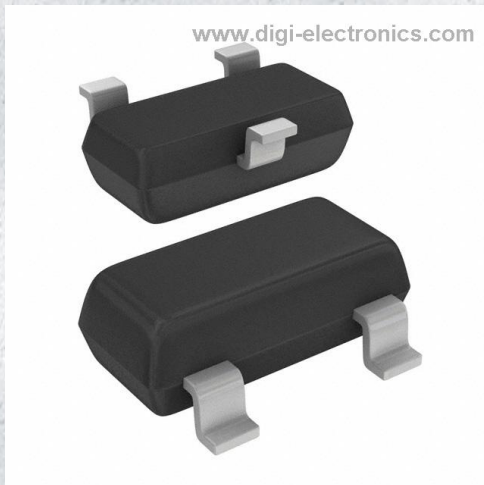


# ESDCAN06-2BWY Datasheet



<https://www.DiGi-Electronics.com>

DiGi Electronics Part Number	ESDCAN06-2BWY-DG
Manufacturer	<a href="#">STMicroelectronics</a>
Manufacturer Product Number	ESDCAN06-2BWY
Description	TVS DIODE 35VWM 59VC SOT323-3
Detailed Description	59V Clamp 3A (8/20µs) Ipp Tvs Diode Surface Mount SOT-323-3

This model ESDCAN06-2BWY is available at DiGi Electronics.

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## Purchase and inquiry

Manufacturer Product Number:

ESDCAN06-2BWY

Series:

-

Type:

Zener

Voltage - Reverse Standoff (Typ):

35V

Voltage - Clamping (Max) @ Ipp:

59V

Power - Peak Pulse:

170W

Applications:

CAN

Operating Temperature:

-55°C ~ 175°C (TJ)

Qualification:

AEC-Q101

Package / Case:

SC-70, SOT-323

Base Product Number:

ESDCAN06

Manufacturer:

STMicroelectronics

Product Status:

Active

Bidirectional Channels:

2

Voltage - Breakdown (Min):

38V

Current - Peak Pulse (10/1000µs):

3A (8/20µs)

Power Line Protection:

No

Capacitance @ Frequency:

-

Grade:

Automotive

Mounting Type:

Surface Mount

Supplier Device Package:

SOT-323-3

## Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.10.0080

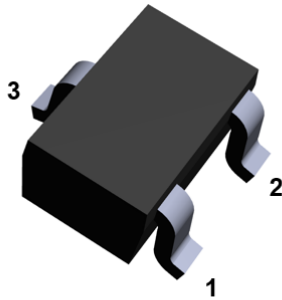
Moisture Sensitivity Level (MSL):

1 (Unlimited)

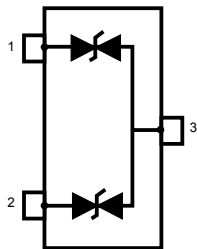
ECCN:

EAR99

## Automotive dual-line TVS in SOT323-3L for CAN bus




**SOT323-3L**  
(Jedec SC-70)



**Product status link**

ESDCAN02-2BWY, ESDCAN03-2BWY,  
ESDCAN04-2BWY, ESDCAN05-2BWY,  
ESDCAN06-2BWY

## Features

- AEC-Q101 qualified 
- Dual-line ESD and EOS protection
- Breakdown voltage,  $V_{BR}$ :
  - ESDCAN02-2BWY: 28.5 V
  - ESDCAN03-2BWY: 26.5 V
  - ESDCAN04-2BWY: 27.5 V
  - ESDCAN05-2BWY: 39 V
  - ESDCAN06-2BWY: 38 V
- Max pulse power up to 170 W (8/20  $\mu$ s)
- Low clamping factor  $V_{CL} / V_{BR}$
- ECOPACK2 ROHS compliant component

### Complies with the following standards

- UL94, V0
- J-STD-020 MSL level 1
- IPC7531 footprint and JEDEC registered package
- ISO 16750-2 (Jump start and reversed battery tests)
- IEC 61000-4-4 (EFT)
  - 4 kV
- ISO 10605 C = 150 pF, R = 330  $\Omega$ , exceeds level 4:
  - $\pm 30$  kV (contact and air discharge)
- ISO 10605 C = 330 pF, R = 2 k $\Omega$  exceeds level 4:
  - $\pm 30$  kV (contact and air discharge)
- ISO 10605 C = 330 pF, R = 330  $\Omega$  exceeds level 4:
  - $\pm 30$  kV (contact and air discharge)
- ISO 7637-3:
  - Pulse 3a: -150 V
  - Pulse 3b: +150 V
  - Pulse 2a: +/- 85 V

## Description

These dual-line CAN transceiver protection devices (TVS) protect both CAN H and CAN L signals of automotive CAN PHY against ISO 7637-3 transients and ESD (electrostatic discharge).

ESDCAN series complies with all the physical layer constraints (jump start, reverse polarity, ...) without compromising the low clamping voltage for an efficient CAN bus protection (controller area network) or LIN bus protection (local interconnect network).

The low line capacitance versions make them compliant with CAN-FD and high speed buses like FlexRay, USB, and even the future CAN XL.

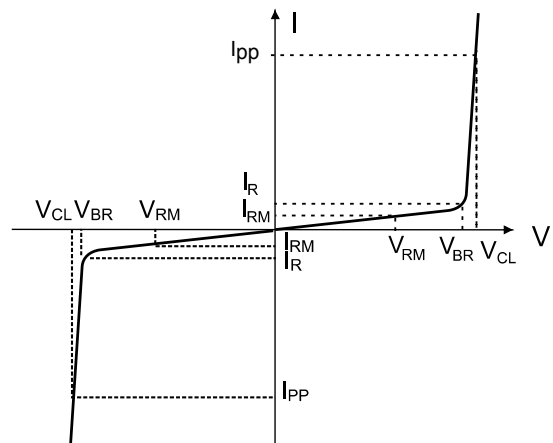
# 1 Characteristics

**Table 1. Absolute ratings ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ )**

Symbol	Parameter		Value	Unit	
$V_{PP}$	Peak pulse voltage	ISO 10605 - C = 150 pF, R = 330 $\Omega$ : Contact and air discharge	30	kV	
		ISO 10605 - C = 330 pF, R = 330 $\Omega$ : Contact and air discharge	ESDCAN02-2BWY ESDCAN03-2BWY ESDCAN04-2BWY		30
		ISO 10605 - C = 330 pF, R = 330 $\Omega$ : Contact discharge	ESDCAN05-2BWY		22
		Air discharge	ESDCAN06-2BWY		30
		ISO 10605 - C = 330 pF, R = 2 k $\Omega$ : Contact and air discharge			30
$I_{PP}$	Peak pulse current (8/20 $\mu\text{s}$ )	ESDCAN02-2BWY ESDCAN03-2BWY ESDCAN04-2BWY	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 1. Electrical characteristics (definitions)**

Symbol	Parameter
$V_{BR}$	= Breakdown voltage
$V_{RM}$	= Stand-off voltage
$V_{CL}$	= Clamping voltage
$I_{RM}$	= Leakage current at $V_{RM}$
$I_{PP}$	= Peak pulse current
$R_d$	= Dynamic impedance
$C_{LINE}$	= Input capacitance per line




**Table 2. 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 $\mu$ s)		C		$\Delta C^{(1)}$	$\alpha T^{(2)}$
			Min.	Max.		3a at -150 V min.	3b at +150 V max.	Max.		Typ.	Max.	Typ.	Typ.
	$\mu$ A	V	V		mA	V		V	A	pF		pF	$10^{-4}/\text{°C}$
ESDCAN02-2BWY	0.01	26.5	28.5	31.7	1	-36	36	44	3	3	3.5	0.01	9
ESDCAN03-2BWY	0.01	24	26.5	29.7	1	-34	34	41	3	3	3.5	0.01	9
ESDCAN04-2BWY	0.05	25.5	27.5	30.7	1	-35	35	43	3	17	19	0.1	9
ESDCAN05-2BWY	0.1	36	39	43.3	1	-45	45	61	3	3	3.5	0.01	9
ESDCAN06-2BWY	0.1	35	38	42.2	1	-44	44	59	3	13	15	0.1	9

1.  $\Delta C$  : capacitance variation between IO1 and IO2 versus GND

2. to calculate  $V_{BR}$  versus  $T_j$ ;  $V_{BR}$  at  $T_j = V_{BR}$  at  $25\text{ °C} \times (1 + \alpha T \times (T_j - 25))$



### 1.1 Characteristics (curves)

Figure 2. Maximum peak current versus initial junction temperature

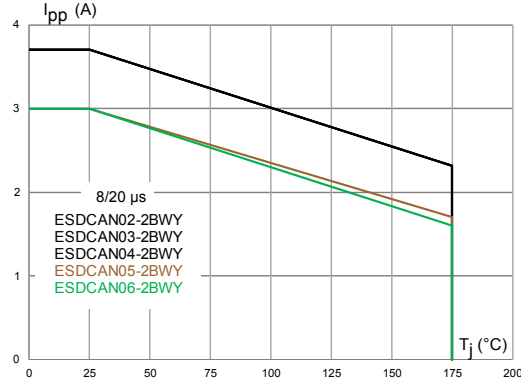


Figure 3. Maximum peak pulse current versus exponential pulse duration

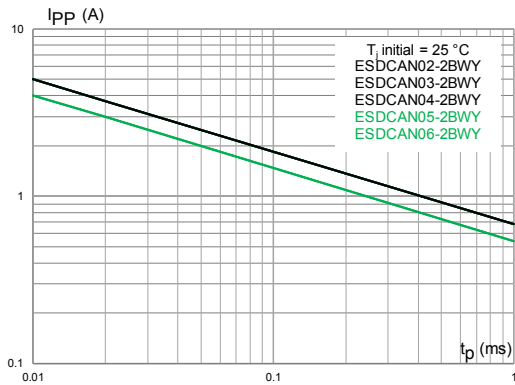


Figure 4. Peak pulse current versus clamping voltage

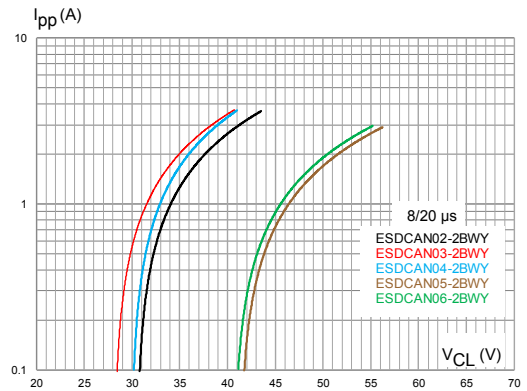


Figure 5. Junction capacitance versus reverse applied voltage

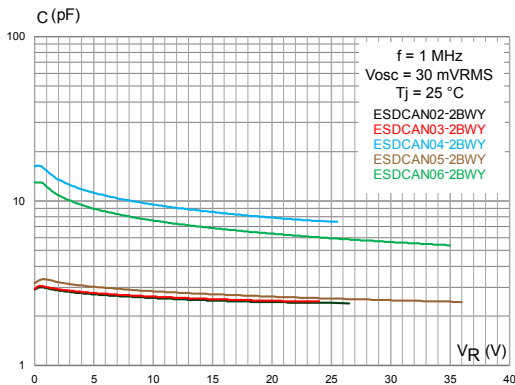
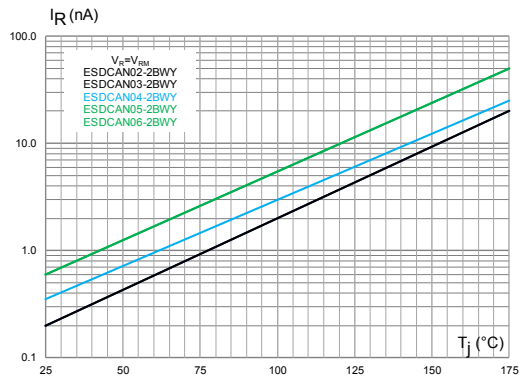
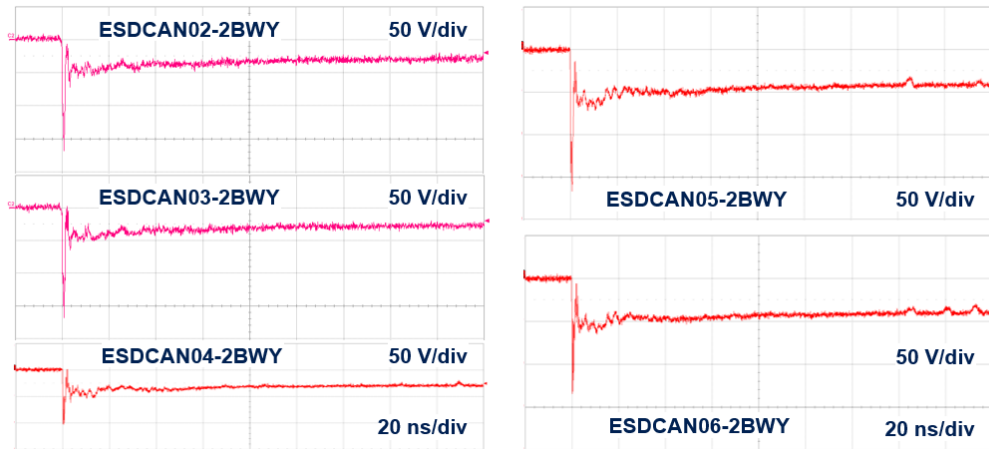


Figure 6. Leakage current versus junction temperature

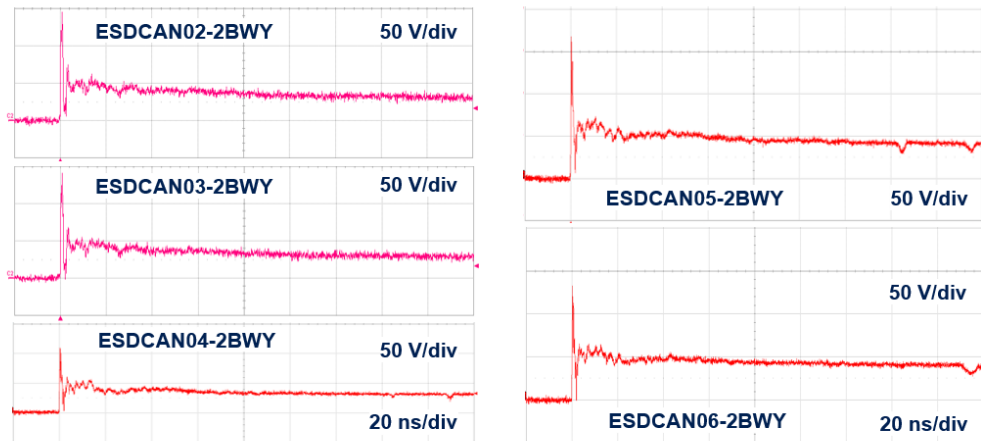




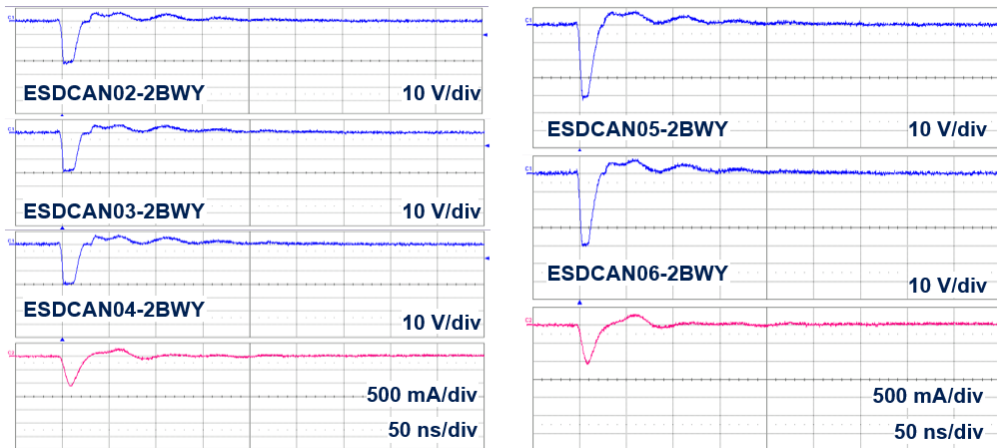
**Figure 7. Response to ISO 10605 -C = 150 pF, R = 330 Ω (-8 kV contact)**



**Figure 8. Response to ISO 10605 - C = 150 pF, R = 330 Ω (+8 kV contact )**

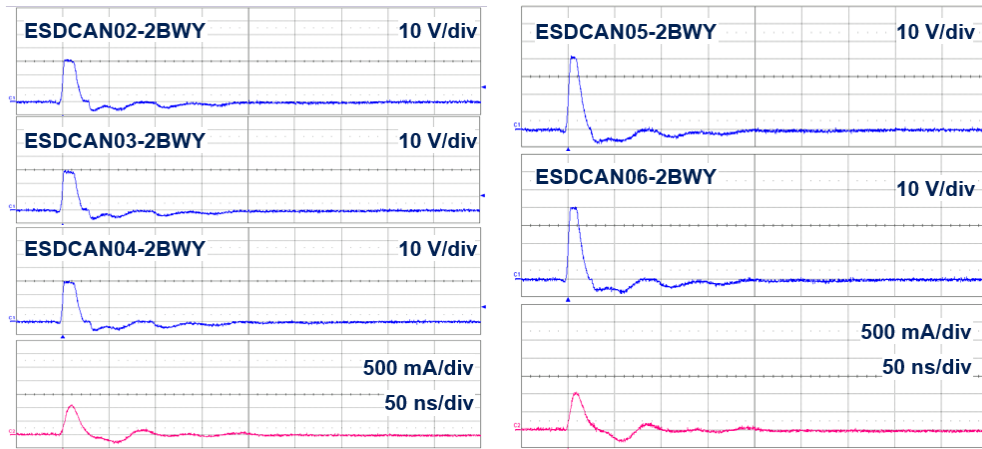


**Figure 9. Response to ISO 7637-3 Pulse 3a: -150 V**

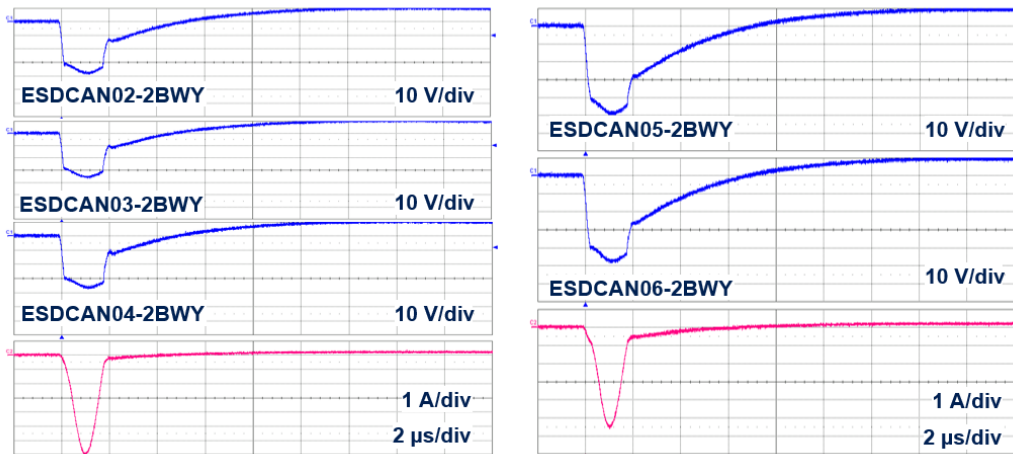




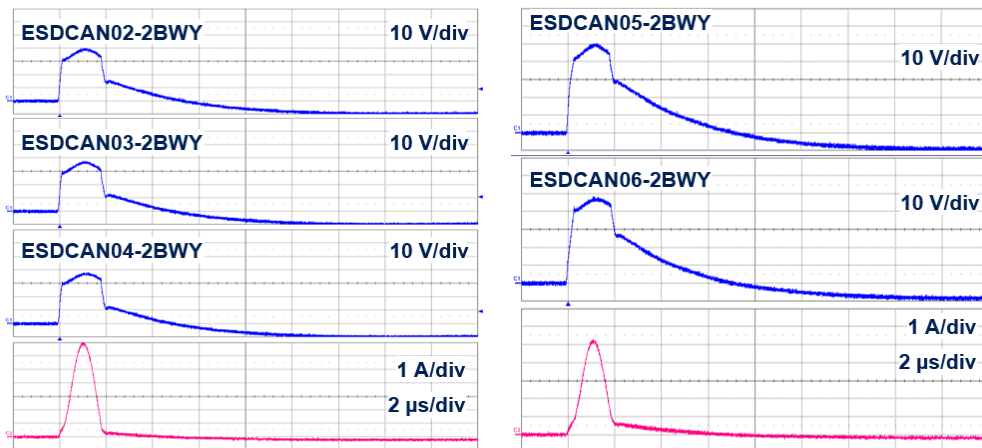
**Figure 10. Response to ISO 7637-3 Pulse 3b : +150 V**



**Figure 11. Response to ISO 7637-3 pulse 2a: -85 V**

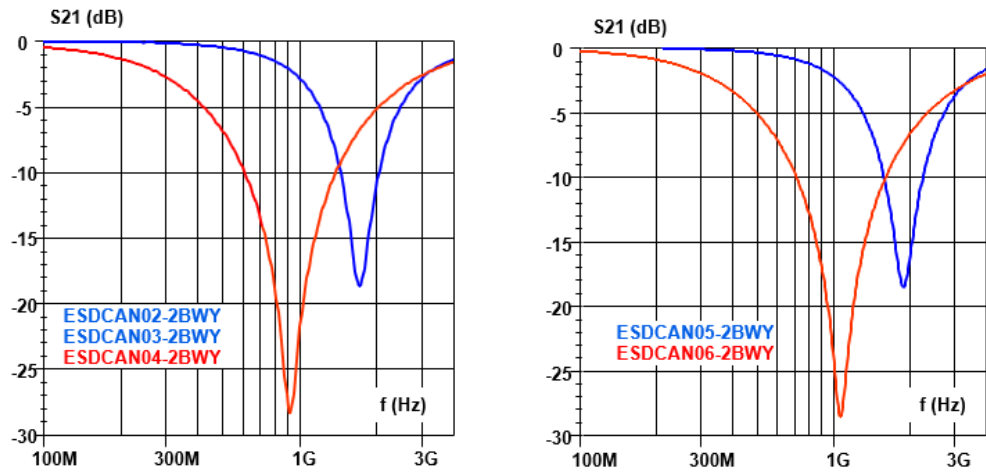


**Figure 12. Response to ISO 7637-3 pulse 2a: +85 V**

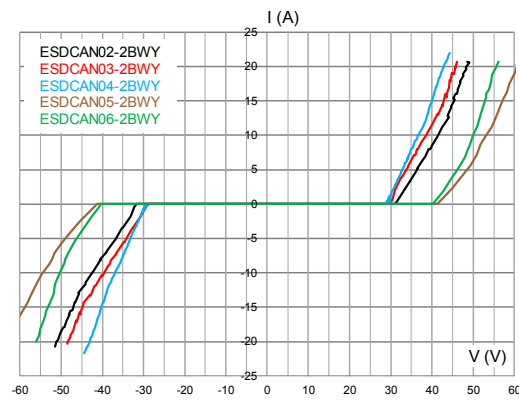




**Figure 13. S21 attenuation**



**Figure 14. TLP**



## 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](http://www.st.com). ECOPACK is an ST trademark.

### 2.1 SOT323-3L package information

Figure 15. SOT323-3L package outline

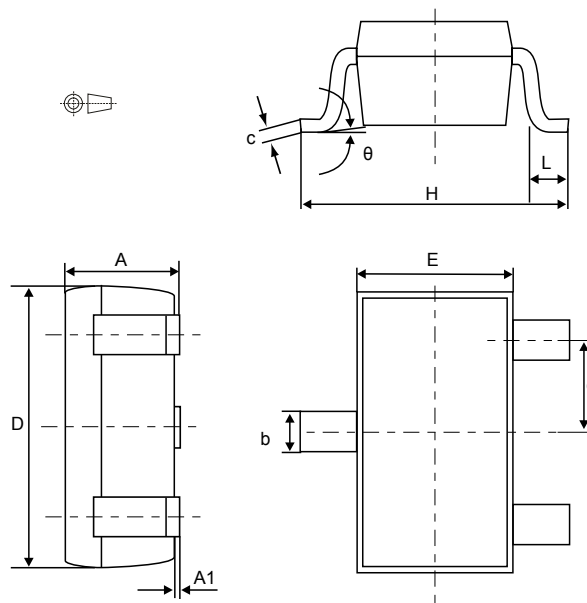
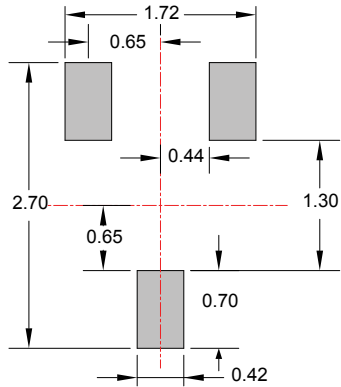
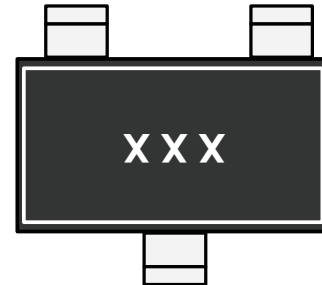
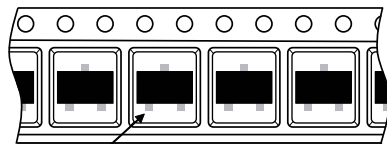


Table 3. SOT323-3L package mechanical data

Ref.	Dimensions					
	Millimeters			Inches <sup>(1)</sup>		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.80		1.10	0.031		0.044
A1	0.00		0.10	0.000		0.004
b	0.25		0.40	0.009		0.016
c	0.10		0.26	0.003		0.011
D	1.80	2.00	2.20	0.070	0.079	0.087
E	1.15	1.25	1.35	0.045	0.049	0.054
e	0.60	0.65	0.70	0.023	0.026	0.028
H	1.80	2.10	2.40	0.070	0.083	0.095
L	0.10	0.20	0.30	0.004	0.008	0.012
θ		0	30°		0	30°

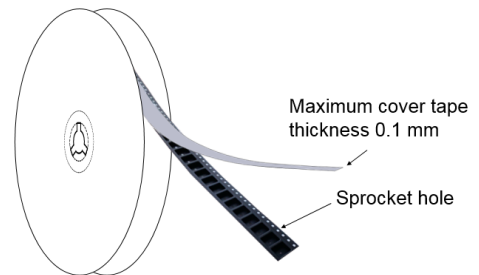
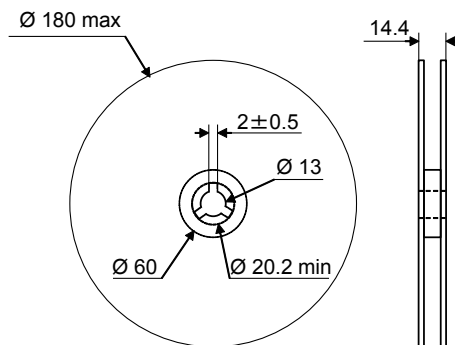
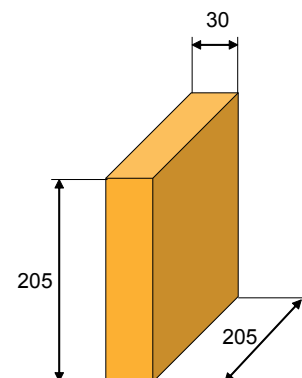
1. Values in inches are converted from mm and rounded to 3 decimal digits

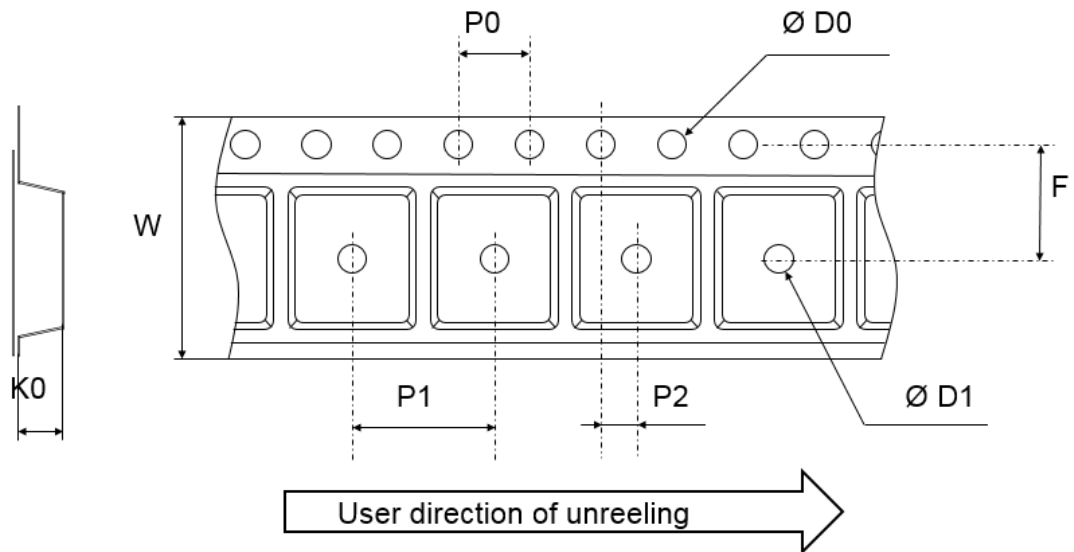
## 2.2 Packing information

**Figure 16. SOT323-3L footprint in mm**

**Figure 17. SOT323-3L marking**

**Figure 18. Package orientation in reel**


Pin 1 located according to EIA-481

Note: Pocket dimensions are not on scale  
 Pocket shape may vary depending on package

**Figure 19. Tape and reel orientation**

**Figure 20. 7" reel dimension values**

**Figure 21. Inner box dimension values**


**Figure 22. Tape outline**


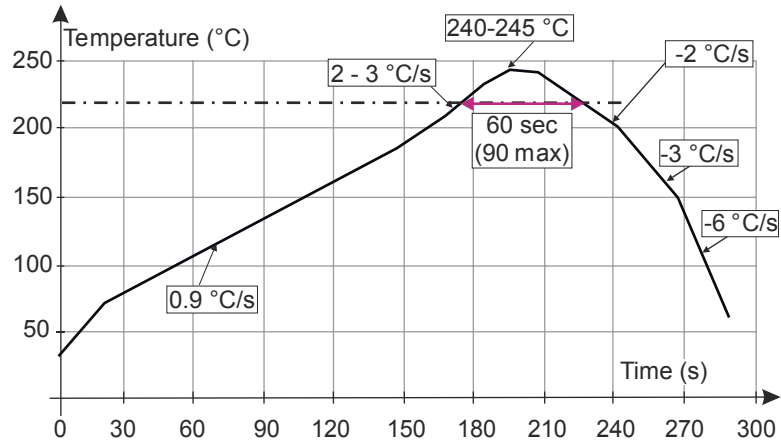
Note: Pocket dimensions are not on scale  
 Pocket shape may vary depending on package

**Table 4. Tape dimension values**

Ref.	Dimensions		
	Millimeters		
	Min.	Typ.	Max.
D0	1.50	1.55	1.6
D1	1.00		
F	3.45	3.50	3.55
K0	1.12	1.22	1.32
P0	3.90	4.00	4.10
P1	3.90	4.00	4.10
P2	1.95	2.00	2.05
W	7.90	8.00	8.30

### 3 Reflow profile

Figure 23. ST ECOPACK® recommended soldering reflow profile for PCB mounting



**Note:** 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 24. Ordering information scheme

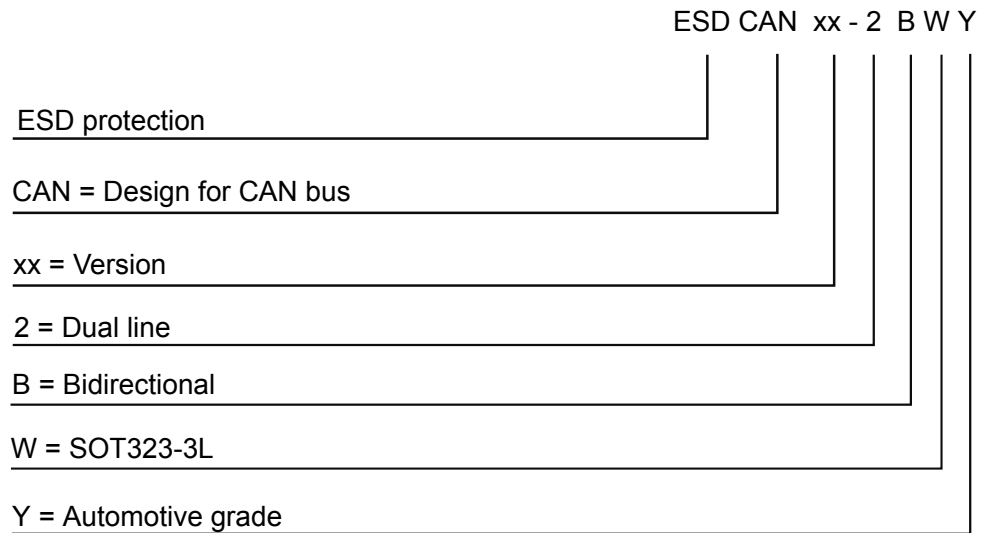


Table 5. Ordering information

Order code	Marking <sup>(1)</sup>	Package	Weight	Base qty.	Delivery mode
ESDCAN02-2BWY	C02	SOT323-3L	6.58 mg	3000	Tape and reel
ESDCAN03-2BWY	C03				
ESDCAN04-2BWY	C04				
ESDCAN05-2BWY	C05				
ESDCAN06-2BWY	C06				

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



## Revision history

**Table 6. Document revision history**

Date	Revision	Changes
17-Oct-2018	1	First issue.
13-Nov-2018	2	Updated product name on cover page.
19-Jul-2022	3	Updated <a href="#">Description</a> , <a href="#">Features</a> and <a href="#">Table 1</a> .

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