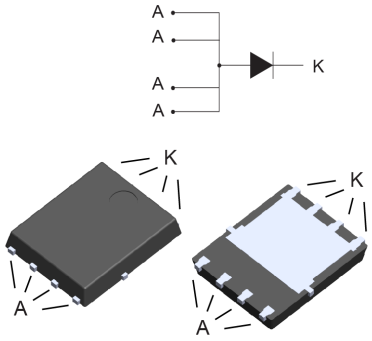
STPS30170DJF

Datasheet

170 V, 30 A power Schottky rectifier



PowerFLAT™ 5x6
(non-contractual)

Features

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low forward voltage drop
- Low thermal resistance
- High avalanche capability specified
- ECOPACK®2 compliant

Applications

- Switching diode
- SMPS
- DC/DC converter
- Telecom power

Description

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

Packaged in PowerFLAT™ 5x6, the STPS30170DJF is optimized for use in low voltage high frequency inverters, free-wheeling and polarity protection applications.

Its low profile was especially designed to be used in applications with space-saving constraints.

PowerFLAT™ is a trademark of STMicroelectronics.

Product status
STPS30170DJF

Product summary	
$I_{F(AV)}$	30 A
V_{RRM}	170 V
T_j(max.)	150 °C
V_F(typ.)	0.71 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		170	V
$I_{F(RMS)}$	Forward rms current		45	A
$I_{F(AV)}$	Average forward current, δ = 0.5, square wave	T_C = 80 °C	30	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	200	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs , T_j = 125 °C	900	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

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 (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		15	µA
		T_j = 125 °C		-	4	12	mA
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 15 A	-		0.88	V
		T_j = 125 °C		-	0.65	0.70	
		T_j = 25 °C	I_F = 30 A			0.95	
		T_j = 125 °C			0.71	0.79	

1. *Pulse test: t_p = 5 ms, δ < 2%*
2. *Pulse test: t_p = 380 µs, δ < 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

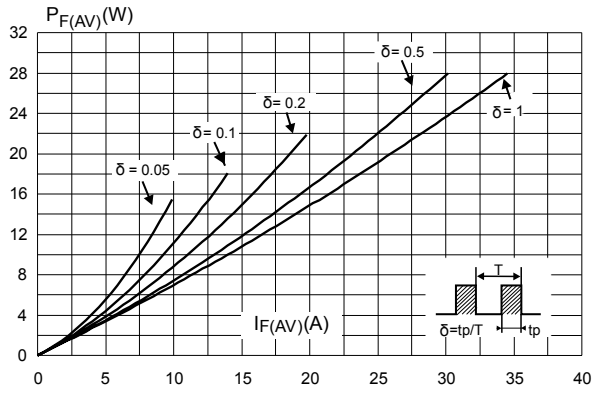


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

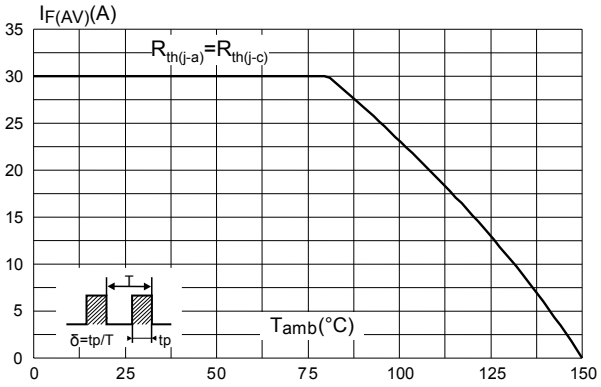


Figure 3. Normalized avalanche power derating versus pulse duration (T_j= 125 °C)

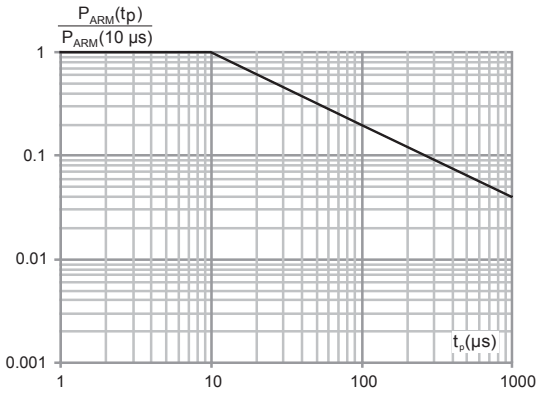


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

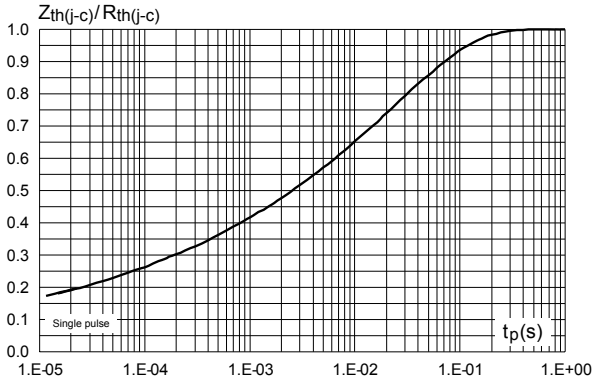


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

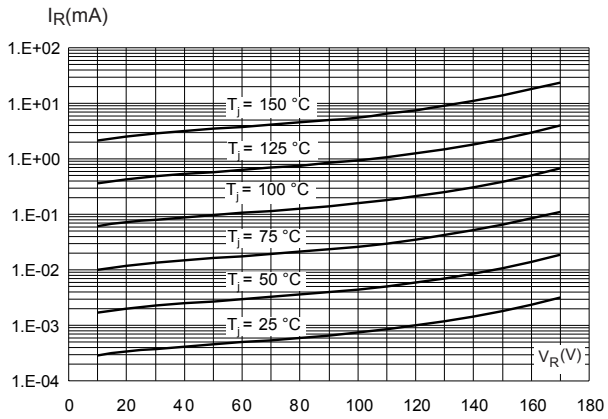


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

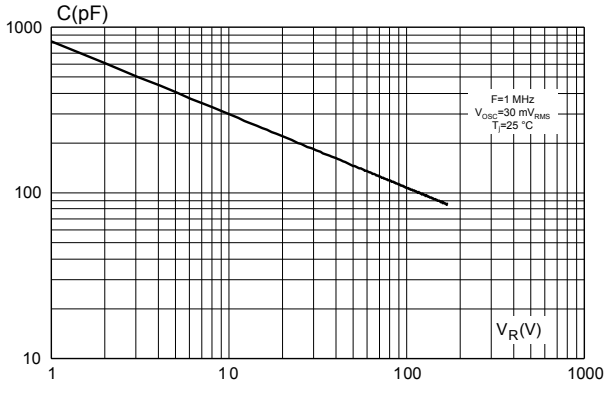


Figure 7. Forward voltage drop versus forward current

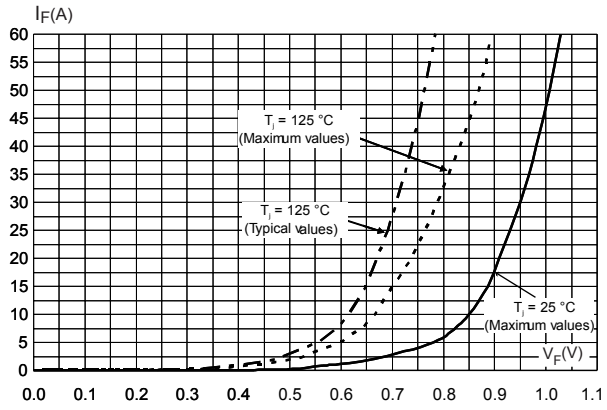
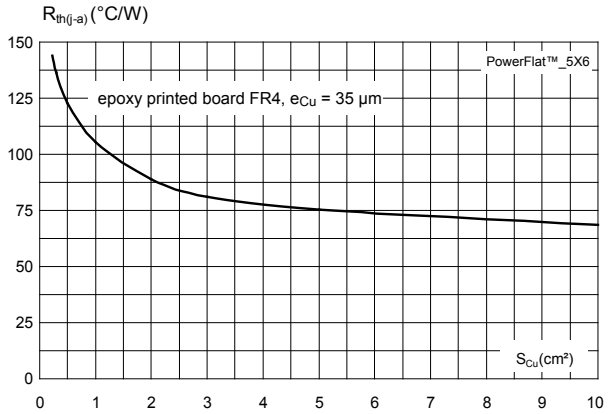


Figure 8. Thermal resistance junction to ambient versus copper surface under tab



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 (non-contractual)

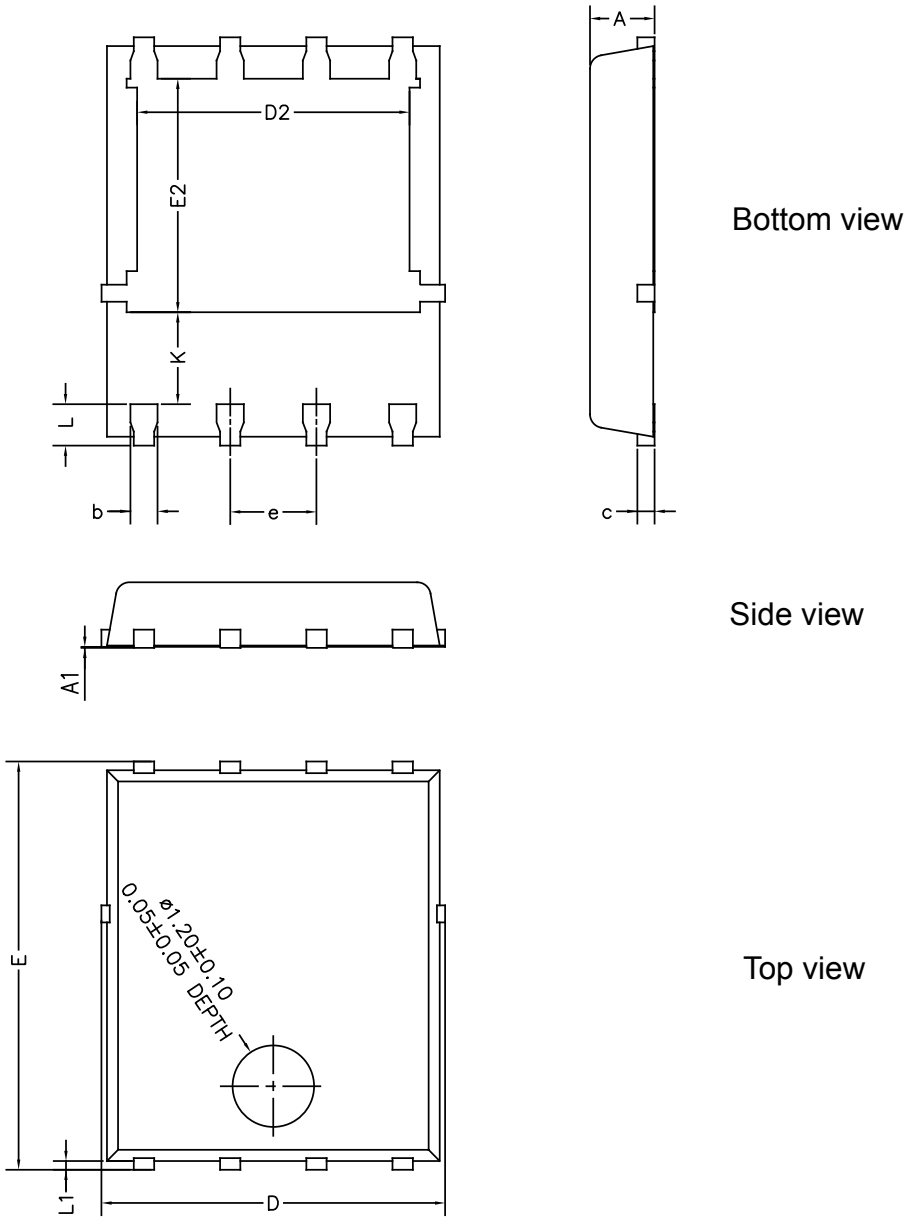
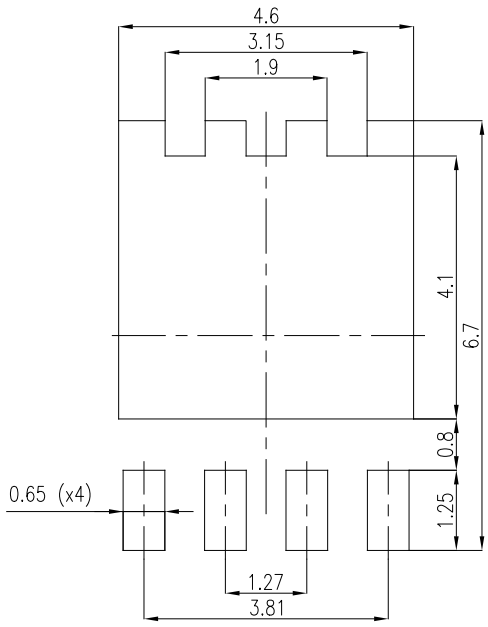


Table 4. **PowerFLAT™ 5x6 mechanical data**

Dimensions						
Ref	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 °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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