

# 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		170	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	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$	-		15	$\mu\text{A}$
		$T_j = 125\text{ °C}$		-	4	12	mA
$V_F$ <sup>(2)</sup>	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 15\text{ A}$	-		0.88	V
		$T_j = 125\text{ °C}$		-	0.65	0.70	
		$T_j = 25\text{ °C}$	$I_F = 30\text{ A}$			0.95	
		$T_j = 125\text{ °C}$			0.71	0.79	

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:

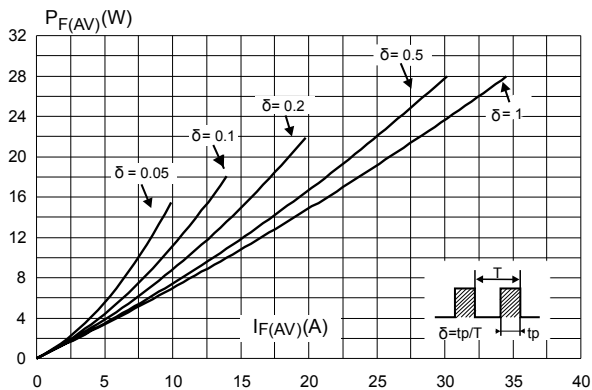
$$P = 0.65 \times I_{F(AV)} + 0.0046 I_F^2 (RMS)$$

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

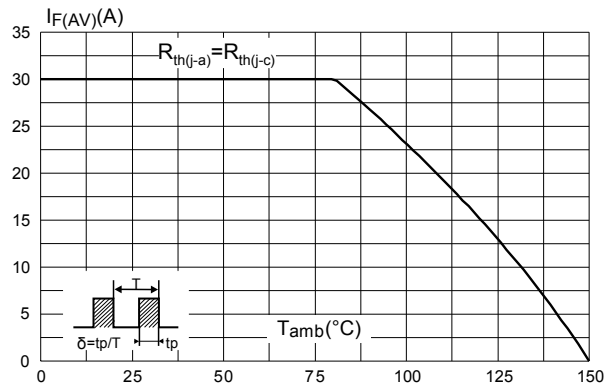
- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

## 1.1 Characteristics (curves)

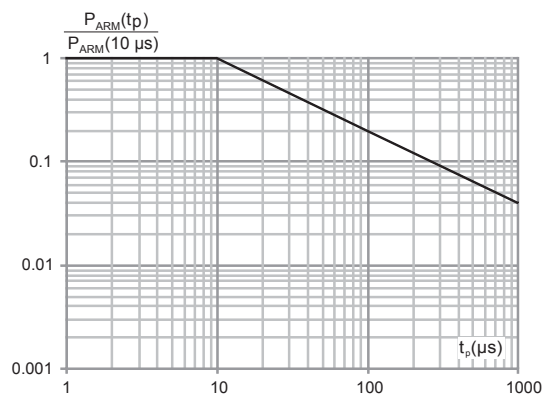
**Figure 1. Average forward power dissipation versus average forward current**



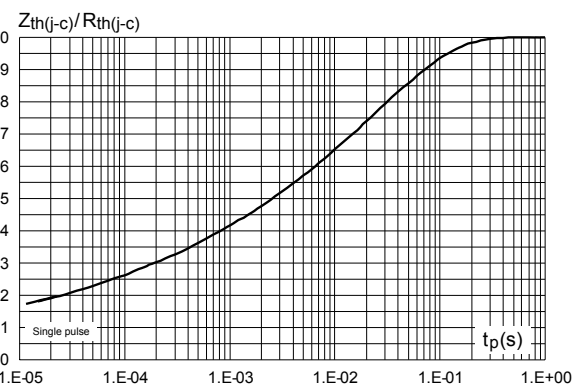
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )**



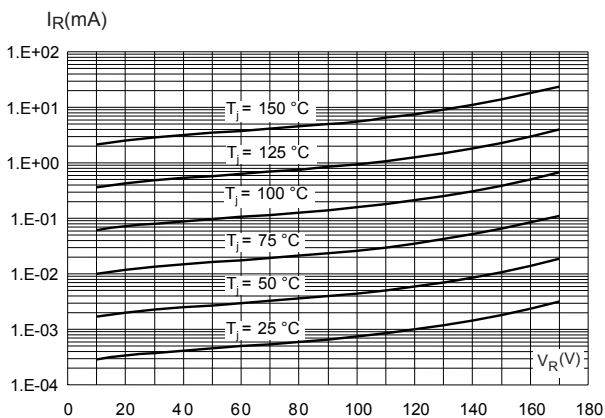
**Figure 3. Normalized avalanche power derating versus pulse duration ( $T_j = 125^\circ\text{C}$ )**



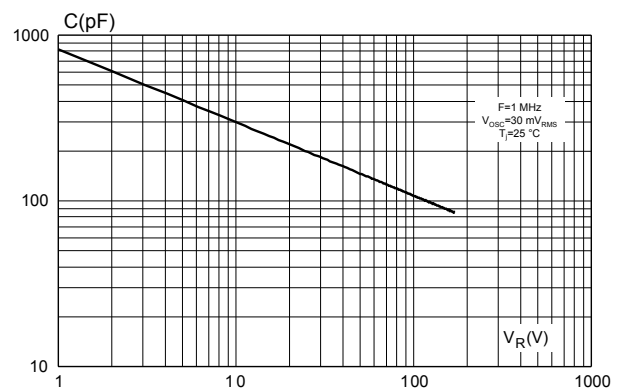
**Figure 4. Relative variation of thermal impedance junction to case versus pulse duration**



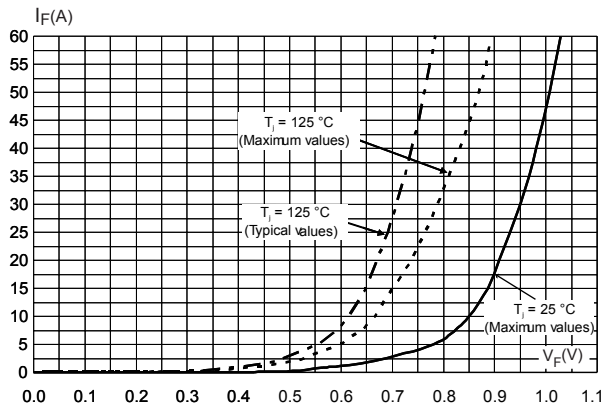
**Figure 5. Reverse leakage current versus reverse voltage applied (typical values)**



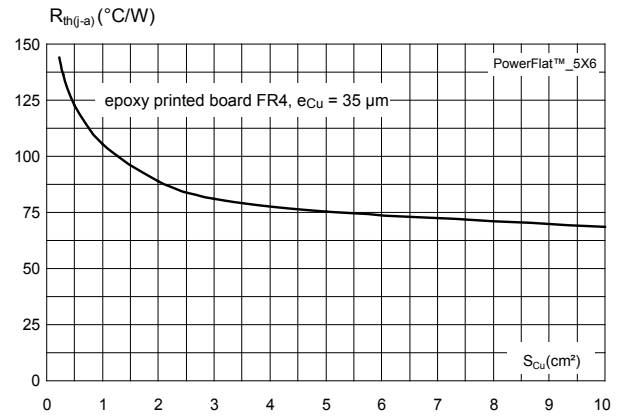
**Figure 6. Junction capacitance versus reverse voltage applied (typical values)**



**Figure 7. Forward voltage drop versus forward current**



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



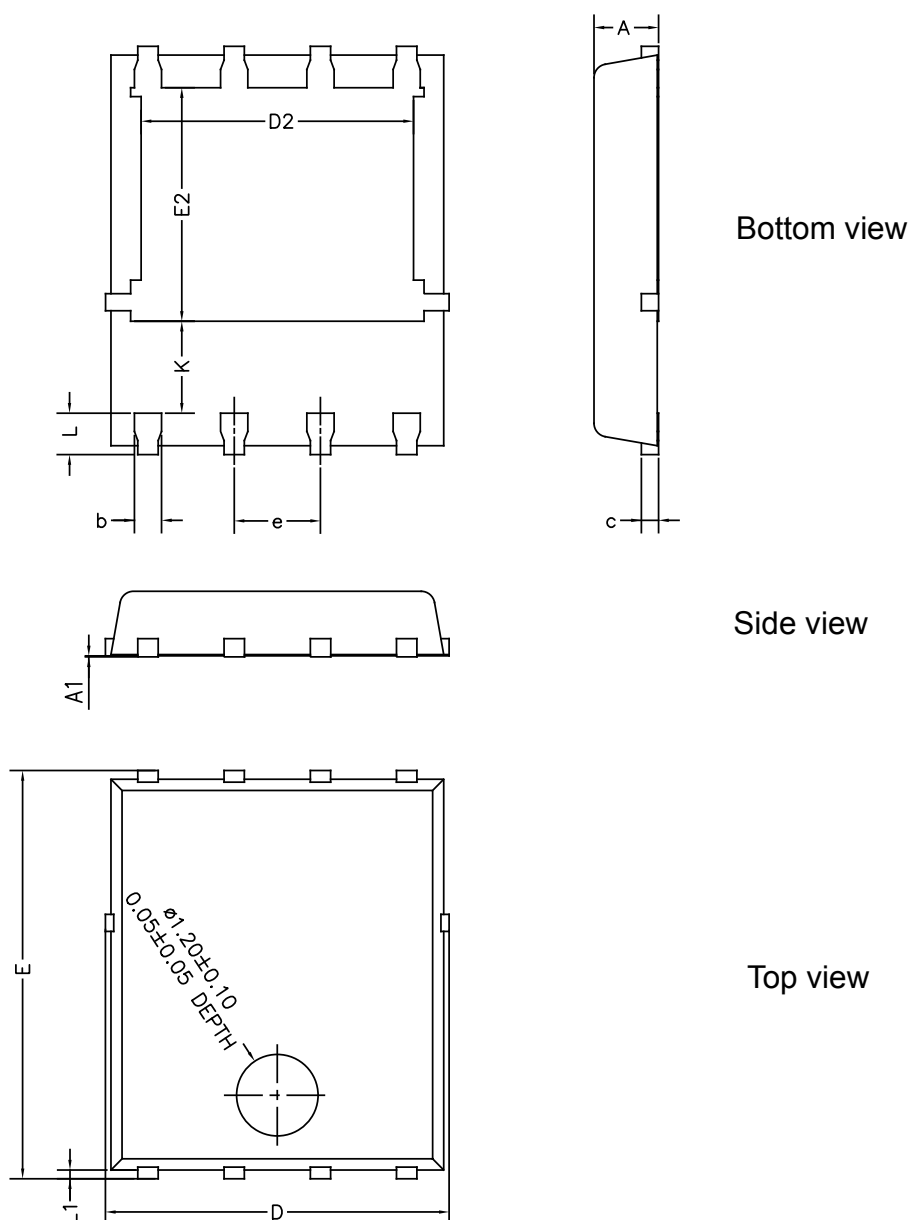
## 2 Package information

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

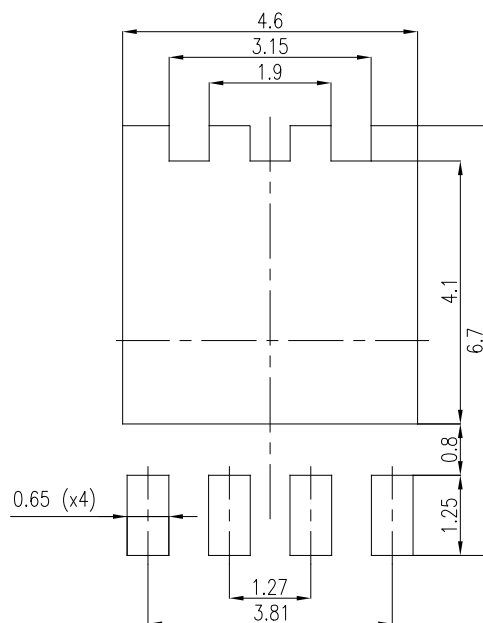
- Epoxy meets UL 94,V0
- Cooling method: by conduction (C)

**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
STPS30170DJF-TR	PS30 170	PowerFLAT 5x6	0.095 g	3000	Tape and reel

## Revision history

**Table 6. Document revision history**

Date	Revision	Changes
06-Nov-2009	1	First issue.
30-Jul-2010	2	Updated Table 1.
20-May-2011	3	Corrected order code and marking in Table 6.
05-Jun-2018	4	Updated Table 1. Absolute Ratings (limiting values at 25 °C, unless otherwise specified, anode terminals short circuited) and Figure 3. Normalized avalanche power derating versus pulse duration ( $T_J = 125\text{ °C}$ ). Minor text changes to improve readability.
08-Feb-2019	5	Updated Section Cover image, Figure 9. PowerFLAT™ 5x6 package outline (non-contractual) and Table 4. PowerFLAT™ 5x6 mechanical data.

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