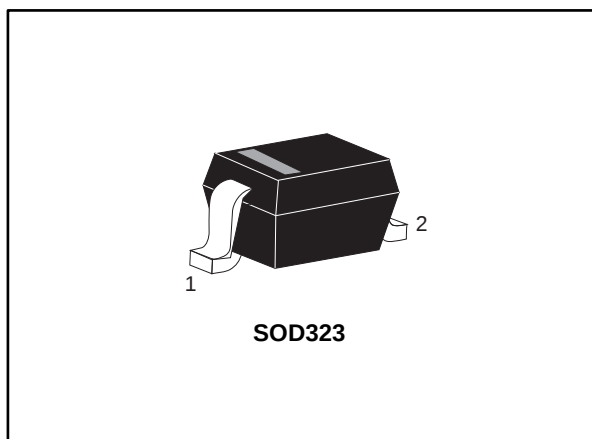


Automotive Transil™, transient voltage suppressor (TVS) for LIN bus

Datasheet - production data



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.

Features

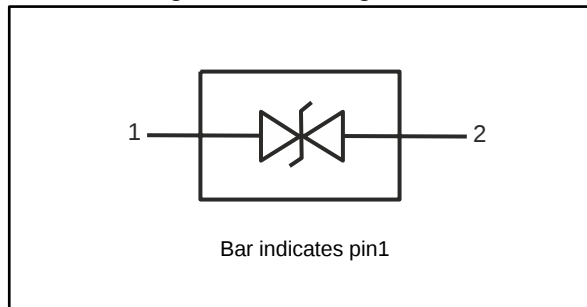
- AEC-Q101 qualified
- Asymmetrical bidirectional device
- Stand-off voltage:
 - -15 V (to comply with reverse battery)
 - +24 V (to comply with jump start)
- Low leakage current



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 883, class 3 (> 4 kV)
- ISO 17987-7 (LIN bus)
- SAE J3076 (CXPI bus)

Figure 1: Pin configuration



1 Characteristics

Table 1: Absolute maximum ratings (limiting values) $T_{amb} = 25^{\circ}C$

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

Table 2: ESD maximum ratings

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

Figure 2: Electrical characteristics (definitions)

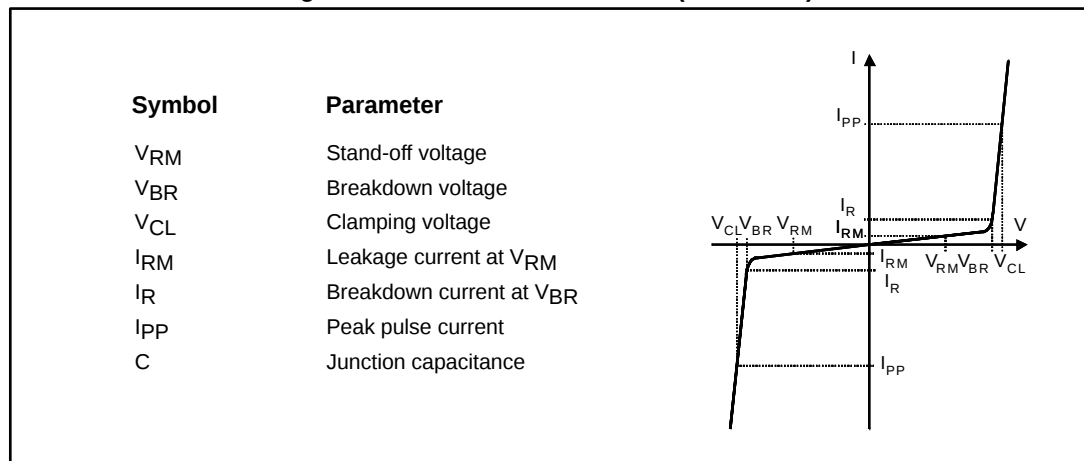


Table 3: Electrical characteristics ($T_{amb} = 25^{\circ}\text{C}$)

Symbol	Test conditions		Min.	Typ.	Max.	Unit
V_{BR}	From pin 2 to pin 1	$I_R = 5\text{ mA}$, $t_p < 50\text{ ms}$	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	$V_{RM} = 24\text{ V}$		1	50	nA
	From pin 1 to pin 2	$V_{RM} = 15\text{ V}$				
V_{CL}	From pin 2 to pin 1	$I_{PP} = 1\text{ A}$			40	V
	From pin 2 to pin 1	$I_{PP} = 3\text{ A}$			50	
	From pin 1 to pin 2	$I_{PP} = 1\text{ A}$			25	
	From pin 1 to pin 2	$I_{PP} = 5\text{ A}$			35	
C	$V_R = 0\text{ V}$, $f = 1\text{ MHz}$			16	20	pF
$\alpha T^{(1)}$	From pin 2 to pin 1				9.6	$10^{-4}/^{\circ}\text{C}$
	From pin 1 to pin 2				8.8	

Notes:

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

1.1 Characteristics (curves)

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

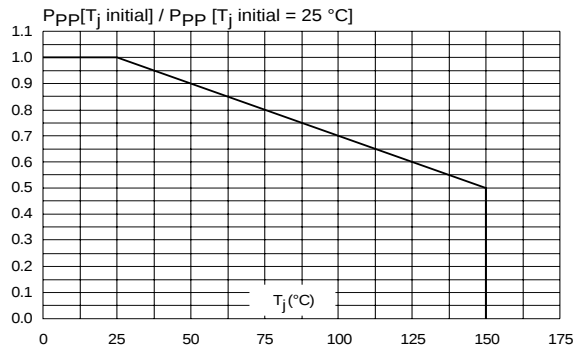


Figure 4: Peak pulse power versus exponential pulse duration

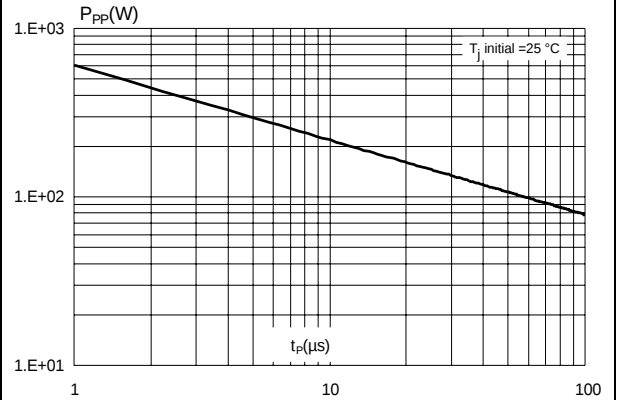


Figure 5: Junction capacitance versus line voltage, 15 V side

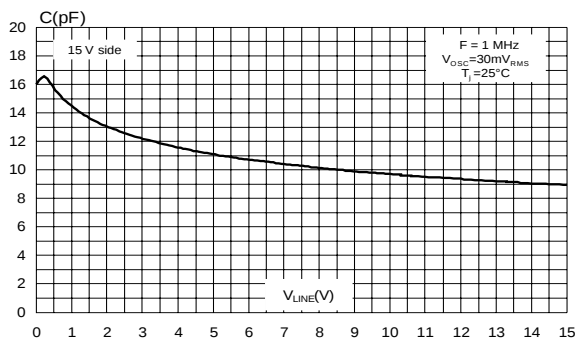


Figure 6: Junction capacitance versus line voltage, 24 V side

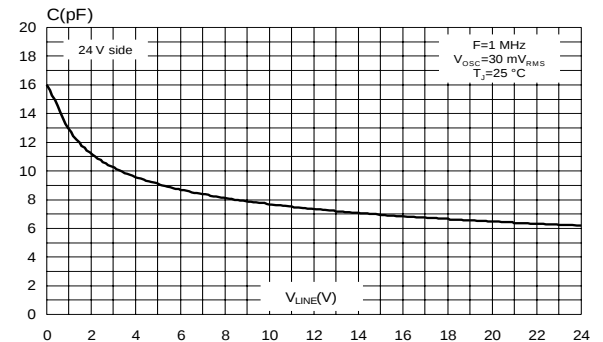


Figure 7: Clamping test conditions

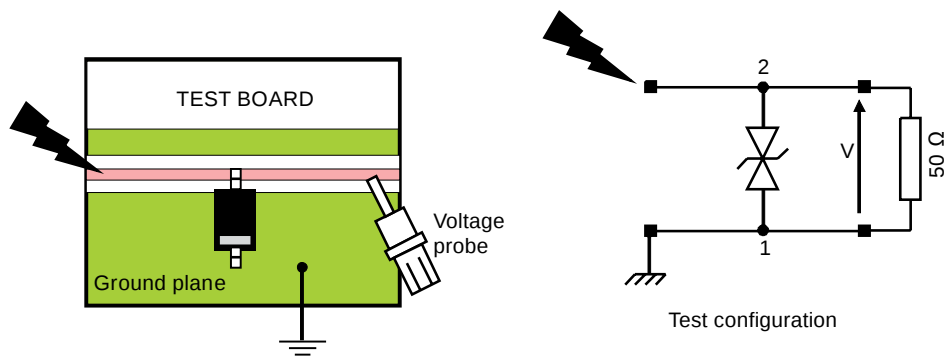


Figure 8: Response to ISO 7637-3 pulse 3a
($U_s = -150$ V)

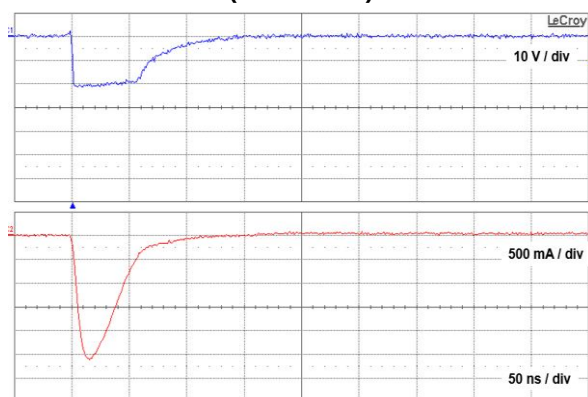


Figure 9: Response to ISO 7637-3 pulse 3b
($U_s = 100$ V)

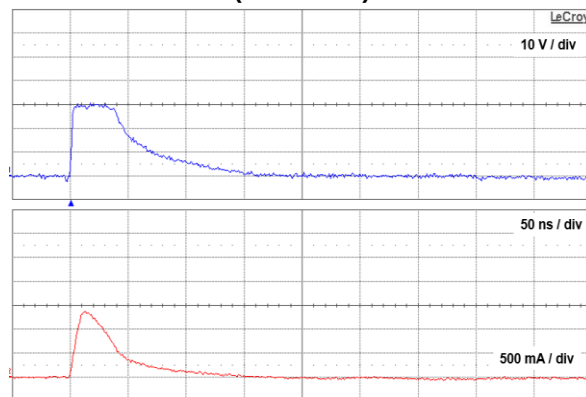


Figure 10: ESD response to ISO 16605
($C = 150$ pF, $R = 330$ Ω , 8 kV contact)

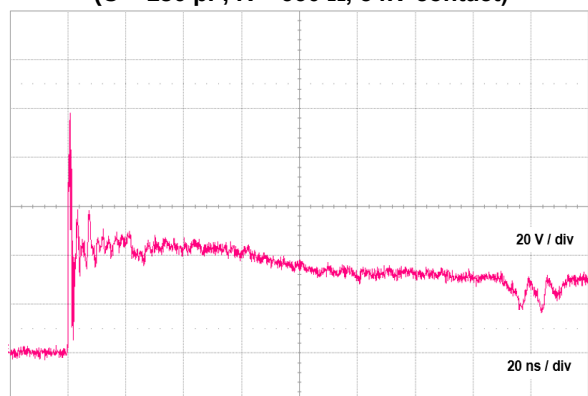
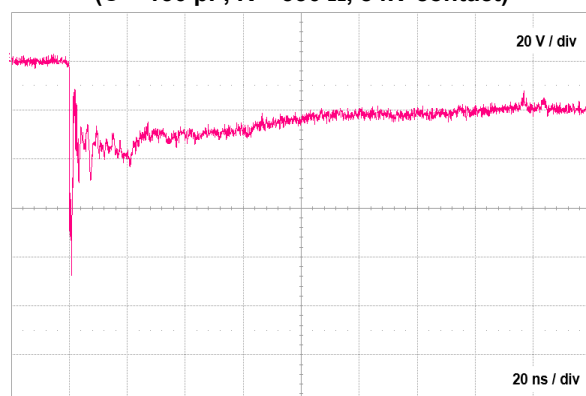


Figure 11: ESD response to ISO 16605
($C = 150$ pF, $R = 330$ Ω , 8 kV contact)



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

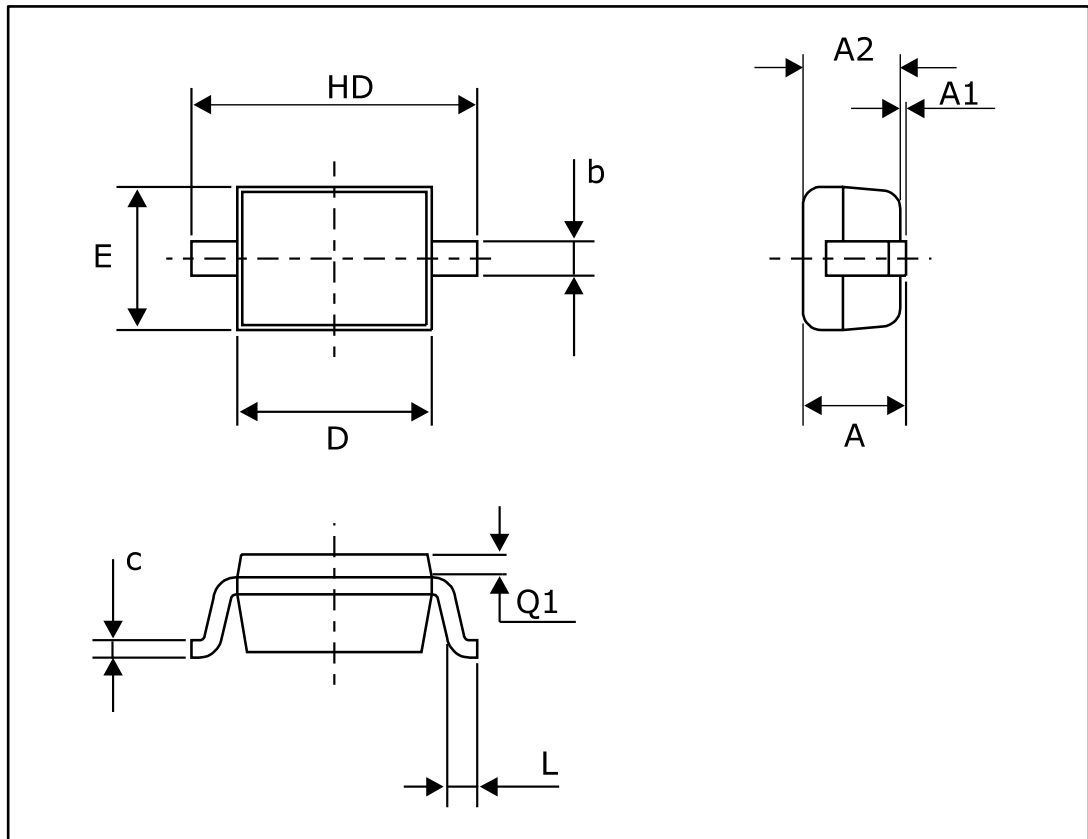
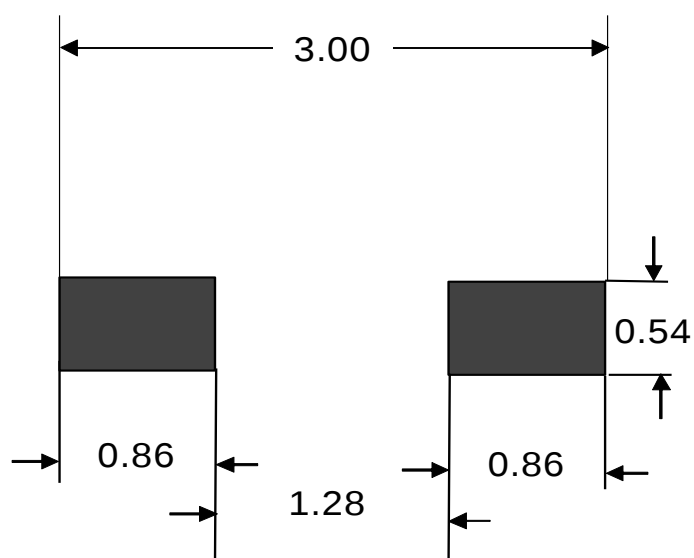


Table 4: SOD323 package mechanical data

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

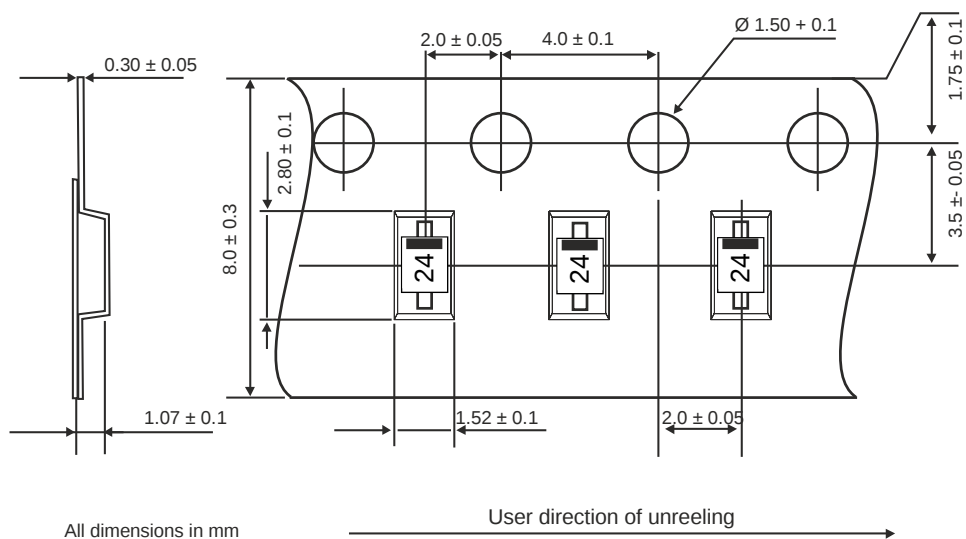
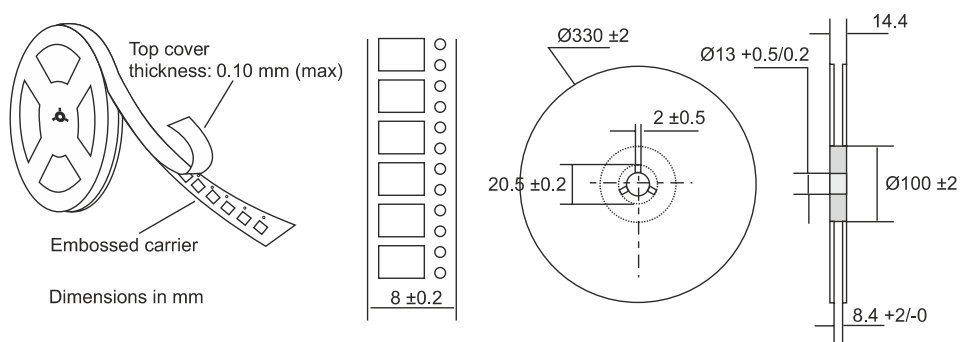


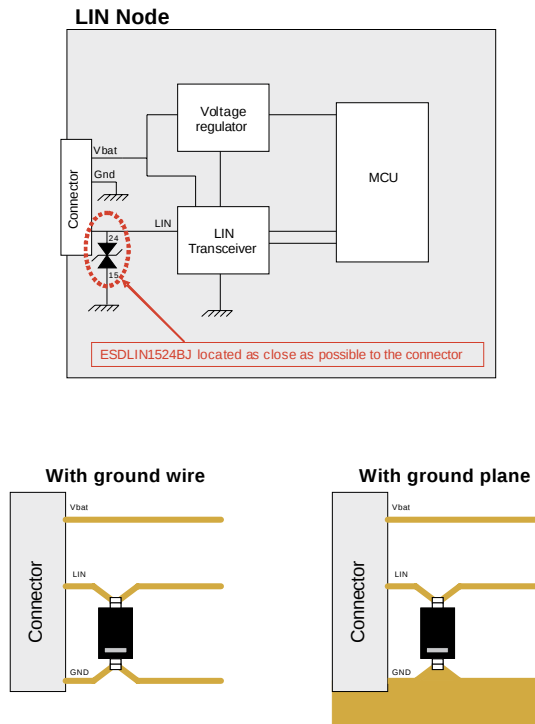
Figure 15: ESDLIN1524BJ-HQ reel dimensions



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

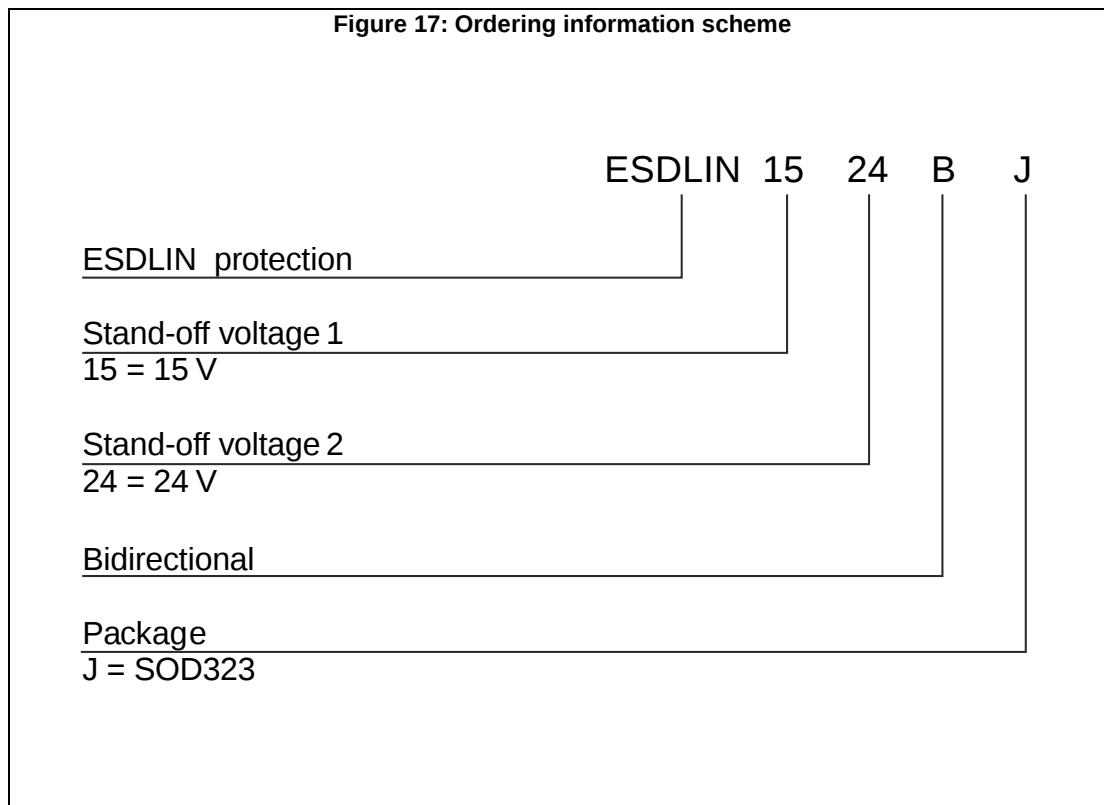


Table 5: Ordering information

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 <i>Table 1: "Absolute maximum ratings (limiting values) Tamb = 25° C"</i> and <i>Table 3: "Electrical characteristics (Tamb = 25 °C)"</i>. Added <i>Figure 8: "Response to ISO 7637-3 pulse 3a (Us = - 150 V)"</i>, <i>Figure 9: "Response to ISO 7637-3 pulse 3b (Us = 100 V)"</i>, <i>Figure 10: "ESD response to ISO 16605 (C = 150 pF, R = 330 Ω, 8 kV contact)"</i> and <i>Figure 11: "ESD response to ISO 16605 (C = 150 pF, R = 330 Ω, 8 kV contact)"</i>. Minor text changes to improve readability.

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