



5V/3.3V DUAL DIFFERENTIAL 2:1 MULTIPLEXER

SY100EL56V

FEATURES

- 3.3V and 5V power supply options
- 440ps propagation delay
- Separate and common select
- High bandwidth output transitions
- Internal 75KΩ input pull-down resistors
- Available in 20-pin SOIC package

DESCRIPTION

The SY100EL56V is a dual, fully differential 2:1 multiplexer. The differential data path makes the device ideal for multiplexing low skew clock or other skew sensitive signals. Multiple V_{BB} pins are provided to ease AC coupling input signals.

The device features both individual and common select inputs to address both data path and random logic applications.

The differential inputs have special circuitry which ensures device stability under open input conditions. When both differential inputs are left open the D input will pull down to V_{EE} , the /D input will bias around $V_{CC}/2$ forcing the Q output LOW.

PIN NAMES

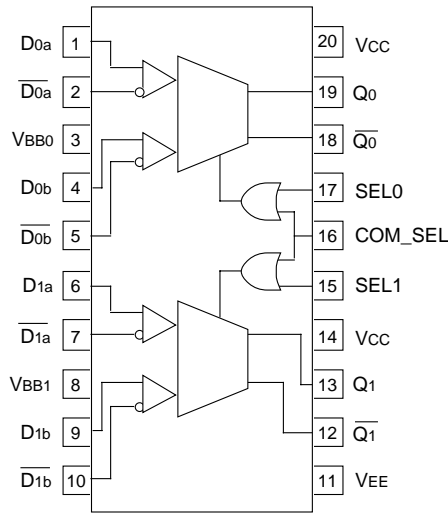
| Pin | Function |
|-----------|-------------------------|
| D0a–D1a | Input Data a |
| D0b–D1b | Input Data b |
| SEL0–SEL1 | Individual Select Input |
| COM_SEL | Common Select Input |
| Q0–Q1 | True Outputs |
| /Q0–/Q1 | Inverted Outputs |

TRUTH TABLE

| SEL | Data |
|-----|------|
| H | a |
| L | b |

PACKAGE/ORDERING INFORMATION

Ordering Information⁽¹⁾



20-Pin Wide SOIC (Z20-1)

| Part Number | Package Type | Operating Range | Package Marking | Lead Finish |
|----------------------------------|--------------|-----------------|--|----------------|
| SY100EL56VZC | Z20-1 | Commercial | SY100EL56VZC | Sn-Pb |
| SY100EL56VZCTR ⁽²⁾ | Z20-1 | Commercial | SY100EL56VZC | Sn-Pb |
| SY100EL56VZI | Z20-1 | Industrial | SY100EL56VZI | Sn-Pb |
| SY100EL56VZITR ⁽²⁾ | Z20-1 | Industrial | SY100EL56VZI | Sn-Pb |
| SY100EL56VZG ⁽³⁾ | Z20-1 | Industrial | SY100EL56VZG with Pb-Free bar-line indicator | Pb-Free NiPdAu |
| SY100EL56VZGTR ^(2, 3) | Z20-1 | Industrial | SY100EL56VZG 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.

PRODUCT/PROCESS INFORMATION

| | |
|-------------|---|
| Process: | Bipolar |
| ESD Rating: | Per Mil Std. 883 Human Body Model, >1.5kV (all pins). |

ABSOLUTE MAXIMUM RATINGS⁽¹⁾

| Symbol | Rating | Value | Unit |
|--------------------|--|------------------------|--------------|
| V _{CC} | Power Supply Voltage (V _{EE} = 0) | +6.0 to 0 | V |
| V _{EE} | Power Supply Voltage (V _{CC} = 0) | -6.0 to 0 | V |
| V _{IN} | Input Voltage (V _{CC} = 0V, V _{IN} not more negative than V _{EE}) Input Voltage (V _{EE} = 0V, V _{IN} not more positive than V _{CC}) | -6.0 to 0 +6.0 to 0 | V V |
| I _{OUT} | Output Current -Continuous -Surge | 50 100 | mA |
| T _{LEAD} | Lead Temperature (soldering, 20sec.) | +260 | °C |
| T _A | Operating Temperature Range | -40 to +85 | °C |
| T _{store} | Storage Temperature Range | -65 to +150 | °C |
| θ _{JA} | Thermal Resistance (Junction-to-Ambient) -Still Air -500lfpm | 160 109 | °C/W °C/W |
| θ _{JC} | Thermal Resistance (Junction-to-Case) | 39 | °C/W |
| ESD | Mil Std. 883 Human Body Model, All Pins | >1.5k | V |

Note 1. Permanent device damage may occur if absolute maximum ratings are exceeded. This is a stress rating only and functional operation is not implied at conditions other than those detailed in the operational sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

DC ELECTRICAL CHARACTERISTICS⁽¹⁾

V_{EE} = V_{EE} (Min) to V_{EE} (Max); V_{CC} = GND

| 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 | — | 20 | 24 | — | 20 | 24 | — | 20 | 24 | — | 20 | 24 | mA | |
| V _{BB} | Output Reference Voltage | -1.38 | — | -1.26 | -1.38 | — | -1.26 | -1.38 | — | -1.26 | -1.38 | — | -1.26 | V | |
| I _{IH} | Input HIGH Current | — | — | 150 | — | — | 150 | — | — | 150 | — | — | 150 | μA | |
| I _{IL} | Input LOW Current | D _n | 0.5 | — | — | 0.5 | — | — | 0.5 | — | — | 0.5 | — | — | μA |
| | | \overline{D}_n | -600 | — | — | -600 | — | — | -600 | — | — | -600 | — | — | |
| V _{PP(DC)} | Input Sensitivity ⁽²⁾ | 50 | — | — | 50 | — | — | 50 | — | — | 50 | — | — | mV | |

Note 1. Parametric values specified at: 100EL56V Series: (-3.0V to -3.8V) or (-4.2V to -5.5V).

Note 2. Differential input voltage required to obtain a full ECL swing on the outputs.

AC ELECTRICAL CHARACTERISTICS

$V_{EE} = V_{EE} (\text{Min})$ to $V_{EE} (\text{Max})$; $V_{CC} = \text{GND}$

| Symbol | Parameter | $T_A = -40^\circ\text{C}$ | | | $T_A = 0^\circ\text{C}$ | | | $T_A = +25^\circ\text{C}$ | | | $T_A = +85^\circ\text{C}$ | | | Unit |
|----------------------------------|--|---------------------------|------|------|-------------------------|------|------|---------------------------|------|------|---------------------------|------|------|------|
| | | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | |
| t _{PD} | Propagation D (Diff) | 340 | — | 540 | 350 | — | 550 | 360 | — | 560 | 380 | — | 580 | ps |
| | Delay D (SE) | 290 | — | 590 | 300 | — | 600 | 310 | — | 610 | 330 | — | 630 | |
| | to Output SEL | 430 | — | 730 | 440 | — | 740 | 440 | — | 740 | 450 | — | 750 | |
| | COM_SEL | 430 | — | 730 | 440 | — | 740 | 440 | — | 740 | 450 | — | 750 | |
| t _{SKEW} | Within Device Skew ⁽¹⁾ | — | 40 | 80 | — | 40 | 80 | — | 40 | 80 | — | 40 | 80 | ps |
| | Duty Cycle Skew ⁽²⁾ | — | — | 100 | — | — | 100 | — | — | 100 | — | — | 100 | ps |
| V _{PP(AC)} | Minimum Input Swing ⁽³⁾ | 150 | — | 1000 | 150 | — | 1000 | 150 | — | 1000 | 150 | — | 1000 | mV |
| V _{CMR} | Common Mode Range | | | | | | | | | | | | | V |
| | $V_{EE} = -3.0\text{V}$ to -3.8V ⁽⁴⁾ | | | | | | | | | | | | | |
| | $V_{PP} < 500\text{mV}$ | -2.0 | — | -0.4 | -2.1 | — | -0.4 | -2.1 | — | -0.4 | -2.1 | — | -0.4 | |
| | $V_{PP} \geq 500\text{mV}$ | -1.8 | — | -0.4 | -1.9 | — | -0.4 | -1.9 | — | -0.4 | -1.9 | — | -0.4 | |
| | $V_{EE} = -4.2\text{V}$ to -5.5V ⁽⁵⁾ | | | | | | | | | | | | | |
| $V_{PP} < 500\text{mV}$ | -3.2 | — | -0.4 | -3.3 | — | -0.4 | -3.3 | — | -0.4 | -3.3 | — | -0.4 | | |
| $V_{PP} \geq 500\text{mV}$ | -3.0 | — | -0.4 | -3.1 | — | -0.4 | -3.1 | — | -0.4 | -3.1 | — | -0.4 | | |
| t _r t _f | Output Rise/Fall Times Q (20% –80%) | 200 | — | 540 | 200 | — | 540 | 200 | — | 540 | 200 | — | 540 | ps |

Note 1. Within device skew is defined as identical transitions on similar paths through a device.

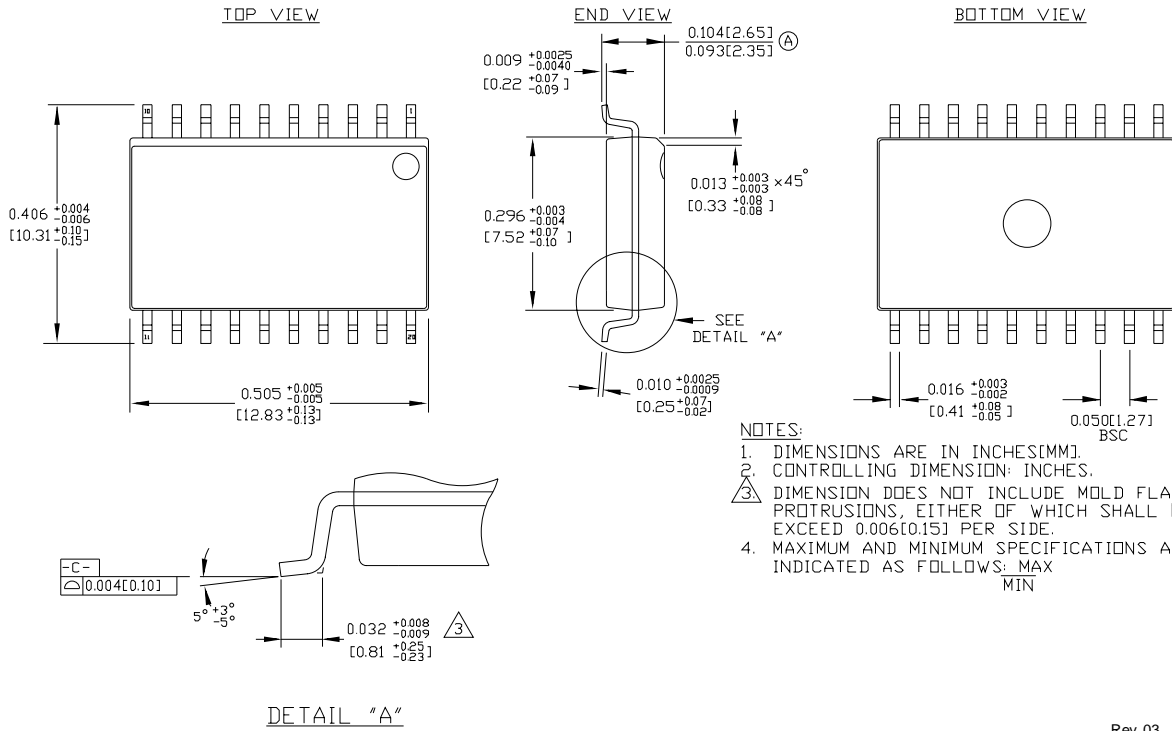
Note 2. Duty cycle skew is defined only for differential operation when the delays are measured from the cross point of the inputs to the cross point of the outputs.

Note 3. Minimum input swing for which AC parameters are guaranteed.

Note 4. The CMR 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 $V_{PP}(\text{min})$ and 1V. The lower end of the CMR range varies 1:1 with V_{EE} . The numbers in the spec table assume a nominal $V_{EE} = -3.3\text{V}$. Note for PECL operation, the $V_{CMR}(\text{min})$ will be fixed at $3.3\text{V} - |V_{CMR}(\text{min})|$.

Note 5. The CMR 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 $V_{PP}(\text{min})$ and 1V. The lower end of the CMR range varies 1:1 with V_{EE} . The numbers in the spec table assume a nominal $V_{EE} = -4.5\text{V}$. Note for PECL operation, the $V_{CMR}(\text{min})$ will be fixed at $5.0\text{V} - |V_{CMR}(\text{min})|$.

20-PIN SOIC .300" WIDE (Z20-1)



Rev. 03

Package Notes:

Note 1. Package meets Level 1 moisture sensitivity.

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