SLSV1T34

1-Bit Dual-Supply Non-Inverting Level Translator

The SLSV1T34 is a 1−bit configurable dual−supply voltage level translator. The input A_n and output B_n ports are designed to track two different power supply rails, V_{CCA} and V_{CCB} respectively. Both supply rails are configurable from 0.9 V to 4.5 V allowing universal low−voltage translation from the input A_n to the output B_n port.

Features

- Wide V_{CCA} and V_{CCB} Operating Range: 0.9 V to 4.5 V
- High−Speed w/ Balanced Propagation Delay
- Input has OVT Protection to 4.5 V
- Non−preferential V_{CCA} and V_{CCB} Sequencing
- Partial Power−Off Protection at Input
- Power−Off High Impedance Inputs and Outputs
- Ultra−Small Packaging: 1.2 mm x 1.0 mm UDFN6
  1.45 mm x 1.0 mm UDFN6
- These Devices are Pb−Free, Halogen Free/BFR Free, Beryllium Free and are RoHS Compliant

Typical Applications

- Mobile Phones, PDAs, Other Portable Devices

Important Information

- ESD Protection for All Pins:
  HBM (Human Body Model) > 3000 V

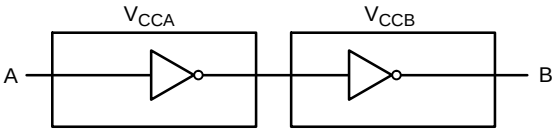

Figure 1. Logic Diagram

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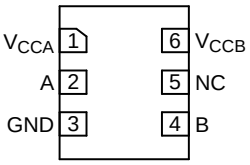
MARKING DIAGRAMS

UDFN6
MU SUFFIX
CASE 517AA

UDFN6
MU SUFFIX
CASE 517AQ

A, Q = Device Code
M = Date Code

PIN ASSIGNMENT



UDFN6
(Top View)

ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

PIN ASSIGNMENT

PIN	FUNCTION
V_{CCA}	Input Port DC Power Supply
V_{CCB}	Output Port DC Power Supply
GND	Ground
A	Input Port
B	Output Port

TRUTH TABLE

INPUTS	OUTPUTS
A	B
L	L
H	H

MAXIMUM RATINGS

Symbol	Rating	Value	Condition	Unit
V_{CCA}, V_{CCB}	DC Supply Voltage	−0.5 to +5.5		V
V_I	DC Input Voltage A	−0.5 to +5.5		V
V_O	DC Output Voltage B	−0.5 to V_{CCB} + 0.5		V
I_{IK}	DC Input Diode Current	−20	V_I < GND	mA
I_{OK}	DC Output Diode Current	−50	V_O < GND	mA
I_O	DC Output Source/Sink Current	±50		mA
I_{CCA}, I_{CCB}	DC Supply Current Per Supply Pin	±100		mA
I_{GND}	DC Ground Current per Ground Pin	±100		mA
T_{STG}	Storage Temperature	−65 to +150		°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V_{CCA}, V_{CCB}	Positive DC Supply Voltage	0.9	4.5	V
V_I	Bus Input Voltage	GND	4.5	V
V_{IO}	Bus Output Voltage	GND	V_{CCB}	V
T_A	Operating Temperature Range	−40	+85	°C
$\Delta t / \Delta V$	Input Transition Rise or Rate V_I, from 30% to 70% of V_{CC}; V_{CC} = 3.3 V ±0.3 V	0	10	nS

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions	V_{CCA} (V)	V_{CCB} (V)	−40°C to +85°C		Unit
					Min	Max	
V_{IH}	Input HIGH Voltage		3.6 – 4.5	0.9 – 4.5	2.2	–	V
			2.7 – 3.6		2.0	–	
			2.3 – 2.7		1.6	–	
			1.4 – 2.3		0.65 * V_{CCA}	–	
			0.9 – 1.4		0.9 * V_{CCA}	–	
V_{IL}	Input LOW Voltage		3.6 – 4.5	0.9 – 4.5	–	0.8	V
			2.7 – 3.6		–	0.8	
			2.3 – 2.7		–	0.7	
			1.4 – 2.3		–	0.35 * V_{CCA}	
			0.9 – 1.4		–	0.1 * V_{CCA}	
V_{OH}	Output HIGH Voltage	I_{OH} = −100 μA; V_I = V_{IH}	0.9 – 4.5	0.9 – 4.5	V_{CCB} – 0.2	–	V
		I_{OH} = −0.5 mA; V_I = V_{IH}	0.9	0.9	0.75 * V_{CCB}	–	
		I_{OH} = −2 mA; V_I = V_{IH}	1.4	1.4	1.05	–	
		I_{OH} = −6 mA; V_I = V_{IH}	1.65	1.65	1.25	–	
			2.3	2.3	2.0	–	
		I_{OH} = −12 mA; V_I = V_{IH}	2.3	2.3	1.8	–	
			2.7	2.7	2.2	–	
		I_{OH} = −18 mA; V_I = V_{IH}	2.3	2.3	1.7	–	
			3.0	3.0	2.4	–	
		I_{OH} = −24 mA; V_I = V_{IH}	3.0	3.0	2.2	–	
V_{OL}	Output LOW Voltage	I_{OL} = 100 μA; V_I = V_{IL}	0.9 – 4.5	0.9 – 4.5	–	0.2	V
		I_{OL} = 0.5 mA; V_I = V_{IH}	1.1	1.1	–	0.3	
		I_{OL} = 2 mA; V_I = V_{IH}	1.4	1.4	–	0.35	
		I_{OL} = 6 mA; V_I = V_{IL}	1.65	1.65	–	0.3	
		I_{OL} = 12 mA; V_I = V_{IL}	2.3	2.3	–	0.4	
			2.7	2.7	–	0.4	
		I_{OL} = 18 mA; V_I = V_{IL}	2.3	2.3	–	0.6	
			3.0	3.0	–	0.4	
		I_{OL} = 24 mA; V_I = V_{IL}	3.0	3.0	–	0.55	
I_I	Input Leakage Current	V_I = V_{CCA} or GND	0.9 – 4.5	0.9 – 4.5	−1.0	1.0	μA
I_{CCA}	Quiescent Supply Current	V_I = V_{CCA} or GND; I_O = 0, V_{CCA} = V_{CCB}	0.9 – 4.5	0.9 − 4.5	−	2.0	μA
I_{CCB}	Quiescent Supply Current	V_I = V_{CCA} or GND; I_O = 0, V_{CCA} = V_{CCB}	0.9 – 4.5	0.9 − 4.5	−	2.0	μA
I_{CCA} + I_{CCB}	Quiescent Supply Current	V_I = V_{CCA} or GND; I_O = 0, V_{CCA} = V_{CCB}	0.9 – 4.5	0.9 – 4.5	−	4.0	μA
I_{OFF}	Power OFF Leakage Current	V_I = 4.5 V	0	0	−	5.0	μA

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	V_{CCA} (V)	−40°C to +85°C													
			V_{CCB} (V)													
			4.5		3.3		2.8		1.8		1.2		1.1		1.0	
			Typ	Max	Typ	Max	Typ	Max	Typ	Max	Typ	Max	Typ	Max	Typ	Max
t_{PLH}, t_{PHL} (Note 1)	Propagation Delay A to B	4.5	2.1	2.6	2.1	2.7	2.2	2.9	2.9	3.9	6.2	8.4	8.0	10.7	11.5	16.9
		3.3	2.3	3.1	2.3	3.1	2.4	3.2	3.0	4.2	6.3	8.6	8.1	10.7	11.6	17
		2.8	2.4	3.4	2.5	3.5	2.6	3.5	3.2	4.2	6.4	8.5	8.2	10.8	11.7	17.1
		1.8	3.2	4.6	3.3	4.5	3.4	4.5	4.2	6.2	7.6	11.7	9.4	14.7	12.8	19
		1.2	5.2	7.7	5.3	8.2	5.4	8.1	6.1	8.5	10	14	12.3	18.6	16.7	26.9
		1.1	6.1	9.1	6.2	9.2	6.3	9.4	7.0	10.3	10.8	15.2	13.1	19.6	17.6	27.9
		1.0	7.7	12.7	7.6	12.5	7.8	12.7	8.6	14	12.3	17.7	14.6	21.4	18.9	30.2

1. Propagation delays defined per Figure 2.

CAPACITANCE

Symbol	Parameter	Test Conditions	**Typ** (Note 2)	Unit
$C_{I/O}$	I/O Pin Input Capacitance	V_{CCA} = V_{CCB} = 3.3 V, V_I = 0 V or $V_{CCA/B}$	5.0	pF
C_{PD}	Power Dissipation Capacitance	V_{CCA} = V_{CCB} = 3.3 V, V_I = 0 V or V_{CCA}, f = 10 MHz	5.0	pF

2. Typical values are at T_A = +25°C.
3. C_{PD} is defined as the value of the IC's equivalent capacitance from which the operating current can be calculated from: $I_{CC(operating)} \cong C_{PD} \times V_{CC} \times f_{IN}$ where $I_{CC} = I_{CCA} + I_{CCB}$.

JITTER: V_{CCA} = 1 V, V_{CCB} = 1.8 V, C_L = 10 pF. f = 38.4 MHz, T_A = 25°C

	Conditions	Peak to Peak	Standard Deviation	Unit
		Typical	Typical	
Period Jitter	16 kSamples	20.5	6.4	ps
	16 kSamples, Power Supply Ripple = ±100 mV, Ripple Frequency = 100 kHz	46.8	11.18	

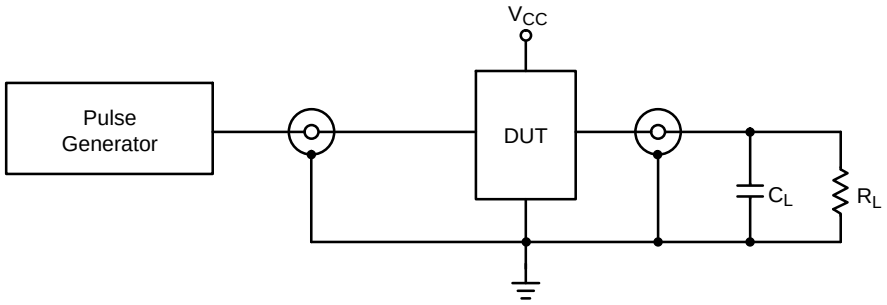
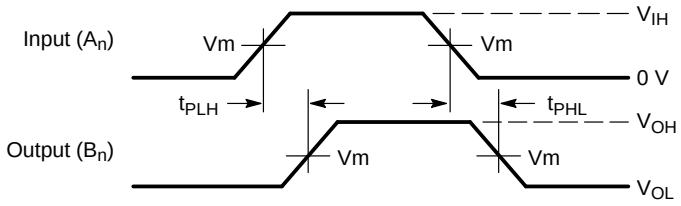


Figure 2. AC (Propagation Delay) Test Circuit

Test	Switch
C_L = 15 pF or equivalent (includes probe and jig capacitance) R_L = 2 kΩ or equivalent Z_{OUT} of pulse generator = 50 Ω	



Waveform 1 − Propagation Delays
$t_R = t_F$ = 2.0 ns, 10% to 90%; f = 1 MHz; t_W = 500 ns

Figure 3. AC (Propagation Delay) Test Circuit Waveforms

Symbol	V_{CC}
	0.9 V – 4.5 V
V_{mA}	$V_{CCA}/2$
V_{mB}	$V_{CCB}/2$

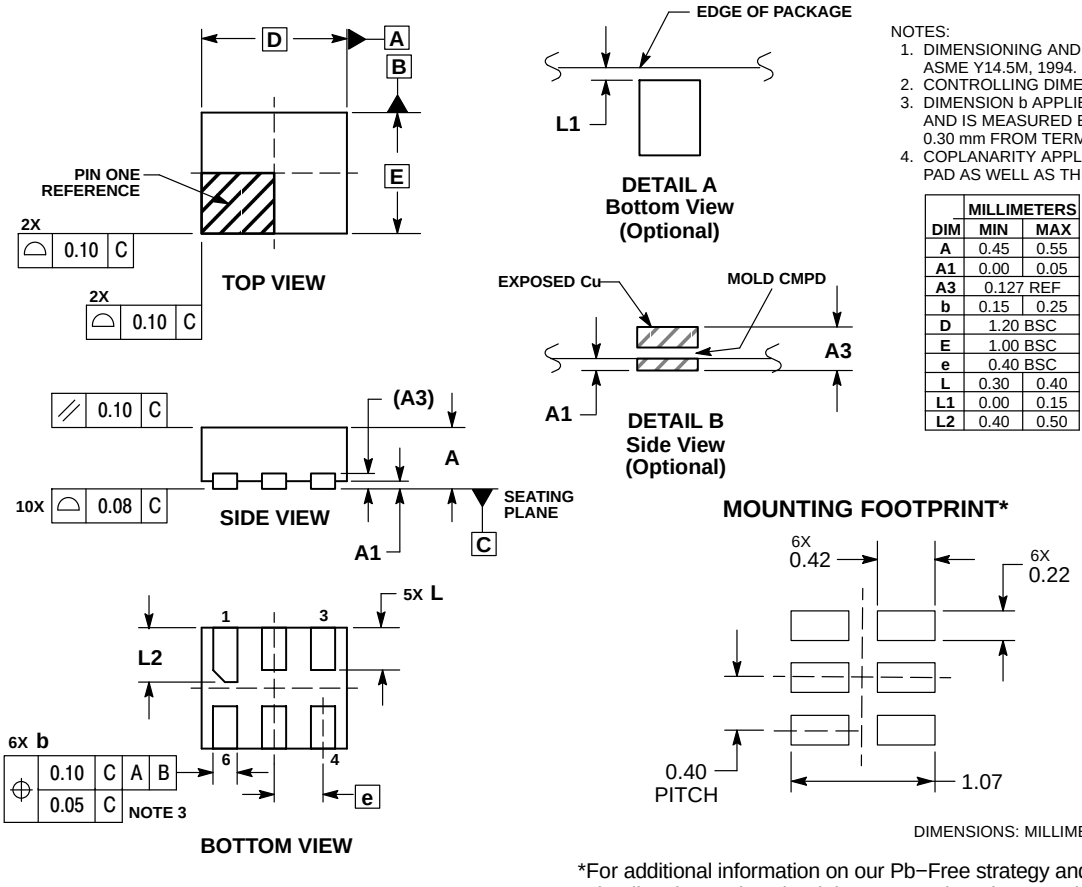
ORDERING INFORMATION

Device	Package	Shipping†
SLSV1T34MUTAG	UDFN6, 1.20 x 1.0, 0.4P (Pb−Free)	3000 / Tape & Reel
SLSV1T34MUTBG	UDFN6, 1.20 x 1.0, 0.4P (Pb−Free)	3000 / Tape & Reel
SLSV1T34AMUTCG	UDFN6, 1.45 x 1.0, 0.5P (Pb−Free)	3000 / Tape & Reel
SLSV1T34AMUTAG	UDFN6, 1.45 x 1.0, 0.5P (Pb−Free)	3000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

PACKAGE DIMENSIONS

UDFN6, 1.2x1.0, 0.4P
CASE 517AA
ISSUE D



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.25 AND 0.30 mm FROM TERMINAL.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

	MILLIMETERS	
DIM	MIN	MAX
A	0.45	0.55
A1	0.00	0.05
A3	0.127 REF	
b	0.15	0.25
D	1.20 BSC	
E	1.00 BSC	
e	0.40 BSC	
L	0.30	0.40
L1	0.00	0.15
L2	0.40	0.50

MOUNTING FOOTPRINT*

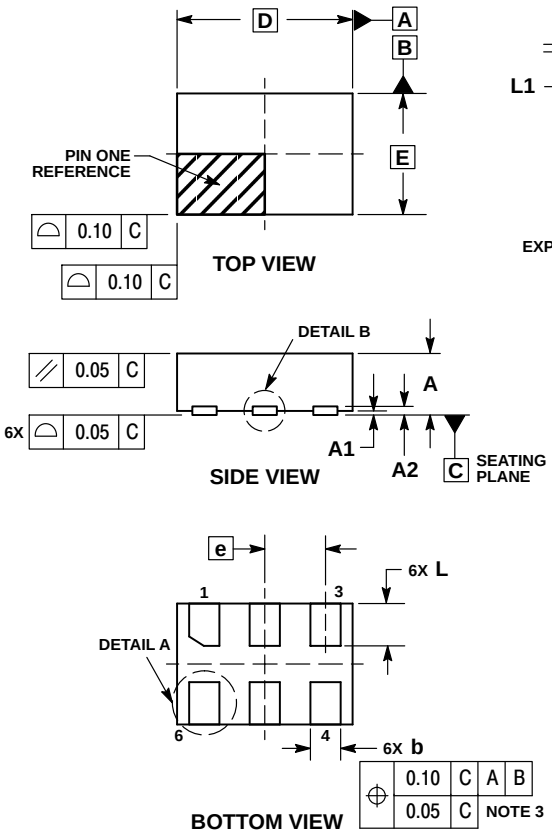
DIMENSIONS: MILLIMETERS

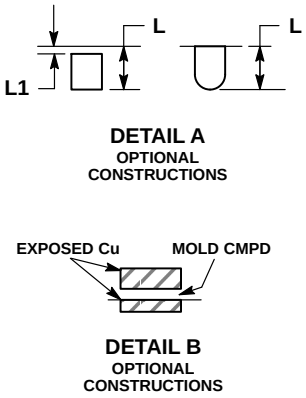
*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

SLSV1T34

PACKAGE DIMENSIONS

UDFN6, 1.45x1.0, 0.5P
CASE 517AQ
ISSUE O

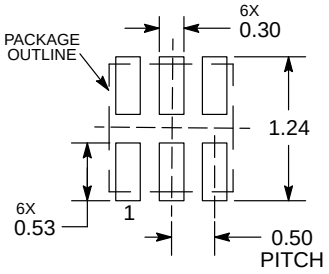




NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.

	MILLIMETERS	
DIM	MIN	MAX
A	0.45	0.55
A1	0.00	0.05
A2	0.07 REF	
b	0.20	0.30
D	1.45 BSC	
E	1.00 BSC	
e	0.50 BSC	
L	0.30	0.40
L1	−−−	0.15

MOUNTING FOOTPRINT



DIMENSIONS: MILLIMETERS

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

PUBLICATION ORDERING INFORMATION

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Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

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