

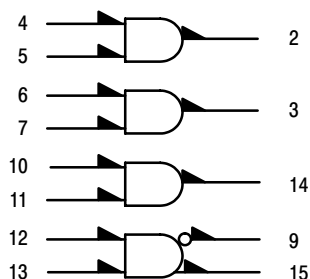
MC10104

Quad 2-Input AND Gate

The MC10104 is a quad 2-input AND gate. One of the gates has both AND/NAND outputs available.

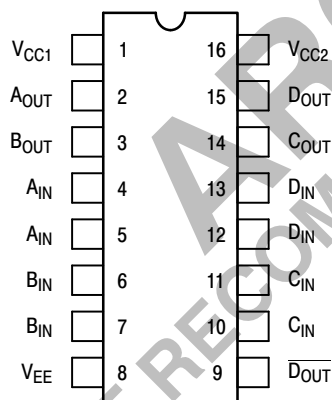
- $P_D = 35 \text{ mW typ/gate (No Load)}$
- $t_{pd} = 2.7 \text{ ns typ}$
- $t_r, t_f = 2.0 \text{ ns typ (20\%–80\%)}$

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.

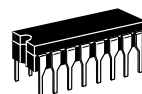
For PLCC pin assignment, see the Pin Conversion Tables on page 18 of the ON Semiconductor MECL Data Book (DL122/D).



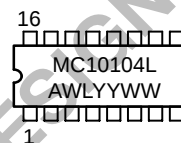
ON Semiconductor

<http://onsemi.com>

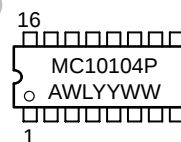
MARKING DIAGRAMS



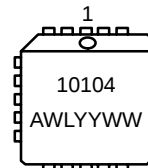
CDIP-16
L SUFFIX
CASE 620



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
MC10104L	CDIP-16	25 Units / Rail
MC10104P	PDIP-16	25 Units / Rail
MC10104FN	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			35		39	mAdc	
Input Current	I _{inH} *	12		425			265		265	μAdc	
		13		350			220		220		
	I _{inL}	12	0.5		0.5			0.3		μAdc	
Output Voltage	Logic 1	V _{OH}	15	−1.060	−0.890	−0.960		−0.810	−0.890	−0.700	Vdc
		9		−1.060	−0.890	−0.960		−0.810	−0.890	−0.700	
Output Voltage	Logic 0	V _{OL}	15	−1.890	−1.675	−1.850		−1.650	−1.825	−1.615	Vdc
		9		−1.890	−1.675	−1.850		−1.650	−1.825	−1.615	
Threshold Voltage	Logic 1	V _{OHA}	9	−1.090		−0.980			−0.910		Vdc
		9		−1.090		−0.980			−0.910		
		15		−1.090		−0.980			−0.910		
		15		−1.090		−0.980			−0.910		
Threshold Voltage	Logic 0	V _{OLA}	9		−1.655			−1.630		−1.595	Vdc
		9			−1.655			−1.630		−1.595	
		15			−1.655			−1.630		−1.595	
		15			−1.655			−1.630		−1.595	
Switching Times (50Ω Load)											ns
Propagation Delay	t ₁₂₊₁₅₊	15	1.0	4.3	1.0	2.2	4.0	1.0	4.2		
	t _{12−15−}	15	1.0	4.3	1.0	2.2	4.0	1.0	4.2		
	t _{12+9−}	9	1.0	4.3	1.0	2.2	4.0	1.0	4.2		
	t _{12−9+}	9	1.0	4.3	1.0	2.2	4.0	1.0	4.2		
	t ₁₃₊₁₅₊	15	1.0	4.3	1.0	2.7	4.0	1.0	4.2		
	t _{13+9−}	9	1.0	4.3	1.0	2.7	4.0	1.0	4.2		
Rise Time	(20 to 80%)	t ₁₅₊	15	1.5	3.7	1.5	2.0	3.5	1.5	3.6	
		t ₉₊	9	1.5	3.7	1.5	2.0	3.5	1.5	3.6	
Fall Time	(20 to 80%)	t _{15−}	15	1.5	3.7	1.5	2.0	3.5	1.5	3.6	
		t _{9−}	9	1.5	3.7	1.5	2.0	3.5	1.5	3.6	

* Inputs 4, 7, 10 and 13 will behave similarly for ac and I_{inH} values.

Inputs 5, 6, 11 and 12 will behave similarly for ac and I_{inH} values.

ELECTRICAL CHARACTERISTICS (continued)

@ Test Temperature			TEST VOLTAGE VALUES (Volts)					(V _{CC}) Gnd
			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} *	12	12, 13				8	1, 16
		13	13				8	1, 16
	I _{inL}	12		12			8	1, 16
Output Voltage Logic 1	V _{OH}	15	12, 13				8	1, 16
		9					8	1, 16
Output Voltage Logic 0	V _{OL}	15					8	1, 16
		9	12, 13				8	1, 16
Threshold Voltage Logic 1	V _{OHA}	9				12	8	1, 16
		9				13	8	1, 16
		15	12		13		8	1, 16
		15	13		12		8	1, 16
Threshold Voltage Logic 0	V _{OLA}	9	12		13		8	1, 16
		9	13		12		8	1, 16
		15				12	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 ₁₂₊₁₅₊	15	13		12	15	8	1, 16
	t _{12–15–}	15	13		12	15	8	1, 16
	t _{12+9–}	9	13		12	9	8	1, 16
	t _{12–9+}	9	13		12	9	8	1, 16
	t ₁₃₊₁₅₊	15	12		13	15	8	1, 16
	t _{13+9–}	9	12		13	9	8	1, 16
Rise Time (20 to 80%)	t ₁₅₊	15	12		13	15	8	1, 16
	t ₉₊	9	12		13	9	8	1, 16
Fall Time (20 to 80%)	t _{15–}	15	12		13	15	8	1, 16
	t _{9–}	9	12		13	9	8	1, 16

* Inputs 4, 7, 10 and 13 will behave similarly for ac and I_{inH} values.

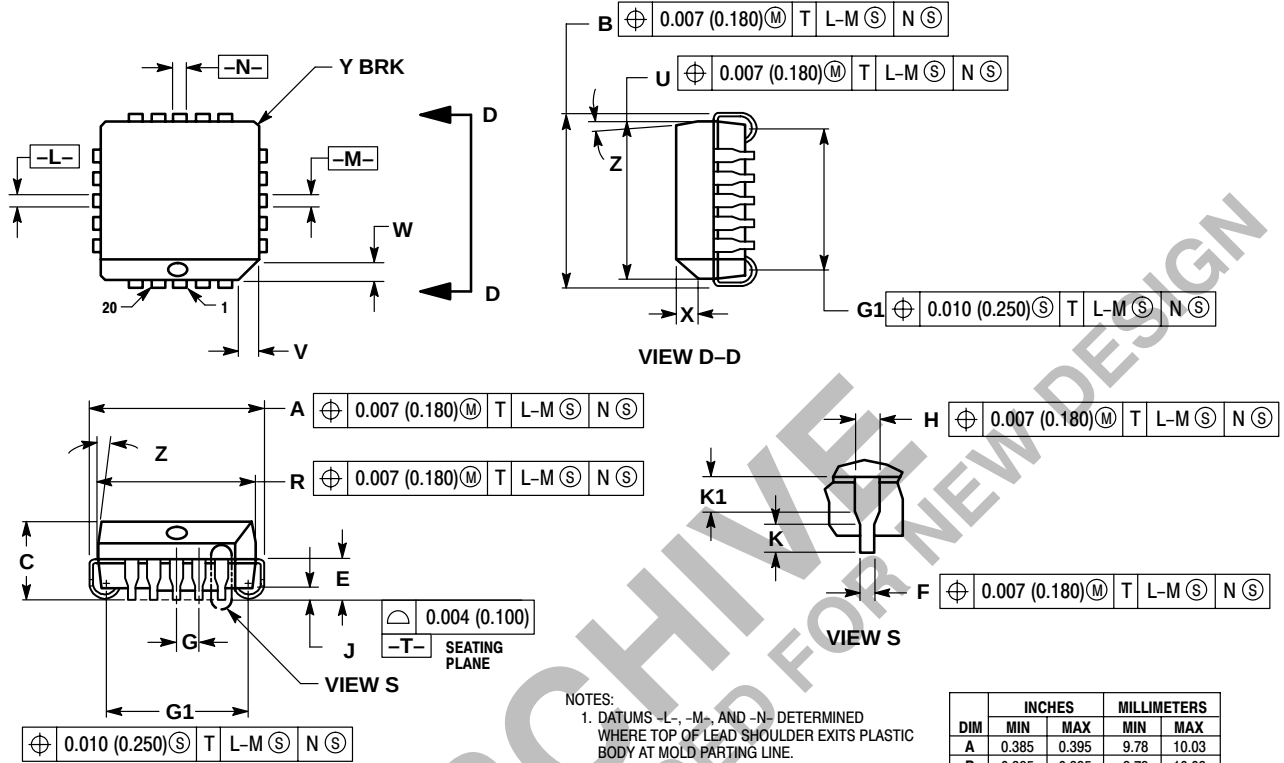
Inputs 5, 6, 11 and 12 will behave similarly for ac and I_{inH} values.

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.

MC10104

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	---

MC10104

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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Notes

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