



**5V/3.3V DIFFERENTIAL
2-INPUT XOR/XNOR**

**ECL Pro™
SY10EP08V**

FEATURES

- 3.3V or 5V power supply options
- Maximum frequency > 3GHz typical
- 200ps typical propagation delay
- Internal input resistors: pulldown on D, pulldown and pullup on /D
- Q output will default LOW with inputs open or at V_{EE}
- Transistor count: 152
- Available in 8-Pin MSOP and SOIC packages



ECL Pro™

DESCRIPTION

The SY10EP08V is a 2-input differential XOR/XNOR gate. The EP08V is ideal for applications requiring the fastest AC performance available.

PIN NAMES

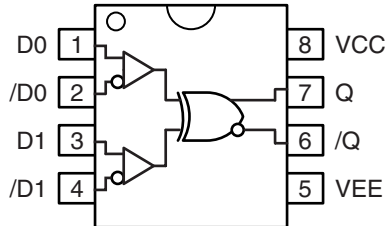
| Pin | Function |
|---|------------------|
| D ₀ , D ₁ , /D ₀ , /D ₁ | ECL Data Inputs |
| Q, /Q | ECL Data Outputs |

TRUTH TABLE

| D ₀ | D ₁ | /D ₀ | /D ₁ | Q | /Q |
|----------------|----------------|-----------------|-----------------|---|----|
| L | L | H | H | L | H |
| L | H | H | L | H | L |
| H | L | L | H | H | L |
| H | H | L | L | L | H |



PACKAGE/ORDERING INFORMATION



Available in 8-Pin SOIC and
MSOP Packages

Ordering Information⁽¹⁾

| Part Number | Package Type | Operating Range | Package Marking | Lead Finish |
|---------------------------------|--------------|-----------------|---|-------------------|
| SY10EP08VZC | Z8-1 | Commercial | HEP08V | Sn-Pb |
| SY10EP08VZCTR ⁽²⁾ | Z8-1 | Commercial | HEP08V | Sn-Pb |
| SY10EP08VKC | K8-1 | Commercial | HP08 | Sn-Pb |
| SY10EP08VKCTR ⁽²⁾ | K8-1 | Commercial | HP08 | Sn-Pb |
| SY10EP08VZI | Z8-1 | Industrial | HEP08V | Sn-Pb |
| SY10EP08VZITR ⁽²⁾ | Z8-1 | Industrial | HEP08V | Sn-Pb |
| SY10EP08VKI | K8-1 | Industrial | HP08 | Sn-Pb |
| SY10EP08VKITR ⁽²⁾ | K8-1 | Industrial | HP08 | Sn-Pb |
| SY10EP08VZG ⁽³⁾ | Z8-1 | Industrial | HEP08V with Pb-Free bar-line indicator | Pb-Free NiPdAu |
| SY10EP08VZGTR ^(2, 3) | Z8-1 | Industrial | HEP08V with Pb-Free bar-line indicator | Pb-Free NiPdAu |
| SY10EP08VKG ⁽³⁾ | K8-1 | Industrial | HP08 with Pb-Free bar-line indicator | Pb-Free NiPdAu |
| SY10EP08VKGTR ^(2, 3) | K8-1 | Industrial | HP08 with Pb-Free bar-line indicator | Pb-Free NiPdAu |

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⁽¹⁾

| Symbol | Rating | Value | Unit |
|-------------------|--|--------------------------|--------------|
| $V_{CC} - V_{EE}$ | Power Supply Voltage | 6V | 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} | Package Thermal Resistance (Junction-to-Ambient) -Still-Air (SOIC) -500lfpm (SOIC) -Still-Air (MSOP) -500lfpm (MSOP) | 160 109 206 155 | °C/W °C/W |
| θ_{JC} | Package Thermal Resistance (Junction-to-Case) (SOIC) (MSOP) | 39 39 | °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.

3.3V LVPECL DC ELECTRICAL CHARACTERISTICS⁽¹⁾

$V_{CC} = 3.3V \pm 0.3V$, $V_{EE} = 0V$ ⁽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 | 20 | 28 | 36 | 20 | 30 | 38 | 20 | 32 | 38 | mA |
| V_{OH} | Output HIGH Voltage ⁽³⁾ | 2165 | 2290 | 2415 | 2230 | 2355 | 2480 | 2290 | 2415 | 2540 | mV |
| V_{OL} | Output LOW Voltage ⁽³⁾ | 1350 | 1490 | 1615 | 1350 | 1555 | 1680 | 1350 | 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_{IHCMR} | Input HIGH Voltage Common Mode Range (Diff.) | 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 | D /D | 0.5 -150 | — — | 0.5 -150 | — — | — — | 0.5 -150 | — — | — — | 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 transverse airflow greater than 500lfpm is maintained.

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

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

5.0V PECL DC ELECTRICAL CHARACTERISTICS⁽¹⁾

$V_{CC} = 5.0V \pm 0.5V, V_{EE} = 0V^{(2)}$

| Symbol | Parameter | $T_A = -40^\circ\text{C}$ | | | $T_A = +25^\circ\text{C}$ | | | $T_A = +85^\circ\text{C}$ | | | Unit |
|-------------|--|---------------------------|-------------|----------|---------------------------|--------|----------|---------------------------|--------|----------|---------------|
| | | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | |
| I_{EE} | Power Supply Current | 20 | 28 | 36 | 20 | 30 | 38 | 20 | 32 | 38 | mA |
| V_{OH} | Output HIGH Voltage ⁽³⁾ | 3865 | 3990 | 4115 | 3930 | 4055 | 4180 | 3990 | 4115 | 4240 | mV |
| V_{OL} | Output LOW Voltage ⁽³⁾ | 3050 | 3190 | 3315 | 3050 | 3255 | 3830 | 3050 | 3315 | 3440 | mV |
| V_{IH} | Input HIGH Voltage (Single-Ended) | 3790 | — | 4115 | 3855 | — | 4180 | 3915 | — | 4240 | mV |
| V_{IL} | Input LOW Voltage (Single-Ended) | 3065 | — | 3390 | 3130 | — | 3455 | 3190 | — | 3515 | mV |
| V_{IHCMR} | Input HIGH Voltage Common Mode Range (Diff.) | 2.0 | — | V_{CC} | 2.0 | — | V_{CC} | 2.0 | — | V_{CC} | mV |
| I_{IH} | Input HIGH Current | — | — | 150 | — | — | 150 | — | — | 150 | μA |
| I_{IL} | Input LOW Current | D /D | 0.5 -150 | — — | 0.5 -150 | — — | — — | 0.5 -150 | — — | — — | 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 transverse airflow greater than 500lfpm is maintained.

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

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

NECL DC ELECTRICAL CHARACTERISTICS⁽¹⁾

$V_{CC} = 0V, V_{EE} = -5.5V \text{ to } -3.0V$

| Symbol | Parameter | $T_A = -40^\circ\text{C}$ | | | $T_A = +25^\circ\text{C}$ | | | $T_A = +85^\circ\text{C}$ | | | Unit |
|-------------|--|---------------------------|-------------|----------|---------------------------|--------|----------|---------------------------|--------|----------|---------------|
| | | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | |
| I_{EE} | Power Supply Current | 20 | 28 | 36 | 20 | 30 | 38 | 20 | 32 | 38 | mA |
| V_{OH} | Output HIGH Voltage ⁽²⁾ | -1135 | -1010 | -885 | -1070 | -945 | -820 | -1010 | -885 | -760 | mV |
| V_{OL} | Output LOW Voltage ⁽²⁾ | -1950 | -1810 | -1685 | -1950 | -1745 | -1620 | -1950 | -1685 | -1560 | mV |
| V_{IH} | Input HIGH Voltage (Single-Ended) | -1210 | — | -885 | -1145 | — | -820 | -1085 | — | -760 | mV |
| V_{IL} | Input LOW Voltage (Single-Ended) | -1935 | — | -1610 | -1870 | — | -1545 | -1810 | — | -1485 | mV |
| V_{IHCMR} | Input HIGH Voltage Common Mode Range (Diff.) | $V_{EE} + 2.0$ | | V_{CC} | $V_{EE} + 2.0$ | | V_{CC} | $V_{EE} + 2.0$ | | V_{CC} | mV |
| I_{IH} | Input HIGH Current | — | — | 150 | — | — | 150 | — | — | 150 | μA |
| I_{IL} | Input LOW Current | D /D | 0.5 -150 | — — | 0.5 -150 | — — | — — | 0.5 -150 | — — | — — | 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 transverse airflow greater than 500lfpm is maintained.

Note 2. All loading with 50Ω to $V_{CC} - 2.0V$.

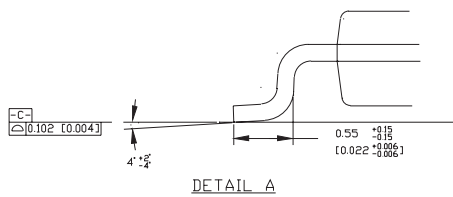
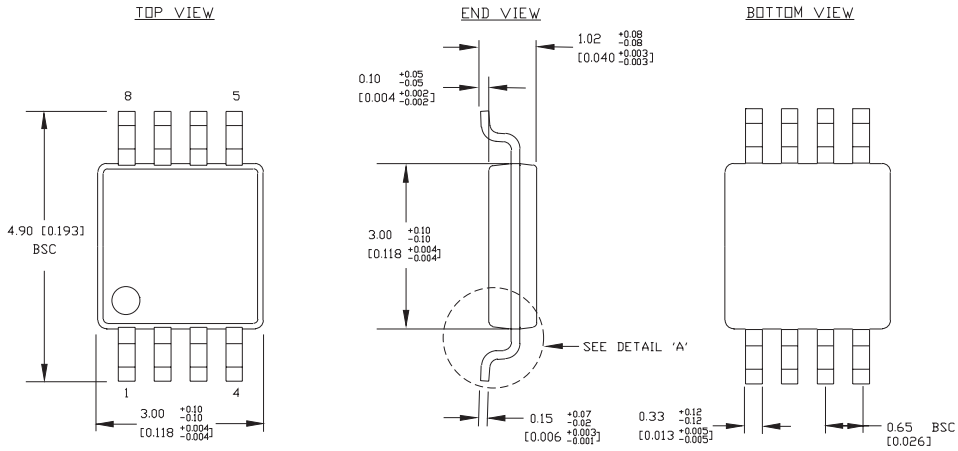
AC ELECTRICAL CHARACTERISTICS
 $V_{CC} = 0V$, $V_{EE} = -3.0V$ to $-5.5V$; $V_{CC} = 3.0V$ to $5.5V$, $V_{EE} = 0V^{(1)}$

| 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 Toggle Frequency ⁽²⁾ | — | — | > 3 | — | — | > 3 | — | — | > 3 | GHz |
| t_{PLH} t_{PHL} | Propagation Delay to Output Differential D, /D → Q, /Q | 100 | — | 240 | 120 | 200 | 260 | 150 | — | 300 | ps |
| V_{PP} | Input Voltage Swing (Diff.) | 150 | 800 | 1200 | 150 | 800 | 1200 | 150 | 800 | 1200 | mV |
| t_r t_f | Output Rise/Fall Times Q, /Q (20% to 80%) | 70 | 120 | 170 | 70 | — | 170 | 70 | — | 170 | ps |

Note 1. Measured using a 750mV source, 50% duty cycle clock source. All loading with 50Ω to $V_{CC} - 2.0V$.

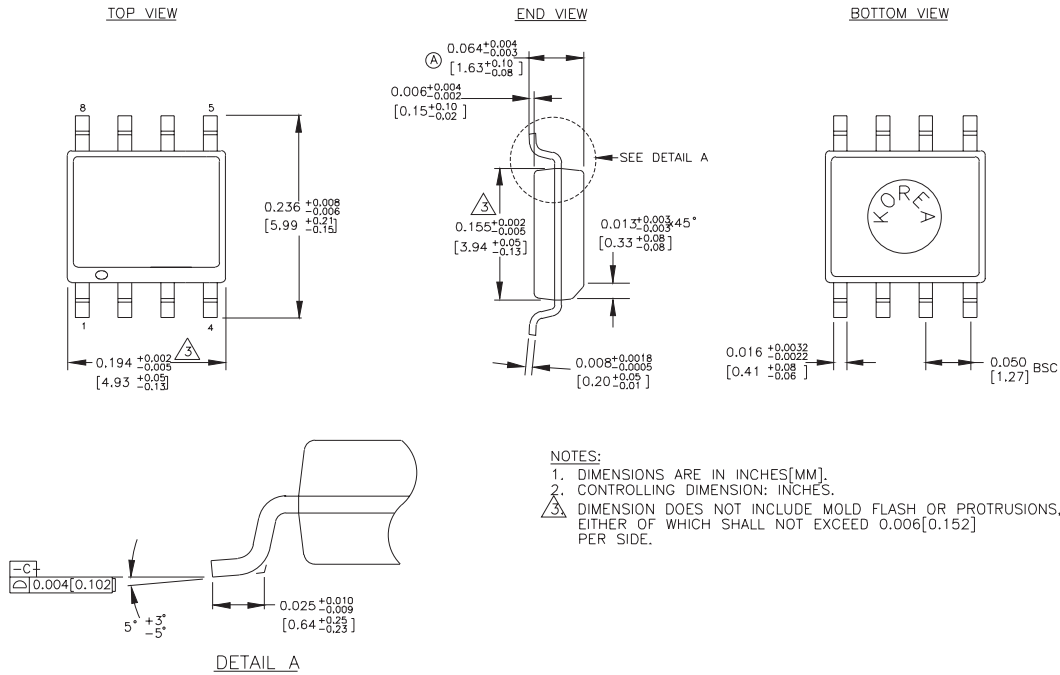
Note 2. f_{MAX} guaranteed for functionality only. V_{OL} and V_{OH} levels are guaranteed at DC only.

8-PIN MSOP (K8-1)



- NOTES:
1. DIMENSIONS ARE IN MM [INCHES].
 2. CONTROLLING DIMENSION: MM
 3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.20 [0.008] PER SIDE.

8-PIN PLASTIC SOIC (Z8-1)



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