

HIGH-PERFORMANCE PRODUCTS

Description

The SK10/100E116 is a quint differential line receiver designed for use in new, high-performance ECL systems.

The receiver design features clamp circuitry to cause a defined output state if both the inverting and non-inverting inputs are left open; in this case the Q output goes low, while the Q* output goes high. This feature makes the device ideal for twisted pair applications.

If both inverting and non-inverting inputs are at an equal potential of $>-2.9V$, the receiver does *not* go to a defined state, but rather shares current in normal differential amplifier fashion, producing output voltage levels midway between high and low. This may even cause the device to oscillate.

The SK10/100E116 provides VBB output for either single-ended use or as a DC bias for AC coupling to the device. The VBB output pin should be used only as a DC bias for the E116 as its current sink/source capability is limited. Whenever used, the VBB pin should be bypassed to VCC via a 0.01 μF capacitor.

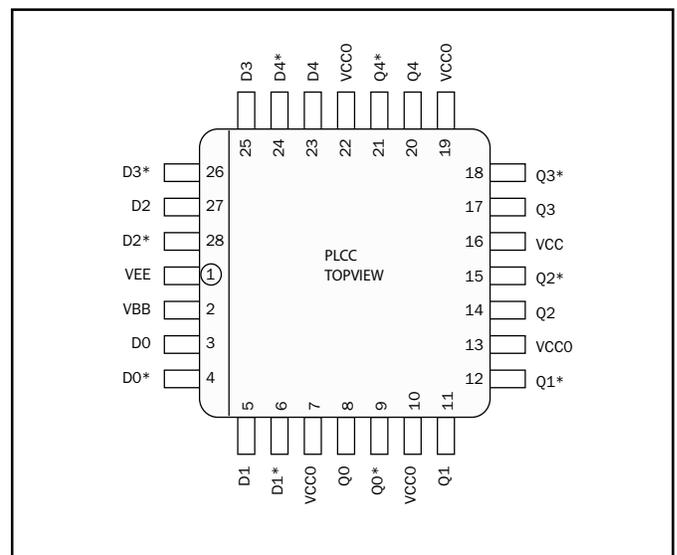
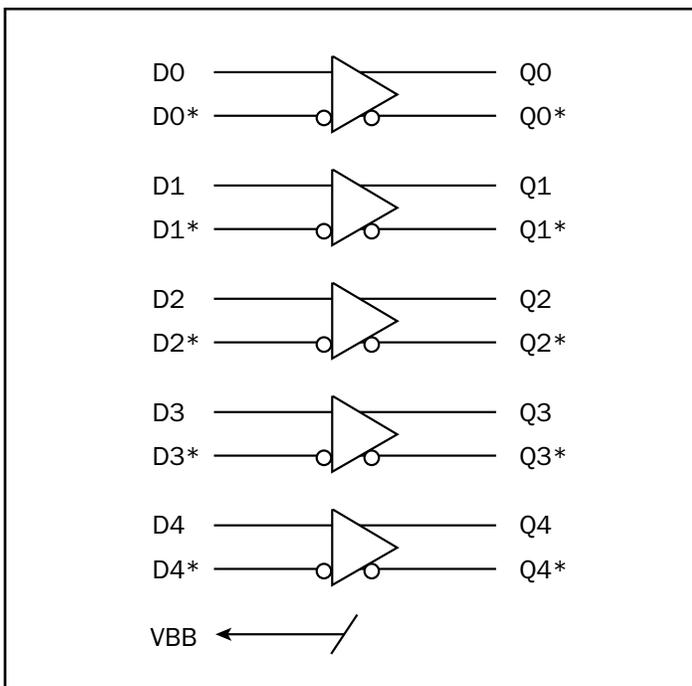
Features

- 500 ps Maximum Propagation Delay
- Extended VEE Range of $-4.2V$ to $-5.5V$
- VBB Output for Single-Ended Reception
- Internal 75K Ω Input Pull-Down Resistors
- ESD Protection of $>4000V$
- Fully Compatible with MC10E/100E116
- Specified Over Industrial Temperature Range: $-40^{\circ}C$ to $+85^{\circ}C$
- Available in 28-Pin PLCC Package

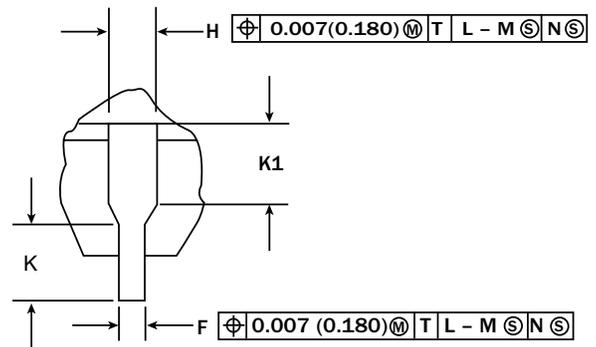
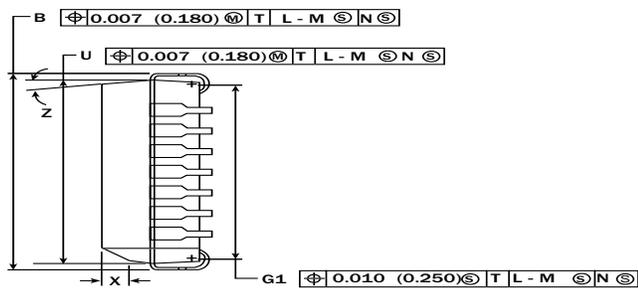
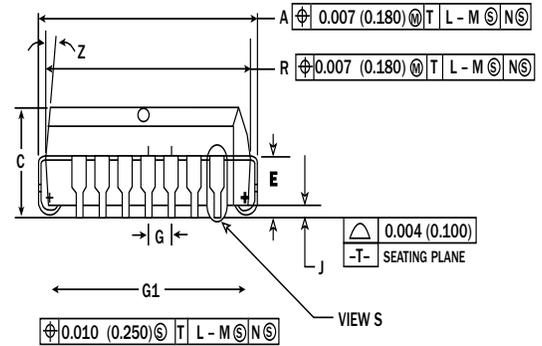
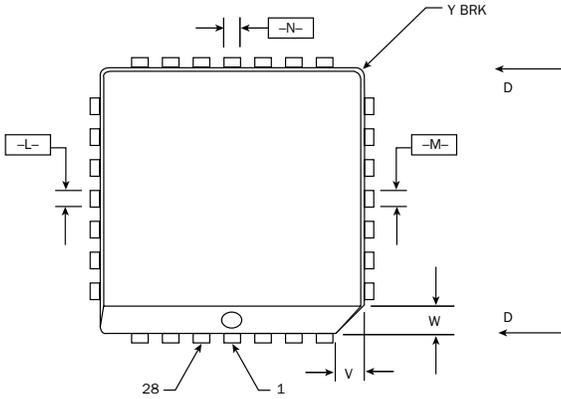
PIN Description

| Pin | Function |
|-----------------|---------------------------|
| D0, D0*-D4, D4* | Differential Input Pairs |
| Q0, Q0*-Q4, Q4* | Differential Output Pairs |
| VBB | Reference Voltage Output |
| VCC0 | VCC to Output |

Functional Block Diagram



28-Pin PLCC Package



NOTES:

1. Datums -L-, -M-, and -N- determined where top of lead shoulder exits plastic body at mold parting line.
2. DIM G1, true position to be measured at Datum -T-, Seating Plane.
3. DIM R and U do not include mold flash. Allowable mold flash is 0.010 (0.250) per side.
4. Dimensioning and tolerancing per ANSI Y14.5M, 1982.
5. Controlling Dimension: Inch.
6. The package top may be smaller than the package bottom by up to 0.012 (0.300). Dimensions R and U are determined at the outermost extremes of the plastic body exclusive of mold flash, tie bar burrs, gate burrs and interlead flash, but including any mismatch between the top and bottom of the plastic body.
7. Dimension H does not include Dambar protrusion or intrusion. The Dambar protrusion(s) shall not cause the H dimension to be greater than 0.037 (0.940). The Dambar intrusion(s) shall not cause the H dimension to be smaller than 0.025 (0.635).

| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.485 | 0.495 | 12.32 | 12.57 |
| B | 0.485 | 0.495 | 12.32 | 12.57 |
| C | 0.165 | 0.180 | 4.20 | 4.57 |
| E | 0.090 | 0.110 | 2.29 | 2.79 |
| F | 0.013 | 0.019 | 0.33 | 0.48 |
| G | 0.050 BSC | | 1.27 BSC | |
| H | 0.026 | 0.032 | 0.66 | 0.81 |
| J | 0.020 | - | 0.51 | - |
| K | 0.025 | - | 0.64 | - |
| R | 0.450 | 0.456 | 11.43 | 11.58 |
| U | 0.450 | 0.456 | 11.43 | 11.58 |
| V | 0.042 | 0.048 | 1.07 | 1.21 |
| W | 0.042 | 0.048 | 1.07 | 1.21 |
| X | 0.042 | 0.056 | 1.07 | 1.42 |
| Y | - | 0.020 | - | 0.50 |
| Z | 2° | 10° | 2° | 10° |
| G1 | 0.410 | 0.430 | 10.42 | 10.92 |
| K1 | 0.040 | - | 1.02 | - |

HIGH-PERFORMANCE PRODUCTS
DC Characteristics
SK10/100E116 DC Electrical Characteristics (Notes 1, 2)
 $(V_{CC} - V_{EE} = 4.2V \text{ to } 5.5V; V_{OUT} \text{ loaded } 50\Omega \text{ to } V_{CC} - 2.0V)$

| Symbol | Characteristic | TA = -40°C | | | TA = 0°C | | | TA = +25°C | | | TA = +85°C | | | Unit |
|-----------------------------------|--|------------|-----|-------|----------|-----|-------|------------|-----|-------|------------|-----|-------|------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| VBB | Output Reference Voltage ⁹ 10E 100E | -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 | V |
| I _{IN} | Input Current | -200 | | 200 | -200 | | 200 | -200 | | 200 | -200 | | 200 | μA |
| I _{EE} | Power Supply Current 10EL 100EL | | | 35 | | | 35 | | | 35 | | | 35 | mA |
| | | | | 35 | | | 35 | | | 35 | | | 40 | mA |
| V _{CC} - V _{EE} | Power Supply Voltage | 4.2 | | 5.5 | 4.2 | | 5.5 | 4.2 | | 5.5 | 4.2 | | 5.5 | V |

AC Characteristics
SK10/100EL116 AC Electrical Characteristics
 $(V_{CC} - V_{EE} = +4.2V \text{ to } +5.5V; V_{OUT} \text{ loaded } 50\Omega \text{ to } V_{CC} - 2.0V)$

| Symbol | Characteristic | TA = -40°C | | | TA = 0°C | | | TA = +25°C | | | TA = +85°C | | | Unit |
|--------------------------------------|---|-----------------------|-----|-----------------------|-----------------------|-----|-----------------------|-----------------------|-----|-----------------------|-----------------------|-----|-----------------------|------|
| | | Min | Typ | Max | |
| t _{PLH} t _{PHL} | Propagation Delay to Output D | 365 | | 445 | 385 | | 505 | 310 | | 530 | 315 | | 495 | ps |
| t _{skew} | Within-Device Skew ⁶ DN to Qn, Qn* | | 50 | | | 50 | | | 50 | | | 50 | | ps |
| t _{skew} | Duty Cycle Skew ⁷ t _{PLH} - t _{PHL} | | ±10 | | | ±10 | | | ±10 | | | ±10 | | ps |
| V _{PP} | Minimum Input Swing CLK ³ | 150 | | 1000 | 150 | | 1000 | 150 | | 1000 | 150 | | 1000 | mV |
| t _r , t _f | Output Rise/Fall Times (20% to 80%) | 190 | | 580 | 210 | | 580 | 210 | | 580 | 210 | | 580 | ps |
| V _{CMR} | Common Mode Range ⁴ | V _{CC} - 2.0 | | V _{CC} - 0.6 | V _{CC} - 2.0 | | V _{CC} - 0.6 | V _{CC} - 2.0 | | V _{CC} - 0.6 | V _{CC} - 2.0 | | V _{CC} - 0.6 | V |

HIGH-PERFORMANCE PRODUCTS**AC Characteristics (continued)**

Notes:

- 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 500 lfpm is maintained. Outputs are terminated through a 50Ω resistor to $V_{CC}-2.0V$.
- 100K circuits are designed to meet the DC specification shown in the table where transverse airflow greater than 500 lfpm is maintained.
- Minimum input swing for which AC parameters guaranteed.
- 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 $V_{PP(\min)}$ and 1V. The lower end of the CMR range varies 1:1 with V_{CC} and is equal to $V_{CC} - 2.0V$.
- Voltages referenced to $V_{CC} = 0V$ (ECL mode).
- Within device skew is defined as identical transition on similar path through a device.
- Duty cycle is defined only for differential operation when the delays are measured from the crosspoint of the inputs to the crosspoints of the outputs.
- For standard ECL DC Specifications, refer to the ECL Logic Family Standard DC Specifications Data Sheet.
- Voltages are referenced to $V_{CC} = 0V$ (ECL Mode).
- For part ordering description, see HPP Part Ordering Information Data Sheet.

Ordering Information

| Ordering Code | Package ID | Temperature Range |
|----------------------|-------------------|--------------------------|
| SK10E116PJ | 28-PLCC | Industrial |
| SK10E116PJT | 28-PLCC | Industrial |
| SK100E116PJ | 28-PLCC | Industrial |
| SK100E116PJT | 28-PLCC | Industrial |

Contact Information

Division Headquarters
10021 Willow Creek Road
San Diego, CA 92131
Phone: (858) 695-1808
FAX: (858) 695-2633

Semtech Corporation
High-Performance Products Division

Marketing Group
1111 Comstock Street
Santa Clara, CA 95054
Phone: (408) 566-8776
FAX: (408) 727-8994