

## FEATURES

- Guaranteed maximum frequency > 4GHz
- 3.3V and 5V power supply options
- Guaranteed propagation delay <440ps over temperature
- Internal 75K $\Omega$  input pull-down resistors
- Wide operating temperature range: -40°C to +85°C
- Available in 8-pin MSOP and SOIC packages


**ECL Pro™**

## DESCRIPTION

The SY10/100EP32V is an integrated  $\div 2$  divider with differential clock inputs.

The  $V_{BB}$  pin, an internally generated voltage supply, is available to this device only. For single-ended input conditions, the unused differential input is connected to  $V_{BB}$  as a switching reference voltage.  $V_{BB}$  may also rebias AC-coupled inputs. When used, decouple  $V_{BB}$  and  $V_{CC}$  via a 0.01 $\mu$ F capacitor and limit current sourcing or sinking to 0.5mA. When not used,  $V_{BB}$  should be left open.

The reset pin is asynchronous and is asserted on the rising edge. Upon power-up, the internal flip-flops will attain a random state; the reset allows for the synchronous use of multiple EP32's in a system.

The 100k series includes internal temperature compensation circuitry.

## PIN NAMES

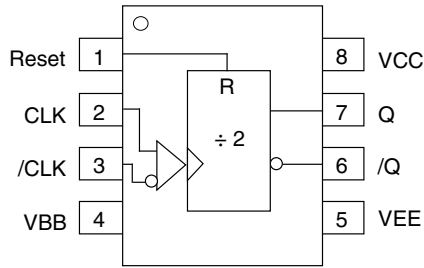
| Pin       | Function                 |
|-----------|--------------------------|
| CLK, /CLK | ECL Clock Inputs         |
| Reset     | ECL Asynchronous Reset   |
| $V_{BB}$  | Reference Voltage Output |
| Q, /Q     | ECL Data Outputs         |

## TRUTH TABLE<sup>(1)</sup>

| CLK | /CLK | RESET | Q | /Q |
|-----|------|-------|---|----|
| X   | X    | Z     | L | H  |
| Z   | /Z   | L     | F | F  |

**Note 1:** Z = LOW-to-HIGH Transition  
 /Z = HIGH-to-LOW Transition  
 F = Divide by 2 function.

## PACKAGE/ORDERING INFORMATION



**8-Pin SOIC (Z8-1)**  
**8-Pin MSOP (K8-1)**

Ordering Information<sup>(1)</sup>

| Part Number                      | Package Type | Operating Range | Package Marking                        | Lead Finish    |
|----------------------------------|--------------|-----------------|----------------------------------------|----------------|
| SY10EP32VZC                      | Z8-1         | Commercial      | HEP32V                                 | Sn-Pb          |
| SY10EP32VZCTR <sup>(2)</sup>     | Z8-1         | Commercial      | HEP32V                                 | Sn-Pb          |
| SY100EP32VZC                     | Z8-1         | Commercial      | XEP32V                                 | Sn-Pb          |
| SY100EP32VZCTR <sup>(2)</sup>    | Z8-1         | Commercial      | XEP32V                                 | Sn-Pb          |
| SY10EP32VKC                      | K8-1         | Commercial      | HP32                                   | Sn-Pb          |
| SY10EP32VKCTR <sup>(2)</sup>     | K8-1         | Commercial      | HP32                                   | Sn-Pb          |
| SY100EP32VKC                     | K8-1         | Commercial      | XP32                                   | Sn-Pb          |
| SY100EP32VKCTR <sup>(2)</sup>    | K8-1         | Commercial      | XP32                                   | Sn-Pb          |
| SY10EP32VZI                      | Z8-1         | Industrial      | HEP32V                                 | Sn-Pb          |
| SY10EP32VZITR <sup>(2)</sup>     | Z8-1         | Industrial      | HEP32V                                 | Sn-Pb          |
| SY100EP32VZI                     | Z8-1         | Industrial      | XEP32V                                 | Sn-Pb          |
| SY100EP32VZITR <sup>(2)</sup>    | Z8-1         | Industrial      | XEP32V                                 | Sn-Pb          |
| SY10EP32VKI                      | K8-1         | Industrial      | HP32                                   | Sn-Pb          |
| SY10EP32VKITR <sup>(2)</sup>     | K8-1         | Industrial      | HP32                                   | Sn-Pb          |
| SY100EP32VKI                     | K8-1         | Industrial      | XP32                                   | Sn-Pb          |
| SY100EP32VKITR <sup>(2)</sup>    | K8-1         | Industrial      | XP32                                   | Sn-Pb          |
| SY10EP32VZG <sup>(3)</sup>       | Z8-1         | Industrial      | HEP32V with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY10EP32VZGTR <sup>(2, 3)</sup>  | Z8-1         | Industrial      | HEP32V with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY100EP32VZG <sup>(3)</sup>      | Z8-1         | Industrial      | XEP32V with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY100EP32VZGTR <sup>(2, 3)</sup> | Z8-1         | Industrial      | XEP32V with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY10EP32VKG <sup>(3)</sup>       | K8-1         | Industrial      | HP32 with Pb-Free bar-line indicator   | NiPdAu Pb-Free |
| SY10EP32VKGTR <sup>(2, 3)</sup>  | K8-1         | Industrial      | HP32 with Pb-Free bar-line indicator   | NiPdAu Pb-Free |
| SY100EP32VKG <sup>(3)</sup>      | K8-1         | Industrial      | XP32 with Pb-Free bar-line indicator   | NiPdAu Pb-Free |
| SY100EP32VKGTR <sup>(2, 3)</sup> | K8-1         | Industrial      | XP32 with Pb-Free bar-line indicator   | NiPdAu Pb-Free |

## Notes:

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

**ABSOLUTE MAXIMUM RATINGS<sup>(1)</sup>**

| Symbol            | Rating                                                                                                                                                   | Value                  | Unit         |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------|
| $V_{CC} - V_{EE}$ | Power Supply Voltage                                                                                                                                     | +6.0                   | V            |
| $V_{IN}$          | Input Voltage ( $V_{CC} = 0V$ , $V_{IN}$ not more negative than $V_{EE}$ )<br>Input Voltage ( $V_{EE} = 0V$ , $V_{IN}$ not more positive than $V_{CC}$ ) | -6.0 to 0<br>+6.0 to 0 | V<br>V       |
| $I_{OUT}$         | Output Current<br>-Continuous<br>-Surge                                                                                                                  | 50<br>100              | mA           |
| $I_{BB}$          | $V_{BB}$ Sink/Source Current <sup>(2)</sup>                                                                                                              | ±0.5                   | mA           |
| $T_A$             | Operating Temperature Range                                                                                                                              | -40 to +85             | °C           |
| $T_{STORE}$       | Storage Temperature Range                                                                                                                                | -65 to +150            | °C           |
| $T_{LEAD}$        | Lead Temperature (soldering, 20 sec.)                                                                                                                    | +260                   | °C           |
| $\theta_{JA}$     | Package Thermal Resistance (Junction-to-Ambient)<br>-Still Air SOIC<br>-Still Air MSOP<br>-multi-layer PCB                                               | 160<br>206             | °C/W<br>°C/W |
| $\theta_{JC}$     | Package Thermal Resistance (Junction-to-Case)<br>SOIC<br>MSOP                                                                                            | 39<br>39               | °C/W<br>°C/W |

**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.

**Note 2.** Due to the limited drive capability, the  $V_{BB}$  reference should only be used for inputs from the same package device (i.e., do not sue for other devices).

**(10EP) LVPECL DC ELECTRICAL CHARACTERISTICS<sup>(1)</sup>**

$V_{CC} = 3.3V \pm 10\%$ ;  $V_{EE} = 0V^{(2)}$

| Symbol      | Parameter                                                             | $T_A = -40^\circ C$ |        |          | $T_A = +25^\circ C$ |        |          | $T_A = +85^\circ C$ |        |          | Unit |
|-------------|-----------------------------------------------------------------------|---------------------|--------|----------|---------------------|--------|----------|---------------------|--------|----------|------|
|             |                                                                       | Min.                | Typ.   | Max.     | Min.                | Typ.   | Max.     | Min.                | Typ.   | Max.     |      |
| $I_{EE}$    | Power Supply Current                                                  | —                   | 30     | 37       | —                   | 30     | 37       | —                   | 30     | 37       | mA   |
| $V_{OH}$    | Output HIGH Voltage <sup>(3)</sup>                                    | 2165                | 2290   | 2415     | 2230                | 2355   | 2480     | 2290                | 2415   | 2540     | mV   |
| $V_{OL}$    | Output LOW Voltage <sup>(3)</sup>                                     | 1365                | 1490   | 1615     | 1430                | 1555   | 1680     | 1490                | 1615   | 1740     | mV   |
| $V_{IH}$    | Input HIGH Voltage (Single-Ended)                                     | 2090                | —      | 2415     | 2155                | —      | 2480     | 2215                | —      | 2540     | mV   |
| $V_{IL}$    | Input LOW Voltage (Single-Ended)                                      | 1365                | —      | 1690     | 1430                | —      | 1755     | 1490                | —      | 1815     | mV   |
| $V_{BB}$    | Output Voltage                                                        | 1790                | 1890   | 1990     | 1855                | 1955   | 2055     | 1915                | 2015   | 2115     | mV   |
| $V_{IHCMR}$ | Input HIGH Voltage <sup>(4)</sup><br>Common Mode Range (Differential) | 2.0                 | —      | $V_{CC}$ | 2.0                 | —      | $V_{CC}$ | 2.0                 | —      | $V_{CC}$ | V    |
| $I_{IH}$    | Input HIGH Current                                                    | —                   | —      | 150      | —                   | —      | 150      | —                   | —      | 150      | μA   |
| $I_{IL}$    | Input LOW Current<br>CLK<br>/CLK                                      | 0.5<br>-150         | —<br>— | —<br>—   | 0.5<br>-150         | —<br>— | —<br>—   | 0.5<br>-150         | —<br>— | —<br>—   | μA   |

**Note 1.** 10EP circuits are designed to meet the DC specifications shown in the above table after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and traverse airflow greater than 500lfpm is maintained.

**Note 2.** Input and output parameters vary 1:1 with  $V_{CC}$ .

**Note 3.** All loading with  $50\Omega$  to  $V_{CC} - 2.0V$ .

**Note 4.** The  $V_{IHCMR}$  range is referenced to the most positive side of the differential input signal.

**(10EP) PECL DC ELECTRICAL CHARACTERISTICS<sup>(1)</sup>** $V_{CC} = 5.0V \pm 10\%$ ;  $V_{EE} = 0V^{(2)}$ 

| Symbol      | Parameter                                                                | $T_A = -40^\circ C$ |        |          | $T_A = +25^\circ C$ |        |          | $T_A = +85^\circ C$ |        |          | Unit    |
|-------------|--------------------------------------------------------------------------|---------------------|--------|----------|---------------------|--------|----------|---------------------|--------|----------|---------|
|             |                                                                          | Min.                | Typ.   | Max.     | Min.                | Typ.   | Max.     | Min.                | Typ.   | Max.     |         |
| $I_{EE}$    | Power Supply Current                                                     | —                   | —      | 37       | —                   | 30     | 37       | —                   | —      | 37       | mA      |
| $V_{OH}$    | Output HIGH Voltage <sup>(3)</sup>                                       | 3865                | 3990   | 4115     | 3930                | 4055   | 4180     | 3990                | 4115   | 4240     | mV      |
| $V_{OL}$    | Output LOW Voltage <sup>(3)</sup>                                        | 3065                | 3190   | 3315     | 3130                | 3255   | 3380     | 3190                | 3315   | 3440     | mV      |
| $V_{IH}$    | Input HIGH Voltage<br>(Single-Ended)                                     | 3790                | —      | 4115     | 3855                | —      | 4180     | 3915                | —      | 4240     | mV      |
| $V_{IL}$    | Input LOW Voltage<br>(Single-Ended)                                      | 3065                | —      | 3390     | 3130                | —      | 3455     | 3190                | —      | 3515     | mV      |
| $V_{BB}$    | Output Voltage                                                           | 3490                | 3590   | 3690     | 3555                | 3655   | 3755     | 3615                | 3715   | 3815     | mV      |
| $V_{IHCMR}$ | Input HIGH Voltage <sup>(4)</sup><br>Common Mode Range<br>(Differential) | 2.0                 | —      | $V_{CC}$ | 2.0                 | —      | $V_{CC}$ | 2.0                 | —      | $V_{CC}$ | V       |
| $I_{IH}$    | Input HIGH Current                                                       | —                   | —      | 150      | —                   | —      | 150      | —                   | —      | 150      | $\mu A$ |
| $I_{IL}$    | Input LOW Current<br>CLK<br>/CLK                                         | 0.5<br>-150         | —<br>— | —<br>—   | 0.5<br>-150         | —<br>— | —<br>—   | 0.5<br>-150         | —<br>— | —<br>—   | $\mu A$ |

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**Note 2.** Input and output parameters vary 1:1 with  $V_{CC}$ .

**Note 3.** All loading with  $50\Omega$  to  $V_{CC} - 2.0V$ .

**Note 4.** The  $V_{IHCMR}$  range is referenced to the most positive side of the differential input signal.

**(10EP) ECL/LVECL DC ELECTRICAL CHARACTERISTICS<sup>(1)</sup>** $V_{CC} = 0V$ ;  $V_{EE} = -3.3V$  to  $5.0V \pm 10\%^{(2)}$ 

| Symbol      | Parameter                                                                | $T_A = -40^\circ C$ |        |        | $T_A = +25^\circ C$ |        |        | $T_A = +85^\circ C$ |        |        | Unit    |
|-------------|--------------------------------------------------------------------------|---------------------|--------|--------|---------------------|--------|--------|---------------------|--------|--------|---------|
|             |                                                                          | Min.                | Typ.   | Max.   | Min.                | Typ.   | Max.   | Min.                | Typ.   | Max.   |         |
| $I_{EE}$    | Power Supply Current                                                     | —                   | —      | 37     | —                   | 30     | 37     | —                   | —      | 37     | mA      |
| $V_{OH}$    | Output HIGH Voltage <sup>(3)</sup>                                       | -1135               | -1010  | -885   | -1070               | -945   | -820   | -1010               | -885   | -760   | mV      |
| $V_{OL}$    | Output LOW Voltage <sup>(3)</sup>                                        | -1935               | -1810  | -1685  | -1870               | -1745  | -1620  | -1810               | -1685  | -1560  | mV      |
| $V_{IH}$    | Input HIGH Voltage<br>(Single-Ended)                                     | -1210               | —      | -885   | -1145               | —      | -820   | -1085               | —      | -760   | mV      |
| $V_{IL}$    | Input LOW Voltage<br>(Single-Ended)                                      | -1935               | —      | -1610  | -1870               | —      | -1545  | -1810               | —      | -1485  | mV      |
| $V_{BB}$    | Output Voltage                                                           | -1510               | -1410  | -1310  | -1445               | -1345  | -1245  | -1385               | -1285  | -1185  | mV      |
| $V_{IHCMR}$ | Input HIGH Voltage <sup>(4)</sup><br>Common Mode Range<br>(Differential) | $V_{EE} + 2.0$      |        | 0.0    | $V_{EE} + 2.0$      |        | 0.0    | $V_{EE} + 2.0$      |        | 0.0    | V       |
| $I_{IH}$    | Input HIGH Current                                                       | —                   | —      | 150    | —                   | —      | 150    | —                   | —      | 150    | $\mu A$ |
| $I_{IL}$    | Input LOW Current<br>CLK<br>/CLK                                         | 0.5<br>-150         | —<br>— | —<br>— | 0.5<br>-150         | —<br>— | —<br>— | 0.5<br>-150         | —<br>— | —<br>— | $\mu A$ |

**Note 1.** 10EP circuits are designed to meet the DC specifications shown in the above table after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and traverse airflow greater than 500lfpm is maintained.

**Note 2.** Input and output parameters vary 1:1 with  $V_{CC}$ .

**Note 3.** All loading with  $50\Omega$  to  $V_{CC} - 2.0V$ .

**Note 4.**  $V_{IHCMR}$  (min) varies 1:1 with  $V_{EE}$ . The  $V_{IHCMR}$  range is referenced to the most positive side of the differential input signal.

**(100EP) LVPECL DC ELECTRICAL CHARACTERISTICS<sup>(1)</sup>** $V_{CC} = +3.3V \pm 10\%$ ;  $V_{EE} = 0V^{(2)}$ 

| Symbol      | Parameter                                                                | $T_A = -40^\circ C$ |        |          | $T_A = +25^\circ C$ |        |          | $T_A = +85^\circ C$ |        |          | Unit    |
|-------------|--------------------------------------------------------------------------|---------------------|--------|----------|---------------------|--------|----------|---------------------|--------|----------|---------|
|             |                                                                          | Min.                | Typ.   | Max.     | Min.                | Typ.   | Max.     | Min.                | Typ.   | Max.     |         |
| $I_{EE}$    | Power Supply Current                                                     | —                   | —      | 37       | —                   | 30     | 37       | —                   | —      | 42       | mA      |
| $V_{OH}$    | Output HIGH Voltage <sup>(3)</sup>                                       | 2155                | 2280   | 2405     | 2155                | 2280   | 2405     | 2155                | 2280   | 2405     | mV      |
| $V_{OL}$    | Output LOW Voltage <sup>(3)</sup>                                        | 1355                | 1480   | 1605     | 1355                | 1480   | 1605     | 1355                | 1480   | 1605     | mV      |
| $V_{IH}$    | Input HIGH Voltage<br>(Single-Ended)                                     | 2075                | —      | 2420     | 2075                | —      | 2420     | 2075                | —      | 2420     | mV      |
| $V_{IL}$    | Input LOW Voltage<br>(Single-Ended)                                      | 1355                | —      | 1675     | 1355                | —      | 1675     | 1355                | —      | 1675     | mV      |
| $V_{BB}$    | Output Voltage                                                           | 1775                | 1875   | 1975     | 1775                | 1875   | 1975     | 1775                | 1875   | 1975     | mV      |
| $V_{IHCMR}$ | Input HIGH Voltage <sup>(4)</sup><br>Common Mode Range<br>(Differential) | 2.0                 | —      | $V_{CC}$ | 2.0                 | —      | $V_{CC}$ | 2.0                 | —      | $V_{CC}$ | V       |
| $I_{IH}$    | Input HIGH Current                                                       | —                   | —      | 150      | —                   | —      | 150      | —                   | —      | 150      | $\mu A$ |
| $I_{IL}$    | Input LOW Current<br>CLK<br>/CLK                                         | 0.5<br>-150         | —<br>— | —<br>—   | 0.5<br>-150         | —<br>— | —<br>—   | 0.5<br>-150         | —<br>— | —<br>—   | $\mu A$ |

**Note 1.** 100EP circuits are designed to meet the DC specifications shown in the above table after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and traverse airflow greater than 500lfpm is maintained.

**Note 2.** Input and output parameters vary 1:1 with  $V_{CC}$ .

**Note 3.** All loading with  $50\Omega$  to  $V_{CC} - 2.0V$ .

**Note 4.** The  $V_{IHCMR}$  range is referenced to the most positive side of the differential input signal.

**(100EP) PECL DC ELECTRICAL CHARACTERISTICS<sup>(1)</sup>** $V_{CC} = +5.0V \pm 10\%$ ;  $V_{EE} = 0V^{(2)}$ 

| Symbol      | Parameter                                                                | $T_A = -40^\circ C$ |        |          | $T_A = +25^\circ C$ |        |          | $T_A = +85^\circ C$ |        |          | Unit    |
|-------------|--------------------------------------------------------------------------|---------------------|--------|----------|---------------------|--------|----------|---------------------|--------|----------|---------|
|             |                                                                          | Min.                | Typ.   | Max.     | Min.                | Typ.   | Max.     | Min.                | Typ.   | Max.     |         |
| $I_{EE}$    | Power Supply Current                                                     | —                   | —      | 37       | —                   | 30     | 37       | —                   | —      | 42       | mA      |
| $V_{OH}$    | Output HIGH Voltage <sup>(3)</sup>                                       | 3855                | 3980   | 4105     | 3855                | 3980   | 4105     | 3855                | 3980   | 4105     | mV      |
| $V_{OL}$    | Output LOW Voltage <sup>(3)</sup>                                        | 3055                | 3180   | 3305     | 3055                | 3180   | 3305     | 3055                | 3180   | 3305     | mV      |
| $V_{IH}$    | Input HIGH Voltage<br>(Single-Ended)                                     | 3775                | —      | 4120     | 3775                | —      | 4120     | 3775                | —      | 4120     | mV      |
| $V_{IL}$    | Input LOW Voltage<br>(Single-Ended)                                      | 3055                | —      | 3375     | 3055                | —      | 3375     | 3055                | —      | 3375     | mV      |
| $V_{BB}$    | Output Voltage                                                           | 3475                | 3575   | 3675     | 3475                | 3575   | 3675     | 3475                | 3575   | 3675     | mV      |
| $V_{IHCMR}$ | Input HIGH Voltage <sup>(4)</sup><br>Common Mode Range<br>(Differential) | 2.0                 | —      | $V_{CC}$ | 2.0                 | —      | $V_{CC}$ | 2.0                 | —      | $V_{CC}$ | V       |
| $I_{IH}$    | Input HIGH Current                                                       | —                   | —      | 150      | —                   | —      | 150      | —                   | —      | 150      | $\mu A$ |
| $I_{IL}$    | Input LOW Current<br>CLK<br>/CLK                                         | 0.5<br>-150         | —<br>— | —<br>—   | 0.5<br>-150         | —<br>— | —<br>—   | 0.5<br>-150         | —<br>— | —<br>—   | $\mu A$ |

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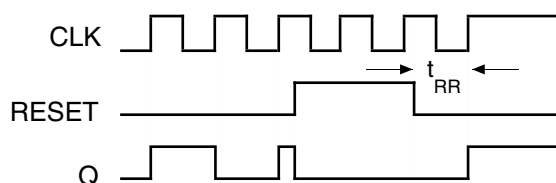
| Symbol      | Parameter                                                                | $T_A = -40^\circ C$ |        |        | $T_A = +25^\circ C$ |        |        | $T_A = +85^\circ C$ |        |        | Unit    |
|-------------|--------------------------------------------------------------------------|---------------------|--------|--------|---------------------|--------|--------|---------------------|--------|--------|---------|
|             |                                                                          | Min.                | Typ.   | Max.   | Min.                | Typ.   | Max.   | Min.                | Typ.   | Max.   |         |
| $I_{EE}$    | Power Supply Current                                                     | —                   | —      | 37     | —                   | 30     | 37     | —                   | —      | 42     | mA      |
| $V_{OH}$    | Output HIGH Voltage <sup>(3)</sup>                                       | -1145               | -1020  | -895   | -1145               | -1020  | -895   | -1145               | -1020  | -895   | mV      |
| $V_{OL}$    | Output LOW Voltage <sup>(3)</sup>                                        | -1945               | -1820  | -1695  | -1945               | -1820  | -1695  | -1945               | -1820  | -1695  | mV      |
| $V_{IH}$    | Input HIGH Voltage<br>(Single-Ended)                                     | -1225               | —      | -880   | -1225               | —      | -880   | -1225               | —      | -880   | mV      |
| $V_{IL}$    | Input LOW Voltage<br>(Single-Ended)                                      | -1945               | —      | -1625  | -1945               | —      | -1625  | -1945               | —      | -1625  | mV      |
| $V_{BB}$    | Output Voltage                                                           | -1525               | -1425  | -1325  | -1525               | -1425  | -1325  | -1525               | -1425  | -1325  | mV      |
| $V_{IHCMR}$ | Input HIGH Voltage <sup>(4)</sup><br>Common Mode Range<br>(Differential) | $V_{EE} + 2.0$      |        | 0.0    | $V_{EE} + 2.0$      |        | 0.0    | $V_{EE} + 2.0$      |        | 0.0    | V       |
| $I_{IH}$    | Input HIGH Current                                                       | —                   | —      | 150    | —                   | —      | 150    | —                   | —      | 150    | $\mu A$ |
| $I_{IL}$    | Input LOW Current<br>CLK<br>/CLK                                         | 0.5<br>-150         | —<br>— | —<br>— | 0.5<br>-150         | —<br>— | —<br>— | 0.5<br>-150         | —<br>— | —<br>— | $\mu A$ |

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**Note 2.** Input and output parameters vary 1:1 with  $V_{CC}$ .

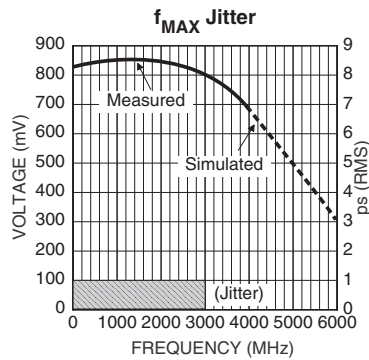
**Note 3.** All loading with  $50\Omega$  to  $V_{CC} - 2.0V$ .

**Note 4.**  $V_{IHCMR}$  (min) varies 1:1 with  $V_{EE}$ . The  $V_{IHCMR}$  range is referenced to the most positive side of the differential input signal.

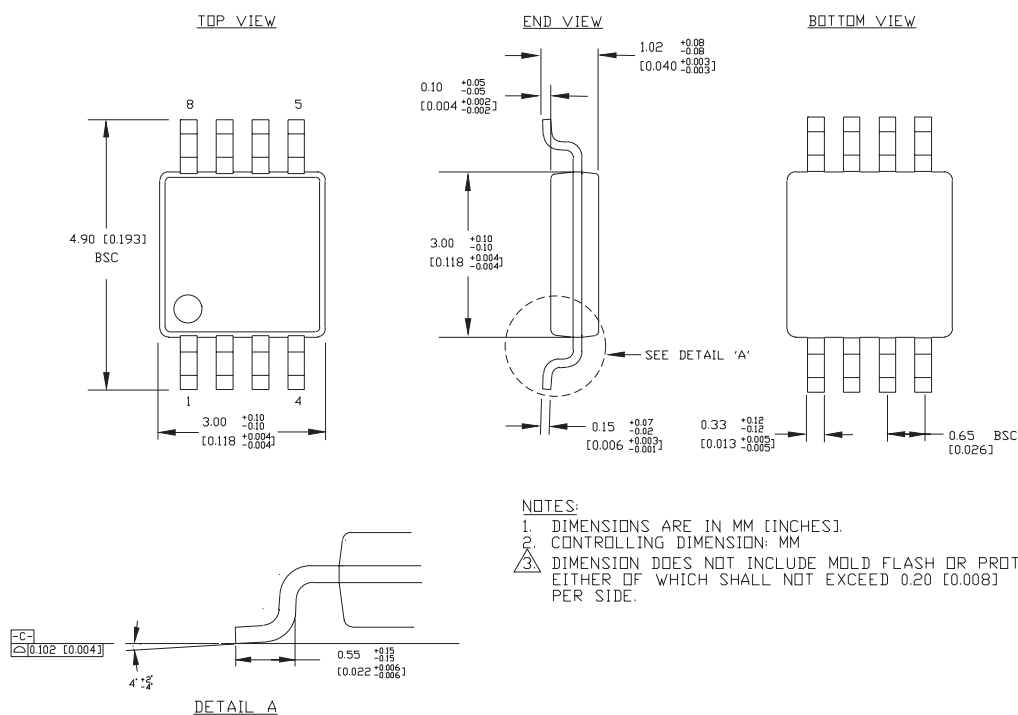
**TIMING DIAGRAM**

**AC ELECTRICAL CHARACTERISTICS<sup>(1)</sup>**NECL:  $V_{CC} = 0V$ ,  $V_{EE} = -3.3V$  to  $-5.0V \pm 10\%$ ; PECL:  $V_{EE} = 0V$ ,  $V_{CC} = +3.3V$  to  $+5.0V \pm 10\%$ 

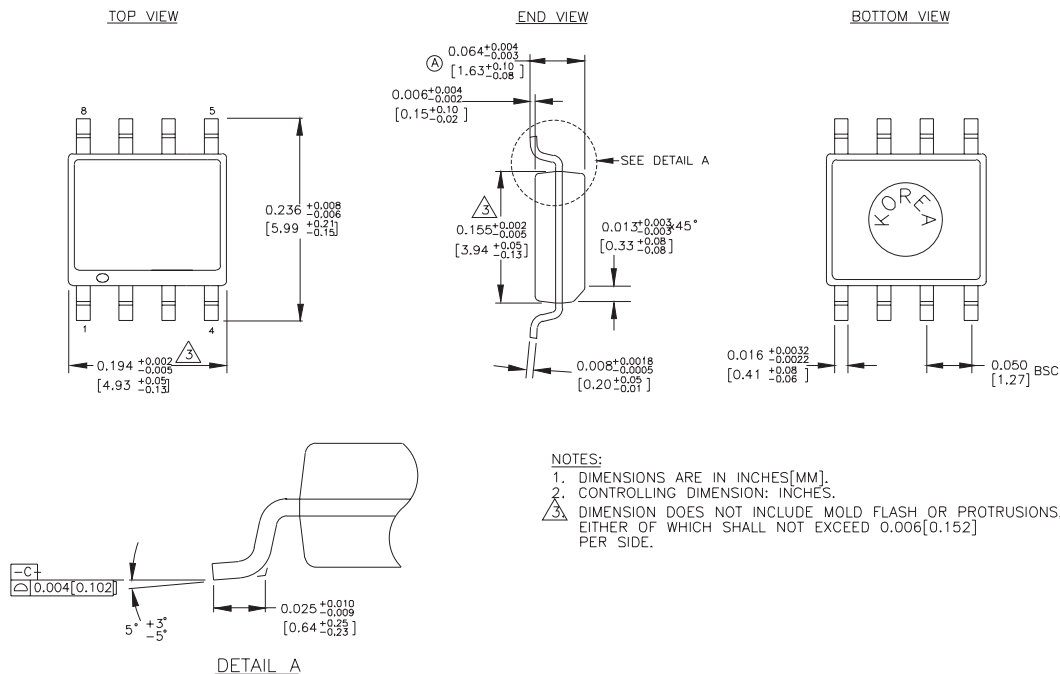
| Symbol                 | Parameter                                                                     | $T_A = -40^\circ C$ |      |      | $T_A = +25^\circ C$ |      |      | $T_A = +85^\circ C$ |      |      | Unit    |
|------------------------|-------------------------------------------------------------------------------|---------------------|------|------|---------------------|------|------|---------------------|------|------|---------|
|                        |                                                                               | Min.                | Typ. | Max. | Min.                | Typ. | Max. | Min.                | Typ. | Max. |         |
| $f_{MAX}$              | Maximum Frequency <sup>(3)</sup>                                              | 4                   | —    | —    | 4                   | —    | —    | 4                   | —    | —    | GHz     |
| $t_{PLH}$<br>$t_{PHL}$ | Propagation Delay to<br>Output Differential<br>RESET, CLK $\rightarrow$ Q, /Q | 250                 | 330  | 420  | 260                 | 275  | 430  | 280                 | 400  | 440  | ps      |
| $t_{RR}$               | Set/Reset Recovery                                                            | 200                 | —    | —    | 200                 | 100  | —    | 200                 | —    | —    | ps      |
| $t_{PW}$               | Minimum Pulse Width RESET                                                     | 550                 | —    | —    | 550                 | 200  | —    | 550                 | —    | —    | ps      |
| $t_{JITTER}$           | Cycle-to-Cycle RMS Jitter <sup>(2)</sup>                                      | —                   | 0.2  | < 1  | —                   | 0.2  | < 1  | —                   | 0.2  | < 1  | ps(rms) |
| $V_{PP}$               | Input Voltage Swing<br>(Differential)                                         | 150                 | 800  | 1200 | 150                 | 800  | 1200 | 150                 | 800  | 1200 | mV      |
| $t_r$<br>$t_f$         | Output Rise/Fall Times Q, /Q<br>(20% to 80%)                                  | 50                  | 100  | 150  | 50                  | 100  | 160  | 50                  | 100  | 160  | ps      |

**Note 1.** Measured using a 750mV source, 50% duty cycle clock source. All loading with  $50\Omega$  to  $V_{CC} - 2.0V$ .**Note 2.** See Figure 1.  $f_{MAX}$  Jitter below.**Note 3.**  $f_{MAX}$  guaranteed for functionality only.  $V_{OL}$  and  $V_{OH}$  levels are guaranteed at DC only.Figure 1.  $f_{MAX}$  and RMS Jitter

## 8 LEAD MSOP (K8-1)



Rev. 01

**8 LEAD SOIC .150" WIDE (Z8-1)**

Rev. 03

**MICREL, INC. 2180 FORTUNE DRIVE SAN JOSE, CA 95131 USA**TEL + 1 (408) 944-0800 FAX + 1 (408) 474-1000 WEB <http://www.micrel.com>

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