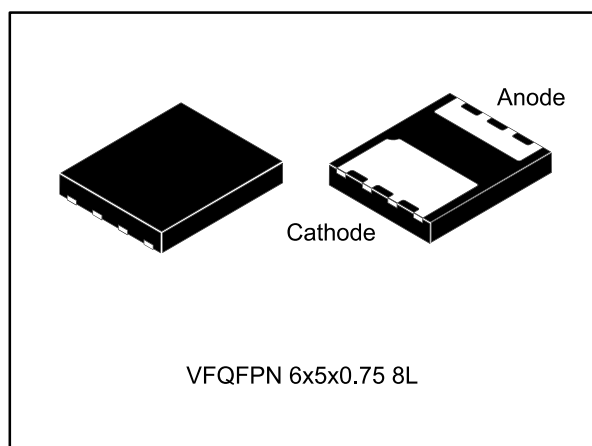


20 V reverse voltage cool bypass switch

Datasheet - preliminary data



Applications

- Photovoltaic panels
- Solar farm

Description

The SPV1520 is a cool bypass switch with a very low forward voltage drop and ultra low reverse leakage current. The former drastically reduces the power dissipation in bypass mode and prolongs the lifetime of the device, by reducing maintenance costs and shutdown due to a device failure. The latter allows the device to work at very high temperature avoiding thermal runaway phenomenon. These are clearly key benefits for all those applications requiring low power consumption to increase the system lifetime and maximize the power transfer from harvesting source to the load. For all these reasons and the strong ESD robustness, the cool bypass switch is the significant evolution with respect to the traditional standard Schottky diode.

Features

- Maximum forward current I_F up to 16 A
- Maximum reverse recovery mode V_R up to 20 V
- Very low forward voltage drop:
 - $V_F = 120 \text{ mV} @ I_F = 10 \text{ A}, T_{AMB} = 125 \text{ }^\circ\text{C}$
- Ultra low reverse leakage current:
 - $I_R = 100 \text{ } \mu\text{A} @ V_R = 20 \text{ V}, T_{AMB} = 125 \text{ }^\circ\text{C}$
- ESD HBM level (JESD22-A114) up to 8 kV
- Surge test level (IEC61000-4-5) up to 2 kV
- Junction temperature range T_J : -40 °C to 150 °C

Table 1: Device summary

Order code	Operating temperature range	Package	Packing
SPV1520N	-40 to 125 °C	VFQFPN (6x5x0.75) 8L	Tape and reel

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1 Electrical ratings

Table 2: Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_R	Max. DC reverse voltage	20	V
I_F	Max. forward current	16	A
T_J	Junction temperature range	-40 to 150	°C
T_{STG}	Storage temperature range	-40 to 175	°C
$R_{TH(j-c)}$	Thermal resistance, junction-to-case	4	°C/W
ESD	Human body model	8	kV

2 Electrical characteristics

T_{AMB} = 25 °C unless otherwise specified

Table 3: Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit	
V _F	Forward voltage drop	I _F = 1 A	T _J = 25 °C	-	100	-	mV
			T _J = 125 °C	-	110	-	
		I _F = 10 A	T _J = 25 °C	-	115	-	
			T _J = 125 °C	-	130	-	
		I _F = 16 A	T _J = 25 °C	-	140	-	
			T _J = 125 °C	-	160	-	
I _R	Reverse leakage current	V _R = 20 V	T _J = 25 °C	-	10	-	μA
			T _J = 125 °C	-	100	-	

Figure 1: Forward power dissipation vs. forward current

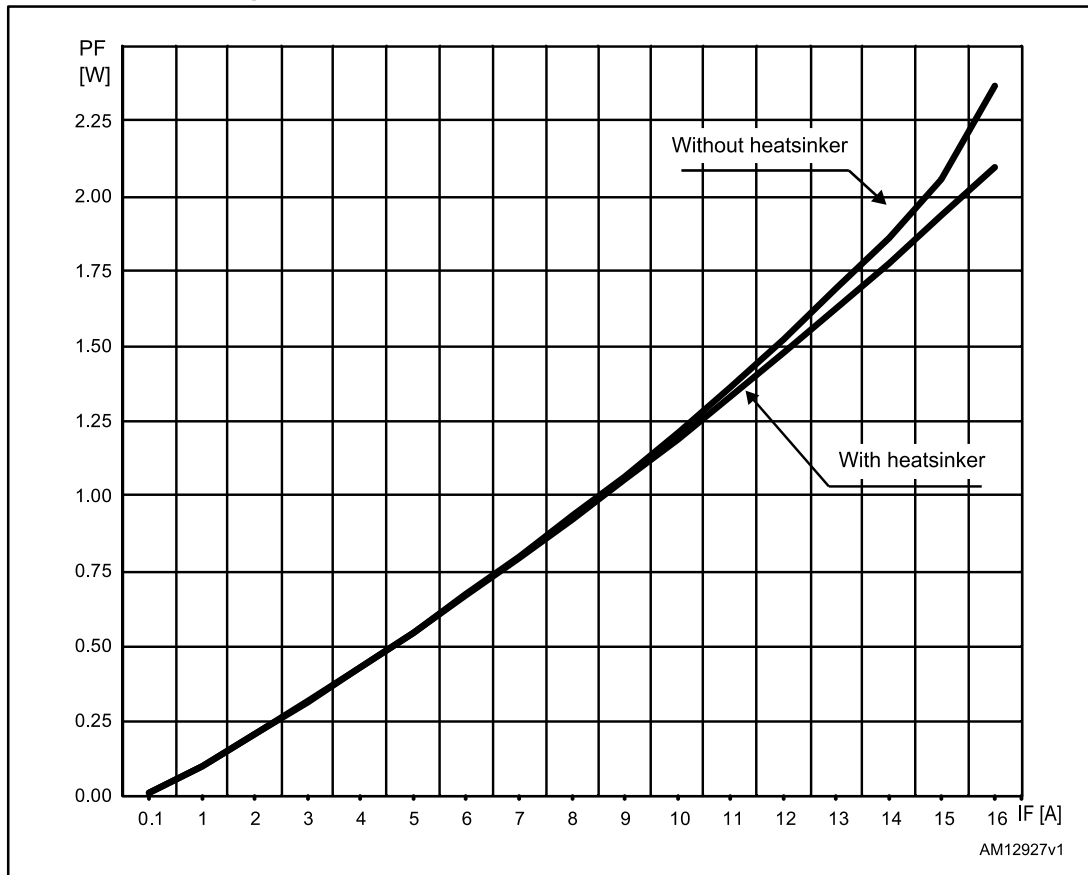


Figure 2: Reverse current vs. reverse voltage

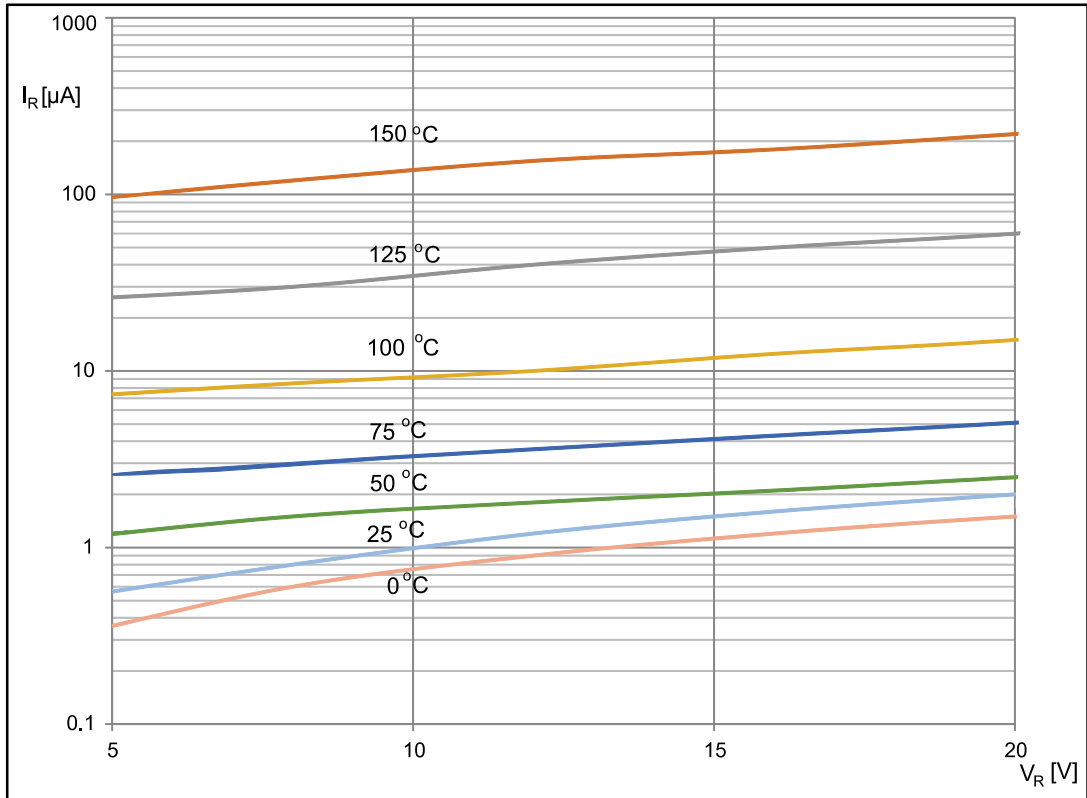
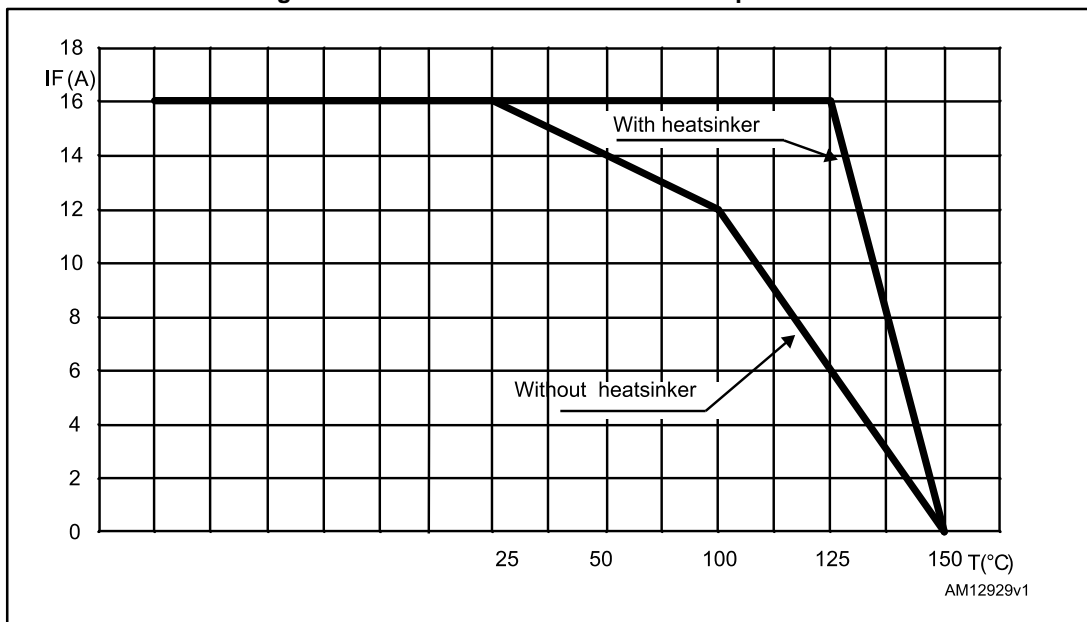


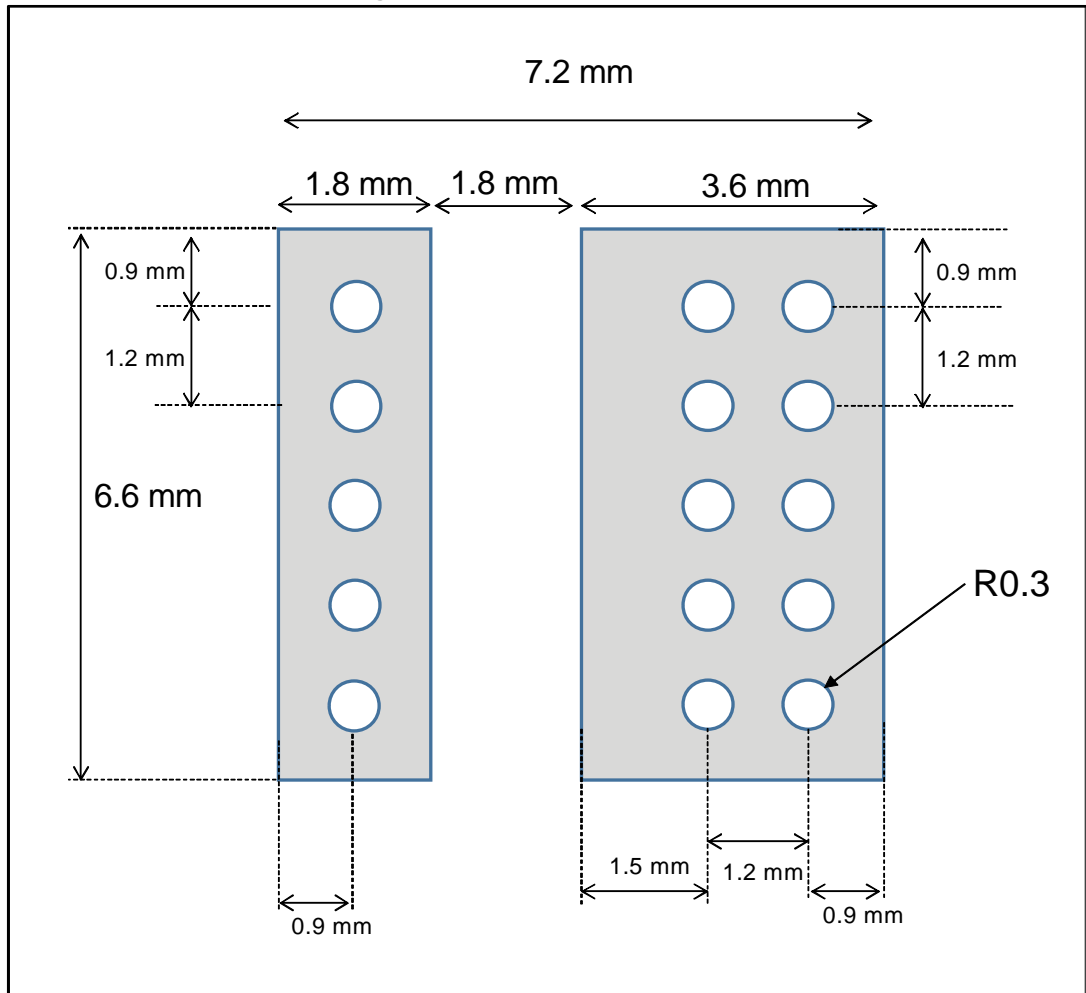
Figure 3: Forward current vs. ambient temperature



3 Recommended footprint on the application board

The below figure shows the suggested footprint on the board, in order to improve heat dissipation.

Figure 4: Recommended footprint



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 VFQFPN (6x5x0.75) package information

Figure 5: VFQFPN (6x5x0.75) package outline

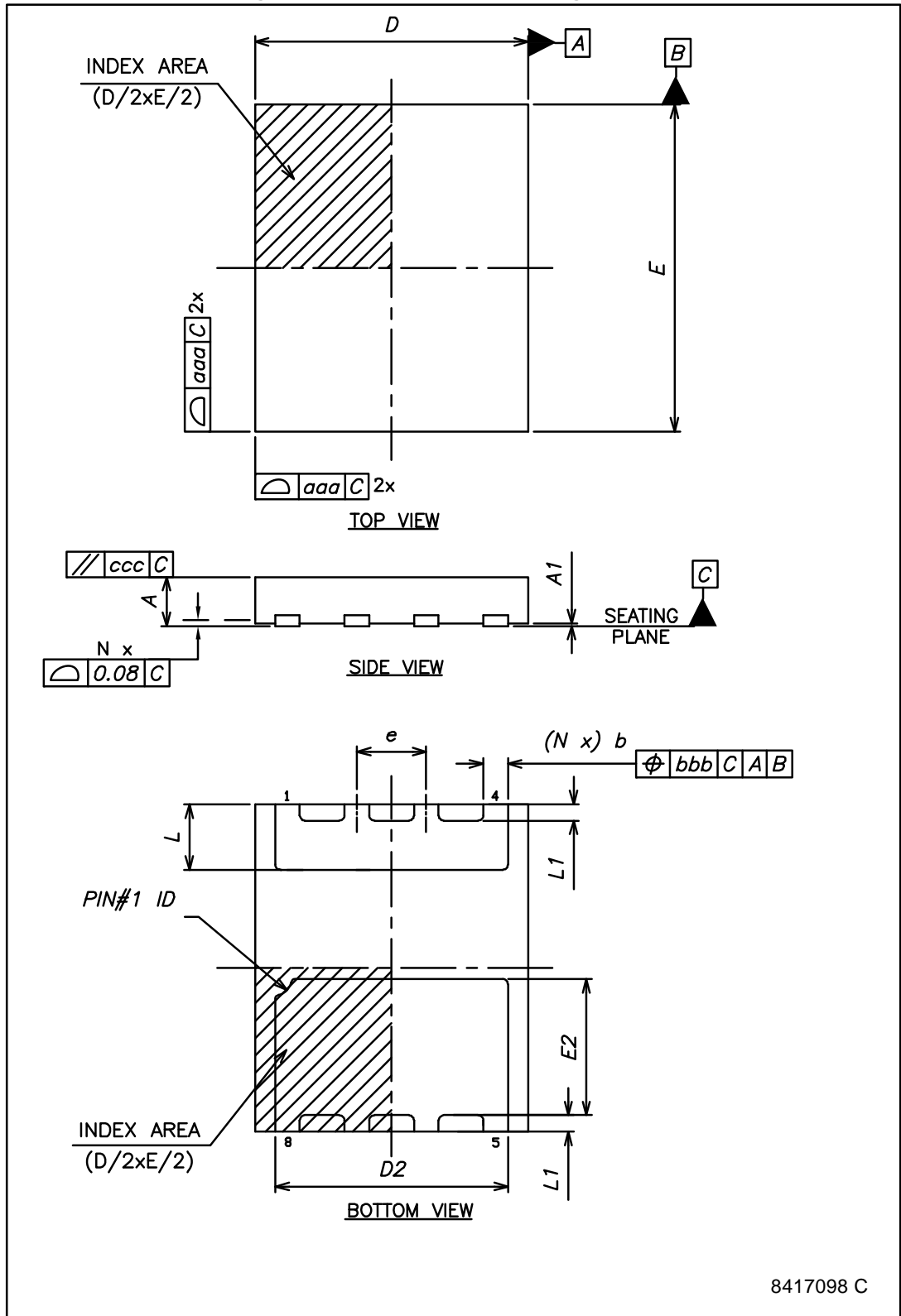


Table 4: VFQFPN (6x5x0.75) package mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	0.70	0.75	0.85
A1	0	0.02	0.05
D		5.00	
D2	4.11	4.26	4.36
E		6.00	
E2	2.35	2.50	2.60
e		1.27	
L	1.10	1.20	1.30
L1		0.30	
b	0.40	0.45	0.50
aaa		0.05	
bbb		0.10	
ccc		0.10	
N		8	

4.2 VFQFPN (6x5x0.75) packing information

Figure 6: VFQFPN (6x5x0.75) tape outline

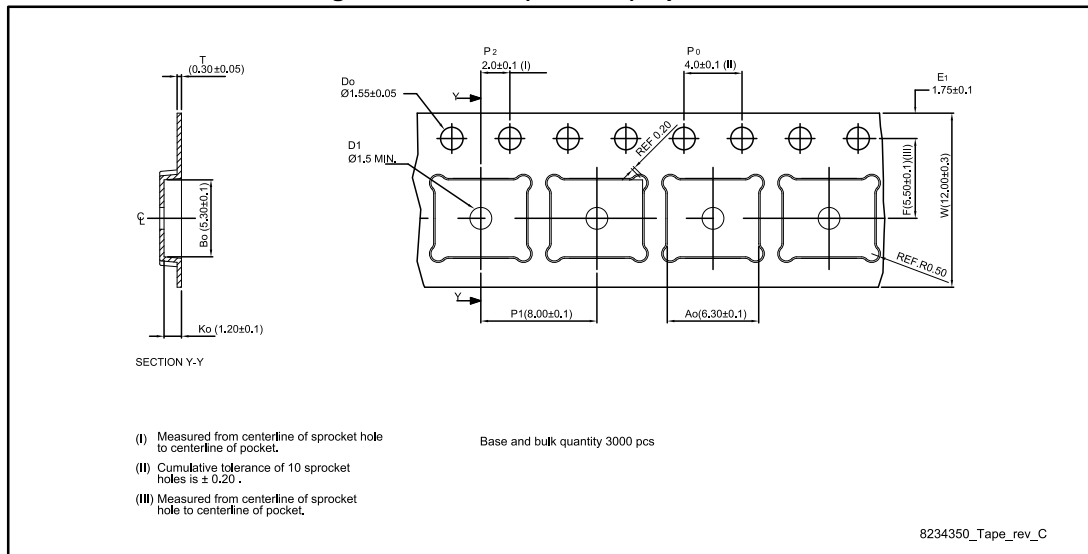


Figure 7: VFQFPN (6x5x0.75) carrier tape outline

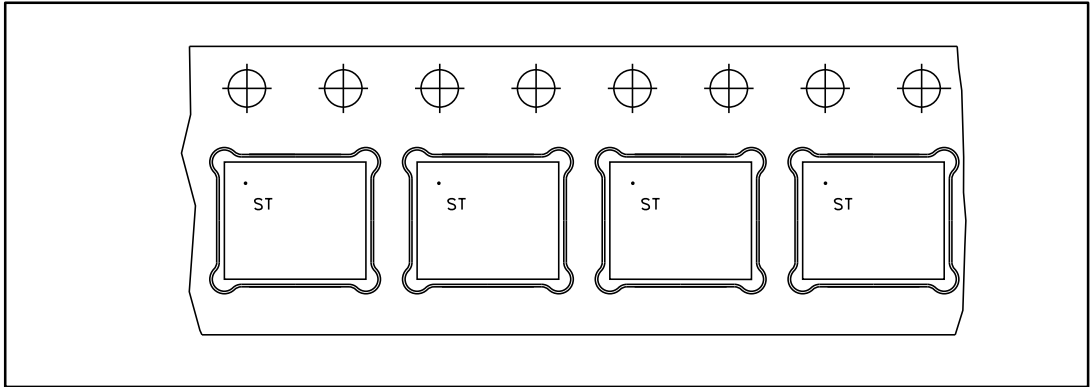
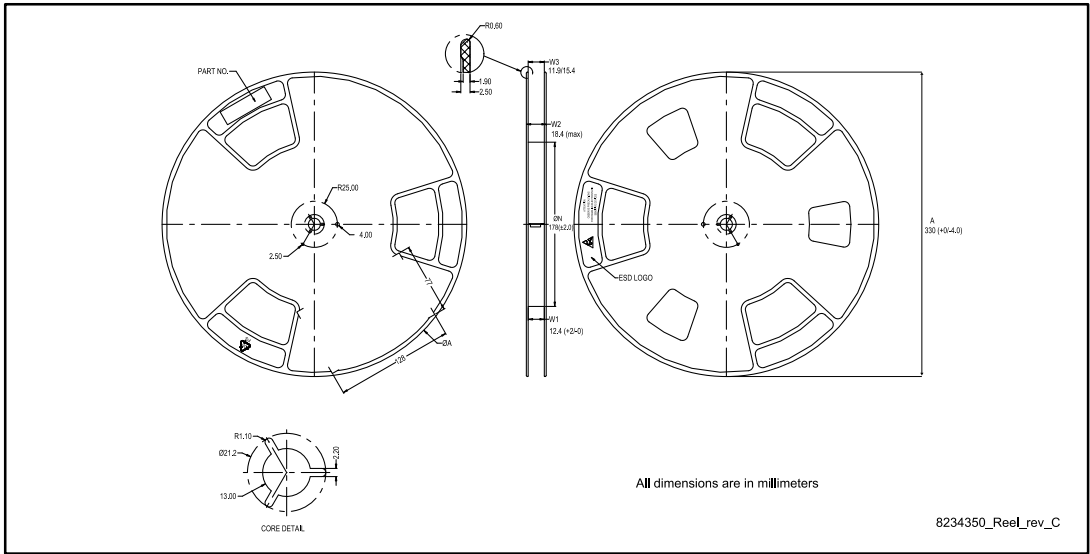


Figure 8: VFQFPN (6x5x0.75) reel outline



5 Revision history

Table 5: Document revision history

Date	Revision	Changes
31-Aug-2012	1	First release.
08-Oct-2015	2	Updated title, features, applications and description in cover page. Removed in the device summary table the SPV1520D and replaced with the SPV1520N. Updated the table of maximum ratings. Changed figure titled "Reverse current vs. reverse voltage" and updated the rest of figures relative to the section titled "Electrical characteristics". Inserted a new section titled "Recommended footprint on the application board". Updated the package information section.

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