

### FEATURES

- 3.3V and 5V power supply options
- High bandwidth output transitions
- Internal 75K $\Omega$  pull-down resistors on inputs
- Functionally equivalent to SY100EL16V with variable output swing
- Improved output waveform characteristics
- Available in 8-pin SOIC and 8-pin (3mm) MSOP

### DESCRIPTION

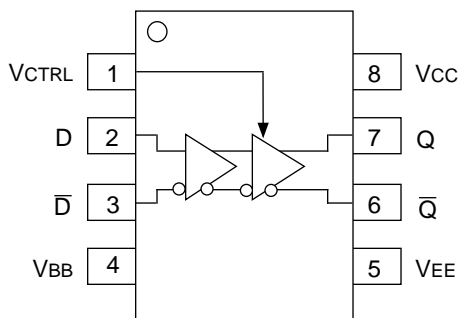
The SY100EL16VS are differential receivers with variable output swing. The devices are functionally equivalent to the EL16V devices with an input that control the amplitude of the outputs.

The operational range of the EL16VS control input is from VBB (max. swing) to VCC (min. swing). Simple control of the output swing can be obtained by a variable resistor between the VBB pin and VCC with the wiper driving VCTRL.

The EL16VS provides a VBB output for either single-ended use or as a DC bias for AC coupling to the device. The VBB pin should be used only as a bias for the EL16VS as its current sink/source capability is limited. Whenever used, the VBB pin should be bypassed to ground via a 0.01 $\mu$ F capacitor.

Under open input conditions (pulled to VEE), internal input clamps will force the Q output LOW.

### PIN CONFIGURATION/BLOCK DIAGRAM



### PIN NAMES

Pin	Function
D	Data Inputs
Q	Data Outputs
VBB	Reference Voltage Output
VCTRL	Output Swing Control

### TYPICAL VOLTAGE OUTPUT SWING

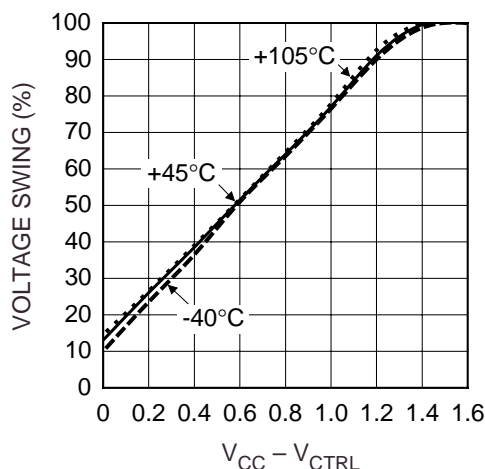


Figure 1. Typical Voltage Output Swing  
VCC = 3.3V or 5V

**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	T <sub>A</sub> = -40°C			T <sub>A</sub> = 0°C			T <sub>A</sub> = +25°C			T <sub>A</sub> = +85°C			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
I <sub>EE</sub>	Power Supply Current	—	18	22	9	18	22	9	18	22	9	21	26	mA
V <sub>BB</sub>	Output Reference Voltage	-1.38	—	-1.26	-1.38	—	-1.26	-1.38	—	-1.26	-1.38	—	-1.26	V
I <sub>IH</sub>	Input HIGH Current -D, $\bar{D}$ -V <sub>CTRL</sub>	—	—	150 40	—	—	150 40	—	—	150 40	—	—	150 40	μA
V <sub>OL</sub>	Output LOW Voltage <sup>(2)</sup> V <sub>CTRL</sub> = V <sub>BB</sub>	-1890	—	-1620	-1870	—	-1680	-1870	-1775	-1680	-1870	—	-1680	mV
V <sub>OL</sub>	Output LOW Voltage <sup>(2)</sup> V <sub>CTRL</sub> = V <sub>CC</sub>	-1180	—	-975	-1135	—	-990	-1135	-1065	-990	-1135	—	-990	mV
V <sub>OH</sub>	Output HIGH Voltage <sup>(3)</sup>	-1085	—	-880	-1025	—	-880	-1025	-955	-880	-1025	—	-880	mV

**NOTES:**

1. Parametric values specified at: 100EL16VS Series: -3.0V to -5.5V.
2. If V<sub>CTRL</sub> is an open circuit, use the V<sub>OH</sub> (max. & min.) and V<sub>OL</sub> (V<sub>CTRL</sub> = V<sub>BB</sub>: max only) limits.
3. V<sub>CC</sub> ≤ V<sub>CTRL</sub> ≤ V<sub>EE</sub>.

**AC 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	T <sub>A</sub> = -40°C			T <sub>A</sub> = 0°C			T <sub>A</sub> = +25°C			T <sub>A</sub> = +85°C			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
t <sub>PLH</sub>	Propagation D (Diff)	175	—	325	175	—	325	175	—	325	205	—	355	ps
t <sub>PHL</sub>	Delay to Output D (SE)	125	250	425	125	250	375	125	250	375	155	280	405	ps
t <sub>skew</sub>	Duty Cycle Skew <sup>(2)</sup> (Diff)	—	5	—	—	5	20	—	5	20	—	5	20	ps
V <sub>PP</sub>	Minimum Input Swing <sup>(3)</sup>	150	—	—	150	—	—	150	—	—	150	—	—	mV
V <sub>CMR</sub>	Common Mode Range <sup>(4)</sup>	-1.3	—	-0.4	-1.4	—	-0.4	-1.4	—	-0.4	-1.4	—	-0.4	V
t <sub>r</sub> t <sub>f</sub>	Output Rise/Fall Times Q (20% to 80%)	—	160	260	—	160	260	—	160	260	—	160	260	ps

**NOTES:**

1. Parametric values specified at: 100EL16VS Series: -3.0V to -5.5V.
2. Duty cycle skew is the difference between a t<sub>PLH</sub> and t<sub>PHL</sub> propagation delay through a device.
3. Minimum input swing for which AC parameters are guaranteed. The device has a DC gain of ≈40 when output has a full swing.
4. 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)|.

**PRODUCT ORDERING CODE**

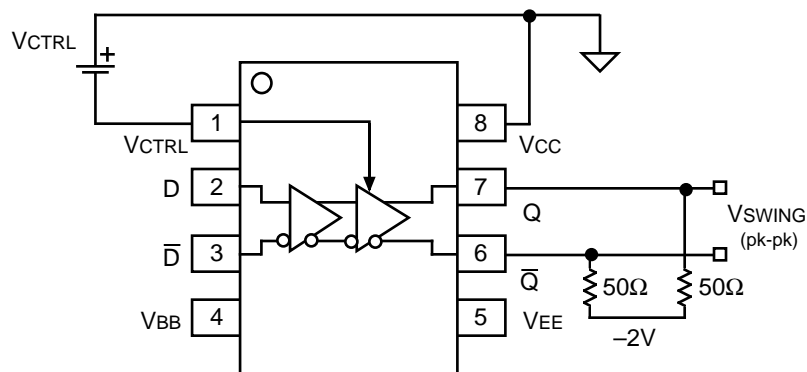
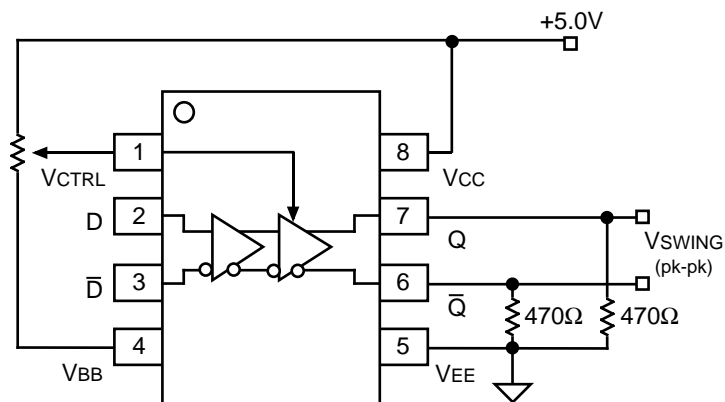
Ordering Code	Package Type	Operating Range	Marking Code
SY100EL16VSKC	K8-1	Commercial	XLEL16VS
SY100EL16VSKCTR*	K8-1	Commercial	XLEL16VS
SY100EL16VSZC	Z8-1	Commercial	XEL16VS
SY100EL16VSZCTR*	Z8-1	Commercial	XEL16VS

\*Tape and Reel

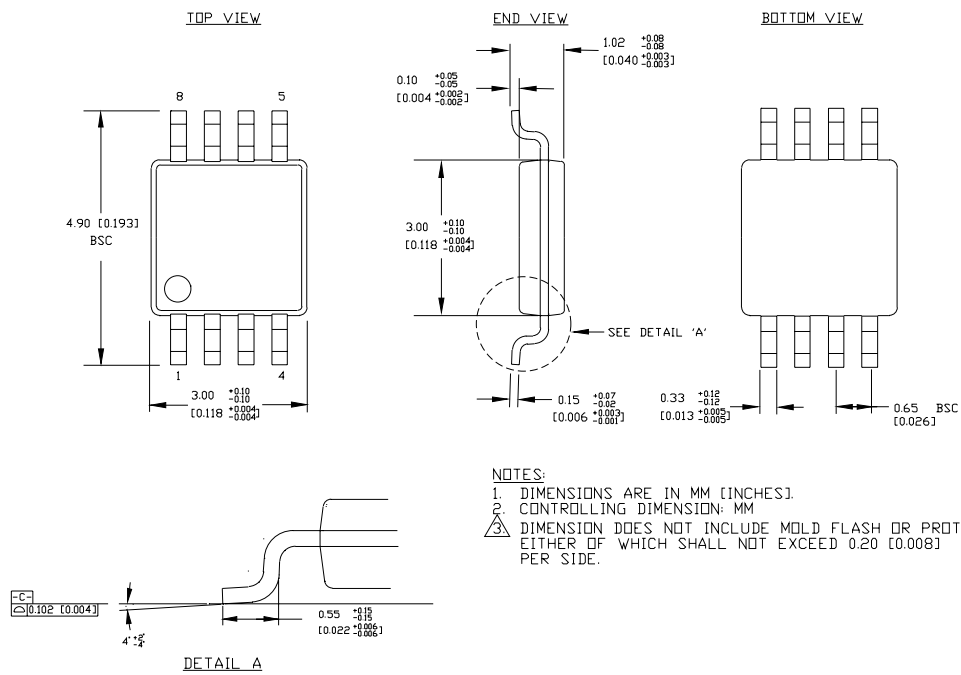
**Note 1.** Recommended for new designs.

Ordering Code	Package Type	Operating Range	Marking Code
SY100EL16VSKI <sup>(1)</sup>	K8-1	Industrial	XLEL16VS
SY100EL16VSKITR* <sup>(1)</sup>	K8-1	Industrial	XLEL16VS
SY100EL16VSZI <sup>(1)</sup>	Z8-1	Industrial	XEL16VS
SY100EL16VSZITR* <sup>(1)</sup>	Z8-1	Industrial	XEL16VS

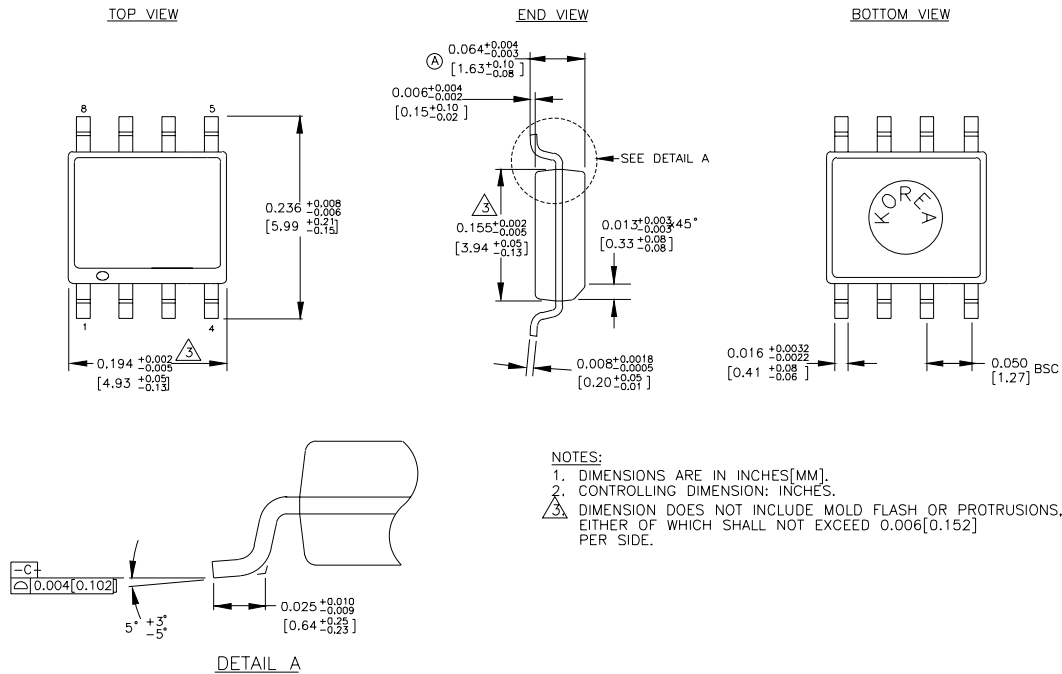
\*Tape and Reel

**APPLICATION IMPLEMENTATION****Figure 2. Voltage Source Implementation****Figure 3. Alternative Implementation**

# 8 LEAD MSOP (K8-1)



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



Rev. 03

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