

## 4:1 Differential Multiplexer

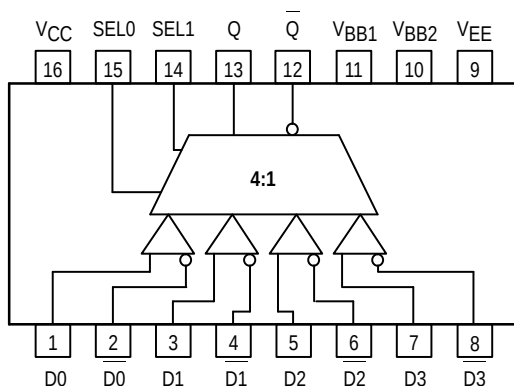
The MC10/100EL57 is a fully differential 4:1 multiplexer. By leaving the SEL1 line open (pulled LOW via the input pulldown resistors) the device can also be used as a differential 2:1 multiplexer with SEL0 input selecting between D0 and D1. The fully differential architecture of the EL57 makes it ideal for use in low skew applications such as clock distribution.

The SEL1 is the most significant select line. The binary number applied to the select inputs will select the same numbered data input (i.e., 00 selects D0).

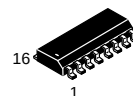
Multiple  $V_{BB}$  outputs are provided for single-ended or AC coupled interfaces. In these scenarios, the  $V_{BB}$  output should be connected to the data bar inputs and bypassed via a  $0.01\mu\text{F}$  capacitor to ground. Note that the  $V_{BB}$  output can source/sink up to 0.5mA of current without upsetting the voltage level.

- Useful as Either 4:1 or 2:1 Multiplexer
- $V_{BB}$  Output for Single-Ended Operation
- $75\text{k}\Omega$  Internal Input Pulldown Resistors
- $>1000\text{V}$  ESD Protection

### LOGIC DIAGRAM AND PINOUT ASSIGNMENT



## MC10EL57 MC100EL57



**D SUFFIX**  
PLASTIC SOIC PACKAGE  
CASE 751B-05

### PIN DESCRIPTION

| PIN                              | FUNCTION                                                                  |
|----------------------------------|---------------------------------------------------------------------------|
| D0–3<br>SEL0,1<br>$V_{BB}$<br>Q0 | Diff Data Inputs<br>Mux Select Inputs<br>Reference Output<br>Data Outputs |

### FUNCTION TABLE

| SEL1 | SEL0 | DATA OUT |
|------|------|----------|
| L    | L    | D0       |
| L    | H    | D1       |
| H    | L    | D2       |
| H    | H    | D3       |

### ABSOLUTE MAXIMUM RATINGS<sup>1</sup>

| Symbol    | Characteristic                          | Rating       | Unit |
|-----------|-----------------------------------------|--------------|------|
| $V_{EE}$  | Power Supply ( $V_{CC} = 0\text{V}$ )   | –8.0 to 0    | VDC  |
| $V_I$     | Input Voltage ( $V_{CC} = 0\text{V}$ )  | 0 to –6.0    | VDC  |
| $I_{out}$ | Output Current      Continuous<br>Surge | 50<br>100    | mA   |
| $T_A$     | Operating Temperature Range             | –40 to +85   | °C   |
| $V_{EE}$  | Operating Range <sup>1,2</sup>          | –5.7 to –4.2 | V    |

1. Absolute maximum rating, beyond which, device life may be impaired, unless otherwise specified on an individual data sheet.

2. Parametric values specified at:  
10EL Series:      –4.94V to –5.50V  
100EL Series:     –4.20V to –5.50V



# MC10EL57 MC100EL57

## 10EL SERIES

**DC CHARACTERISTICS** ( $V_{EE} = V_{EE(min)} - V_{EE(max)}$ ;  $V_{CC} = GND^1$ )

| Symbol   | Characteristic      | -40°C |       | 0°C   |       | 25°C  |       | 85°C  |       | Unit |
|----------|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|------|
|          |                     | Min   | Max   | Min   | Max   | Min   | Max   | Min   | Max   |      |
| $V_{OH}$ | Output HIGH Voltage | -1080 | -890  | -1020 | -840  | -980  | -810  | -910  | -720  | mV   |
| $V_{OL}$ | Output LOW Voltage  | -1950 | -1650 | -1950 | -1630 | -1950 | -1630 | -1950 | -1595 | mV   |
| $V_{IH}$ | Input HIGH Voltage  | -1230 | -890  | -1170 | -840  | -1130 | -810  | -1060 | -720  | mV   |
| $V_{IL}$ | Input LOW Voltage   | -1950 | -1500 | -1950 | -1480 | -1950 | -1480 | -1950 | -1445 | mV   |
| $I_{IL}$ | Input LOW Current   | 0.5   | —     | 0.5   | —     | 0.5   | —     | 0.3   | —     | μA   |

1. 10EL circuits are designed to meet the DC specifications shown in the table after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse airflow greater than 500fpm is maintained. Outputs are terminated through a 50Ω resistor to -2.0V except where otherwise specified on the individual data sheets.

## 100EL SERIES

**DC CHARACTERISTICS** ( $V_{EE} = V_{EE(min)} - V_{EE(max)}$ ;  $V_{CC} = GND^1$ )

| Symbol    | Characteristic      | -40°C |       |       | 0°C to 85°C |       |       | Unit | Condition                                  |
|-----------|---------------------|-------|-------|-------|-------------|-------|-------|------|--------------------------------------------|
|           |                     | Min   | Typ   | Max   | Min         | Typ   | Max   |      |                                            |
| $V_{OH}$  | Output HIGH Voltage | -1085 | -1005 | -880  | -1025       | -955  | -880  | mV   | $V_{IN} = V_{IH(max)}$<br>or $V_{IL(min)}$ |
| $V_{OL}$  | Output LOW Voltage  | -1830 | -1695 | -1555 | -1810       | -1705 | -1620 | mV   |                                            |
| $V_{OHA}$ | Output HIGH Voltage | -1095 | —     | —     | -1035       | —     | —     | mV   | $V_{IN} = V_{IH(max)}$<br>or $V_{IL(min)}$ |
| $V_{OLA}$ | Output LOW Voltage  | —     | —     | -1555 | —           | —     | -1610 | mV   |                                            |
| $V_{IH}$  | Input HIGH Voltage  | -1165 | —     | -880  | -1165       | —     | -880  | mV   |                                            |
| $V_{IL}$  | Input LOW Voltage   | -1810 | —     | -1475 | -1810       | —     | -1475 | mV   |                                            |
| $I_{IL}$  | Input LOW Current   | 0.5   | —     | —     | 0.5         | —     | —     | μA   | $V_{IN} = V_{IL(max)}$                     |

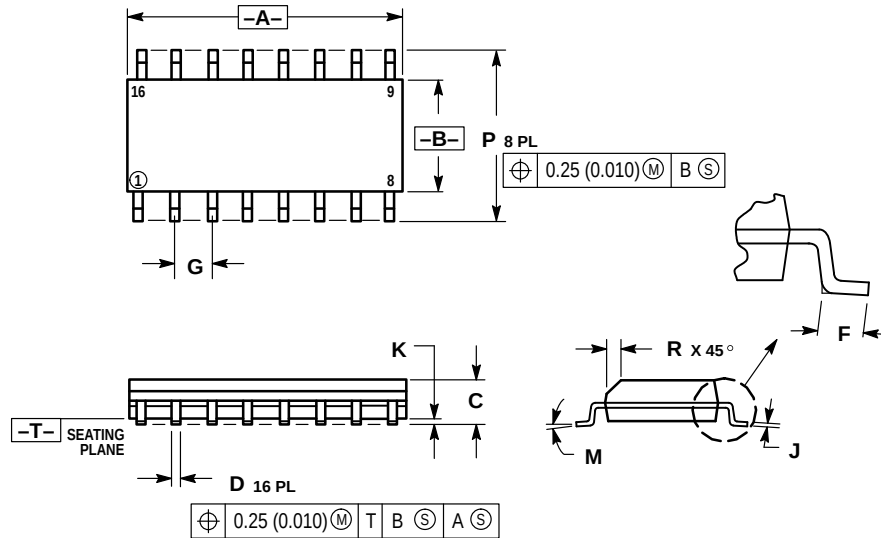
1. This table replaces the three tables traditionally seen in ECL 100K data books. The same DC parameter values at  $V_{EE} = -4.5V$  now apply across the full  $V_{EE}$  range of -4.2V to -5.5V. Outputs are terminated through a 50Ω resistor to -2.0V except where otherwise specified on the individual data sheets.

**AC/DC CHARACTERISTICS** ( $V_{EE} = V_{EE(min)}$  to  $V_{EE(max)}$ ;  $V_{CC} = GND$ )

| Symbol     | Characteristic             | -40°C |     |       | 0°C   |     |       | 25°C  |     |       | 85°C  |     |       | Unit |
|------------|----------------------------|-------|-----|-------|-------|-----|-------|-------|-----|-------|-------|-----|-------|------|
|            |                            | Min   | Typ | Max   | Min   | Typ | Max   | Min   | Typ | Max   | Min   | Typ | Max   |      |
| $I_{EE}$   | Power Supply Current       |       |     | 24    |       |     | 24    |       |     | 24    |       |     | 24    | mA   |
|            |                            |       |     | 24    |       |     | 24    |       |     | 24    |       |     | 27    |      |
| $V_{BB}$   | Output Reference Voltage   | -1.43 |     | -1.30 | -1.38 |     | -1.27 | -1.35 |     | -1.25 | -1.31 |     | -1.19 | V    |
|            |                            | -1.38 |     | -1.26 | -1.38 |     | -1.26 | -1.38 |     | -1.26 | -1.38 |     | -1.26 |      |
| $I_{IH}$   | Input High Current         |       |     | 150   |       |     | 150   |       |     | 150   |       |     | 150   | μA   |
| $t_{PLH}$  | Propagation Delay DATA→Q/Q | 350   |     | 550   | 350   |     | 550   | 360   |     | 560   | 380   |     | 580   | ps   |
| $t_{PHL}$  | Delay SEL→Q/Q              | 440   |     | 690   | 440   |     | 690   | 440   |     | 690   | 460   |     | 710   |      |
| $t_{SKEW}$ | Input Skew $D_n, D_m$ to Q |       |     | 100   |       |     | 100   |       |     | 100   |       |     | 100   | ps   |
| $V_{PP}$   | Minimum Input Swing CLK    | 250   |     |       | 250   |     |       | 250   |     |       | 250   |     |       | mV   |
| $V_{CMR}$  | Common Mode Range CLK      | -2.0  |     | -0.4  | -2.0  |     | -0.4  | -2.0  |     | -0.4  | -2.0  |     | -0.4  | V    |
| $t_r$      | Output Rise/Fall Times Q   | 125   |     | 375   | 125   |     | 375   | 125   |     | 375   | 125   |     | 375   | ps   |
| $t_f$      | (20% – 80%)                |       |     |       |       |     |       |       |     |       |       |     |       |      |

## OUTLINE DIMENSIONS

**D SUFFIX**  
**PLASTIC SOIC PACKAGE**  
**CASE 751B-05**  
**ISSUE J**



## NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS 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   | 9.80        | 10.00 | 0.386     | 0.393 |
| B   | 3.80        | 4.00  | 0.150     | 0.157 |
| C   | 1.35        | 1.75  | 0.054     | 0.068 |
| D   | 0.35        | 0.49  | 0.014     | 0.019 |
| E   | 0.40        | 1.25  | 0.016     | 0.049 |
| F   | 1.27 BSC    |       | 0.050 BSC |       |
| G   | 0.19        | 0.25  | 0.008     | 0.009 |
| H   | 0.10        | 0.25  | 0.004     | 0.009 |
| I   | 0°          | 7°    | 0°        | 7°    |
| J   | 5.80        | 6.20  | 0.229     | 0.244 |
| K   | 0.25        | 0.50  | 0.010     | 0.019 |

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