



ENHANCED DIFFERENTIAL RECEIVER

SY10EL16VA-VF
SY100EL16VA-VF

FEATURES

- 3.3V and 5V power supply options
- 250ps propagation delay
- Very high voltage gain vs. standard EL16 or EL16V
- Ideal for Pulse Amplifier and Limiting Amplifier applications
- Data synchronous Enable/Disable (/EN) on QHG and /QHG provides for complete glitchless gating of the outputs
- Ideal for gating timing signals
- Complete solution for high quality, high frequency crystal oscillator applications
- Internal 75kΩ input pull-down resistors
- Available in both 8- and 16-pin SOIC package; 8- and 10-pin (3mm) MSOP and in DIE form

PIN NAMES

| Pin | Function |
|-----------------|--------------------------|
| D | Data Inputs |
| Q | Data Outputs |
| QHG | Data Outputs w/High Gain |
| V _{BB} | Reference Voltage Output |
| /EN | Enable Input |

TRUTH TABLE

| /EN | QHG Output |
|-----|------------|
| 0 | Data |
| 1 | Logic Low |

DESCRIPTION

The SY10/100EL16VA-VF are differential receivers. The devices are equivalent to SY10/100EL16 or SY10/100EL16V with enhanced capabilities. The QHG, /QHG outputs have a DC gain several times larger than the DC gain of the Q output.

The SY10/100EL16VA have an identical pinout to the SY10/100EL16 or SY10/100EL16V. It provides a V_{BB} output for either single-ended application or as a DC bias for AC coupling to the device.

The SY10/100EL16VB are very similar to the SY10/100EL16VA. The /Q output is provided for feedback purposes.

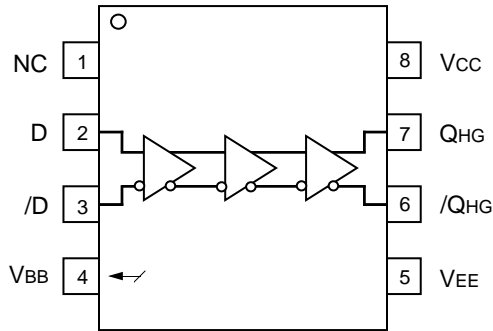
The SY10/100EL16VC provides an /EN input which is synchronized with the data input (D) signal in a way that provides glitchless gating of the QHG and /QHG outputs. When the /EN signal is LOW, the input is passed to the outputs and the data output equals the data input. When the data input is HIGH and the /EN goes HIGH, it will force the QHG LOW and the /QHG HIGH on the next negative transition of the data input. If the data input is LOW when the /EN goes HIGH, the next data transition to a HIGH is ignored and QHG remains LOW and /QHG remains HIGH. The next positive transition of the data input is not passed on to the data outputs under these conditions. The QHG and /QHG outputs remain in their disabled state as long as the /EN input is held HIGH. The /EN input has no influence on the /Q output and the data input is passed on (inverted) to this output whether /EN is HIGH or LOW. This configuration is ideal for crystal oscillator applications, where the oscillator can be free running and gated on and off synchronously without adding extra counts to the output.

The SY10/100EL16VD provides the flexibility of all the combinations in DIE form, in 16-pin 150mil SOIC package or in 10-pin MSOP package. The 16-pin SOIC and 10-pin MSOP packages are ideal for prototyping DIE applications.

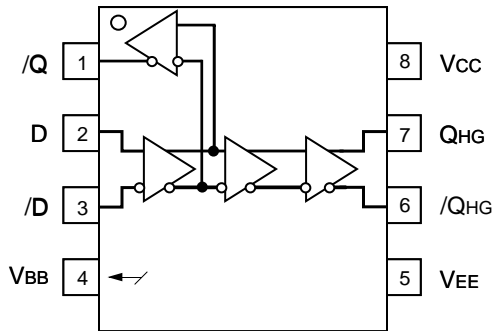
The SY10/100EL16VE are similar to the SY10/100EL16VB where the Q, /Q output is made available differently. In this package option, V_{BB} is no longer provided.

The SY10/100EL16VF are similar to the SY10/100EL16VC, offering the D, /D inputs rather than the V_{BB} output.

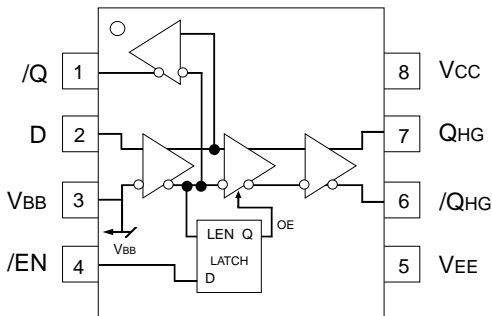
PIN CONFIGURATION/BLOCK DIAGRAM



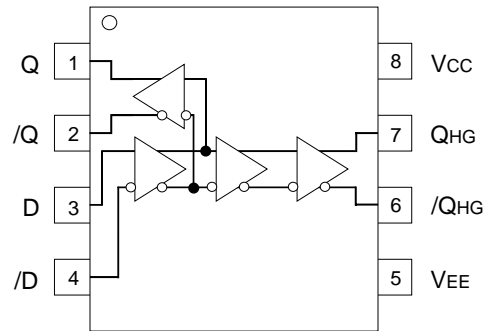
SY10/100EL16VA
5V/3.3V Differential Receiver w/High Gain
(Available in 8-pin SOIC or 8-pin MSOP)



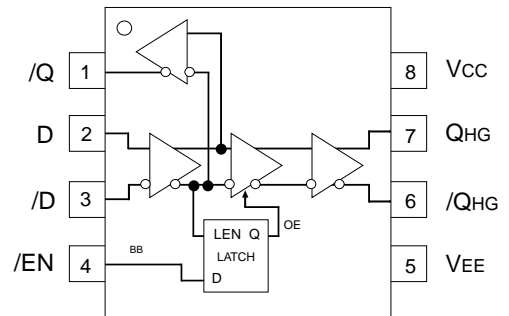
SY10/100EL16VB
EL16VA w/Extra QB output
(Available in 8-pin SOIC or 8-pin MSOP)



SY10/100EL16VC
EL16VB w/Enable Input
(Available in 8-pin SOIC or 8-pin MSOP)

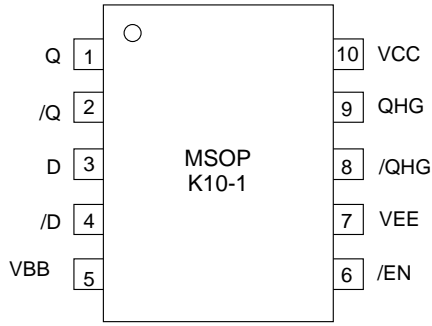


SY10/100EL16VE
EL16VB w/Differential Q, QB output (no VBB)
(Available in 8-pin SOIC or 8-pin MSOP)

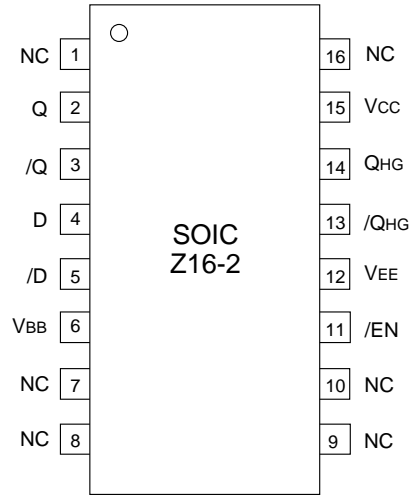


SY10/100EL16VF
EL16VC w/Differential Data Input
(Available in 8-pin SOIC or 8-pin MSOP)

PIN CONFIGURATION/BLOCK DIAGRAM



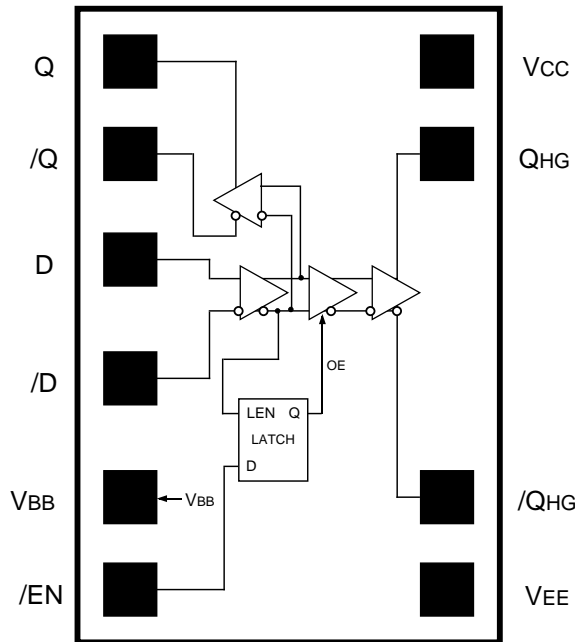
SY10/100EL16VDKC
EL16VDXC packaged in 10-pin MSOP



SY10/100EL16VDZC
EL16VDXC packaged in 16-pin SOIC

DIE LAYOUT

All options in DIE form w/Extra Q output and VBB output
Die Size (mils) 39. X 52. X 14.5



SY10/100EL16VDXC
DIE
TOP VIEW

PACKAGE/ORDERING INFORMATION**Ordering Information⁽¹⁾**

| Part Number | Package Type | Operating Range | Package Marking | Lead Finish |
|----------------------------------|--------------|-----------------|-----------------|-------------|
| SY10EL16VAZC | Z8-1 | Commercial | HEL16VA | Sn-Pb |
| SY10EL16VAZCTR ⁽²⁾ | Z8-1 | Commercial | HEL16VA | Sn-Pb |
| SY100EL16VAZC | Z8-1 | Commercial | XEL16VA | Sn-Pb |
| SY100EL16VAZCTR ⁽²⁾ | Z8-1 | Commercial | XEL16VA | Sn-Pb |
| SY10EL16VBZC | Z8-1 | Commercial | HEL16VB | Sn-Pb |
| SY10EL16VBZCTR ⁽²⁾ | Z8-1 | Commercial | HEL16VB | Sn-Pb |
| SY100EL16VBZC | Z8-1 | Commercial | XEL16VB | Sn-Pb |
| SY100EL16VBZCTR ⁽²⁾ | Z8-1 | Commercial | XEL16VB | Sn-Pb |
| SY10EL16VCZC | Z8-1 | Commercial | HEL16VC | Sn-Pb |
| SY10EL16VCZCTR ⁽²⁾ | Z8-1 | Commercial | HEL16VC | Sn-Pb |
| SY100EL16VCZC | Z8-1 | Commercial | XEL16VC | Sn-Pb |
| SY100EL16VCZCTR ⁽²⁾ | Z8-1 | Commercial | XEL16V | Sn-Pb |
| SY10EL16VDZC | Z16-2 | Commercial | SY10EL16VDZC | Sn-Pb |
| SY10EL16VDZCTR ⁽²⁾ | Z16-2 | Commercial | SY10EL16VDZC | Sn-Pb |
| SY100EL16VDZC | Z16-2 | Commercial | SY100EL16VDZC | Sn-Pb |
| SY100EL16VDZCTR ⁽²⁾ | Z16-2 | Commercial | SY100EL16VDZC | Sn-Pb |
| SY10EL16VEZC | Z8-1 | Commercial | HEL16VE | Sn-Pb |
| SY10EL16VEZCTR ⁽²⁾ | Z8-1 | Commercial | HEL16VE | Sn-Pb |
| SY100EL16VEZC | Z8-1 | Commercial | XEL16VE | Sn-Pb |
| SY100EL16VEZCTR ⁽²⁾ | Z8-1 | Commercial | XEL16VE | Sn-Pb |
| SY10EL16VFZC | Z8-1 | Commercial | HEL16VF | Sn-Pb |
| SY10EL16VFZCTR ⁽²⁾ | Z8-1 | Commercial | HEL16VF | Sn-Pb |
| SY100EL16VFZC | Z8-1 | Commercial | XEL16VF | Sn-Pb |
| SY100EL16VFZCTR ⁽²⁾ | Z8-1 | Commercial | XEL16VF | Sn-Pb |
| SY10EL16VAZI ⁽²⁾ | Z8-1 | Industrial | HEL16VA | Sn-Pb |
| SY10EL16VAZITR ^(1,2) | Z8-1 | Industrial | HEL16VA | Sn-Pb |
| SY100EL16VAZI ⁽²⁾ | Z8-1 | Industrial | XEL16VA | Sn-Pb |
| SY100EL16VAZITR ^(1,2) | Z8-1 | Industrial | XEL16VA | Sn-Pb |
| SY10EL16VBZI ⁽²⁾ | Z8-1 | Industrial | HEL16VB | Sn-Pb |
| SY10EL16VBZITR ^(1,2) | Z8-1 | Industrial | HEL16VB | Sn-Pb |
| SY100EL16VBZI ⁽²⁾ | Z8-1 | Industrial | XEL16VB | Sn-Pb |
| SY100EL16VBZITR ^(1,2) | Z8-1 | Industrial | XEL16VB | Sn-Pb |
| SY10EL16VCZI ⁽²⁾ | Z8-1 | Industrial | HEL16VC | Sn-Pb |
| SY10EL16VCZITR ^(1,2) | Z8-1 | Industrial | HEL16VC | Sn-Pb |
| SY100EL16VCZI ⁽²⁾ | Z8-1 | Industrial | XEL16VC | Sn-Pb |
| SY100EL16VCZITR ⁽²⁾ | Z8-1 | Industrial | XEL16VC | Sn-Pb |

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.

Ordering Information⁽¹⁾

| Part Number | Package Type | Operating Range | Package Marking | Lead Finish |
|-----------------------------------|--------------|-----------------|--|-------------------|
| SY10EL16VDZI | Z16-2 | Industrial | SY10EL16VDZI | Sn-Pb |
| SY10EL16VDZITR ⁽²⁾ | Z16-2 | Industrial | SY10EL16VDZI | Sn-Pb |
| SY100EL16VDZI | Z16-2 | Industrial | SY100EL16VDZI | Sn-Pb |
| SY100EL16VDZITR ⁽²⁾ | Z16-2 | Industrial | SY100EL16VDZI | Sn-Pb |
| SY10EL16VEZI | Z8-1 | Industrial | HEL16VE | Sn-Pb |
| SY10EL16VEZITR ⁽²⁾ | Z8-1 | Industrial | HEL16VE | Sn-Pb |
| SY100EL16VEZI | Z8-1 | Industrial | XEL16VE | Sn-Pb |
| SY100EL16VEZITR ⁽²⁾ | Z8-1 | Industrial | XEL16VE | Sn-Pb |
| SY10EL16VFZI | Z8-1 | Industrial | HEL16VF | Sn-Pb |
| SY10EL16VFZITR ⁽²⁾ | Z8-1 | Industrial | HEL16VF | Sn-Pb |
| SY100EL16VFZI | Z8-1 | Industrial | XEL16VF | Sn-Pb |
| SY100EL16VFZITR ⁽²⁾ | Z8-1 | Industrial | XEL16VF | Sn-Pb |
| SY10EL16VAZG ⁽³⁾ | Z8-1 | Industrial | HEL16VA with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY10EL16VAZGTR ^(2, 3) | Z8-1 | Industrial | HEL16VA with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY100EL16VAZG ⁽³⁾ | Z8-1 | Industrial | XEL16VA with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY100EL16VAZGTR ^(2, 3) | Z8-1 | Industrial | XEL16VA with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY10EL16VBZG ⁽³⁾ | Z8-1 | Industrial | HEL16VB with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY10EL16VBZGTR ^(2, 3) | Z8-1 | Industrial | HEL16VB with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY100EL16VBZG ⁽³⁾ | Z8-1 | Industrial | XEL16VB with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY100EL16VBZGTR ^(2, 3) | Z8-1 | Industrial | XEL16VB with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY100EL16VCKGTR ^(2, 3) | K8-1 | Industrial | X16C with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY10EL16VCZG ⁽³⁾ | Z8-1 | Industrial | HEL16VC with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY10EL16VCZGTR ^(2, 3) | Z8-1 | Industrial | HEL16VC with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY100EL16VCZG ⁽³⁾ | Z8-1 | Industrial | XEL16VC with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY100EL16VCZGTR ^(2, 3) | Z8-1 | Industrial | XEL16VC with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY100EL16VDKG | K10-1 | Industrial | XEL16VD with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY100EL16VDKGTR ⁽²⁾ | K10-1 | Industrial | XEL16VD 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.

Ordering Information⁽¹⁾

| Part Number | Package Type | Operating Range | Package Marking | Lead Finish |
|-----------------------------------|--------------|-----------------|---|----------------|
| SY10EL16VDZG ⁽³⁾ | Z16-2 | Industrial | SY10EL16VDZG with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY10EL16VDZGTR ^(2, 3) | Z16-2 | Industrial | SY10EL16VDZG with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY100EL16VDZG ⁽³⁾ | Z16-2 | Industrial | SY100EL16VDZG with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY100EL16VDZGTR ^(2, 3) | Z16-2 | Industrial | SY100EL16VDZG with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY10EL16VEZG ⁽³⁾ | Z8-1 | Industrial | HEL16VE with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY10EL16VEZGTR ^(2, 3) | Z8-1 | Industrial | HEL16VE with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY100EL16VEZG ⁽³⁾ | Z8-1 | Industrial | XEL16VE with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY100EL16VEZGTR ^(2, 3) | Z8-1 | Industrial | XEL16VE with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY10EL16VFZG ⁽³⁾ | Z8-1 | Industrial | HEL16VF with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY10EL16VFZGTR ^(2, 3) | Z8-1 | Industrial | HEL16VF with Pb-Free bar-line indicator | NiPdAu Pb-Free |
| SY100EL16VFZG ⁽³⁾ | Z8-1 | Industrial | XEL16VF 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.

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 | 10EL | — | — | 40 | — | — | 40 | — | — | 40 | — | — | 40 | mA |
| | | 100EL | — | — | 40 | — | — | 40 | — | — | 40 | — | — | 46 | |
| V _{BB} | Output Reference Voltage | 10EL | -1.43 | — | -1.30 | -1.38 | — | -1.27 | -1.35 | — | -1.25 | -1.31 | — | -1.19 | V |
| | | 100EL | -1.38 | — | -1.26 | -1.38 | — | -1.26 | -1.38 | — | -1.26 | -1.38 | — | -1.26 | |
| I _{IH} | Input HIGH Current | — | — | 150 | — | — | 150 | — | — | 150 | — | — | 150 | μA | |

Note:

1. Parametric values specified at: 10/100EL16VA-VF Series: -3.0V to -5.5V.

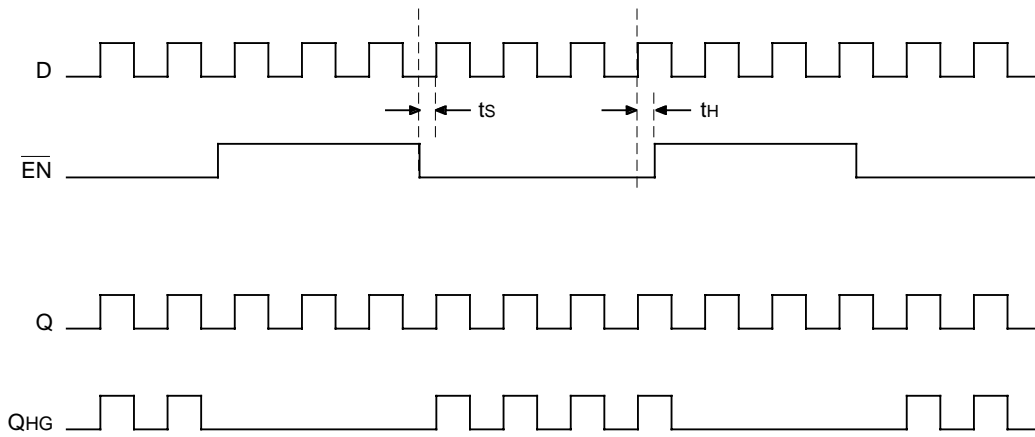
AC ELECTRICAL CHARACTERISTICS⁽⁴⁾V_{EE} = V_{EE} (Min) to V_{EE} (Max), V_{CC} = GND

| 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. | |
| t _{PLH} t _{PHL} | Propagation Delay to Q, /Q Output | — | — | 350 | — | — | 350 | — | — | 350 | — | — | 380 | ps |
| | D (Diff) | | | | | | | | | | | | | |
| | QHG, /QHG Output | — | — | 650 | — | — | 650 | — | — | 650 | — | — | 730 | ps |
| | D (Diff) | | | | | | | | | | | | | |
| t _S | Setup Time /EN | — | 150 | — | — | 150 | — | — | 150 | — | — | 150 | — | ps |
| t _H | Hold Time /EN | — | 150 | — | — | 150 | — | — | 150 | — | — | 150 | — | ps |
| t _{skew} | Duty Cycle Skew ⁽¹⁾ (Diff) | — | 5 | — | — | 5 | 20 | — | 5 | 20 | — | 5 | 20 | ps |
| V _{PP} | Minimum Input Swing ⁽²⁾ | 150 | — | — | 150 | — | — | 150 | — | — | 150 | — | — | mV |
| V _{CMR} | Common Mode Range ⁽³⁾ | -1.3 | — | -0.4 | -1.4 | — | -0.4 | -1.4 | — | -0.4 | -1.4 | — | -0.4 | V |
| t _r t _f | Output Q Rise/Fall Time (20% TO 80%) | 100 | 225 | 350 | 100 | 225 | 350 | 100 | 225 | 350 | 100 | 225 | 350 | ps |

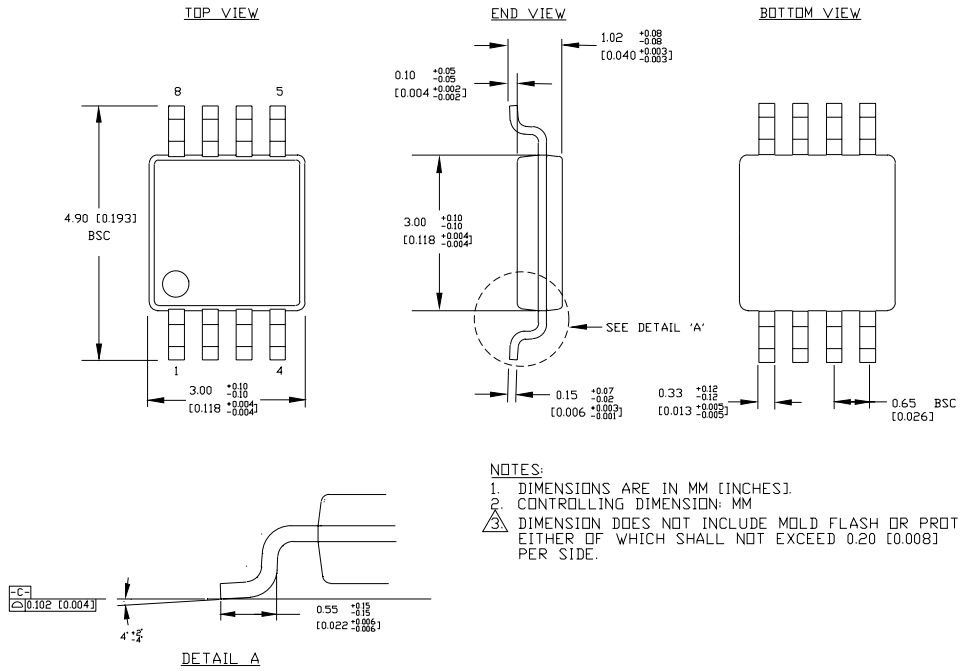
Notes:

1. Duty cycle skew is the difference between a t_{PLH} and t_{PHL} propagation delay through a device.
2. Minimum input swing for which AC parameters are guaranteed. The device has a DC gain of ≈ 40 to Q, /Q outputs and a DC gain of ≈ 200 or higher to /QHG/QHG outputs.
3. 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} 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} = -3.3V. Note for PECL operation, the V_{CMR} (min) will be fixed at 3.3V - [V_{CMR} (min)].
4. Parametric values specified at: 10/100EL16VA-VF Series: -3.0V to -5.5V.

TIMING DIAGRAM

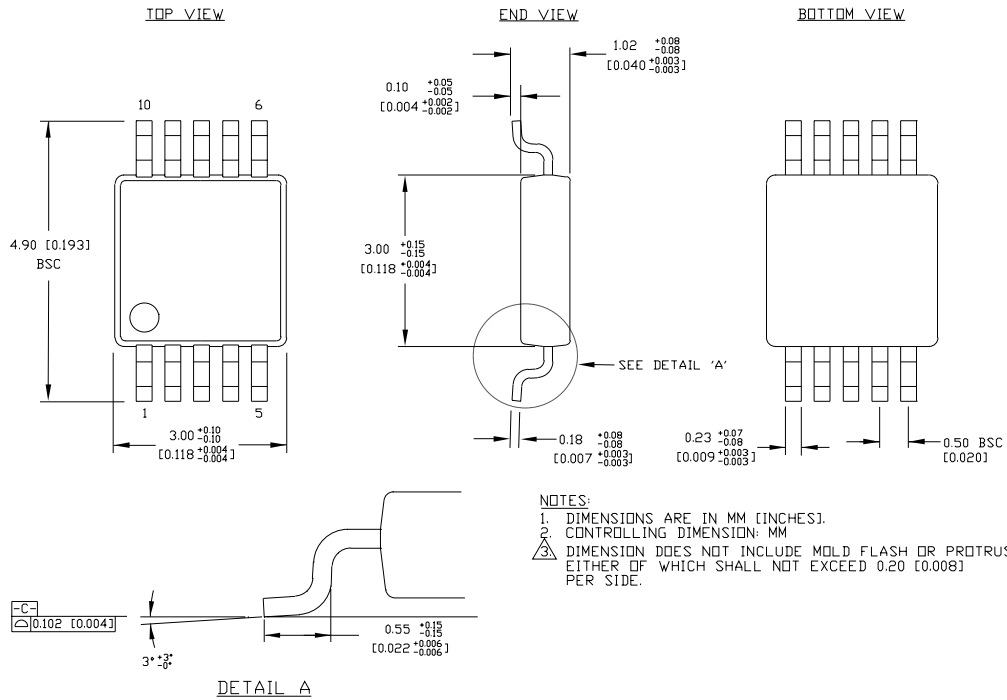


8-PIN MSOP (K8-1)



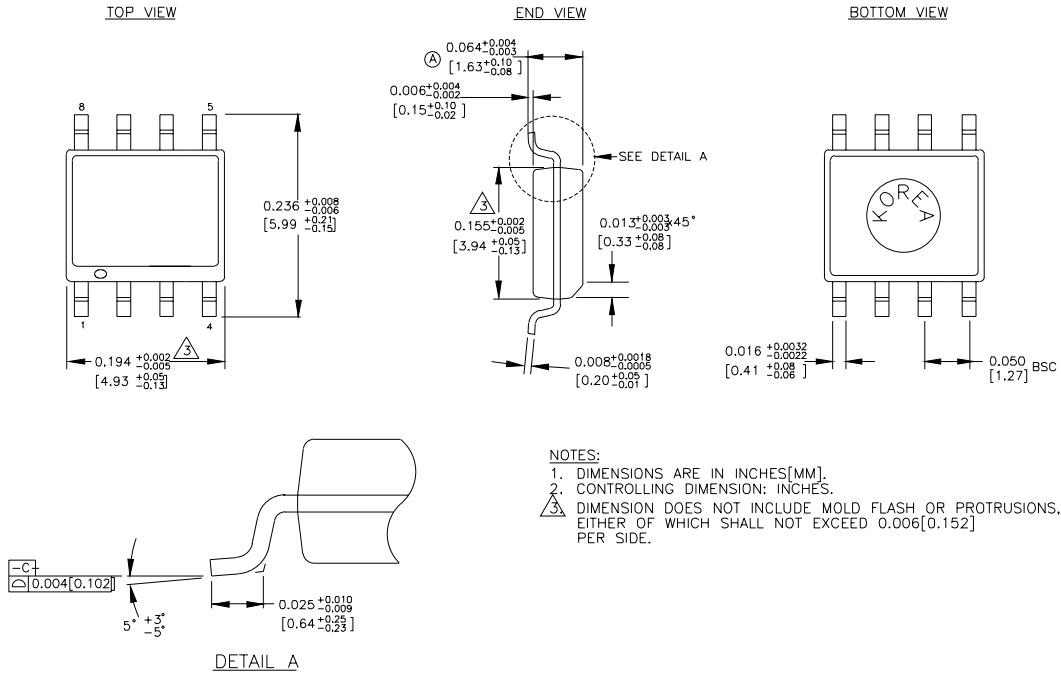
Rev. 01

10-PIN MSOP (K10-1)



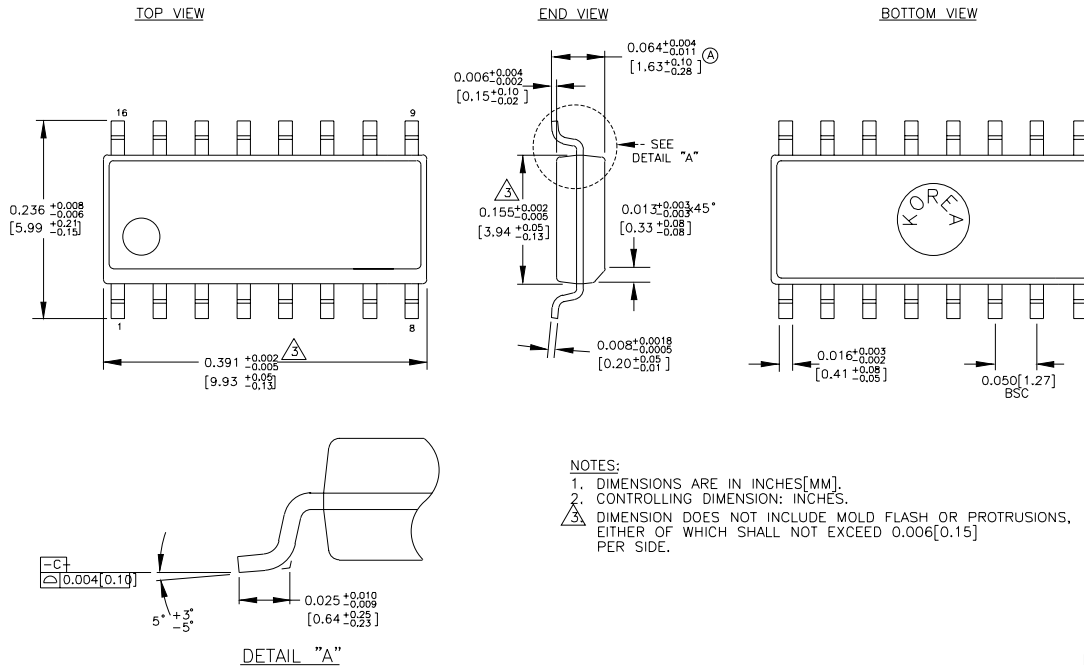
Rev. 00

8-PIN SOIC .150" WIDE (Z8-1)



Rev. 03

16-PIN SOIC .150" WIDE (Z16-2)



Rev. 02

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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- Подбор аналогов.
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- Работу по проектам и поставку образцов.
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- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)

Email: org@lifeelectronics.ru