MC10E193, MC10E193

5V ECL Error Detection/ Correction Circuit

The MC10E/100E193 is an error detection and correction (EDAC) circuit. Modified Hamming parity codes are generated on an 8-bit word according to the pattern shown in the logic symbol. The P5 output gives the parity of the whole word. The word parity is also provided at the PGEN pin, after Odd/Even parity control and gating with the BPAR input. This output also feeds to a 1-bit shiftable register, for use as part of a scan ring.

Used in conjunction with 12-bit parity generators such as the E160, a SECDED (single error correction, double error detection) error system can be designed for a multiple of an 8-bit word.

The 100 Series contains temperature compensation.

- Hamming Code Generation
- 8-Bit Word, Expandable
- Provides Parity of Whole Word
- Scannable Parity Register
- PECL Mode Operating Range: V_{CC}= 4.2 V to 5.7 V with V_{EE}= 0 V
- NECL Mode Operating Range: V_{CC}= 0 V with V_{EE}= –4.2 V to –5.7 V
- Internal Input Pulldown Resistors
- ESD Protection: > 1 KV HBM, > 75 V MM
- 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 code V–0 @ 1/8”,
  Oxygen Index 28 to 34
- Transistor Count = 368 devices

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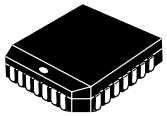
MARKING DIAGRAMS



PLCC–28
FN SUFFIX
CASE 776

28 1

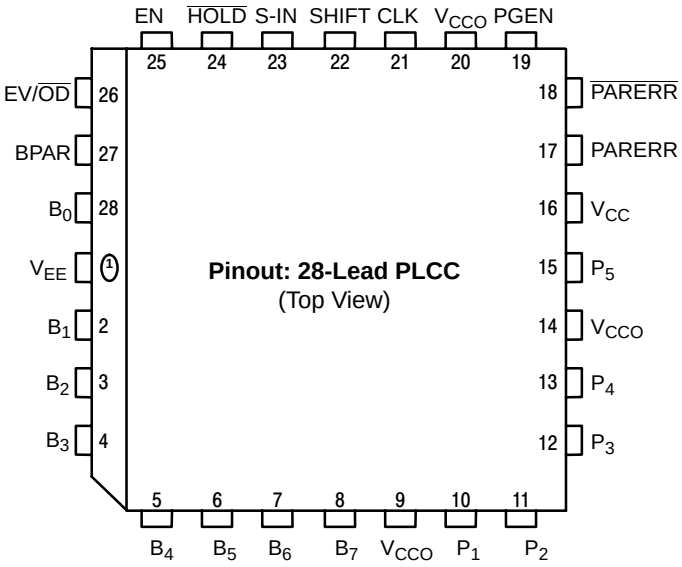
A = Assembly Location
WL = Wafer Lot
YY = Year
WW = Work Week

28 1

ORDERING INFORMATION

Device	Package	Shipping
MC10E193FN	PLCC–28	37 Units/Rail
MC10E193FNR2	PLCC–28	500 Units/Reel
MC100E193FN	PLCC–28	37 Units/Rail
MC100E193FNR2	PLCC–28	500 Units/Reel

LOGIC DIAGRAM AND PINOUT ASSIGNMENT



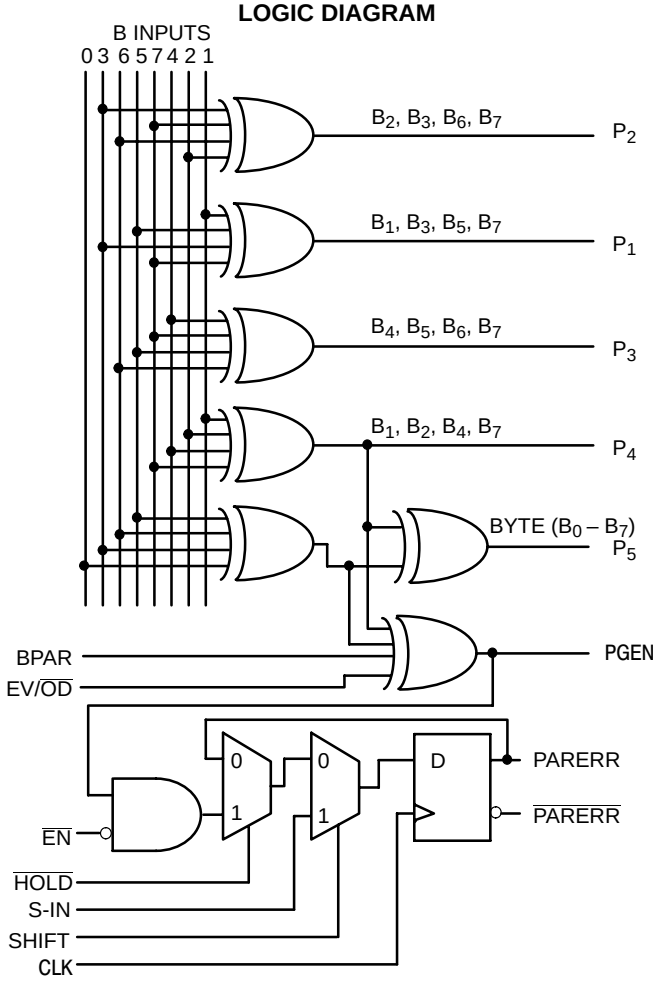
* All V_{CC} and V_{CCO} pins are tied together on the die.

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

PIN DESCRIPTION

PIN	FUNCTION
B0–B6	ECL Bit Inputs
P1–P5	ECL Parity Outputs
PARERR, $\overline{\text{PARERR}}$	ECL Parity Error Outputs
PGEN	ECL Word Parity Generator Output
CLK	ECL Clock Input
SHIFT	ECL Shift Input (Active–High)
S–IN	ECL Serial Data Input
$\overline{\text{HOLD}}$	ECL Hold (Active–Low)
EN	ECL Enable (Active–Low)
EV/$\overline{\text{DD}}$	ECL Even/Odd Contact
BPAR	ECL Bit Parity Gate Input
V_{CC}, V_{CCO}	Positive Supply
V_{EE}	Negative Supply
NC	No Connect

LOGIC DIAGRAM



MAXIMUM RATINGS (Note 1.)

Symbol	Parameter	Condition 1	Condition 2	Rating	Units
V_{CC}	PECL Mode Power Supply	V_{EE} = 0 V		8	V
V_{EE}	NECL Mode Power Supply	V_{CC} = 0 V		–8	V
V_I	PECL Mode Input Voltage NECL Mode Input Voltage	V_{EE} = 0 V V_{CC} = 0 V	$V_I \leq V_{CC}$ $V_I \geq V_{EE}$	6 –6	V V
I_{out}	Output Current	Continuous Surge		50 100	mA mA
TA	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)	std bd	28 PLCC	22 to 26	°C/W
V_{EE}	PECL Operating Range NECL Operating Range			4.2 to 5.7 –5.7 to –4.2	V V
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 1.)

		0°C			25°C			85°C			
Symbol	Characteristic	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Unit
I_{EE}	Power Supply Current		112	134		112	134		112	134	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: 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.
1. Input and output parameters vary 1:1 with V_{CC}. V_{EE} can vary +0.46 V / –0.06 V.
2. Outputs are terminated through a 50 ohm resistor to V_{CC}–2 volts.

10E SERIES NECL DC CHARACTERISTICS V_{CCx}= 0.0 V; V_{EE}= –5.0 V (Note 1.)

		0°C			25°C			85°C			
Symbol	Characteristic	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Unit
I_{EE}	Power Supply Current		112	134		112	134		112	134	mA
V_{OH}	Output HIGH Voltage (Note 2.)	–1020	–930	–840	–980	–895	–810	–910	–815	–720	mV
V_{OL}	Output LOW Voltage (Note 2.)	–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	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.
1. Input and output parameters vary 1:1 with V_{CC}. V_{EE} can vary +0.46 V / –0.06 V.
2. Outputs are terminated through a 50 ohm resistor to V_{CC}–2 volts.

100E SERIES PECL DC CHARACTERISTICS V_{CCx}= 5.0 V; V_{EE}= 0.0 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		112	134		112	134		129	155	mA
V_{OH}	Output HIGH Voltage (Note 2.)	3975	4050	4120	3975	4050	4120	3975	4050	4120	mV
V_{OL}	Output LOW Voltage (Note 2.)	3190	3295	3380	3190	3255	3380	3190	3260	3380	mV
V_{IH}	Input HIGH Voltage	3835	4050	4120	3835	4120	4120	3835	4120	4120	mV
V_{IL}	Input LOW Voltage	3190	3300	3525	3190	3525	3525	3190	3525	3525	mV
I_{IH}	Input HIGH Current			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.

1. Input and output parameters vary 1:1 with V_{CC}. V_{EE} can vary +0.46 V / –0.8 V.
2. 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 1.)

Symbol	Characteristic	0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I_{EE}	Power Supply Current		112	134		112	134		129	155	mA
V_{OH}	Output HIGH Voltage (Note 2.)	–1025	–950	–880	–1025	–950	–880	–1025	–950	–880	mV
V_{OL}	Output LOW Voltage (Note 2.)	–1810	–1705	–1620	–1810	–1745	–1620	–1810	–1740	–1620	mV
V_{IH}	Input HIGH Voltage	–1165	–950	–880	–1165	–880	–880	–1165	–880	–880	mV
V_{IL}	Input LOW Voltage	–1810	–1700	–1475	–1810	–1475	–1475	–1810	–1475	–1475	mV
I_{IH}	Input HIGH Current			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.

1. Input and output parameters vary 1:1 with V_{CC}. V_{EE} can vary +0.46 V / –0.8 V.
2. Outputs are terminated through a 50 ohm resistor to V_{CC}–2 volts.

AC CHARACTERISTICS V_{CCx}= 5.0 V; V_{EE}= 0.0 V or V_{CCx}= 0.0 V; V_{EE}= –5.0 V (Note 1.)

Symbol	Characteristic	0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
f_{MAX}	Maximum Toggle Frequency		TBD			TBD			TBD		GHz
t_{PLH}	Propagation Delay to Output										ps
t_{PHL}	B to P1, P2, P3, P4	350	700	1000	350	700	1000	350	700	1000	
	B to P5	400	775	1150	400	775	1150	400	775	1150	
	EV/$\overline{OD}$, BPAR to PGEN	350	650	850	350	650	850	350	650	850	
	B to PGEN	600	1000	1450	600	1000	1450	600	1000	1450	
	CLK to PARERR	300	550	850	300	550	850	300	550	850	
t_s	Setup Time										ps
	SHIFT	400	150		400	150		400	150		
	S-IN	300	50		300	50		300	50		
	$\overline{HOLD}$	750	350		750	350		750	350		
	$\overline{EN}$	500	250		500	250		500	250		
	EV/$\overline{OD}$	1300	850		1300	850		1300	850		
	BPAR	1300	850		1300	850		1300	850		
	B	1700	1100		1700	1100		1700	1100		
t_h	Hold Time										ps
	SHIFT	200	–150		200	–150		200	–150		
	S-IN	300	– 50		300	– 50		300	– 50		
	$\overline{HOLD}$	100	– 350		100	– 350		100	– 350		
	$\overline{EN}$	100	– 250		100	– 250		100	– 250		
	EV/$\overline{OD}$	– 200	– 850		– 200	– 850		– 200	– 850		
	BPAR	– 200	– 850		– 200	– 850		– 200	– 850		
	B	– 300	–1100		– 300	–1100		– 300	–1100		
t_{JITTER}	Cycle–to–Cycle Jitter		TBD			TBD			TBD		ps
t_r	Rise/Fall Times										ps
t_f	(20 - 80%)	300	700	1100	300	700	1100	300	700	1100	

1. 10 Series: V_{EE} can vary +0.46 V / –0.06 V.
   100 Series: V_{EE} can vary +0.46 V / –0.8 V.

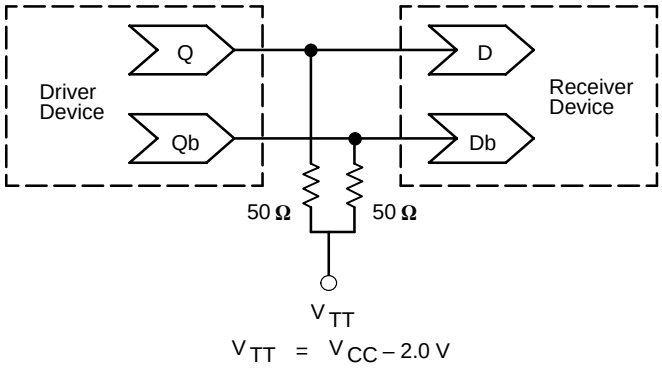


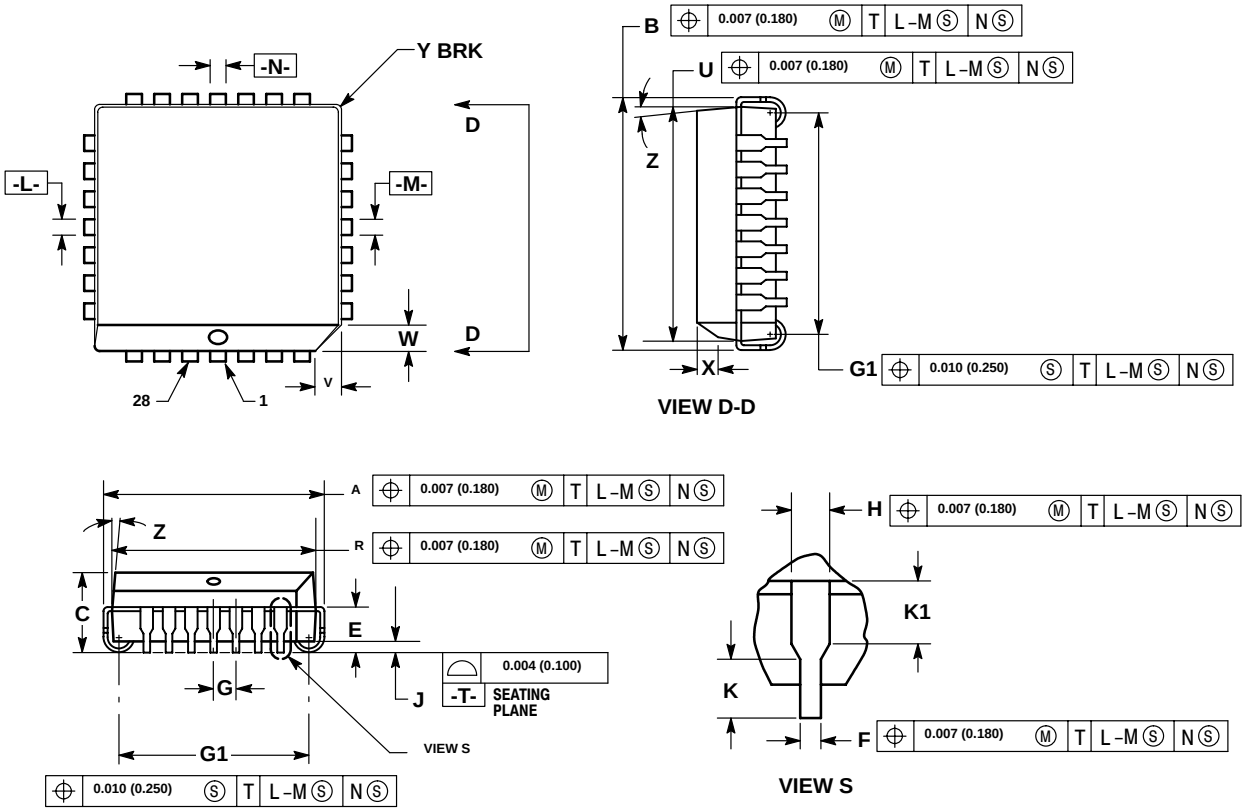
Figure 1. Typical Termination for Output Driver and Device Evaluation
(See Application Note AND8020 – Termination of ECL Logic Devices.)

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

PACKAGE DIMENSIONS

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



NOTES:
1. DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
2. DIM G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
3. DIM R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
4. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
5. CONTROLLING DIMENSION: INCH.
6. 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.
7. 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).

	INCHES		MILLIMETERS	
DIM	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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