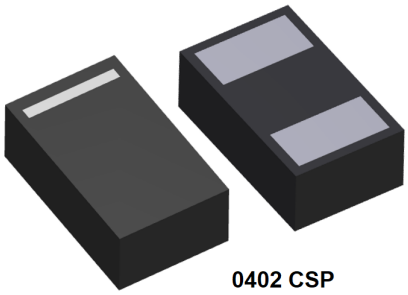
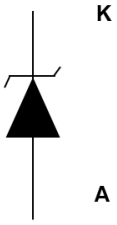
ESDA17P20-1F2

Datasheet

15 V, 25 A unidirectional TVS in 0402 CSP



0402 CSP



Unidirectional

Product status link
ESDA17P20-1F2

Features

- Peak pulse power: 600 W (8/20 µs)
- 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 Ω 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.

1 Characteristics

Table 1. Absolute maximum ratings (T_{amb} = 25 °C)

Symbol	Parameter		Value	Unit
V_{pp}	Peak pulse voltage	ISO10605 (C = 330 pF, R = 330 Ω) contact discharge air discharge	 30 30	kV
P_{pp}	Peak pulse power (8/20 µs)		600	W
I_{pp}	Peak pulse current (8/20 µs)		25	A
T_{op}	Operating junction temperature range		-55 to 150	°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
αT Voltage temperature coefficient

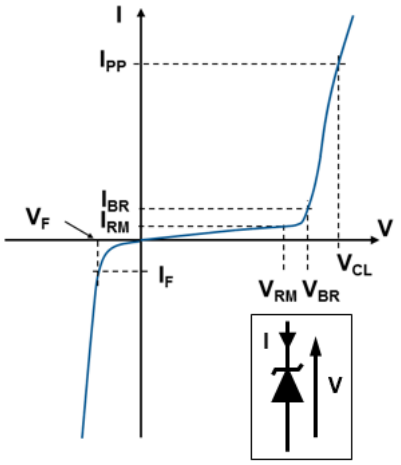


Table 2. Electrical characteristics (values) (T_{amb} = 25° C)

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

1.1 Characteristics (curves)

Figure 2. Maximum peak power dissipation versus initial junction temperature

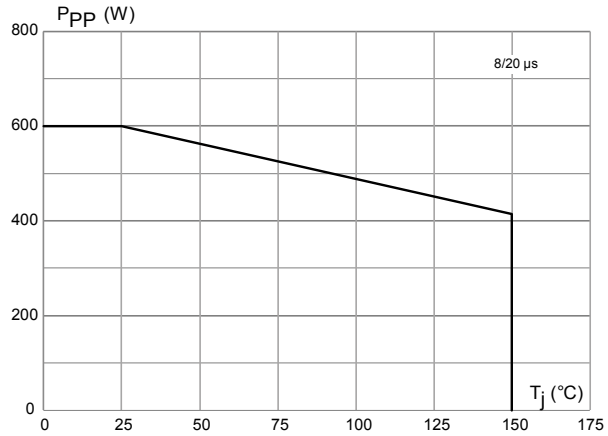


Figure 3. Maximum peak pulse power versus exponential pulse duration

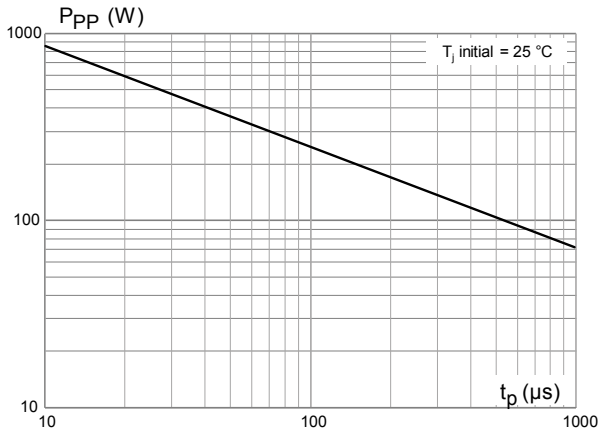


Figure 4. Maximum clamping voltage versus peak pulse current

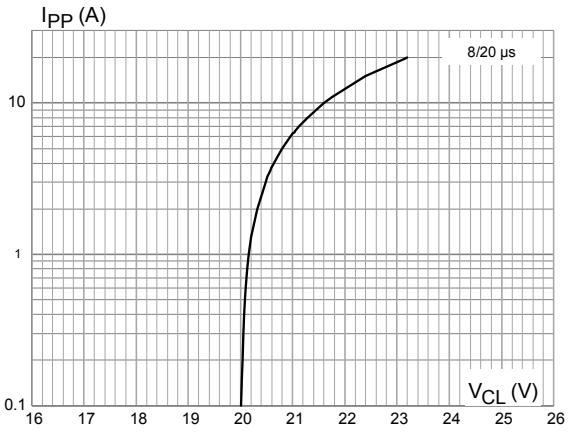


Figure 5. Leakage current versus junction temperature

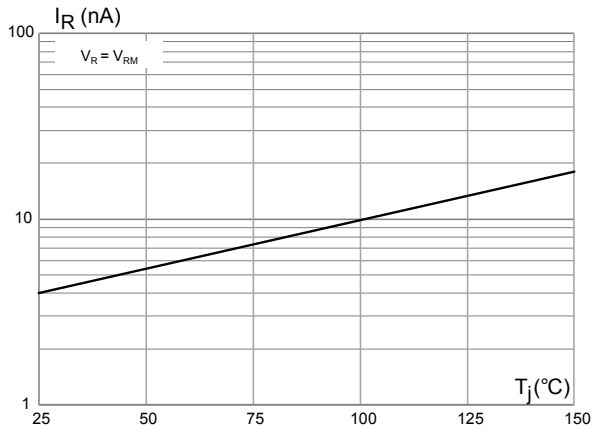


Figure 6. ESD response to IEC 61000-4-2 (-8 kV contact discharge)

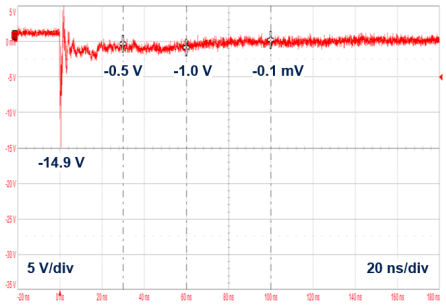
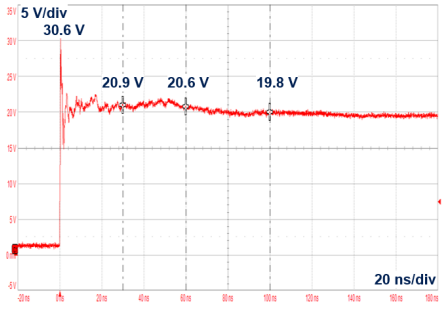


Figure 7. ESD response to IEC 61000-4-2 (+8 kV contact discharge)



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. ECOPACK is an ST trademark.

2.1 0402 CSP package information

Figure 8. 0402 CSP package outline

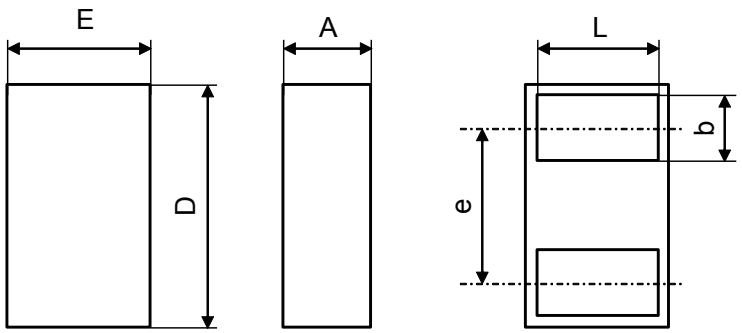


Table 3. 0402 CSP mechanical data

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)

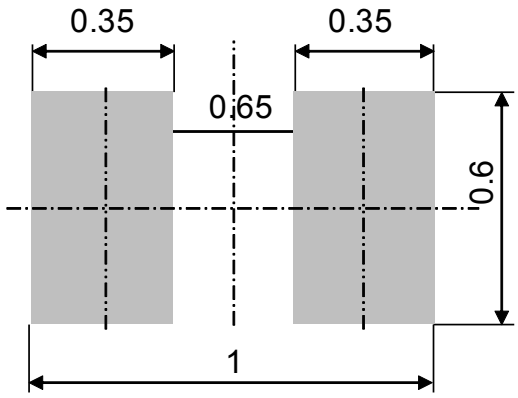
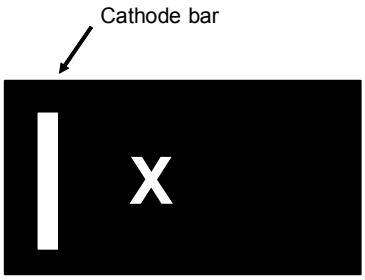
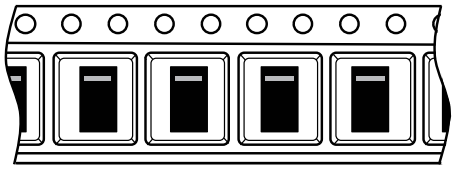


Figure 10. Marking



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

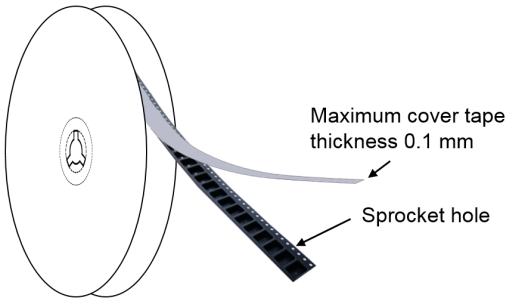


Figure 13. Reel dimension values (mm)

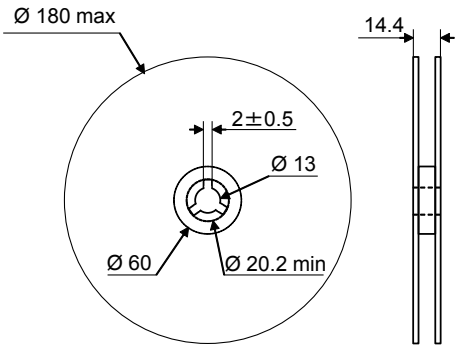


Figure 14. Inner box dimension values (mm)

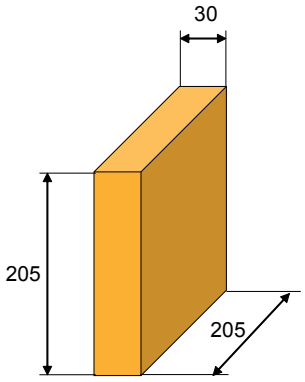
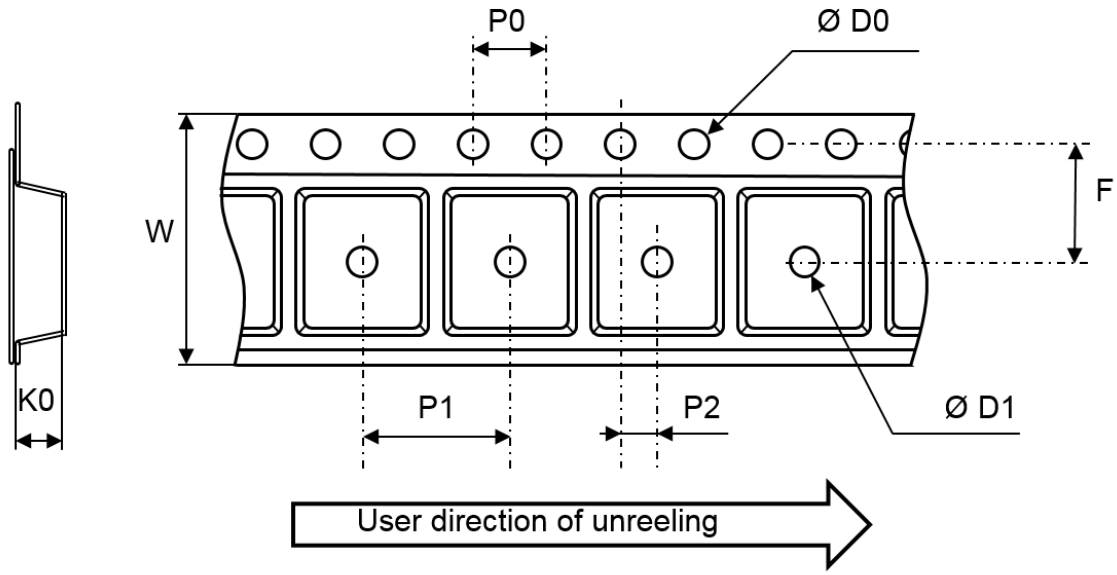


Figure 15. **Tape outline**



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

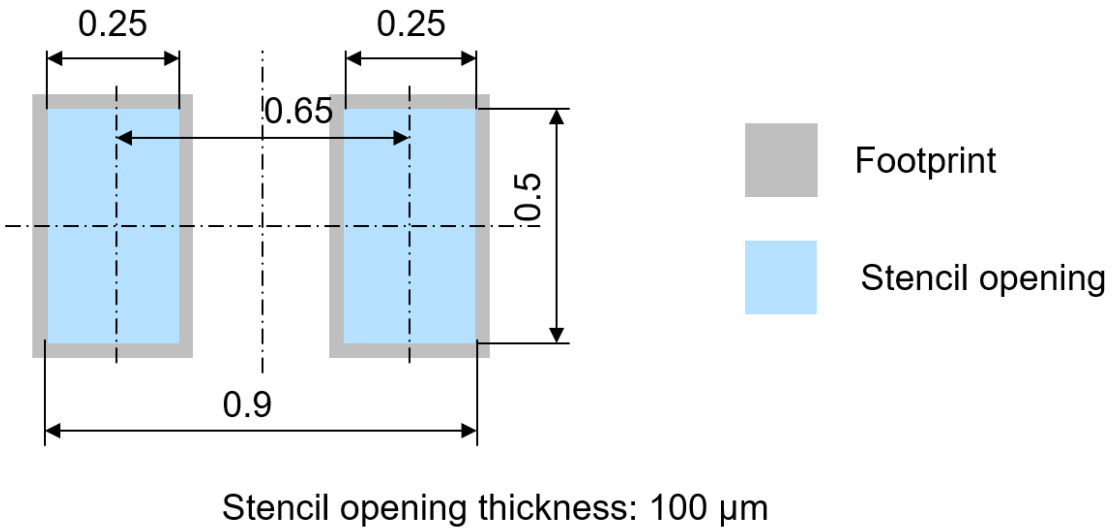
Table 4. **Tape dimension values**

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)**



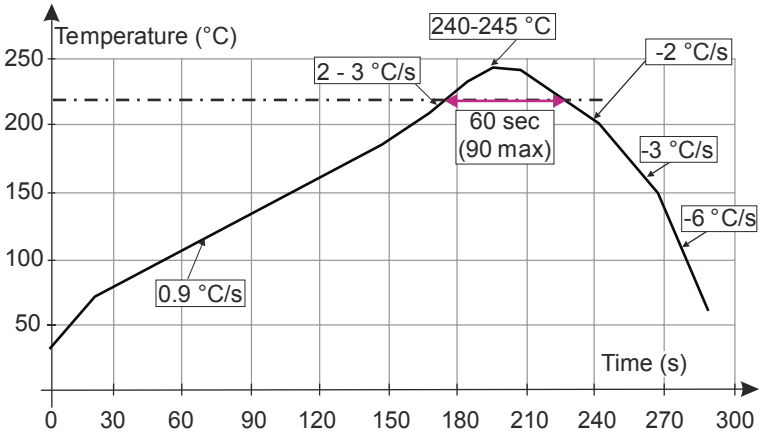
Stencil opening thickness: 100 µm

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 µm.

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.