

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

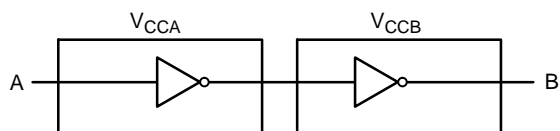


Figure 1. Logic Diagram



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MARKING DIAGRAMS



UDFN6
MU SUFFIX
CASE 517AA

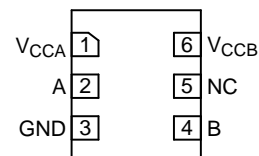


UDFN6
MU SUFFIX
CASE 517AQ



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.

SLSV1T34

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
Δt / ΔV	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.

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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	–			
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	
			2.3	2.3	–	0.4	
		I _{OL} = 12 mA; V _I = V _{IL}	2.7	2.7	–	0.4	
			2.3	2.3	–	0.6	
		I _{OL} = 18 mA; V _I = V _{IL}	3.0	3.0	–	0.4	
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.

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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:

$$I_{CC(\text{operating})} \cong C_{PD} \times V_{CC} \times f_{IN} \text{ where } I_{CC} = I_{CCA} + I_{CCB}.$$

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	

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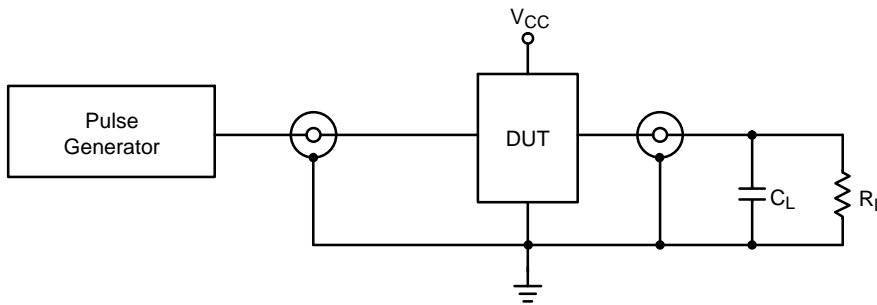
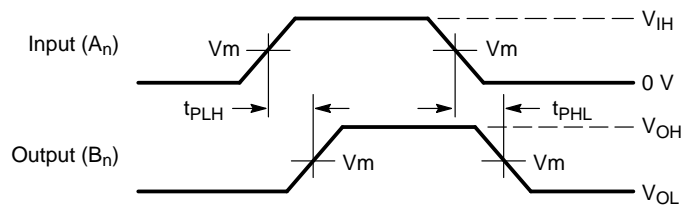


Figure 2. AC (Propagation Delay) Test Circuit

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



Waveform 1 – Propagation Delays
 $t_R = t_F = 2.0 \text{ ns}$, 10% to 90%; $f = 1 \text{ MHz}$; $t_W = 500 \text{ ns}$

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

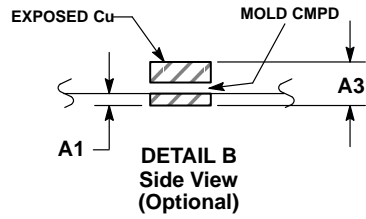
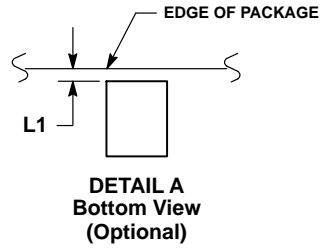
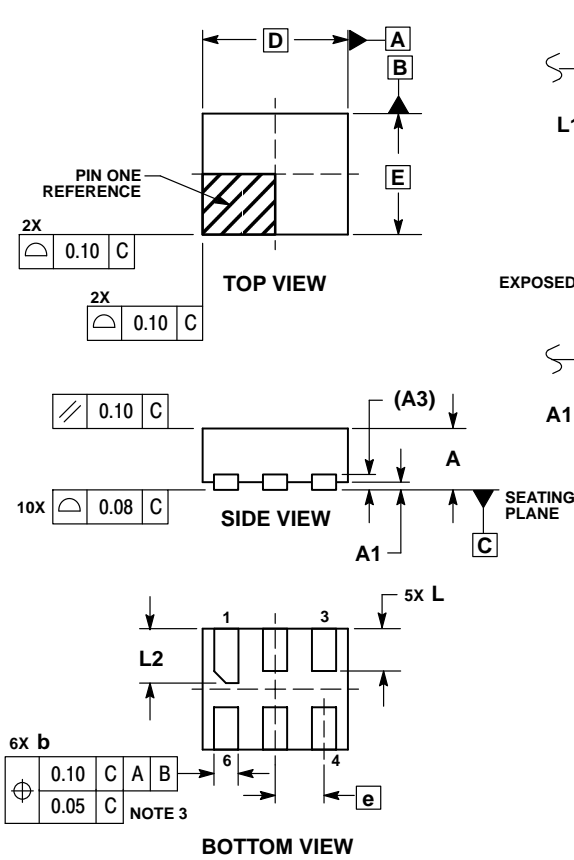
Device	Package	Shipping [†]
SLSV1T34MUTAG	UDFN6, 1.20 x 1.0, 0.4P (Pb-Free)	3000 / Tape & Reel
SLSV1T34MUTBG	UDFN6, 1.20 x 1.0, 0.4P (Pb-Free)	3000 / Tape & Reel
SLSV1T34AMUTCG	UDFN6, 1.45 x 1.0, 0.5P (Pb-Free)	3000 / Tape & Reel
SLSV1T34AMUTAG	UDFN6, 1.45 x 1.0, 0.5P (Pb-Free)	3000 / Tape & Reel

[†]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.

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PACKAGE DIMENSIONS

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

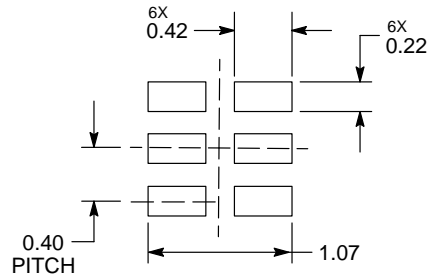


NOTES:

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.

DIM	MILLIMETERS	
	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*



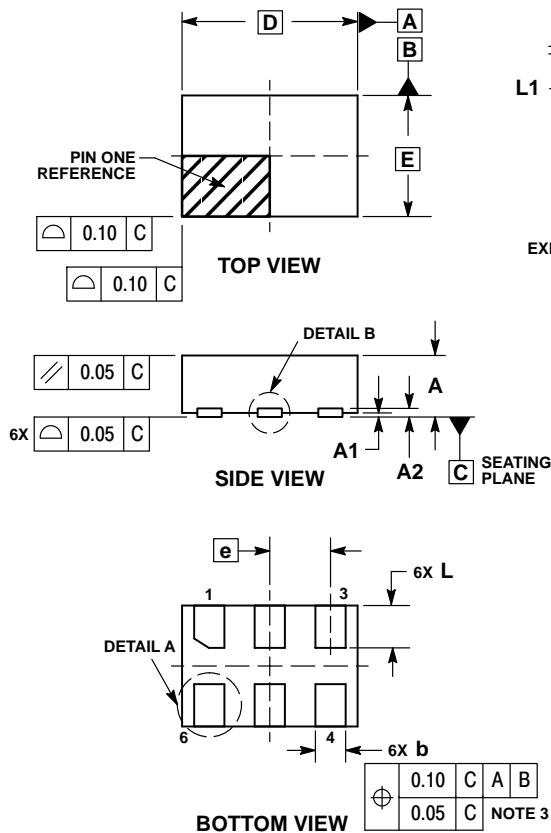
DIMENSIONS: MILLIMETERS

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

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PACKAGE DIMENSIONS

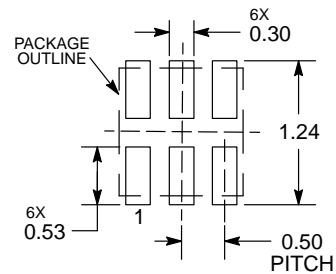
UDFN6, 1.45x1.0, 0.5P
CASE 517AQ
ISSUE O



- 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.

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