

MC10EL11, MC100EL11

ATTRIBUTES

Characteristics	Value
Internal Input Pulldown Resistor	75 K Ω
Internal Input Pullup Resistor	N/A
ESD Protection Human Body Model Machine Model	> 1 KV > 100 V
Moisture Sensitivity, Indefinite Time Out of Drypack (Note 1)	Level 1
Flammability Rating Oxygen Index: 28 to 34	UL 94 V-0 @ 0.125 in
Transistor Count	44
Meets or Exceeds JEDEC Spec EIA/JESD78 IC Latchup Test	

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

MAXIMUM RATINGS (Note 2)

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 ≤ 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			-40 to +85	°C
T _{stg}	Storage Temperature Range			-65 to +150	°C
θ _{JA}	Thermal Resistance (Junction-to-Ambient)	0 LFPM 500 LFPM	SO-8 SO-8	190 130	°C/W °C/W
θ _{JC}	Thermal Resistance (Junction-to-Case)	Standard Board	SO-8	41 to 44	°C/W
θ _{JA}	Thermal Resistance (Junction-to-Ambient)	0 LFPM 500 LFPM	TSSOP-8 TSSOP-8	185 140	°C/W °C/W
θ _{JC}	Thermal Resistance (Junction-to-Case)	Standard Board	TSSOP-8	41 to 44 ± 5%	°C/W
T _{sol}	Wave Solder	<2 to 3 sec @ 248°C		265	°C

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

MC10EL11, MC100EL11

10EL SERIES PECL DC CHARACTERISTICS $V_{CC} = 5.0 \text{ V}$; $V_{EE} = 0.0 \text{ V}$ (Note 3)

		-40 °C			25 °C			85 °C			
Symbol	Characteristic	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Unit
I_{EE}	Power Supply Current		26	31		26	31		26	31	mA
V_{OH}	Output HIGH Voltage (Note 4)	3920	4010	4110	4020	4105	4190	4090	4185	4280	mV
V_{OL}	Output LOW Voltage (Note 4)	3050	3200	3350	3050	3210	3370	3050	3227	3405	mV
V_{IH}	Input HIGH Voltage (Single-Ended)	3770		4110	3870		4190	3940		4280	mV
V_{IL}	Input LOW Voltage (Single-Ended)	3050		3500	3050		3520	3050		3555	mV
V_{IHCMR}	Input HIGH Voltage Common Mode Range (Differential) (Note 5)	2.5		4.6	2.5		4.6	2.5		4.6	V
I_{IH}	Input HIGH Current			150			150			150	μA
I_{IL}	Input LOW Current	0.5			0.5			0.3			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 lfm is maintained.

3. Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary +0.25 V / -0.5 V.

4. Outputs are terminated through a 50 Ω resistor to V_{CC} - 2 volts.

5. V_{IHCMR} min varies 1:1 with V_{EE} , V_{IHCMR} max varies 1:1 with V_{CC} . The V_{IHCMR} range is referenced to the most positive side of the differential input signal. Normal operation is obtained if the HIGH level falls within the specified range and the peak-to-peak voltage lies between V_{ppmin} and 1 V.

10EL SERIES NECL DC CHARACTERISTICS $V_{CC} = 0.0 \text{ V}$; $V_{EE} = -5.0 \text{ V}$ (Note 6)

		-40 °C			25 °C			85 °C			
Symbol	Characteristic	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Unit
I_{EE}	Power Supply Current		26	31		26	31		26	31	mA
V_{OH}	Output HIGH Voltage (Note 7)	-1080	-990	-890	-980	-895	-810	-910	-815	-720	mV
V_{OL}	Output LOW Voltage (Note 7)	-1950	-1800	-1650	-1950	-1790	-1630	-1950	-1773	-1595	mV
V_{IH}	Input HIGH Voltage (Single-Ended)	-1230		-890	-1130		-810	-1060		-720	mV
V_{IL}	Input LOW Voltage (Single-Ended)	-1950		-1500	-1950		-1480	-1950		-1445	mV
V_{IHCMR}	Input HIGH Voltage Common Mode Range (Differential) (Note 8)	-2.5		-0.4	-2.5		-0.4	-2.5		-0.4	V
I_{IH}	Input HIGH Current			150			150			150	μA
I_{IL}	Input LOW Current	0.5			0.5			0.3			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 lfm is maintained.

6. Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary +0.25 V / -0.5 V.

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

8. V_{IHCMR} min varies 1:1 with V_{EE} , V_{IHCMR} max varies 1:1 with V_{CC} . The V_{IHCMR} range is referenced to the most positive side of the differential input signal. Normal operation is obtained if the HIGH level falls within the specified range and the peak-to-peak voltage lies between V_{ppmin} and 1 V.

MC10EL11, MC100EL11

100EL SERIES PECL DC CHARACTERISTICS $V_{CC} = 5.0\text{ V}$; $V_{EE} = 0.0\text{ V}$ (Note 9)

		-40 °C			25 °C			85 °C			
Symbol	Characteristic	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Unit
I_{EE}	Power Supply Current		26	31		26	31		30	36	mA
V_{OH}	Output HIGH Voltage (Note 10)	3915	3995	4120	3975	4045	4120	3975	4050	4120	mV
V_{OL}	Output LOW Voltage (Note 10)	3170	3305	3445	3190	3295	3380	3190	3295	3380	mV
V_{IH}	Input HIGH Voltage (Single-Ended)	3835		4120	3835		4120	3835		4120	mV
V_{IL}	Input LOW Voltage (Single-Ended)	3190		3525	3190		3525	3190		3525	mV
V_{IHCMR}	Input HIGH Voltage Common Mode Range (Differential) (Note 11)	2.5		4.6	2.5		4.6	2.5		4.6	V
I_{IH}	Input HIGH Current			150			150			150	μA
I_{IL}	Input LOW Current	0.5			0.5			0.5			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 lfm is maintained.

9. Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary +0.8 V / -0.5 V.

10. Outputs are terminated through a 50 Ω resistor to V_{CC} - 2 volts.

11. V_{IHCMR} min varies 1:1 with V_{EE} , V_{IHCMR} max varies 1:1 with V_{CC} . The V_{IHCMR} range is referenced to the most positive side of the differential input signal. Normal operation is obtained if the HIGH level falls within the specified range and the peak-to-peak voltage lies between V_{ppmin} and 1 V.

100EL SERIES NECL DC CHARACTERISTICS $V_{CC} = 0.0\text{ V}$; $V_{EE} = -5.0\text{ V}$ (Note 12)

		-40 °C			25 °C			85 °C			
Symbol	Characteristic	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Unit
I_{EE}	Power Supply Current		26	31		26	31		30	36	mA
V_{OH}	Output HIGH Voltage (Note 13)	-1085	-1005	-880	-1025	-955	-880	-1025	-955	-880	mV
V_{OL}	Output LOW Voltage (Note 13)	-1830	-1695	-1555	-1810	-1705	-1620	-1810	-1705	-1620	mV
V_{IH}	Input HIGH Voltage (Single-Ended)	-1165		-880	-1165		-880	-1165		-880	mV
V_{IL}	Input LOW Voltage (Single-Ended)	-1810		-1475	-1810		-1475	-1810		-1475	mV
V_{IHCMR}	Input HIGH Voltage Common Mode Range (Differential) (Note 14)	-2.5		-0.4	-2.5		-0.4	-2.5		-0.4	V
I_{IH}	Input HIGH Current			150			150			150	μA
I_{IL}	Input LOW Current	0.5			0.5			0.5			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 lfm is maintained.

12. Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary +0.8 V / -0.5 V.

13. Outputs are terminated through a 50 Ω resistor to V_{CC} - 2 volts.

14. V_{IHCMR} min varies 1:1 with V_{EE} , V_{IHCMR} max varies 1:1 with V_{CC} . The V_{IHCMR} range is referenced to the most positive side of the differential input signal. Normal operation is obtained if the HIGH level falls within the specified range and the peak-to-peak voltage lies between V_{ppmin} and 1 V.

MC10EL11, MC100EL11

AC CHARACTERISTICS $V_{CC} = 5.0\text{ V}$; $V_{EE} = 0.0\text{ V}$ or $V_{CC} = 0.0\text{ V}$; $V_{EE} = -5.0\text{ V}$ (Note 15)

Symbol	Characteristic	-40 °C			25 °C			85 °C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$f_{\max}$	Maximum Toggle Frequency					1.5					GHz
t_{PLH} t_{PHL}	Propagation Delay to Output	135	260	385	190	265	340	215	29*0	365	ps
t_{SKEW}	Within-Device Skew (Note 16) Duty Cycle Skew (Note 17)		5 5			5 5	20 20		5 5	20 20	ps
t_{JITTER}	Random Clock Jitter (RMS)					0.6					ps
V_{PP}	Input Swing (Note 18)	150		1000	150		1000	150		1000	mV
t_r t_f	Output Rise/Fall Times Q (20% - 80%)	100	225	350	100	225	350	100	225	350	ps

15.10 Series: V_{EE} can vary +0.25 V / -0.5 V.

100 Series: V_{EE} can vary +0.8 V / -0.5 V.

16. Within-device skew defined as identical transitions on similar paths through a device.

17. Duty cycle skew is the difference between a t_{PLH} and t_{PHL} propagation delay through a device.

18. $V_{PP}(\min)$ is minimum input swing for which AC parameters guaranteed. The device has a DC gain of ≈ 40 .

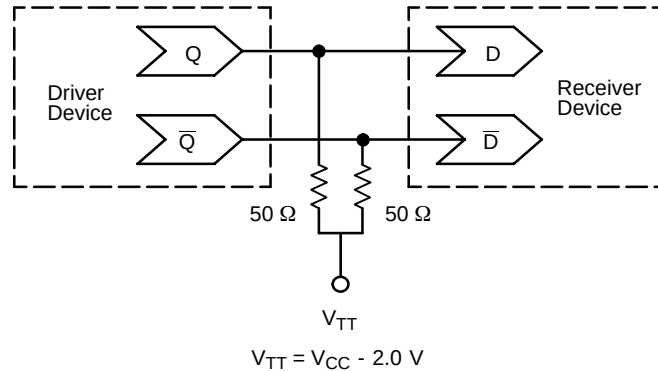


Figure 2. Typical Termination for Output Driver and Device Evaluation
(See Application Note AND8020 - Termination of ECL Logic Devices.)

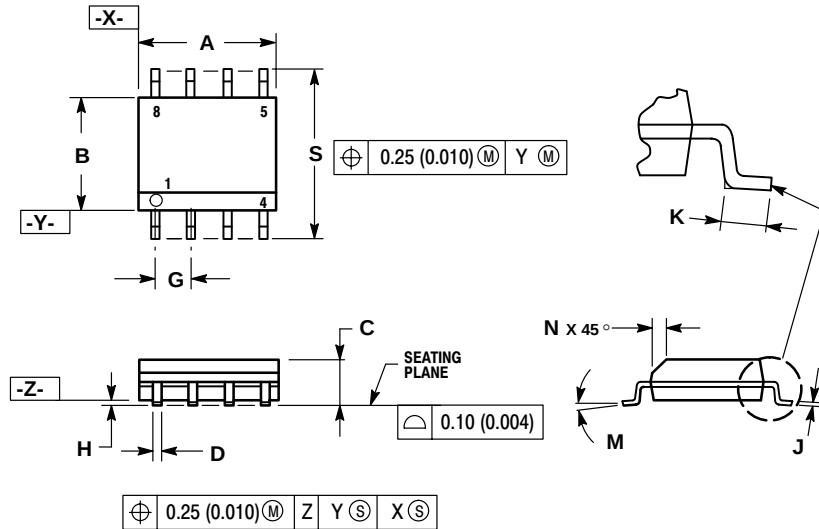
Resource Reference of Application Notes

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
AN1560	- Low Voltage ECLinPS SPICE Modeling Kit
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
AND8090	- AC Characteristics of ECL Devices

MC10EL11, MC100EL11

PACKAGE DIMENSIONS

SO-8 D SUFFIX PLASTIC SOIC PACKAGE CASE 751-07 ISSUE AA



NOTES:

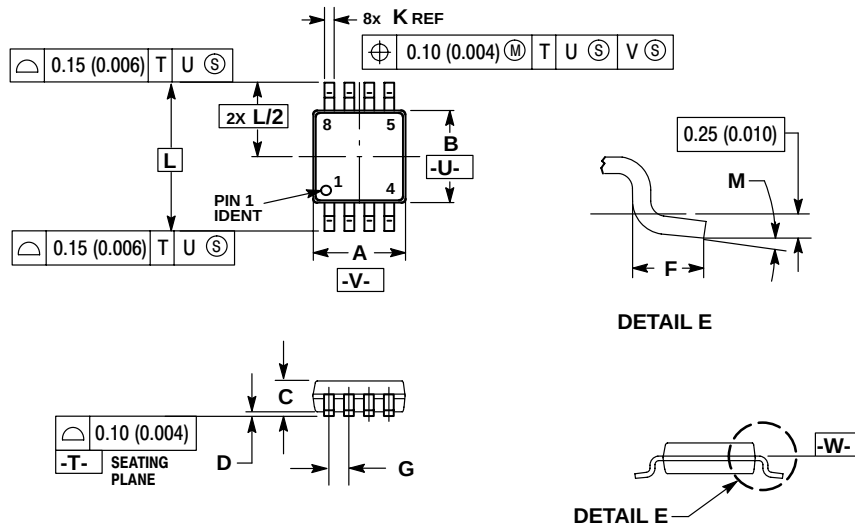
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. 751-01 THRU 751-06 ARE OBSOLETE. NEW STANDARD IS 751-07.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.197
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.053	0.069
D	0.33	0.51	0.013	0.020
G	1.27 BSC		0.050 BSC	
H	0.10	0.25	0.004	0.010
J	0.19	0.25	0.007	0.010
K	0.40	1.27	0.016	0.050
M	0°	8°	0°	8°
N	0.25	0.50	0.010	0.020
S	5.80	6.20	0.228	0.244

MC10EL11, MC100EL11

PACKAGE DIMENSIONS

TSSOP-8
DT SUFFIX
PLASTIC TSSOP PACKAGE
CASE 948R-02
ISSUE A



NOTES:

1. DIMENSIONS AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH. PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.
5. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
6. DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE -V-.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.90	3.10	0.114	0.122
B	2.90	3.10	0.114	0.122
C	0.80	1.10	0.031	0.043
D	0.05	0.15	0.002	0.006
F	0.40	0.70	0.016	0.028
G	0.65 BSC		0.026 BSC	
K	0.25	0.40	0.010	0.016
L	4.90 BSC		0.193 BSC	
M	0°	6°	0°	6°

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