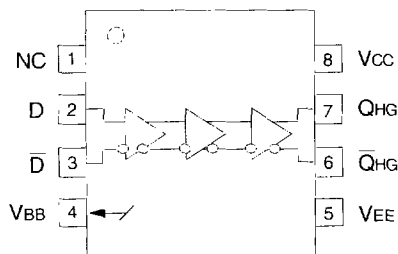


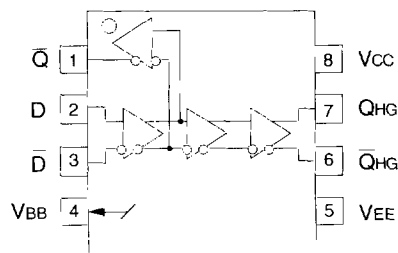
### FEATURES

- 3.3V and 5V power supply options
- 250ps propagation delay
- Very high voltage gain vs. standard EL16
- Ideal for Pulse Amplifier and Limiting Amplifier applications
- Data synchronous Enable/Disable ( $\overline{EN}$ ) on QHG and  $\overline{QHG}$  provides for complete glitchless gating of the outputs
- Ideal for gating timing signals
- Complete solution for high quality, high frequency crystal oscillator applications
- Internal 75K Ohm input pull-down resistors
- ESD protection of 2000V
- Available in both 8-pin SOIC and in DIE form

### PIN CONFIGURATION/BLOCK DIAGRAM



**SY10/100EL16A/LA**  
5V/3.3V Differential Receiver w/High Gain



**SY10/100EL16B/LB**  
EL16A/LA w/Extra QB output

### DESCRIPTION

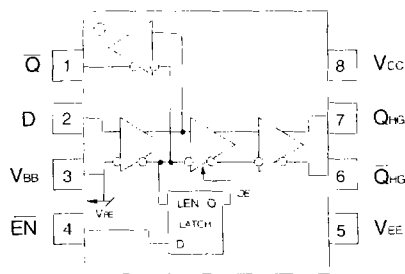
The SY10/100EL16A/LA/B/LB/C/LC/V are differential receivers. The devices are equivalent to SY10/100EL16 with enhanced capabilities. The QHG/QHG outputs have a DC gain several times larger than the DC gain of the Q output.

The SY10/100EL16A/LA have an identical pinout to the SY10/100EL16. It provides a VBB output for either single-ended application or as a DC bias for AC coupling to the device.

The SY10/100EL16B/LB are very similar to the SY10/100EL16A/LA. The Q output is provided for feedback purposes.

The SY10/100EL16C/LC provides an  $\overline{EN}$  input which is synchronized with the data input (D) signal in a way that provides glitchless gating of the QHG and  $\overline{QHG}$  outputs. When the  $\overline{EN}$  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  $\overline{EN}$  goes HIGH, it will force the QHG LOW and the  $\overline{QHG}$  HIGH on the next negative transition of the data input. If the data input is LOW when the  $\overline{EN}$  goes HIGH, the next data transition to a HIGH is ignored and QHG remains LOW and  $\overline{QHG}$  remains HIGH. The next positive transition of the data input is not passed on to the data outputs under these conditions. The QHG and  $\overline{QHG}$  outputs remain in their disabled state as long as the  $\overline{EN}$  input is held HIGH. The  $\overline{EN}$  input has no influence on the Q output and the data input is passed on (inverted) to this output whether  $\overline{EN}$  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.

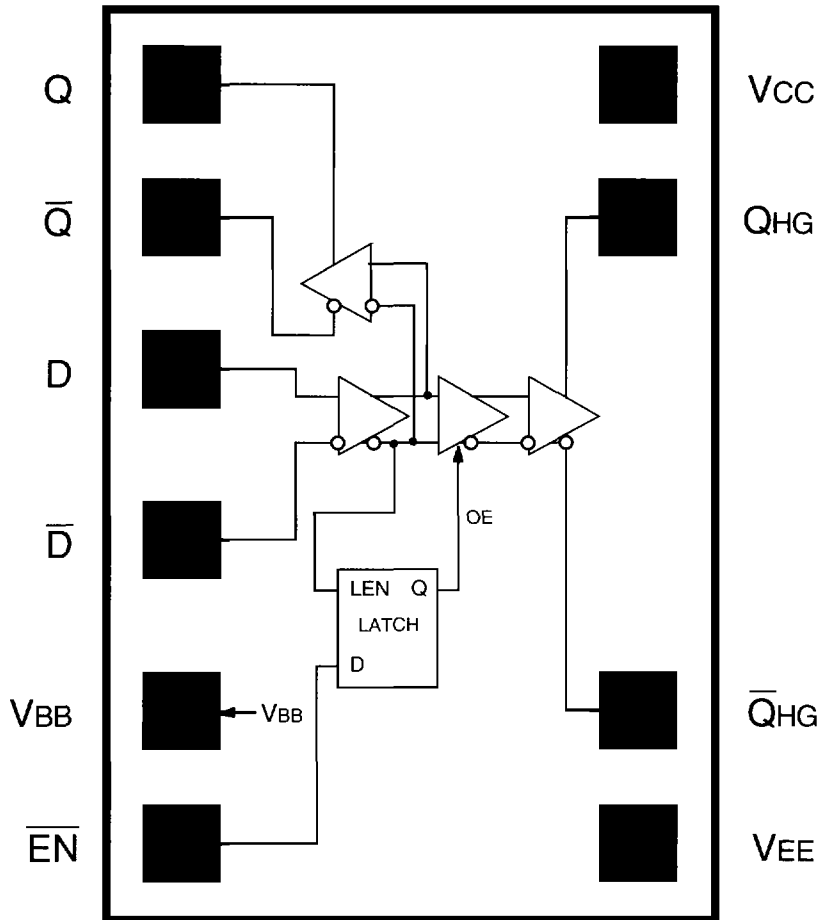
The SY10/100EL16V (DIE form) provides the flexibility of all the above combinations, as well as separate bond pad availability for additional Q,  $\overline{Q}$ , VBB and EN functions.



**SY10/100EL16C/LC**  
EL16B/LB w/Enable input

**DIE LAYOUT**

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



5

SY10/100EL16V

DIE  
TOP VIEW

## PIN NAMES

| Pin                    | Function                  |
|------------------------|---------------------------|
| D                      | Data Inputs               |
| Q                      | Data Outputs              |
| QHG                    | Data Outputs w/ High Gain |
| V <sub>BB</sub>        | Reference Voltage Output  |
| $\overline{\text{EN}}$ | Enable Input              |

## TRUTH TABLE

| $\overline{\text{EN}}$ | QHG Output |
|------------------------|------------|
| 0                      | Data       |
| 1                      | Logic Low  |

## DC ELECTRICAL CHARACTERISTICS<sup>(1)</sup>

V<sub>EE</sub> = V<sub>EE</sub> (Min) to V<sub>EE</sub> (Max). V<sub>CC</sub> = GND

| Symbol          | Parameter                | -40°C |      |       | 0°C   |      |       | +25°C |      |       | +85°C |      |       | Unit |
|-----------------|--------------------------|-------|------|-------|-------|------|-------|-------|------|-------|-------|------|-------|------|
|                 |                          | Min.  | Typ. | Max.  | Min.  | Typ. | Max.  | Min.  | Typ. | Max.  | Min.  | Typ. | Max.  |      |
| IEE             | Power Supply Current     | —     | —    | 40    | —     | —    | 40    | —     | —    | 40    | —     | —    | 40    | mA   |
|                 | 100EL                    | —     | —    | 40    | —     | —    | 40    | —     | —    | 40    | —     | —    | 46    |      |
| VBB             | Output Reference Voltage | —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 <sub>IH</sub> | Input HIGH Current       | —     | —    | 150   | —     | —    | 150   | —     | —    | 150   | —     | —    | 150   | μA   |

NOTE:

- Parametric values specified at: 5 volt Power Supply Range: 100EL16A/B/C/V Series: -4.2V to -5.5V.  
10EL16A/B/C/V Series: -4.75V to -5.5V.  
3 volt Power Supply Range: 10/100EL16LA/LB/LC/V Series: -3.0V to -3.8V.

## AC ELECTRICAL CHARACTERISTICS<sup>(4)</sup>

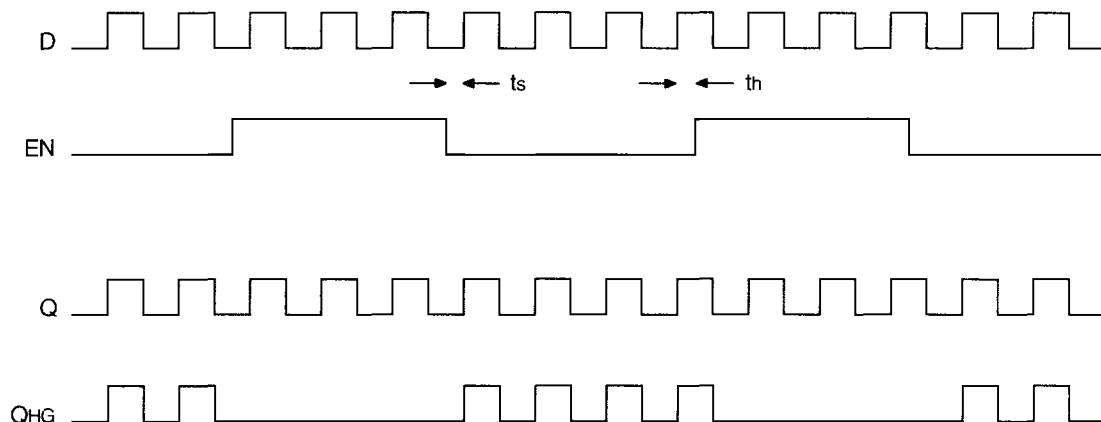
V<sub>EE</sub> = V<sub>EE</sub> (Min) to V<sub>EE</sub> (Max). V<sub>CC</sub> = GND

| Symbol | Parameter                          | -40°C |      |      | 0°C  |      |      | +25°C |      |      | +85°C |      |      | Unit |
|--------|------------------------------------|-------|------|------|------|------|------|-------|------|------|-------|------|------|------|
|        |                                    | Min.  | Typ. | Max. | Min. | Typ. | Max. | Min.  | Typ. | Max. | Min.  | Typ. | Max. |      |
| tPLH   | Propagation Delay to Q/Q Output    | —     | —    | 350  | —    | —    | 350  | —     | —    | 350  | —     | —    | 380  | ps   |
| tPHL   | D (Diff)                           | —     | —    | 400  | —    | —    | 400  | —     | —    | 400  | —     | —    | 430  |      |
|        | D (SE)                             | —     | —    | 400  | —    | —    | 400  | —     | —    | 400  | —     | —    | 430  |      |
|        | QHG/QHG Output                     | —     | —    | 650  | —    | —    | 650  | —     | —    | 650  | —     | —    | 730  | ps   |
|        | D (Diff)                           | —     | —    | 700  | —    | —    | 700  | —     | —    | 700  | —     | —    | 780  |      |
|        | D (SE)                             | —     | —    | 700  | —    | —    | 700  | —     | —    | 700  | —     | —    | 780  |      |
| tS     | Setup Time                         | EN    | —    | 150  | —    | —    | 150  | —     | —    | 150  | —     | —    | 150  | ps   |
| tH     | Hold Time                          | EN    | —    | 150  | —    | —    | 150  | —     | —    | 150  | —     | —    | 150  | ps   |
| tSkew  | Duty Cycle Skew <sup>(1)</sup>     |       |      |      |      |      |      |       |      |      |       |      |      |      |
|        | (Diff)                             | —     | 5    | —    | —    | 5    | 20   | —     | 5    | 20   | —     | 5    | 20   | ps   |
| VPP    | Minimum Input Swing <sup>(2)</sup> | 150   | —    | —    | 150  | —    | —    | 150   | —    | —    | 150   | —    | —    | mV   |
| VCMR   | Common Mode Range <sup>(3)</sup>   | -1.3  | —    | -0.4 | -1.4 | —    | -0.4 | -1.4  | —    | -0.4 | -1.4  | —    | -0.4 | V    |
| tr     | Output Q                           | 100   | 225  | 350  | 100  | 225  | 350  | 100   | 225  | 350  | 100   | 225  | 350  | ps   |
| tf     | Rise/Fall Time (20% TO 80%)        |       |      |      |      |      |      |       |      |      |       |      |      |      |

NOTES:

- Duty cycle skew is the difference between a t<sub>PLH</sub> and t<sub>PHL</sub> propagation delay through a device.
- 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.
- 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<sub>PP</sub> min. and 1V. The lower end of the CMR range varies 1:1 with V<sub>EE</sub>. The numbers in the spec table assume a nominal V<sub>EE</sub> = -3.3V. Note for PECL operation, the V<sub>CMR</sub> (min) will be fixed at 3.3V - |V<sub>CMR</sub> (min)|.
- Parametric values specified at: 5 volt Power Supply Range: 100EL16A/B/C/V Series: -4.2V to -5.5V.  
10EL16A/B/C/V Series: -4.75V to -5.5V.  
3 volt Power Supply Range: 10/100EL16LA/LB/LC/V Series: -3.0V to -3.8V.

## TIMING DIAGRAM



5

## PRODUCT ORDERING CODE

### 5V

| Ordering Code  | Package Type | Operating Range | VEE Range (V) |
|----------------|--------------|-----------------|---------------|
| SY10EL16AZC    | Z8-1         | Commercial      | -4.75 to -5.5 |
| SY10EL16AZCTR  | Z8-1         | Commercial      | -4.75 to -5.5 |
| SY100EL16AZC   | Z8-1         | Commercial      | -4.2 to -5.5  |
| SY100EL16AZCTR | Z8-1         | Commercial      | -4.2 to -5.5  |
| SY10EL16BZC    | Z8-1         | Commercial      | -4.75 to -5.5 |
| SY10EL16BZCTR  | Z8-1         | Commercial      | -4.75 to -5.5 |
| SY100EL16BZC   | Z8-1         | Commercial      | -4.2 to -5.5  |
| SY100EL16BZCTR | Z8-1         | Commercial      | -4.2 to -5.5  |
| SY10EL16CZC    | Z8-1         | Commercial      | -4.75 to -5.5 |
| SY10EL16CZCTR  | Z8-1         | Commercial      | -4.75 to -5.5 |
| SY100EL16CZC   | Z8-1         | Commercial      | -4.2 to -5.5  |
| SY100EL16CZCTR | Z8-1         | Commercial      | -4.2 to -5.5  |

### 3.3V

| Ordering Code   | Package Type | Operating Range | VEE Range (V) |
|-----------------|--------------|-----------------|---------------|
| SY10EL16LAZC    | Z8-1         | Commercial      | -3.0 to -3.8  |
| SY10EL16LAZCTR  | Z8-1         | Commercial      | -3.0 to -3.8  |
| SY100EL16LAZC   | Z8-1         | Commercial      | -3.0 to -3.8  |
| SY100EL16LAZCTR | Z8-1         | Commercial      | -3.0 to -3.8  |
| SY10EL16LBZC    | Z8-1         | Commercial      | -3.0 to -3.8  |
| SY10EL16LBZCTR  | Z8-1         | Commercial      | -3.0 to -3.8  |
| SY100EL16LBZC   | Z8-1         | Commercial      | -3.0 to -3.8  |
| SY100EL16LBZCTR | Z8-1         | Commercial      | -3.0 to -3.8  |
| SY10EL16LCZC    | Z8-1         | Commercial      | -3.0 to -3.8  |
| SY10EL16LCZCTR  | Z8-1         | Commercial      | -3.0 to -3.8  |
| SY100EL16LCZC   | Z8-1         | Commercial      | -3.0 to -3.8  |
| SY100EL16LCZCTR | Z8-1         | Commercial      | -3.0 to -3.8  |
| SY10EL16VXC     | DIE          | Commercial      | -3.0 to -3.8  |
| SY100EL16VXC    | DIE          | Commercial      | -3.0 to -3.8  |