

# MC10EL12, MC100EL12

## 5.0 V ECL Low Impedance Driver

The MC10EL/100EL12 is a low impedance drive buffer. With two pairs of OR/NOR outputs the device is ideally suited for high drive applications such as memory addressing. The device is a function equivalent to the E112 device with higher performance capabilities. With propagation delays significantly faster than the E112, the EL12 is ideally suited for those applications which require the ultimate in AC performance.

The 100 Series contains temperature compensation.

### Features

- 290 ps Propagation Delay
- Dual Outputs for 25  $\Omega$  Drive Applications
- ESD Protection: Human Body Model; > 1.0 KV  
Machine Model; > 100 V
- 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
- 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 = 44 devices
- Pb-Free Packages are Available

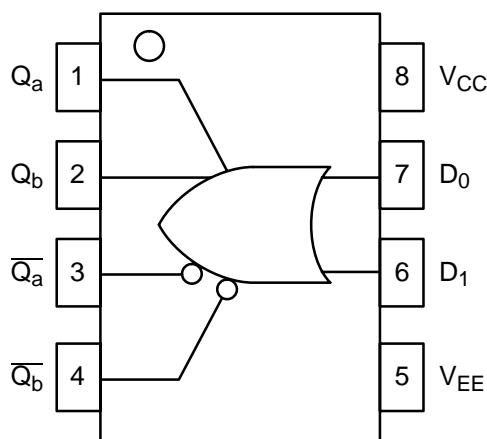


Figure 1. Logic Diagram and Pinout Assignment

### PIN DESCRIPTION

PIN	FUNCTION
D0, D1	ECL Data Inputs
Qa, $\overline{Qa}$ ; Qb, $\overline{Qb}$	ECL Data Outputs
$V_{CC}$	Positive Supply
$V_{EE}$	Negative Supply

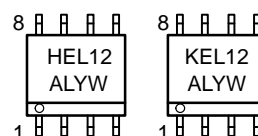


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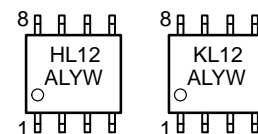
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### MARKING DIAGRAMS\*

8  
1  
SOIC-8  
D SUFFIX  
CASE 751



8  
1  
TSSOP-8  
DT SUFFIX  
CASE 948R



H = MC10  
K = MC100  
A = Assembly Location  
L = Wafer Lot  
Y = Year  
W = Work Week

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

### ORDERING INFORMATION

Device	Package	Shipping†
MC10EL12D	SOIC-8	98 Units / Rail
MC10EL12DR2	SOIC-8	2500 Tape & Reel
MC100EL12D	SOIC-8	98 Units / Rail
MC100EL12DG	SOIC-8 (Pb-Free)	98 Units / Rail
MC100EL12DR2	SOIC-8	2500 Tape & Reel
MC100EL12DR2G	SOIC-8 (Pb-Free)	2500 Tape & Reel
MC10EL12DT	TSSOP-8	98 Units / Rail
MC10EL12DTR2	TSSOP-8	2500 Tape & Reel
MC100EL12DT	TSSOP-8	98 Units / Rail
MC100EL12DTR2	TSSOP-8	2500 Tape & 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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## MAXIMUM RATINGS

Symbol	Parameter	Condition 1	Condition 2	Rating	Units
$V_{CC}$	PECL Mode Power Supply	$V_{EE} = 0\text{ V}$		8	V
$V_{EE}$	NECL Mode Power Supply	$V_{CC} = 0\text{ V}$		-8	V
$V_I$	PECL Mode Input Voltage	$V_{EE} = 0\text{ V}$	$V_I \leq V_{CC}$	6	V
	NECL Mode Input Voltage	$V_{CC} = 0\text{ V}$	$V_I \geq V_{EE}$	-6	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
$\theta_{JA}$	Thermal Resistance (Junction to Ambient)	0 lfpm	SOIC-8	190	°C/W
		500 lfpm	SOIC-8	130	°C/W
$\theta_{JC}$	Thermal Resistance (Junction to Case)	Standard Board	SOIC-8	41 to 44	°C/W
$\theta_{JA}$	Thermal Resistance (Junction to Ambient)	0 lfpm	TSSOP-8	185	°C/W
		500 lfpm	TSSOP-8	140	°C/W
$\theta_{JC}$	Thermal Resistance (Junction to Case)	Standard Board	TSSOP-8	41 to 44 $\pm$ 5%	°C/W
$T_{sol}$	Wave Solder	<2 to 3 sec @ 248°C		265	°C

Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If stress limits are exceeded device functional operation is not implied, damage may occur and reliability may be affected. Functional operation should be restricted to the Recommended Operating Conditions.

## 10EL SERIES PECL DC CHARACTERISTICS $V_{CC}=5.0\text{ V}$ ; $V_{EE}=0.0\text{ V}$ (Note 1)

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$I_{EE}$	Power Supply Current		14	17		14	17		14	17	mA
$V_{OH}$	Output HIGH Voltage (Note 4)	3920	4010	4110	4020	4105	4190	4090	4185	4280	mV
$V_{OL}$	Output LOW Voltage (Note 2)	3050	3200	3350	3050	3210	3370	3050	3227	3405	mV
$V_{IH}$	Input HIGH Voltage	3770		4110	3870		4190	3940		4280	mV
$V_{IL}$	Input LOW Voltage	3050		3500	3050		3520	3050		3555	mV
$I_{IH}$	Input HIGH Current			150			150			150	μA
$I_{IL}$	Input LOW Current	0.5			0.5			0.3			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 +0.06 V / -0.5 V.
2. Outputs are terminated through a 50  $\Omega$  resistor to  $V_{CC} - 2$  volts.

## MC10EL12, MC100EL12

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

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$I_{EE}$	Power Supply Current		14	17		14	17		14	17	mA
$V_{OH}$	Output HIGH Voltage (Note 4)	-1080	-990	-890	-980	-895	-810	-910	-815	-720	mV
$V_{OL}$	Output LOW Voltage (Note 4)	-1950	-1800	-1650	-1950	-1790	-1630	-1950	-1773	-1595	mV
$V_{IH}$	Input HIGH Voltage	-1230		-890	-1130		-810	-1060		-720	mV
$V_{IL}$	Input LOW Voltage	-1950		-1500	-1950		-1480	-1950		-1445	mV
$I_{IH}$	Input HIGH Current			150			150			150	$\mu\text{A}$
$I_{IL}$	Input LOW Current	0.5			0.5			0.3			$\mu\text{A}$

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 lfm. 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 +0.06 V / -0.5 V.

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

### 100EL SERIES PECL DC CHARACTERISTICS $V_{CC}= 5.0\text{ V}$ ; $V_{EE}= 0.0\text{ V}$ (Note 5)

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$I_{EE}$	Power Supply Current		14	17		14	17		16	20	mA
$V_{OH}$	Output HIGH Voltage (Note 6)	3915	3995	4120	3975	4045	4120	3975	4050	4120	mV
$V_{OL}$	Output LOW Voltage (Note 6)	3170	3305	3445	3190	3295	3380	3190	3295	3380	mV
$V_{IH}$	Input HIGH Voltage	3835		4120	3835		4120	3835		4120	mV
$V_{IL}$	Input LOW Voltage	3190		3525	3190		3525	3190		3525	mV
$I_{IH}$	Input HIGH Current			150			150			150	$\mu\text{A}$
$I_{IL}$	Input LOW Current	0.5			0.5			0.5			$\mu\text{A}$

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 lfm. 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 +0.8 V / -0.5 V.

6. Outputs are terminated through a 50  $\Omega$  resistor to  $V_{CC} - 2$  volts.

### 100EL SERIES NECL DC CHARACTERISTICS $V_{CC}= 0.0\text{ V}$ ; $V_{EE}= -5.0\text{ V}$ (Note 7)

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$I_{EE}$	Power Supply Current		14	17		14	17		16	20	mA
$V_{OH}$	Output HIGH Voltage (Note 8)	-1085	-1005	-880	-1025	-955	-880	-1025	-955	-880	mV
$V_{OL}$	Output LOW Voltage (Note 8)	-1830	-1695	-1555	-1810	-1705	-1620	-1810	-1705	-1620	mV
$V_{IH}$	Input HIGH Voltage	-1165		-880	-1165		-880	-1165		-880	mV
$V_{IL}$	Input LOW Voltage	-1810		-1475	-1810		-1475	-1810		-1475	mV
$I_{IH}$	Input HIGH Current			150			150			150	$\mu\text{A}$
$I_{IL}$	Input LOW Current	0.5			0.5			0.5			$\mu\text{A}$

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 lfm. 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 +0.8 V / -0.5 V.

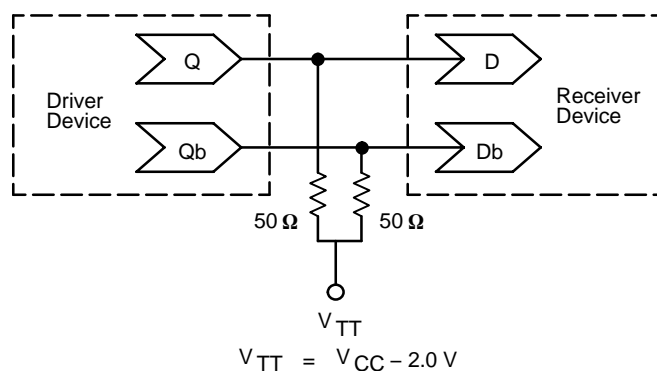
8. Outputs are terminated through a 50  $\Omega$  resistor to  $V_{CC} - 2$  volts.

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**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 9)

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$f_{\max}$	Maximum Toggle Frequency		TBD			TBD			TBD		GHz
$t_{PLH}$ $t_{PHL}$	Propagation Delay to Output	120	280	500	180	290	450	210	320	480	ps
$t_{JITTER}$	Cycle-to-Cycle Jitter		TBD			TBD			TBD		ps
$t_r$ $t_f$	Output Rise/Fall Times Q (20% – 80%)	150	350	550	150	350	550	150	350	550	ps

9. 10 Series:  $V_{EE}$  can vary +0.06 V / -0.5 V.  
100 Series:  $V_{EE}$  can vary +0.8 V / -0.5 V.



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

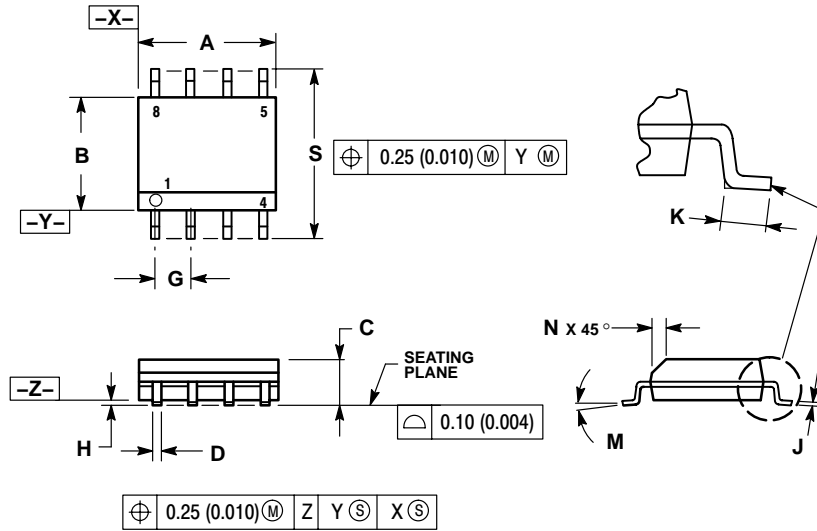
## Resource Reference of Application Notes

- 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
- AN1672** – The ECL Translator Guide
- AND8001** – Odd Number Counters Design
- AND8002** – Marking and Date Codes
- AND8020** – Termination of ECL Logic Devices
- AND8066** – Interfacing with ECLinPS
- AND8090** – AC Characteristics of ECL Devices

# MC10EL12, MC100EL12

## PACKAGE DIMENSIONS

### SOIC-8 D SUFFIX CASE 751-07 ISSUE AB

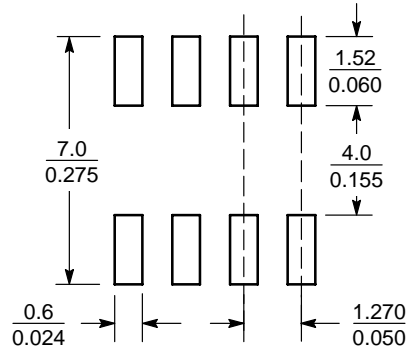


#### NOTES:

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

### SOLDERING FOOTPRINT\*



SCALE 6:1 (mm/inches)

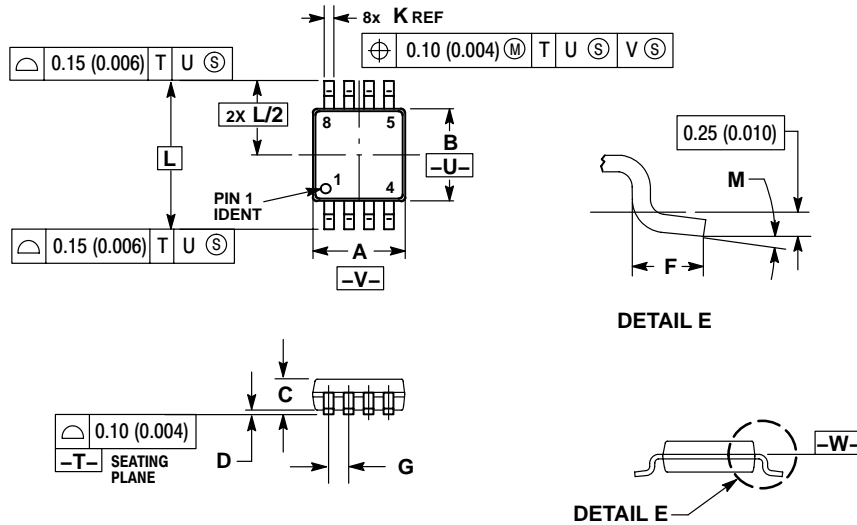
### SOIC-8

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

# MC10EL12, MC100EL12

## PACKAGE DIMENSIONS


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



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
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 -W-.

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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