

**FEATURES**

- Reverse stand-off voltage: 24V Max.
- Transient protection for each line according to IEC61000-4-2 (ESD):  $\pm 30\text{kV}$  (contact discharge)  
:  $\pm 30\text{kV}$  (air discharge)  
ISO 10605 (ESD):  $\pm 30\text{kV}$  (contact discharge)  
IEC61000-4-5 (surge): 8A (8/20 $\mu\text{s}$ )
- Capacitance:  $C_j = 10\text{pF}$  typ.
- Low leakage current
- Low clamping voltage:  $V_{CL} = 30\text{V}$  typ. @  $I_{PP} = 16\text{A}$  (TLP)
- Solid-state silicon technology
- Device meets MSL 1 requirements
- AEC-Q101 qualified

**PRODUCT APPEARANCE**

Provide green and environmentally friendly lead-free package

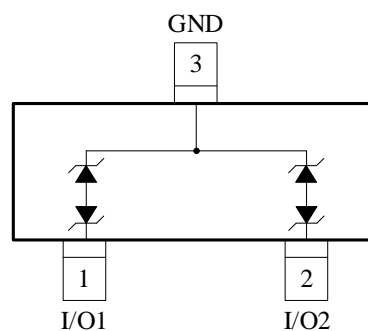
**DESCRIPTION**

The SITL24V2BNQ is a transient voltage suppressor designed to protect two automotive Controller Area Network (CAN) bus lines from the damage caused by ESD and other transients.

The SITL24V2BNQ is available in SOT-23 package. Standard products are Pb-free and Halogen-free.

**Applications:**

- CAN Bus Protection
- Automotive Applications
- Electronic Control Units
- Body Control Units
- ADAS Control Units
- Power Train Control Units

**CIRCUIT DIAGRAM**

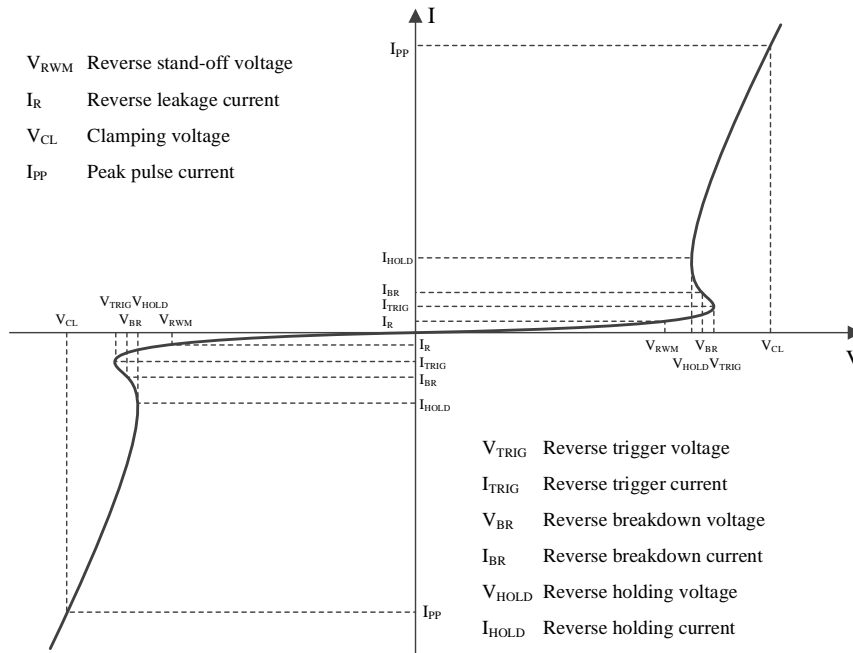
**MARKING (TOP VIEW)**


TH = Device code

MW = Date code (A-Z a-2)

**LIMITING VALUES**

Parameter	Symbol	Value	Unit
Peak pulse power (tp=8/20μs)	P <sub>PK</sub>	280	W
Peak pulse current (tp = 8/20μs)	I <sub>PP</sub>	8	A
ESD according to IEC61000-4-2 air discharge	V <sub>ESD</sub>	±30	kV
ESD according to IEC61000-4-2 contact discharge		±30	kV
ESD according to ISO 10605 contact discharge C = 330 pF, R = 330 Ω; C = 150 pF, R = 330 Ω; C = 330 pF, R = 2 kΩ; C = 150 pF, R = 2 kΩ		±30	kV
Junction temperature	T <sub>J</sub>	150	°C
Operating temperature	T <sub>OP</sub>	-55~150	°C
Lead temperature	T <sub>L</sub>	260	°C
Storage temperature	T <sub>stg</sub>	-65~150	°C

**ELECTRICAL CHARACTERISTICS**

**Definitions of electrical characteristics**

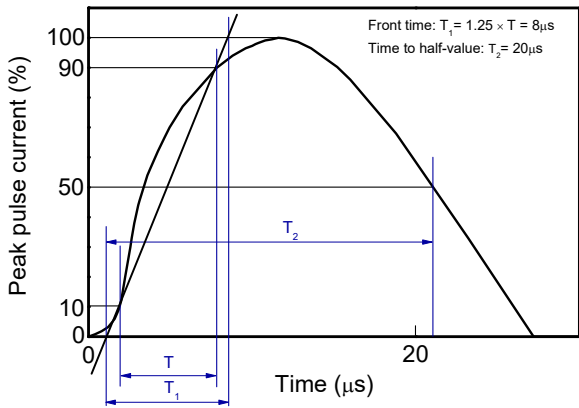
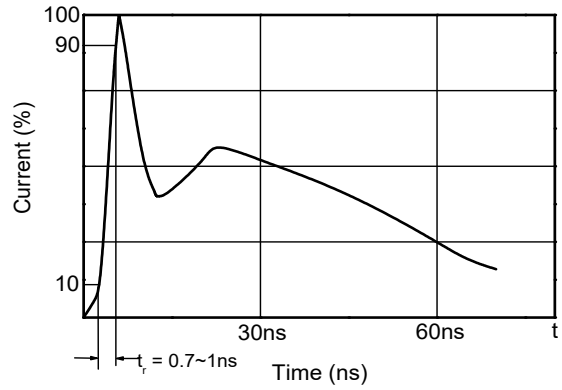
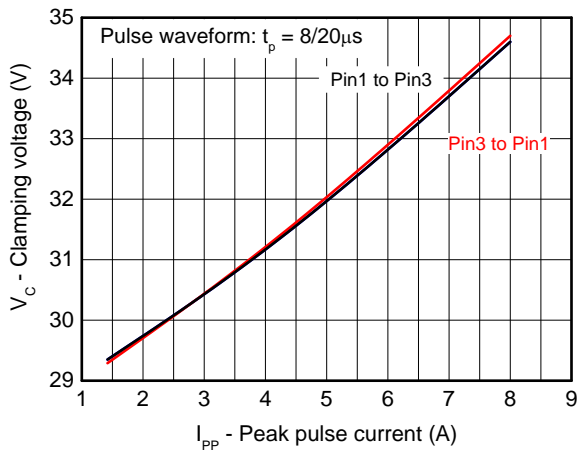
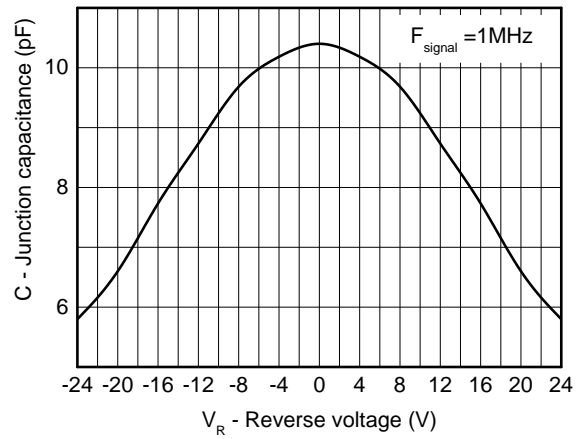
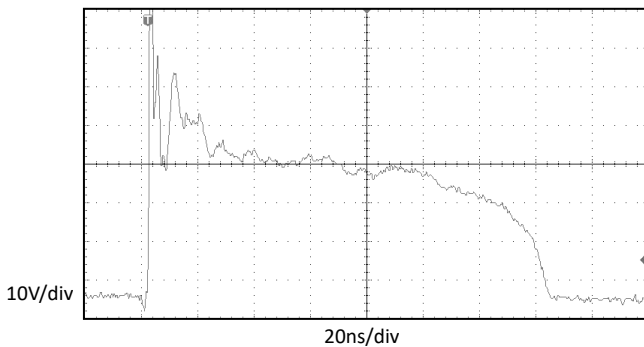
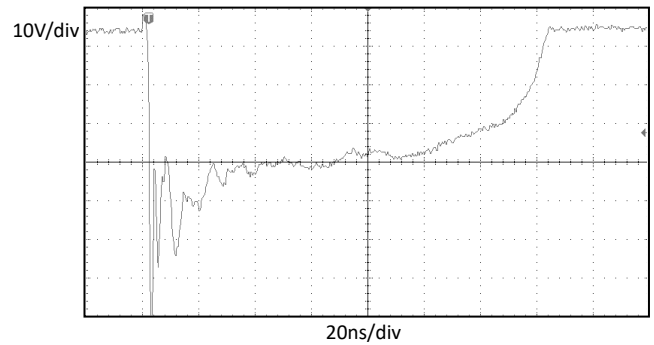
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse stand-off voltage	$V_{RWM}$				$\pm 24$	V
Reverse leakage current	$I_R$	$V_{RWM} = 24V$			50	nA
Reverse breakdown voltage	$V_{BR}$	$I_{BR} = 1mA$		31.5		V
Clamping voltage <sup>(1)</sup>	$V_{CL}$	$I_{PP} = 16A, t_p = 100ns$		30		V
Clamping voltage <sup>(2)</sup>	$V_{CL}$	$V_{ESD} = 8kV$		36		V
Clamping voltage <sup>(3)</sup>	$V_{CL}$	$I_{PP} = 1A, t_p = 8/20\mu s$		30		V
		$I_{PP} = 8A, t_p = 8/20\mu s$		35		V
Dynamic resistance <sup>(1)</sup>	$R_{DYN}$			0.2		$\Omega$
Junction capacitance	$C_J$	$F=1MHz, V_R=0V$ Any I/O pin to GND		10	15	pF

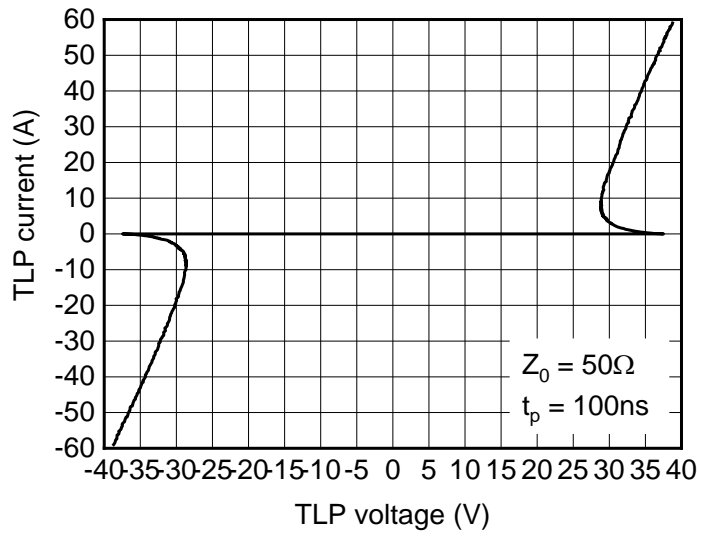
( $T_A=25^\circ C$ , unless otherwise noted.)

(1) TLP parameter:  $Z_0 = 50\Omega, t_p = 100ns$ , averaging window from 70ns to 90ns.  $R_{DYN}$  is calculated from 20A to 40A.

(2) Contact discharge mode, according to IEC61000-4-2.

(3) Non-repetitive current pulse, according to IEC61000-4-5.

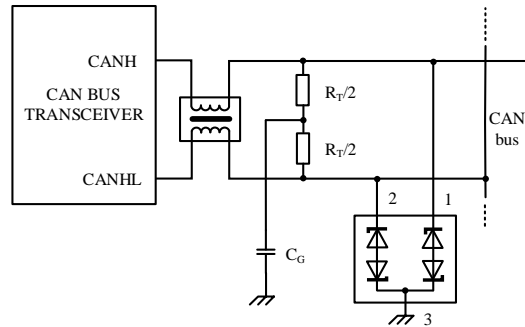
**TYPICAL CHARACTERISTICS**

**8/20μs waveform per IEC61000-4-5**

**Contact discharge current waveform per IEC61000-4-2**

**Clamping voltage vs. Peak pulse current**

**Capacitance vs. Reverse voltage**

**ESD clamping**  
**(+8kV contact discharge per IEC61000-4-2)**

**ESD clamping**  
**(-8kV contact discharge per IEC61000-4-2)**



TLP Measurement

**APPLICATION INFORMATION**

The device is designed for the protection of two automotive CAN bus lines from surge pulses and ESD damage. The device is suitable on lines where the signal polarities are both, positive and negative with respect to ground.

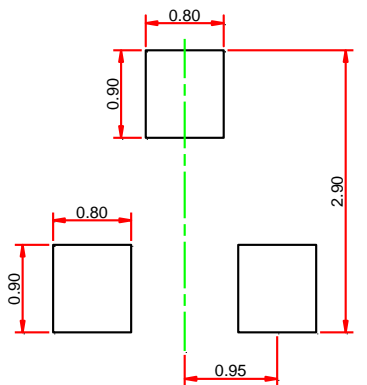
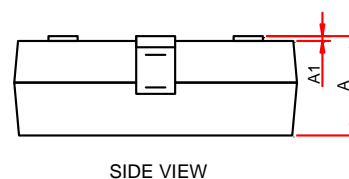
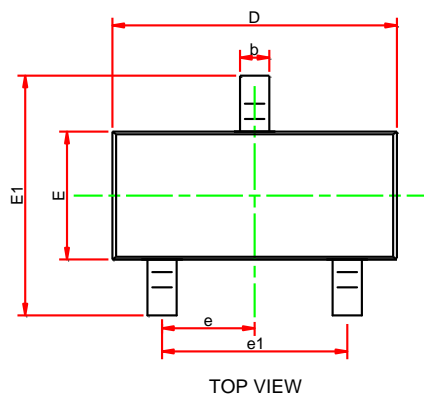


Circuit board layout is critical for the suppression of ESD, Electrical Fast Transient (EFT) and surge transients. The following guidelines are recommended:

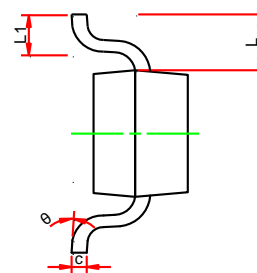
1. Place the device as close to the input terminal or connector as possible.
2. Minimize the path length between the device and the protected line.
3. Keep parallel signal paths to a minimum.
4. Avoid running protected conductors in parallel with unprotected conductors.
5. Minimize all Printed-Circuit Board (PCB) conductive loops including power and ground loops.
6. Minimize the length of the transient return path to ground.
7. Avoid using shared transient return paths to a common ground point.
8. Use ground planes whenever possible. For multilayer PCBs, use ground vias.

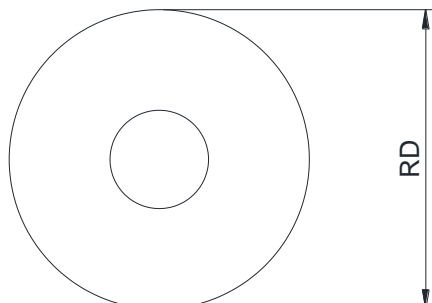
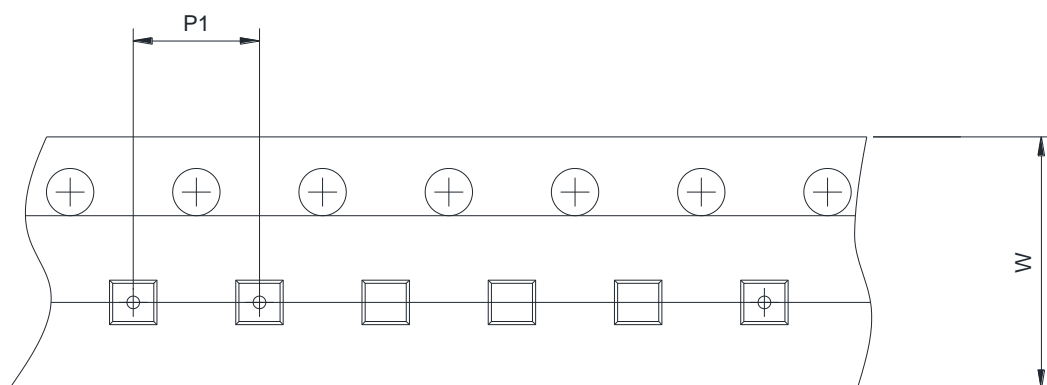
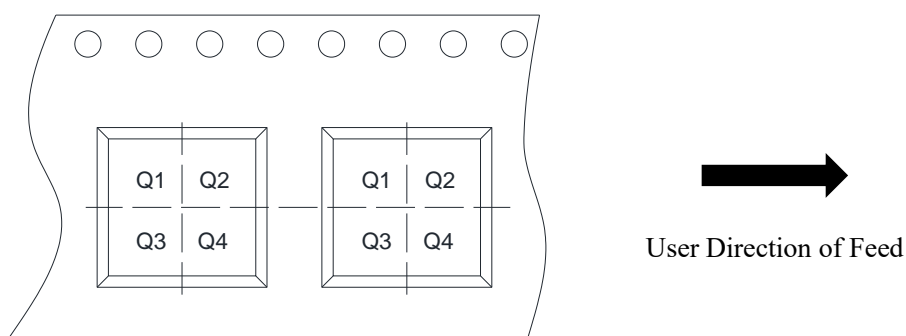
**SOT-23 DIMENSIONS**
**PACKAGE SIZE**

Symbol	Min.	Typ.	Max.
A	0.91	-	1.12
A1	0.01	-	0.10
b	0.30	0.40	0.50
c	0.09	-	0.15
D	2.80	2.90	3.00
E1	2.25	2.40	2.55
E	1.20	1.30	1.40
e	0.95 BSC		
e1	1.80	1.90	2.00
L	0.55 Ref		
L1	0.30	0.40	0.50
$\theta$	0°	-	8°



RECOMMENDED LAND PATTERN(unit:mm)



**TAPE AND REEL INFORMATION**
**Reel Dimensions**

**Tape Dimensions**

**Quadrant Assignments For PIN1 Orientation In Tape**


RD	Reel Dimension	<input checked="" type="checkbox"/> 7inch <input type="checkbox"/> 13inch
W	Overall width of the carrier tape	<input checked="" type="checkbox"/> 8mm <input type="checkbox"/> 12mm <input type="checkbox"/> 16mm
P1	Pitch between successive cavity centers	<input type="checkbox"/> 2mm <input checked="" type="checkbox"/> 4mm <input type="checkbox"/> 8mm
Pin1	Pin1 Quadrant	<input type="checkbox"/> Q1 <input type="checkbox"/> Q2 <input checked="" type="checkbox"/> Q3 <input type="checkbox"/> Q4



**ORDERING INFORMATION**

TYPE NUMBER	PACKAGE	PACKING
SITL24V2BNQ-3/TR	SOT-23	Tape and reel

SOT-23 is packed with 3000 pieces/disc in braided packaging.

**Important statement**

SIT reserves the right to change the above-mentioned information without prior notice.

**REVISION HISTORY**

Version number	Datasheet status	Revision date
V1.0	Initial version.	November 2023