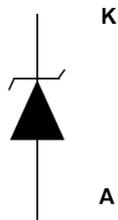


## 15 V, 25 A unidirectional TVS in 0402 CSP



Unidirectional

## Features

- Peak pulse power: 600 W (8/20  $\mu$ s)
- Stand-off voltage: 15 V
- Unidirectional type
- Low leakage current: 80 nA at 25 °C
- Operating  $T_j$  max: 150 °C
- Lead finishing: gold

## Complies with the following standards

- IPC7531 footprint and JEDEC registered package outline
- IEC 61000-4-2, C = 150 pF - R = 330  $\Omega$  exceeds level 4:
  - 30 kV (contact discharge)
  - 30 kV (air discharge)

## Description

The ESDA17P20-1F2 is a unidirectional single line TVS diode designed to protect the power line against EOS and ESD transients.

This ESD suppressor is ideal for applications where PCB space saving is required such as cellular handsets and accessories, wearable devices, USB buses, battery lines.

Product status link

[ESDA17P20-1F2](#)

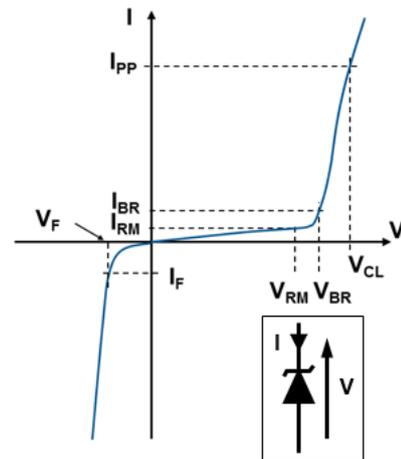
# 1 Characteristics

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

Symbol	Parameter	Value	Unit
$V_{pp}$	Peak pulse voltage	ISO10605 (C = 330 pF, R = 330 $\Omega$ )	30
		contact discharge	30
	air discharge		kV
$P_{pp}$	Peak pulse power (8/20 $\mu\text{s}$ )	600	W
$I_{pp}$	Peak pulse current (8/20 $\mu\text{s}$ )	25	A
$T_{op}$	Operating junction temperature range	-55 to 150	$^{\circ}\text{C}$
$T_{stg}$	Storage junction temperature range	-55 to 150	
$T_L$	Maximum lead temperature for soldering during 10 s	260	

**Figure 1. Electrical characteristics (definitions)**

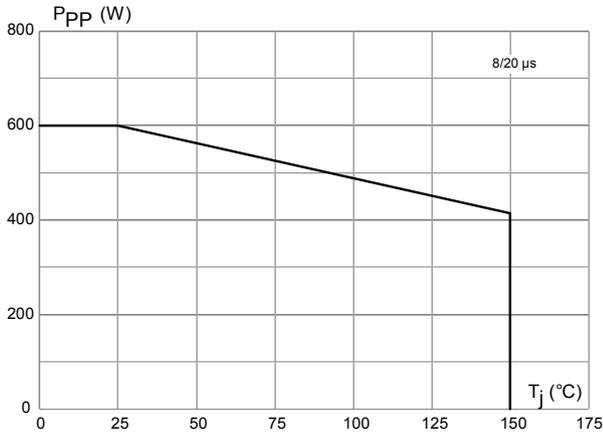
- $V_{RM}$  Maximum stand-off voltage
- $I_{RM}$  Maximum leakage current @  $V_{RM}$
- $V_R$  Stand-off voltage
- $I_R$  Leakage current @  $V_R$
- $V_{BR}$  Breakdown voltage @  $I_{BR}$
- $I_{BR}$  Breakdown current
- $V_{CL}$  Clamping voltage @  $I_{pp}$
- $I_{pp}$  Peak pulse current
- $R_D$  Dynamic resistance
- $V_F$  Forward voltage drop @  $I_F$
- $I_F$  Forward current
- $\alpha T$  Voltage temperature coefficient


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

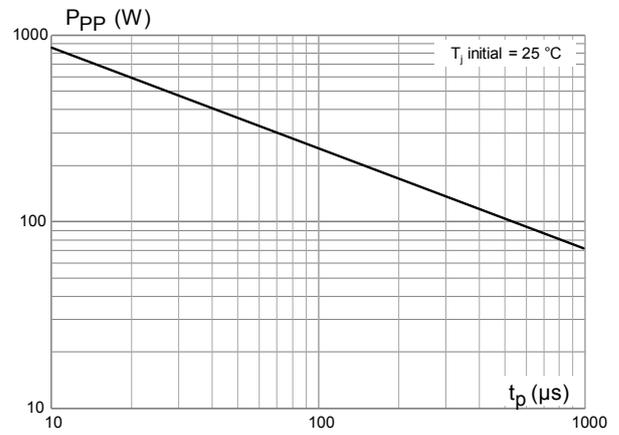
Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
$V_{RM}$	Stand-off voltage				15	V
$V_{BR}$	Breakdown voltage	$I_R = 1\text{ mA}$	15.6	16.7	17.9	V
$I_{RM}$	Leakage current	$V_{RM} = 15\text{ V}$			80	nA
$V_{CL}$	Clamping voltage	$I_{pp} = 20\text{ A} - 8/20\text{ }\mu\text{s}$			23	V
		IEC 61000-4-2, 8 kV contact discharge measured at 30 ns		20.6		
$R_D$	Dynamic resistance, pulse	8/20 $\mu\text{s}$		0.25		$\Omega$
$C_{LINE}$	Line capacitance	$f = 1\text{ MHz}$ , $V_{LINE} = 0\text{ V}$ , $V_{OSC} = 30\text{ mV}$		190		pF

## 1.1 Characteristics (curves)

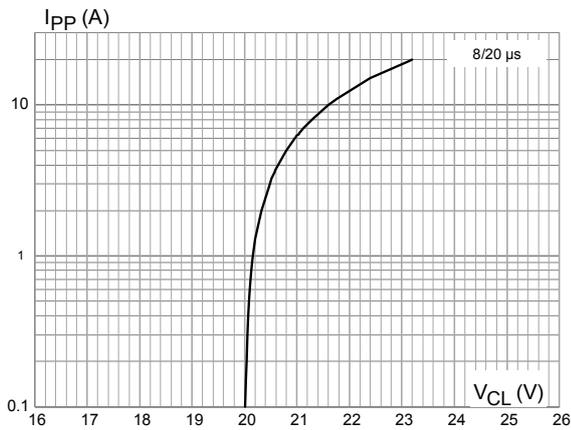
**Figure 2. Maximum peak power dissipation versus initial junction temperature**



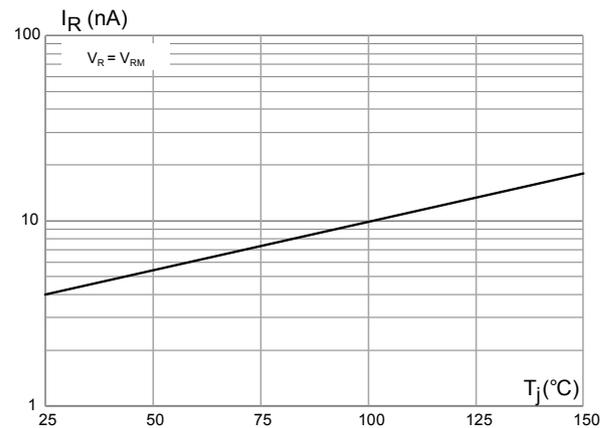
**Figure 3. Maximum peak pulse power versus exponential pulse duration**



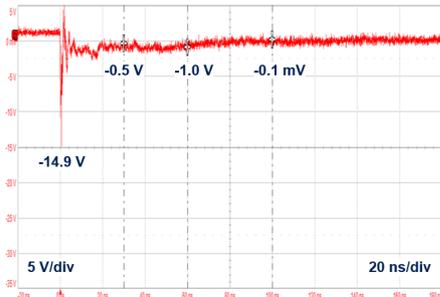
**Figure 4. Maximum clamping voltage versus peak pulse current**



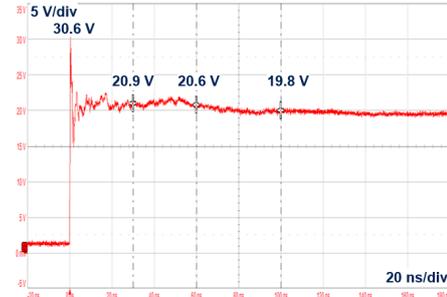
**Figure 5. Leakage current versus junction temperature**



**Figure 6. ESD response to IEC 61000-4-2 (-8 kV contact discharge)**



**Figure 7. ESD response to IEC 61000-4-2 (+8 kV contact discharge)**

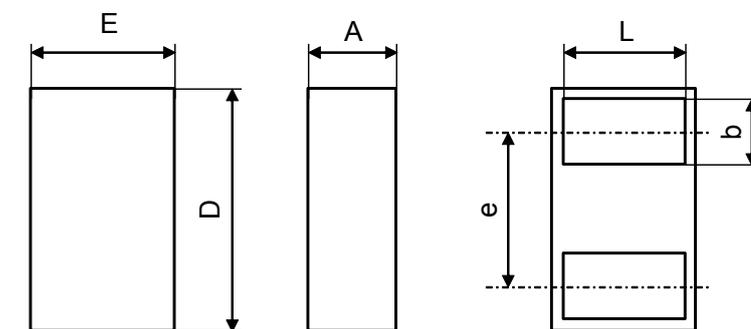


## 2 Package information

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](http://www.st.com). ECOPACK is an ST trademark.

### 2.1 0402 CSP package information

**Figure 8. 0402 CSP package outline**



**Table 3. 0402 CSP mechanical data**

Ref.	Dimensions		
	Millimeters		
	Min.	Typ.	Max.
A	0.330	0.350	0.370
b	0.230	0.250	0.270
D	0.970	1.000	1.030
E	0.570	0.600	0.630
e		0.650	
L	0.480	0.500	0.520

Figure 9. Recommended footprint (mm)

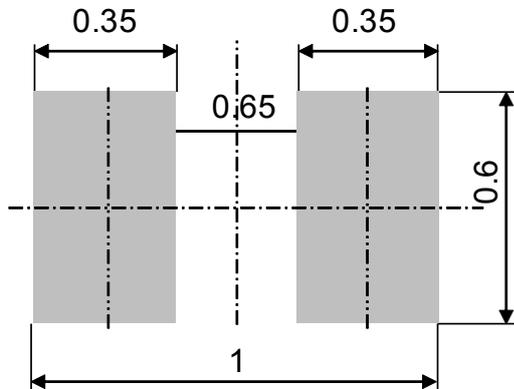
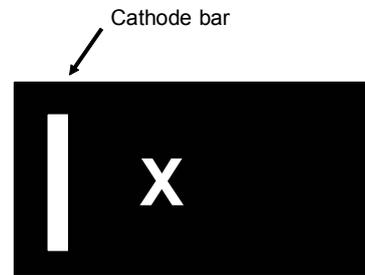
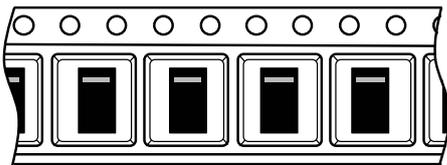


Figure 10. Marking



X : refer to ordering table for marking

Figure 11. Package orientation in reel



Taped according to EIA-481

Note: Pocket dimensions are not on scale  
Pocket shape may vary depending on package  
On bidirectional devices, marking and logo may be not always in the same direction

Figure 12. Tape and reel orientation

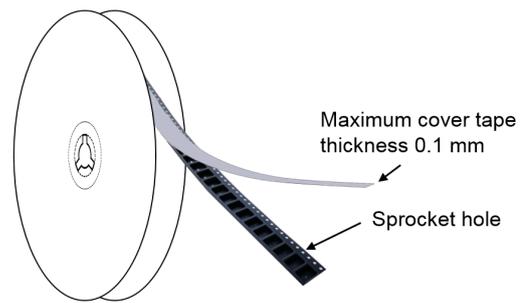


Figure 13. Reel dimension values (mm)

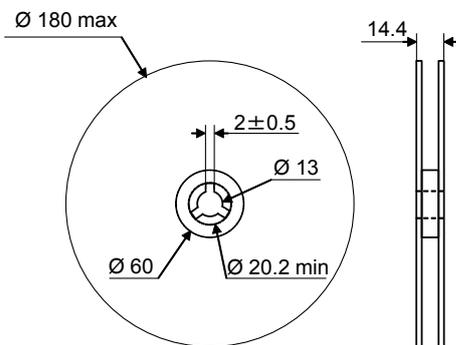


Figure 14. Inner box dimension values (mm)

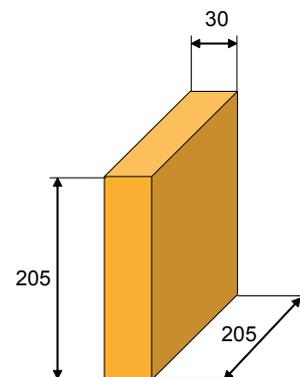
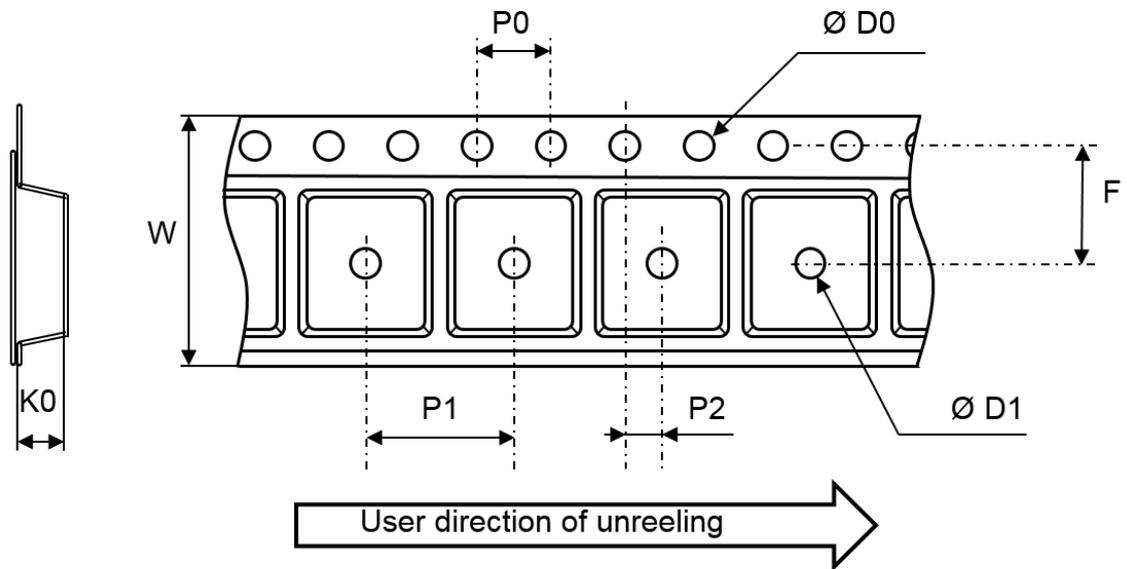


Figure 15. Tape outline



Note: Pocket dimensions are not on scale  
Pocket shape may vary depending on package

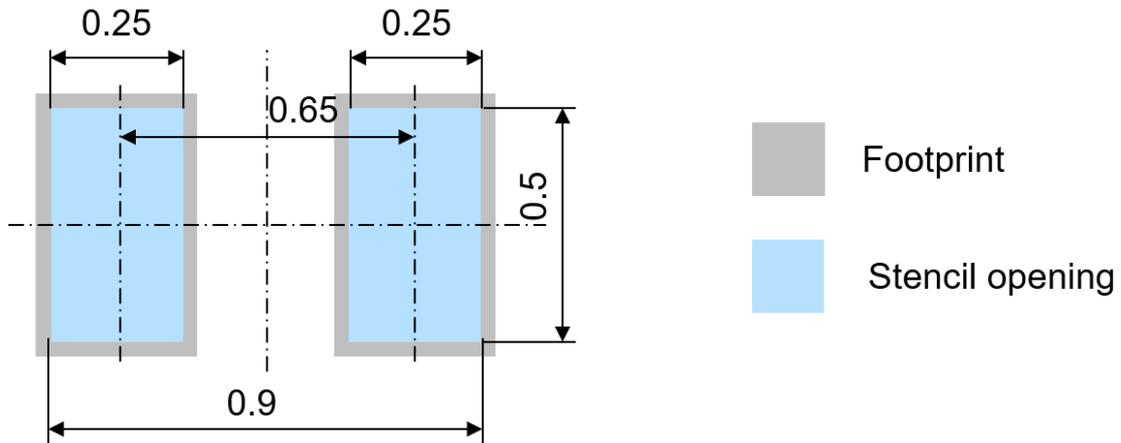
Table 4. Tape dimension values

Ref.	Dimensions		
	Millimeters		
	Min.	Typ.	Max.
D0	1.5	1.55	1.6
D1	0.195	0.2	0.205
F	3.45	3.5	3.55
K0	0.39	0.42	0.45
P0	3.9	4.0	4.1
P1	1.95	2.0	2.05
P2	1.95	2.0	2.05
W	7.9	8.0	8.3

### 3 PCB assembly recommendations

#### 3.1 Recommended stencil opening

Figure 16. Recommended stencil opening (mm)



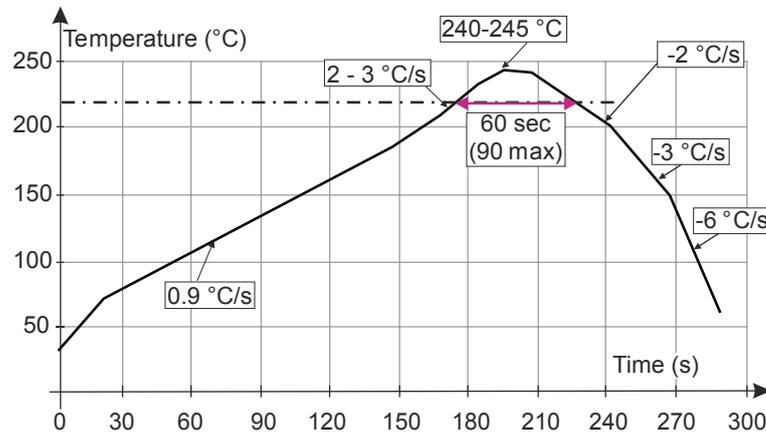
Stencil opening thickness: 100  $\mu$ m

#### 3.2 Solder paste

1. Halide-free flux qualification ROL0 according to ANSI/J-STD-004.
2. "No clean" solder paste is recommended.
3. Offers a high tack force to resist component movement during high speed.
4. Use solder paste with fine particles: powder particle size 20-38  $\mu$ m.

### 3.3 Reflow profile

Figure 17. ST ECOPACK recommended soldering reflow profile for PCB mounting



Note: Minimize air convection currents in the reflow oven to avoid component movement. Maximum soldering profile corresponds to the latest IPC/JEDEC J-STD-020.

## 4 Ordering information

**Table 5. Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
ESDA17P20-1F2	A	0402 CSP	0.54 mg	10000	Tape and reel

## Revision history

**Table 6. Document revision history**

Date	Version	Changes
15-Jun-2020	1	Initial release.
16-Sep-2022	2	Updated package name.

**IMPORTANT NOTICE – 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 acknowledgment.

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. For additional information about ST trademarks, refer to [www.st.com/trademarks](http://www.st.com/trademarks). 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.

© 2022 STMicroelectronics – All rights reserved