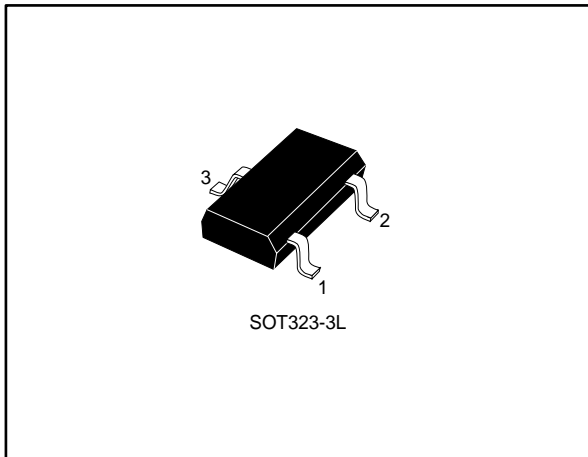


Automotive dual-line Transil™, transient voltage suppressor (TVS) for CAN bus

Datasheet - production data



Applications

Automotive controller area network (CAN) bus lines where electrostatic discharge and other transients must be suppressed. This product is compliant with most of automotive interfaces.

Description

The ESDCAN0x-2BWY are a dual-line Transil specifically designed for the protection of the automotive CAN bus lines against electrostatic discharge (ESD).

Its improved parameters make it compliant with all key interfaces in automotive: CAN-FD, LIN, FlexRay, MOST, SENT, USB, etc.

Features

- AEC-Q101 qualified
- Dual-line ESD and EOS protection
- Stand-off voltage compatible with jump start and truck battery
- Bidirectional device
- Max pulse power up to 250 W (8/20 μ s)
- Low clamping factor V_{CL} / V_{BR}
- Low leakage current
- ECOPACK®2 compliant component



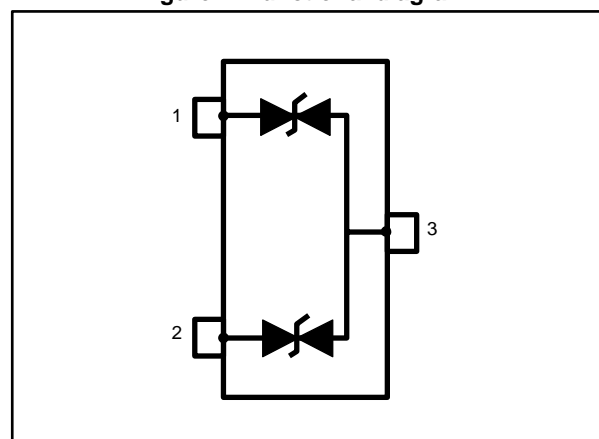
Complies with the following standards

- ISO 10605 - C = 150 pF, R = 330 Ω , up to:
 - ± 30 kV (air discharge)
 - ± 30 kV (contact discharge)
- ISO 10605 - C = 330 pF, R = 330 Ω , up to:
 - ± 30 kV (air discharge)
 - ± 30 kV (contact discharge)
- ISO 7637-3:
 - Fast transient pulse a: $V_s = -150$ V
 - Fast transient pulse b: $V_s = +100$ V
 - Slow transient pulses

Table 1: Device summary

Order code	V_{RM}	Package
ESDCAN02-2BWY	26.5 V	SOT323-3L
ESDCAN03-2BWY	24 V	
ESDCAN05-2BWY	36 V	
ESDCAN06-2BWY	35 V	

Figure 1: Functional diagram



1 Characteristics

Table 2: Absolute ratings ($T_{amb} = 25\text{ }^{\circ}\text{C}$)

Symbol	Parameter	Value	Unit	
V_{PP}	Electrostatic discharge capability: ESDCAN02-2BWY ESDCAN03-2BWY	ISO 10605 - C = 150 pF, R = 330 Ω : Contact discharge	30	kV
		Air discharge	30	
	Electrostatic discharge capability: ESDCAN05-2BWY ESDCAN06-2BWY	ISO 10605 - C = 330 pF, R = 330 Ω : Contact discharge	30	
		Air discharge	30	
	Electrostatic discharge capability: all products	HBM MIL STD 883	30	
P_{PP}	Peak pulse power dissipation (8/20 μs) T_j initial = T_{amb}	ESDCAN02-2BWY, ESDCAN03-2BWY	250	W
		ESDCAN05-2BWY, ESDCAN06-2BWY	170	
I_{PP}	Peak pulse current (8/20 μs)	ESDCAN02-2BWY, ESDCAN03-2BWY	3.7	A
		ESDCAN05-2BWY, ESDCAN06-2BWY	3	
T_j	Operating junction temperature range	-55 to +175	$^{\circ}\text{C}$	
T_{stg}	Storage temperature range	-55 to +175	$^{\circ}\text{C}$	

Figure 2: Electrical characteristics (definitions)

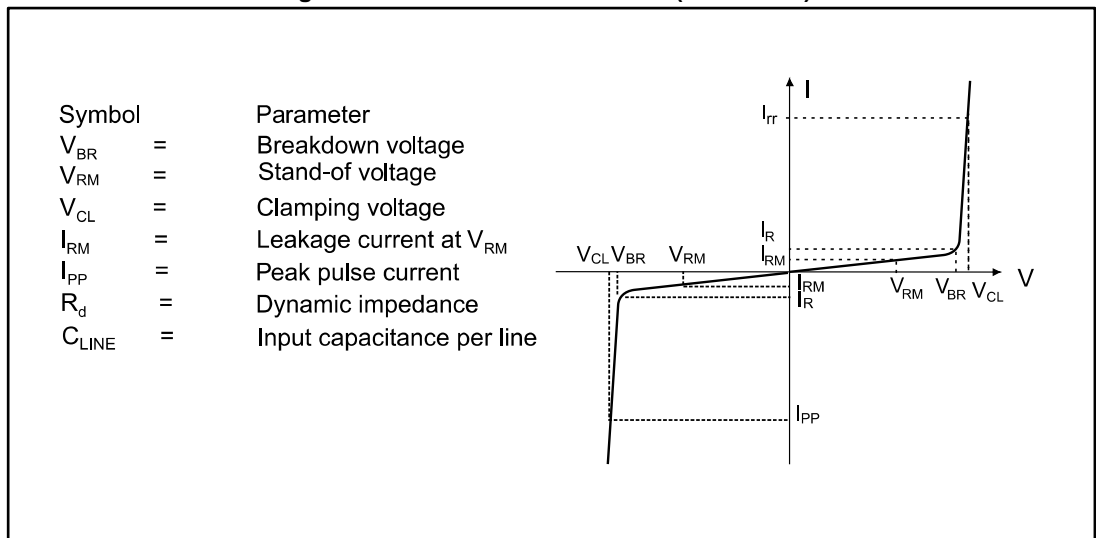


Table 3: Electrical characteristics (values, T_{amb} = 25 °C)

Order code	I _{RM} max. at V _{RM}		V _{BR} at I _R		V _{CL} Pulse ISO7637-3		V _{CL} at I _{PP} (8/20 μs)		C		ΔC	αT ⁽¹⁾	
	μA	V	Min.	Max.	mA	3a at -150 V min.	3b at +100 V max.	Max.	A	Typ.	Max.	Typ.	Typ.
			V			V		V		pF		pF	10 ⁻⁴ /°C
ESDCAN02 ⁽²⁾	0.01	26.5	28.5	31.7	1	-36	36	37	1	3	3.5	0.01	9
								44	3				
ESDCAN03 ⁽²⁾	0.01	24	26.5	29.7	1	-34	34	35	1	3	3.5	0.01	9
								41	3				
ESDCAN05 ⁽²⁾	0.1	36	39	43.3	1	-45	45	52	1	3	3.5	0.01	9
								61	3				
ESDCAN06 ⁽²⁾	0.1	35	38	42.2	1	-44	44	50	1	13	15	0.01	9
								59	3				

Notes:

⁽¹⁾V_{BR} at T_j = V_{BR} at 25 °C x (1 + αT x (T_j - 25))

⁽²⁾To include suffix -2BWY to complete RPN name

2 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

- Epoxy meets UL 94,V0
- Lead-free package

2.1 SOT323-3L package information

Figure 3: SOT323-3L package outline

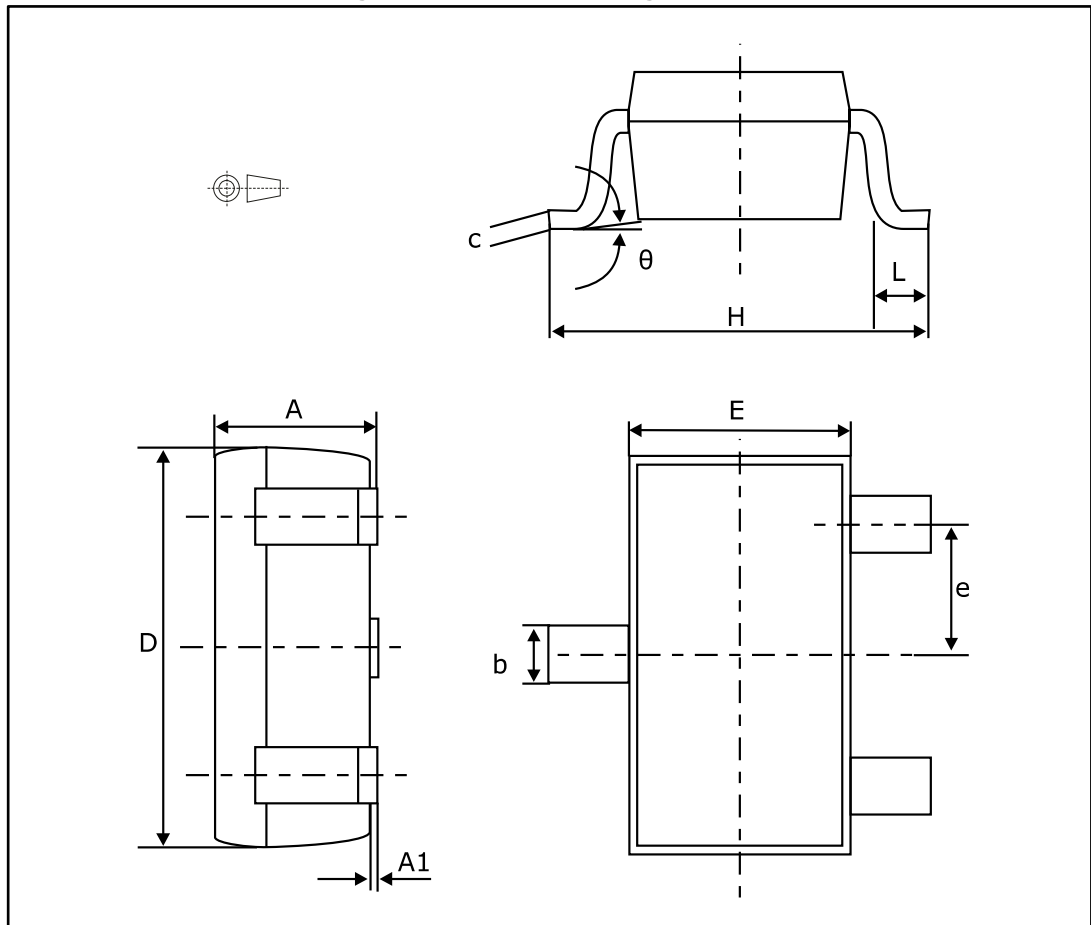
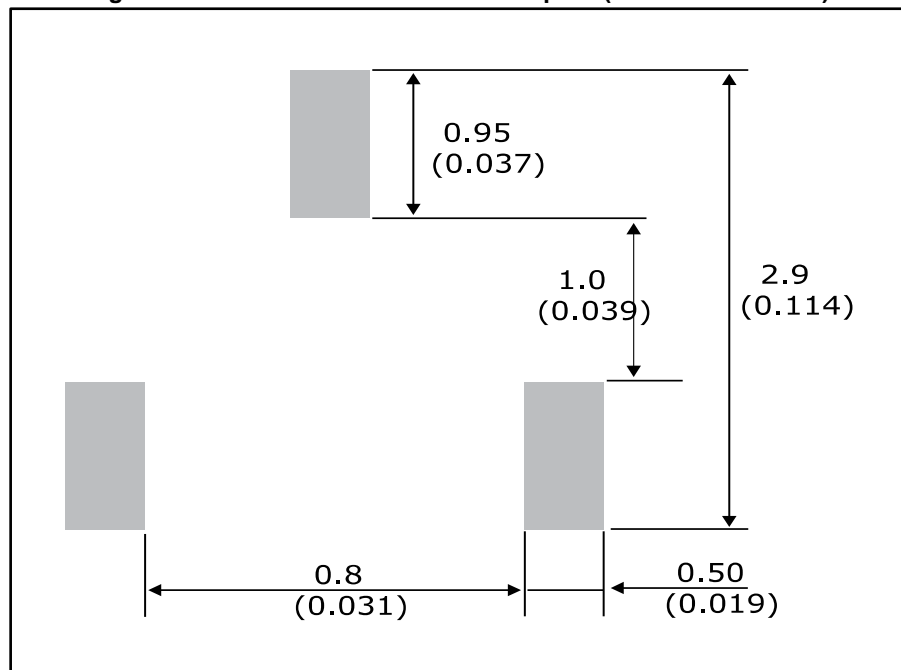


Table 4: SOT323-3L package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.8		1.1	0.031		0.043
A1	0.0		0.1	0.000		0.003
b	0.25		0.4	0.0098		0.0157
c	0.1		0.26	0.003		0.0102
D	1.8	2.0	2.2	0.070	0.078	0.086
E	1.15	1.25	1.35	0.0452	0.0492	0.0531
e	0.60	0.65	0.70	0.024	0.026	0.028
H	1.8	2.1	2.4	0.070	0.082	0.094
L	0.1	0.2	0.30	0.004	0.008	0.012
Θ		0	30°		0	30°

Figure 4: SOT323-3L recommended footprint (dimensions in mm)



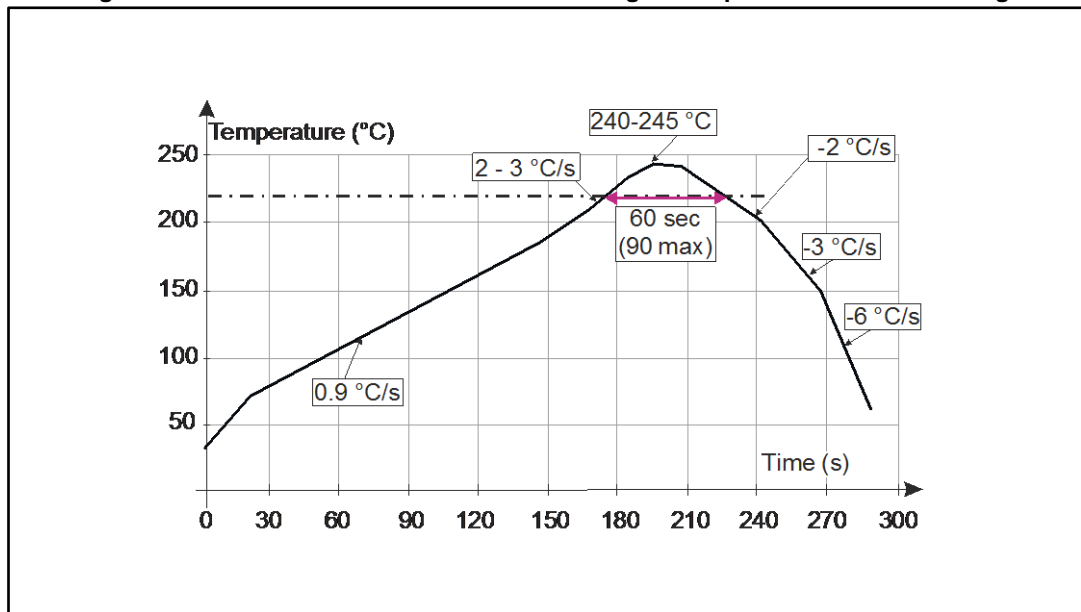
3 Recommendation on PCB assembly

3.1 PCB design preference

1. To control the solder paste amount, the closed via is recommended instead of open vias.
2. The position of tracks and open vias in the solder area should be well balanced. A symmetrical layout is recommended, to avoid any tilt phenomena caused by asymmetrical solder paste due to solder flow away.

3.2 Reflow profile

Figure 5: ST ECOPACK® recommended soldering reflow profile for PCB mounting



Minimize air convection currents in the reflow oven to avoid component movement. Maximum soldering profile corresponds to the latest IPC/JEDEC J-STD-020.

4 Ordering information

Figure 6: Ordering information scheme

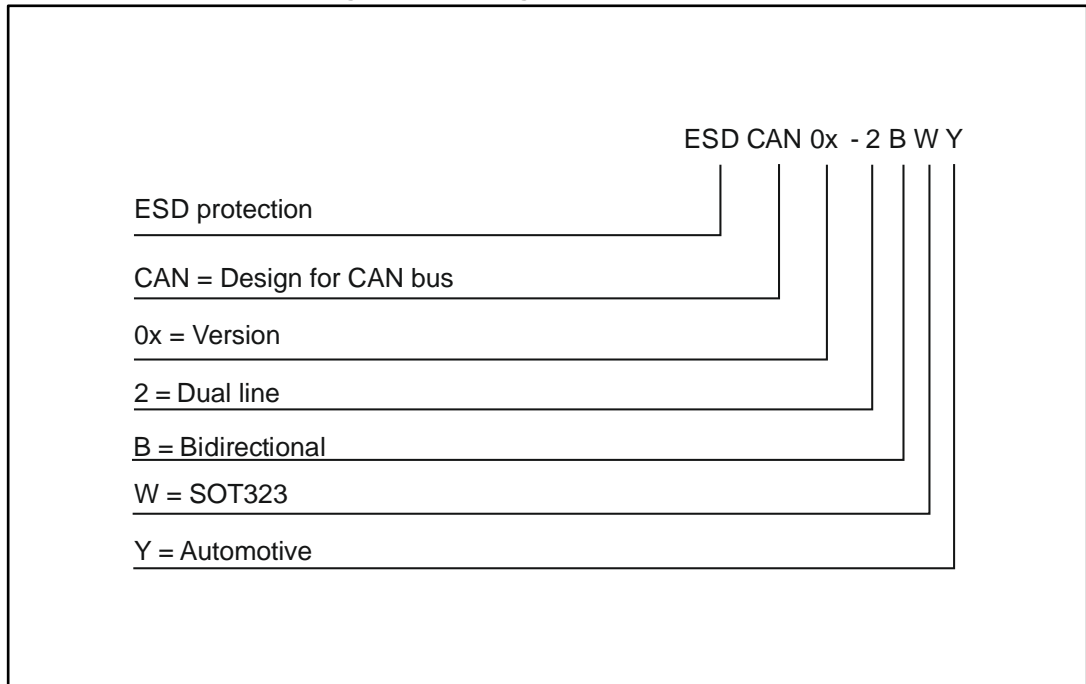


Table 5: Ordering information

Order code	Marking ⁽¹⁾	Package	Weight	Base qty.	Delivery mode
ESDCAN02-2BWY	C02	SOT323-3L	6.58 mg	3000	Tape and reel
ESDCAN03-2BWY	C03				
ESDCAN05-2BWY	C05				
ESDCAN06-2BWY	C06				

Notes:

⁽¹⁾The marking can be rotated by multiples of 90° to differentiate assembly location

5 Revision history

Table 6: Document revision history

Date	Revision	Changes
11-Apr-2015	1	First issue.
30-Sep-2015	2	Updated <i>Figure 3: "Peak pulse current versus initial junction temperature (maximum values)"</i> .
16-Jun-2016	3	Updated <i>Figure 5: "Peak pulse current versus clamping voltage ESDCAN02-2BWY"</i> and <i>Figure 6: "Peak pulse current versus clamping voltage ESDCAN03-2BWY"</i> .
20-Dec-2016	4	ESDCAN05-2BWY and ESDCAN06-2BWY added. Remove of characteristics curves section.
04-Aug-2017	5	Updated Table 4: "SOT323-3L package mechanical data" .

IMPORTANT NOTICE – PLEASE READ CAREFULLY

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2017 STMicroelectronics – All rights reserved