THE DATASHEET OF

PESD36VS2UT

PESD36VS2UT

Low capacitance unidirectional double ESD protection diode

17 April 2023 Product data sheet

1. General description

Low capacitance unidirectional double ElectroStatic Discharge (ESD) protection diode in a SOT23 (TO-236AB) small Surface-Mounted Device (SMD) plastic package designed to protect up to two signal lines from the damage caused by ESD and other transients.

2. Features and benefits

- Unidirectional ESD protection of two lines
- Low diode capacitance: C_d = 17 pF
- Max. peak pulse power: P_{PP} = 160 W
- Low clamping voltage: V_{CL} = 55 V
- Ultra low leakage current: I_{RM} ≤ 1 uA
- ESD protection up to 30 kV
- IEC 61000-4-2; level 4 (ESD)
- IEC 61000-4-5 (surge); I_{PP} = 2.5 A

3. Applications

- Computers and peripherals
- Audio and video equipment
- Cellular handsets and accessories
- SIM card protection
- Portable electronics
- Communication systems
- 10/100 Mbit/s Ethernet

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage		[1]	-	-	36	V
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; T_{amb} = 25 °C	[1]	-	17	35	pF

[1] Measured from pin 1 or 2 to pin 3.

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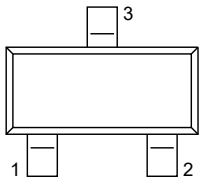
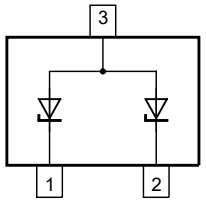
5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K1	cathode (diode 1)	 SOT23	 006aaa154
2	K2	cathode (diode 2)		
3	A	common anode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PESD36VS2UT	SOT23	plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body	SOT23

7. Marking

Table 4. Marking codes

Type number	Marking code[1]
PESD36VS2UT	LF%

[1] % = placeholder for manufacturing site code

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8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
P_{PPM}	rated peak pulse power	t_p = 8/20 µs	[1] [2]	-	160	W
I_{PPM}	rated peak pulse current		[1] [2]	-	2.5	A
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-55	150	°C
T_{stg}	storage temperature			-65	150	°C
ESD maximum ratings						
V_{ESD}	electrostatic discharge voltage	IEC 61000-4-2 (contact discharge)	[3] [2]	-	30	kV
		machine model	[2]	-	400	V
		MIL-STD-883 (human body model)		-	8	kV

[1] Non-repetitive current pulse 8/20 µs exponential decay waveform according to IEC 61000-4-5.
[2] Measured from pin 1 or 2 to pin 3.
[3] Device stressed with ten non-repetitive ESD pulses.

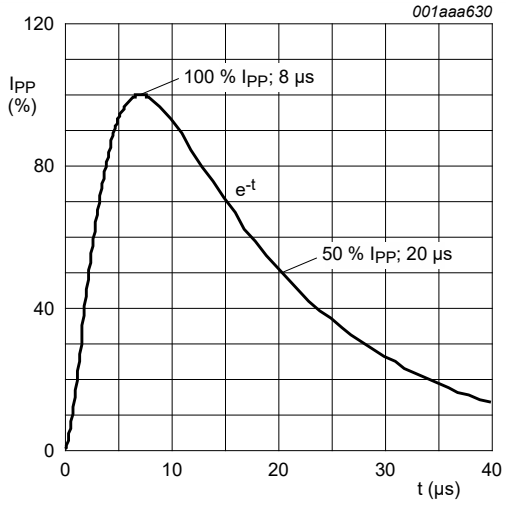

Fig. 1. 8/20 µs pulse waveform according to IEC 61000-4-5

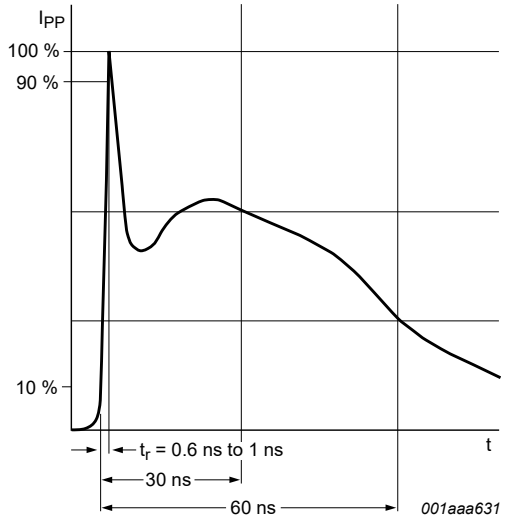

Fig. 2. ESD pulse waveform according to IEC 61000-4-2

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9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage		[1]	-	-	36	V
V_{BR}	breakdown voltage	I_R = 5 mA; T_{amb} = 25 °C	[1]	40	44	-	V
I_{RM}	reverse leakage current	V_{RWM} = 30 V; T_{amb} = 25 °C	[1]	-	0.02	1	µA
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; T_{amb} = 25 °C	[1]	-	17	35	pF
V_{CL}	clamping voltage	I_{PP} = 1 A; T_{amb} = 25 °C	[1] [2]	-	55	60	V
R_{diff}	differential resistance	I_R = 0.5 mA; T_{amb} = 25 °C	[1]	-	-	300	Ω

[1] Measured from pin 1 or 2 to pin 3.
[2] Non-repetitive current pulse 8/20 µs exponential decay waveform according to IEC 61000-4-5.

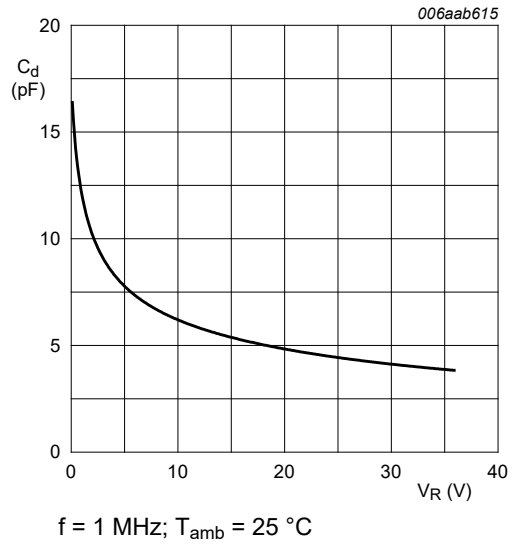

Fig. 3. Diode capacitance as a function of reverse voltage; typical values

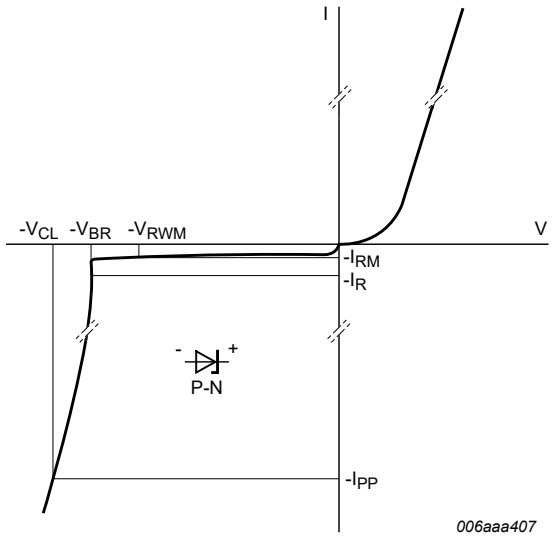

Fig. 4. V-I characteristics for a unidirectional ESD protection diode

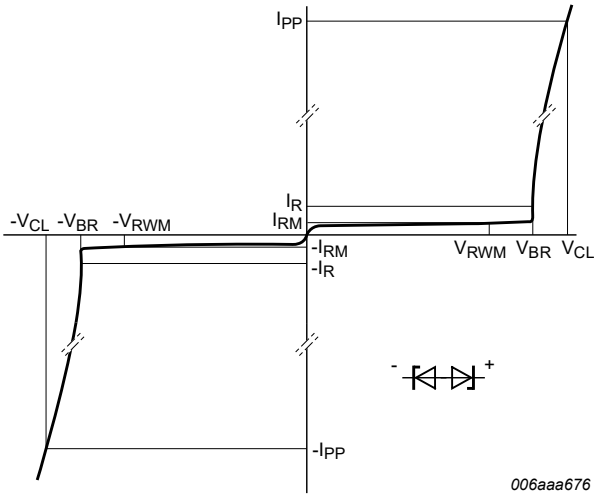

Fig. 5. V-I characteristics for a bidirectional ESD protection diode

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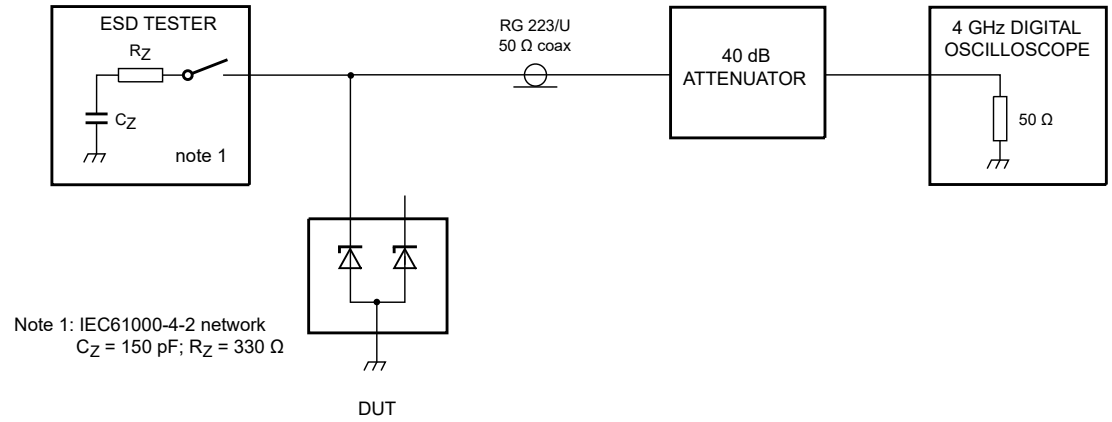
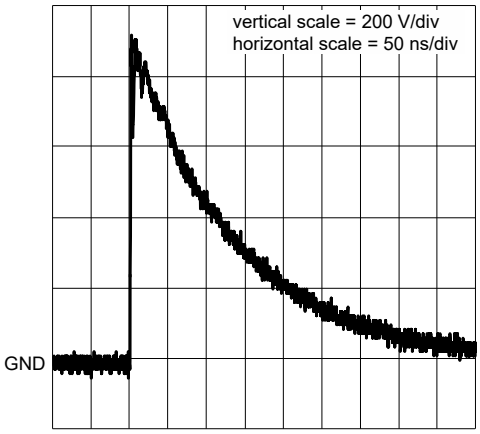
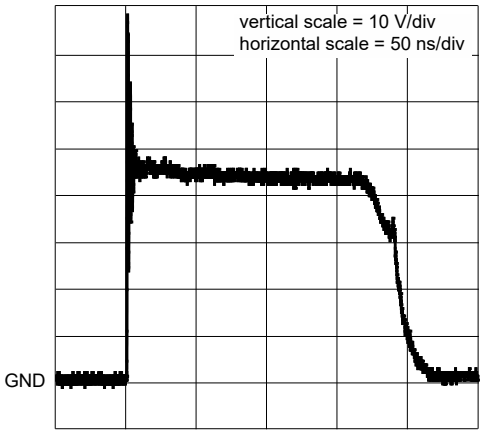
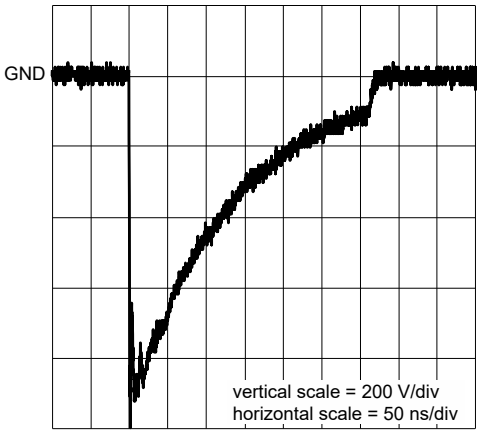




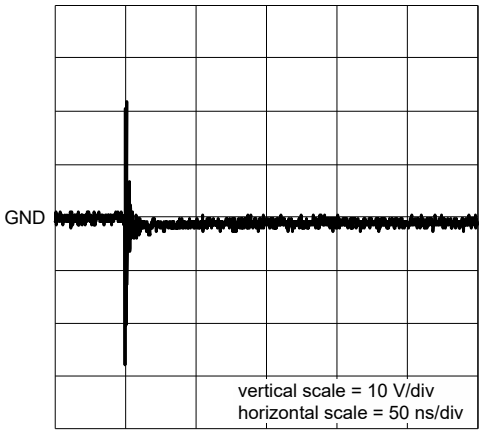
unclamped +1 kV ESD voltage waveform
(IEC61000-4-2 network)



clamped +1 kV ESD voltage waveform
(IEC61000-4-2 network)



unclamped -1 kV ESD voltage waveform
(IEC61000-4-2 network)



clamped -1 kV ESD voltage waveform
(IEC61000-4-2 network)

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Fig. 6. ESD clamping test setup and waveforms

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10. Application information

The device is designed for the protection of up to two unidirectional data or signal lines from the damage caused by ESD and surge pulses. The devices may be used on lines where the signal polarities are either positive or negative with respect to ground.

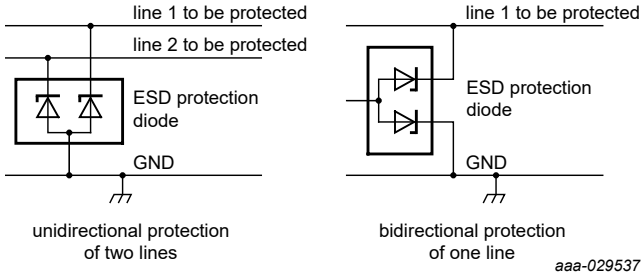

Fig. 7. Application diagram

Circuit board layout and protection device placement

Circuit board layout is critical for the suppression of ESD, Electrical Fast Transient (EFT) and surge transients. The following guidelines are recommended:

1. Place the device as close to the input terminal or connector as possible.
2. Minimize the path length between the device and the protected line.
3. Keep parallel signal paths to a minimum.
4. Avoid running protected conductors in parallel with unprotected conductors.
5. Minimize all Printed-Circuit Board (PCB) conductive loops including power and ground loops.
6. Minimize the length of the transient return path to ground.
7. Avoid using shared transient return paths to a common ground point.
8. Use ground planes whenever possible. For multilayer PCBs, use ground vias.

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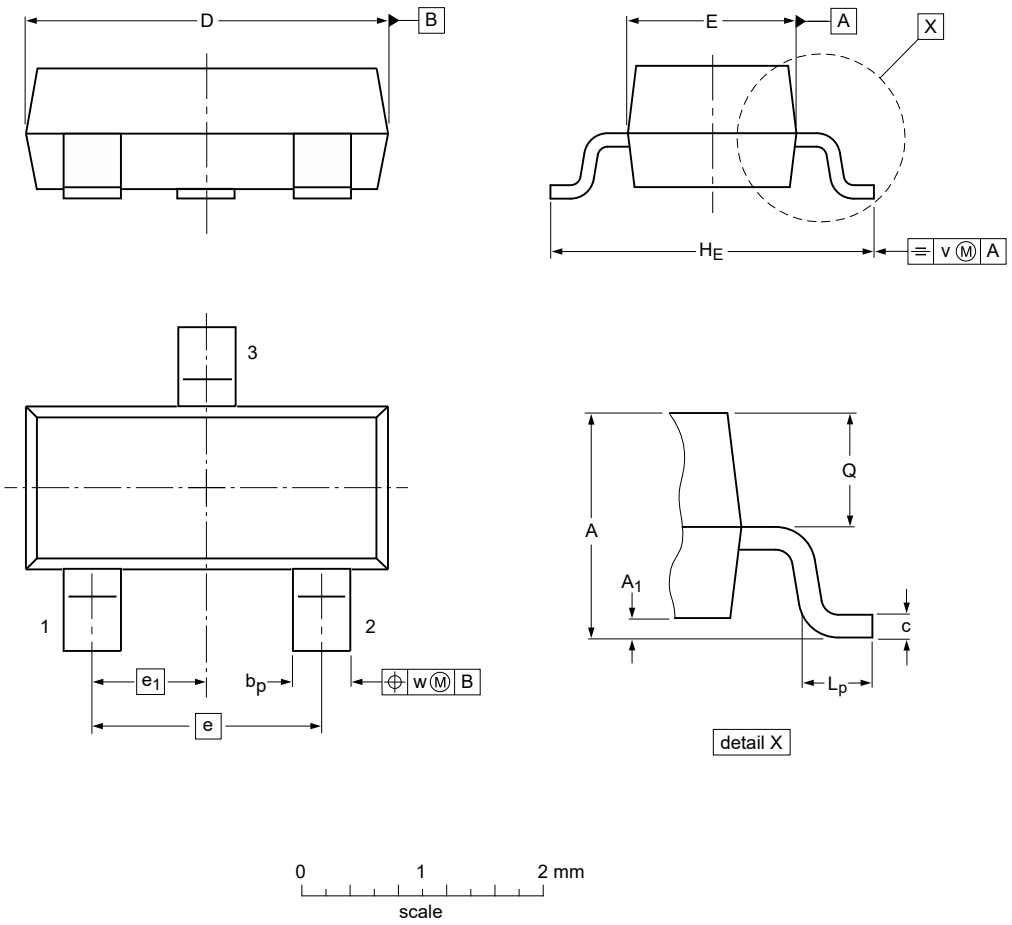
11. Package outline

Plastic surface-mounted package; 3 leads **SOT23**



Dimensions (mm are the original dimensions)

Unit		A	A_1	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w
mm	max	1.1	0.1	0.48	0.15	3.0	1.4			2.5	0.45	0.55		
	nom							1.9	0.95				0.2	0.1
	min	0.9		0.38	0.09	2.8	1.2			2.1	0.15	0.45		

sot023_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT23		TO-236AB				~~14-06-19~~ 14-09-22

Fig. 8. Package outline SOT23

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12. Soldering

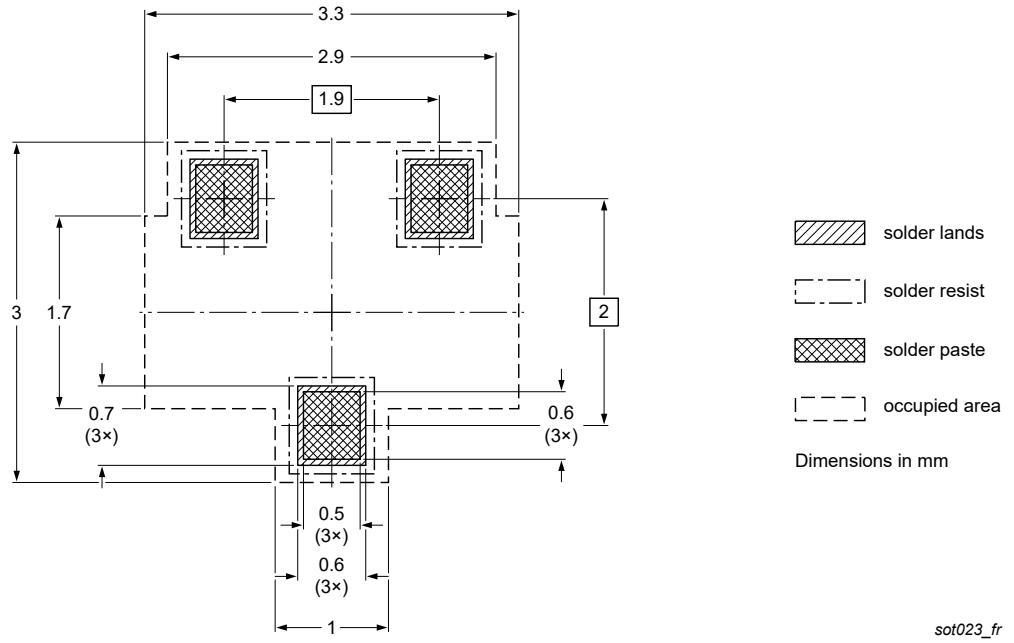

Fig. 9. Reflow soldering footprint for SOT23

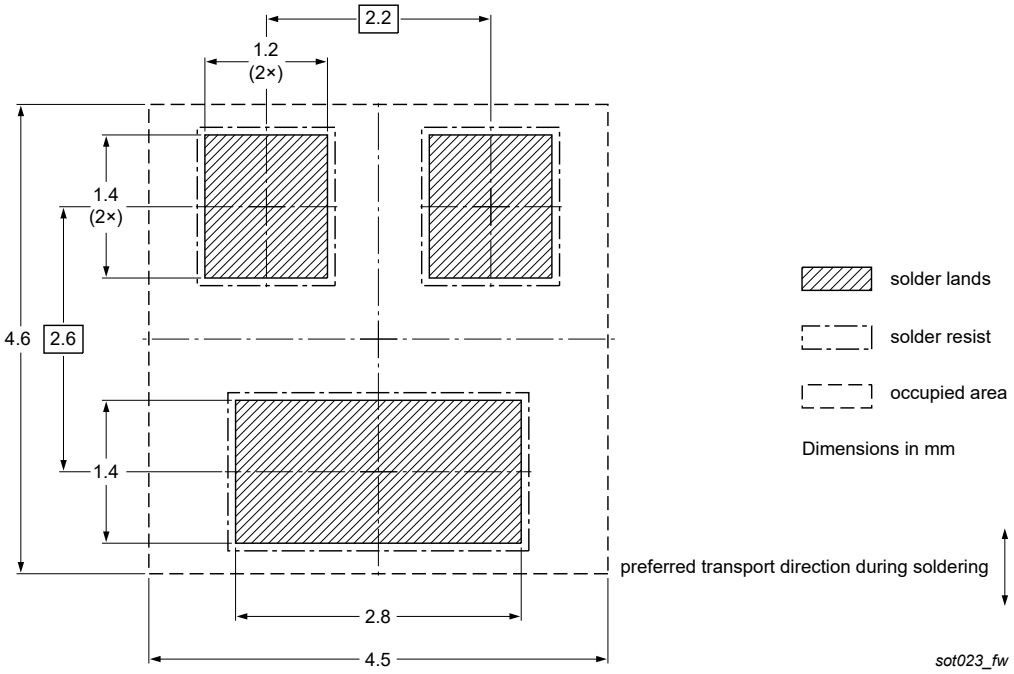

Fig. 10. Wave soldering footprint for SOT23

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13. Revision history

Table 7. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PESD36VS2UT v.3	20230417	Product data sheet	-	PESD36VS2UT v.2
Modifications:	• Product changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s)			
PESD36VS2UT v.2	20180703	Product data sheet	-	PESD36VS2UT v.1
PESD36VS2UT v.1	20090716	Product data sheet	-	-

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14. Legal information

Data sheet status

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.
[2] The term 'short data sheet' is explained in section "Definitions".
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