5	3.7 3.7	

ELECTRICAL CHARACTERISTICS (continued)

@ Test Temperature			TEST VOLTAGE VALUES (Volts)					
			V_{IHmax}	V_{ILmin}	V_{IHAmin}	V_{ILAmax}	V_{BB}	
–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_{IHmax}	V_{ILmin}	V_{IHAmin}	V_{ILAmax}	V_{BB}	
Power Supply Drain Current		I_E	8		4, 9, 12			5, 10, 13	mAdc
Input Current		I_{inH}	4	4	9, 12			5, 10, 13	μAdc
		I_{inL}	4		9, 12			5, 10, 13	μAdc
Output Voltage	Logic 1	V_{OH}	2 3	4 9, 12	9, 12 4			5, 10, 13 5, 10, 13	Vdc
Output Voltage	Logic 0	V_{OL}	2 3	9, 12 4	4 9, 12			5, 10, 13 5, 10, 13	Vdc
Threshold Voltage	Logic 1	V_{OHA}	2 3	 9, 12	9, 12	4	 4	5, 10, 13 5, 10, 13	Vdc
Threshold Voltage	Logic 0	V_{OLA}	2 3	9, 12	 9, 12	 4	4	5, 10, 13 5, 10, 13	Vdc
Reference Voltage		V_{BB}	11					5, 10, 13	Vdc
Common Mode Rejection Test		V_{OH}	2 3						Vdc
		V_{OL}	2 3						Vdc
Switching Times	(50Ω Load)					**Pulse In**	**Pulse Out**		
Propagation Delay		t_{4+2+} t_{4-2-} t_{4+3-} t_{4-3+}	2 2 3 3			4 4 4 4	2 2 3 3	5, 10, 13 5, 10, 13 5, 10, 13 5, 10, 13	ns
Rise Time	(20 to 80%)	t_{2+} t_{3+}	2 3			4 4	2 3	5, 10, 13 5, 10, 13	
Fall Time	(20 to 80%)	t_{2-} t_{3-}	2 3			4 4	2 3	5, 10, 13 5, 10, 13	

ELECTRICAL CHARACTERISTICS (continued)

@ Test Temperature	V_{IHH}*	V_{ILH}*	V_{IHL}*	V_{ILL}*	V_{EE}
–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

TEST VOLTAGE VALUES (Volts)

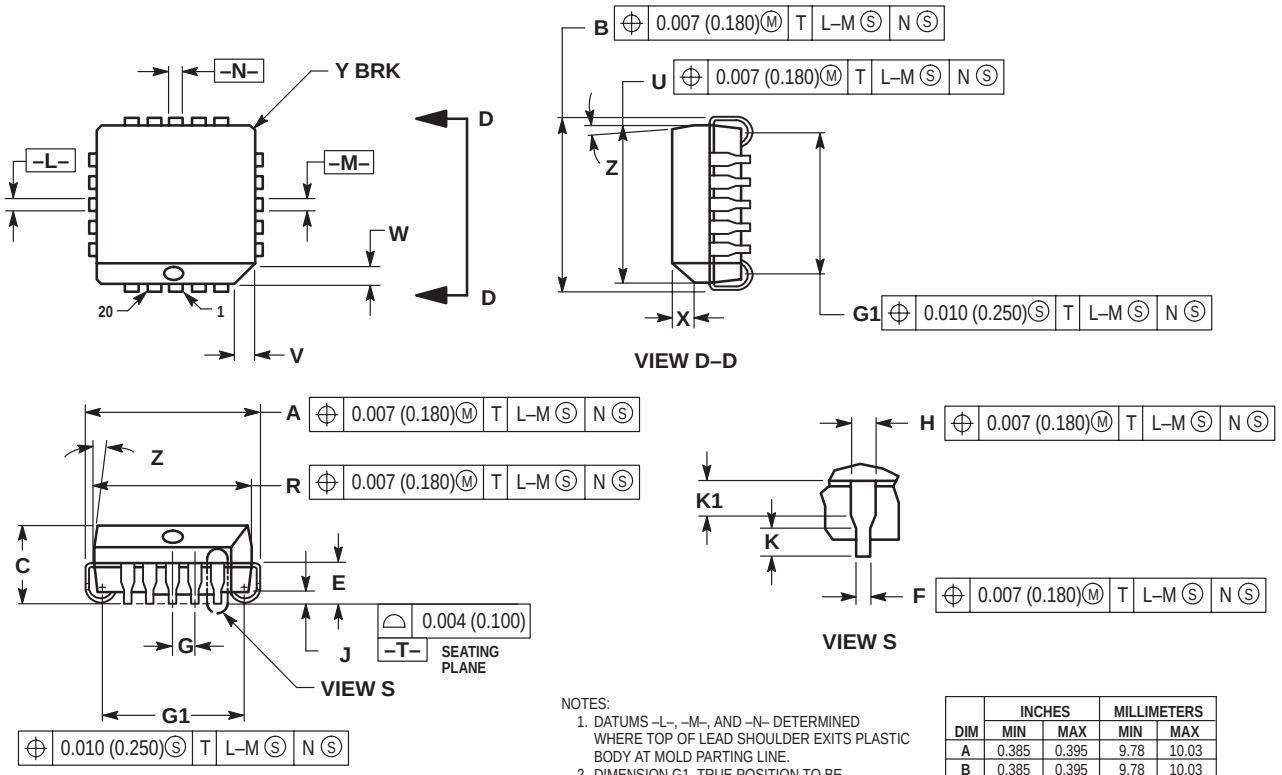
Characteristic	Symbol	Pin Under Test	TEST VOLTAGE APPLIED TO PINS LISTED BELOW					(V_{CC}) Gnd
			V_{IHH}*	V_{ILH}*	V_{IHL}*	V_{ILL}*	V_{EE}	
Power Supply Drain Current	I_E	8					8	1, 16
Input Current	I_{inH}	4					8	1, 16
	I_{inL}	4					8, 4	1, 16
Output Voltage Logic 1	V_{OH}	2 3					8 8	1, 16 1, 16
Output Voltage Logic 0	V_{OL}	2 3					8 8	1, 16 1, 16
Threshold Voltage Logic 1	V_{OHA}	2 3					8 8	1, 16 1, 16
Threshold Voltage Logic 0	V_{OLA}	2 3					8 8	1, 16 1, 16
Reference Voltage	V_{BB}	11					8	1, 16
Common Mode Rejection Test	V_{OH}	2 3	4	5	 5	 4	8 8	1, 16 1, 16
	V_{OL}	2 3	 4	 5	5	4	8 8	1, 16 1, 16
Switching Times (50Ω Load)							**–3.2 V**	**+2.0 V**
Propagation Delay	t_{4+2+} t_{4-2-} t_{4+3-} t_{4-3+}	2 2 3 3					8 8 8 8	1, 16 1, 16 1, 16 1, 16
Rise Time (20 to 80%)	t_{2+} t_{3+}	2 3					8 8	1, 16 1, 16
Fall Time (20 to 80%)	t_{2-} t_{3-}	2 3					8 8	1, 16 1, 16

* V_{IHH} = Input Logic 1 level shifted positive one volt for common mode rejection tests
V_{ILH} = Input Logic 0 level shifted positive one volt for common mode rejection tests
V_{IHL} = Input Logic 1 level shifted negative one volt for common mode rejection tests
V_{ILL} = 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.

PACKAGE DIMENSIONS

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

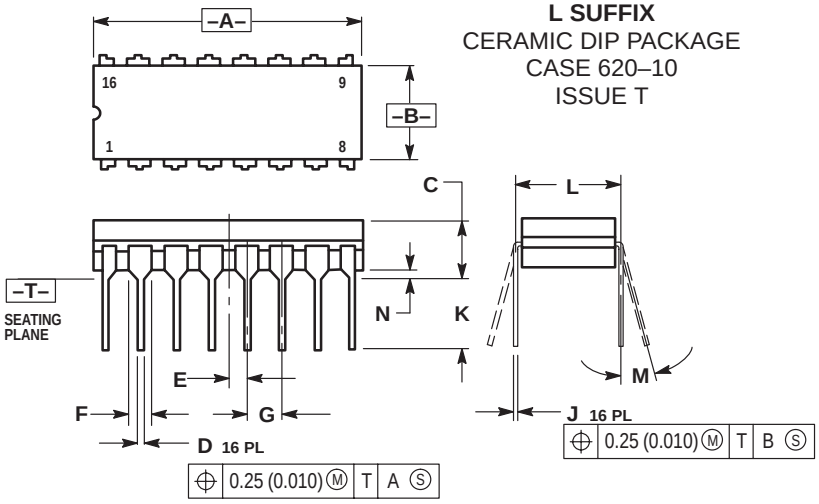


NOTES:
1. DATUMS –L–, –M–, AND –N– DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
2. DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM –T–, SEATING PLANE.
3. DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
4. DIMENSIONING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

	INCHES		MILLIMETERS	
DIM	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	—

PACKAGE DIMENSIONS

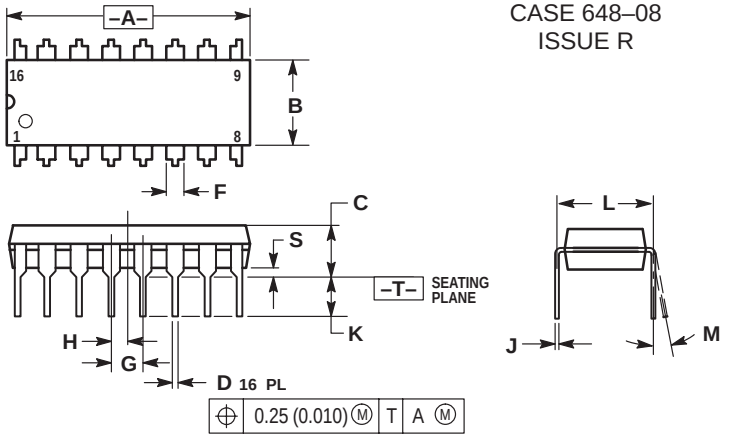
CDIP–16
L SUFFIX
CERAMIC DIP PACKAGE
CASE 620–10
ISSUE T



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.

	INCHES		MILLIMETERS	
DIM	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.

	INCHES		MILLIMETERS	
DIM	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

PUBLICATION ORDERING INFORMATION

North America Literature Fulfillment:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303–675–2175 or 800–344–3860 Toll Free USA/Canada
Fax: 303–675–2176 or 800–344–3867 Toll Free USA/Canada
Email: ONlit@hibbertco.com

N. American Technical Support: 800–282–9855 Toll Free USA/Canada

EUROPE: LDC for ON Semiconductor – European Support
German **Phone:** (+1) 303–308–7140 (M–F 2:30pm to 5:00pm Munich Time)
Email: ONlit–german@hibbertco.com
French **Phone:** (+1) 303–308–7141 (M–F 2:30pm to 5:00pm Toulouse Time)
Email: ONlit–french@hibbertco.com
English **Phone:** (+1) 303–308–7142 (M–F 1:30pm to 5:00pm UK Time)
Email: ONlit@hibbertco.com

ASIA/PACIFIC: LDC for ON Semiconductor – Asia Support
Phone: 303–675–2121 (Tue–Fri 9:00am to 1:00pm, Hong Kong Time)
Toll Free from Hong Kong 800–4422–3781
Email: ONlit–asia@hibbertco.com

JAPAN: ON Semiconductor, Japan Customer Focus Center
4–32–1 Nishi–Gotanda, Shinagawa–ku, Tokyo, Japan 141–8549
Phone: 81–3–5740–2745
Email: r14525@onsemi.com

Fax Response Line: 303–675–2167
800–344–3810 Toll Free USA/Canada

ON Semiconductor Website: http://onsemi.com

For additional information, please contact your local
Sales Representative.