

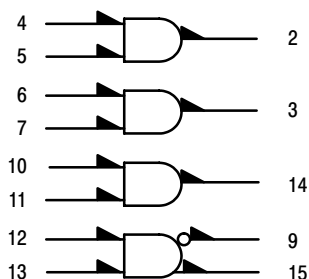
MC10104

Quad 2-Input AND Gate

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

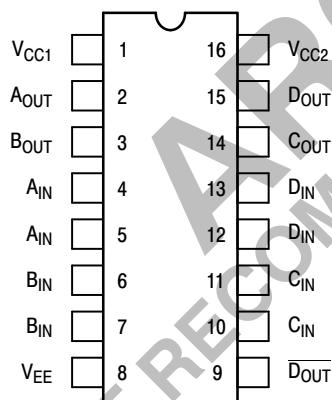
- $P_D = 35 \text{ mW typ/gate (No Load)}$
- $t_{pd} = 2.7 \text{ ns typ}$
- $t_r, t_f = 2.0 \text{ ns typ (20\%–80\%)}$

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.

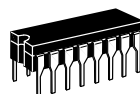
For PLCC pin assignment, see the Pin Conversion Tables on page 18 of the ON Semiconductor MECL Data Book (DL122/D).



ON Semiconductor

<http://onsemi.com>

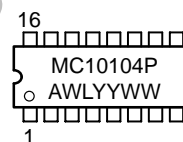
MARKING DIAGRAMS



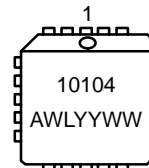
CDIP-16
L SUFFIX
CASE 620



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 13		425 350			265 220		265 220	μAdc
	I _{inL}	12	0.5		0.5			0.3		μAdc
Output Voltage Logic 1	V _{OH}	15 9	−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}	15 9	−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}	9 9 15 15	−1.090 −1.090 −1.090 −1.090		−0.980 −0.980 −0.980 −0.980			−0.910 −0.910 −0.910 −0.910		Vdc
Threshold Voltage Logic 0	V _{OLA}	9 9 15 15		−1.655 −1.655 −1.655 −1.655			−1.630 −1.630 −1.630 −1.630		−1.595 −1.595 −1.595 −1.595	Vdc
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.

MC10104

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.

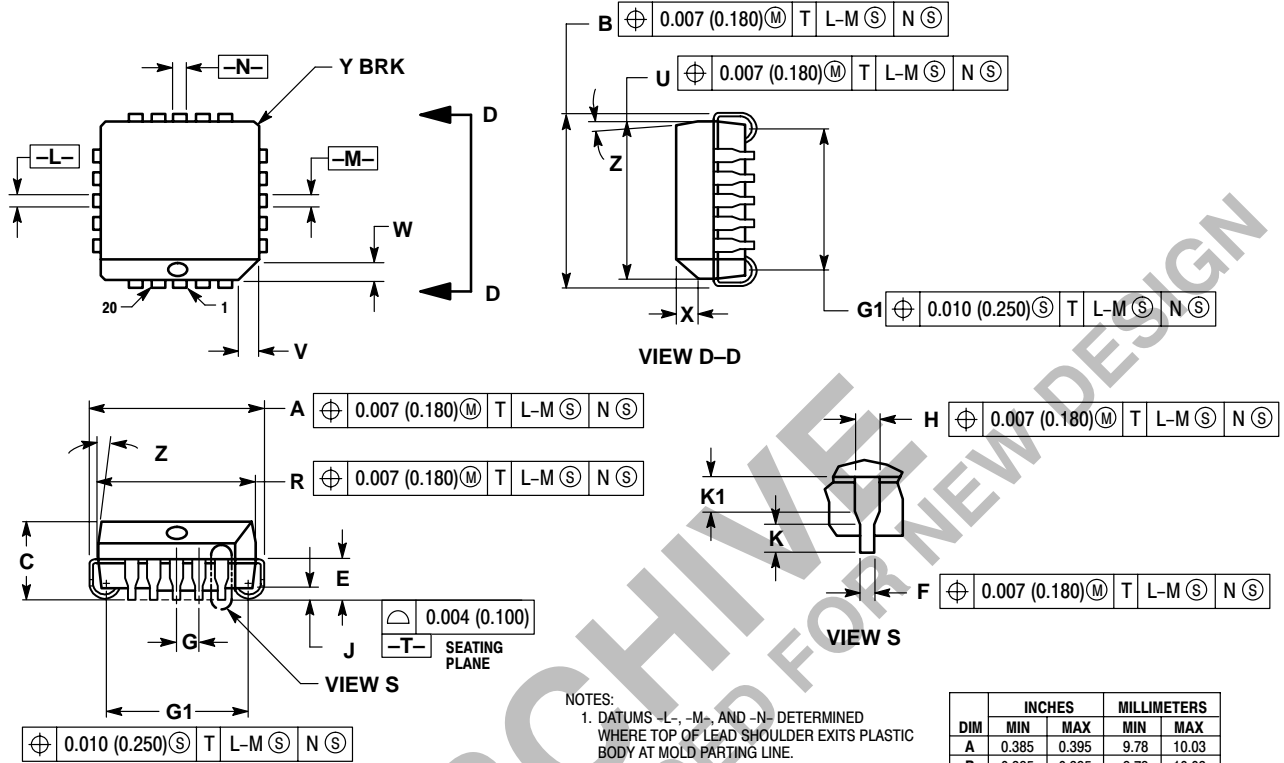
Inputs 5, 6, 11 and 12 will behave similarly for ac and I_{inH} values.

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

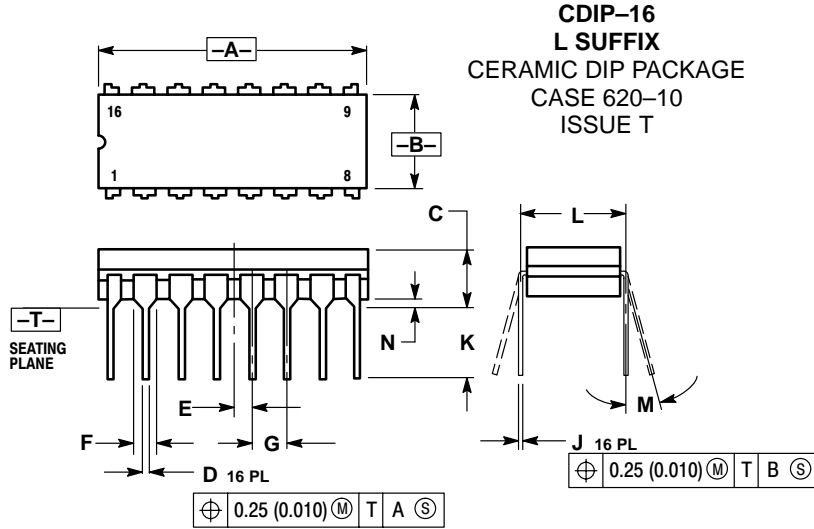
PLCC-20
FN SUFFIX
PLASTIC PLCC PACKAGE
CASE 775-02
ISSUE C



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

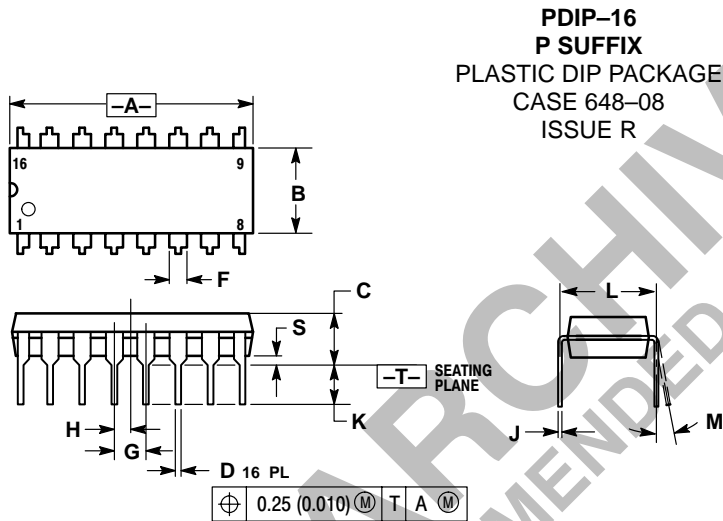
PACKAGE DIMENSIONS



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

ARCHIVE
DEVICE NOT RECOMMENDED FOR NEW DESIGN

Notes

ARCHIVE
DEVICE NOT RECOMMENDED FOR NEW DESIGN

ARCHIVE
RECOMMENDED FOR NEW DESIGN

ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer.

PUBLICATION ORDERING INFORMATION

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

JAPAN: ON Semiconductor, Japan Customer Focus Center
4-32-1 Nishi-Gotanda, Shinagawa-ku, Tokyo, Japan 141-0031
Phone: 81-3-5740-2700
Email: r14525@onsemi.com

ON Semiconductor Website: <http://onsemi.com>

For additional information, please contact your local
Sales Representative.