

# MC10133

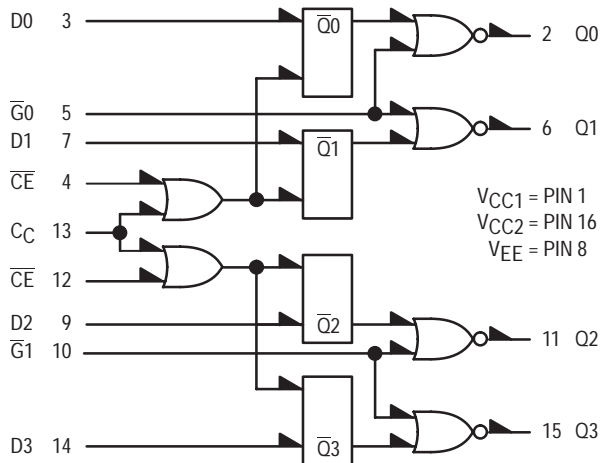
## Quad Latch

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.

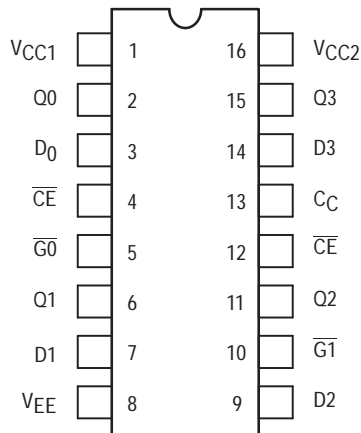
The outputs are gated when the output enable ( $\overline{G}$ ) is low. All four latches may be clocked at one time with the common clock ( $C_C$ ), or each half may be clocked separately with its clock enable ( $\overline{C_E}$ ).

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

### LOGIC DIAGRAM



### DIP PIN ASSIGNMENT



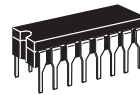
Pin assignment is for Dual-in-Line Package.  
For PLCC pin assignment, see the Pin Conversion Tables on page 18.



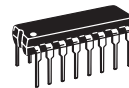
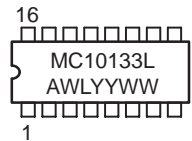
**ON Semiconductor**

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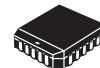
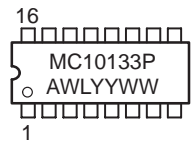
### MARKING DIAGRAMS



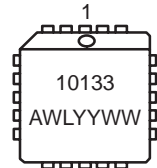
**CDIP-16**  
**L SUFFIX**  
**CASE 620**



**PDIP-16**  
**P SUFFIX**  
**CASE 648**



**PLCC-20**  
**FN SUFFIX**  
**CASE 775**



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

### 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

$C = C_C = C_E$


### ORDERING INFORMATION

Device	Package	Shipping
MC10133L	CDIP-16	25 Units / Rail
MC10133P	PDIP-16	25 Units / Rail
MC10133FN	PLCC-20	46 Units / Rail

# MC10133

## 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	$\mu$ Adc	
		4		425			265		265		
5			560			350		350			
13			560			350		350			
	$I_{inL}$	3	0.5		0.5			0.3		$\mu$ Adc	
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)	Propagation Delay	$t_{3+2+}$	2	1.0	5.6	1.0	4.0	5.4	1.1	5.9	ns
		$t_{4+2+}$	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	
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 at proper high/low level for test. Levels are measured after device has latched.

\* Latch set to zero state before test.

# MC10133

## ELECTRICAL CHARACTERISTICS (continued)

			TEST VOLTAGE VALUES (Volts)					(VCC) Gnd
			V <sub>IHmax</sub>	V <sub>ILmin</sub>	V <sub>IHAmin</sub>	V <sub>ILAmax</sub>	V <sub>EE</sub>	
@ Test Temperature								
-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 <sub>IHmax</sub>	V <sub>ILmin</sub>	V <sub>IHAmin</sub>	V <sub>ILAmax</sub>	V <sub>EE</sub>	
Power Supply Drain Current	I <sub>E</sub>	8		13			8	1, 16
Input Current	I <sub>inH</sub>	3	3				8	1, 16
		4	4				8	1, 16
		5	5				8	1, 16
		13	13				8	1, 16
	I <sub>inL</sub>	3		3			8	1, 16
Output Voltage	Logic 1	V <sub>OH</sub>	2	3, 4			8	1, 16
			2	3, 13			8	1, 16
Output Voltage	Logic 0	V <sub>OL</sub>	2	13	3		8	1, 16
			2	3, 5, 13			8	1, 16
			2	4	3		8	1, 16
Threshold Voltage	Logic 1	V <sub>OHA</sub>	2	3, 4			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 <sub>OLA</sub>	2	3, 4		5	8	1, 16
			2	4			8	1, 16
			2	4		3	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 <sub>3+2+</sub> t <sub>4+2+</sub> t <sub>5-2+</sub> t <sub>setup</sub> t <sub>hold</sub>	2	4		3	2	8	1, 16
		2	3*		4	2	8	1, 16
		2			5	2	8	1, 16
		3			3	2	8	1, 16
		3			3	2	8	1, 16
Rise Time	(20 to 80%)	t <sub>2+</sub>	2	4	3	2	8	1, 16
Fall Time	(20 to 80%)	t <sub>2-</sub>	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 at 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.