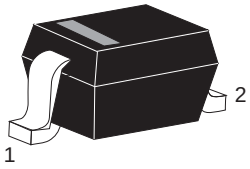
ESDLIN1524BJ

Automotive Transil™, transient voltage suppressor (TVS) for LIN bus

Datasheet - production data



SOD323

Features

- AEC-Q101 qualified
- Asymmetrical bidirectional device
- Stand-off voltage:
  - – 15 V (to comply with reverse battery)
  - – + 24 V (to comply with jump start)
- Low leakage current

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
- HBM MIL STD 833, class 3 (> 4 kV)
- ISO 17987-7 (LIN bus)
- SAE J3076 (CXPI bus)

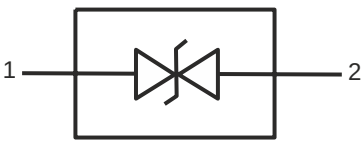
Description

The device is an asymmetrical Transil diode designed specifically for one automotive LIN bus line against electrostatic discharge (ESD) protection. The SOD323 is a very small package that saves space on high density printed circuit board.

Transil diodes provide high overvoltage protection by clamping action and have instantaneous response to transient overvoltages.

TM: Transil is a trademark of STMicroelectronics.

Figure 1: Pin configuration



Bar indicates pin1

1 Characteristics

Table 1: Absolute maximum ratings (limiting values) T_{amb} = 25° C

Symbol	Parameter		Value	Unit
P_{PP}	Peak pulse power dissipation 8/20 µs	T_j initial = T_{amb}	160	W
T_{stg}	Storage junction temperature range		-65 to +175	°C
T_j	Maximum operating junction temperature		-40 to +150	
T_L	Maximum temperature for soldering during 10 s		260	°C

Table 2: ESD maximum ratings

Symbol	Parameter	Conditions	Value	Unit
ESD	Electrostatic discharge capability	ISO 10605 (C = 150 pF, R = 330 Ω) air discharge contact discharge	 30 30	kV
		ISO 10605 (C = 330 pF, R = 330 Ω) air discharge contact discharge	 30 30	
		HBM MIL STD 833	10	

Figure 2: Electrical characteristics (definitions)

Symbol	Parameter
V_{RM}	Stand-off voltage
V_{BR}	Breakdown voltage
V_{CL}	Clamping voltage
I_{RM}	Leakage current at V_{RM}
I_R	Breakdown current at V_{BR}
I_{PP}	Peak pulse current
C	Junction capacitance

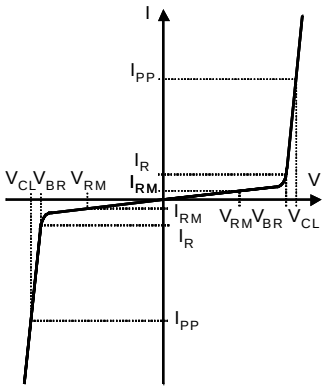


Table 3: Electrical characteristics (T_{amb} = 25 °C)

Symbol	Test conditions			Min.	Typ.	Max.	Unit
V_{BR}	From pin 2 to pin 1	I_R = 5 mA, t_p < 50 ms		25.4	27.8	30.3	V
	From pin 1 to pin 2			17.1	18.9	20.3	
I_{RM}	From pin 2 to pin 1	V_{RM} = 24 V			1	50	nA
	From pin 1 to pin 2	V_{RM} = 15 V					
V_{CL}	From pin 2 to pin 1	I_{PP} = 1 A	8/20 µs			40	V
	From pin 2 to pin 1	I_{PP} = 3 A				50	
	From pin 1 to pin 2	I_{PP} = 1 A				25	
	From pin 1 to pin 2	I_{PP} = 5 A				35	
C	V_R = 0 V, f = 1 MHz				16	20	pF
αT(1)	From pin 2 to pin 1					9.6	10^{-4}/°C
	From pin 1 to pin 2					8.8	

Notes:

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

1.1 Characteristics (curves)

Figure 3: Relative variation of peak pulse power versus initial junction temperature

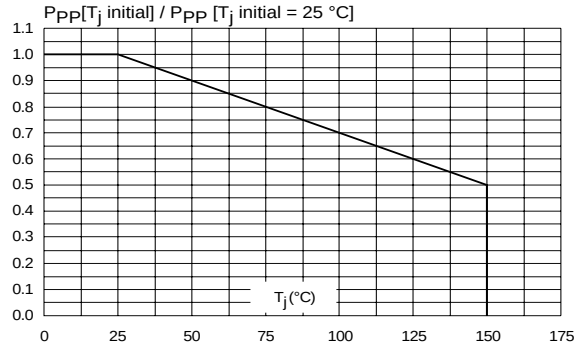


Figure 4: Peak pulse power versus exponential pulse duration

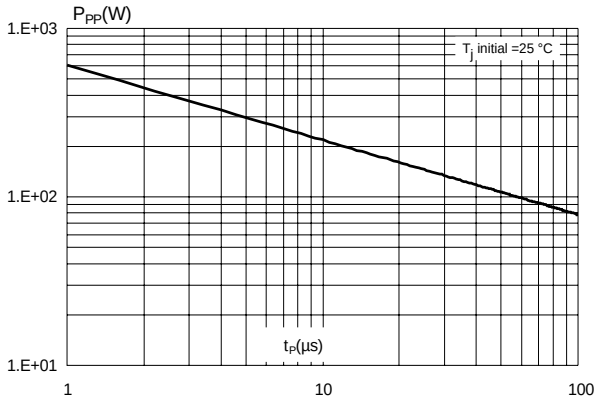


Figure 5: Junction capacitance versus line voltage, 15 V side

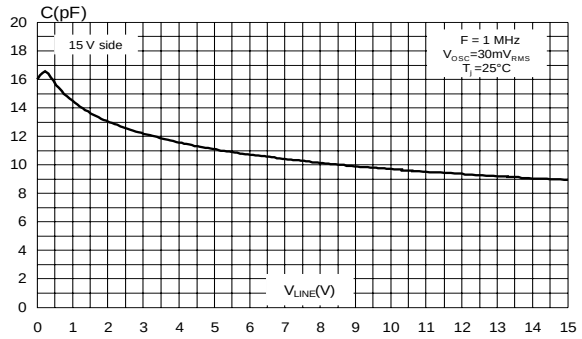


Figure 6: Junction capacitance versus line voltage, 24 V side

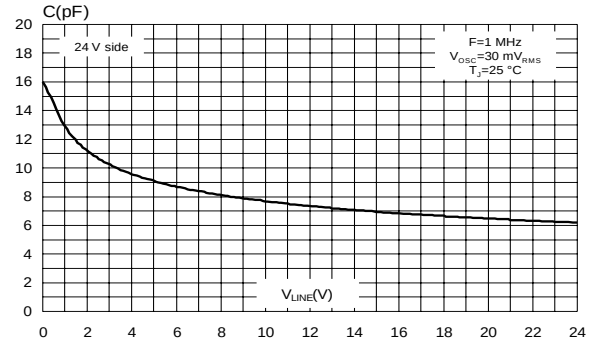


Figure 7: Clamping test conditions

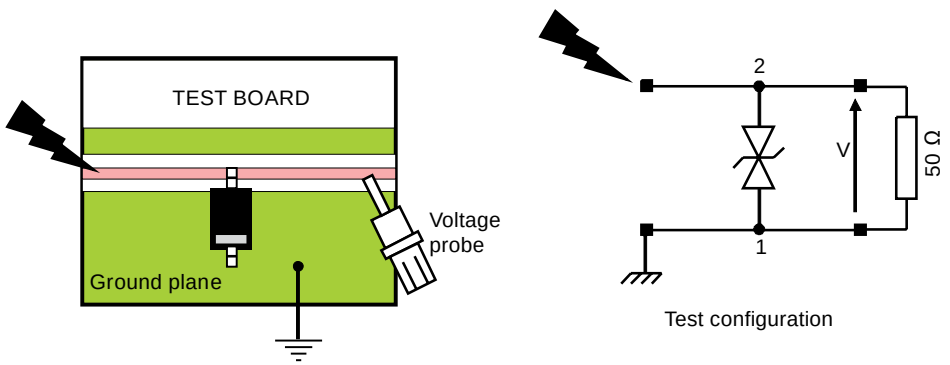


Figure 8: Response to ISO 7637-3 pulse 3a (Us = -150 V)

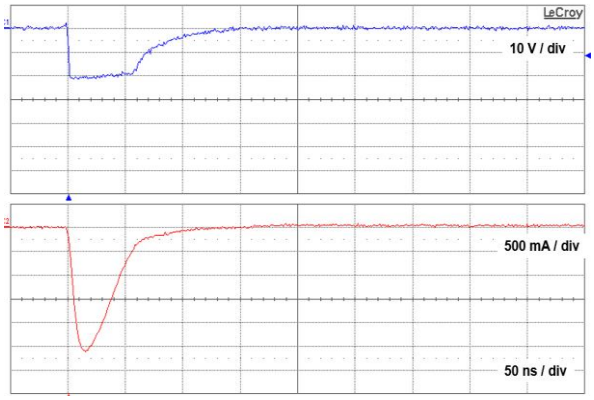


Figure 9: Response to ISO 7637-3 pulse 3b (Us = 100 V)

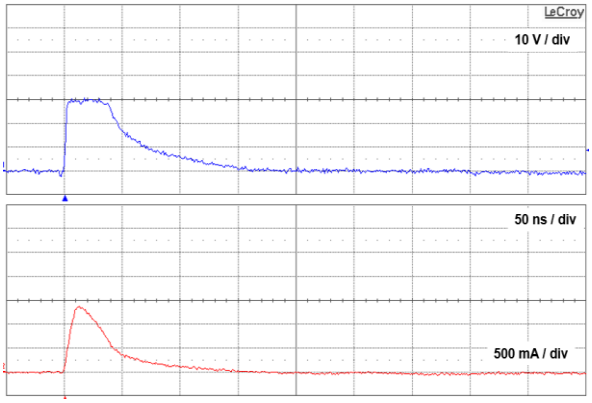


Figure 10: ESD response to ISO 16605 (C = 150 pF, R = 330 Ω, 8 kV contact)

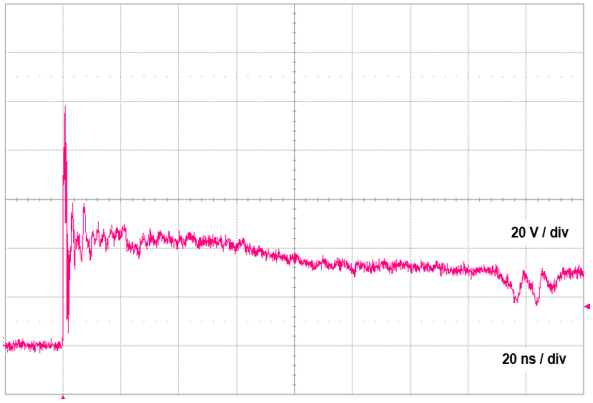
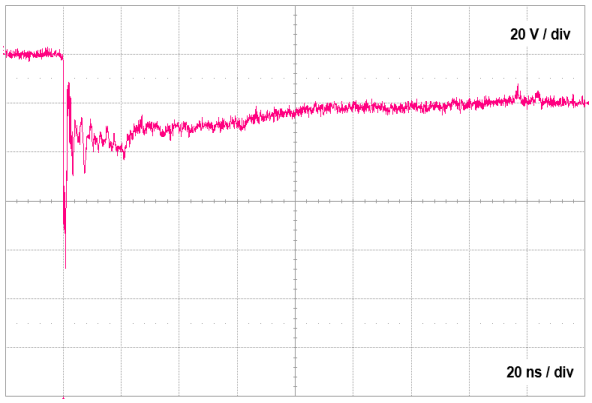


Figure 11: ESD response to ISO 16605 (C = 150 pF, R = 330 Ω, 8 kV contact)



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 UL94, V0
- Lead-free package

2.1 SOD323 package information

Figure 12: SOD323 package outline

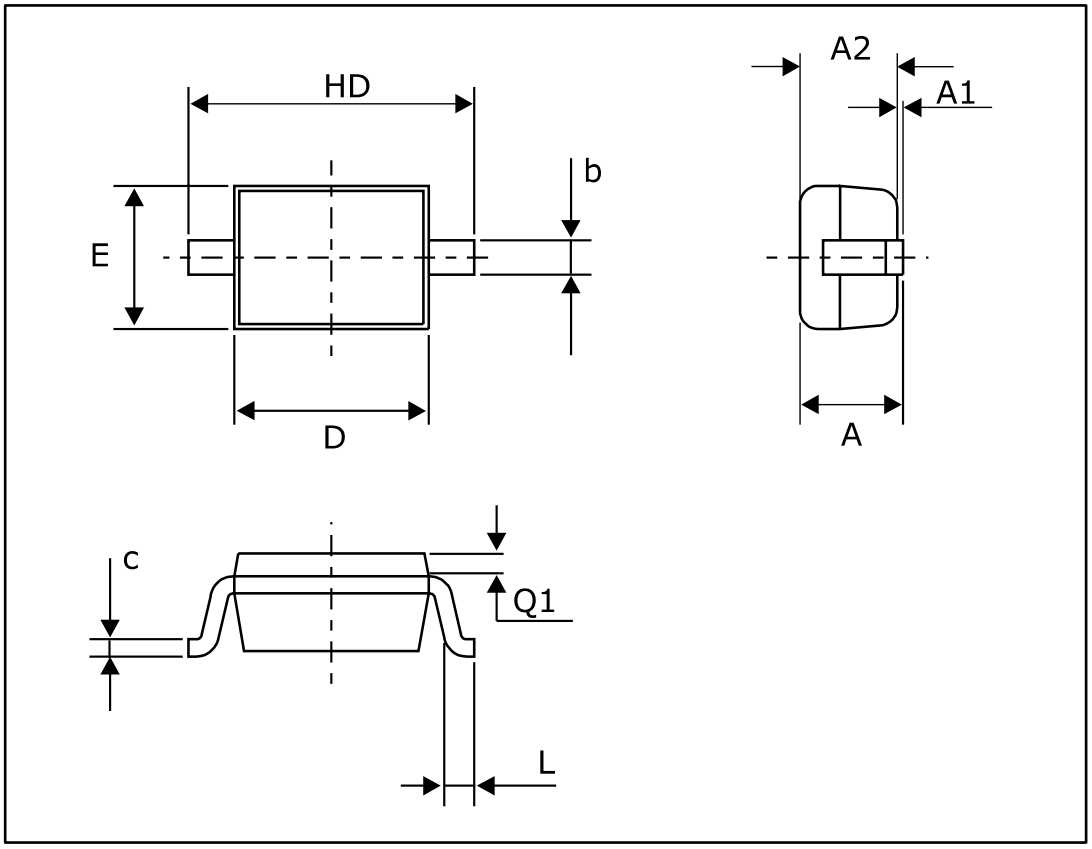
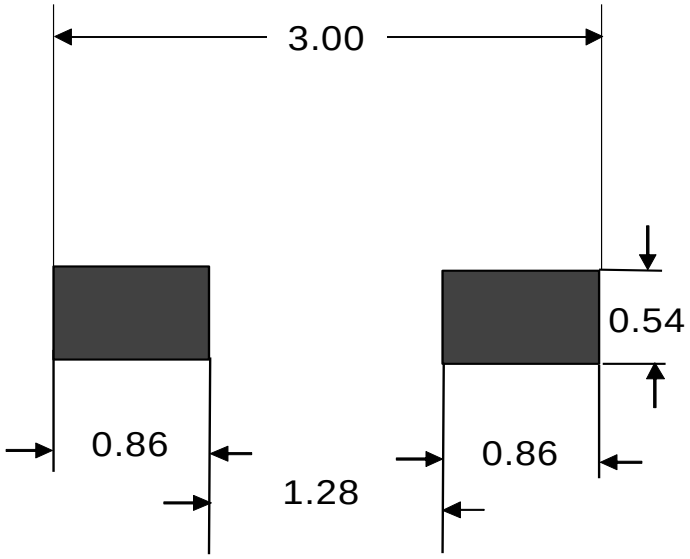


Table 4: SOD323 package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A		1.17		0.046
A1		0.10		0.004
A2	0.93	1.01	0.037	0.040
b	0.25	0.44	0.01	0.017
c	0.10	0.25	0.004	0.01
D	1.52	1.80	0.06	0.071
E	1.11	1.45	0.044	0.057
HD	2.30	2.70	0.09	0.106
L	0.10	0.46	0.004	0.02
Q1	0.10	0.41	0.004	0.016

Figure 13: Footprint recommendations, dimensions in mm



2.2 SOD323 packing information

Figure 14: Tape dimension definitions

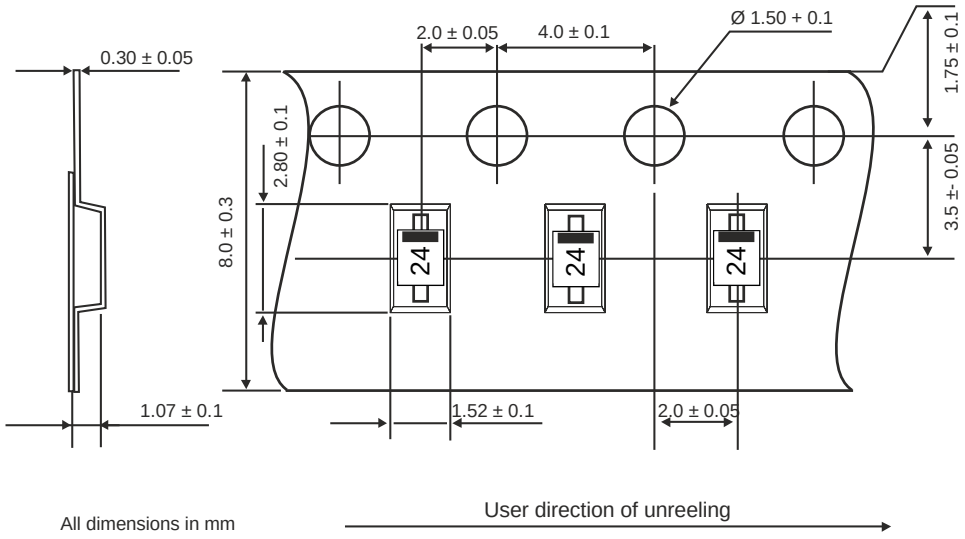
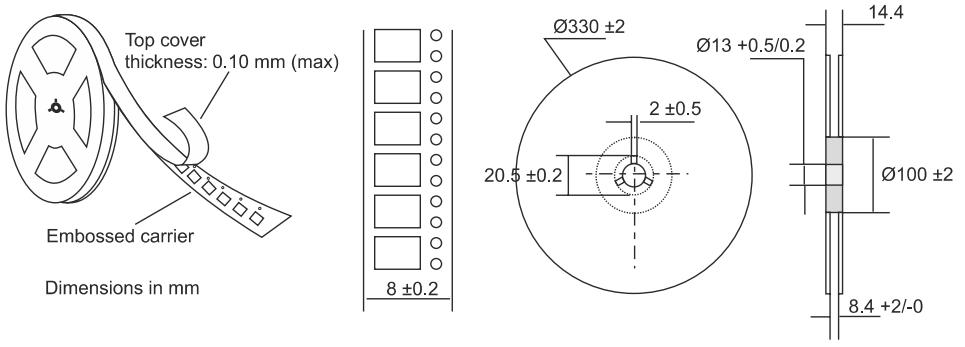


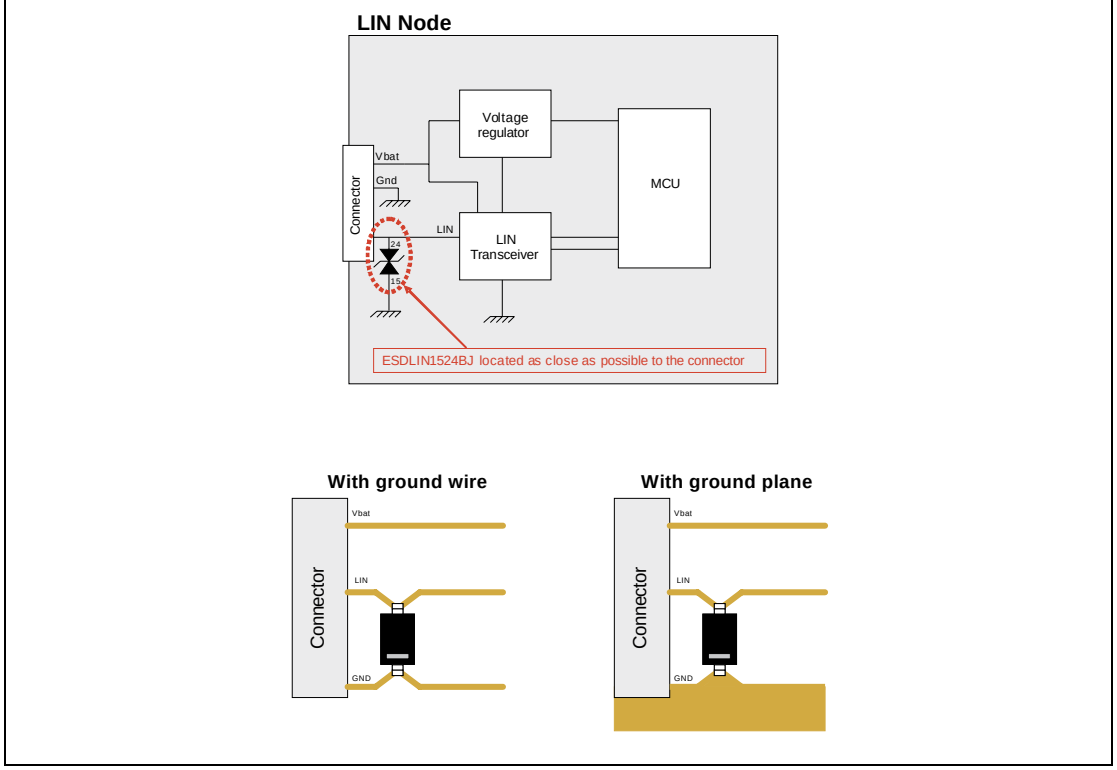
Figure 15: ESDLIN1524BJ-HQ reel dimensions



3 Placement and PCB layout recommendations

Below figure illustrates the PCB placement and layout recommendations for optimal benefits of the ESDLIN1524BJ.

Figure 16: Placement and PCB layout recommendations



4 Ordering information

Figure 17: Ordering information scheme

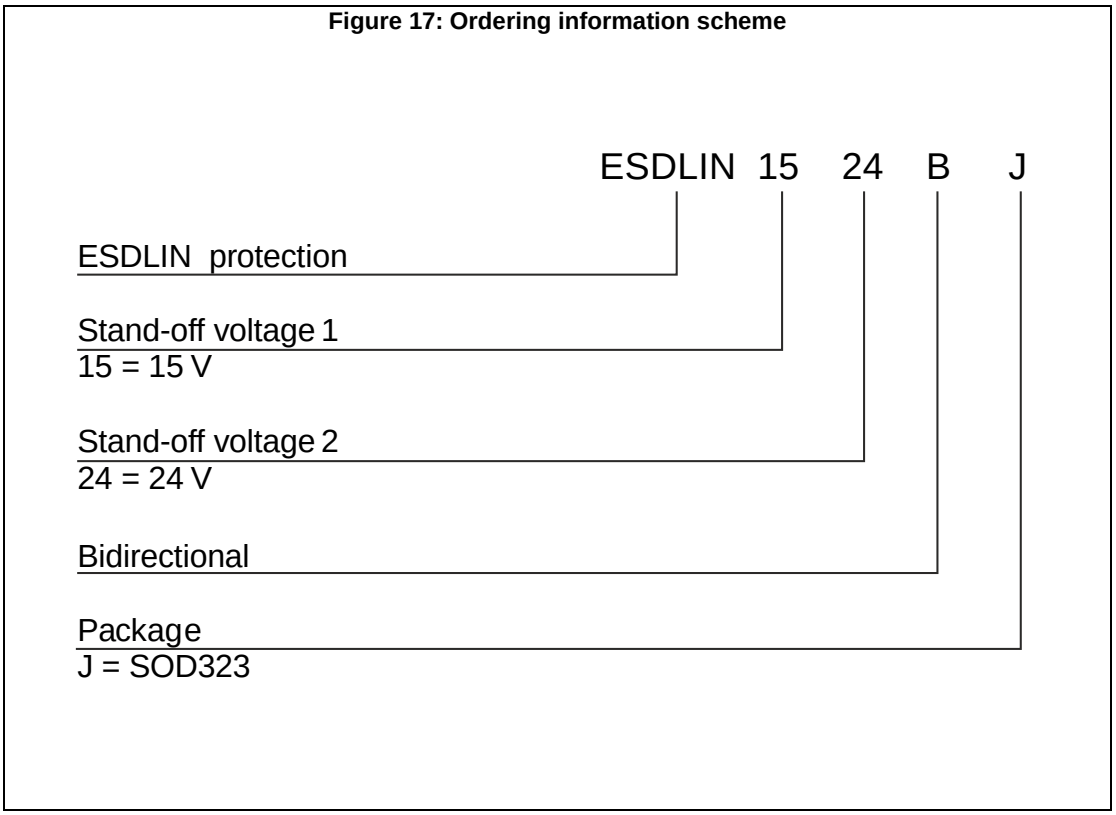


Table 5: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
ESDLIN1524BJ	24	SOD323	5 mg	3000	Tape and reel
ESDLIN1524BJ-HQ				10000	

5 Revision history

Table 6: Document revision history

Date	Revision	Changes
28-Aug-2006	1	Initial release.
22-Sep-2006	2	Added Figure 6 Placement and layout recommendations
18-Jan-2013	3	Updated Table 6. Added Figure 10 and Figure 11.
17-Oct-2017	4	Updated title and cover page. Updated *Table 1: "Absolute maximum ratings (limiting values) Tamb = 25° C"* and *Table 3: "Electrical characteristics (Tamb = 25 °C)"*. Added *Figure 8: "Response to ISO 7637-3 pulse 3a (Us = -150 V)"*, *Figure 9: "Response to ISO 7637-3 pulse 3b (Us = 100 V)"*, *Figure 10: "ESD response to ISO 16605 (C = 150 pF, R = 330 Ω, 8 kV contact)"* and *Figure 11: "ESD response to ISO 16605 (C = 150 pF, R = 330 Ω, 8 kV contact)"*. Minor text changes to improve readability.

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