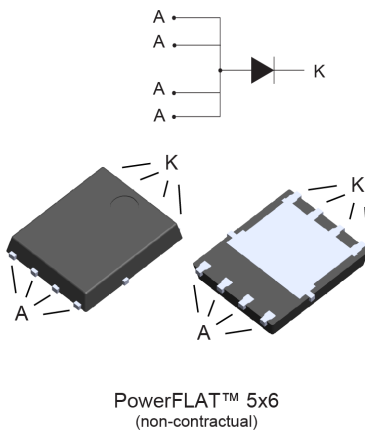


## 120 V, 30 A power Schottky rectifier



### 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, $\delta = 0.5$ , square wave	$T_C = 80\text{ °C}$ 30	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ ms}$ sinusoidal 200	A
$P_{ARM}$	Repetitive peak avalanche power	$t_p = 10\text{ }\mu\text{s}$ , $T_j = 125\text{ °C}$ 900	W
$T_{stg}$	Storage temperature range	-65 to +175	°C
$T_j$	Maximum operating junction temperature <sup>(1)</sup>	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

For more information, please refer to the following application note :

- AN5046 : Printed circuit board assembly recommendations for STMicroelectronics PowerFLAT™ packages

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

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit	
$I_R$ <sup>(1)</sup>	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$	-		35	$\mu\text{A}$
		$T_j = 125\text{ °C}$		-	5.5	16	mA
$V_F$ <sup>(2)</sup>	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:

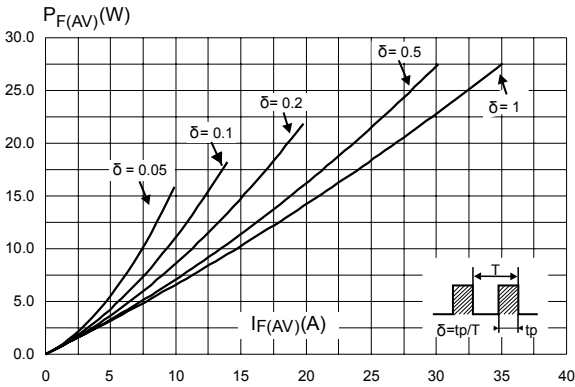
$$P = 0.61 \times I_{F(AV)} + 0.005 I_F^2 (RMS)$$

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

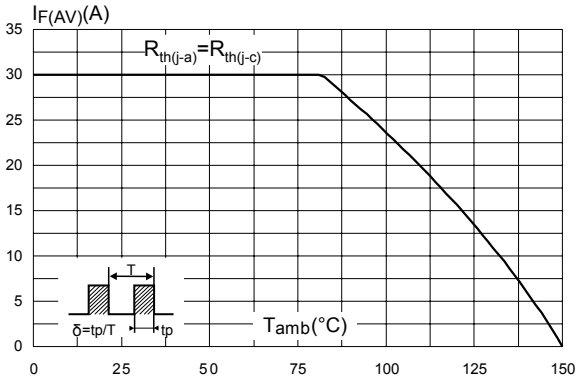
- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

## 1.1 Characteristics (curves)

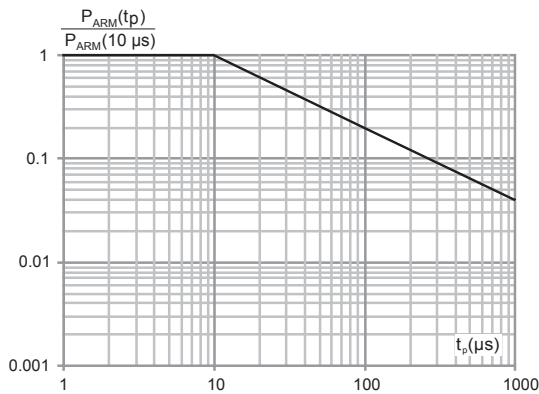
**Figure 1. Average forward power dissipation versus average forward current**



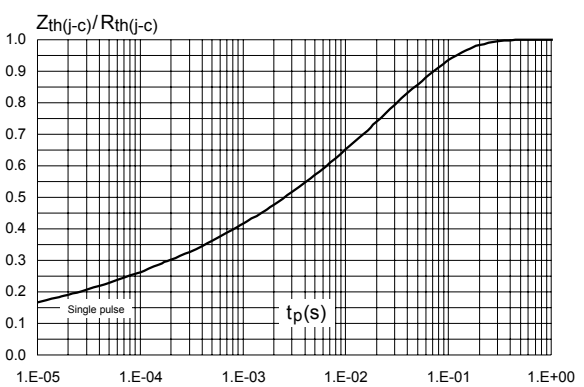
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )**



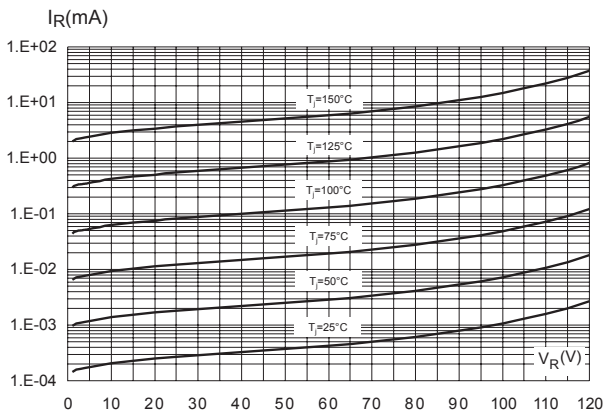
**Figure 3. Normalized avalanche power derating versus pulse duration ( $T_j = 125$  °C)**



**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)**

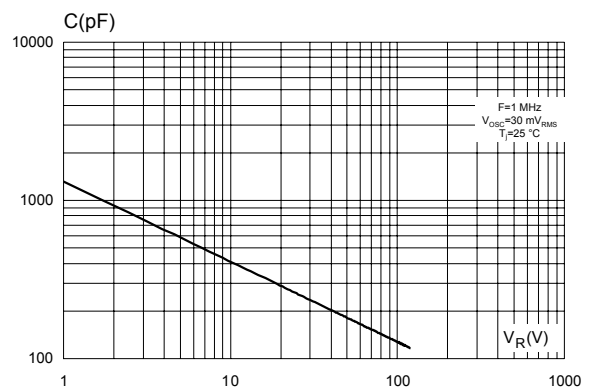


Figure 7. Forward voltage drop versus forward current

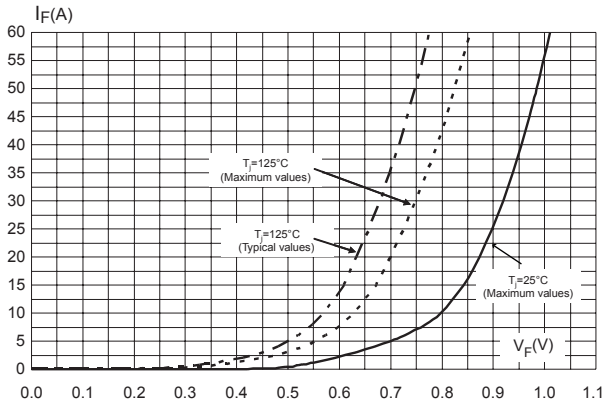
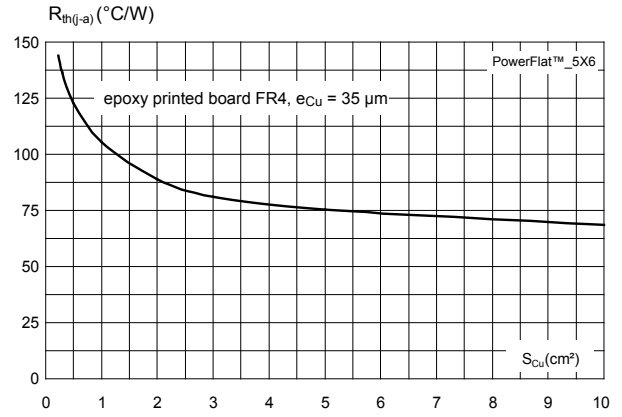


Figure 8. Thermal resistance junction to ambient versus copper surface under tab



## 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](http://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 (non-contractual)**

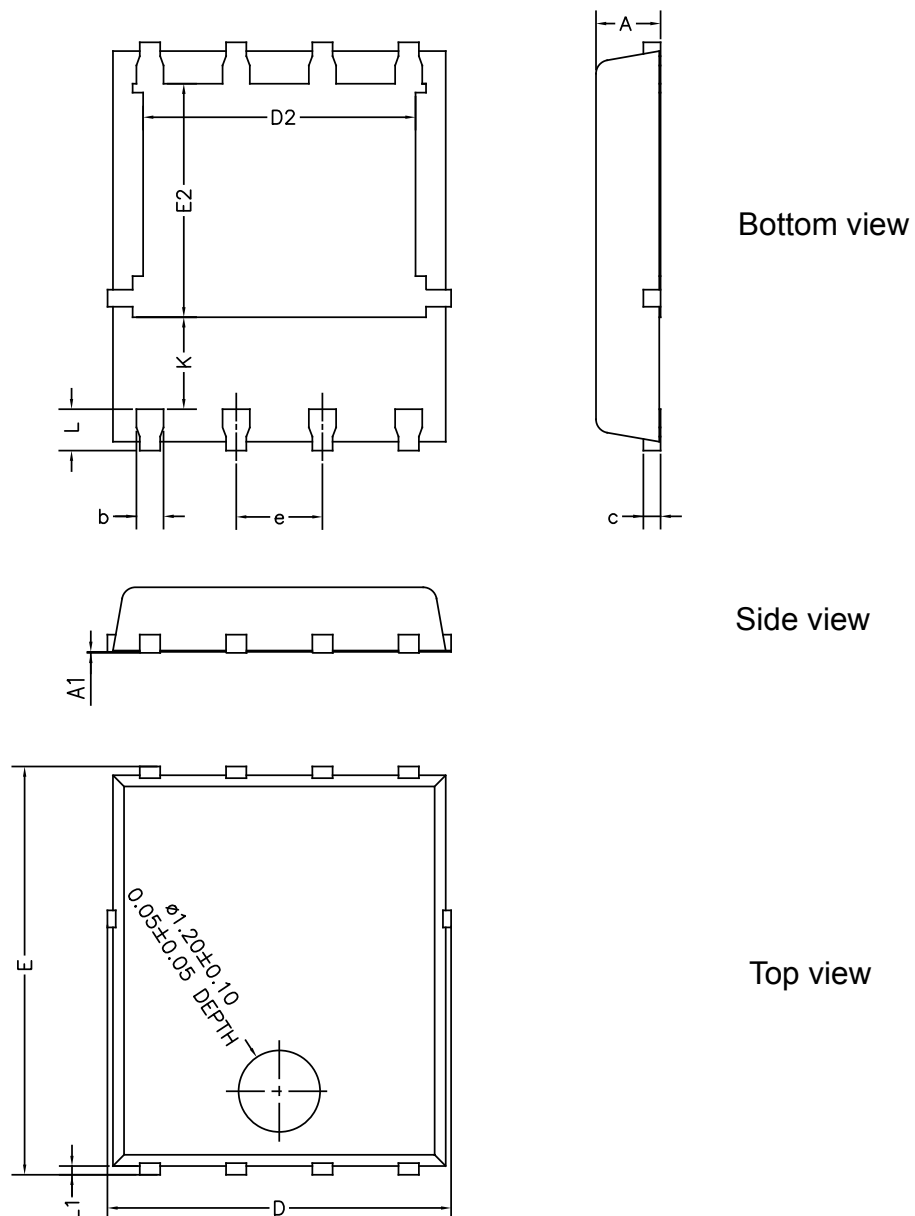
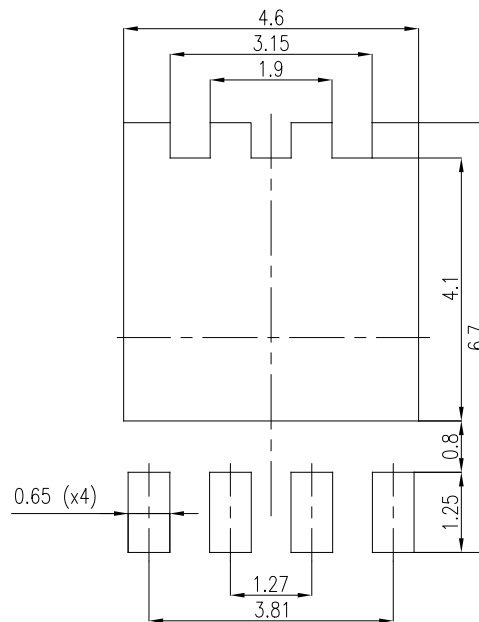


Table 4. PowerFLAT™ 5x6 mechanical data

Ref	Dimensions					
	Millimeters			Inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.80		1.00	0.031		0.039
A1	0.00		0.05	0.000		0.002
b	0.30		0.50	0.01		0.02
c		0.25			0.010	
D	4.80		5.40	0.189		0.212
D2	3.91		4.45	0.154		0.175
e		1.27			0.050	
E	5.90		6.35	0.232		0.250
E2	3.34		3.70	0.138		0.146
L	0.50		0.80	0.020		0.031
K	1.10		1.575	0.015		0.023
L1	0.05	0.15	0.25	0.002	0.006	0.009

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



### 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 <sub>ARM</sub> value and removed "Normalized avalanche power derating" curves.
08-Feb-2019	7	Updated <a href="#">Figure 9. PowerFLAT™ 5x6 package outline (non-contractual)</a> , <a href="#">Table 4. PowerFLAT™ 5x6 mechanical data</a> and <a href="#">Section Cover image</a> .



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