MOTOROLA

# Quint Differential Line Receiver

**Military 10E516**

## *Product Preview*

**ELECTRICALLY TESTED PER:**
**10E516**

The 10E516 is a quint differential line receiver with emitter-follower outputs. An internally generated reference supply ($V_{BB}$) is available for single-ended reception.

Active current sources plus a deep collector feature of the MOSAIC III process provide the receivers with excellent common-mode noise rejection. Each receiver has a dedicated $V_{CCO}$ supply lead, providing optimum symmetry and stability.

The receiver design features clamp circuity to cause a defined state if both the inverting and non-inverting inputs are left open; in this case the Q output goes LOW, while the $\overline{Q}$ output goes HIGH. This feature makes the device ideal for twisted pair applications.

If both inverting and non-inverting inputs are at equal potential > -2.5 V, the receiver does not go to a defined state, but rather current-shares in normal differential amplifier fashion, producing output voltage levels midway between HIGH and LOW, or the device may even oscillate.

The device $V_{BB}$ output is intended for use as a reference voltage for single-ended reception of ECL signals to that device only. When using for this purpose, it is recommended that $V_{BB}$ is decoupled to $V_{CC}$ via a 0.01μF capacitor.

The 10E516 features input pull-down resistors, as does the rest of the ECLinPS family.

- 500 ps Max. Propagation Delay
- $V_{BB}$ Supply Output
- Dedicated $V_{CCO}$ Pin for Each Receiver
- 75 kΩ Input Pulldown Resistors

**AVAILABLE AS**

**1) JAN: N/A**
**2) SMD: N/A**
**3) 883: Planned**
**X = CASE OUTLINE AS FOLLOWS:**

**PACKAGE: NON-Compliant**
**QFP: X**

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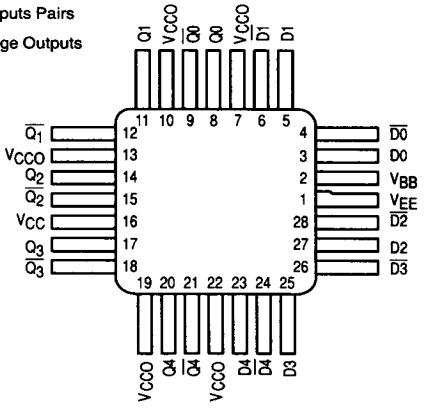
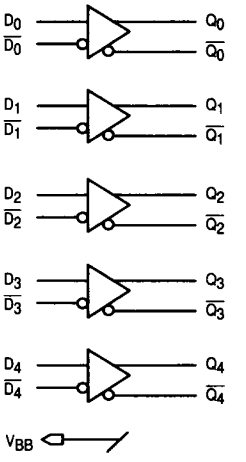
**PIN NAME**

| Pin | Function |
|---|---|
| $D_0$, $\overline{D_0}$ - $D_4$, $\overline{D_4}$ | Differential Inputs Pairs |
| $Q_0$, $\overline{Q_0}$ - $Q_4$, $\overline{Q_4}$ | Differential Outputs Pairs |
| $V_{BB}$ | Reference Voltage Outputs |




**LOGIC DIAGRAM**

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**10E Series DC CHARACTERISTICS:** $V_{EE}$ = -5.2 V ± 5%; $V_{CC} = V_{CCO}$ = GND[1]

| Symbol | Parameter | Limits | | | | | | Units |
|---|---|---|---|---|---|---|---|---|
| | | + 25° C | | + 125° C | | − 55° C | | |
| | | Min | Max | Min | Max | Min | Max | |
| $V_{OH}$ | Output HIGH Voltage | -980 | -810 | TBA | | TBA | | mV |
| $V_{OL}$ | Output LOW Voltage | -1950 | -1630 | TBA | | TBA | | mV |
| $V_{IH}$ | Input HIGH Voltage | -1130 | -810 | TBA | | TBA | | mV |
| $V_{IL}$ | Input LOW Voltage | -1950 | -1480 | TBA | | TBA | | mV |
| $I_{IL}$ | Input LOW Current | 0.5 | | TBA | | TBA | | µA |

1. 10E series 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 air flow greater than 500 lfpm is maintained. Outputs are terminated through a 50Ω resistor to -2.0 volts, except bus outputs where specified, are terminated into 25Ω.

**DC CHARACTERISTICS:** $V_{EE} = V_{EE}$(min) to $V_{EE}$(max), $V_{CC} = V_{CCO}$ = GND

| Symbol | Parameter | Limits | | | | | | Units | TEST CONDITION APPLIED: |
|---|---|---|---|---|---|---|---|---|---|
| | Functional Parameters: | + 25° C | | + 125° C | | − 55° C | | | |
| | | Min | Max | Min | Max | Min | Max | | |
| $V_{BB}$ | Output Reference Voltage | -1.35 | -1.25 | -1.31 | -1.19 | -1.38 | -1.27 | V | |
| $I_{IH}$ | Input High Current | | 200 | | 200 | | 200 | µA | |
| $I_{EE}$ | Power Supply Current | | 35 | | 35 | | 35 | mA | |
| $V_{PP(DC)}$ | Input Seneitivity | 150 | | 150 | | 150 | | mV | (Note 1) |
| $V_{CMR}$ | Common Mode Range | -2.0 | -0.6 | -2.0 | -0.6 | -2.0 | -0.6 | V | (Note 2) |

1. $V_{PP}$ is the minimum differential input voltage required to assure full ECL levels are present at the outputs.
2. $V_{CMR}$ is referenced to the most positive side of the differential input signal. Normal operation is obtained when the "HIGH" input is within the $V_{CMR}$ range and the input swing is greater than $V_{PPMIN}$ and < 1.0 V.

**AC CHARACTERISTICS:** $V_{EE} = V_{EE}$(min) to $V_{EE}$(max), $V_{CC} = V_{CCO}$ = GND

| Symbol | Parameter | Limits | | | | | | Units | TEST CONDITION APPLIED: |
|---|---|---|---|---|---|---|---|---|---|
| | Functional Parameters: | + 25° C | | + 125° C | | − 55° C | | | |
| | | Min | Max | Min | Max | Min | Max | | |
| $t_{PLH}$ $t_{PHL}$ | Propagation Delay to Output | | | | | | | | |
| | D | 200 | 450 | 200 | 450 | 200 | 450 | ps | |
| | D (SE) | 150 | 500 | 150 | 500 | 150 | 500 | ps | |
| $V_{PP(AC)}$ | Minimum Input Swing | 150 | | 150 | | 150 | | mV | (Note 1) |
| $t_{Skew}$ | Within-device Skew | | | | | | | | |
| | Dn to Qn, $\overline{Qn}$ | 50 | | 50 | | 50 | | ps | (Note 2) |
| $t_{Skew}$ | Duty Cycle Skew | | | | | | | | |
| | $t_{PLH}$ - $t_{PHL}$ | ± 10 | | ± 10 | | ± 10 | | ps | (Note 3) |
| $t_r$ $t_f$ | Rise/Fall Times 20 - 80% | 275 | 575 | 275 | 575 | 275 | 575 | ps | |

1. Minimum input swing for which AC parameters are guaranteed.
2. Within-device skew is defined as identical transitions on similar paths through a device.
3. Duty cycle skew is defined only for differential operation when the delays are measured from the cross point of the inputs to the cross points of the outputs.