

2-Bit Bidirectional Voltage-Level Translator for Open-Drain and Push-Pull Application

DESCRIPTION

The VLT0102 is a 2-bit non-inverting translator is a bidirectional voltage-level translator and can be used to establish digital switching compatibility between mixed-voltage systems.

It uses two separate configurable power-supply rails, with the A ports supporting operating voltages from 1.65V to 5.5V while it tracks the V_{CCA} supply, and the B ports supporting operating voltages from 2.3V to 5.5V while it tracks the V_{CCB} supply.

This allows the support of both lower and higher logic signal levels while providing bidirectional translation capabilities between any of the 1.8V, 2.5V, 3.3V and 5.0V voltage nodes.

When the output-enable (OE) input is low, all I/Os are placed in the high-impedance state, which significantly reduces the power-supply quiescent current consumption. OE has an internal pull-down current source, as long as V_{CCA} is powered.

To ensure the high-impedance state during power-up or power down, OE should be tied to GND through a pull-down resistor; the minimum value of the resistor is determined by the current-sourcing capability of the driver.

The VLT0102 is available in Green 8-pin SOT/VSSOP/DFN packages. It operates over an ambient temperature range of -40°C to $+85^{\circ}\text{C}$.

TYPICAL APPLICATION

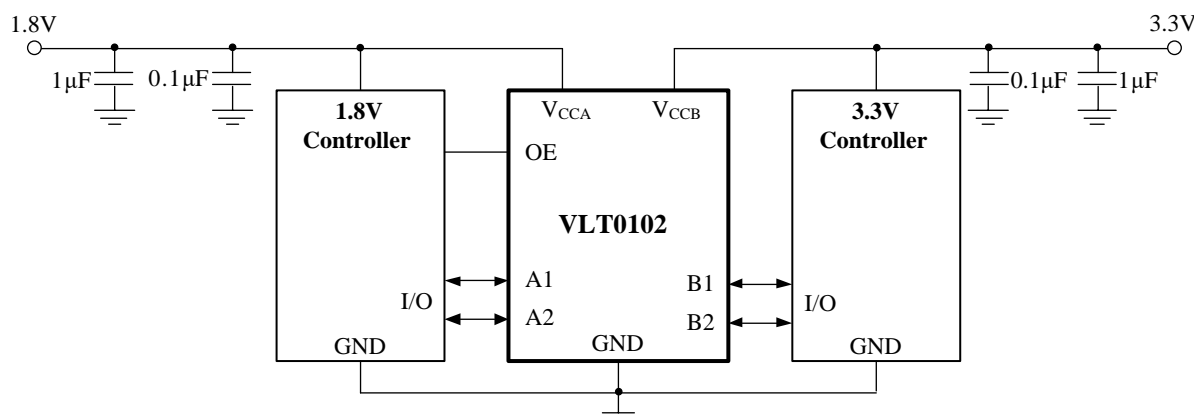


Figure 1. Typical Application Circuit

Datasheet Brief

PRELIMINARY DATASHEET

KEY FEATURES

- Direction-Control Signal is Not Required
- Data Rates
 - ▲ 24Mbps (Push-Pull)
 - ▲ 2Mbps (Open-Drain)
- 1.65V ~ 5.5V on A ports and 2.3V ~ 5.5V on B Ports ($V_{CCA} \leq V_{CCB}$)
- V_{CC} Isolation: If Either V_{CC} is at GND, Both Ports are in the High-Impedance State
- No Power-Supply Sequencing Required: Either V_{CCA} or V_{CCB} can be Ramped First
- I_{OFF} : Supports Partial-Power-Down Mode Operation
- Extended Temperature: -40°C to $+85^{\circ}\text{C}$

Device Information (1)

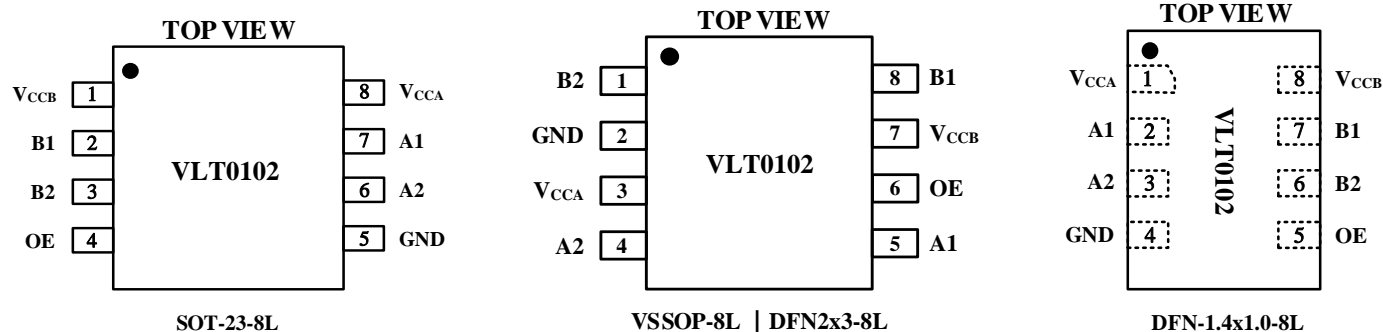
DEVICE NUMBER	PACKAGE	BODY SIZE (NOM)
VLT0102	SOT (8)	2.90mm × 1.63mm
	VSSOP (8)	2.30mm × 2.00mm
	DFN (8)	2.00mm × 3.00mm 1.40mm × 1.00mm

(1) For all available packages, see the orderable addendum at the end of the data sheet.

APPLICATIONS

- Universal Asynchronous Receiver/Transmitter
- I²C/SMBus Interfaces
- General Purpose I/O (GPIO)

PIN CONFIGURATIONS



PIN DESCRIPTION

PIN ASSIGNMENT		NAME	TYPE ⁽¹⁾	FUNCTION
SOT-23-8L	DFN-1.4x1.0-8L			
1	8	VCCB	P	B Ports Supply Voltage. $2.3V \leq V_{CCB} \leq 5.5V$.
2	7	B1	I/O	Input / output B1. Reference to VCCB.
3	6	B2	I/O	Input/output B2. Reference to VCCB.
4	5	OE	I	Output Enable (Active High). Pull OE low to place all outputs in 3-state mode. Referenced to VCCA.
5	4	GND	–	Ground.
6	3	A2	I/O	Input/output A2. Reference to VCCA.
7	2	A1	I/O	Input/output A1. Reference to VCCA.
8	1	VCCA	P	A Port Supply Voltage. $1.65V \leq V_{CCA} \leq 5.5V$ and $V_{CCA} \leq V_{CCB}$.

PIN ASSIGNMENT		NAME	TYPE ⁽¹⁾	FUNCTION
VSSOP -8/DFN2*3-8L				
1		B2	I/O	Input/output B2. Reference to VCCB.
2		GND	–	Ground.
3		VCCA	P	A Port Supply Voltage. $1.65V \leq V_{CCA} \leq 5.5V$ and $V_{CCA} \leq V_{CCB}$
4		A2	I/O	Input/output A2. Reference to VCCA.
5		A1	I/O	Input/output A1. Reference to VCCA.
6		OE	I	Output Enable (Active High). Pull OE low to place all outputs in 3-state mode. Referenced to VCCA.
7		VCCB	P	B Ports Supply Voltage. $2.3V \leq V_{CCB} \leq 5.5V$.
8		B1	I/O	Input/output B1. Reference to VCCB.

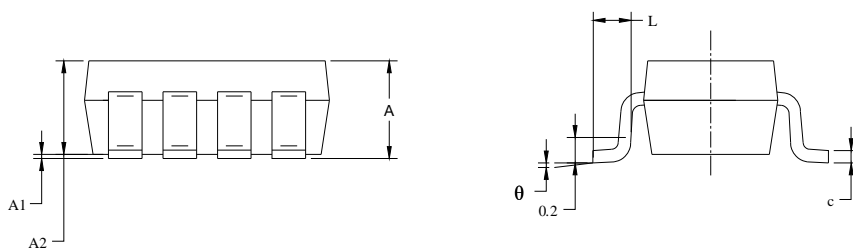
(1) I = Input, O = Output, I/O = Input and output, P = Power

PACKAGE OUTLINE DIMENSIONS

- Type: SOT-23-8L



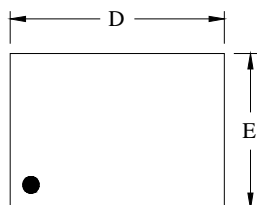
RECOMMENDED LAND PATTERN (Unit: mm)



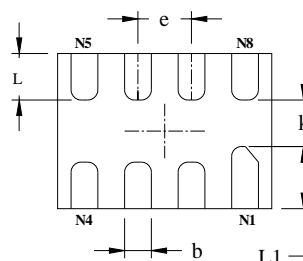
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.650(BSC)		0.026(BSC)	
e1	0.975 (BSC)		0.038 (BSC)	
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

PACKAGE OUTLINE DIMENSIONS

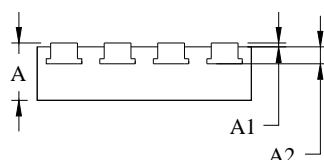
- Type: DFN-1.4x1.0-8L



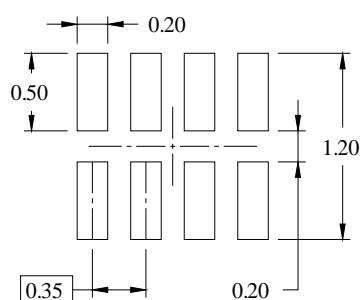
TOP VIEW



BOTTOM VIEW



SIDE VIEW

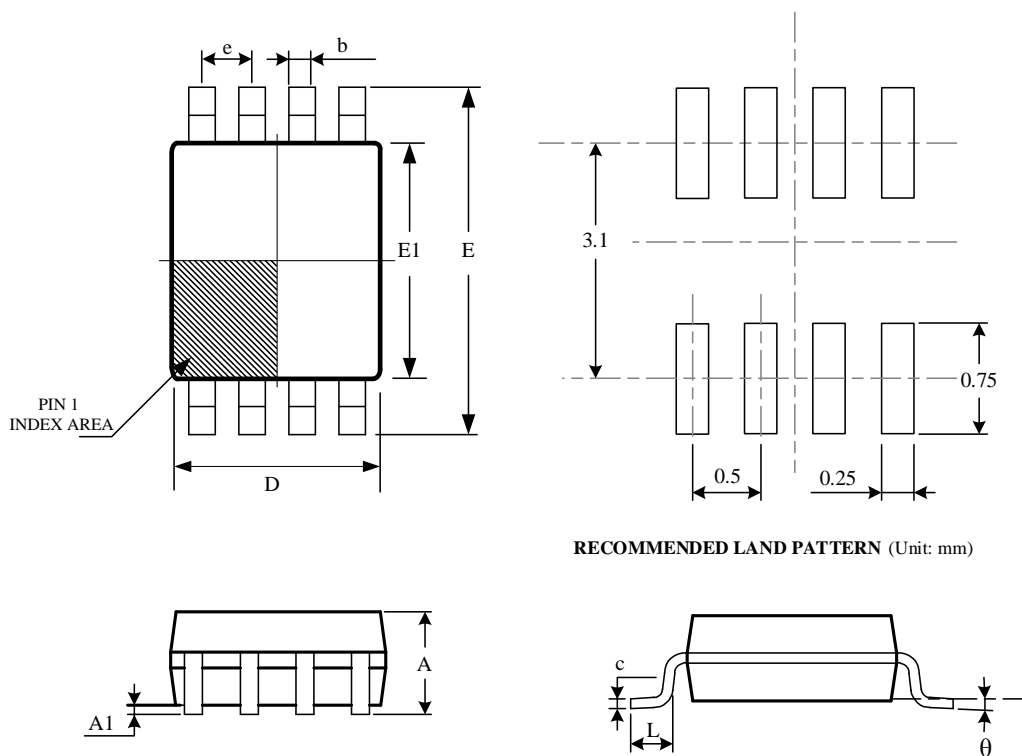


RECOMMENDED LAND PATTERN(Unit: mm)

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.340	0.400	0.013	0.016
A1	0.000	0.050	0.000	0.002
A2	0.110 REF		0.004 REF	
D	1.350	1.450	0.053	0.057
E	0.950	1.050	0.037	0.041
k	0.200 MIN		0.008 MIN	
b	0.150	0.200	0.006	0.008
e	0.350 TYP		0.014 TYP	
L	0.250	0.350	0.010	0.014
L1	0.350	0.450	0.014	0.018

PACKAGE OUTLINE DIMENSIONS

- Type: VSSOP-8L

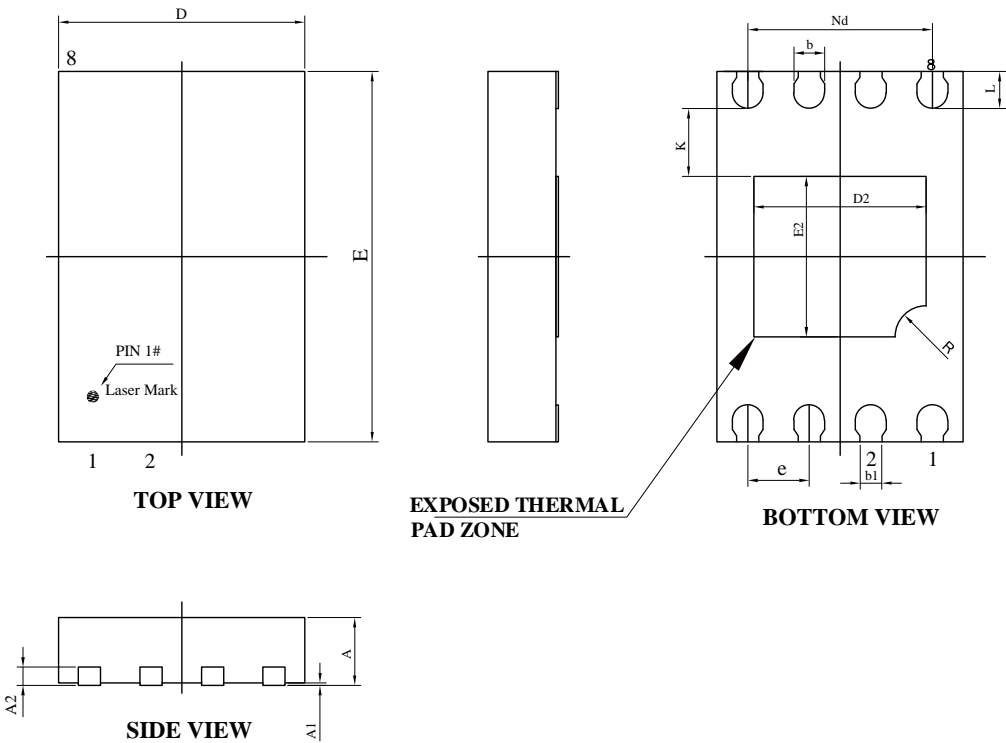


RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.600	0.900	0.024	0.085
A1	0.000	0.100	0.000	0.004
b	0.170	0.250	0.007	0.010
c	0.100	0.200	0.004	0.008
D	1.900	2.100	0.075	0.083
e	0.500(BSC)		0.020(BSC)	
E	3.000	3.200	0.118	0.126
E1	2.200	2.400	0.087	0.095
L	0.200	0.350	0.008	0.014
θ	0°	6°	0°	6°

PACKAGE OUTLINE DIMENSIONS

- Type: DFN2x3-8L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.500	0.600	0.020	0.024
A1	0.000	0.050	0.000	0.002
A2	0.152 REF		0.006 REF	
D	1.900	2.100	0.075	0.083
E	2.900	3.100	0.114	0.122
D2	1.300	1.500	0.051	0.059
E2	1.200	1.400	0.047	0.055
e	0.500 BSC		0.020 BSC	
Nd	1.500 BSC		0.059 BSC	
b	0.200	0.300	0.008	0.012
bl	0.180 REF		0.007 REF	
L	0.250	0.350	0.010	0.014
R	0.200	0.300	0.008	0.012
K	0.500	0.600	0.020	0.024

ORDERING INFORMATION

Part Number	Voltage Range	Features	Operating Temperature	Package Type	Top Mark	SPQ
VLT0102M8	1.65V ~ 5.5V	<ul style="list-style-type: none"> No Direction-Control Data Rates 24Mbps (Push-Pull) 2Mbps (Open-Drain) 2-Bit Bidirectional Voltage-Level Translator 	-40°C to 85°C	SOT-23-8L	0102	3000EA/Reel
VLT0102D8	1.65V ~ 5.5V		-40°C to 85°C	DFN1.4x1.0-8L	0102	5000EA/Reel
VLT0102S8	1.65V ~ 5.5V		-40°C to 85°C	VSSOP-8L	0102	3000EA/Reel
VLT0102DN8	1.65V ~ 5.5V		-40°C to 85°C	DFN2.0x3.0-8L	0102	3000EA/Reel

Note:

- **VLT0102** devices are Pb-free and RoHS compliant.
- The surface prints of our semiconductor devices are subject to change during the production process and do not involve changes in electrical parameters, and we will not separately state the notice.
- If you have any other custom purchase needs, please contact our sales department.



ESD SENSITIVITY CAUTION

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.



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