

## HIGH PERFORMANCE PRODUCTS

## Description

The SK1300 is a high speed PECL / LVPECL to LVDS translator. This device is designed to support frequency rates in excess of 800 MHz utilizing low voltage differential signaling (LVDS) technology. SK1300 operates over an extended supply range of 3.0 to 5.5V which allow either PECL or LVPECL signal at its inputs based on the supply voltage range. It also provides a new alternative to high power pseudo-ECL devices for high speed point-to-point interface using LVDS type signals.

The SK1300 provides a VBB outputs for either single-ended use or as a DC bias for AC coupling to the device. The VBB output should only be used as a bias for the SK1300 as its current sink/source capability is limited. Whenever used, the VBB output should be bypassed to VCC via a 0.01  $\mu$ F capacitor.

Under open input condition, the pulldown on D and pullup and pulldown on D\* will force the Q output low and Q\* output high.

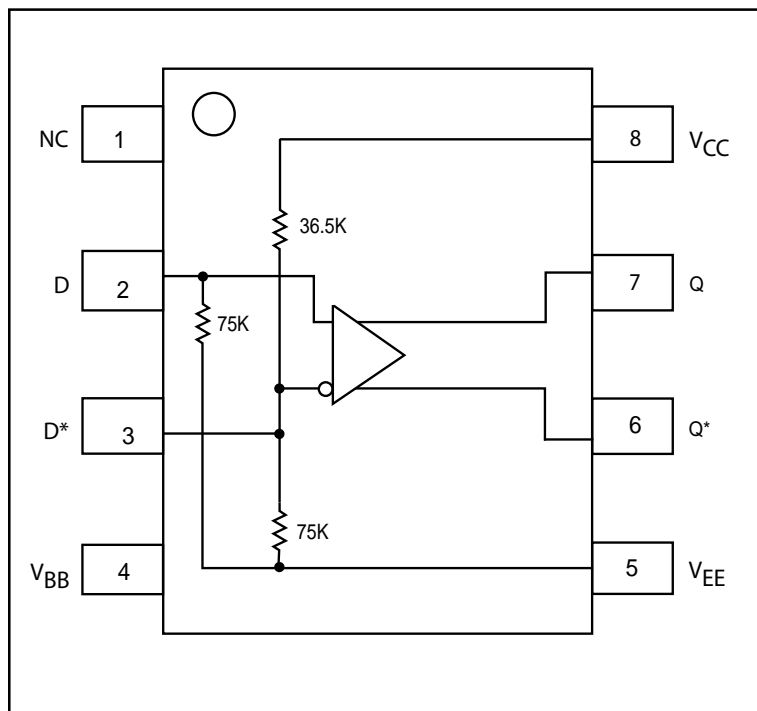
## Features

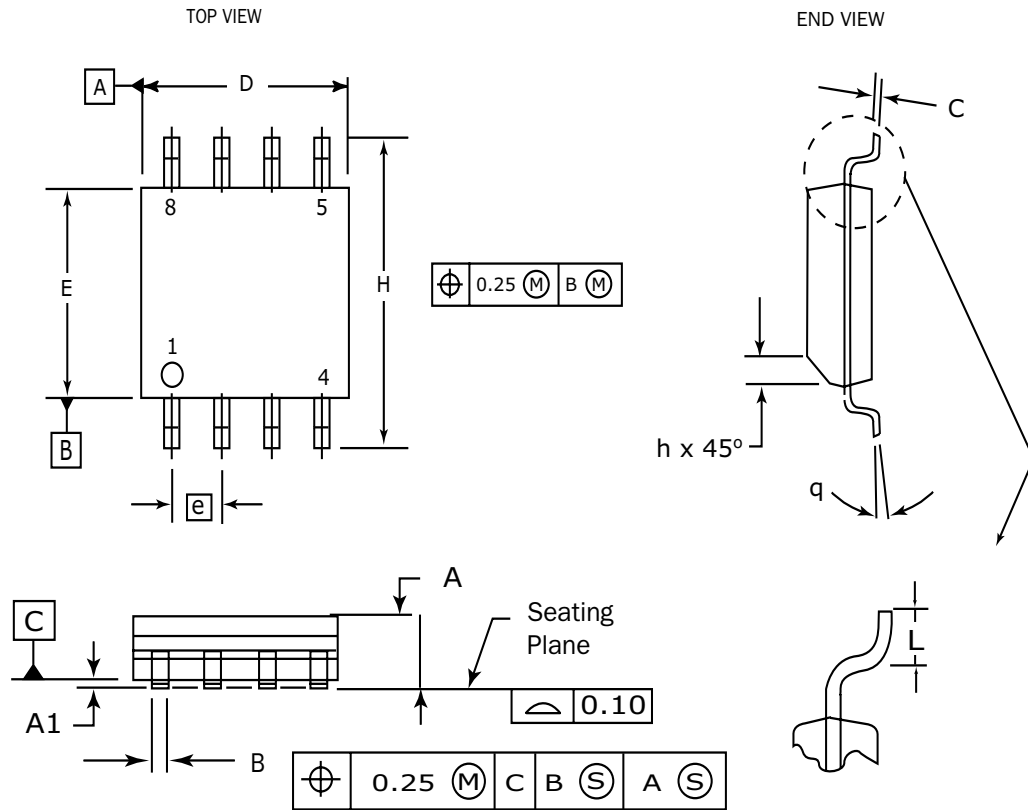
- Extended Supply Voltage Range: (VCC = 3.0V to 5.5V; VEE = 0V)
- 800 MHz Min. Toggle Frequency
- Typical 350 mV Differential LVDS Output
- VBB Output for Single-ended Applications
- Internal Input Resistors; Pulldown on D, Pulldown and Pullup on D\*
- ESD Protection > 4000V
- Specified Over Industrial Temperature Range:  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$
- Available in both 8 pin SOIC and MSOP Packages
- Flammability Rate: UL-94 code V-0
- Moisture Sensitivity: Level 1

## Pin Descriptions

Pin Name	Function
D, D*	Differential PECL / LVPECL inputs
Q, Q*	Differential LVDS Outputs
VBB	Reference Output Voltage

## Functional Block Diagram

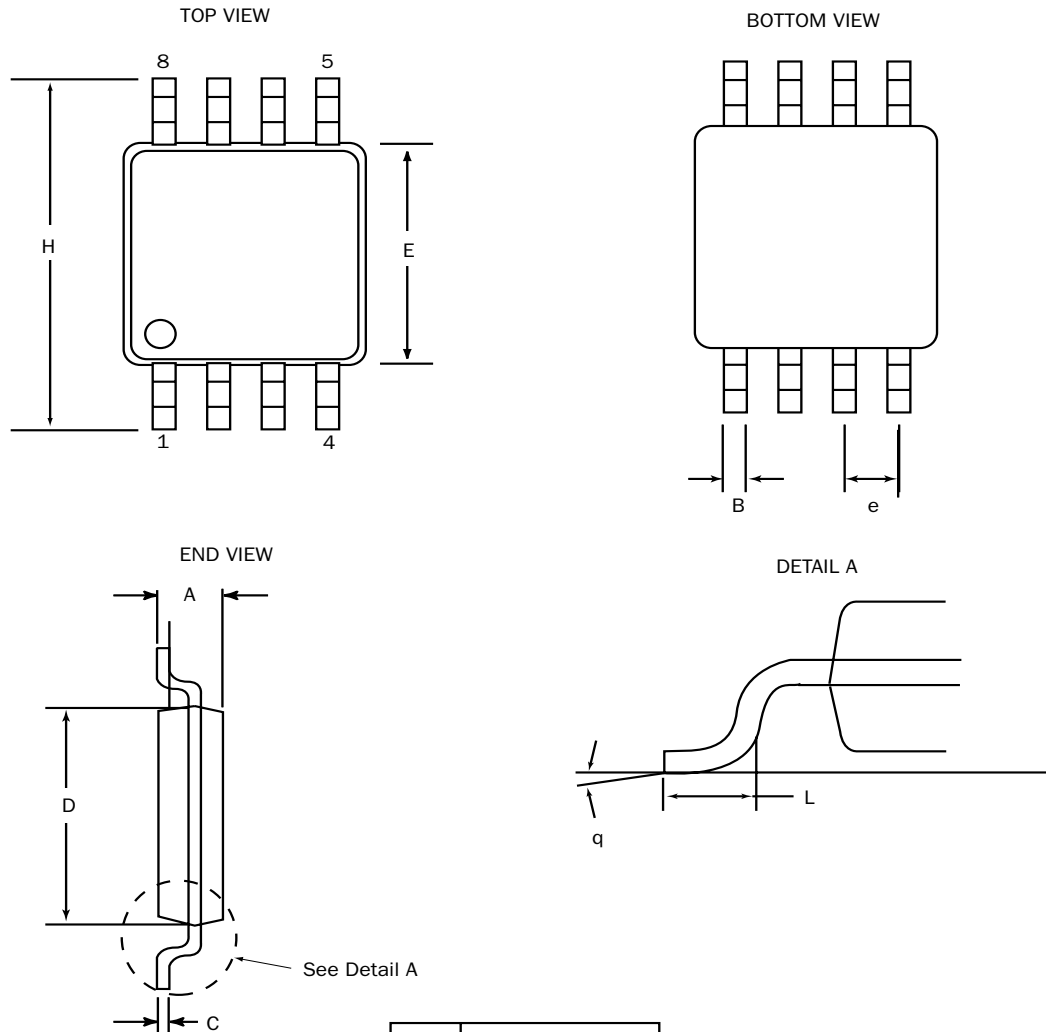


**8 Pin SOIC Package**


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	0.25	0.40
C	0.13	0.23
D	2.90	3.10
E	2.90	3.10
e	0.65	BSC
H	4.75	5.1
L	0.4	0.7
$\theta$	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

**HIGH PERFORMANCE PRODUCTS**
**Absolute Maximum Ratings**

Symbol	Parameter	Value	Unit
V <sub>EE</sub>	Power Supply (V <sub>CC</sub> = 0V)	-6.0 to 0	V
V <sub>CC</sub>	Power Supply (V <sub>EE</sub> = 0V)	6.0 to 0	V
V <sub>I</sub>	Input Voltage (V <sub>CC</sub> = 0V, V <sub>I</sub> not more negative than V <sub>EE</sub> )	-6.0 to 0	V
V <sub>I</sub>	Input Voltage (V <sub>EE</sub> = 0V, V <sub>I</sub> not more positive than V <sub>CC</sub> )	6.0 to 0	V
I <sub>OUT</sub>	Output Current Continuous Surge	50 100	mA mA
T <sub>A</sub>	Operating Temperature Range	-40 to +85	°C
T <sub>stg</sub>	Storage Temperature	-65 to +150	°C
θ <sub>JA</sub> for SOIC	Thermal Resistance (Junction-to-Ambient) Still Air	153.7	°C/W
θ <sub>JC</sub> for SOIC	Thermal Resistance (Junction-to-Case)	41.2	°C/W
θ <sub>JA</sub> for MSOP	Thermal Resistance (Junction-to-Ambient) Still Air 500 lfpm (>2 layers)	206.3 140	°C/W °C/W
θ <sub>JC</sub> for MSOP	Thermal Resistance (Junction-to-Case)	39.1	°C/W
T <sub>sol</sub>	Solder Temperature (<2 to 3 seconds: 245°C desired)	265	°C

\* Maximum Ratings are those values beyond which damage to the device may occur.

**DC Characteristics**
**SK1300 LVDS Outputs DC Electrical Characteristics**

(V<sub>CC</sub> = +3.0V to +5.5V; V<sub>EE</sub> = 0V)

Symbol	Characteristic	TA = - 40°C			TA = 0°C			TA = + 25°C			TA = + 85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
V <sub>OH</sub> <sup>4</sup>	Output High Voltage	1.25		1.8	1.25		1.8	1.25		1.8	1.25		1.8	V
V <sub>OL</sub> <sup>4</sup>	Output Low Voltage	0.95		1.5	0.95		1.5	0.95		1.5	0.95		1.5	V
R <sub>O</sub>	Output Impedance	15		70	15		70	15		70	15		70	Ω
DV <sub>OUT</sub>	Peak-to-Peak Voltage <sup>1</sup>	250	350	470	250	350	470	250	350	470	250	350	470	mV

**HIGH PERFORMANCE PRODUCTS**
**DC Characteristics (Continued)**
**SK1300 PECL / LVPECL Input DC Electrical Characteristics**

(VCC = +3.0V to +5.5V; VEE = 0V)

Symbol	Characteristic	TA = - 40°C		TA = 0°C		TA = + 25°C		TA = + 85°C		Unit	Cond
		Min	Max	Min	Max	Min	Max	Min	Max		
I <sub>IN</sub>	Input Current	-150	150	-150	150	-150	150	-150	150	μA	
V <sub>BB</sub>	Output Reference Voltage	3.62 1.92	3.74 2.04	3.62 1.92	3.74 2.04	3.62 1.92	3.74 2.04	3.62 1.92	3.74 2.04	V V	VCC = 5.0V VCC = 3.3V
V <sub>IH</sub>	Input HIGH Voltage	3835 2135	4120 2420	3835 2135	4120 2420	3835 2135	4120 2420	3835 2135	4120 2420	mV mV	VCC = 5.0V VCC = 3.3V
V <sub>IL</sub>	Input LOW Voltage	3190 1490	3525 1825	3190 1490	3525 1825	3190 1490	3525 1825	3190 1490	3525 1825	mV mV	VCC = 5.0V VCC = 3.3V
IEE	Supply Current		50		50		50		50	mA	

**AC Characteristics**
**SK1300 AC Electrical Characteristics**

(VCC = +3.0V to +5.5V; VEE = 0V)

Symbol	Characteristic	TA = - 40°C		TA = 0°C		TA = + 25°C		TA = + 85°C		Unit
		Min	Max	Min	Max	Min	Max	Min	Max	
F <sub>MAX</sub>	Max Toggle Frequency <sup>3</sup>	800		800		800		800		MHz
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay D to Q	450	780	500	820	500	850	500	950	ps
V <sub>PP</sub>	Minimum Peak-to-Peak Input	200	1000	200	1000	200	1000	200	1000	mV
V <sub>CMR</sub>	Common Mode Range <sup>2</sup>	VEE+1.7	VCC-0.4	VEE+1.7	VCC-0.4	VEE+1.7	VCC-0.4	VEE+1.7	VCC-0.4	V
t <sub>r</sub> , t <sub>f</sub>	Output Rise/Fall	120	320	120	330	130	350	150	450	ps

**Notes:**

1. DV<sub>OUT</sub> is obtained as follows: Voltages of Q and Q\* outputs with respect with V<sub>EE</sub> are measured. The absolute difference between the high and the low is equal to DV<sub>OUT</sub>.
2. 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(min)</sub> and 1V. The lower end of the CMR range varies 1:1 with VEE and is equal to VEE + 1.7V.
3. 250 mV minimum output peak-to-peak swing for Max Toggle Frequency.
4. Output test conditions: 100Ω termination resistor between Q and Q\*.

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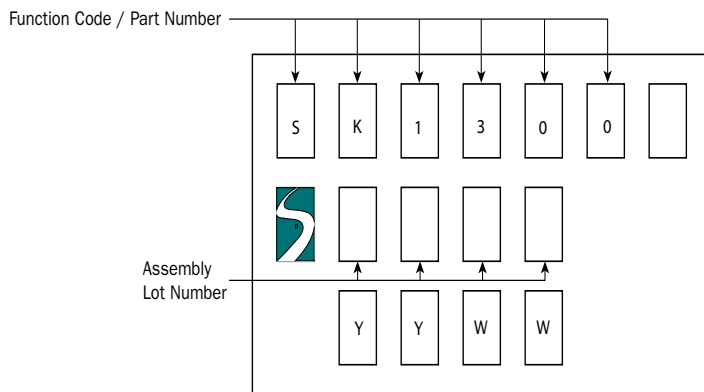
**Ordering Information**

Ordering Code	Package ID	Temperature Range
SK1300D	8-SOIC	Industrial
SK1300DT	8-SOIC	Industrial
SK1300MS	8-MSOP	Industrial
SK1300MST	8-MSOP	Industrial

The letter "T" stands for tape and reel. For tape and reel information refer to the HPP Part Ordering Information Data Sheet.

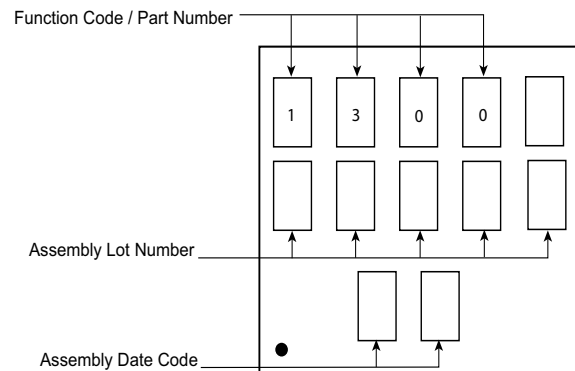
**Marking Information**

8 PIN SOIC PACKAGE



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

8 PIN MSOP PACKAGE



**Application Notes**

- AN1003** - Termination Techniques for ECL / LVECL / PECL / LVPECL Devices
- AN1004** - Interfacing Between LVDS and ECL / LVECL / PECL / LVPECL

**Contact Information**

Division Headquarters 10021 Willow Creek Road San Diego, CA 92131 Phone: (858) 695-1808 FAX: (858) 695-2633	<b>Semtech Corporation</b> <b>High-Performance Products Division</b>	Marketing Group 1111 Comstock Street Santa Clara, CA 95054 Phone: (408) 566-8776 FAX: (408) 727-8994
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