

HIGH-PERFORMANCE PRODUCTS

Description

The SK100EL16X is a high gain differential receiver with variable output swing. Its VCTRL input controls the amplitude of the QHG and QHG* outputs. The operating range of the EL16X control input, VCTRL, is from VBB (large swing) to VCC (min swing), see Figure 2. Simple control of the output swing can be obtained by a variable resistor between the VBB and VCC pins, with wiper driving CTRL. Typical application circuit and results are described in Figures 1a, 1b, and 2.

The SK100EL16X 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 EL16X as its current sink/source capability is limited. Whenever used, the VBB pin should be bypassed to VCC via a 0.01 μ F capacitor.

Under open input conditions, the pulldown resistor on D, pulldown and pullup resistors on D* will force the QHG output LOW and QHG* output HIGH. The VCTRL pin should be bypassed to VCC via a 0.01 μ F capacitor when the pin is used.

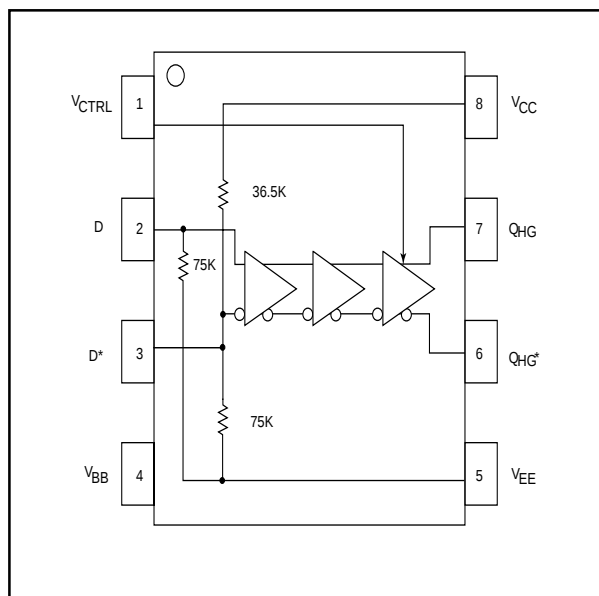
Features

- Extended Supply Voltage Range: (VEE = -5.5V to -3.0V, VCC = 0V) or (VCC = +3.0V to +5.5V, VEE = 0V)
- High Bandwidth Output Transitions
- 350 ps Propagation Delay
- VBB Output
- Internal Input Resistors: Pulldown on D, Pulldown and Pullup on D*
- QHG Output will Default Low with Inputs Open or at VEE
- New Differential Input Common Mode Range
- ESD Protection of >4000V
- Specified Over Industrial Temperature Range: -40°C to 85°C
- Available in both 8 Pin SOIC (150 mil) and MSOP (3mm x 3mm) Packages
- Flammability Rate: UL-94 code V-0.
- Moisture Sensitivity: Level 1.

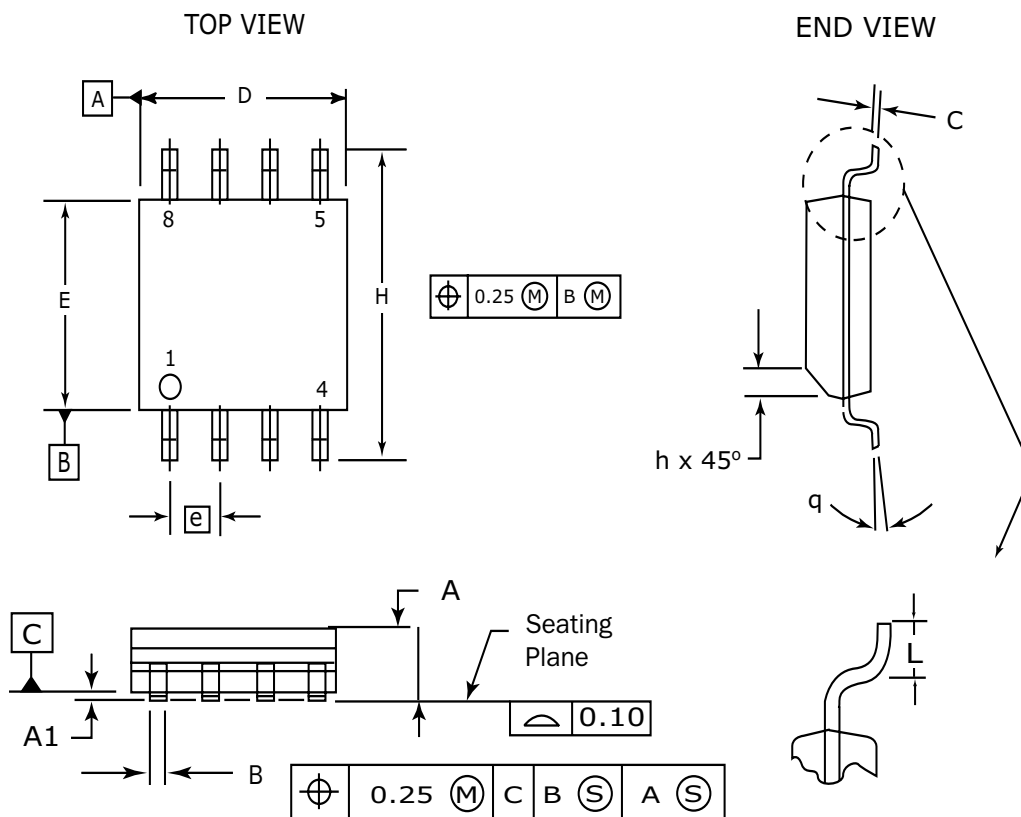
PIN Description

Pin	Function
D, D*	Differential Data Inputs
QHG, QHG*	Differential Data Outputs
VBB	VBB Ref Voltage Output
VCTRL	Output Swing Control

Functional Block Diagram



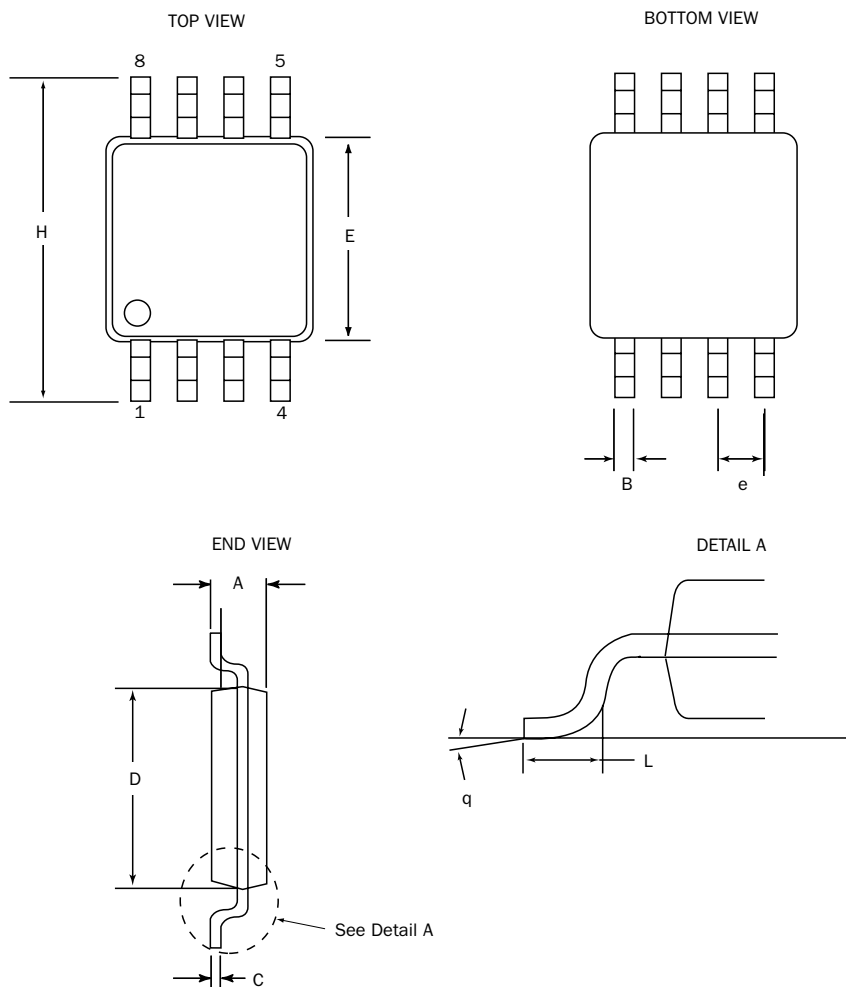
8 Lead SOIC Package



DIM	MILLIMETERS	
	MIN	MAX
A	1.35	1.75
A1	0.10	0.25
B	0.33	0.51
C	0.19	0.25
D	4.80	5.00
E	3.80	4.00
e	1.27 BSC	
H	5.80	6.20
h	0.25	0.50
L	0.40	1.27
θ	0°	8°

NOTES:

1. Dimensions are in millimeters.
2. Dimensions D and E do not include mold protrusion.
3. Maximum mold protrusion 0.15 per side.
4. Dimension B does not include Dambar protrusion. Allowable Dambar protrusion shall be 0.127 total in excess of the B dimension at maximum material condition.

8 Pin MSOP Package


DIM	Millimeters	
	MIN	MAX
A	0.94	1.1
B	0.21	0.45
C	0.13	0.22
D	2.90	3.10
E	2.90	3.10
e	0.65	BSC
H	4.7	5.1
L	0.4	0.7
θ	0°	6°

NOTES:

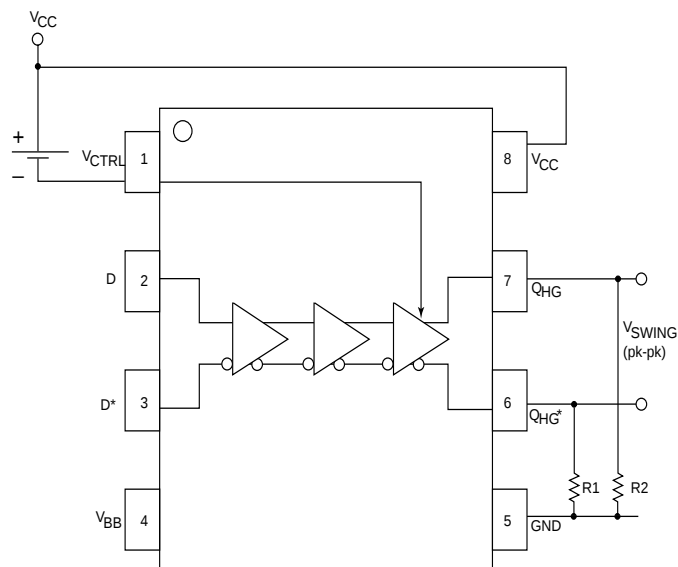
1. Dimensions are in mm.
2. Controlling dimension: mm
3. Dimension does not include mold flash or protrusions, either of which shall not exceed 0.20.

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DC Characteristics
SK100EL16X DC Electrical Characteristics (Note 1)
 $(V_{EE} = -3.0V \text{ to } -5.5V; V_{CC} = 0V; V_{OUT} \text{ loaded } 50\Omega \text{ to } V_{CC} - 2.0V)$

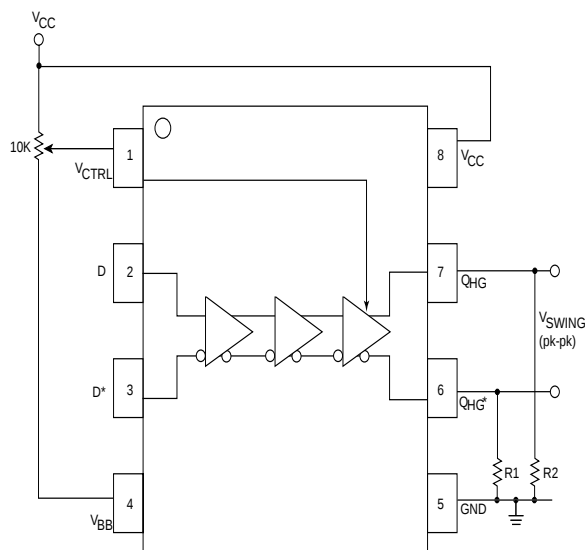
Symbol	Characteristic	TA = -40°C		TA = 0°C to 85°C		Unit	Condition
		Min	Max	Min	Max		
V _{OH}	Output HIGH Voltage ⁸	- 1085	- 880	- 1025	- 880	mV	V _{IN} = V _{IHmax} or V _{ILmin}
V _{OL}	Output LOW Voltage ⁸	- 1950	- 1555	- 1950	- 1620	mV	V _{IN} = V _{IHmax} or V _{ILmin}
V _{IH}	Input HIGH Voltage	- 1165	- 880	- 1165	- 880	mV	Guaranteed HIGH signal for all inputs
V _{IL}	Input LOW Voltage	- 1810	- 1475	- 1810	- 1475	mV	Guaranteed LOW signal for all inputs
V _{BB}	Reference Output Voltage	-1430	-1260	-1430	-1260	mV	
I _{EE}	Power Supply Current		45		45	mA	
I _{IN}	Input Current: D, D* (Diff) VCTRL (SE)	-150	150 150	-150	150 150	μA μA	

AC Characteristics
SK100EL16X AC Electrical Characteristics
 $(V_{CC} - V_{EE} = 3.0V \text{ to } 5.5V; V_{OUT} \text{ loaded } 50\Omega \text{ to } V_{CC} - 2.0V)$

Symbol	Characteristic	TA = -40°C			TA = 0°C			TA = +25°C			TA = +85°C			Unit	Condition
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max		
f _{max}	Max. Toggle Frequency ³	2.5			2.5			2.5			2.5			GHz	
t _{PLH} t _{PHL}	Propagation Delay to Output (Diff)	250	300	350	250	300	350	250	305	360	250	315	380	ps	
A _V	Small Signal Gain ⁴								46					dB	
tskew	Duty Cycle Skew ² (Diff)		5	20		5	20		5	20		5	20	ps	
t _r , t _f	Output Rise/Fall Time Q _{HG} (20% to 80%)	80	120	140	80	120	140	90	120	150	90	135	180	ps	
V _{CMR}	Common Mode Range ⁶	V _{EE} +1.5		V _{CC}	V _{EE} +1.5		V _{CC}	V _{EE} +1.5		V _{CC}	V _{EE} +1.5		V _{CC}	V	
V _{PP}	Differential Input Swing ⁵	150		1000	150		1000	150		1000	150		1000	mV	
V _{O_PP}	Output Voltage ⁷			200			200			200			200	mV	V _{CTRL} =V _{CC}

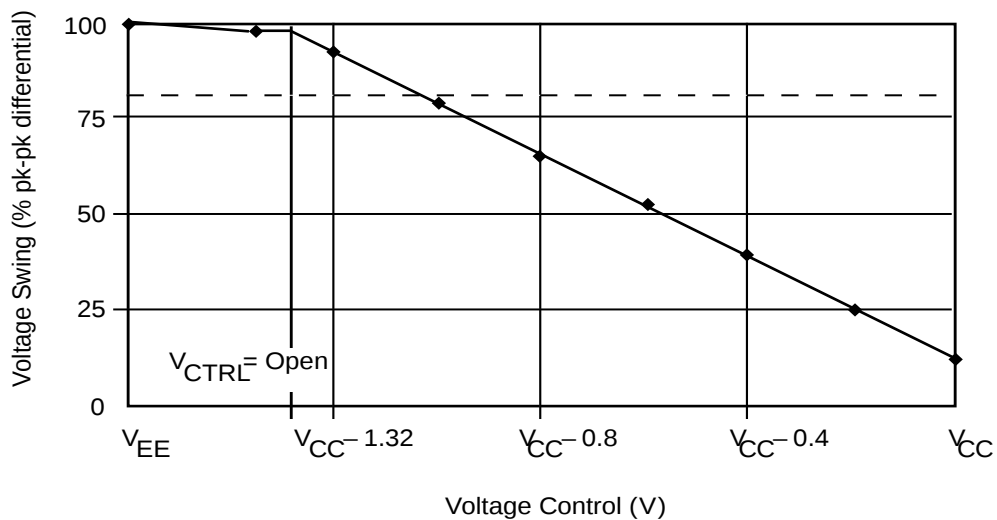
HIGH-PERFORMANCE PRODUCTS
AC Characteristics (continued)

Figure 1A

Note: $R1 = R2 = 150\Omega$ for $V_{CC} = 3.3V$


Figure 1B

Note: $R1 = R2 = 150\Omega$ for $V_{CC} = 3.3V$

$R1 = R2 = 330\Omega$ for $V_{CC} = 5.0V$

Implementation of Voltage Source

Figure 2. Typical Voltage Output Swing at 25°C

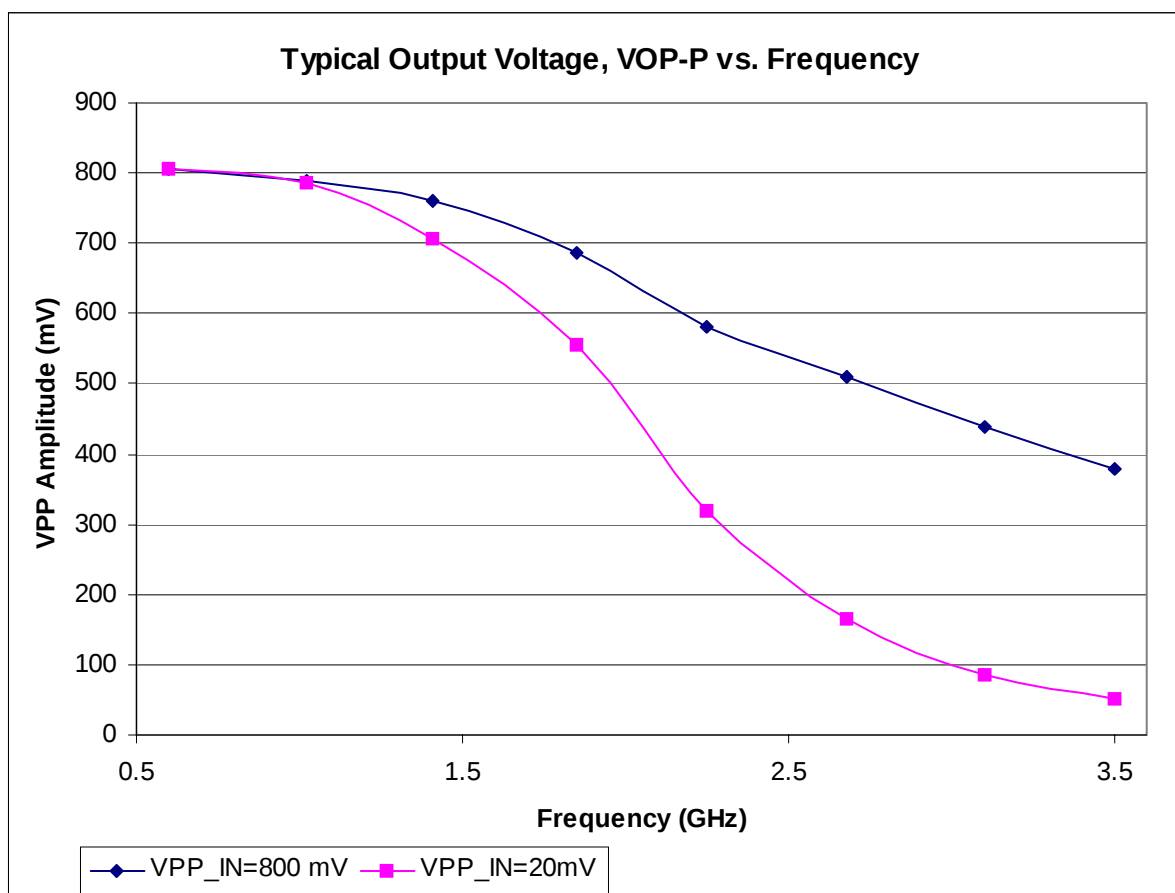
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AC Characteristics (continued)


Figure 3. Typical Output VO_{P-P} vs. Frequency

Notes:

- 100K circuits are designed to meet the DC specification shown in the table where transverse airflow greater than 500 lfpm is maintained.
- Duty cycle skew is the difference between T_{PLH} and T_{PHL} propagation delay through a device.
- F_{max} guaranteed for functionality only. See Figure 3 for typical output swing. VO_{P-P} levels are guaranteed at DC only.
- The device has a DC gain of ~ 200 .
- Minimum input swing for which parameters are guaranteed.
- 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 $VPP_{(min)}$ and 1V. The lower end of the CMR range varies 1:1 with VEE and is equal to $VEE + 1.5V$.
- VO_{P-P} is obtained as follows: Voltages of Q_{HG} and Q_{HG}^* outputs with respect to VCC are measured. The absolute difference between a high and a low state is equal to VO_{P-P} .
- The VOH and VOL limits apply when the V_{CTRL} pin is left open. Otherwise, see figure 2.
- For part ordering description, see HPP Part Ordering Information Data Sheet.

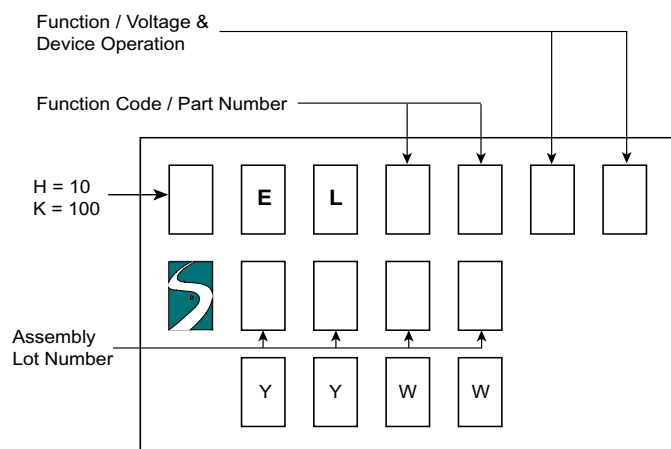
HIGH-PERFORMANCE PRODUCTS

Ordering Information

Ordering Code	Package ID	Temperature Range
SK100EL16XD	8-SOIC	Industrial
SK100EL16XDT	8-SOIC	Industrial
SK100EL16XMS	8-MSOP	Industrial
SK100EL16XMST	8-MSOP	Industrial
SK100EL16XU	Die	

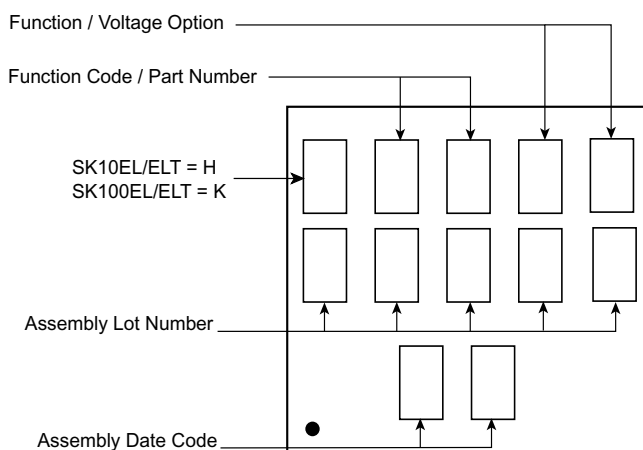
Marking Information

8 PIN SOIC PACKAGE



YY: Last two digits of the Year
WW: Working Week

8/10 PIN MSOP PACKAGES



Application Notes

AN1002 - Interfacing Between ECL / LVECL / PECL / LVPECL - to - TTL / LVTTTL / CMOS / LVCMOS

AN1003 - Termination Techniques for ECL / LVECL / PECL / LVPECL Devices

AN1005 - Using ECL / LVECL Devices as PECL / LVPECL

AN1006 - Designing with 10K and 100K ECL / PECL Devices

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