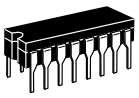
Quad Latch

MC10133

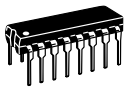
The MC10133 is a high speed, low power, quad latch consisting of four bistable latch circuits with D type inputs and gated Q outputs, allowing direct wiring to a bus. When the clock is high, outputs will follow D inputs. Information is latched on the negative going transition of the clock.

The outputs are gated when the output enable (G) is low. All four latches may be clocked at one time with the common clock (C_C), or each half may be clocked separately with its clock enable (CE).

P_D = 310 mW typ/pkg (No Load)
t_{pd} = 4.0 ns typ
t_r, t_f = 2.0 ns typ (20%–80%)

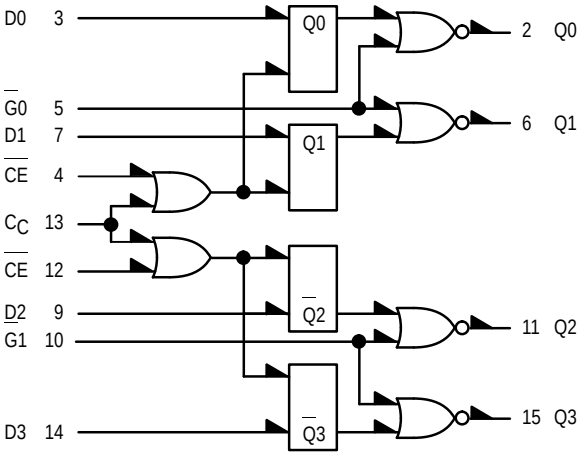


L SUFFIX
CERAMIC PACKAGE
CASE 620–10



P SUFFIX
PLASTIC PACKAGE
CASE 648–08

LOGIC DIAGRAM



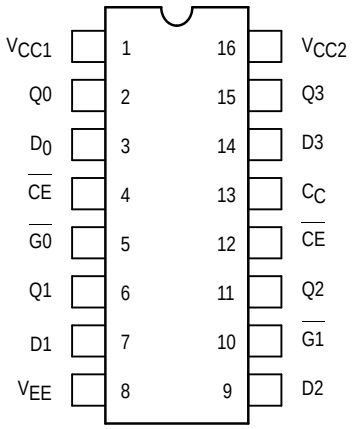
TRUTH TABLE

$\overline{G}$	C	D	Q_{n+1}
H	X	X	L
L	L	X	Q_n
L	H	L	L
L	H	H	H

C = C_C + CE

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

DIP
PIN ASSIGNMENT

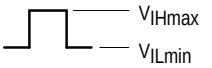


MOTOROLA

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		82			75		82	mAdc
Input Current	I_{inH}	3		390			245		245	μAdc
		4		425			265		265	
		5		560			350		350	
		13		560			350		350	
	I_{inL}	3	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
		2	–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
		2	–1.890	–1.675	–1.850		–1.650	–1.825	–1.615	
		2	–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
		2	–1.080		–0.980			–0.910		
		2	–1.080		–0.980			–0.910		
		2†	–1.080		–0.980			–0.910		
		2‡	–1.080		–0.980			–0.910		
		2‡	–1.080		–0.980			–0.910		
		2	–1.080		–0.980			–0.910		
		2	–1.080		–0.980			–0.910		
Threshold Voltage Logic 0	V_{OLA}	2		–1.655			–1.630		–1.595	Vdc
		2		–1.655			–1.630		–1.595	
		2		–1.655			–1.630		–1.595	
		2†		–1.655			–1.630		–1.595	
		2‡		–1.655			–1.630		–1.595	
		2‡		–1.655			–1.630		–1.595	
Switching Times (50Ω Load)										ns
Propagation Delay	t_{3+2+}	2	1.0	5.6	1.0	4.0	5.4	1.1	5.9	
	t_{4+2+}	2	1.0	5.4	1.0	4.0	5.4	1.2	6.0	
	t_{5-2+}	2	1.0	3.2	1.0	2.0	3.1	1.0	3.4	
	t_{setup}	3	2.5		2.5	0.7		2.5		
	t_{hold}	3	1.5		1.5	0.7		1.5		
Rise Time (20 to 80%)	t_{2+}	2	1.0	3.6	1.1	2.0	3.5	1.1	3.8	
Fall Time (20 to 80%)	t_{2-}	2	1.0	3.6	1.1	2.0	3.5	1.1	3.8	

† Output level to be measured after a clock pulse has been applied to the clock input (Pin 4)



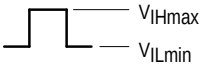
‡ Data input at proper high/low level while clock pulse is high so that device latches ar proper high/low level for test. Levels are measured after device has latched.

* Latch set to zero state before test.

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		13			8	1, 16
Input Current		I_{inH}	3	3				8	1, 16
			4	4				8	1, 16
			5	5				8	1, 16
			13	13				8	1, 16
		I_{inL}	3		3			8	1, 16
Output Voltage	Logic 1	V_{OH}	2	3, 4				8	1, 16
			2	3, 13				8	1, 16
Output Voltage	Logic 0	V_{OL}	2	13	3			8	1, 16
			2	3, 5, 13				8	1, 16
			2	4	3			8	1, 16
Threshold Voltage	Logic 1	V_{OHA}	2	3, 4			5	8	1, 16
			2	4		3		8	1, 16
			2	3, 4				8	1, 16
			2†	3				8	1, 16
			2‡					8	1, 16
			2‡				4	8	1, 16
			2	3		4		8	1, 16
			2	3		13		8	1, 16
Threshold Voltage	Logic 0	V_{OLA}	2	3, 4		5		8	1, 16
			2	4			3	8	1, 16
			2	4				8	1, 16
			2†					8	1, 16
			2‡	3				8	1, 16
			2‡	3			13	8	1, 16
Switching Times	(50Ω Load)			**+1.11V**		**Pulse In**	**Pulse Out**	**–3.2 V**	**+2.0 V**
Propagation Delay		t_{3+2+}	2	4		3	2	8	1, 16
		t_{4+2+}	2	3*		4	2	8	1, 16
		t_{5-2+}	2			5	2	8	1, 16
		t_{setup}	3			3	2	8	1, 16
		t_{hold}	3			3	2	8	1, 16
Rise Time	(20 to 80%)	t_{2+}	2	4		3	2	8	1, 16
Fall Time	(20 to 80%)	t_{2-}	2	4		3	2	8	1, 16

† Output level to be measured after a clock pulse has been applied to the clock input (Pin 4)



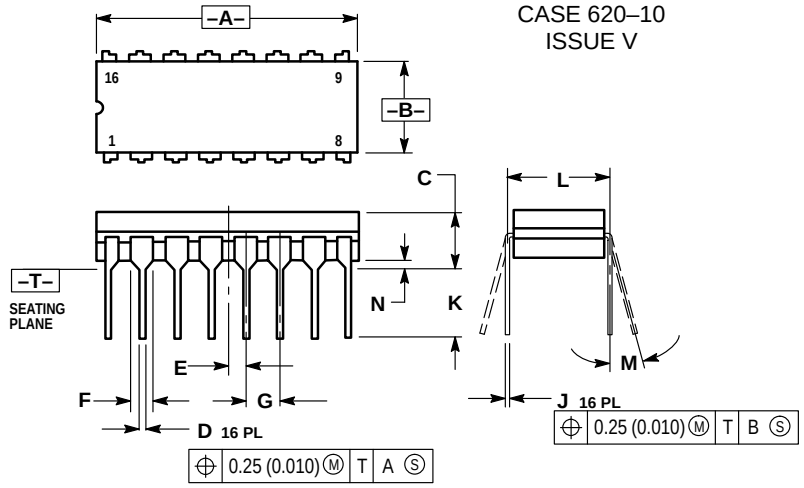
‡ Data input at proper high/low level while clock pulse is high so that device latches ar proper high/low level for test. Levels are measured after device has latched.

* Latch set to zero state before 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.

OUTLINE DIMENSIONS

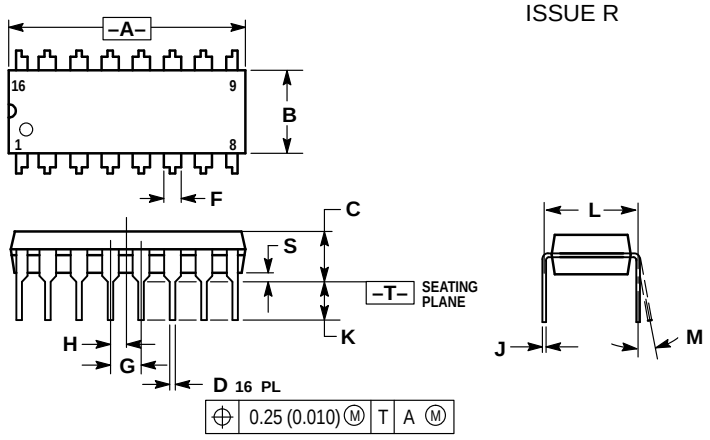
L SUFFIX
CERAMIC DIP PACKAGE
CASE 620–10
ISSUE V



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.

	INCHES		MILLIMETERS	
DIM	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

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.

	INCHES		MILLIMETERS	
DIM	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

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