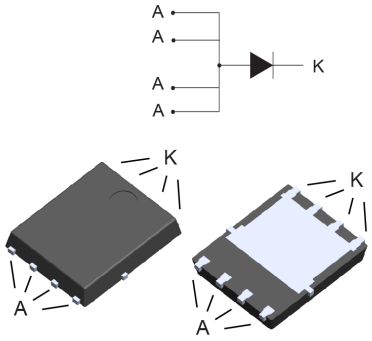
STPS30M100DJF

Datasheet

100 V, 30 A power Schottky rectifier



PowerFLAT™ 5x6
(non-contractual)

Features

- Very low conduction losses
- Low forward voltage drop
- Low thermal resistance
- High specified avalanche capability
- High integration
- ECOPACK®2 compliant

Applications

- Switching diode
- SMPS
- DC/DC converter
- LED lighting
- Desktop power supply

Description

The STPS30M100DJF is a power Schottky rectifier optimized for switch mode power supply and high frequency DC to DC converters.

Packaged in PowerFLAT™, this device is intended to be used in adaptors requiring good efficiency at both low and high load. Its low profile was especially designed to be used in applications with space-saving constraints.

PowerFLAT™ is a trademark of STMicroelectronics.

Product status link
STPS30M100DJF

Product summary	
Symbol	**Value**
$I_{F(AV)}$	30 A
V_{RRM}	100 V
T_j (max.)	150 °C
V_F (typ.)	0.66 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		100	V
$I_{F(RMS)}$	Forward rms current		45	A
$I_{F(AV)}$	Average forward current, δ = 0.5, square wave	T_C = 90 °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	1080	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	$V_R = V_{RRM}$	-		100	µA
		T_j = 125 °C		-	10	40	mA
V_F (1)	Forward voltage drop	T_j = 25 °C	I_F = 15 A	-		0.82	V
		T_j = 125 °C		-	0.58	0.66	
		T_j = 25 °C	I_F = 30 A			0.96	
		T_j = 125 °C			0.66	0.73	

1. *Pulse test: t_p = 380 µs, δ < 2%*

To evaluate the conduction losses, use the following equation:

$P = 0.65 \times I_{F(AV)} + 0.00267 \times I_F{}^2{}_{(RMS)}$

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

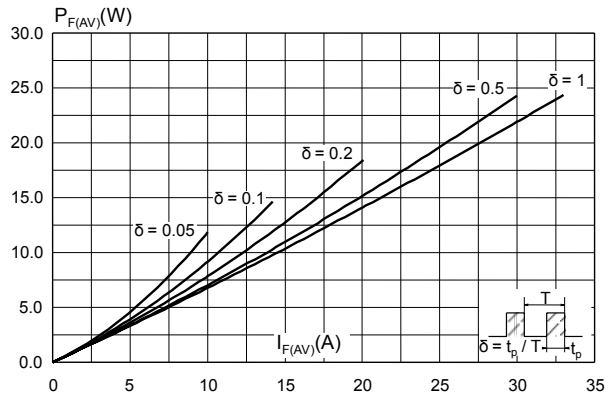


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

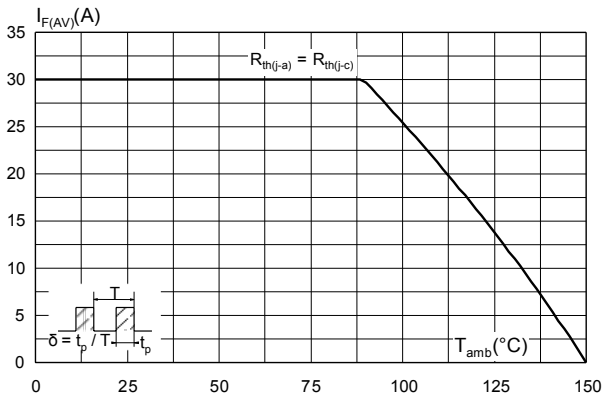


Figure 3. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

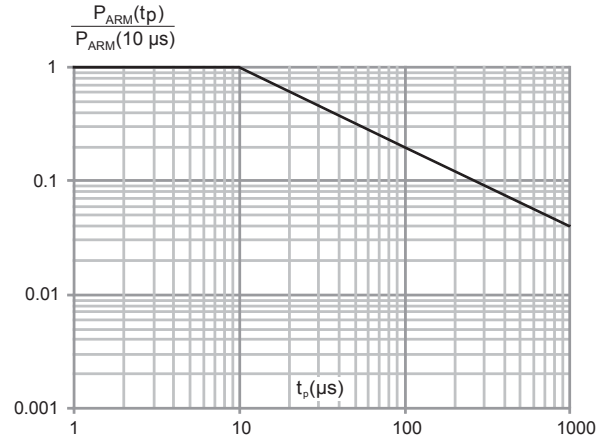


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

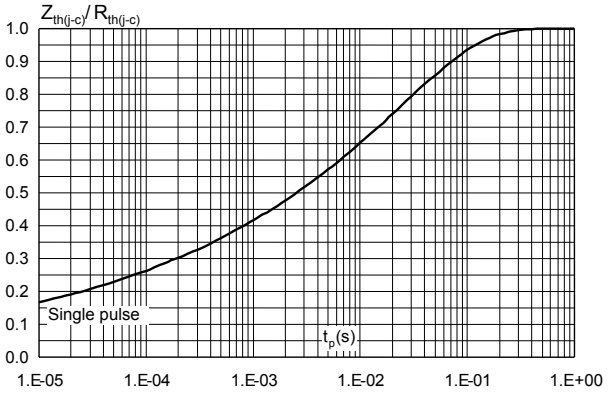


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

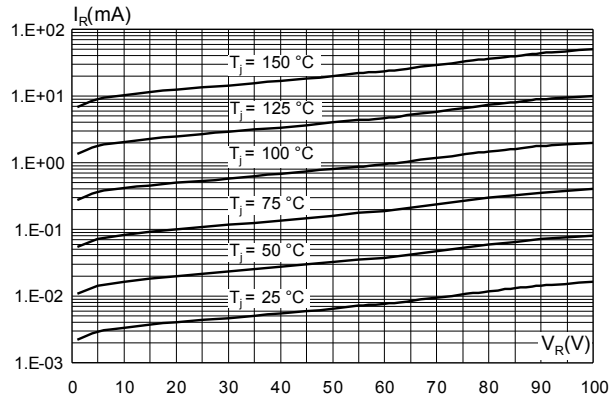


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

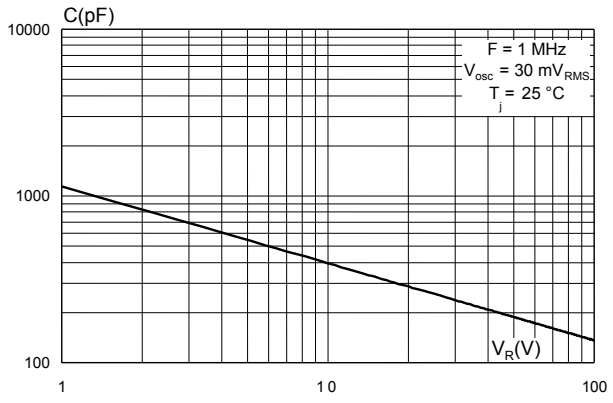


Figure 7. Forward voltage drop versus forward current

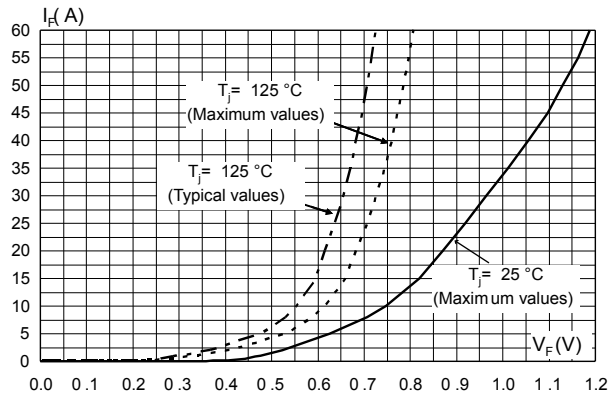
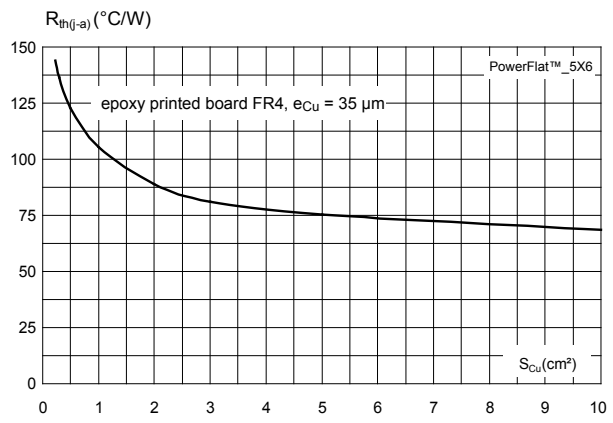


Figure 8. Thermal resistance junction to ambient versus copper surface under tab



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)

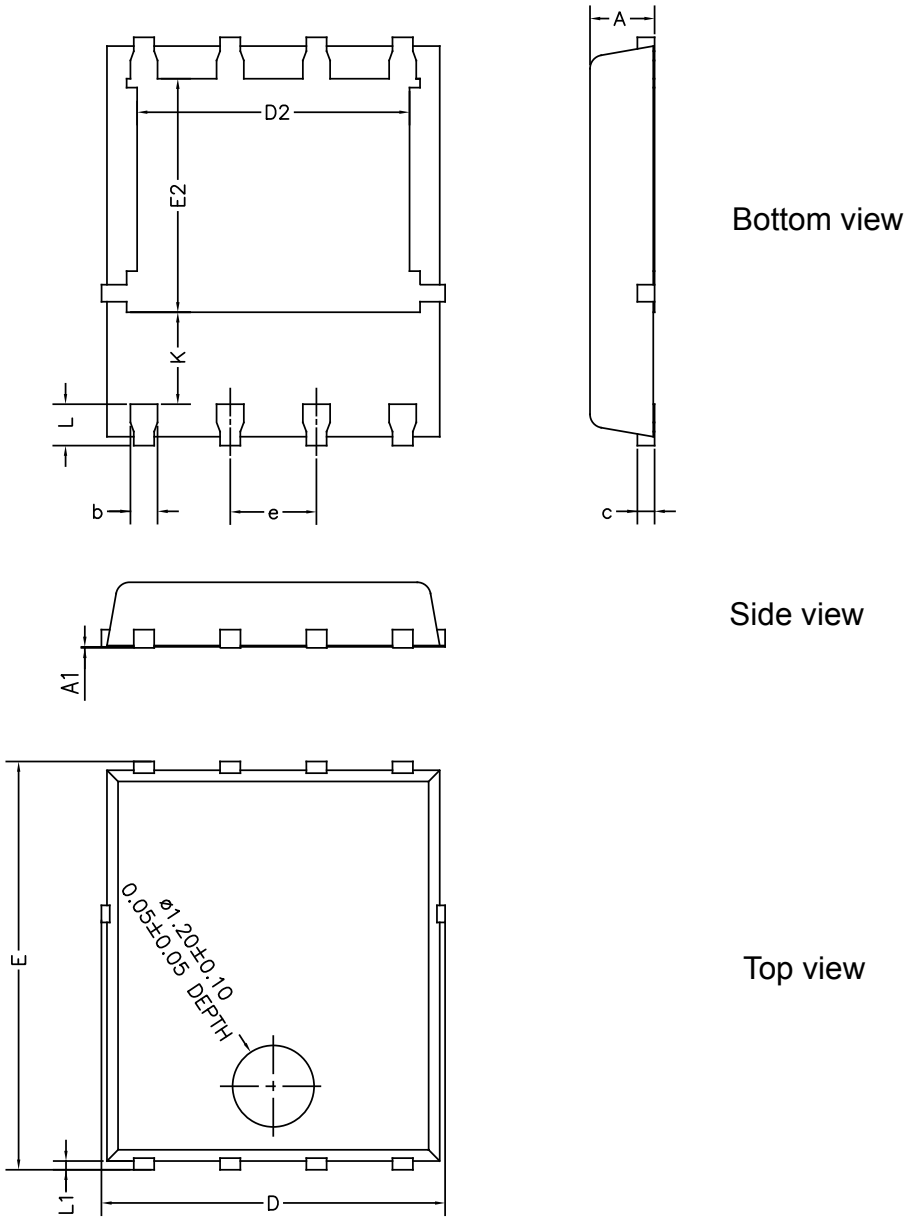
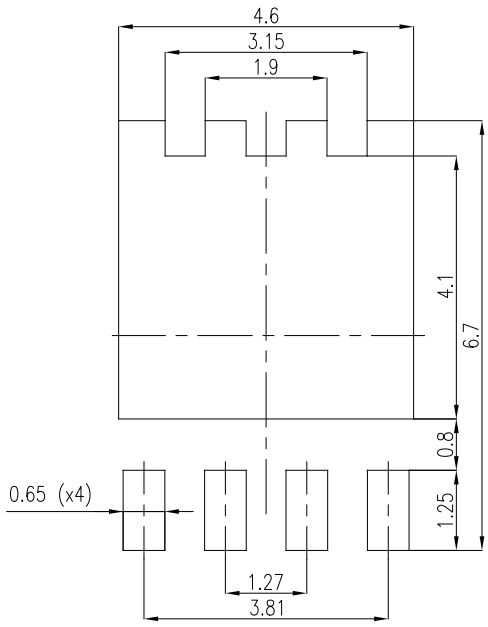


Table 4. **PowerFLAT™ 5x6 mechanical data**

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
STPS30M100DJF-TR	PS30M 100	PowerFLAT 5x6	0.095 g	3000	Tape and reel

Revision history

Table 6. Document revision history

Date	Version	Changes
06-Nov-2009	1	First issue.
30-Jul-2010	2	Replace Power QFN with PowerFLAT.
15-Jan-2011	3	Add reference E in Table 5.
20-May-2011	4	Update all package illustrations. Updated base quantity and marking in Table 6. Updated terminal identification in captions of Table 2 and Table 4. Added Figure 14.
11-Jun-2018	5	Removed figure 5, figure 6 and figure 12. Updated Table 1. Absolute Ratings (limiting values at 25 °C, unless otherwise specified, anode terminals short circuited). Minor text changes to improve readability.
08-Feb-2019	6	Updated Section Cover image, Figure 9. PowerFLAT™ 5x6 package outline (non-contractual) and Table 4. PowerFLAT™ 5x6 mechanical data.