MC10109

Dual 4-5-Input OR/NOR Gate

The MC10109 is a dual 4–5 input OR/NOR gate.
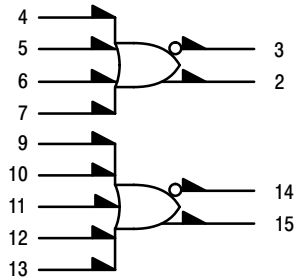
- P_D = 30 mW typ/gate (No Load)
- t_{pd} = 2.0 ns typ
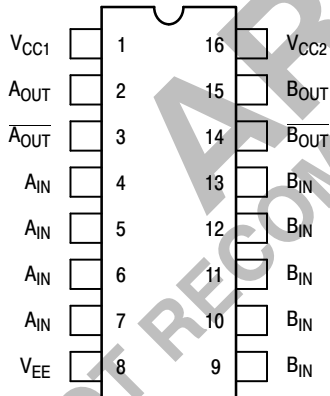- t_r, t_f = 2.0 ns typ (20%–80%)

ON Semiconductor

http://onsemi.com

LOGIC DIAGRAM

V_{CC1} = PIN 1
V_{CC2} = PIN 16
V_{EE} = PIN 8

MARKING DIAGRAMS

CDIP–16
L SUFFIX
CASE 620

MC10109L
AWLYYWW

PDIP–16
P SUFFIX
CASE 648

MC10109P
AWLYYWW

PLCC–20
FN SUFFIX
CASE 775

10109
AWLYYWW

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

DIP PIN ASSIGNMENT

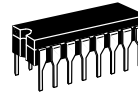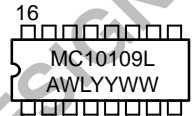|			
V_{CC1}	1	16	V_{CC2}
A_{OUT}	2	15	B_{OUT}
$\overline{A_{OUT}}$	3	14	$\overline{B_{OUT}}$
A_{IN}	4	13	B_{IN}
A_{IN}	5	12	B_{IN}
A_{IN}	6	11	B_{IN}
A_{IN}	7	10	B_{IN}
V_{EE}	8	9	B_{IN}

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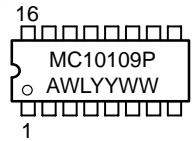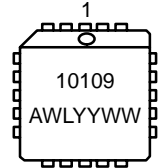of the ON Semiconductor MECL Data Book (DL122/D).

ORDERING INFORMATION

Device	Package	Shipping
MC10109L	CDIP–16	25 Units / Rail
MC10109P	PDIP–16	25 Units / Rail
MC10109FN	PLCC–20	46 Units / Rail

MC10109

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Pin Under Test	Test Limits −30°C Min	Max	+25°C Min	Typ	Max	+85°C Min	Max	Unit
Power Supply Drain Current	I_E	8		15		11	14		15	mAdc
Input Current	I_{inH}	4		425			265		265	μAdc
	I_{inL}	4	0.5		0.5			0.3		μAdc
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	
Switching Times (50Ω Load)										ns
Propagation Delay	t_{4+2+}	2	1.0	3.7	1.0	2.0	2.9	1.0	3.7	
	t_{4-2-}	2	1.0	3.7	1.0	2.0	2.9	1.0	3.7	
	t_{4+3-}	3	1.0	3.7	1.0	2.0	2.9	1.0	3.7	
	t_{4-3+}	3	1.0	3.7	1.0	2.0	2.9	1.0	3.7	
Rise Time (20 to 80%)	t_{2+}	2	1.1	4.0	1.1	2.0	3.3	1.1	4.0	
	t_{3+}	3	1.1	4.0	1.1	2.0	3.3	1.1	4.0	
Fall Time (20 to 80%)	t_{2-}	2	1.1	4.0	1.1	2.0	3.3	1.1	4.0	
	t_{3-}	3	1.1	4.0	1.1	2.0	3.3	1.1	4.0	

ELECTRICAL CHARACTERISTICS (continued)

			TEST VOLTAGE VALUES (Volts)					
@ Test Temperature			V_{IHmax}	V_{ILmin}	V_{IHAmin}	V_{ILAmax}	V_{EE}	
−30°C			−0.890	−1.890	−1.205	−1.500	−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_{CC}) Gnd**
			V_{IHmax}	V_{ILmin}	V_{IHAmin}	V_{ILAmax}	V_{EE}	
Power Supply Drain Current	I_E	8					8	1, 16
Input Current	I_{inH}	4	4				8	1, 16
	I_{inL}	4		4			8	1, 16
Output Voltage Logic 1	V_{OH}	2 3	4				8 8	1, 16 1, 16
Output Voltage Logic 0	V_{OL}	2 3	4				8 8	1, 16 1, 16
Threshold Voltage Logic 1	V_{OHA}	2 3			4	4	8 8	1, 16 1, 16
Threshold Voltage Logic 0	V_{OLA}	2 3			4	4	8 8	1, 16 1, 16
Switching Times (50Ω Load)					**Pulse In**	**Pulse Out**	**−3.2 V**	**+2.0 V**
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	8 8 8 8	1, 16 1, 16 1, 16 1, 16
Rise Time (20 to 80%)	t_{2+} t_{3+}	2 3			4 4	2 3	8 8	1, 16 1, 16
Fall Time (20 to 80%)	t_{2-} t_{3-}	2 3			4 4	2 3	8 8	1, 16 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.

MC10109

PACKAGE DIMENSIONS

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

VIEW D–D

VIEW S
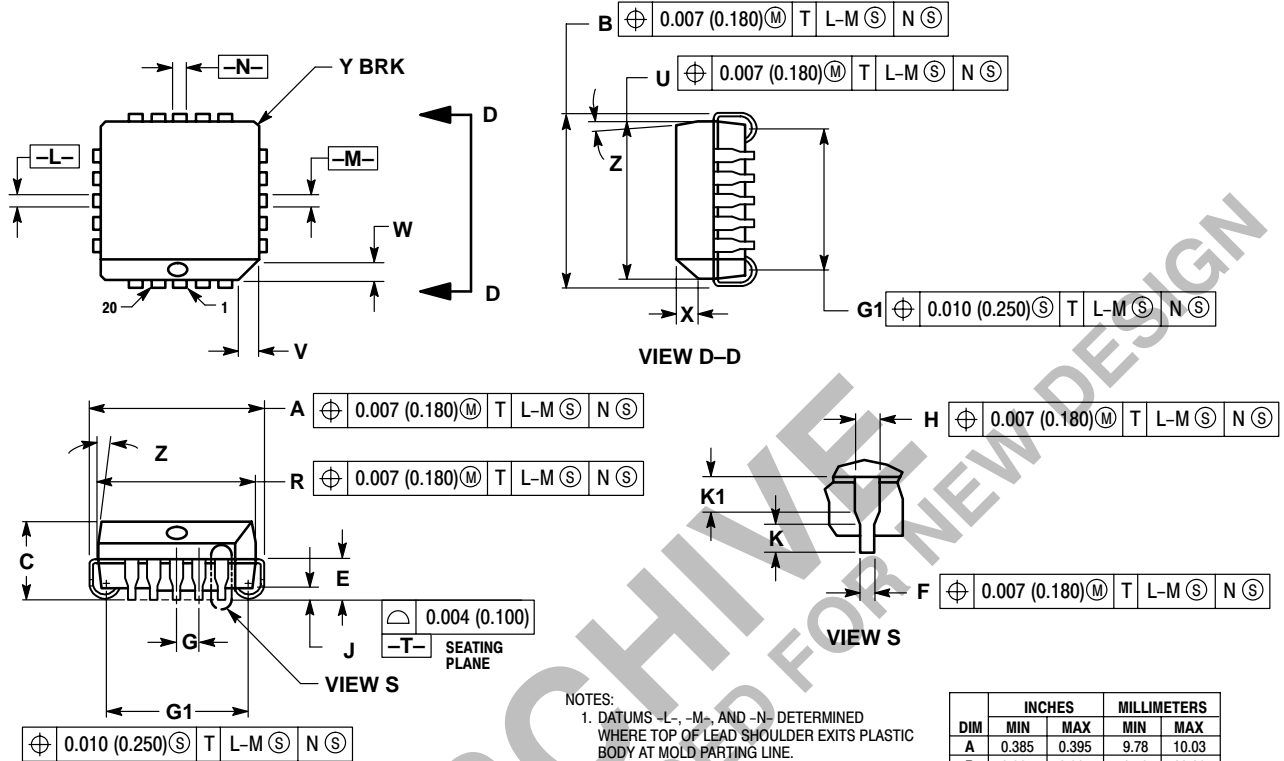
SEATING PLANE

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).

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	---

MC10109

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

<u>Notes</u>

<u>Notes</u>

MC10109