

# MC10E016, MC100E016

## 5.0 V ECL 8-Bit Synchronous Binary Up Counter

### Description

The MC10E/100E016 is a high-speed synchronous, presettable, cascadable 8-bit binary counter. Architecture and operation are the same as the MC10H016 in the MECL 10H™ family, extended to 8-bits, as shown in the logic symbol.

The counter features internal feedback of  $\overline{TC}$ , gated by the TCLD (terminal count load) pin. When TCLD is LOW (or left open, in which case it is pulled LOW by the internal pull-downs), the  $\overline{TC}$  feedback is disabled, and counting proceeds continuously, with  $\overline{TC}$  going LOW to indicate an all-one state. When TCLD is HIGH, the  $\overline{TC}$  feedback causes the counter to automatically reload upon  $\overline{TC} = \text{LOW}$ , thus functioning as a programmable counter. The  $Q_n$  outputs do not need to be terminated for the count function to operate properly. To minimize noise and power, unused Q outputs should be left unterminated.

The 100 series contains temperature compensation.

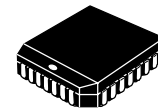
### Features

- 700 MHz Min. Count Frequency
- 1000 ps CLK to Q,  $\overline{TC}$
- Internal  $\overline{TC}$  Feedback (Gated)
- 8-Bit
- Fully Synchronous Counting and  $\overline{TC}$  Generation
- Asynchronous Master Reset
- PECL Mode Operating Range:  $V_{CC} = 4.2 \text{ V}$  to  $5.7 \text{ V}$  with  $V_{EE} = 0 \text{ V}$
- NECL Mode Operating Range:  $V_{CC} = 0 \text{ V}$  with  $V_{EE} = -4.2 \text{ V}$  to  $-5.7 \text{ V}$
- Pb-Free Packages are Available\*



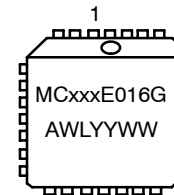
ON Semiconductor®

<http://onsemi.com>



PLCC-28  
FN SUFFIX  
CASE 776

### MARKING DIAGRAM\*



xxx	= 10 or 100
A	= Assembly Location
WL	= Wafer Lot
YY	= Year
WW	= Work Week
G	= Pb-Free Package

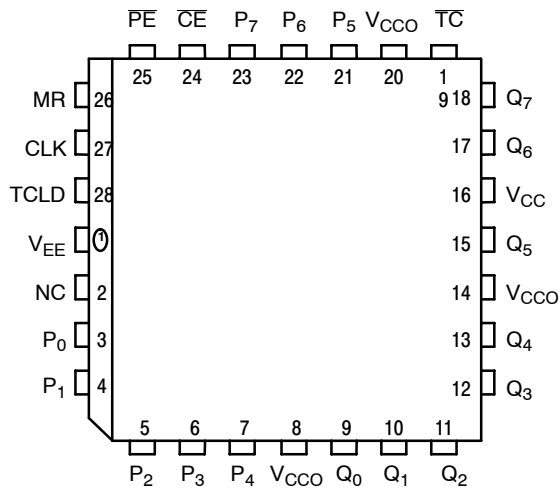
\*For additional marking information, refer to Application Note AND8002/D.

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 10 of this data sheet.

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

# MC10E016, MC100E016

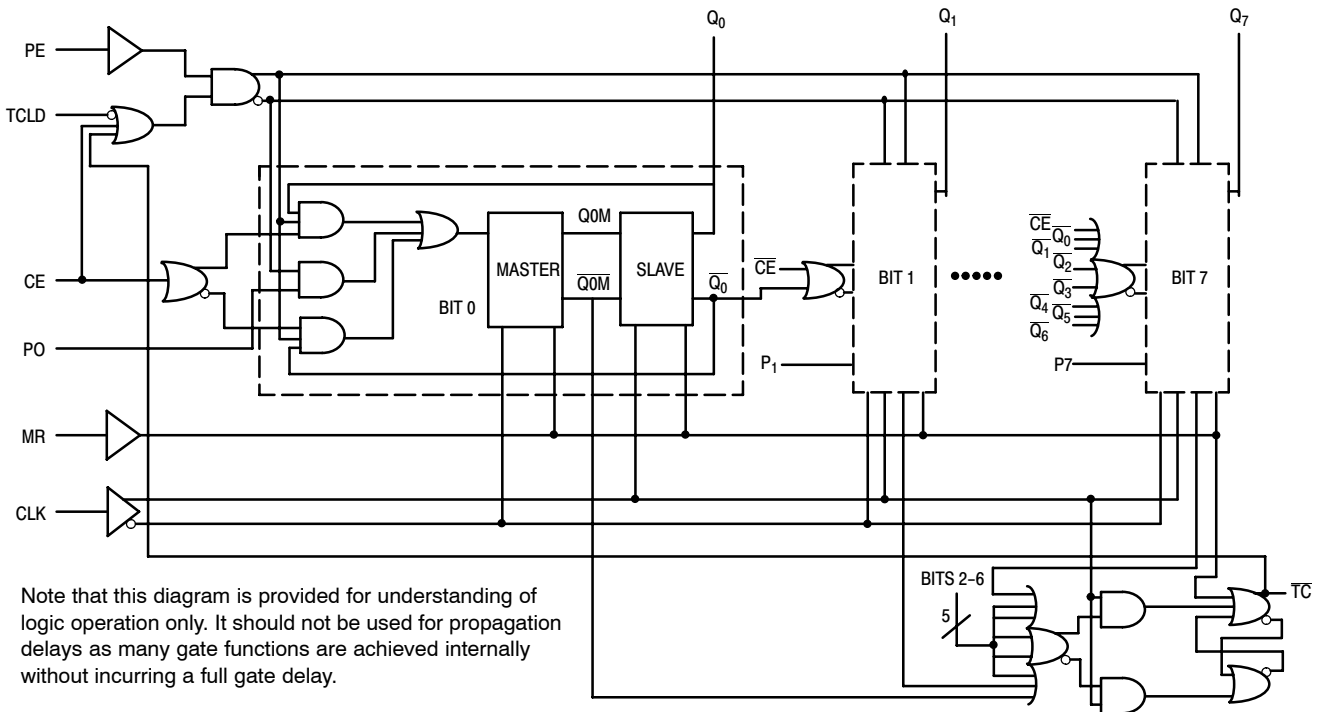


**Table 1. PIN DESCRIPTION**

PIN	FUNCTION
P0 - P7	ECL Parallel Data (Preset) Inputs
Q0 - Q7	ECL Data Outputs
CE	ECL Count Enable Control Input
PE	ECL Parallel Load Enable Control Input
MR	ECL Master Reset
CLK	ECL Clock
TC	ECL Terminal Count Output
TCLD	ECL TC-Load Control Input
NC	No Connect
V <sub>CC</sub> , V <sub>CCO</sub>	Positive Supply
V <sub>EE</sub>	Negative Supply

All V<sub>CC</sub> and V<sub>CCO</sub> pins are tied together on the die.  
 Warning: All V<sub>CC</sub>, V<sub>CCO</sub>, and V<sub>EE</sub> pins must be externally connected to Power Supply to guarantee proper operation.

**Figure 1. 28-Lead Pinout Assignment (Top View)**



Note that this diagram is provided for understanding of logic operation only. It should not be used for propagation delays as many gate functions are achieved internally without incurring a full gate delay.

**Figure 2. 8-Bit Binary Counter Logic Counter**

**Table 2. FUNCTION TABLE**

FUNCTION	CE	PE	TCLD	MR	CLK
Load Parallel (P <sub>n</sub> to Q <sub>n</sub> )	X	L	X	L	Z
Continuous Count	L	H	L	L	Z
Count; Load Parallel on TC = LOW	L	H	H	L	Z
Hold	H	H	X	L	Z
Masters Respond, Slaves Hold	X	X	X	L	ZZ
Reset (Q <sub>n</sub> : = LOW, TC : = HIGH)	X	X	X	H	X

Z = clock pulse (low to high);  
 ZZ = clock pulse (high to low)

# MC10E016, MC100E016

**Table 3. EXPANDED FUNCTION TABLE**

Function	PE	CE	MR	TCLD	CLK	P7-P4	P3	P2	P1	P0	Q7-Q4	Q3	Q2	Q1	Q0	TC
Load	L	X	L	X	Z	H	H	H	L	L	H	H	H	L	L	H
Count	H	L	L	L	Z	X	X	X	X	X	H	H	H	L	H	H
	H	L	L	L	Z	X	X	X	X	X	H	H	H	H	L	H
	H	L	L	L	Z	X	X	X	X	X	H	H	H	H	H	L
	H	L	L	L	Z	X	X	X	X	X	L	L	L	L	L	H
Load	L	X	L	X	Z	H	H	H	L	L	H	H	H	L	L	H
Hold	H	H	L	X	Z	X	X	X	X	X	H	H	H	L	L	H
	H	H	L	X	Z	X	X	X	X	X	H	H	H	L	L	H
Load On	H	L	L	H	Z	H	L	H	H	L	H	H	H	L	H	H
Terminal Count	H	L	L	H	Z	H	L	H	H	L	H	H	H	H	L	H
	H	L	L	H	Z	H	L	H	H	L	H	H	H	H	H	L
	H	L	L	H	Z	H	L	H	H	L	H	L	H	H	H	H
	H	L	L	H	Z	H	L	H	H	L	H	H	L	L	L	H
Reset	X	X	H	X	X	X	X	X	X	X	L	L	L	L	L	H

**Table 4. ATTRIBUTES**

Characteristics	Value	
Internal Input Pulldown Resistor	50 kΩ	
Internal Input Pullup Resistor	50 kΩ	
ESD Protection	Human Body Model Machine Model	> 2 kV > 200 V
Moisture Sensitivity, Indefinite Time Out of Drypack (Note 1)	Pb Pkg	Pb-Free Pkg
	PLCC-28	Level 1      Level 3
Flammability Rating	Oxygen Index: 28 to 34	UL 94 V-0 @ 0.125 in
Transistor Count	592 Devices	
Meets or exceeds JEDEC Spec EIA/JESD78 IC Latchup Test		

1. For additional information, see Application Note AND8003/D.

# MC10E016, MC100E016

**Table 5. MAXIMUM RATINGS**

Symbol	Parameter	Condition 1	Condition 2	Rating	Unit
$V_{CC}$	PECL Mode Power Supply	$V_{EE} = 0\text{ V}$		8	V
$V_I$	PECL Mode Input Voltage NECL Mode Input Voltage	$V_{EE} = 0\text{ V}$ $V_{CC} = 0\text{ V}$	$V_I \leq V_{CC}$ $V_I \geq V_{EE}$	6 -6	V
$I_{out}$	Output Current	Continuous Surge		50 100	mA mA
$T_A$	Operating Temperature Range			0 to +85	°C
$T_{stg}$	Storage Temperature Range			-65 to +150	°C
$\theta_{JA}$	Thermal Resistance (Junction-to-Ambient)	0 lfpm 500 lfpm	PLCC-28 PLCC-28	63.5 43.5	°C/W °C/W
$\theta_{JC}$	Thermal Resistance (Junction-to-Case)	Standard Board	PLCC-28	22 to 26	°C/W
$T_{sol}$	Wave Solder Pb Pb-Free			265 265	°C

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

**Table 6. 10E SERIES PECL DC CHARACTERISTICS**  $V_{CCx} = 5.0\text{ V}$ ;  $V_{EE} = 0.0\text{ V}$  (Note 1)

Symbol	Characteristic	0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$I_{EE}$	Power Supply Current		151	181		151	181		151	181	mA
$V_{OH}$	Output HIGH Voltage (Note 2)	3980	4070	4160	4020	4105	4190	4090	4185	4280	mV
$V_{OL}$	Output LOW Voltage (Note 2)	3050	3210	3370	3050	3210	3370	3050	3227	3405	mV
$V_{IH}$	Input HIGH Voltage	3830	3995	4160	3870	4030	4190	3940	4110	4280	mV
$V_{IL}$	Input LOW Voltage	3050	3285	3520	3050	3285	3520	3050	3302	3555	mV
$I_{IH}$	Input HIGH Current			150			150			150	μA
$I_{IL}$	Input LOW Current	0.5	0.3		0.5	0.25		0.3	0.2		μA

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

1. Input and output parameters vary 1:1 with  $V_{CC}$ .  $V_{EE}$  can vary  $-0.46\text{ V} / +0.06\text{ V}$ .
2. Outputs are terminated through a  $50\ \Omega$  resistor to  $V_{CC} - 2.0\text{ V}$ .

## MC10E016, MC100E016

**Table 7. 10E SERIES NECL DC CHARACTERISTICS**  $V_{CCx} = 0.0\text{ V}$ ;  $V_{EE} = -5.0\text{ V}$  (Note 3)

Symbol	Characteristic	0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$I_{EE}$	Power Supply Current		151	181		151	181		151	181	mA
$V_{OH}$	Output HIGH Voltage (Note 4)	-1020	-930	-840	-980	-895	-810	-910	-815	-720	mV
$V_{OL}$	Output LOW Voltage (Note 4)	-1950	-1790	-1630	-1950	-1790	-1630	-1950	-1773	-1595	mV
$V_{IH}$	Input HIGH Voltage	-1170	-1005	-840	-1130	-970	-810	-1060	-890	-720	mV
$V_{IL}$	Input LOW Voltage	-1950	-1715	-1480	-1950	-1715	-1480	-1950	-1698	-1445	mV
$I_{IH}$	Input HIGH Current			150			150			150	$\mu\text{A}$
$I_{IL}$	Input LOW Current	0.5	0.3		0.5	0.065		0.3	0.2		$\mu\text{A}$

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

3. Input and output parameters vary 1:1 with  $V_{CC}$ .  $V_{EE}$  can vary  $-0.46\text{ V} / +0.06\text{ V}$ .
4. Outputs are terminated through a  $50\ \Omega$  resistor to  $V_{CC} - 2.0\text{ V}$ .

**Table 8. 100E SERIES PECL DC CHARACTERISTICS**  $V_{CCx} = 5.0\text{ V}$ ;  $V_{EE} = 0.0\text{ V}$  (Note 5)

Symbol	Characteristic	0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$I_{EE}$	Power Supply Current		151	181		151	181		174	208	mA
$V_{OH}$	Output HIGH Voltage (Note 6)	3975	4050	4120	3975	4050	4120	3975	4050	4120	mV
$V_{OL}$	Output LOW Voltage (Note 6)	3190	3295	3380	3190	3255	3380	3190	3260	3380	mV
$V_{IH}$	Input HIGH Voltage	3835	3975	4120	3835	3975	4120	3835	3975	4120	mV
$V_{IL}$	Input LOW Voltage	3190	3355	3525	3190	3355	3525	3190	3355	3525	mV
$I_{IH}$	Input HIGH Current			150			150			150	$\mu\text{A}$
$I_{IL}$	Input LOW Current	0.5	0.3		0.5	0.25		0.5	0.2		$\mu\text{A}$

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

5. Input and output parameters vary 1:1 with  $V_{CC}$ .  $V_{EE}$  can vary  $-0.46\text{ V} / +0.8\text{ V}$ .
6. Outputs are terminated through a  $50\ \Omega$  resistor to  $V_{CC} - 2.0\text{ V}$ .

# MC10E016, MC100E016

**Table 9. 100E SERIES NECL DC CHARACTERISTICS**  $V_{CCx} = 0.0\text{ V}$ ;  $V_{EE} = -5.0\text{ V}$  (Note 7)

Symbol	Characteristic	0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$I_{EE}$	Power Supply Current		151	181		151	181		174	208	mA
$V_{OH}$	Output HIGH Voltage (Note 8)	-1025	-950	-880	-1025	-950	-880	-1025	-950	-880	mV
$V_{OL}$	Output LOW Voltage (Note 8)	-1810	-1705	-1620	-1810	-1745	-1620	-1810	-1740	-1620	mV
$V_{IH}$	Input HIGH Voltage	-1165	-1025	-880	-1165	-1025	-880	-1165	-1025	-880	mV
$V_{IL}$	Input LOW Voltage	-1810	-1645	-1475	-1810	-1645	-1475	-1810	-1645	-1475	mV
$I_{IH}$	Input HIGH Current			150			150			150	$\mu\text{A}$
$I_{IL}$	Input LOW Current	0.5	0.3		0.5	0.25		0.5	0.2		$\mu\text{A}$

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

7. Input and output parameters vary 1:1 with  $V_{CC}$ .  $V_{EE}$  can vary  $-0.46\text{ V} / +0.8\text{ V}$ .

8. Outputs are terminated through a  $50\ \Omega$  resistor to  $V_{CC} - 2.0\text{ V}$ .

**Table 10. AC CHARACTERISTICS**  $V_{CCx} = 5.0\text{ V}$ ;  $V_{EE} = 0.0\text{ V}$  or  $V_{CCx} = 0.0\text{ V}$ ;  $V_{EE} = -5.0\text{ V}$  (Note 9)

Symbol	Characteristic	0°C			25°C			85°C			Unit	
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max		
$f_{MAX}$	Maximum Toggle Frequency		700			700			700		MHz	
$f_{COUNT}$	Maximum Count Frequency	700	900		700	900		700	900		MHz	
$t_{PLH}, t_{PHL}$	Propagation Delay to Output	CLK to Q	500	725	900	500	725	900	500	725	900	ps
		MR to Q	500	775	900	500	775	900	500	775	900	
		CLK to $\overline{TC}$	500	775	900	500	775	900	500	775	900	
		MR to $\overline{TC}$	500	775	900	500	775	900	500	775	900	
$t_s$	Setup Time (to CLK +)	Pn	150	-30		150	-30		150	-30		ps
		$\overline{CE}$	600	400		600	400		600	400		
		$\overline{PE}$	600	400		600	400		600	400		
		TCLD	500	300		500	300		500	300		
$t_h$	Hold Time (to CLK +)	Pn	350	100		350	100		350	100		
		$\overline{CE}$	400	200		400	200		400	200		
		$\overline{PE}$	0	200		0	200		0	200		
		TCLD	100	-300		100	-300		100	-300		
$t_{RR}$	Reset Recovery Time	900	700		900	700		900	700		ps	
$t_{PW}$	Minimum Pulse Width										ps	
		CLK, MR	400			400			400			
$t_{JITTER}$	Random Clock Jitter (RMS)		< 1			< 1			< 1		ps	
$t_r, t_f$	Rise/Fall Times (20 – 80%)	200	510	700	200	510	700	200	510	700	ps	

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

9. 10 Series:  $V_{EE}$  can vary  $-0.46\text{ V} / +0.06\text{ V}$ .

100 Series:  $V_{EE}$  can vary  $-0.46\text{ V} / +0.8\text{ V}$ .



APPLICATIONS INFORMATION (continued)

**Programmable Divider**

The E016 has been designed with a control pin which makes it ideal for use as an 8-bit programmable divider. The TCLD pin (load on terminal count) when asserted reloads the data present at the parallel input pin (Pn's) upon reaching terminal count (an all 1s state on the outputs). Because this feedback is built internal to the chip, the programmable division operation will run at very nearly the same frequency as the maximum counting frequency of the device. Figure 4 below illustrates the input conditions necessary for utilizing the E016 as a programmable divider set up to divide by 113.

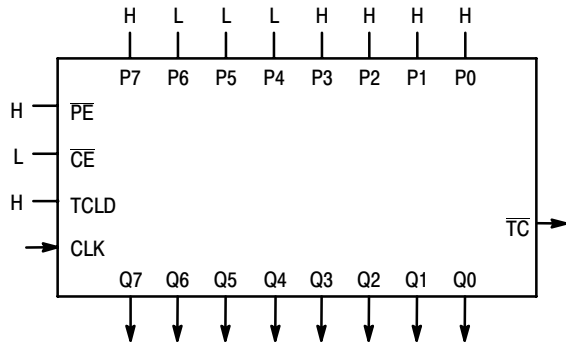


Figure 4. Mod 2 to 256 Programmable Divider

To determine what value to load into the device to accomplish the desired division, the designer simply subtracts the binary equivalent of the desired divide ratio from the binary value for 256. As an example for a divide ratio of 113:

$$Pn's = 256 - 113 = 8F_{16} = 1000\ 1111$$

where:

P0 = LSB and P7 = MSB

Forcing this input condition as per the setup in Figure 4 will result in the waveforms of Figure 5. Note that the  $\overline{TC}$  output is used as the divide output and the pulse duration is

equal to a full clock period. For even divide ratios, twice the desired divide ratio can be loaded into the E016 and the  $\overline{TC}$  output can feed the clock input of a toggle flip flop to create a signal divided as desired with a 50% duty cycle.

Table 11. Preset Values for Various Divide Ratios

Divide Ratio	Preset Data Inputs							
	P7	P6	P5	P4	P3	P2	P1	P0
2	H	H	H	H	H	H	H	L
3	H	H	H	H	H	H	L	H
4	H	H	H	H	H	H	L	L
5	H	H	H	H	H	L	H	H
w	w	•	•	•	•	•	•	•
w	•	•	•	•	•	•	•	•
112	H	L	L	H	L	L	L	L
113	H	L	L	L	H	H	H	H
114	H	L	L	L	H	H	H	L
•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•
254	L	L	L	L	L	L	H	L
255	L	L	L	L	L	L	L	H
256	L	L	L	L	L	L	L	L

A single E016 can be used to divide by any ratio from 2 to 256 inclusive. If divide ratios of greater than 256 are needed multiple E016s can be cascaded in a manner similar to that already discussed. When E016s are cascaded to build larger dividers the TCLD pin will no longer provide a means for loading on terminal count. Because one does not want to reload the counters until all of the devices in the chain have reached terminal count, external gating of the  $\overline{TC}$  pins must be used for multiple E016 divider chains.

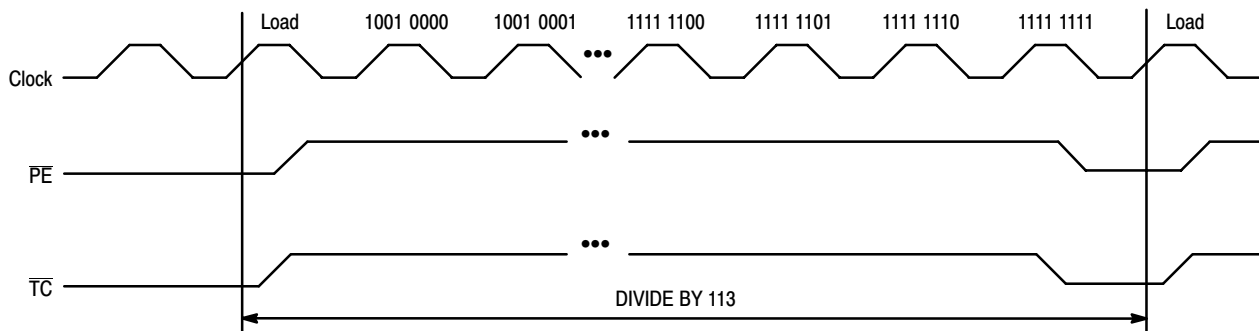


Figure 5. Divide by 113 E016 Programmable Divider Waveforms



## APPLICATIONS INFORMATION (continued)

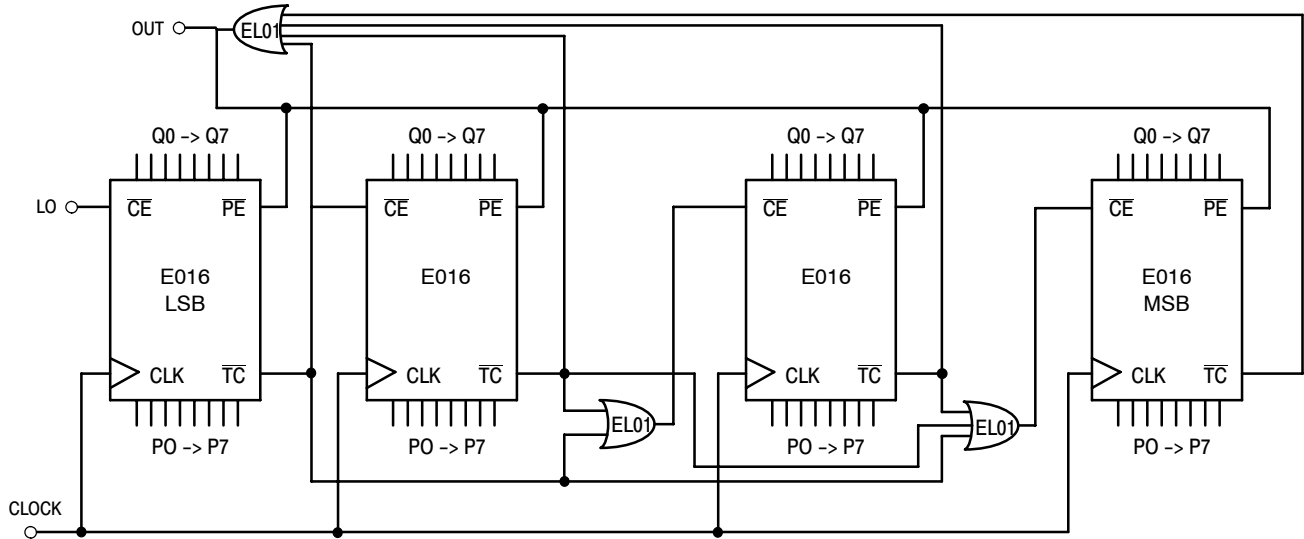


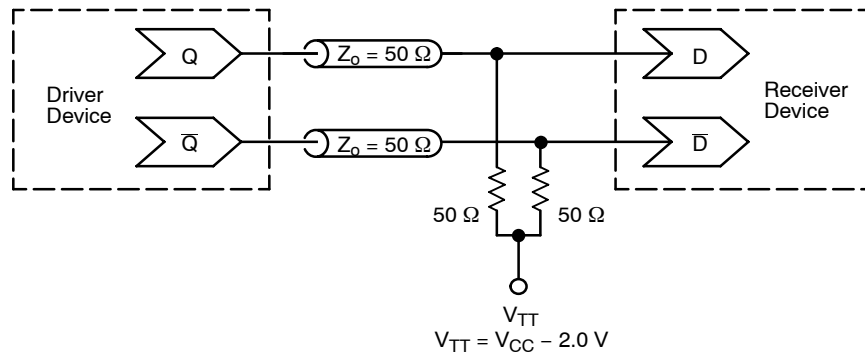
Figure 6. 32-Bit Cascaded E016 Programmable Divider

Figure 6 shows a typical block diagram of a 32-bit divider chain. Once again to maximize the frequency of operation EL01 OR gates were used. For lower frequency applications a slower OR gate could replace the EL01. Note that for a 16-bit divider the OR function feeding the  $\overline{PE}$  (program enable) input CANNOT be replaced by a wire OR tie as the  $\overline{TC}$  output of the least significant E016 must also feed the  $\overline{CE}$  input of the most significant E016. If the two  $\overline{TC}$  outputs were OR tied the cascaded count operation would not operate properly. Because in the cascaded form the  $\overline{PE}$  feedback is external and requires external gating, the maximum frequency of operation will be significantly less than the same operation in a single device.

#### Maximizing E016 Count Frequency

The E016 device produces 9 fast transitioning single-ended outputs, thus  $V_{CC}$  noise can become significant in situations where all of the outputs switch simultaneously in the same direction. This  $V_{CC}$  noise can negatively impact the maximum frequency of operation of the device. Since the device does not need to have the Q outputs terminated to count properly, it is recommended that if the outputs are not going to be used in the rest of the system they should be left unterminated. In addition, if only a subset of the Q outputs are used in the system only those outputs should be terminated. Not terminating the unused outputs will not only cut down the  $V_{CC}$  noise generated but will also save in total system power dissipation. Following these guidelines will allow designers to either be more aggressive in their designs or provide them with an extra margin to the published data book specifications.

## MC10E016, MC100E016



**Figure 7. Typical Termination for Output Driver and Device Evaluation  
(See Application Note AND8020/D – Termination of ECL Logic Devices.)**

### ORDERING INFORMATION

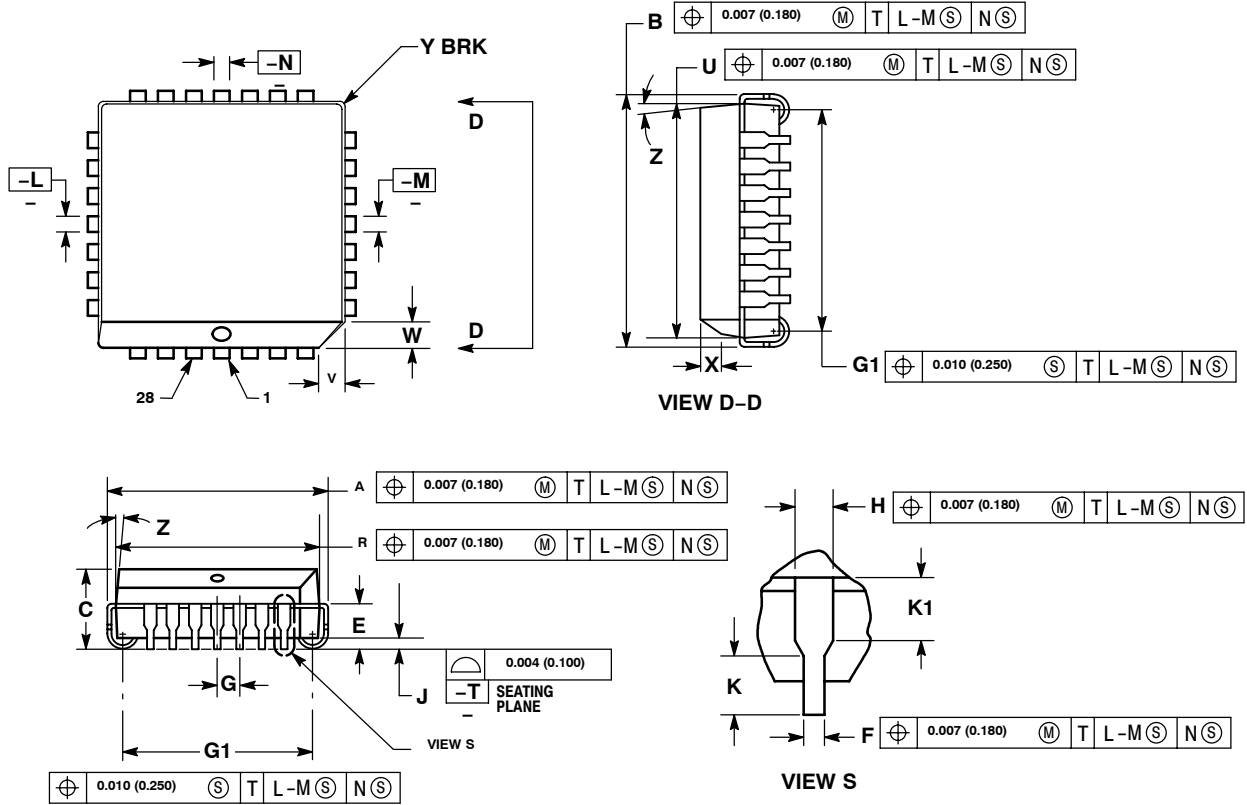
Device	Package Type	Shipping†
MC10E016FN	PLCC-28	37 Units/Rail
MC10E016FNG	PLCC-28 (Pb-Free)	37 Units/Rail
MC10E016FNR2	PLCC-28	500 Units/Reel
MC10E016FNR2G	PLCC-28 (Pb-Free)	500 Units/Reel
MC100E016FN	PLCC-28	37 Units/Rail
MC100E016FNG	PLCC-28 (Pb-Free)	37 Units/Rail
MC100E016FNR2	PLCC-28	500 Units/Reel
MC100E016FNR2G	PLCC-28 (Pb-Free)	500 Units/Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

# MC10E016, MC100E016

## PACKAGE DIMENSIONS

PLCC-28  
FN SUFFIX  
PLASTIC PLCC PACKAGE  
CASE 776-02  
ISSUE E




### NOTES:

- DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
- DIM G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
- DIM R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- CONTROLLING DIMENSION: INCH.
- THE PACKAGE TOP MAY BE SMALLER THAN THE PACKAGE BOTTOM BY UP TO 0.012 (0.300). DIMENSIONS R AND U ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY EXCLUSIVE OF MOLD FLASH, TIE BAR BURRS, GATE BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
- DIMENSION H DOES NOT INCLUDE DAMBAR PROTRUSION OR INTRUSION. THE DAMBAR PROTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE GREATER THAN 0.037 (0.940). THE DAMBAR INTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE SMALLER THAN 0.025 (0.635).

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.485	0.495	12.32	12.57
B	0.485	0.495	12.32	12.57
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	0.450	0.456	11.43	11.58
U	0.450	0.456	11.43	11.58
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	0.410	0.430	10.42	10.92
K1	0.040	—	1.02	—

# MC10E016, MC100E016

MECL is a trademark of Motorola, Inc.

**ON Semiconductor** and  are registered 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. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## PUBLICATION ORDERING INFORMATION

### LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor  
P.O. Box 61312, Phoenix, Arizona 85082-1312 USA  
**Phone:** 480-829-7710 or 800-344-3860 Toll Free USA/Canada  
**Fax:** 480-829-7709 or 800-344-3867 Toll Free USA/Canada  
**Email:** [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

**N. American Technical Support:** 800-282-9855 Toll Free  
USA/Canada

**Japan:** ON Semiconductor, Japan Customer Focus Center  
2-9-1 Kamimeguro, Meguro-ku, Tokyo, Japan 153-0051  
**Phone:** 81-3-5773-3850

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

**Order Literature:** <http://www.onsemi.com/litorder>

For additional information, please contact your  
local Sales Representative.

**MC10E106/D**