

# MC10113

## Quad Exclusive OR Gate

The MC10113 is a quad Exclusive OR gate, with an enable common to all four gates. The outputs may be wire-ORed together to perform a 4-bit comparison function ( $A = B$ ). The enable is active low.

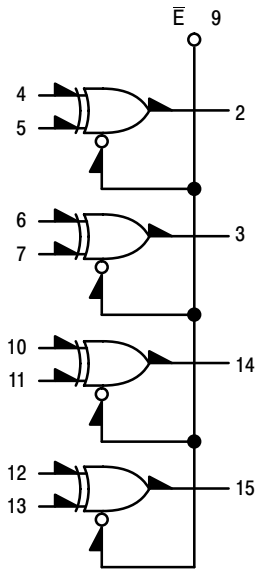
- $P_D = 175 \text{ mW typ/pkg (No Load)}$
- $t_{pd} = 2.5 \text{ ns typ}$
- $t_r, t_f = 2.0 \text{ ns typ (20\%–80\%)}$



ON Semiconductor

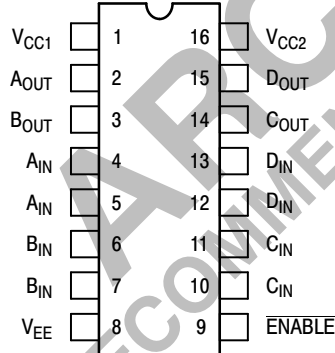
<http://onsemi.com>

### LOGIC DIAGRAM



$V_{CC1} = \text{PIN 1}$   
 $V_{CC2} = \text{PIN 16}$   
 $V_{EE} = \text{PIN 8}$

### DIP PIN ASSIGNMENT

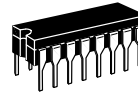


Pin assignment is for Dual-in-Line Package.  
 For PLCC pin assignment, see the Pin Conversion Tables on page 18 of the ON Semiconductor MECL Data Book (DL122/D).

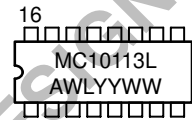
### TRUTH TABLE

IN	E	OUTPUT
L	L	L
L	H	H
H	L	H
H	H	L
X	X	L

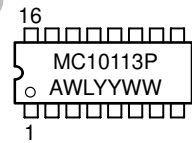
### MARKING DIAGRAMS



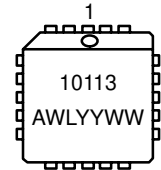
CDIP-16  
 L SUFFIX  
 CASE 620



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
MC10113L	CDIP-16	25 Units / Rail
MC10113P	PDIP-16	25 Units / Rail
MC10113FN	PLCC-20	46 Units / Rail

# MC10113

## 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		46			42		46	mAdc	
Input Current	$I_{inH}$	4,7,10,13		425			265		265	$\mu$ Adc	
		5,6,11,12		350			220		220		
	$I_{inL}$	9		870			545		545		
		*	0.5		0.5			0.3		$\mu$ 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		
		14	-1.060	-0.890	-0.960		-0.810	-0.890	-0.700		
		15	-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		
		14	-1.890	-1.675	-1.850		-1.650	-1.825	-1.615		
		15	-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			
		14	-1.080		-0.980			-0.910			
		15	-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		
		14		-1.655			-1.630		-1.595		
		15		-1.655			-1.630		-1.595		
Switching Times (50 $\Omega$ Load)					<b>Min</b>	<b>Typ</b>	<b>Max</b>			ns	
Propagation Delay	$t_{4+2+}$	2	1.1	4.7	1.3	2.6	4.5	1.3	5.0		
		$t_{4-2-}$	2	1.1	4.7	1.3	2.6	4.5	1.3		5.0
		$t_{9+2-}$	2	1.3	5.2	1.5	3.4	5.0	1.5		5.5
		$t_{9-2+}$	2	1.3	5.2	1.5	3.4	5.0	1.5		5.5
Rise Time (20 to 80%)	$t_{2+}$	2	1.1	4.2	1.1	2.5	3.9	1.1	4.4		
Fall Time (20 to 80%)	$t_{2-}$	2	1.1	4.2	1.1	2.5	3.9	1.1	4.4		

\* Individually test each input applying  $V_{IH}$  or  $V_{IL}$  to input under test.

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## ELECTRICAL CHARACTERISTICS (continued)

@ Test Temperature -30°C +25°C +85°C			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>EE</sub>	
			-0.890	-1.890	-1.205	-1.500	-5.2	
			-0.810	-1.850	-1.105	-1.475	-5.2	
			-0.700	-1.825	-1.035	-1.440	-5.2	
Characteristic	Symbol	Pin Under Test	TEST VOLTAGE APPLIED TO PINS LISTED BELOW					
			V <sub>IHmax</sub>	V <sub>ILmin</sub>	V <sub>IHAmin</sub>	V <sub>ILAmax</sub>	V <sub>EE</sub>	
Power Supply Drain Current	I <sub>E</sub>	8					8	1, 16
Input Current	I <sub>inH</sub>	4,7,10,13	*				8	1, 16
		5,6,11,12	*				8	1, 16
		9	9				8	1, 16
	I <sub>inL</sub>	*		*			8	1, 16
Output Voltage	Logic 1	V <sub>OH</sub>	2	4			8	1, 16
			3	7			8	1, 16
			14	11			8	1, 16
			15	13			8	1, 16
Output Voltage	Logic 0	V <sub>OL</sub>	2		4		8	1, 16
			3		7		8	1, 16
			14		11		8	1, 16
			15		13		8	1, 16
Threshold Voltage	Logic 1	V <sub>OHA</sub>	2		4		8	1, 16
			3		6		8	1, 16
			14		10		8	1, 16
			15		12		8	1, 16
Threshold Voltage	Logic 0	V <sub>OLA</sub>	2			5	8	1, 16
			3			7	8	1, 16
			14			11	8	1, 16
			15			13	8	1, 16
Switching Times (50Ω Load)			+1.11V		Pulse In	Pulse Out	-3.2 V	+2.0 V
Propagation Delay	t <sub>4+2+</sub> t <sub>4-2-</sub> t <sub>9+2-</sub> t <sub>9-2+</sub>	2			4	2	8	1, 16
		2			4	2	8	1, 16
		2	4		9	2	8	1, 16
		2	4		9	2	8	1, 16
Rise Time (20 to 80%)	t <sub>2+</sub>	2			4	2	8	1, 16
Fall Time (20 to 80%)	t <sub>2-</sub>	2			4	2	8	1, 16

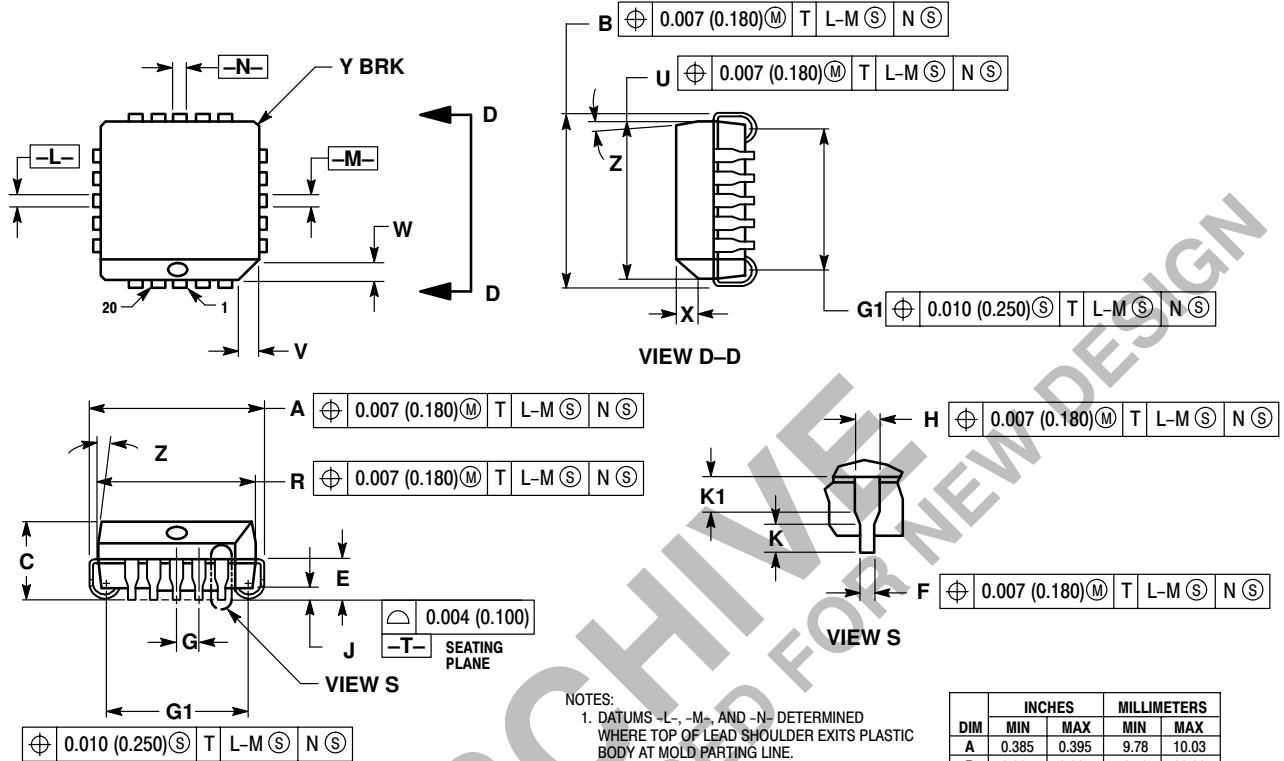
\* Individually test each input applying V<sub>IH</sub> or V<sub>IL</sub> to input under test.

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.

# MC10113

## PACKAGE DIMENSIONS

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



### NOTES:

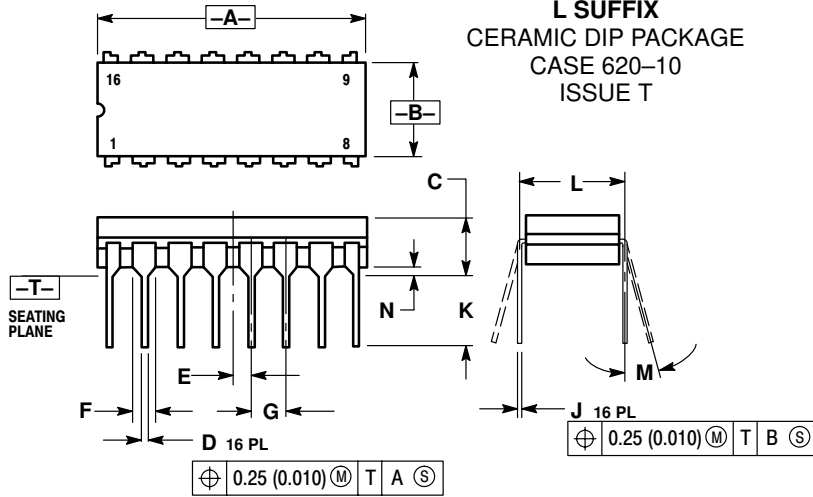
- DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
- DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
- DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
- DIMENSIONING AND TOLERANCING 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°	
G1	0.310	0.330	7.88	8.38
K1	0.040	---	1.02	---

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## PACKAGE DIMENSIONS

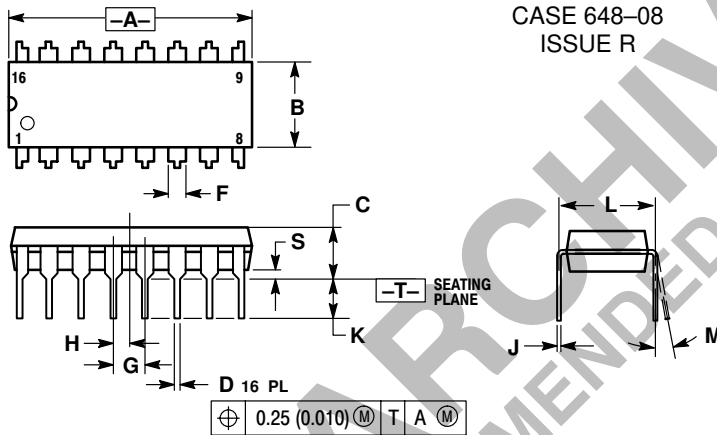
### CDIP-16 L SUFFIX CERAMIC DIP PACKAGE CASE 620-10 ISSUE T



- 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


**Notes**

**ARCHIVE**  
DEVICE NOT RECOMMENDED FOR NEW DESIGN

**Notes**

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ARCHIVE  
RECOMMENDED FOR NEW DESIGN

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