# 4:1 DIFFERENTIAL MULTIPLEXER

**SY10EL57**
**SY100EL57**

## FEATURES

- **5V power supply**
- **Useful as either 4:1 or 2:1 multiplexer**
- **VBB output for single-ended operation**
- **75KΩ internal input pulldown resistors**
- **Available in 150 mil 16-pin SOIC package**

## DESCRIPTION

The SY10/100EL57 are fully differential 4:1 multiplexers. 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 VBB outputs are provided for single-ended or AC coupled interfaces. In these scenarios, the VBB output should be connected to the data bar inputs and bypassed via a 0.01µF capacitor to ground. Note that the VBB output can source/sink up to 0.5mA of current without upsetting the voltage level.

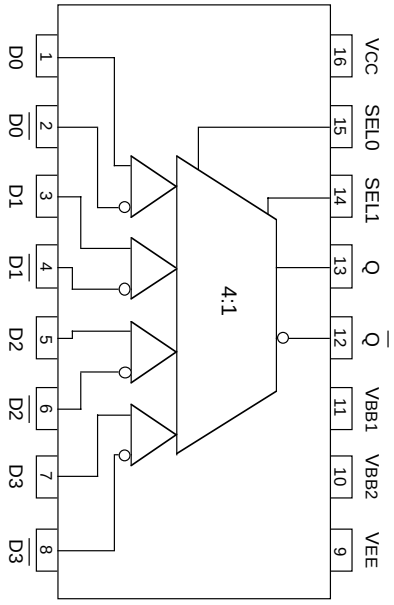
## TRUTH TABLE

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

## PIN NAMES

| Pin | Function |
|---|---|
| D0-3 | Differential Data Inputs |
| SEL0, 1 | Mux Select Inputs |
| VBB1, 2 | Reference Outputs |
| Q | Data Outputs |

## PACKAGE/ORDERING INFORMATION




**16-Pin SOIC (Z16-1)**

### Ordering Information[1]

| Part Number | Package Type | Operating Range | Package Marking | Lead Finish |
|---|---|---|---|---|
| SY10EL57ZC | Z16-2 | Commercial | SY10EL57ZC | Sn-Pb |
| SY10EL57ZCTR[2] | Z16-2 | Commercial | SY10EL57ZC | Sn-Pb |
| SY100EL57ZC | Z16-2 | Commercial | SY100EL57ZC | Sn-Pb |
| SY100EL57ZCTR[2] | Z16-2 | Commercial | SY100EL57ZC | Sn-Pb |
| SY10EL57ZI | Z16-2 | Industrial | SY10EL57ZI | Sn-Pb |
| SY10EL57ZITR[2] | Z16-2 | Industrial | SY10EL57ZI | Sn-Pb |
| SY100EL57ZI | Z16-2 | Industrial | SY100EL57ZI | Sn-Pb |
| SY100EL57ZITR[2] | Z16-2 | Industrial | SY100EL57ZI | Sn-Pb |
| SY10EL57ZG[3] | Z16-2 | Industrial | SY10EL57ZG with Pb-Free bar-line indicator | Pb-Free NiPdAu |
| SY10EL57ZGTR[2, 3] | Z16-2 | Industrial | SY10EL57ZG with Pb-Free bar-line indicator | Pb-Free NiPdAu |
| SY100EL57ZG[3] | Z16-2 | Industrial | SY100EL57ZG with Pb-Free bar-line indicator | Pb-Free NiPdAu |
| SY100EL57ZGTR[2, 3] | Z16-2 | Industrial | SY100EL57ZG with Pb-Free bar-line indicator | Pb-Free NiPdAu |

**Notes:**

1. Contact factory for die availability. Dice are guaranteed at $T_A$ = 25°C, DC Electricals only.
2. Tape and Reel.
3. Pb-Free package is recommended for new designs.

## ABSOLUTE MAXIMUM RATINGS[1]

| Symbol | Rating | Value | Unit |
|---|---|---|---|
| $V_{EE}$ | Power Supply ($V_{CC}$ = 0V) | –8.0 to 0 | V |
| $V_{IN}$ | Input Voltage ($V_{CC}$ = 0V) | 0 to -6.0 | V |
| $I_{OUT}$ | Output Current<br>- Continuous<br>- Surge | <br>50<br>100 | mA |
| $T_{LEAD}$ | Lead Storage Temperature | +260 | ˚C |
| $T_A$ | Operating Temperature Range | -40 to +85 | ˚C |
| $V_{EE}$ | Operating Range[1, 2] | -5.7 to -4.2 | V |

**Notes:**

1. Absolute maximum ratings, beyond which, device life may be impaired, unless otherwise specified on an individual data sheet.
2. Parametric values specified at: 5 volt Power Supply Range 100EL57 Series: -4.2V to -5.5V.
   10EL57 Series -4.75V to -5.5V.

## 10EL DC CHARACTERISTICS

$V_{EE}$ = -5.5 to -4.75V; $V_{CC}$ = GND = 0V[1]

| | | $T_A$ = -40˚C | | $T_A$ = 0˚C | | $T_A$ = +25˚C | | $T_A$ = +85˚C | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Symbol | Parameter | Min. | Max. | Min. | Max. | MIn. | Max. | Min. | Max. | Unit |
| $V_{OH}$ | 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 | — | 0.5 | — | µA |

**Note:**

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 500lfpm is maintained. Outputs are terminated through a 50Ω resistor to -2.0V except where otherwise specified on the individual data sheets.

## 100EL DC CHARACTERISTICS

$V_{EE}$ = -5.5 to -4.75V; $V_{CC}$ = GND = 0V[1]

| | | $T_A$ =-40˚C | | | $T_A$ =0˚C to 85C | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Symbol | Parameter | Min. | Typ. | Max. | Min. | Typ. | Max. | Unit | Condition |
| $V_{OH}$ | Output HIGH Voltage | -1085 | -1005 | -880 | -1025 | -955 | -880 | mV | $V_{IN}$ = $V_{IH}$ (Max) or $V_{IL}$ (Min) |
| $V_{OL}$ | Output LOW Voltage | -1830 | -1695 | -1555 | -1810 | -1705 | -1620 | mV | $V_{IN}$ = $V_{IH}$ (Max) or $V_{IL}$ (Min) |
| $V_{OHA}$ | Output HIGH Voltage | -1095 | — | — | -1035 | — | — | mV | $V_{IN}$ = $V_{IH}$ (Min) or $V_{IL}$ (Max) |
| $V_{OLA}$ | Output LOW Voltage | — | — | -1555 | — | — | -1610 | mV | $V_{IN}$ = $V_{IH}$ (Min) or $V_{IL}$ (Max) |
| $V_{IH}$ | 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) |

**Note:**

1. 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.

## DC ELECTRICAL CHARACTERISTICS

$V_{EE}$ = -5.5 to -4.2V; $V_{CC}$ = GND = 0V

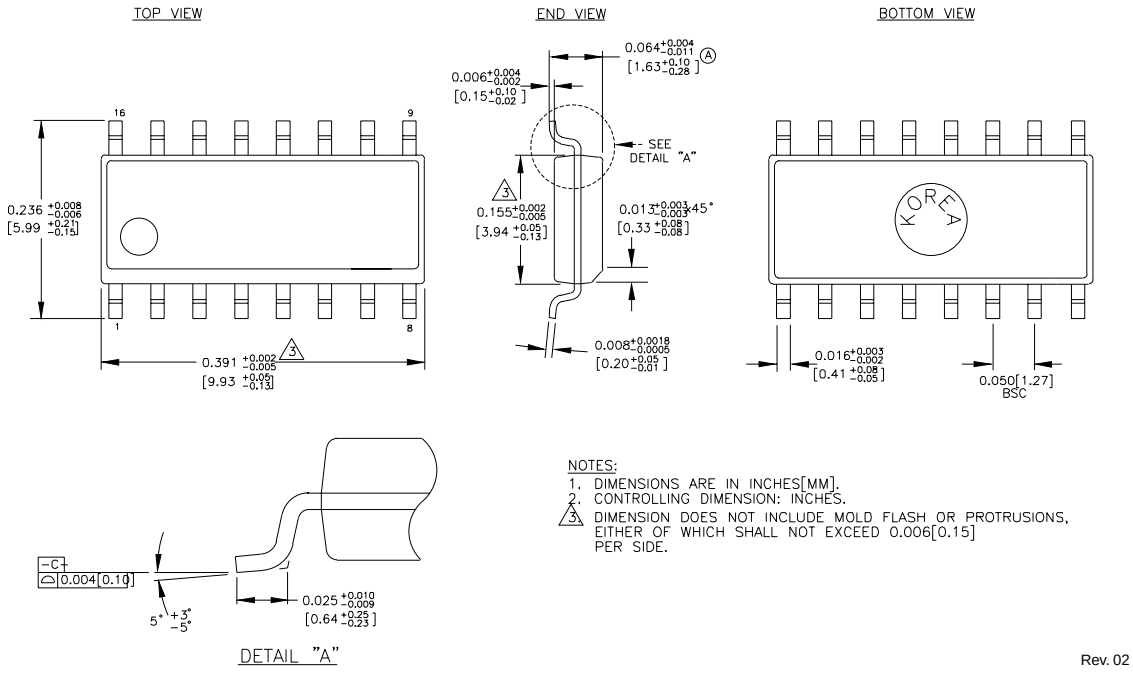
| Symbol | Parameter | | $T_A$ = -40°C | | | $T_A$ = 0°C | | | $T_A$ = +25°C | | | $T_A$ = +85°C | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | |
| $I_{EE}$ | Power Supply Current | 10EL | — | 15 | 24 | — | 15 | 24 | — | 15 | 24 | — | 15 | 24 | mA |
| | | 100EL | — | 15 | 24 | — | 15 | 24 | — | 15 | 24 | — | 15 | 27 | |
| $V_{BB}$ | Output Reference Voltage | 10EL | -1.43 | — | -1.30 | -1.38 | — | -1.27 | -1.35 | — | -1.25 | -1.31 | — | -1.19 | V |
| | | 100EL | -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 |

## AC ELECTRICAL CHARACTERISTICS

$V_{EE}$ = -5.5 to -4.2V; $V_{CC}$ = GND = 0V

| Symbol | Parameter | $T_A$ = -40°C | | | $T_A$ = 0°C | | | $T_A$ = +25°C | | | $T_A$ = +85°C | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | |
| $t_{PD}$ | Propagation Delay | | | | | | | | | | | | | ps |
| | DATA to Q/$\overline{Q}$ | 350 | — | 550 | 350 | — | 550 | 360 | — | 560 | 380 | — | 580 | |
| | SEL to Q/$\overline{Q}$ | 440 | — | 690 | 440 | — | 690 | 440 | — | 690 | 460 | — | 710 | |
| $t_{skew}$ | Input Skew DATA to Q | — | — | 50 | — | — | 50 | — | — | 50 | — | — | 50 | ps |
| $V_{PP}$ | Minmum Input Swing | | | | | | | | | | | | | mV |
| | DATA | 150 | — | — | 150 | — | — | 150 | — | — | 150 | — | — | |
| $V_{CMR}$ | Common Mode Range | | | | | | | | | | | | | V |
| | DATA | -2.0 | — | -0.4 | -2.0 | — | -0.4 | -2.0 | — | -0.4 | -2.0 | — | -0.4 | |
| tr<br>tf | Output Rise/Fall Times Q (20% - 80%) | 125 | — | 375 | 125 | — | 375 | 125 | — | 375 | 125 | — | 375 | ps |

## 16-PIN SOIC .150" WIDE (Z16-2)




Rev. 02

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