

1 Characteristics

Table 1. Absolute ratings ($T_{amb} = 25\text{ }^{\circ}\text{C}$)

Symbol	Parameter		Value	Unit
V_{PP}	Peak pulse voltage	Electrostatics discharge: MIL STD 883C-Method 3015-6	25	kV
P_{PP}	Peak pulse power (8/20 μ s)		200	W
T_j	Maximum operating junction temperature		+150	$^{\circ}\text{C}$
T_{stg}	Storage temperature range		-55 to +150	$^{\circ}\text{C}$
T_L	Maximum lead temperature for soldering during 10 s		260	$^{\circ}\text{C}$

Figure 2. Electrical characteristics (definitions)

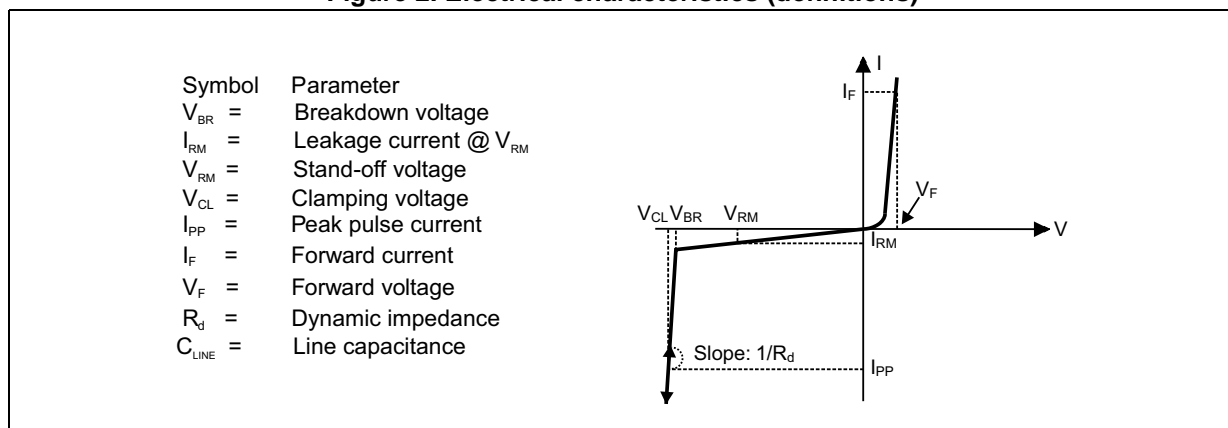


Table 2. Electrical characteristics - values ($T_{amb} = 25\text{ }^{\circ}\text{C}$)

Types	V_{BR} at I_R		I_{RM} at V_{RM}		V_F at I_F		$\alpha T^{(1)}$	C_{line} at 0 V	
	min.	max.		max. ⁽²⁾	max.		max.	typ.	
	V	V	mA	μ A	V	V	mA	$10^{-4}/\text{C}$	pF
ESDA6V1S3	6.1	7.2	1	2	5.25	1.25	200	6	120

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

2. Between any I/O pin and ground.

2 Calculation of the clamping voltage

2.1 Use of the dynamic resistance

The ESDA family has been designed to clamp fast spikes like ESD. Generally the PCB designers need to calculate easily the clamping voltage V_{CL} . This is why we give the dynamic resistance in addition to the classical parameters. The voltage across the protection cell can be calculated with the following formula:

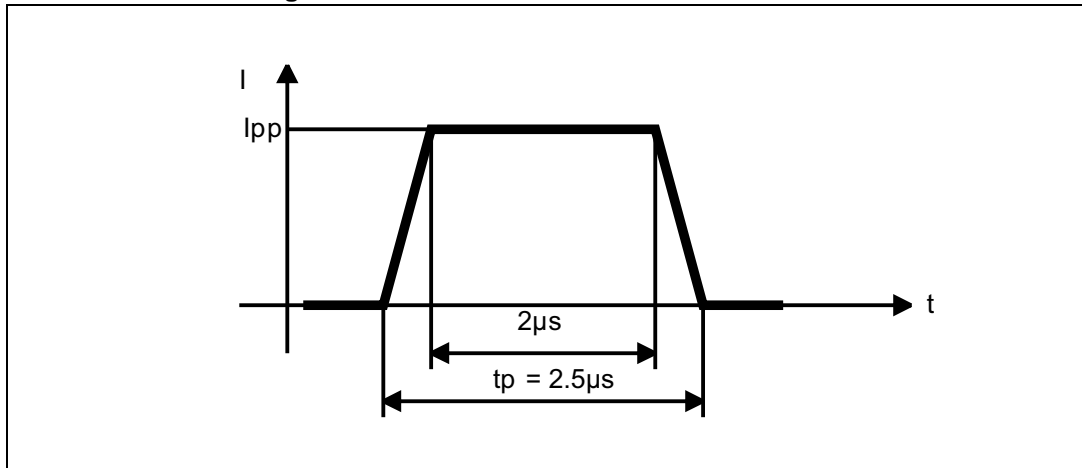
$$V_{CL} = V_{BR} + R_d I_{PP}$$

Where I_{PP} is the peak current through the ESDA cell.

2.2 Dynamic resistance measurement

The short duration of the ESD has led us to prefer a more adapted test wave, as below defined, to the classical 8/20 μ s and 10/1000 μ s surges.

Figure 3. 2.5 ms duration measurement wave



As the value of the dynamic resistance remains stable for a surge duration lower than 20 μ s, the 2.5 μ s rectangular surge is well adapted. In addition both rise and fall times are optimized to avoid any parasitic phenomenon during the measurement of R_d .

Figure 4. Peak power dissipation versus initial junction temperature (T_j initial = 25 °C)

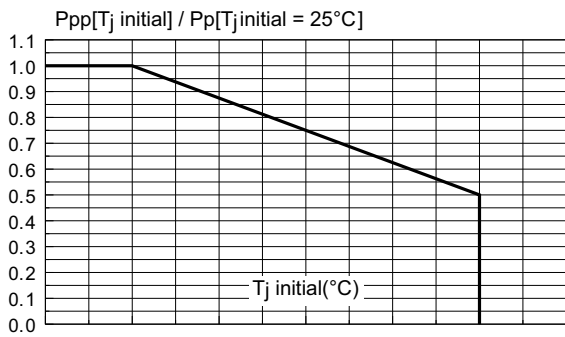


Figure 5. Peak pulse power versus exponential pulse duration (T_j initial = 25 °C)

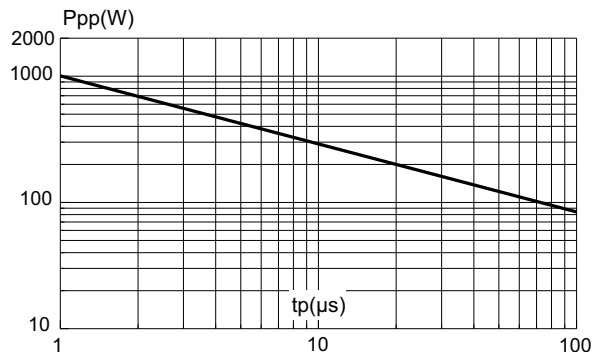


Figure 6. Clamping voltage versus peak pulse current (T_j initial = 25 °C), rectangular waveform

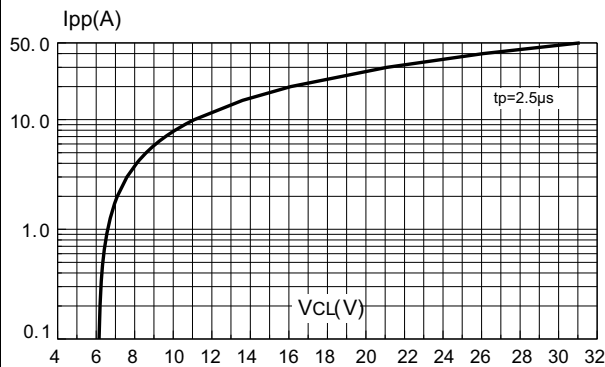


Figure 7. Capacitance versus reverse applied voltage (typical values)

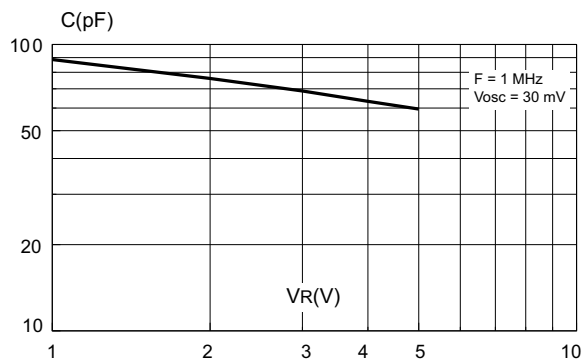


Figure 8. Relative variation of leakage current versus junction temperature (typical values)

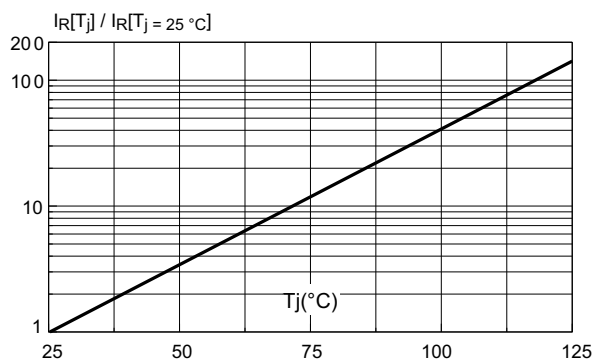
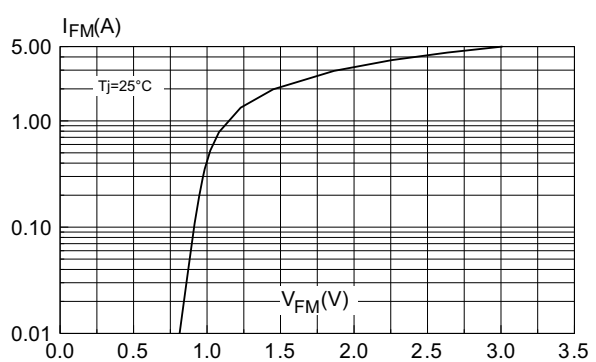


Figure 9. Peak forward voltage drop versus peak forward current (typical values)



3 Application example

Figure 10. Protection of logic-level signals (ex: centronics junction)

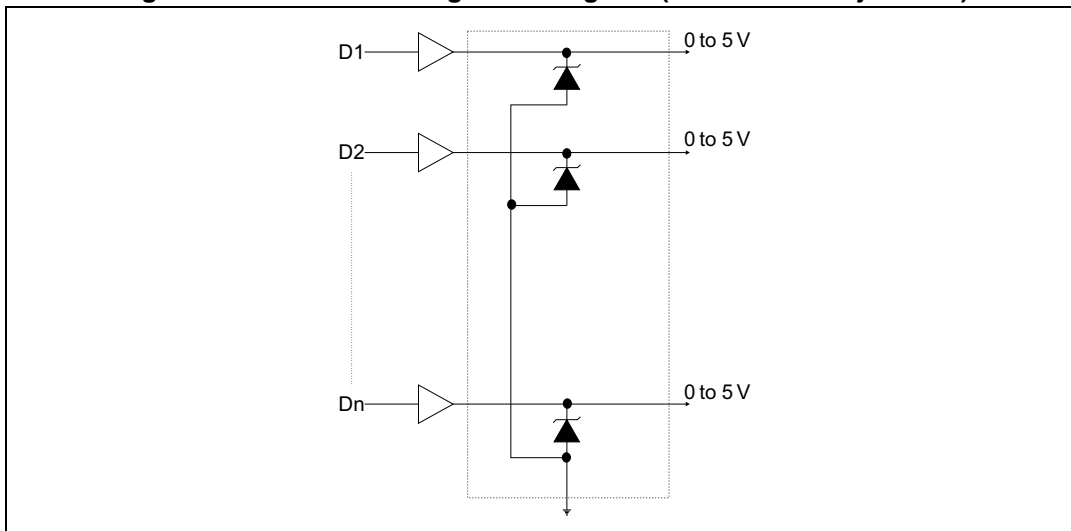
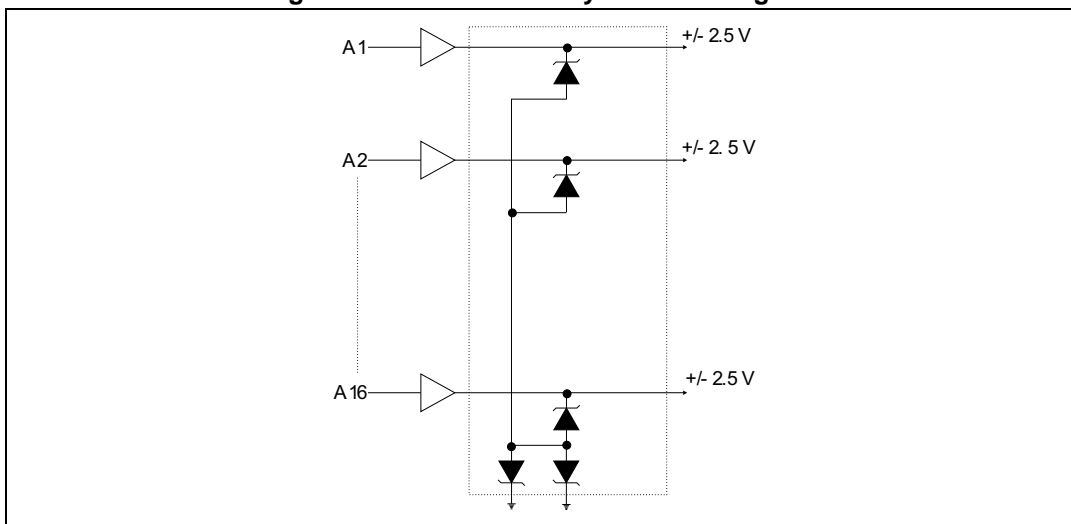


Figure 11. Protection of symmetrical signals



Note: Capacitance value between any I/O pin and ground is divided by 2.

Implementing its ASD™ technology, STMicroelectronics has developed a monolithic Transil™ diode array, which is a reliable protection against electrostatic overloads for computer I/O ports, modems, GSM handsets and accessories or other similar systems with data outputs. The ESDA6V1S3 integrates 18 Transil™ diodes in a compact package that can be easily mounted close to the circuitry to be protected, eliminating the assembly costs associated with the use of discrete diodes, and also increasing system reliability.

Each Transil™ has a breakdown voltage between 6.2 V (minimum) and 7.2 V (maximum). When the input voltage is lower than the breakdown voltage, the diodes present a high impedance to ground. For short overvoltage pulses, the fast-acting diodes provide an almost instantaneous response, clamping the voltage to a safe level.

4 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.

4.1 SO-20 package information

Figure 12. SO-20 package outline

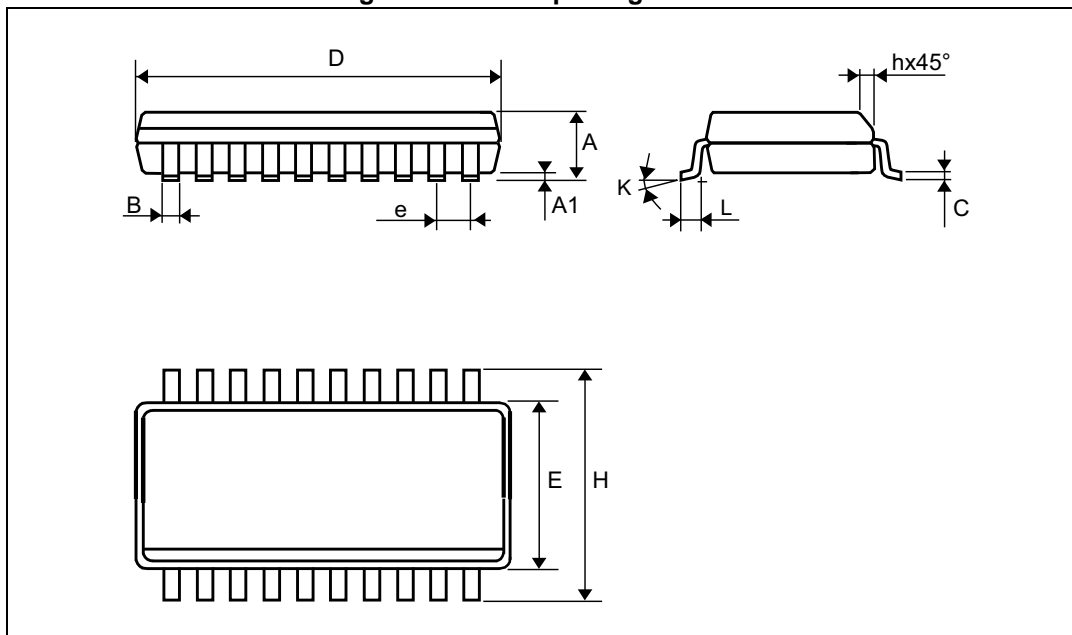


Table 3. SO-20 package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.35		2.65	0.092		0.104
A1	0.10		0.20	0.004		0.008
B	0.33		0.51	0.013		0.020
C	0.23		0.32	0.009		0.013
D	12.6		13.0	0.484		0.512
E	7.40		7.60	0.291		0.299
e		1.27			0.050	
H	10.0		10.65	0.394		0.419
h	0.25		0.75	0.010		0.029
L	0.50		1.27	0.020		0.050
K			8°			8°

5 Ordering information

Figure 13. Ordering information scheme

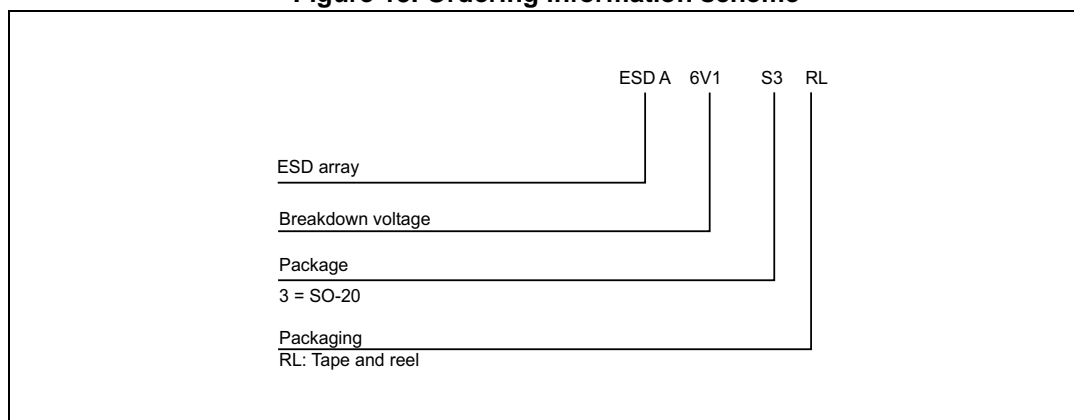


Table 4. Ordering information

Order codes	Marking	Package	Weight	Base qty	Delivery mode
ESDA6V1S3	E6V1S3	SO-20	0.55 g	1000	Tape and reel

6 Revision history

Table 5. Document revision history

Date	Revision	Changes
18-Sep-2014	4	
13-Nov-2015	5	Removed ESDA6V2S6 package information.

IMPORTANT NOTICE – PLEASE READ CAREFULLY

STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST’s terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers’ products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2015 STMicroelectronics – All rights reserved

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[STMicroelectronics:](#)

[ESDA6V2S6RL](#)