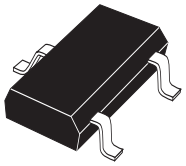
ESDCAN24-2BLY

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

Datasheet - production data



SOT23-3L

Features

- Dual-line ESD and EOS protection
- Bidirectional device
- Max pulse power: 230 W (8/20 µs)
- Stand-off voltage 24 V
- Low clamping factor V_{CL}/V_{BR}
- Fast response time
- Low leakage current
- Small plastic package
- ECOPACK®2 compliant component
- AEC-Q101 qualified

Benefits

- ESD and EOS protection for CAN transceiver
- SOT23 package for space saving on high density printed circuit board
- Transil diodes providing high overvoltage protection by clamping action and instantaneous response to transient overvoltages

Complies with the following standards

- ISO 10605 - C = 150 pF, R = 330 Ω :
  - 30 kV (air discharge)
  - 30 kV (contact discharge)
- ISO 10605 - C = 330 pF, R = 330 Ω :
  - 30 kV (air discharge)
  - 30 kV (contact discharge)
- ISO 7637-3:
  - Pulse 3a: V_S = -150 V
  - Pulse 3b: V_S = +100 V

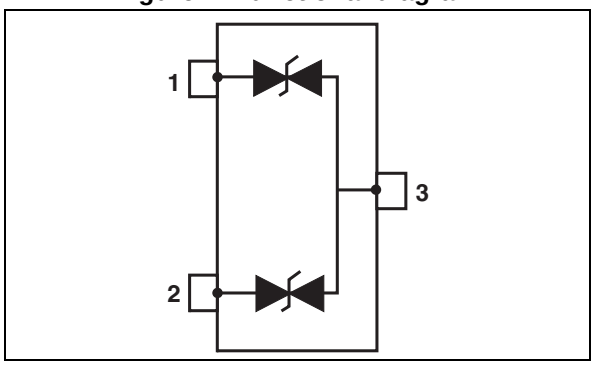
Application

Automotive controller area network (CAN) bus lines where electrostatic discharge and other transients must be suppressed.

Description

The ESDCAN24-2BLY is a dual-line Transil specifically designed for the protection of the automotive CAN bus lines against electrostatic discharge (ESD).

Figure 1. Functional diagram



TM: Transil is a trademark of STMicroelectronics

1 Characteristics

Table 1. Absolute maximum ratings (T_{amb} = 25°C)

Symbol	Parameter		Value	Unit
V_{PP}	Electrostatic discharge capability	ISO 10605 - C = 150 pF, R = 330 Ω :		kV
		Contact discharge	30	
		Air discharge	30	
		ISO 10605 - C = 330 pF, R = 330 Ω :		
		Contact discharge	30	
		Air discharge	30	
		HBM MIL STD 883	8	
P_{PP}	Peak pulse power dissipation 8/20 µs)	T_j initial = T_{amb}	230	W
I_{PP}	Peak pulse current (8/20 µs)		5.5	A
T_{op}	Operating junction temperature range		-40 to +150	°C
T_{stg}	Storage temperature range		-55 to +150	°C

Figure 2. Electrical characteristics (definitions)

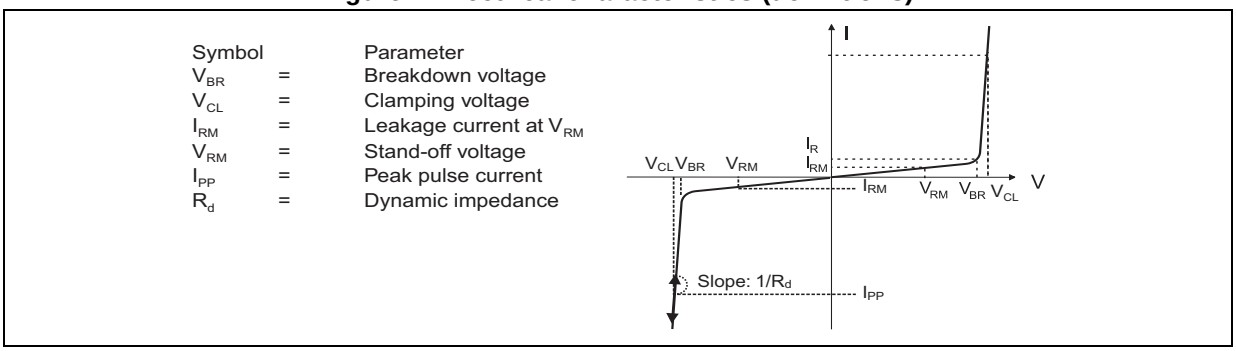


Table 2. Electrical characteristics (values, T_{amb} = 25 °C)

Symbol	Test conditions	Min.	Typ.	Max.	Unit
V_{RM}	Stand-off voltage			24	V
V_{BR}	I_R = 1 mA	27		32	V
I_{RM}	V_{RM} = 24 V			100	nA
V_{CL}	Pulse ISO 7637-3 Pulse 3b			40	V
V_{CL}	Pulse ISO 7637-3 Pulse 3a (negative pulse)	-40			V
V_{CL}	I_{PP} = 5 A, 8/20µs			43	V
$\alpha T^{(1)}$	Voltage temperature coefficient			9	10^{-4}/°C
C	V_R = 0 V DC, F = 1 MHz			30	pF

1. $\Delta V_{BR} = \alpha$ T x (T_{amb} -25) x V_{BR}(25 °C)

Figure 3. Response to ISO 7637-3 Pulse 3a (Vs = -150 V)

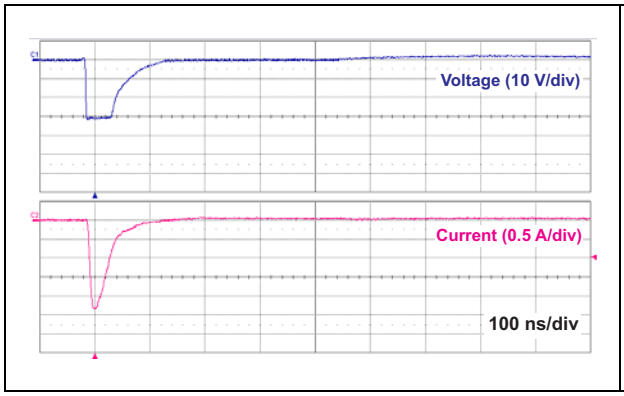


Figure 4. Response to ISO 7637-3 Pulse 3b (Vs = +100 V)

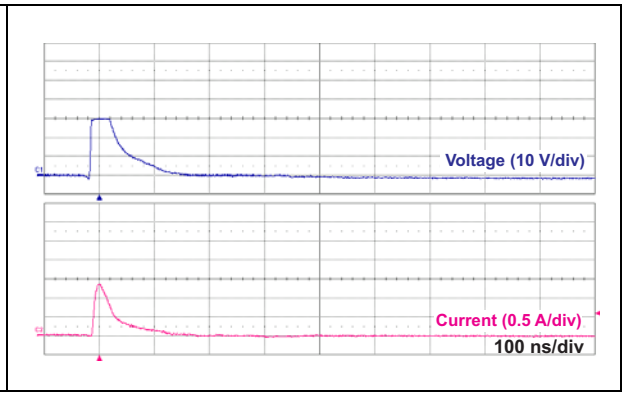


Figure 5. ESD response to ISO 10605 - C = 330 pF, R = 330 Ω (+25 kV air discharge)

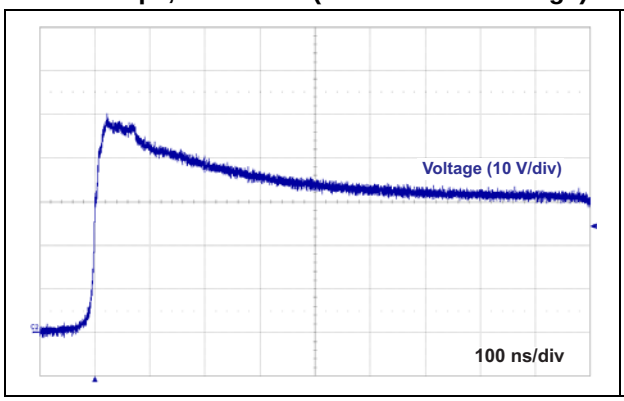


Figure 6. ESD response to ISO 10605 - C = 330 pF, R = 330 Ω (-25 kV air discharge)

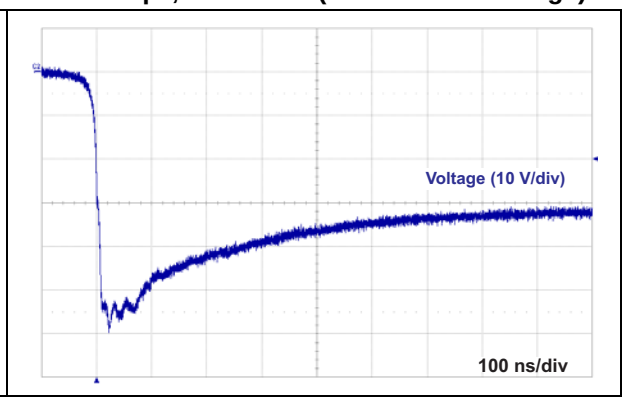


Figure 7. Peak pulse power dissipation versus initial junction temperature (maximum values)

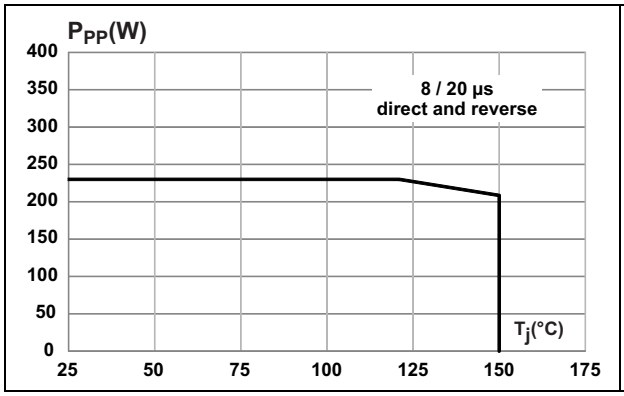


Figure 8. Peak pulse power versus exponential pulse duration (maximum values)

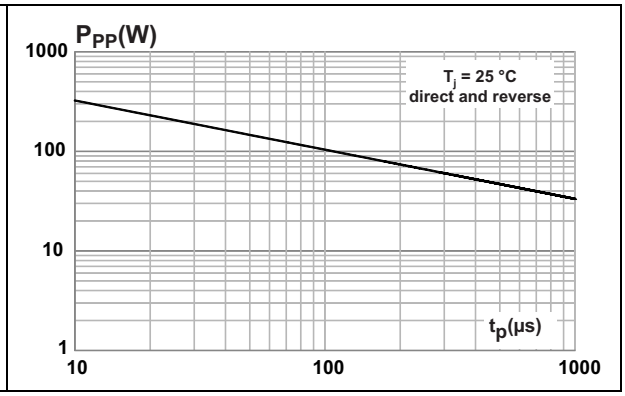


Figure 9. Peak pulse current versus clamping voltage (typical values)

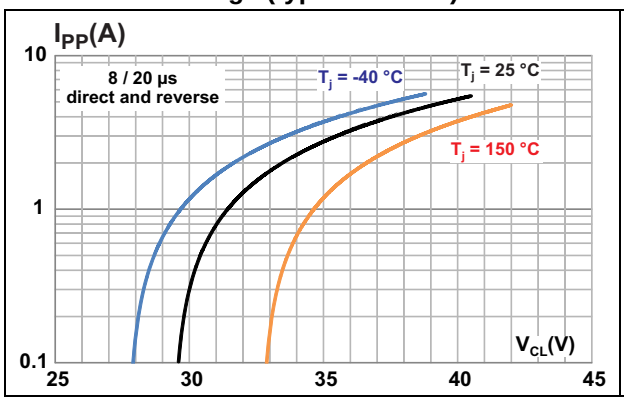


Figure 10. Junction capacitance versus reverse voltage applied (typical values)

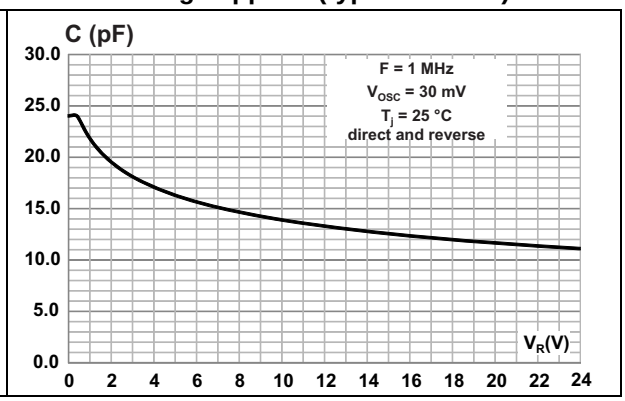


Figure 11. Leakage current versus junction temperature (typical values)

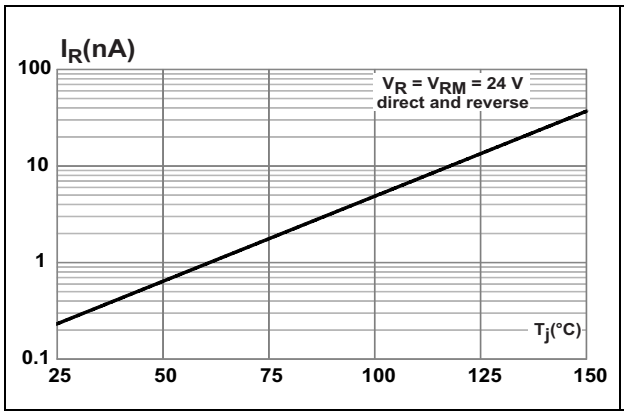
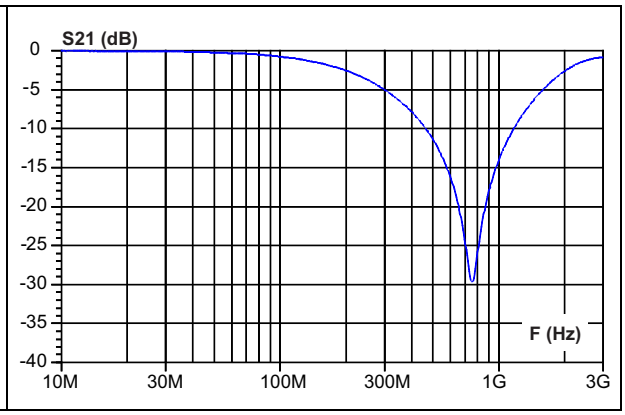


Figure 12. S21 attenuation measurement results of each channel



2 Application and design guidelines

More information is available in the ST Application note AN2689 “Protection of automotive electronics from electrical hazards, guidelines for design and component selection”.

3 Package information

- Epoxy meets UL94, V0
- Lead-free packages

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.

Figure 13. SOT23-3L dimension definitions

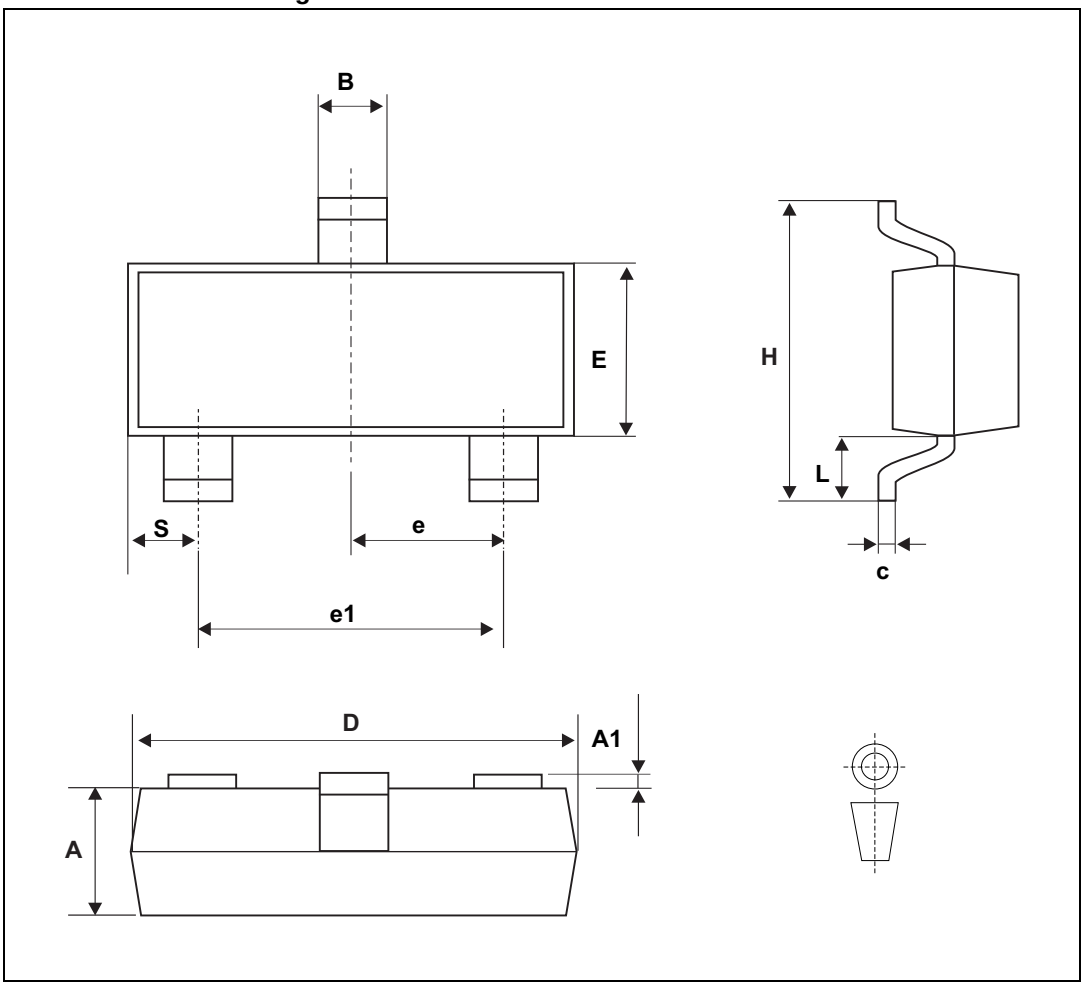
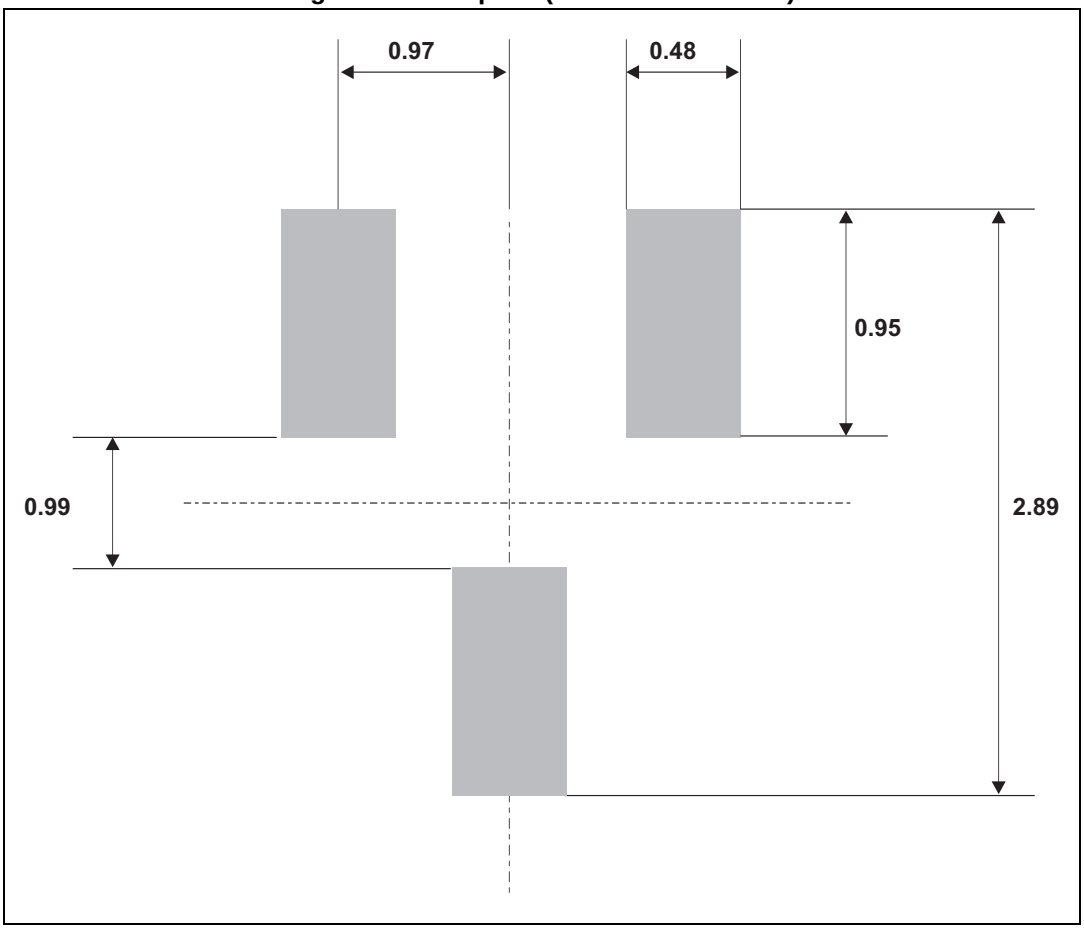


Table 3. SOT23-3L dimension values

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.89	1.4	0.035	0.055
A1	0	0.1	0	0.004
B	0.3	0.51	0.012	0.02
C	0.085	0.18	0.003	0.007
D	2.75	3.04	0.108	0.12
e	0.85	1.05	0.033	0.041
e1	1.7	2.1	0.067	0.083
E	1.2	1.75	0.047	0.069
H	2.1	3.00	0.083	0.118
L	0.6 typ.		0.024 typ.	
S	0.35	0.65	0.013	0.026

Figure 14. Footprint (dimensions in mm)



4 Ordering information

Figure 15. Ordering information scheme

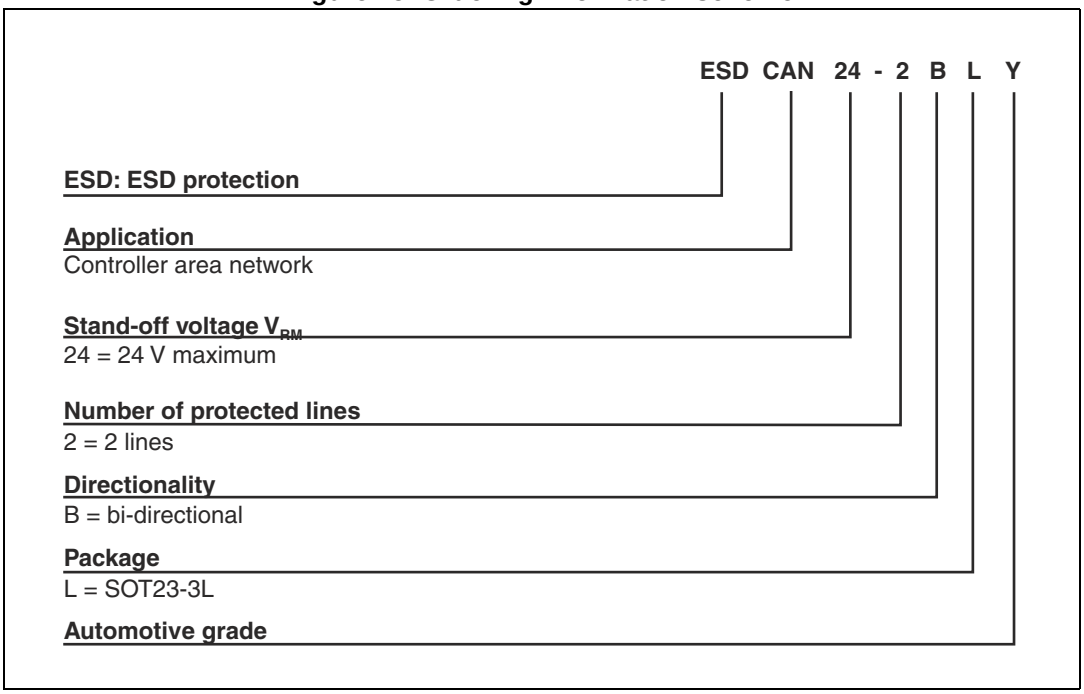


Table 4. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
ESDCAN24-2BLY	EL24	SOT-23	9.794 mg	3000	Tape and reel

5 Revision history

Table 5. Document revision history

Date	Revision	Changes
29-May-2012	1	First issue.
04-Sep-2012	2	Update values for V_{RM} in *Table 2*. Updated *Figure 10*, *Figure 11*, and *Figure 15*.
07-Nov-2012	3	Added dimensions a and L1 in *Table 3*.
30-Oct-2013	4	Clarified references to ISO 7637. Updated *Figure 3*, *Figure 4*, *Figure 5*, *Figure 6*, and *Figure 12*.
13-Dec-2013	5	Updated *Table 1*, *Table 2*,*Table 4*, *Figure 2*, *Figure 3*, *Figure 4*, *Figure 7*, *Figure 8*, *Figure 9*, *Figure 10*, *Figure 11* and *Figure 14*.

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