

Cool bypass switch for photovoltaic applications

Datasheet — preliminary data

Features

Symbol	Value
$I_{F(AV)}$	16 A
V_{RRM}	20 V
$T_{j(max)}$	175 °C

- Very low forward voltage drop: $V_F=120$ mV @ $I_F=10$ A, $T_A=125$ °C
- Very low reverse leakage current: $I_R=100$ uA @ $V_R=20$ V, $T_A=125$ °C *f*
- Very high robustness: ESD HBM level (JESD22-A114) > 30 KV Surge test level (IEC61000-4-5) > 2 KV
- Junction temperature operating range - 40 °C to 175 °C

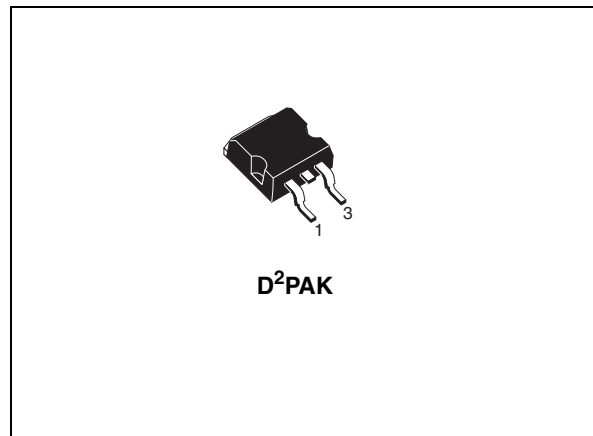


Table 1. Device summary

Order codes	Package	Packaging
SPV1520D	D ² PAK	Tape and reel

Applications

- Photovoltaic modules

Description

The SPV1520 is a high performance (low forward voltage drop and low reverse leakage current) bypass diode specifically developed in ST's innovative patented technology for photovoltaic applications. The lower forward voltage drop of this device versus standard Schottky diodes allow a drastic reduction of the power dissipation in bypass mode, which can be translated into a longer MTBF and lifetime. Another strong point of this device is the very low leakage current which allows operation at extreme high temperature without risking the well known thermal runaway phenomenon, normally affecting Schottky diodes. Furthermore, SPV1520 shows high robustness to surge and SD tests.

1 Absolute maximum 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 operating range	-40 to 175	°C
T_{STG}	Storage temperature range	-40 to 175	°C
$R_{TH(j-c)}$	Thermal resistance, junction to case	4	°C/W
SURGE	Voltage level (IEC61000-4-5)	4	kV
SURGE	Current level (IEC61000-4-5)	500	A
ESD	Human body model	> 30	KV

2 Electrical characteristics

Table 3. Electrical characteristic

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit	
V_F	Forward voltage drop	$I_F = 1A$	$T_J = 25\text{ °C}$	-	100	-	mV
			$T_J = 125\text{ °C}$		110		
		$I_F = 10A$	$T_J = 25\text{ °C}$		115		
			$T_J = 125\text{ °C}$		130		
		$I_F = 16A$	$T_J = 25\text{ °C}$		140		
			$T_J = 125\text{ °C}$		160		
I_R	Reverse leakage current	$V_R=20V$	$T_J = 25\text{ °C}$	10	-	μA	
			$T_J = 125\text{ °C}$	100			

Figure 1. Forward power dissipation vs. forward current

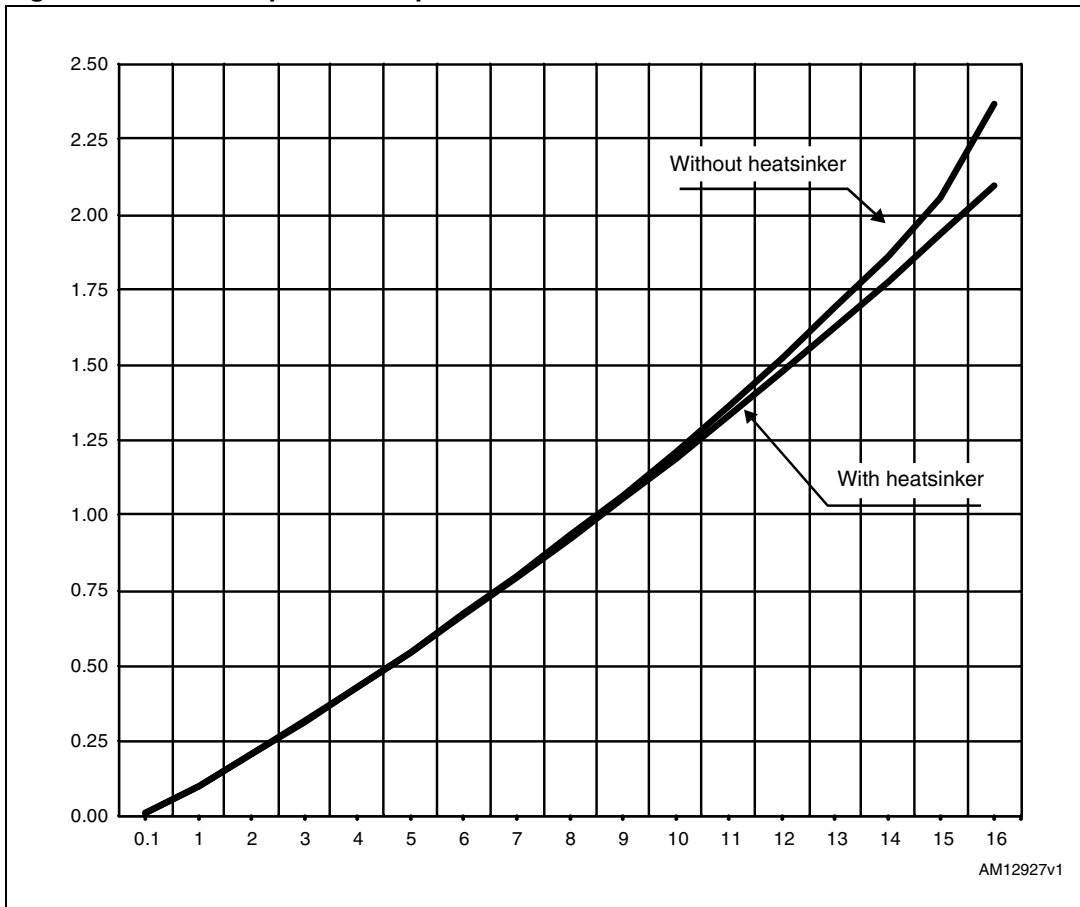
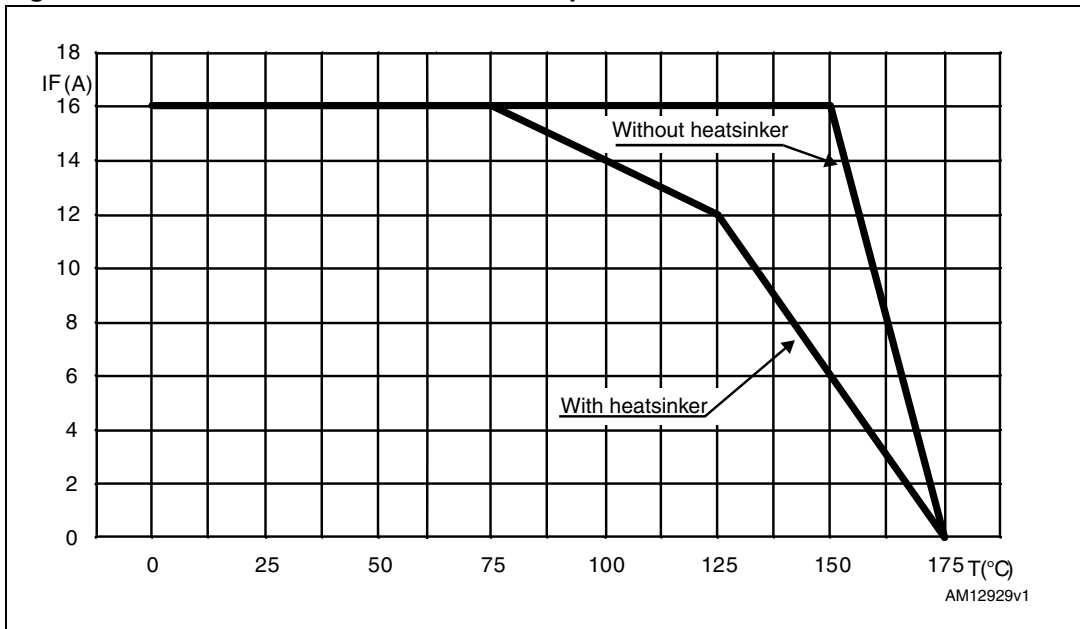


Figure 2. Forward current vs. ambient temperature



3 Package mechanical data

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.

Table 4. D²PAK (TO-263) mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	4.40		4.60
A1	0.03		0.23
b	0.70		0.93
b2	1.14		1.70
c	0.45		0.60
c2	1.23		1.36
D	8.95		9.35
D1	7.50		
E	10		10.40
E1	8.50		
e		2.54	
e1	4.88		5.28
H	15		15.85
J1	2.49		2.69
L	2.29		2.79
L1	1.27		1.40
L2	1.30		1.75
R		0.4	
V2	0°		8°

Figure 3. D²PAK (TO-263) drawing

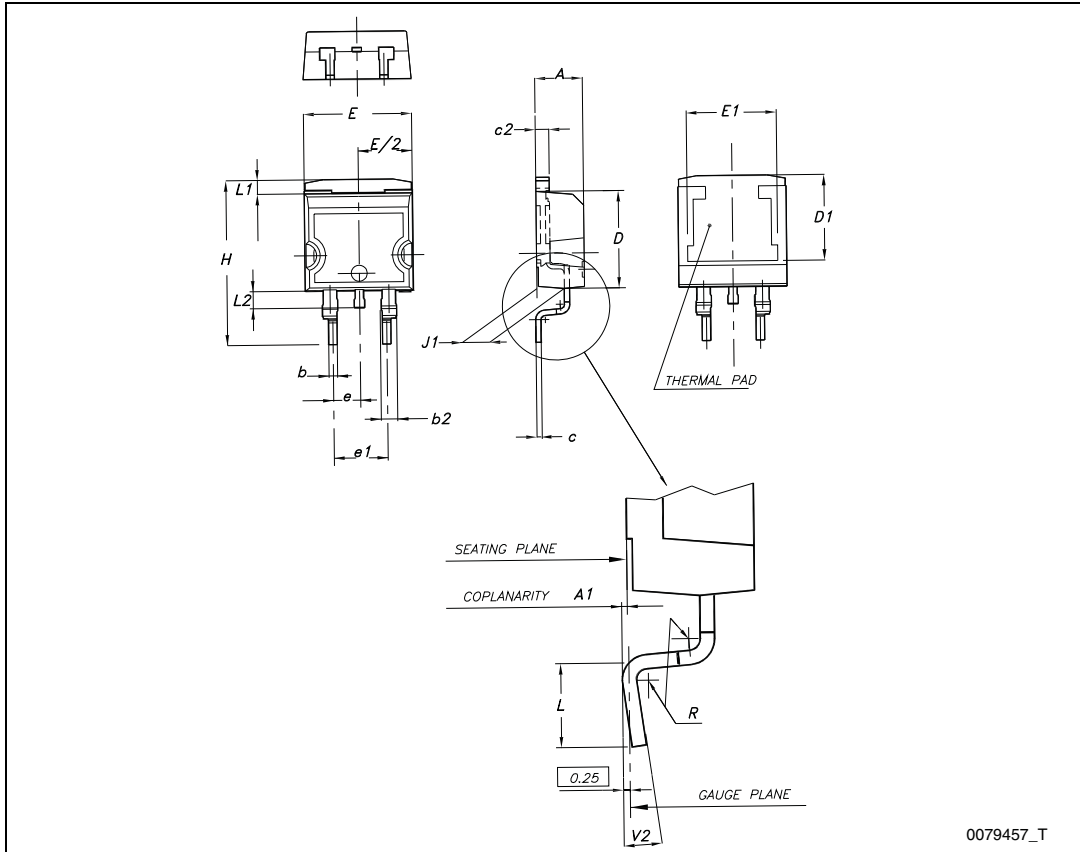
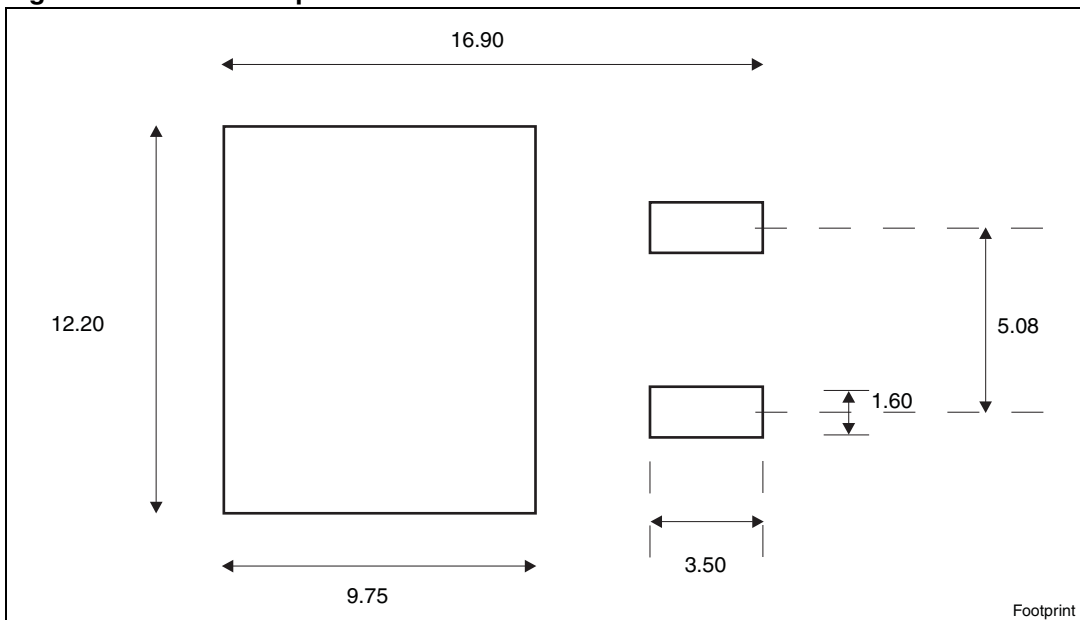


Figure 4. D²PAK footprint^(a)



a. All dimension are in millimeters

4 Packaging mechanical data

Table 5. D²PAK (TO-263) tape and reel mechanical data

Tape			Reel		
Dim.	mm		Dim.	mm	
	Min.	Max.		Min.	Max.
A0	10.5	10.7	A		330
B0	15.7	15.9	B	1.5	
D	1.5	1.6	C	12.8	13.2
D1	1.59	1.61	D	20.2	
E	1.65	1.85	G	24.4	26.4
F	11.4	11.6	N	100	
K0	4.8	5.0	T		30.4
P0	3.9	4.1			
P1	11.9	12.1	Base qty		1000
P2	1.9	2.1	Bulk qty		1000
R	50				
T	0.25	0.35			
W	23.7	24.3			

Figure 5. D²PAK (TO-263) tape

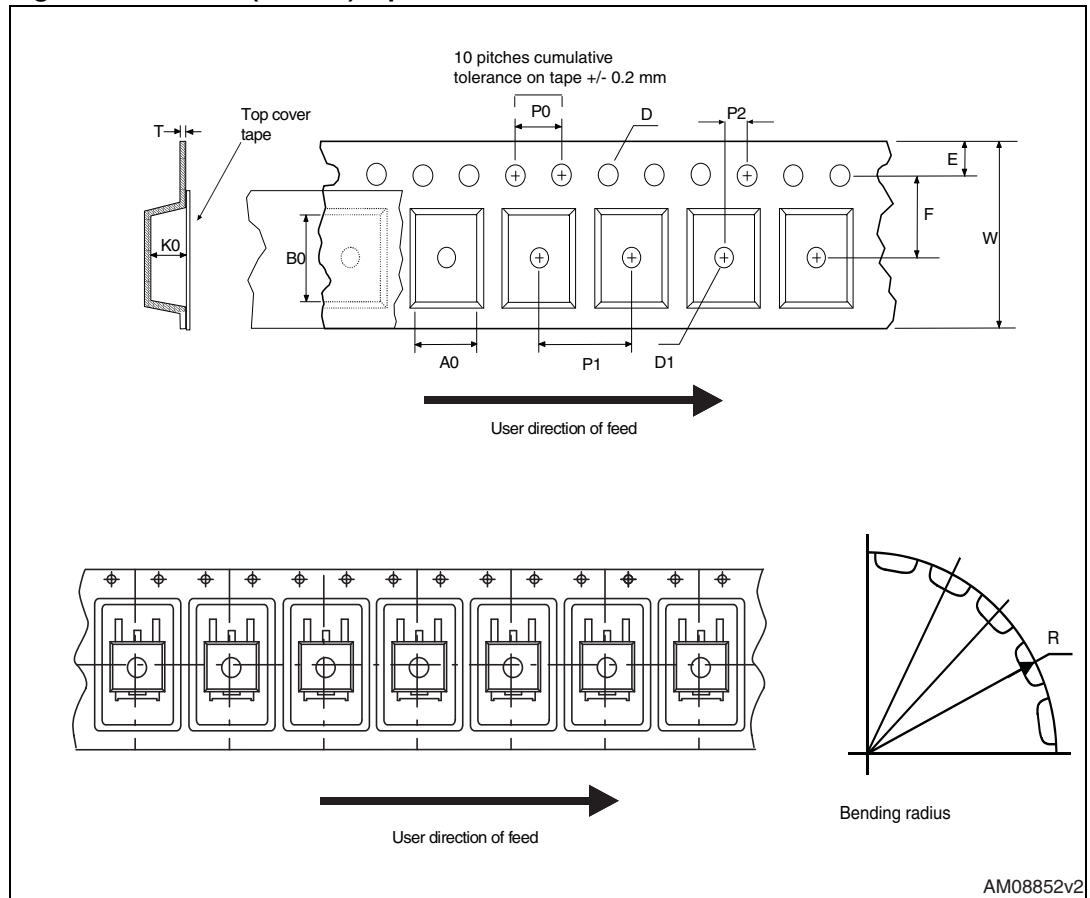
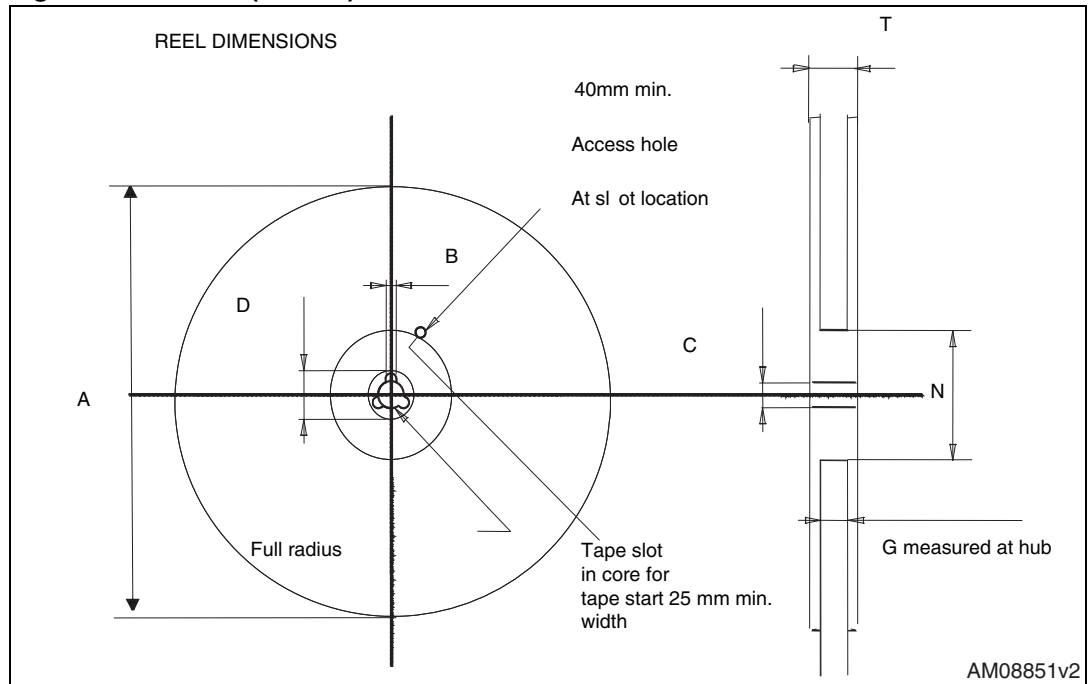


Figure 6. D²PAK (TO-263) reel



5 Revision history

Table 6. Document revision history

Date	Revision	Changes
31-Aug-2012	1	Initial release.

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