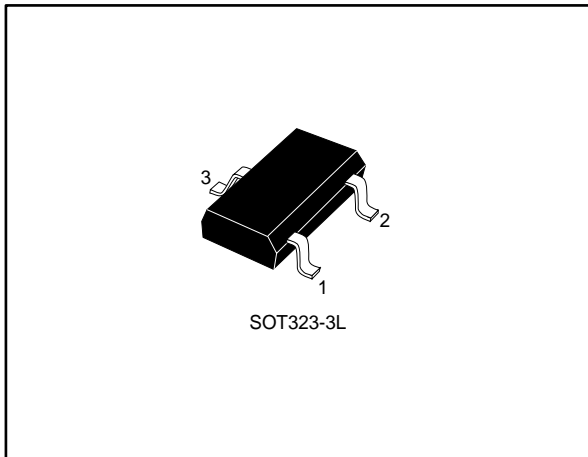


Automotive dual-line Transil™, transient voltage suppressor (TVS) for CAN bus

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



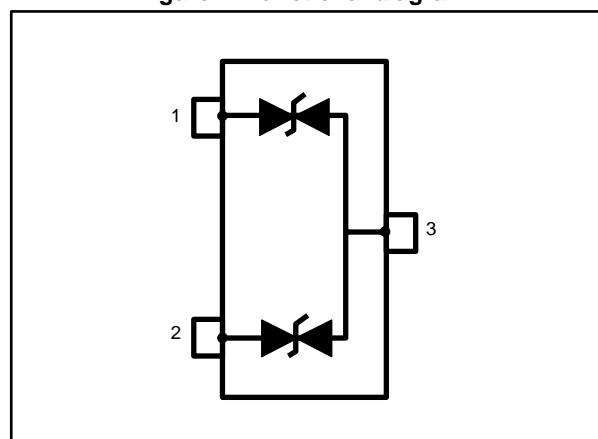
Table 1: Device summary

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

Complies with the following standards

- ISO 10605 - C = 150 pF, R = 330 Ω , up to:
 - \pm 30 kV (air discharge)
 - \pm 30 kV (contact discharge)
- ISO 10605 - C = 330 pF, R = 330 Ω , up to:
 - \pm 30 kV (air discharge)
 - \pm 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

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	$^{\circ}\text{C}$	

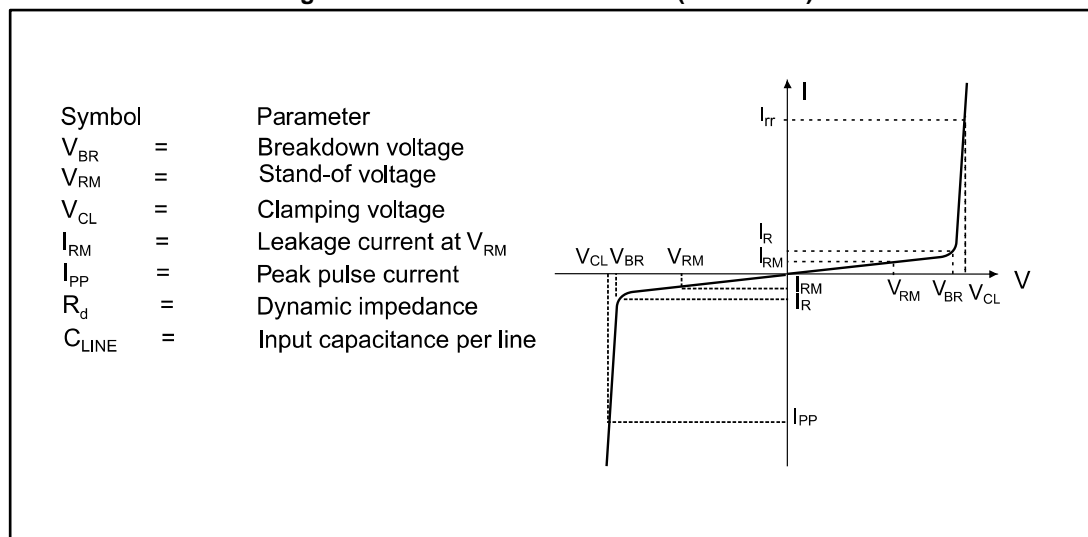
Figure 2: Electrical characteristics (definitions)


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

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 μ s)		C		ΔC	$\alpha T^{(1)}$
	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	$10^{-4}/\text{°C}$	
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 $25\text{ °C} \times (1 + \alpha T \times (T_j - 25))$

⁽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

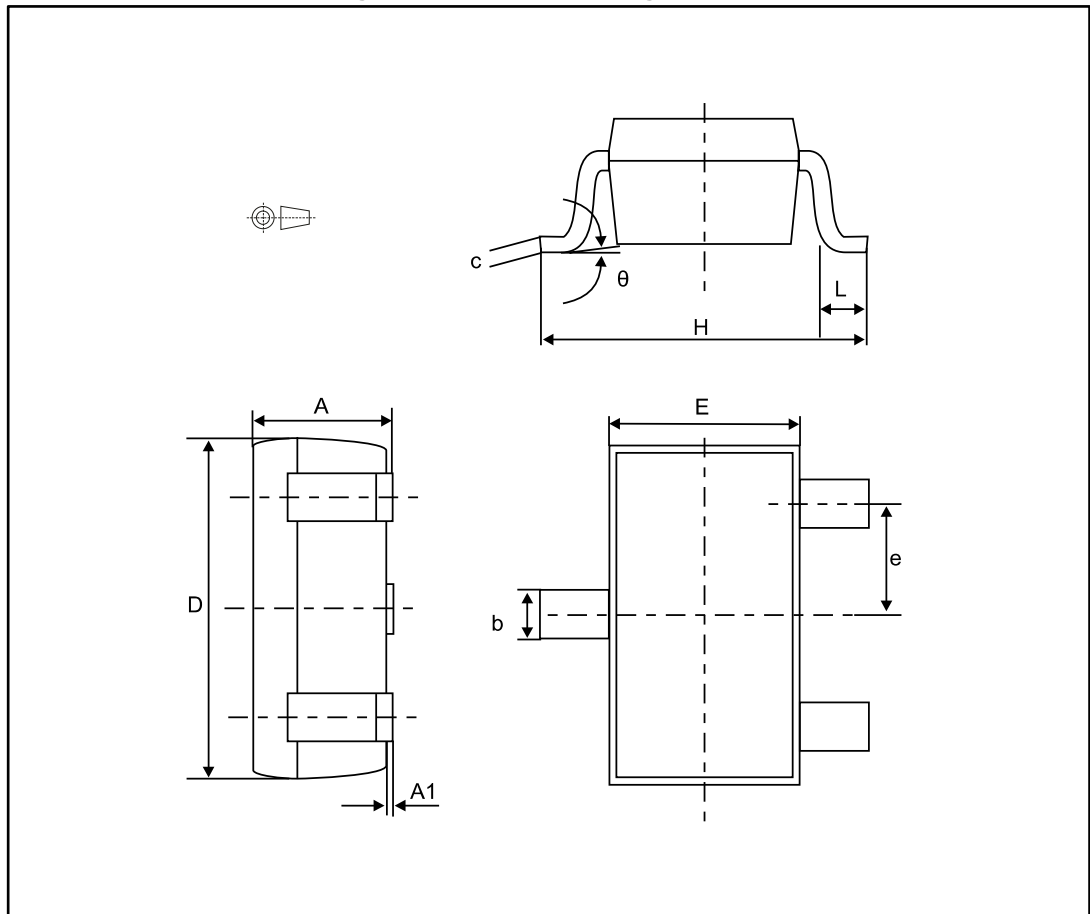


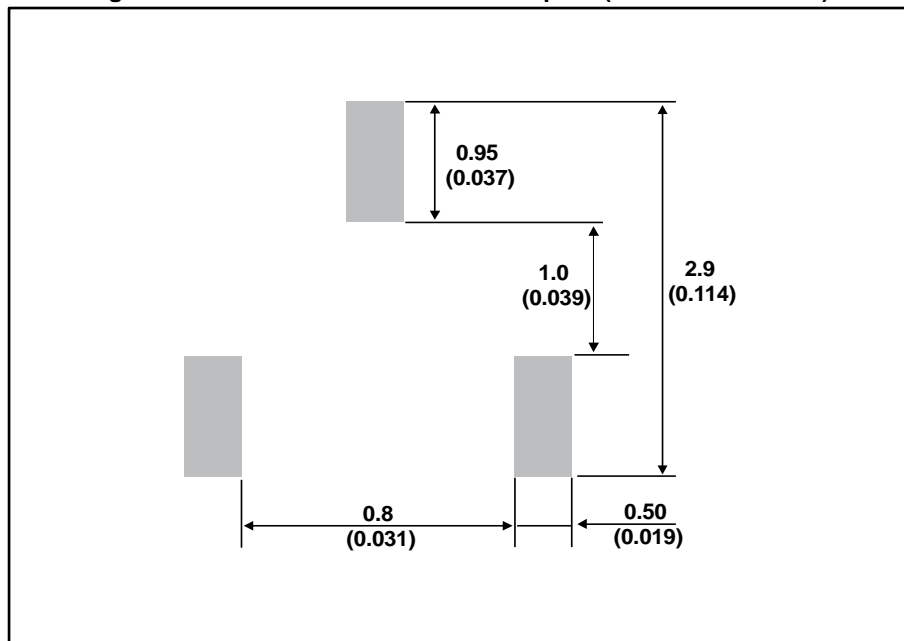
Table 4: SOT323-3L package mechanical data

Ref.	Dimensions					
	Millimeters			Inches ⁽¹⁾		
	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	2.0	1.8	2.2	0.078	0.070	0.086
E	1.25	1.15	1.35	0.0492	0.0452	0.0531
e	0.65			0.0255		
H	2.1	1.8	2.4	0.082	0.070	0.094
L	0.2	0.1	0.3	0.007	0.003	0.011
Θ		0	30°		0	30°

Notes:

⁽¹⁾Values in inches are converted from mm and rounded to 4 decimal digits.

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



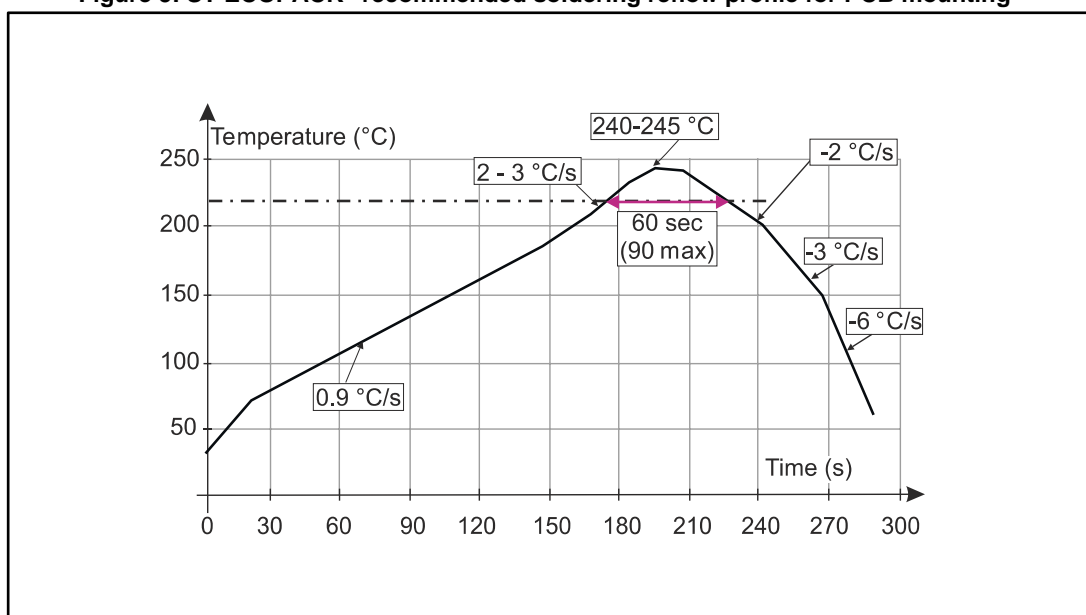
3 Recommendation on PCB assembly

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

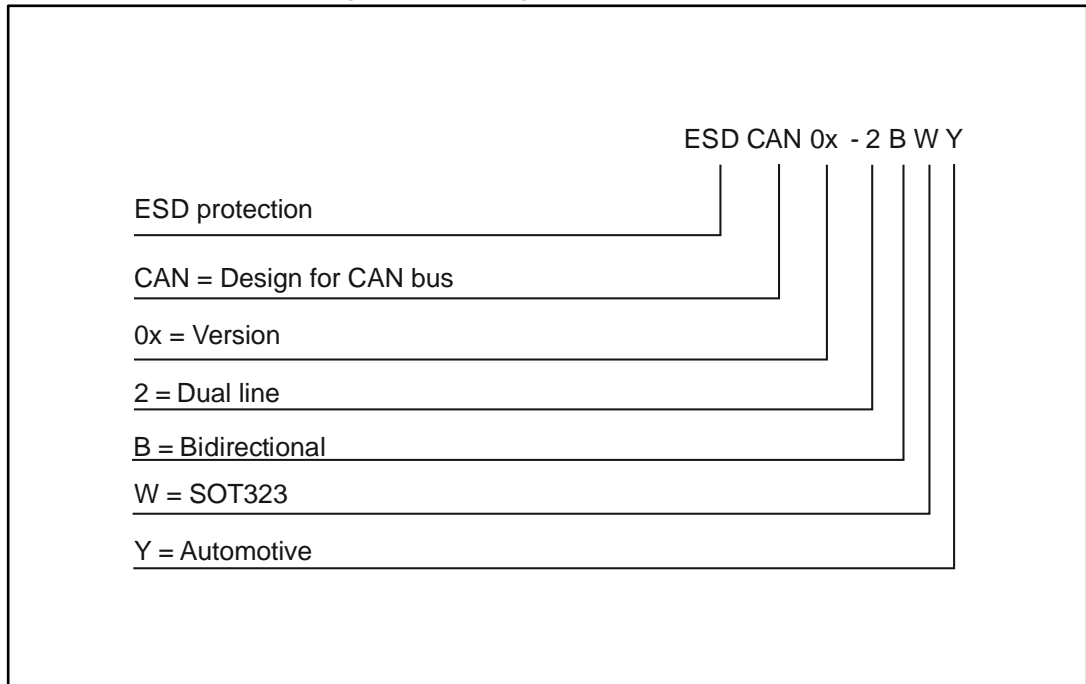


Table 5: Ordering information

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 Figure 3: "Peak pulse current versus initial junction temperature (maximum values)".
16-Jun-2016	3	Updated Figure 5: "Peak pulse current versus clamping voltage ESDCAN02-2BWY" and Figure 6: "Peak pulse current versus clamping voltage ESDCAN03-2BWY".
20-Dec-2016	4	ESDCAN05-2BWY and ESDCAN06-2BWY added. Remove of characteristics curves section.

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