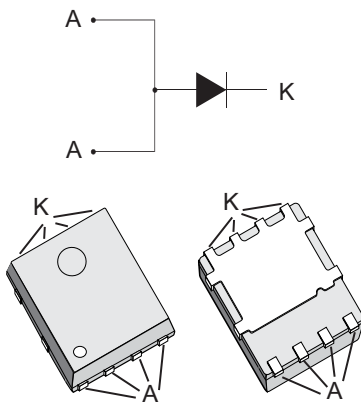


120 V power Schottky rectifier



PowerFLAT 5x6

Features

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low thermal resistance
- Avalanche capability specified
- ECOPACK[®]2 compliant

Applications

- Switching diode
- SMPS
- DC/DC converter
- LED lighting
- Notebook adapter

Description

This power Schottky is suited for switch mode power supply and high frequency DC to DC converters.

Packaged in PowerFLAT[™] 5x6, the [STPS30120DJF](#) is optimized for use in low voltage high frequency inverters, free-wheeling and polarity protection applications.

PowerFLAT[™] is a trademark of STMicroelectronics.

Product status link	
STPS30120DJF	
Product summary	
Symbol	Value
$I_{F(AV)}$	30 A
V_{RRM}	120 V
T_j (max.)	150 °C
V_F (typ.)	0.68 V

1 Characteristics

Table 1. Absolute Ratings (limiting values at 25 °C, unless otherwise specified, anode terminals short circuited)

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	120	V
$I_{F(RMS)}$	Forward rms current	45	A
$I_{F(AV)}$	Average forward current	$T_C = 80\text{ °C}, \delta = 0.5$	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10\text{ ms sinusoidal}$	A
P_{ARM}	Repetitive peak avalanche power	$t_p = 10\text{ }\mu\text{s}, T_j = 125\text{ °C}$	W
T_{stg}	Storage temperature range	-65 to +175	°C
T_j	Maximum operating junction temperature ⁽¹⁾	150	°C

1. $(dP_{tot}/dT_j) < (1/R_{th(j-a)})$ condition to avoid thermal runaway for a diode on its own heatsink.

Table 2. Thermal resistance parameters

Symbol	Parameter	Max. value	Unit
$R_{th(j-c)}$	Junction to case	2.5	°C/W

Table 3. Static electrical characteristics (anode terminals short circuited)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit	
I_R ⁽¹⁾	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$	-		35	μA
		$T_j = 125\text{ °C}$		-	5.5	16	mA
V_F ⁽²⁾	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 15\text{ A}$	-		0.84	V
		$T_j = 125\text{ °C}$		-	0.61	0.67	
		$T_j = 25\text{ °C}$	$I_F = 30\text{ A}$			0.92	
		$T_j = 125\text{ °C}$			0.68	0.75	

1. Pulse test: $t_p = 5\text{ ms}, \delta < 2\%$

2. Pulse test: $t_p = 380\text{ }\mu\text{s}, \delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 0.61 \times I_{F(AV)} + 0.005 I_F^2 (RMS)$$

For more information, please refer to the following application notes related to the power losses :

- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

1.1 Characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current

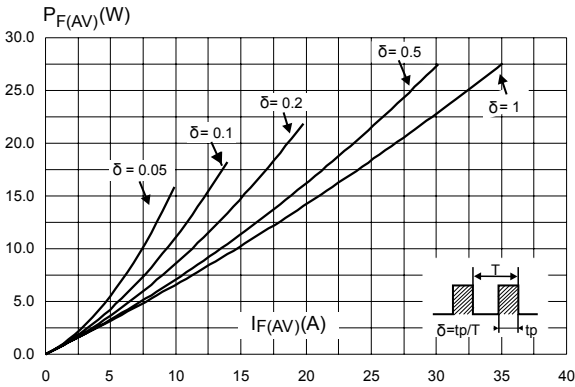


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$)

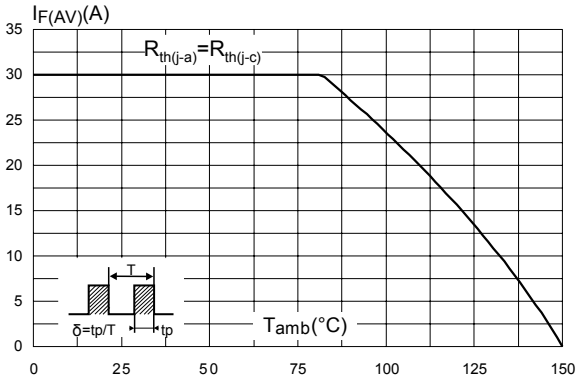


Figure 3. Normalized avalanche power derating versus pulse duration ($T_j = 125$ °C)

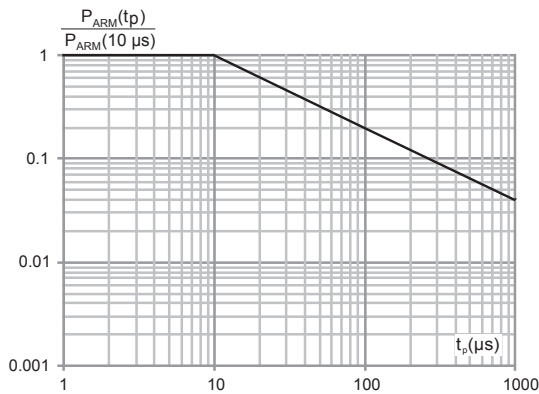


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

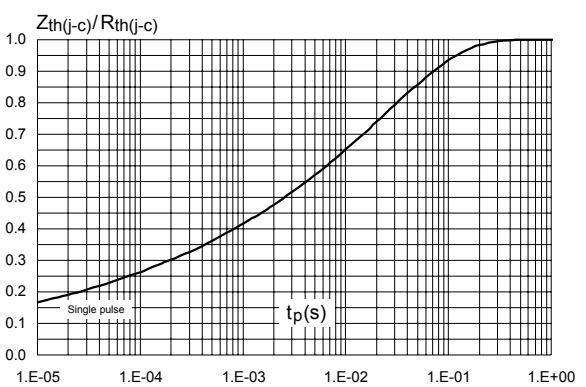


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

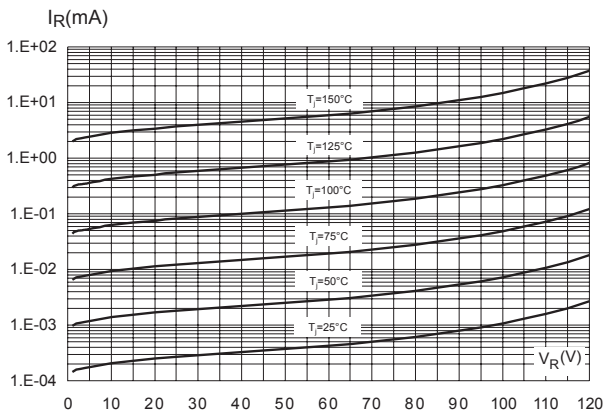


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

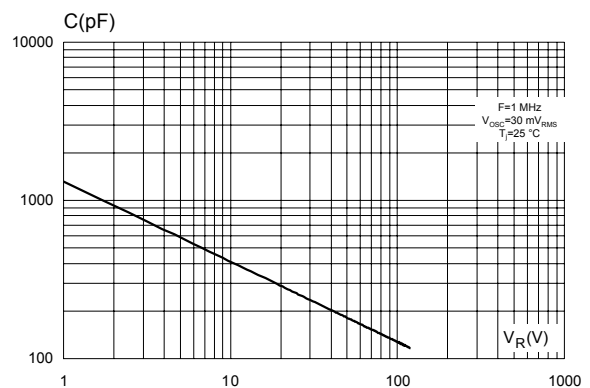


Figure 7. Forward voltage drop versus forward current

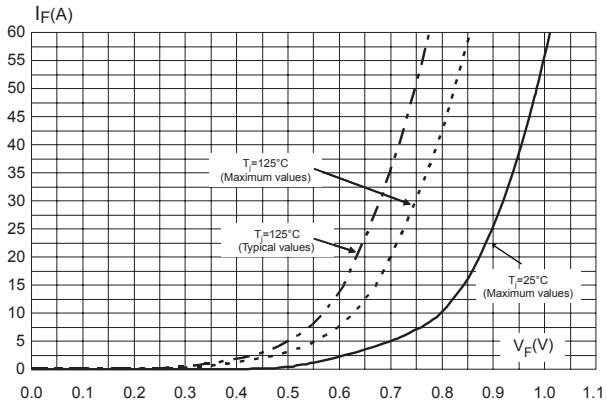
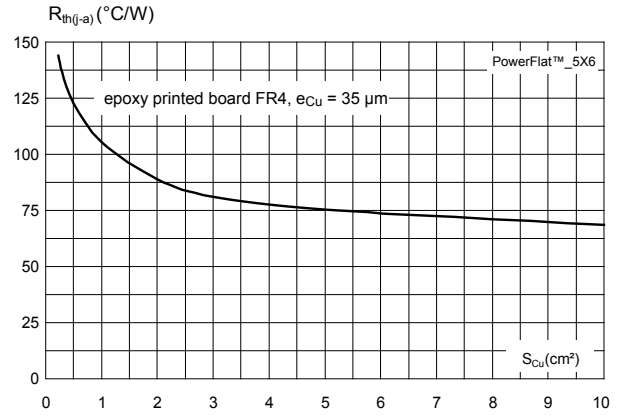


Figure 8. Thermal resistance junction to ambient versus copper surface under tab



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 PowerFLAT™ 5x6 package information

- Epoxy meets UL 94,V0
- Cooling method: by conduction (C)

Figure 9. PowerFLAT™ 5x6 package outline

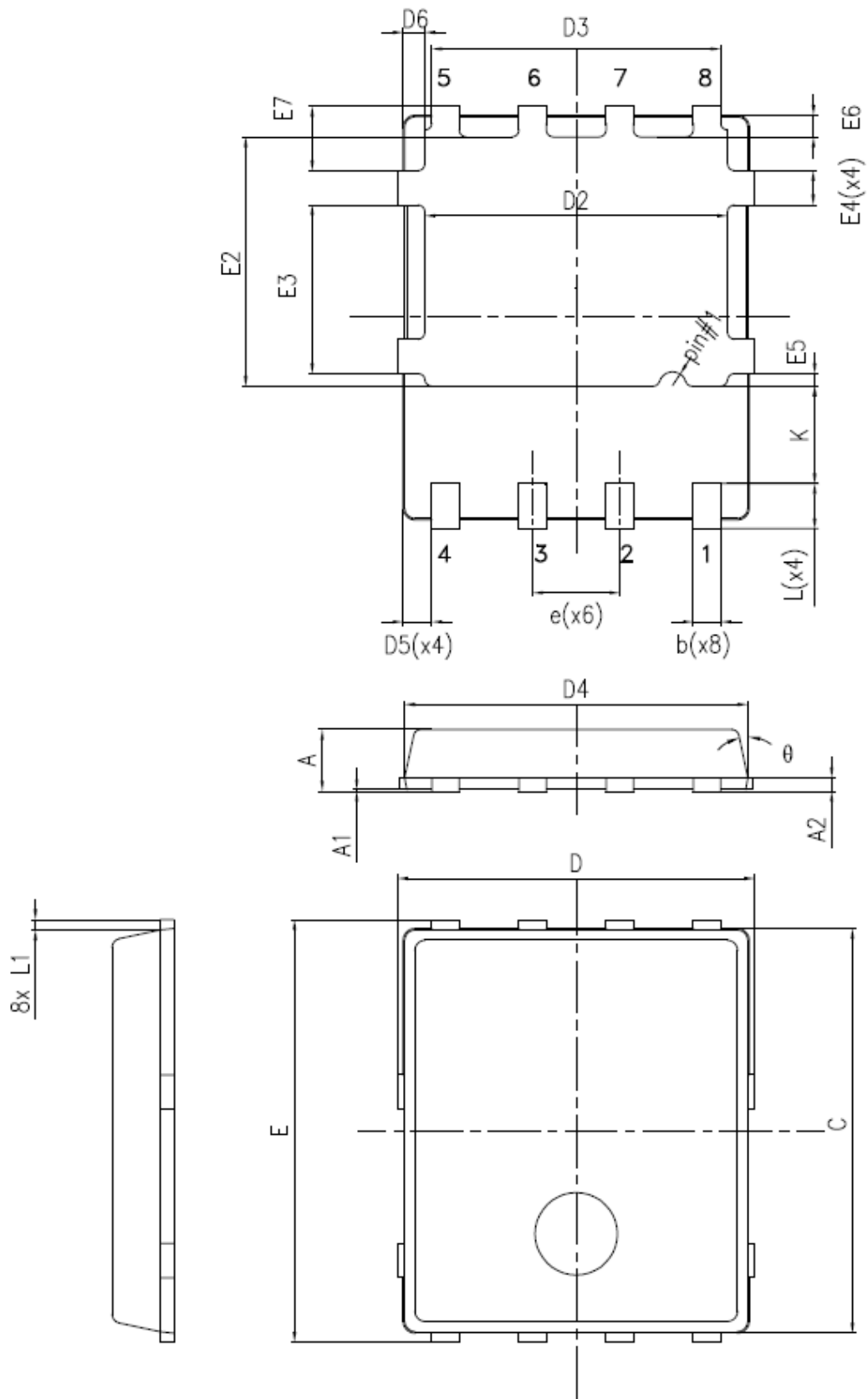


Table 4. PowerFLAT™ 5x6 mechanical data

Ref	Dim.					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.80		1.00	0.031		0.039
A1	0.02		0.05	0.001		0.002
A2		0.25			0.010	
b	0.30		0.50	0.012		0.020
C	5.80	6.00	6.20	0.228	0.236	0.244
D	5.00	5.20	5.40	0.196	0.205	0.212
D2	4.15		4.45	0.163		0.175
D3	4.05	4.20	4.35	0.159	0.165	0.171
D4	4.80	5.00	5.20	0.188	0.196	0.204
D5	0.25	0.40	0.55	0.009	0.015	0.021
D6	0.15	0.30	0.45	0.005	0.011	0.017
e		1.27			0.050	
E	5.95	6.15	6.35	0.234	0.242	0.250
E2	3.50		3.70	0.138		0.146
E3	2.35		2.55	0.092		0.100
E4	0.40		0.60	0.015		0.023
E5	0.08		0.28	0.003		0.011
E6	0.20	0.325	0.45	0.007	0.012	0.017
E7	0.75	0.90	1.05	0.029	0.035	0.041
K	1.275		1.575	0.050		0.062
L	0.60		0.80	0.023		0.031
L1	0.05	0.15	0.25	0.001	0.005	0.009
θ	0°		12°	0°		12°

Figure 10. PowerFLAT™ 5x6 recommended footprint (dimensions are in mm)

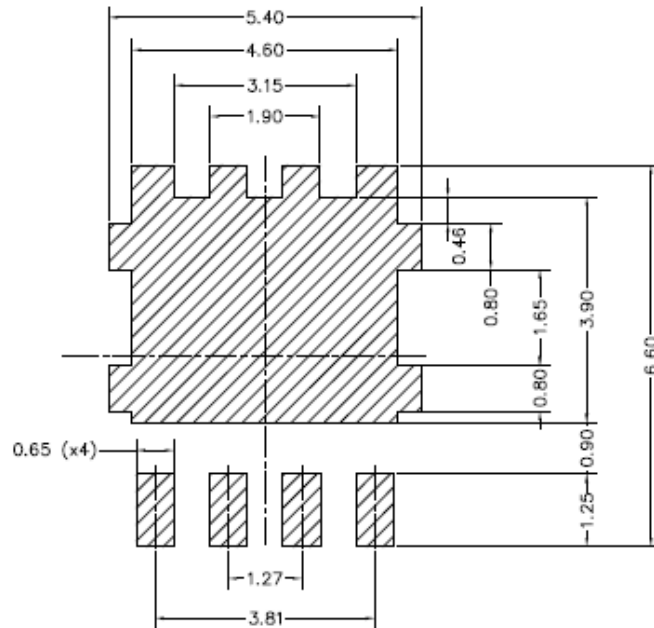
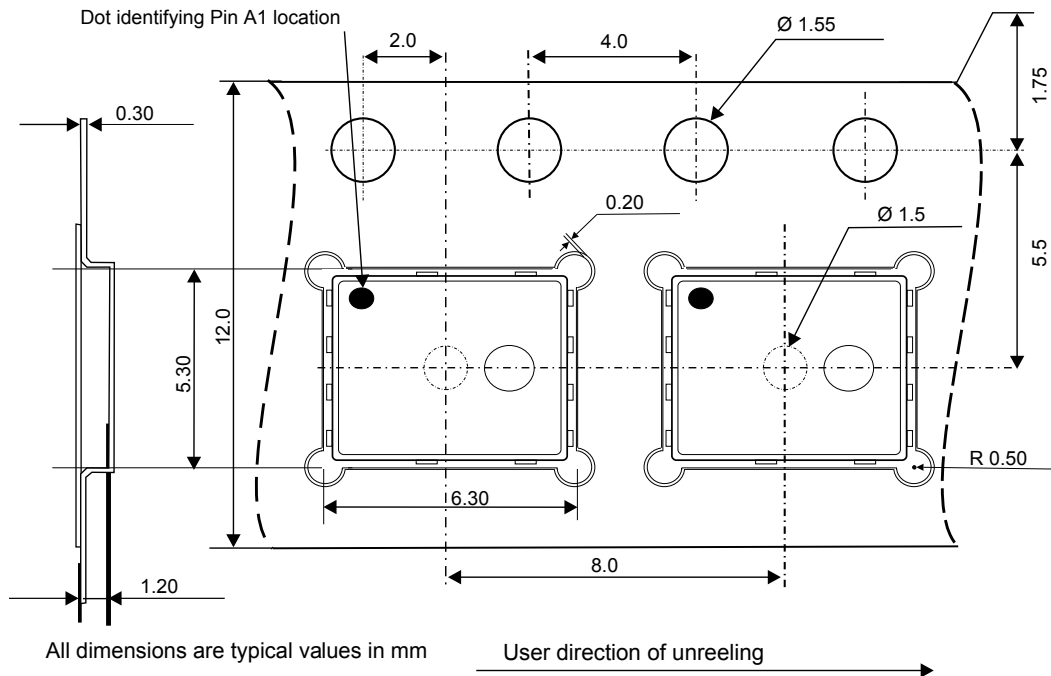


Figure 11. Tape and reel specifications



3 Ordering information

Table 5. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS30120DJF-TR	PS30 120	PowerFLAT 5x6	0.095 g	3000	Tape and reel

Revision history

Table 6. Document revision history

Date	Revision	Changes
18-May-2009	1	First issue.
09-Nov-2009	2	Updated Table 1.
25-Feb-2010	3	Corrected order code and marking in Table 6.
30-Jul-2010	4	Replace Power QFN with PowerFLAT.
20-May-2011	5	Updated package graphics. Added mention of terminals to captions of Table 2 and Table 4. Updated base quantity and marking in Table 6. Added Figure 12.
28-May-2018	6	Updated P_{ARM} value and removed "Normalized avalanche power derating" curves.

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