

MC10E160, MC100E160

5V ECL 12-Bit Parity Generator/Checker

The MC10E/100E160 is a 12-bit parity generator/checker. The Q output is HIGH when an odd number of inputs are HIGH. A HIGH on the Enable input (\overline{EN}) forces the Q output LOW.

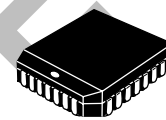
The 100 Series contains temperature compensation.

- Provides Odd-HIGH Parity of 12 Inputs
- Shiftable Output Register with Hold
- 900 ps Max. D to Q/\overline{Q} Output
- Enable
- Asynchronous Register Reset
- Dual Clocks
- PECL Mode Operating Range: $V_{CC} = 4.2\text{ V}$ to 5.7 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 V
- Internal Input to $50\text{ K}\Omega$ Pulldown Resistors
- ESD Protection: Human Body Model; $> 1\text{ KV}$, Machine Model; $> 7\text{ V}$
- Meets or Exceeds JEDEC Spec EIA/JESD78 IC Latchup Test
- Moisture Sensitivity Level 1
For Additional Information, see Application Note AND8003/D
- Flammability Rating: UL 94 V-0 @ 0.125 in, Oxygen Index: 28 to 34
- Transistor Count = 312 devices



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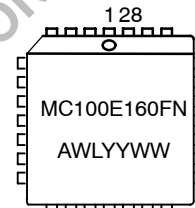
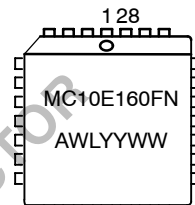
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PLCC-28
FN SUFFIX
CASE 776

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

MARKING DIAGRAMS



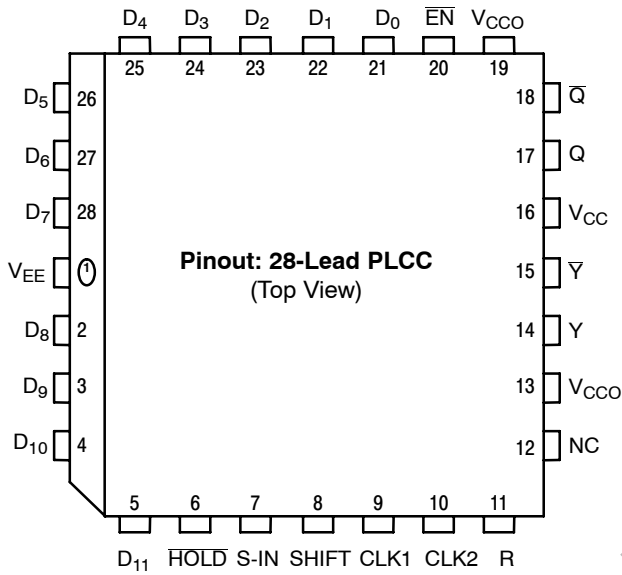
ORDERING INFORMATION

Device	Package	Shipping [†]
MC10E160FN	PLCC-28	37 Units/Rail
MC10E160FNR2	PLCC-28	500 Units/Reel
MC100E160FN	PLCC-28	37 Units/Rail
MC100E160FNR2	PLCC-28	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.

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LOGIC DIAGRAM AND PINOUT ASSIGNMENT



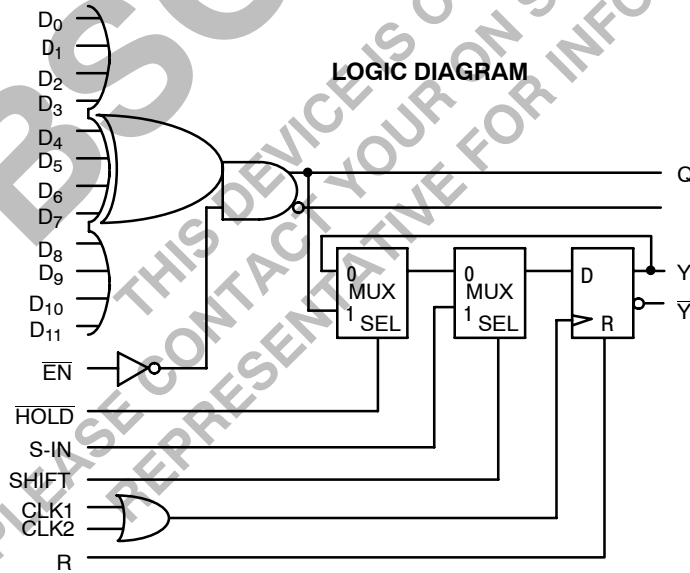
PIN DESCRIPTION

PIN	FUNCTION
D ₀ - D ₁₁	ECL Data Inputs
S-IN	ECL Serial Data Input
EN	ECL Enable, active LOW
HOLD	ECL Hold, active LOW
SHIFT	ECL Shift, active HIGH
CLK1, CLK2	ECL Clock Inputs
R	ECL Reset Inputs
Q, Q̄	ECL Direct Output
Y, Ȳ	ECL Register Output
V _{CC} , V _{CCO}	Positive Supply
V _{EE}	Negative Supply
NC	No Connect

* All V_{CC} and V_{CCO} pins are tied together on the die.

Warning: All V_{CC}, V_{CCO}, and V_{EE} pins must be externally connected to Power Supply to guarantee proper operation.

LOGIC DIAGRAM



MC10E160, MC100E160

MAXIMUM RATINGS (Note 1)

Symbol	Parameter	Condition 1	Condition 2	Rating	Unit
V _{CC}	PECL Mode Power Supply	V _{EE} = 0 V		8	V
V _I	PECL Mode Input Voltage NECL Mode Input Voltage	V _{EE} = 0 V V _{CC} = 0 V	V _I ≤ V _{CC} V _I ≥ V _{EE}	6 -6	V 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
θ _{JA}	Thermal Resistance (Junction-to-Ambient)	0 LFPM 500 LFPM	28 PLCC 28 PLCC	63.5 43.5	°C/W °C/W
θ _{JC}	Thermal Resistance (Junction-to-Case)	Standard Board	28 PLCC	22 to 26	°C/W
T _{sol}	Wave Solder	<2 to 3 sec @ 248°C		265	°C

1. Maximum Ratings are those values beyond which device damage may occur.

10E SERIES PECL DC CHARACTERISTICS V_{CCx} = 5.0 V; V_{EE} = 0.0 V (Note 2)

Symbol	Characteristic	0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I _{EE}	Power Supply Current		82	98		82	98		82	98	mA
V _{OH}	Output HIGH Voltage (Note 3)	3980	4070	4160	4020	4105	4190	4090	4185	4280	mV
V _{OL}	Output LOW Voltage (Note 3)	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 CLK1, CLK2 R All Other Inputs			200 300 150			200 300 150			200 300 150	μA μA μA
I _{IL}	Input LOW Current	0.5	0.3		0.5	0.25		0.3	0.2		μA

NOTE: Devices are designed to meet the DC specifications shown in the above 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 LFPM is maintained.

2. Input and output parameters vary 1:1 with V_{CC}. V_{EE} can vary -0.46 V / +0.06 V.
3. Outputs are terminated through a 50 ohm resistor to V_{CC} - 2 volts.

100E SERIES NECL DC CHARACTERISTICS V_{CCx} = 0.0 V; V_{EE} = -5.0 V (Note 8)

Symbol	Characteristic	0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I _{EE}	Power Supply Current		82	98		82	98		82	98	mA
V _{OH}	Output HIGH Voltage (Note 5)	-1020	-930	-840	-980	-895	-810	-910	-815	-720	mV
V _{OL}	Output LOW Voltage (Note 5)	-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 CLK1, CLK2 R All Other Inputs			200 300 150			200 300 150			200 300 150	μA μA μA
I _{IL}	Input LOW Current	0.5	0.3		0.5	0.065		0.3	0.2		μA

NOTE: Devices are designed to meet the DC specifications shown in the above 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 LFPM is maintained.

4. Input and output parameters vary 1:1 with V_{CC}. V_{EE} can vary -0.46 V / +0.06 V.
5. Outputs are terminated through a 50 ohm resistor to V_{CC} - 2 volts.

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100E SERIES PECL DC CHARACTERISTICS $V_{CCx}= 5.0\text{ V}$; $V_{EE}= 0.0\text{ V}$ (Note 6)

Symbol	Characteristic	0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I_{EE}	Power Supply Current		82	98		82	98		94	113	mA
V_{OH}	Output HIGH Voltage (Note 7)	3975	4050	4120	3975	4050	4120	3975	4050	4120	mV
V_{OL}	Output LOW Voltage (Note 7)	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 CLK1, CLK2 R All Other Inputs			200			200			200	μA
				300			300			300	μA
				150			150			150	μA
I_{IL}	Input LOW Current	0.5	0.3		0.5	0.25		0.5	0.2		μA

NOTE: Devices are designed to meet the DC specifications shown in the above 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 LFPM is maintained.

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

7. Outputs are terminated through a 50 ohm resistor to $V_{CC} - 2$ volts.

100E SERIES NECL DC CHARACTERISTICS $V_{CCx}= 0.0\text{ V}$; $V_{EE}= -5.0\text{ V}$ (Note 8)

Symbol	Characteristic	0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I_{EE}	Power Supply Current		82	98		82	98		94	113	mA
V_{OH}	Output HIGH Voltage (Note 9)	-1025	-950	-880	-1025	-950	-880	-1025	-950	-880	mV
V_{OL}	Output LOW Voltage (Note 9)	-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 CLK1, CLK2 R All Other Inputs			200			200			200	μA
				300			300			300	μA
				150			150			150	μA
I_{IL}	Input LOW Current	0.5	0.3		0.5	0.25		0.5	0.2		μA

NOTE: Devices are designed to meet the DC specifications shown in the above 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 LFPM is maintained.

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

9. Outputs are terminated through a 50 ohm resistor to $V_{CC} - 2$ volts.

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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 10)

Symbol	Characteristic	0°C			25°C			85°C			Unit	
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max		
f_{MAX}	Maximum Toggle Frequency	700	1100		700	1100		700	1100		MHz	
t_{PLH}	Propagation Delay to Output										ps	
t_{PHL}		D to Q	400	650	950	400	650	950	400	650		950
		$\overline{E}n$ to Q	300	550	750	300	550	750	300	550		750
		CLK to Y	275	500	700	275	500	700	275	500		700
	R to Y	275	500	725	275	500	725	275	500	725		
t_s	Setup Time										ps	
		D	1200	900		1200	900		1200	900		
		\overline{HOLD}	600	300		600	300		600	300		
		S-IN	350	150		350	150		350	150		
	SHIFT	500	250		500	250		500	250			
t_h	Hold Time										ps	
		D	-400	-900		-400	-900		-400	-900		
		\overline{HOLD}	100	-300		100	-300		100	-300		
		S-IN	300	-150		300	-150		300	-150		
	SHIFT	200	-250		200	-250		200	-250			
t_{JITTER}	Random Clock Jitter (RMS)		< 1			< 1			< 1		ps	
t_r	Rise/Fall Time										ps	
t_f	(20 - 80%)	300	450	650	300	450	650	300	450	650		

NOTE: Devices are designed to meet the AC specifications shown in the above 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 LFPM is maintained.

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

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

MC10E160, MC100E160

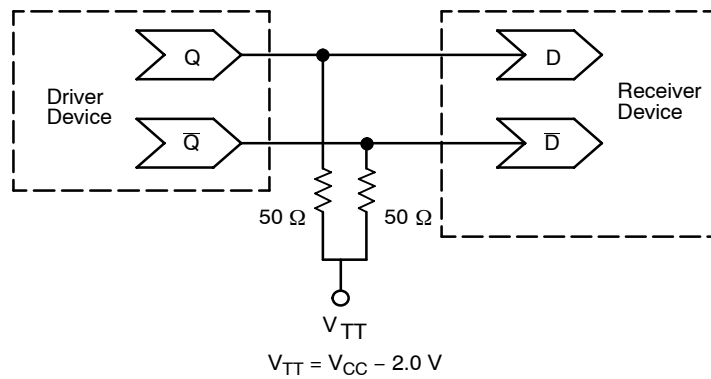


Figure 1. Typical Termination for Output Driver and Device Evaluation
(See Application Note AND8020 – Termination of ECL Logic Devices.)

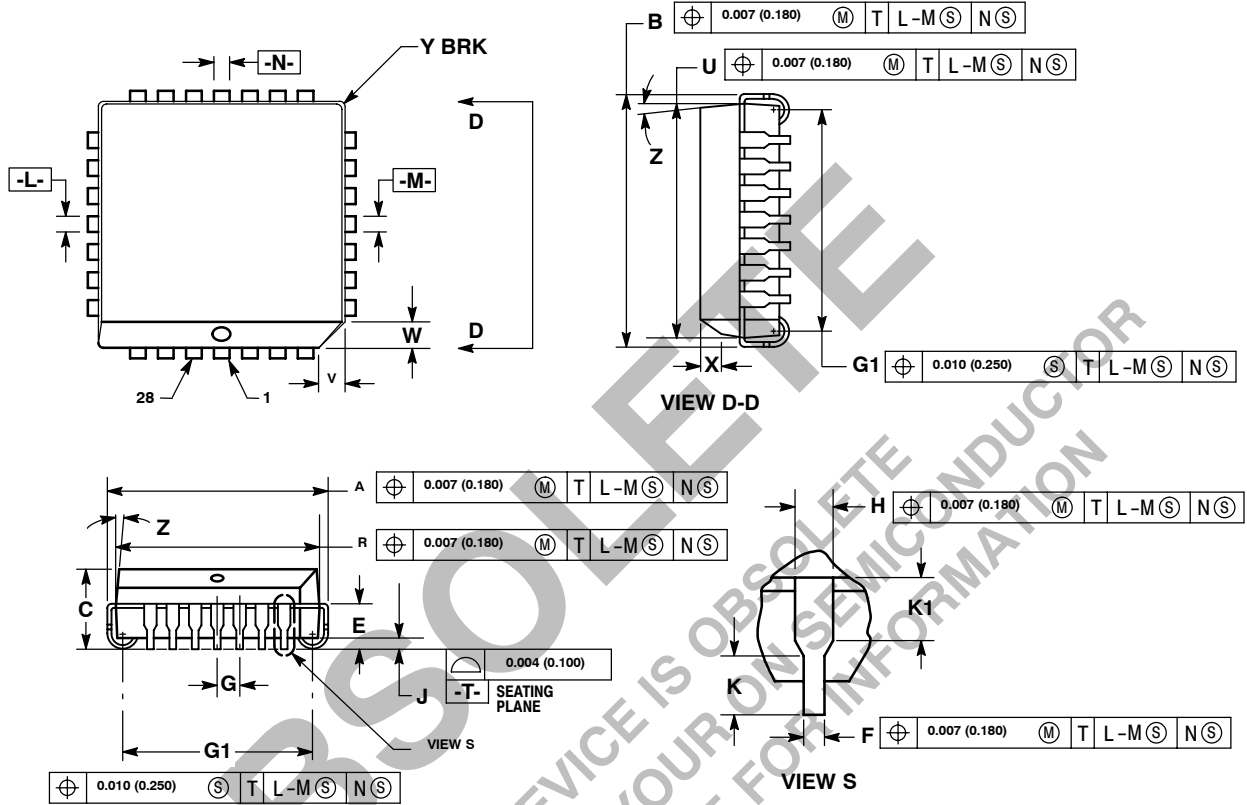
Resource Reference of Application Notes

- AN1404** – ECLinPS Circuit Performance at Non-Standard V_{IH} Levels
- AN1405** – ECL Clock Distribution Techniques
- AN1406** – Designing with PECL (ECL at +5.0 V)
- AN1503** – ECLinPS I/O SPICE Modeling Kit
- AN1504** – Metastability and the ECLinPS Family
- AN1568** – Interfacing Between LVDS and ECL
- AN1596** – ECLinPS Lite Translator ELT Family SPICE I/O Model Kit
- AN1650** – Using Wire-OR Ties in ECLinPS Designs
- AN1672** – The ECL Translator Guide
- AND8001** – Odd Number Counters Design
- AND8002** – Marking and Date Codes
- AND8020** – Termination of ECL Logic Devices

MC10E160, MC100E160

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	—

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