SK10/100EL15W
1:4 Clock Distribution

SEMTECH

HIGH-PERFORMANCE PRODUCTS

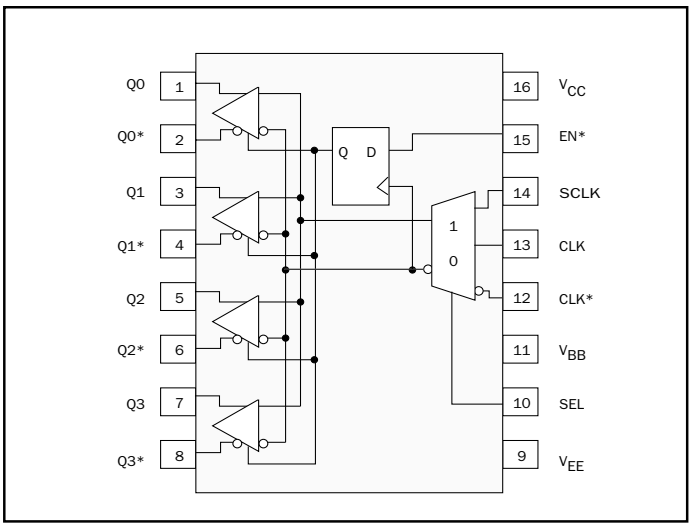
Description

The SK10/100EL15W is a low skew 1:4 clock distribution chips designed explicitly for low skew clock distribution applications. This device is fully compatible with MC10EL15 & MC100EL15. The device can be driven by either a differential or single-ended ECL or, if positive power supplies are used, PECL input signal. If a single-ended input is to be used, the VBB output should be connected to the CLK* input and bypassed to VCC via a 0.01 µF capacitor. The EL15W 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 EL15W as its current sink/source capability is limited. Whenever used, the VBB pin should be bypassed to VCC via a 0.01 µF capacitor.

The EL15W features a multiplexed clock input to allow for the distribution of a lower speed scan or test clock along with the high speed system clock. When LOW (or left open and pulled LOW by the input pull-down resistor) the SEL pin will select the differential clock input.

The common enable (EN*) is synchronous so that the outputs will only be enabled/disabled when they are already in the LOW state. This avoids any chance of generating a runt clock pulse when the device is enabled/disabled as can happen with an asynchronous control. The internal flip-flop is clocked on the falling edge of the input clock, therefore, all associated specification limits are referenced to the negative edge of the clock input.

Functional Block Diagram



Features

- Extended Supply Voltage Range: (VEE = –5.5V to –3.0V, VCC = 0V) or (VCC = + 3.0V to +5.5V, VEE=0V)
- 50 ps Output-to-Output Skew
- Synchronous Enable/Disable
- Multiplexed Clock Input
- 75KΩ Internal Input Pull-Down Resistors
- Fully Compatible with MC10EL15 and MC100EL15
- Specified Over Industrial Temperature Range: –40°C to +85°C
- ESD Protection of >4000V
- Available in 16-Pin SOIC Package

PIN Description

Pin Name	Function
CLK	Differential Clock Inputs
SCLK	Synchronous Clock Input
EN*	Synchronous Enable
SEL	Clock Select Input
V_{BB}	Reference Output Voltage
Q0–Q3, Q0*-Q3*	Differential Clock Outputs

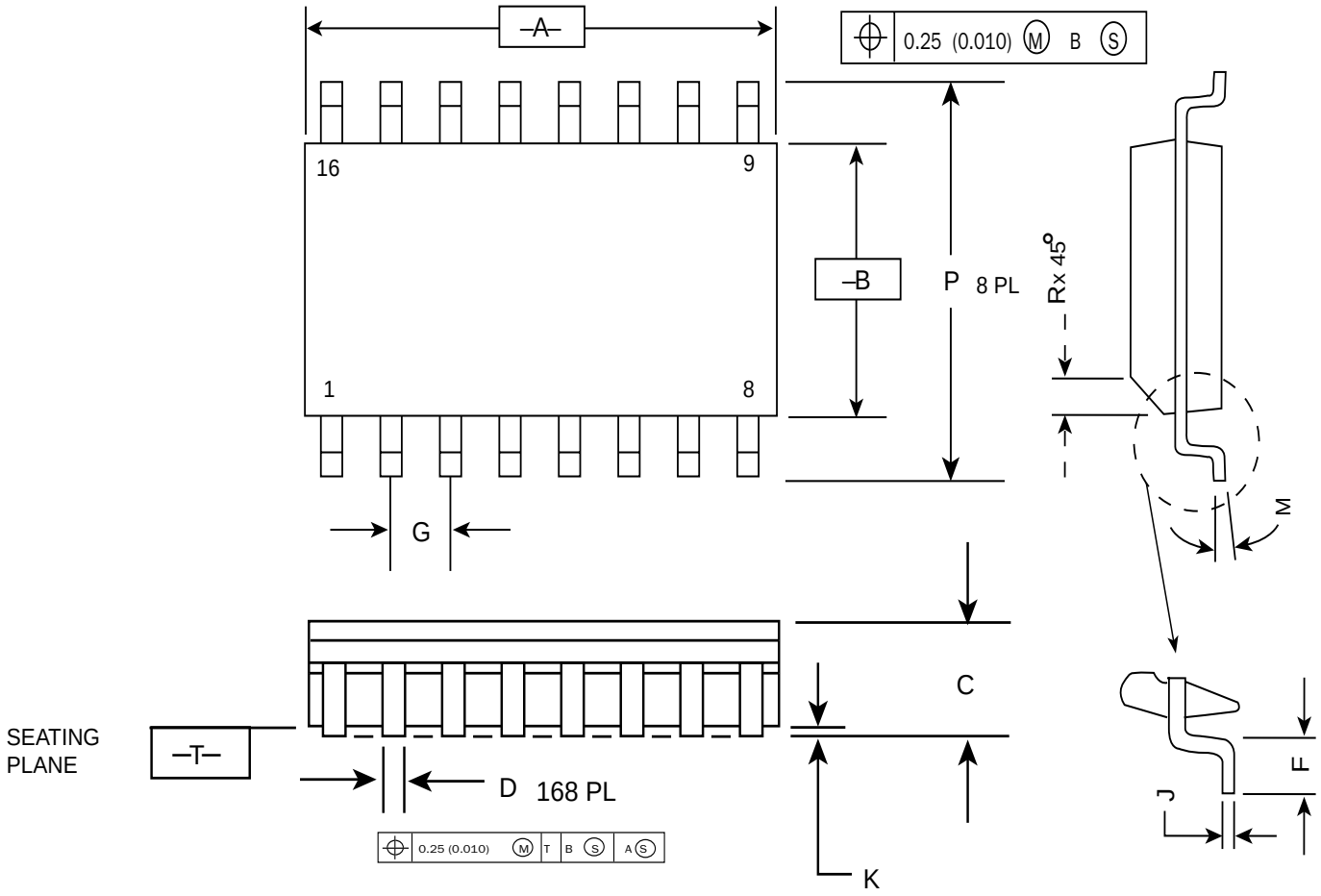
CLK	SCLK	SEL	EN*	Q
L	X	L	L	L
H	X	L	L	H
X	L	H	L	L
X	H	H	L	H
X	X	X	H	L*

*On next negative transition of CLK or SCLK.

Truth Table

Package Information

16 Pin SOIC Package



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9/80	10.00	0.386	0.393
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 BSC		0.050 BSC	
J	0.19	0.25	0.008	0.009
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

NOTES:
1. Dimensioning and tolerancing per ANSI Y14.5M, 1982.
2. Controlling dimension: millimeter.
3. Dimensions A and B do not include mold protrusion.
4. Maximum mold protrusion 0.150 (0.006) per side.
5. Dimension D does not include Dambar protrusion. Allowable Dambar protrusion shall be 0.13 (0.005) total in excess of d dimension at maximum material condition.

DC Characteristics

SK10/100EL15W DC Electrical Characteristics (Notes 1, 2)

(V_{CC} – V_{EE} = +3.0V to +5.5V ; V_{OUT} loaded 50Ω to V_{CC} – 2.0V)

		TA = –40°C			TA = 0°C			TA = +25°C			TA = +85°C			
Symbol	**Characteristic**	**Min**	**Typ**	**Max**	**Min**	**Typ**	**Max**	**Min**	**Typ**	**Max**	**Min**	**Typ**	**Max**	**Unit**
I_{IN}	Input Current (Diff) (SE)	- 150		150 150	- 150		150 150	- 150		150 150	- 150		150 150	µA µA
I_{EE}	Power Supply Current 10EL 100EL	 20 21		 35 35	 21 21		 36 36	 21 22		 36 38	 22 24		 38 41	 mA mA
V_{BB}	Output Reference Voltage[5] 10EL 100EL	 –1.43 –1.38		 –1.30 –1.26	 –1.38 –1.38		 –1.27 –1.26	 –1.35 –1.38		 –1.25 –1.26	 –1.31 –1.38		 –1.19 –1.26	 mV mV
V_{CC} – V_{EE}	Power Supply Voltage	3.0		5.5	3.0		5.5	3.0		5.5	3.0		5.5	V

AC Characteristics

SK10/100EL15W AC Electrical Characteristics

(V_{CC} – V_{EE} = +3.0V to +5.5V ; V_{OUT} loaded 50Ω to V_{CC} – 2.0V)

		TA = –40°C		TA = 0°C		TA = +25°C		TA = +85°C		
Symbol	**Characteristic**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Unit**
t_{PLH} t_{PHL}	Propagation Delay CLK to Q (Diff) CLK to Q (SE) SCLK to Q	 560 470 465	 650 710 685	 580 500 495	 675 695 700	 591 510 510	 695 680 705	 620 545 566	 740 725 745	 ps ps ps
t_{skew}	Part-to-Part Skew Within-Device SkeW		200 50		200 50		200 50		200 50	ps ps
t_S	Setup Time EN*	150		150		150		150		ps
t_H	Hold Time EN*	400		400		400		400		ps
V_{PP}	Minimum Input Swing CLK[3]	250	1000	250	1000	250	1000	250	1000	mV
V_{CMR}	Common Mode Range CLK[4] VPP < 500 mV VPP > 500 mV	 VEE + 1.3 VEE + 1.5	 VCC – 0.4 VCC – 0.4	 VEE + 1.3 VEE + 1.5	 VCC – 0.4 VCC – 0.4	 VEE + 1.3 VEE + 1.5	 VCC – 0.4 VCC – 0.4	 VEE + 1.3 VEE + 1.5	 VCC – 0.4 VCC – 0.4	 V V
t_r , t_f	Output Rise/Fall Times Qn, Qn* (20% to 80%)	195	340	205	350	210	360	225	380	ps

AC Characteristics *(continued)*

Notes:

1. 10EL circuits are designed to meet the DC specifications shown in the table after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse airflow greater than 500 lfpm is maintained. Outputs are terminated through a 50Ω resistor to VCC –2.0V.
2. 100K circuits are designed to meet the DC specification shown in the table where transverse airflow greater than 500 lfpm is maintained.
3. Minimum input swing for which AC parameters guaranteed.
4. 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 + 1.3V for VPP < 500 mV and VEE + 1.5V for VPP > 500 mV.
5. Voltages referenced to VCC = 0V (ECL mode).
6. For standard ECL DC specifications, refer to the ECL Logic Family Standard DC Specifications Data Sheet.
7. For part ordering descriptions, see HPP Part Ordering Information Data Sheet.

Ordering Information

Ordering Code	Package ID	Temperature Range
SK10EL15WD	16-SOIC	Industrial
SK10EL15WDT	16-SOIC	Industrial
SK100EL15WD	16-SOIC	Industrial
SK100EL15WDT	16-SOIC	Industrial
SK10EL15WU	Die	
SK100EL15WU	Die	

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