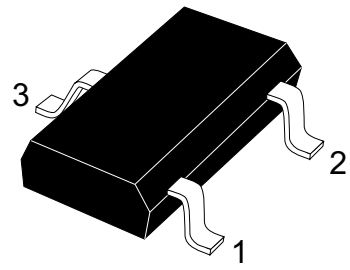
ESDLIN03-1BWY

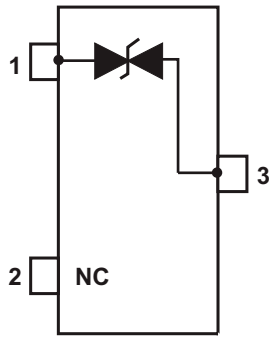
Automotive single-line Transil™, transient voltage suppressor (TVS) for LIN bus

Datasheet - production data



SOT323-3L

Figure 1. Functional schematic



Top view

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

LIN bus lines where electrostatic discharge and other transients must be suppressed. This product is compliant with most of automotive interfaces.

Description

The ESDLIN03-1BWY is a single-line Transil specifically designed for the protection of the automotive LIN bus lines against electrostatic discharge (ESD) and transient voltages.

Features

- Single-line ESD and EOS protection
- Stand-off voltage: 26.5 V
- Bidirectional device
- Max pulse power: 250 W (8/20 µs)
- Low clamping factor V_{CL} / V_{BR}
- Low leakage current
- ECOPACK®2 compliant component
- AEC-Q101 qualified

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 : Contact discharge Air discharge	 30 30	kV
		ISO 10605 - C = 330 pF, R = 330 Ω : Contact discharge Air discharge	 30 30	
		HBM MIL STD 883	30	
P_{PP}	Peak pulse power dissipation (8/20 µs)	T_j initial = T_{amb}	250	W
I_{PP}	Peak pulse current (8/20 µs)		3.7	A
T_j	Operating junction temperature range		-55 to +175	°C
T_{stg}	Storage temperature range		-55 to +175	°C

Figure 2. Electrical characteristics (definitions)

Symbol		Parameter
V_{BR}	=	Breakdown voltage
V_{RM}	=	Stand-of voltage
V_{CL}	=	Clamping voltage
I_{RM}	=	Leakage current at V_{RM}
I_{PP}	=	Peak pulse current
R_d	=	Dynamic impedance

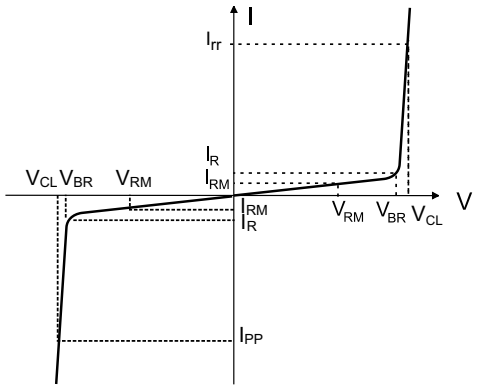


Table 2. Electrical characteristics (values, T_{amb} = 25 °C)

Symbol	Test conditions		Min.	Typ.	Max.	Unit
V_{RM}	ESDLIN03-1BWY				26.5	V
V_{BR}	I_R = 1 mA		28.5			V
I_{RM}	V_{RM} = 24 V	T_j = 25 °C			10	nA
	V_{RM} = 5V				1	
	V_{RM} = 24 V	T_j = 125 °C			50	
	V_{RM} = 5V				10	
V_{CL}	ISO 7637-3 Pulse 3a (U_s = -150 V)		-39			V
	ISO 7637-3 Pulse 3b (U_s = +100 V)				39	
	IEC 61000-4-5 (8/20 µs), I_{PP} = 1 A				37	
	IEC 61000-4-5 (8/20 µs), I_{PP} = 3A				44	
C	V_R = 0 V DC, f = 1 MHz			3	3.5	pF
$\alpha T^{(1)}$	Voltage temperature coefficient				9	10^{-4}/°C

1. V_{BR} at T_j = V_{BR} at 25°C x (1 + αT x (T_j – 25))

Figure 3. Peak pulse current versus initial junction temperature (maximum values)

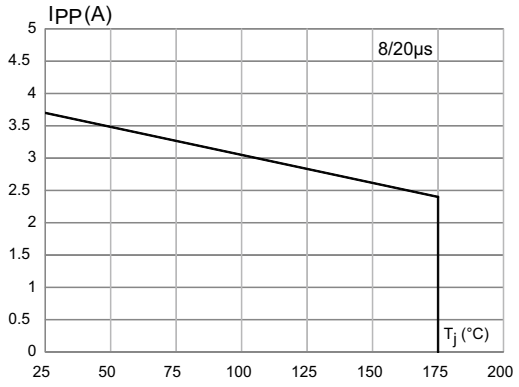


Figure 4. Junction capacitance versus reverse voltage applied

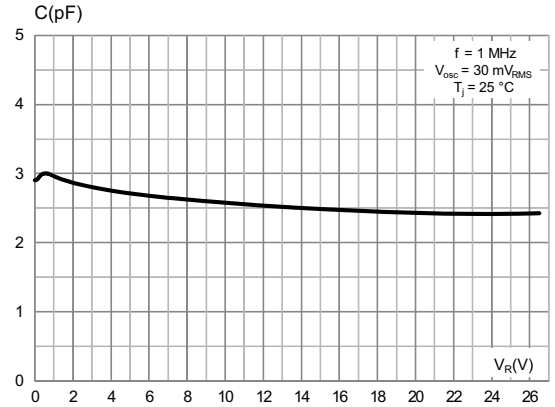


Figure 5. Peak pulse current versus clamping voltage

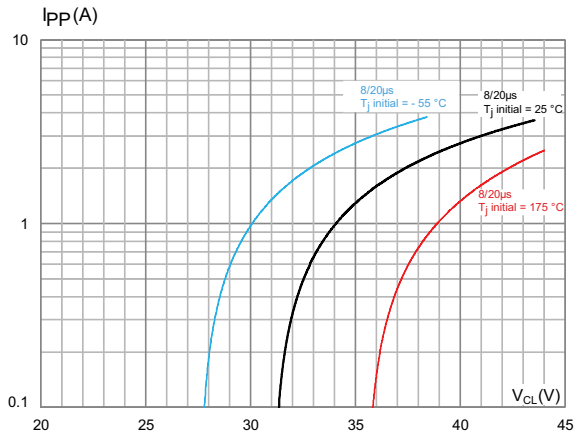


Figure 6. Leakage current versus junction temperature

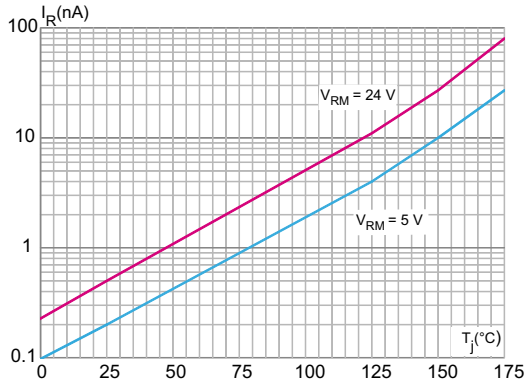


Figure 7. S21 attenuation measurement

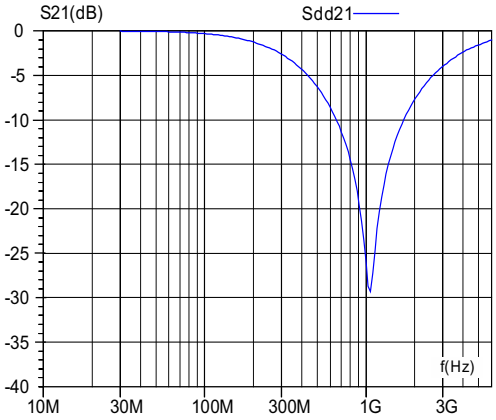


Figure 8. ESD response to ISO 10605 - C = 150 pF, R = 330 Ω (+8 kV contact)

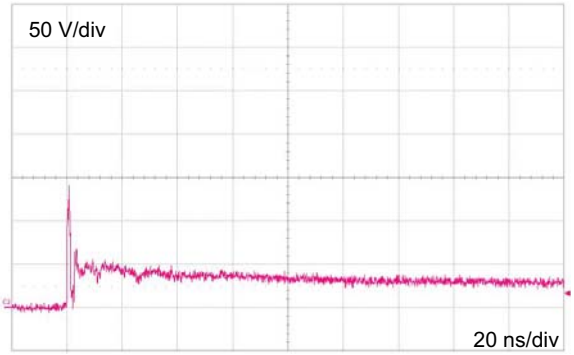


Figure 9. ESD response to ISO 10605 - C = 150 pF, R = 330 Ω (-8 kV contact)

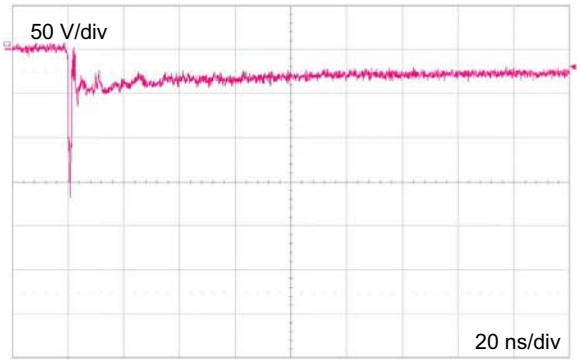


Figure 10. Response to ISO 7637-3 Pulse 3a (Us = -150 V)

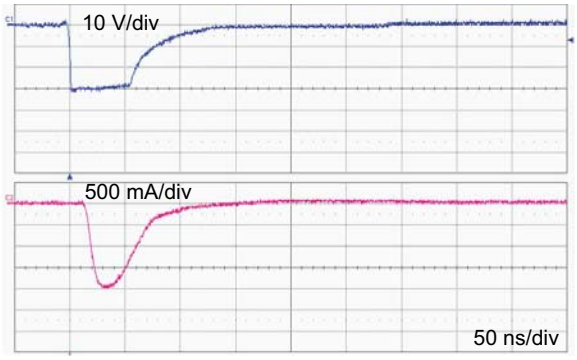


Figure 11. Response to ISO 7637-3 Pulse 3b (Us = +100 V)

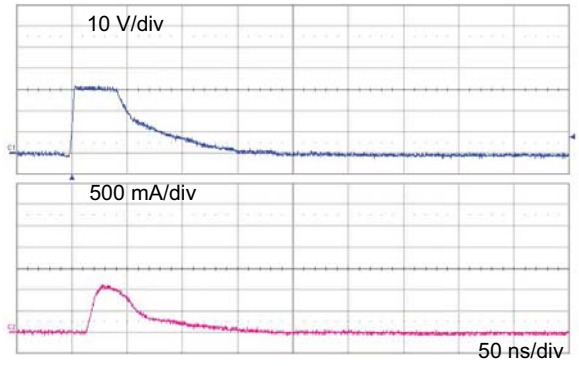
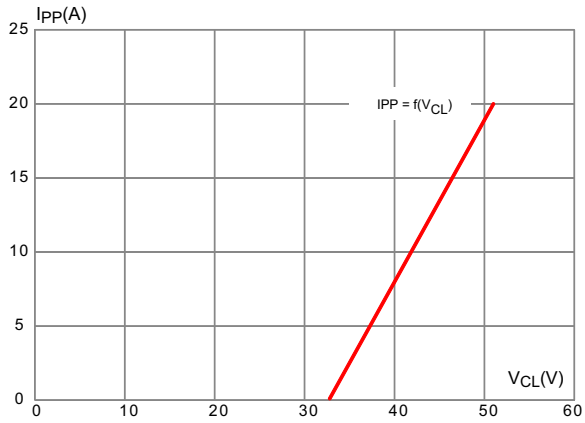


Figure 12. TLP measurements



2 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.

2.1 SOT323-3L package information

Figure 13. SOT323-3L package outline

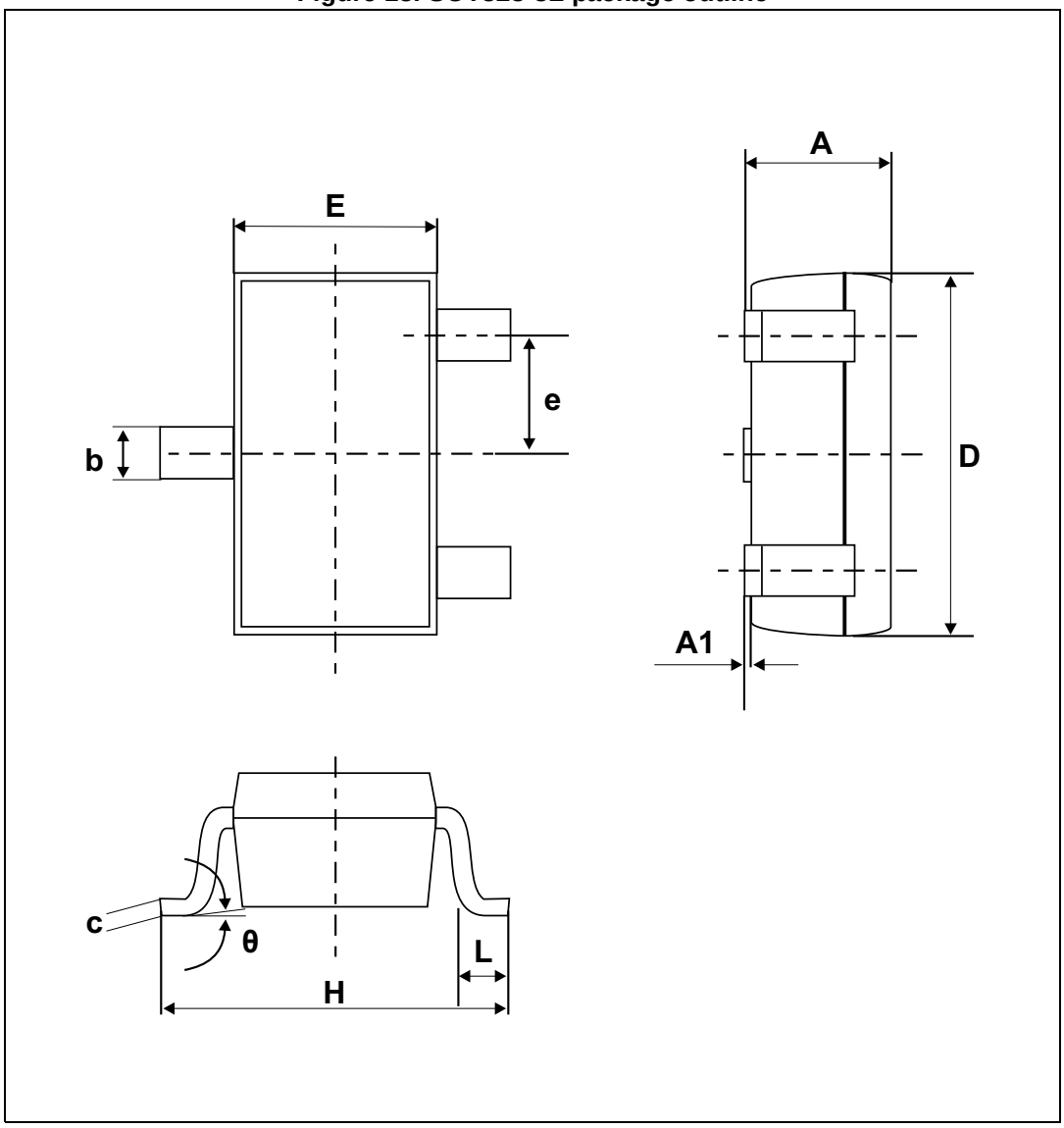
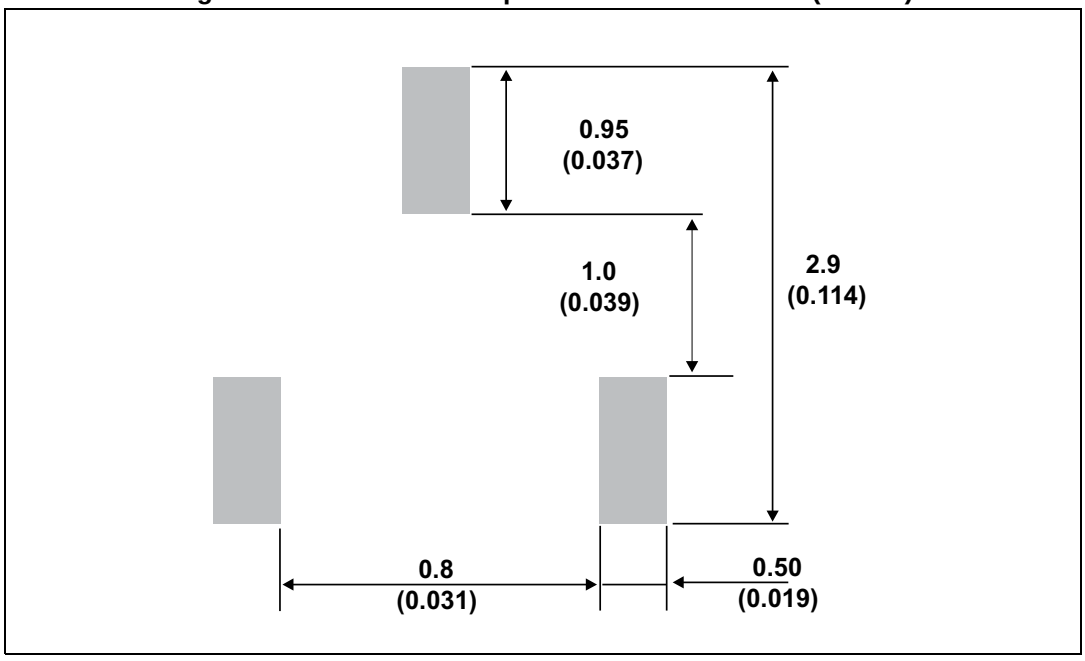


Table 3. SOT323-3L package mechanical data

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	0.0		0.004
b	0.25		0.4	0.01		0.016
c	0.1		0.26	0.004		0.01
D	1.8	2.0	2.2	0.071	0.079	0.086
E	1.15	1.25	1.35	0.045	0.049	0.053
e		0.65			0.026	
H	1.8	2.1	2.4	0.071	0.083	0.094
L	0.1	0.2	0.3	0.004	0.008	0.012
Θ	0		30°	0		30°

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

Figure 14. SOT323-3L footprint dimensions in mm (inches)

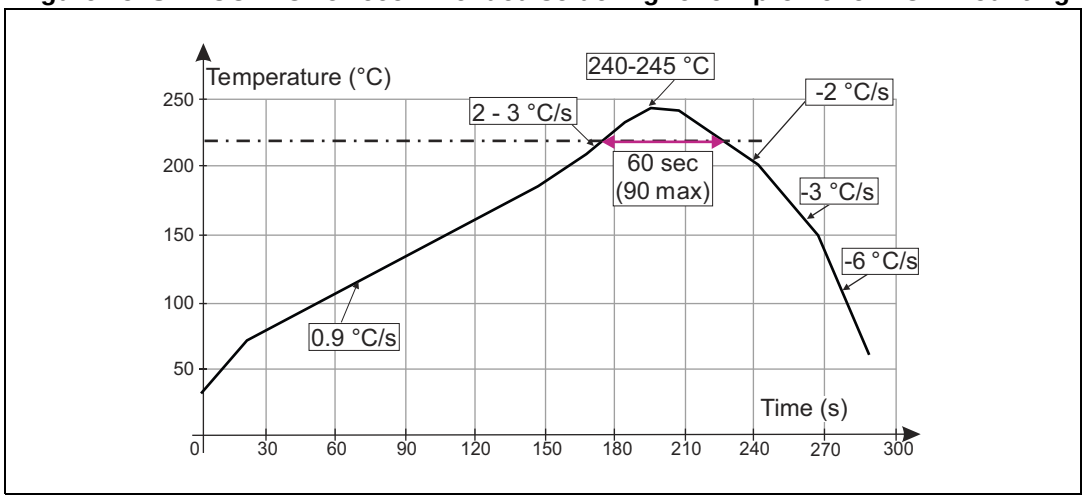


2.2 PCB design preference

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. The symmetrical layout is recommended, in case any tilt phenomena caused by asymmetrical solder paste amount due to the solder flow away.

2.3 Reflow profile

Figure 15. 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.

3 Ordering information

Figure 16. Ordering information scheme

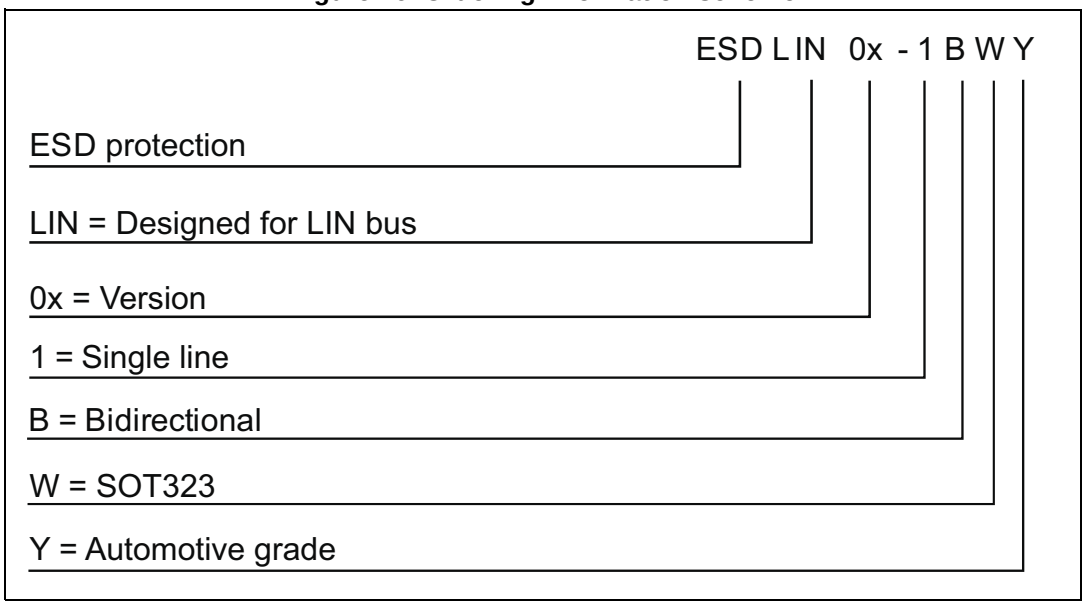


Table 4. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
ESDLIN03-1BWY	C12	SOT-323-3L	6.58 mg	3000	Tape and reel

4 Revision history

Table 5. Document revision history

Date	Revision	Changes
05-Jan-2016	1	Initial release.