

MC10EL01, MC100EL01

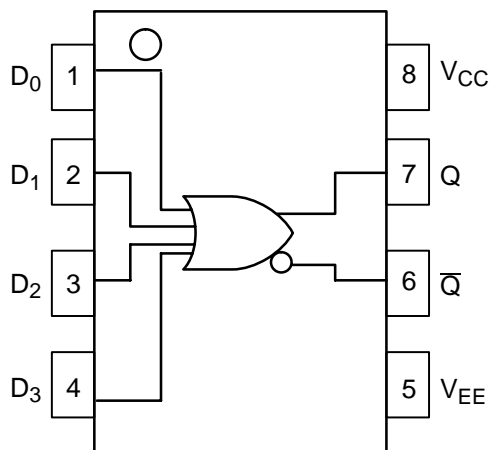
5V ECL 4-Input OR/NOR

The MC10EL/100EL01 is a 4-input OR/NOR gate. The device is functionally equivalent to the E101 device with higher performance capabilities. With propagation delays and output transition times significantly faster than the E101, the EL01 is ideally suited for those applications which require the ultimate in AC performance.

The 100 series contains temperature compensation.

- 230 ps Propagation Delay
- ESD Protection: > 1 KV HBM, > 100 V MM
- 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 $V_{EE}= -4.2\text{ V to } -5.7\text{ V}$
- 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 code V-0 @ 1/8", Oxygen Index 28 to 34
- Transistor Count = 46 devices

LOGIC DIAGRAM AND PINOUT ASSIGNMENT



PIN DESCRIPTION

| PIN | FUNCTION |
|--------------|------------------|
| D0–D3 | ECL Data Inputs |
| Q, \bar{Q} | ECL Data Outputs |
| V_{CC} | Positive Supply |
| V_{EE} | Negative Supply |



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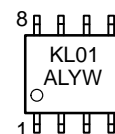
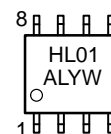
MARKING DIAGRAMS*



SO-8
D SUFFIX
CASE 751



TSSOP-8
DT SUFFIX
CASE 948R



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

*For additional information, see Application Note AND8002/D

ORDERING INFORMATION

| Device | Package | Shipping |
|---------------|---------|------------------|
| MC10EL01D | SO-8 | 98 Units/Rail |
| MC10EL01DR2 | SO-8 | 2500 Tape & Reel |
| MC100EL01D | SO-8 | 98 Units/Rail |
| MC100EL01DR2 | SO-8 | 2500 Tape & Reel |
| MC10EL01DT | TSSOP-8 | 98 Units/Rail |
| MC10EL01DTR2 | TSSOP-8 | 2500 Tape & Reel |
| MC100EL01DT | TSSOP-8 | 98 Units/Rail |
| MC100EL01DTR2 | TSSOP-8 | 2500 Tape & Reel |

MC10EL01, MC100EL01

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 ≤ V _{CC} V _I ≥ V _{EE} | 6 -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 |
| θ _{JA} | Thermal Resistance (Junction to Ambient) | 0 LFPM 500 LFPM | 8 SOIC 8 SOIC | 190 130 | °C/W °C/W |
| θ _{JC} | Thermal Resistance (Junction to Case) | std bd | 8 SOIC | 41 to 44 | °C/W |
| θ _{JA} | Thermal Resistance (Junction to Ambient) | 0 LFPM 500 LFPM | 8 TSSOP 8 TSSOP | 185 140 | °C/W °C/W |
| θ _{JC} | Thermal Resistance (Junction to Case) | std bd | 8 TSSOP | 41 to 44 ± 5% | °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.

10EL SERIES PECL DC CHARACTERISTICS V_{CC}= 5.0 V; V_{EE}= 0.0 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 2.) | 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: 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.

1. Input and output parameters vary 1:1 with V_{CC}. V_{EE} can vary +0.25 V / -0.5 V.
2. Outputs are terminated through a 50 ohm resistor to V_{CC}-2 volts.

10EL SERIES NECL DC CHARACTERISTICS V_{CC}= 0.0 V; V_{EE}= -5.0 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 2.) | -1080 | -990 | -890 | -980 | -895 | -810 | -910 | -815 | -720 | mV |
| V _{OL} | Output LOW Voltage (Note 2.) | -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 | 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.

1. Input and output parameters vary 1:1 with V_{CC}. V_{EE} can vary +0.25 V / -0.5 V.
2. Outputs are terminated through a 50 ohm resistor to V_{CC}-2 volts.

MC10EL01, MC100EL01

100EL 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 | | 16 | 20 | mA |
| V_{OH} | Output HIGH Voltage (Note 2.) | 3915 | 3995 | 4120 | 3975 | 4045 | 4120 | 3975 | 4050 | 4120 | mV |
| V_{OL} | Output LOW Voltage (Note 2.) | 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 | 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 lfpm is maintained.

1. Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary +0.8 V / -0.5 V.
2. Outputs are terminated through a 50 ohm resistor to $V_{CC}-2$ volts.

100EL SERIES NECL DC CHARACTERISTICS $V_{CC}=0.0\text{ V}; V_{EE}=-5.0\text{ V}$ (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 | | 16 | 20 | mA |
| V_{OH} | Output HIGH Voltage (Note 2.) | -1085 | -1005 | -880 | -1025 | -955 | -880 | -1025 | -955 | -880 | mV |
| V_{OL} | Output LOW Voltage (Note 2.) | -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 | 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 lfpm is maintained.

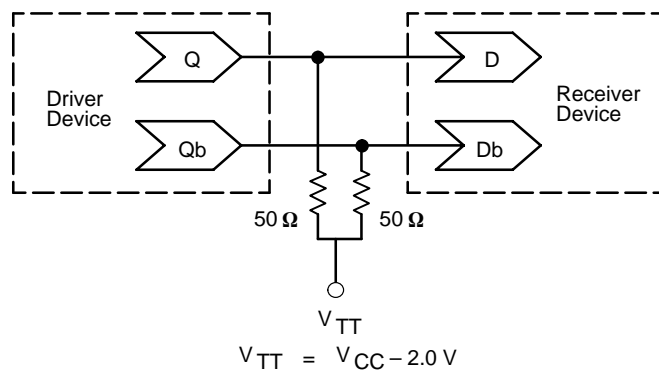
1. Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary +0.8 V / -0.5 V.
2. Outputs are terminated through a 50 ohm resistor to $V_{CC}-2$ volts.

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 1.)

| 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 | 70 | 220 | 370 | 130 | 230 | 330 | 150 | 250 | 350 | ps |
| t_{JITTER} | Cycle-to-Cycle Jitter | | TBD | | | TBD | | | TBD | | ps |
| t_r t_f | Output Rise/Fall Times Q (20% – 80%) | 100 | 225 | 350 | 100 | 225 | 350 | 100 | 225 | 350 | ps |

1. 10 Series: V_{EE} can vary +0.25 V / -0.5 V.
100 Series: V_{EE} can vary +0.8 V / -0.5 V.

MC10EL01, MC100EL01



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

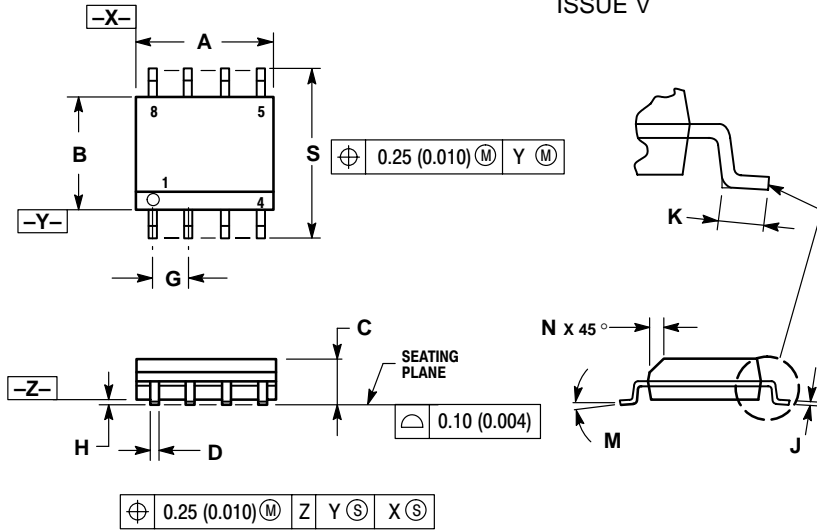
Resource Reference of Application Notes

- 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
- 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

MC10EL01, MC100EL01

PACKAGE DIMENSIONS

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



NOTES:

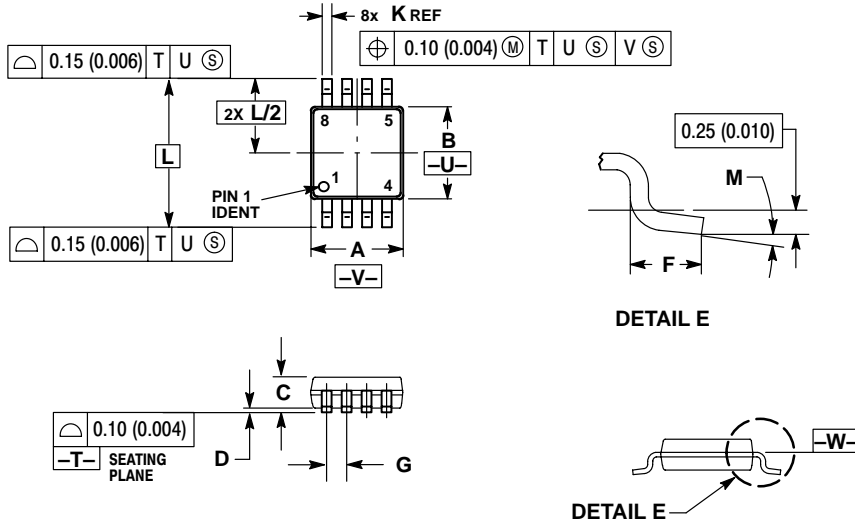
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL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

| 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 |

MC10EL01, MC100EL01

PACKAGE DIMENSIONS

TSSOP-8
DT SUFFIX
PLASTIC TSSOP PACKAGE
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° |

Notes

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