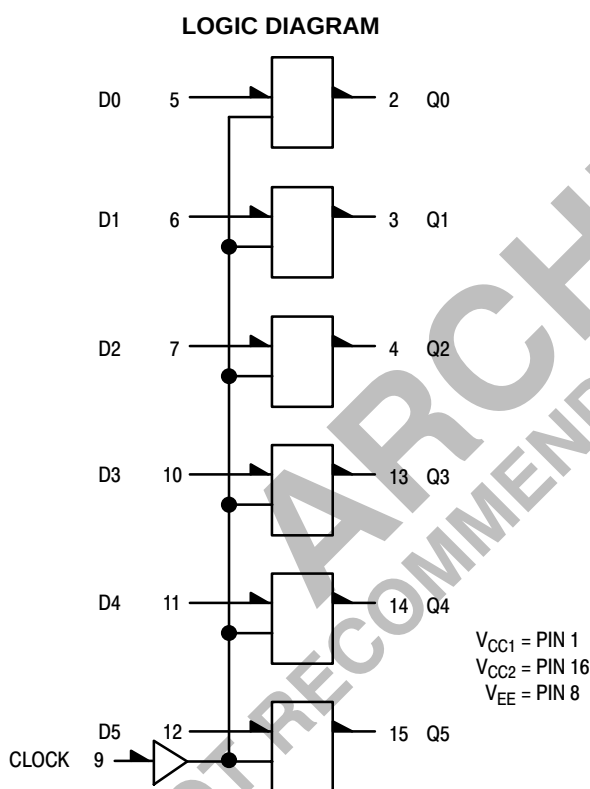


MC10176

Hex D Master/Slave Flip-Flop

The MC10176 contains six high-speed, master slave type “D” flip-flops. Clocking is common to all six flip-flops. Data is entered into the master when the clock is low. Master to slave data transfer takes place on the positive-going Clock transition. Thus, outputs may change only on a positive-going Clock transition. A change in the information present at the data (D) input will not affect the output until a positive-going Clock transition. A change in the information present at the data (D) input will not affect the output until a positive-going Clock transition.

- $P_D = 460 \text{ mW typ/pkg (No Load)}$
- $f_{\text{toggle}} = 150 \text{ MHz (typ)}$
- $t_r, t_f = 2.0 \text{ ns typ (20\%–80\%)}$



CLOCKED TRUTH TABLE

C	D	Q_{n+1}
L	X	Q_n
H*	L	L
H*	H	H

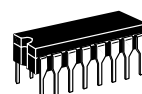
*A clock H is a clock transition from a low to a high state.



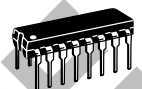
ON Semiconductor

<http://onsemi.com>

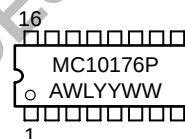
MARKING DIAGRAMS



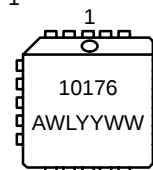
CDIP-16
L SUFFIX
CASE 620



PDIP-16
P SUFFIX
CASE 648

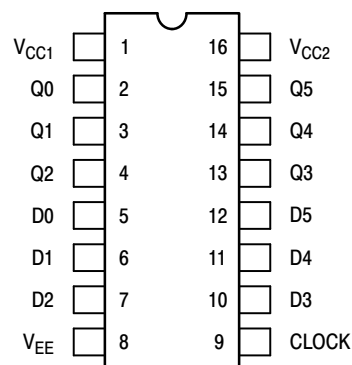


PLCC-20
FN SUFFIX
CASE 775



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

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).

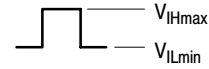
ORDERING INFORMATION

Device	Package	Shipping
MC10176L	CDIP-16	25 Units / Rail
MC10176P	PDIP-16	25 Units / Rail
MC10176FN	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		121		88	110		121	mAdc
Input Current	I _{inH}	5 9		350 495			220 310		220 310	μAdc
	I _{inL}	5 9	0.5 0.5		0.5 0.5			0.3 0.3		μAdc
Output Voltage Logic 1	V _{OH}	2† 15†	−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† 15†	−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† 15†	−1.080 −1.080		−0.980 −0.980			−0.910 −0.910		Vdc
Threshold Voltage Logic 0	V _{OLA}	2† 15†		−1.655 −1.655			−1.630 −1.630		−1.595 −1.595	Vdc
Switching Times (50Ω Load) Clock Input										ns
Propagation Delay	t _{g+2+}	2	1.6	4.6	1.6		4.5	1.6	5.0	
	t _{g+2−}	2	1.6	4.6	1.6		4.5	1.6	5.0	
Rise Time (20 to 80%)	t ₂₊	2	1.0	4.1	1.1		4.0	1.1	4.4	
Fall Time (20 to 80%)	t _{2−}	2	1.0	4.1	1.1		4.0	1.1	4.4	
Setup Time	t _{setup}	2	2.5		2.5			2.5		ns
Hold Time	t _{hold}	2	1.5		1.5			1.5		ns
Toggle Frequency (Max)	f _{tog}	2	125		125	150		125		MHz

† Output level to be measured after a clock pulse has been applied to the C Input (Pin 9)

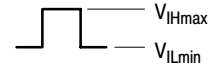


MC10176

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}	5 9	5 9				8 8	1, 16 1, 16
	I _{inL}	5 9		5 9			8 8	1, 16 1, 16
Output Voltage Logic 1	V _{OH}	2 [†] 15 [†]	5 12				8 8	1, 16 1, 16
Output Voltage Logic 0	V _{OL}	2 [†] 15 [†]		5 12			8 8	1, 16 1, 16
Threshold Voltage Logic 1	V _{OHA}	2 [†] 15 [†]			5 12		8 8	1, 16 1, 16
Threshold Voltage Logic 0	V _{OLA}	2 [†] 15 [†]				5 12	8 8	1, 16 1, 16
Switching Times (50Ω Load)			+1.11Vdc	+0.31V	Pulse In	Pulse Out	–3.2 V	+2.0 V
Clock Input								
Propagation Delay	t _{g+2+}	2			5, 9	2	8	1, 16
	t _{g+2–}	2			5, 9	2	8	1, 16
Rise Time (20 to 80%)	t ₂₊	2			5, 9	2	8	1, 16
Fall Time (20 to 80%)	t _{2–}	2			5, 9	2	8	1, 16
Setup Time	t _{setup}	2			5, 9	2	8	1, 16
Hold Time	t _{hold}	2			5, 9	2	8	1, 16
Toggle Frequency (Max)	f _{tog}	2					8	1, 16

† Output level to be measured after a clock pulse has been applied to the C Input (Pin 9)

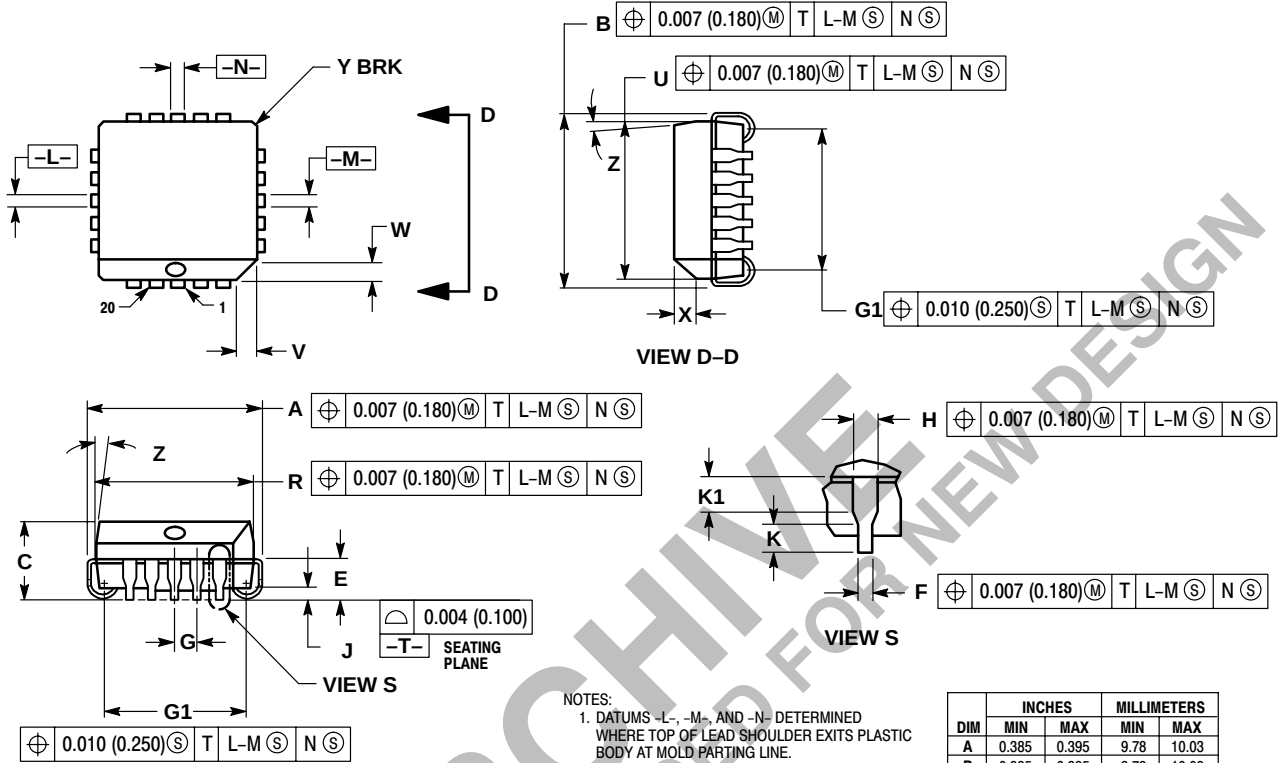


Each MECL 10,000 series circuit has been designed to meet the dc specifications shown in the test table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 linear fpm is maintained. Outputs are 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.

MC10176

PACKAGE DIMENSIONS

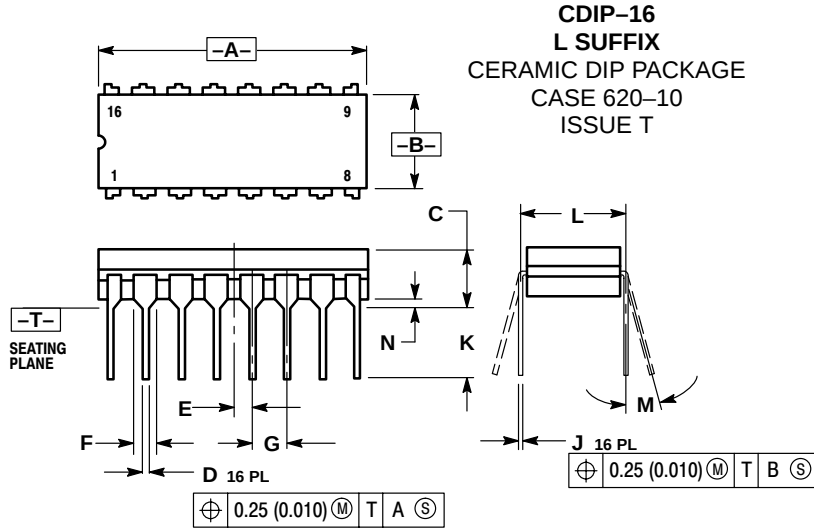
PLCC-20
FN SUFFIX
PLASTIC PLCC PACKAGE
CASE 775-02
ISSUE C



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	---

MC10176

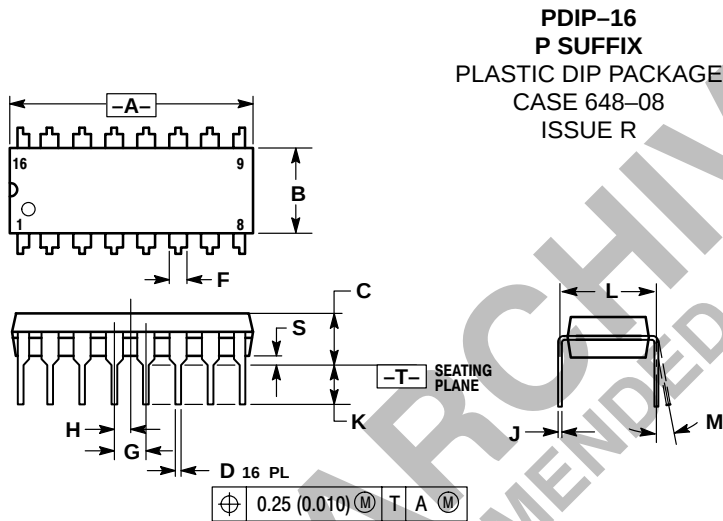
PACKAGE DIMENSIONS



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
J	0.125	0.170	3.18	4.31
K	0.300 BSC		7.62 BSC	
L	0°	15°	0°	15°
M	0.020	0.040	0.51	1.01
N				



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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