5V/3.3V VARIABLE OUTPUT SWING DIFFERENTIAL RECEIVER

SY100EL16VS

FEATURES

- **3.3V and 5V power supply options**
- **High bandwidth output transitions**
- **Internal 75KΩ 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

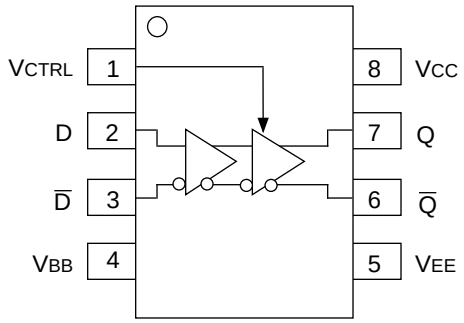
The SY100EL16VS are differential receivers with variable output swing. The devices are functionally equivalent to the EL16V devices with an input that control the amplitude of the outputs.

The operational range of the EL16VS control input is from V_{BB} (max. swing) to V_{CC} (min. swing). Simple control of the output swing can be obtained by a variable resistor between the V_{BB} pin and V_{CC} with the wiper driving V_{CTRL}.

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

Under open input conditions (pulled to V_{EE}), internal input clamps will force the Q output LOW.

PIN CONFIGURATION/BLOCK DIAGRAM



PIN NAMES

Pin	Function
D	Data Inputs
Q	Data Outputs
V_{BB}	Reference Voltage Output
V_{CTRL}	Output Swing Control

TYPICAL VOLTAGE OUTPUT SWING

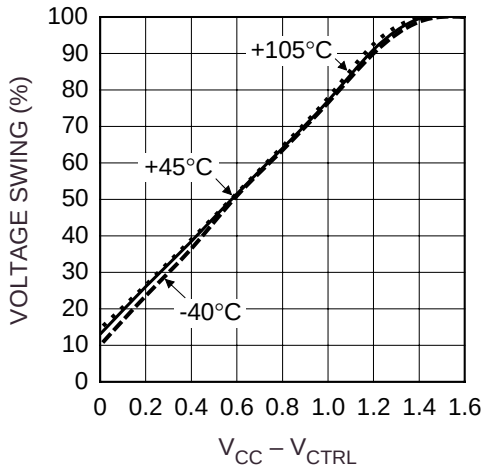


Figure 1. Typical Voltage Output Swing
Vcc = 3.3V or 5V

Rev.: B Amendment: /1
Issue Date: July 2000

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	—	18	22	9	18	22	9	18	22	9	21	26	mA
V_{BB}	Output Reference Voltage	-1.38	—	-1.26	-1.38	—	-1.26	-1.38	—	-1.26	-1.38	—	-1.26	V
I_{IH}	Input HIGH -D, $\overline{D}$ Current -V_{CTRL}	— —	— —	150 40	— —	— —	150 40	— —	— —	150 40	— —	— —	150 40	µA
V_{OL}	Output LOW Voltage[2] V_{CTRL} = V_{BB}	-1890	—	-1620	-1870	—	-1680	-1870	-1775	-1680	-1870	—	-1680	mV
V_{OL}	Output LOW Voltage[2] V_{CTRL} = V_{CC}	-1180	—	-975	-1135	—	-990	-1135	-1065	-990	-1135	—	-990	mV
V_{OH}	Output HIGH Voltage[3]	-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_{CTRL} is an open circuit, use the V_{OH} (max. & min.) and V_{OL} (V_{CTRL} = V_{BB}: max only) limits.
3. $V_{CC} \le V_{CTRL} \le V_{EE}$.

AC 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.	
t_{PLH} t_{PHL}	Propagation D (Diff) Delay to Output D (SE)	175 125	— 250	325 425	175 125	— 250	325 375	175 125	— 250	325 375	205 155	— 280	355 405	ps
t_{skew}	Duty Cycle Skew[2] (Diff)	—	5	—	—	5	20	—	5	20	—	5	20	ps
V_{PP}	Minimum Input Swing[3]	150	—	—	150	—	—	150	—	—	150	—	—	mV
V_{CMR}	Common Mode Range[4]	-1.3	—	-0.4	-1.4	—	-0.4	-1.4	—	-0.4	-1.4	—	-0.4	V
t_r t_f	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_{PLH} and t_{PHL} 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_{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)|.

PRODUCT ORDERING CODE

Ordering Code	Package Type	Operating Range	V_{EE} Range (V)
SY100EL16VSKC	K8-1	Commercial	-3.0 to -5.5
SY100EL16VSZC	Z8-1	Commercial	-3.0 to -5.5

APPLICATION IMPLEMENTATION

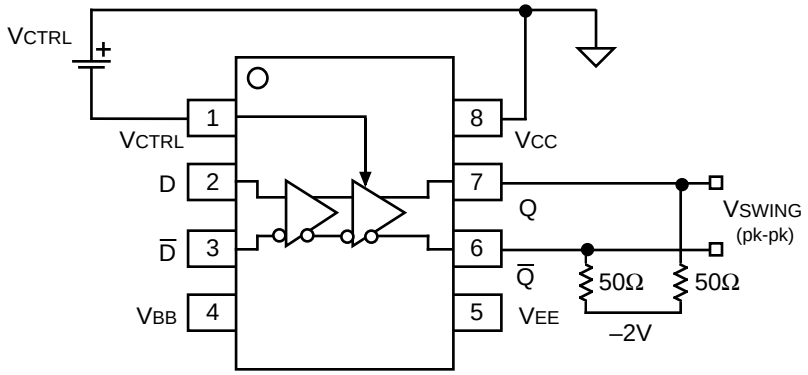


Figure 2. Voltage Source Implementation

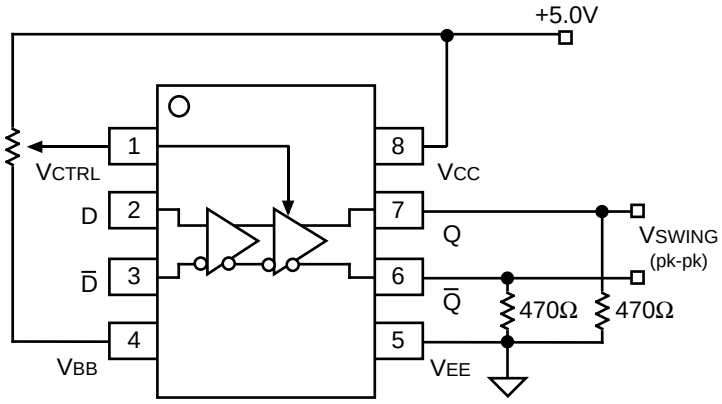
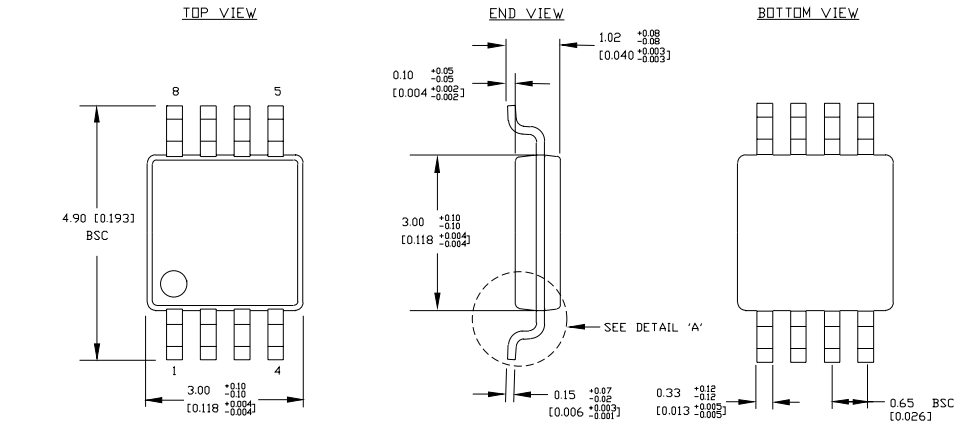
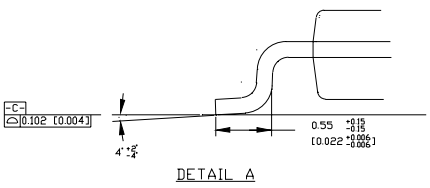


Figure 3. Alternative Implementation

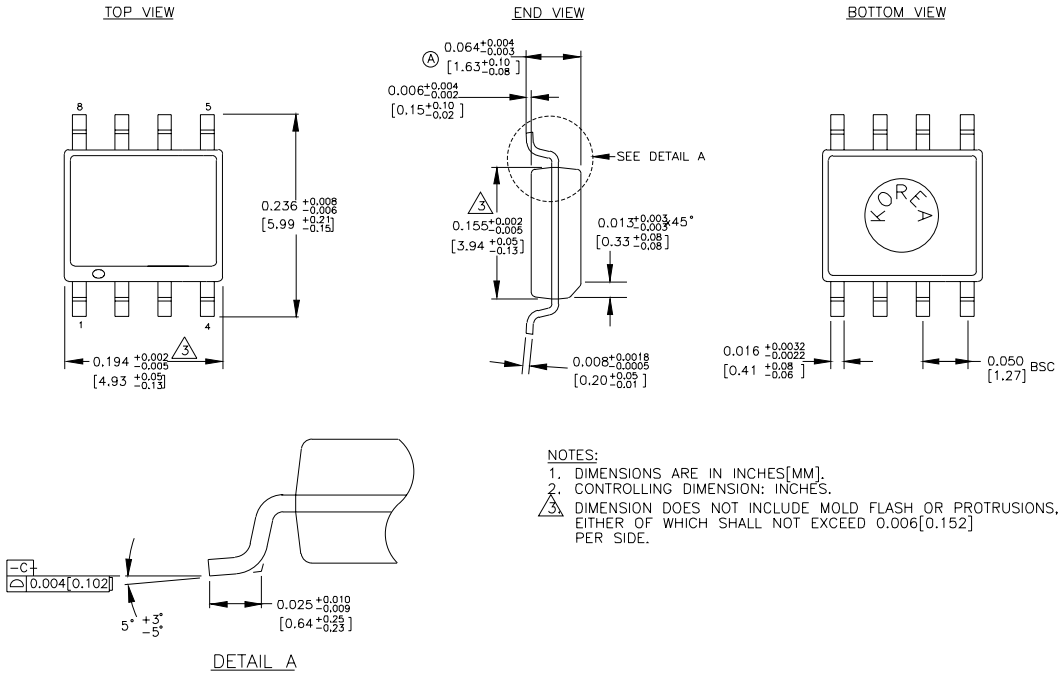
8 LEAD MSOP (K8-1)





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 LEAD SOIC .150" WIDE (Z8-1)



NOTES:
1. DIMENSIONS ARE IN INCHES[MM].
2. CONTROLLING DIMENSION: INCHES.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.006[0.152] PER SIDE.

Rev. 03

MICREL-SYNERGY 3250 SCOTT BOULEVARD SANTA CLARA CA 95054 USA

TEL + 1 (408) 980-9191 FAX + 1 (408) 914-7878 WEB http://www.micrel.com