STPS30M100DJF

Power Schottky rectifier

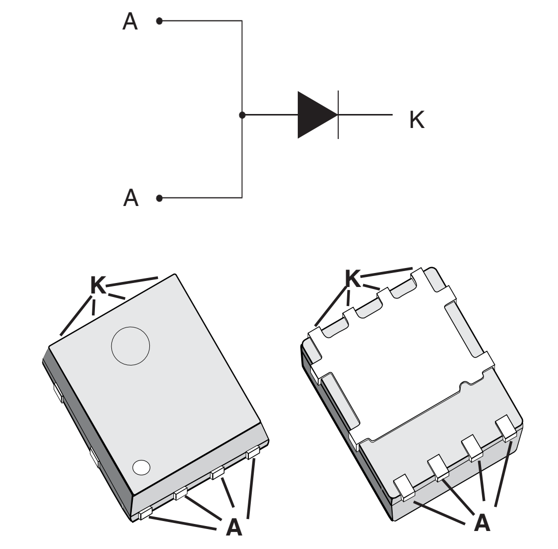
Features

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

Description

The STPS30M100DJF is a power Schottky rectifier suited 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.

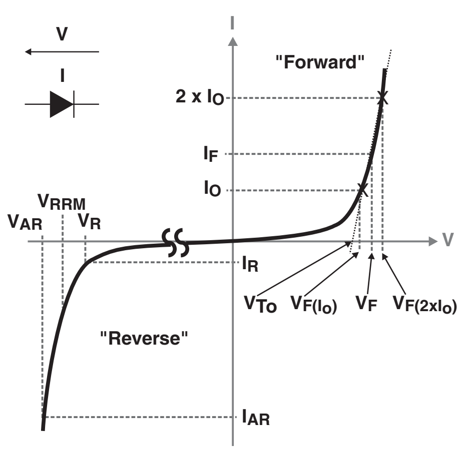


PowerFLAT 5x6
STPS30M100DJF

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	30 A
V_{RRM}	100 V
T_j(max)	150 °C
V_F(typ)	0.58 V

Figure 1. Electrical characteristics [(a)]



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a. V_{ARM} and I_{ARM} must respect the reverse safe operating area defined in *Figure 12.* V_{AR} and I_{AR} are pulse measurements ($t_p < 1$ µs). V_R, I_R, V_{RRM} and V_F, are static characteristics

1 Characteristics

Table 2. Absolute ratings (limiting values, 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 $\delta = 0.5$	$T_c = 90$ °C	30	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10$ ms sinusoidal	200	A
P_{ARM}	Repetitive peak avalanche power	$t_p = 1$ µs, $T_j = 25$ °C	15000	W
V_{ARM} (1)	Maximum repetitive peak avalanche voltage	$t_p < 1$ µs, $T_j < 150$ °C $I_{AR} < 37.5$ A	120	V
V_{ASM} (1)	Maximum single pulse peak avalanche voltage	$t_p < 1$ µs, $T_j < 150$ °C $I_{AR} < 37.5$ A	120	V
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Maximum operating junction temperature (2)		150	°C

1. Refer to *Figure 12.*
2. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal resistance

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

Table 4. 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, $\delta < 2\%$

To evaluate the conduction losses use the following equation:
$P = 0.65 \times I_{F(AV)} + 0.00267 \times I_F^2{}_{(RMS)}$

Figure 2. Average forward power dissipation versus average forward current

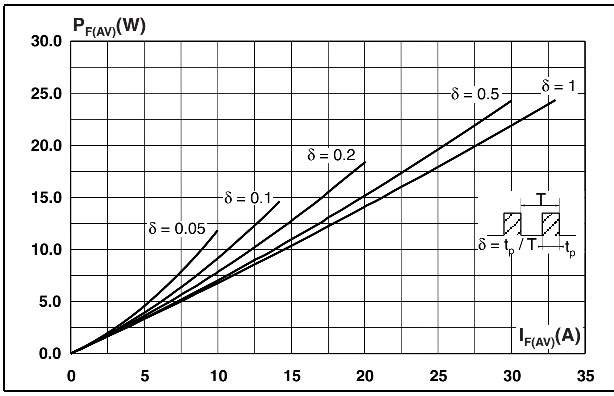


Figure 3. Average forward current versus ambient temperature (δ = 0.5)

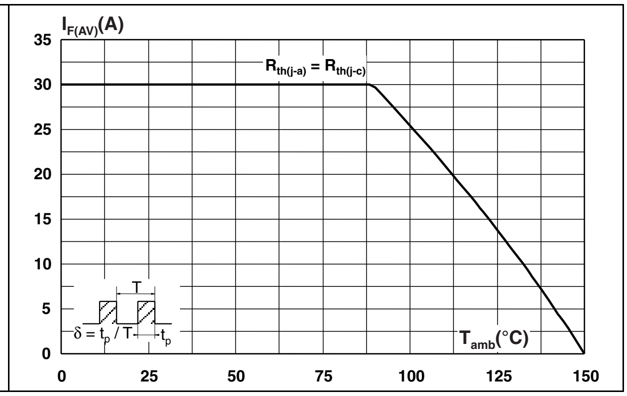


Figure 4. Normalized avalanche power derating versus pulse duration

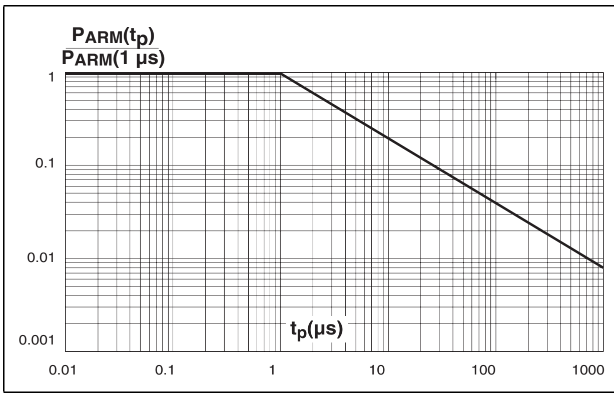


Figure 5. Normalized avalanche power derating versus junction temperature

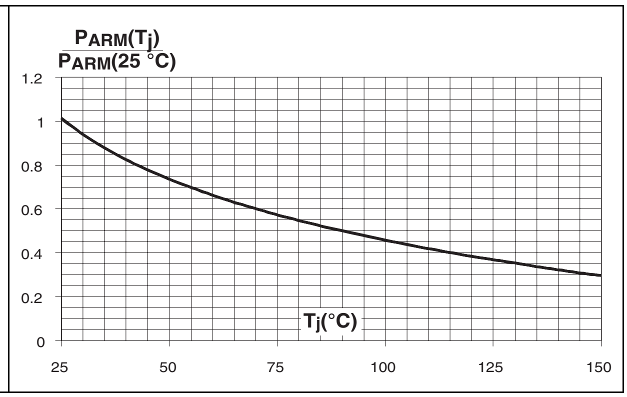


Figure 6. Non repetitive surge peak forward current versus overload duration (maximum values)

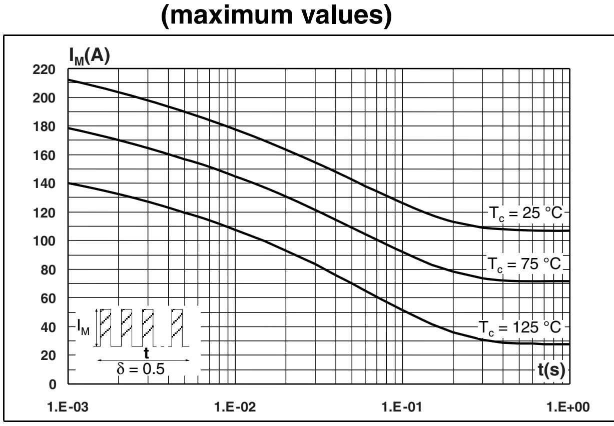


Figure 7. Relative variation of thermal impedance junction to case versus pulse duration

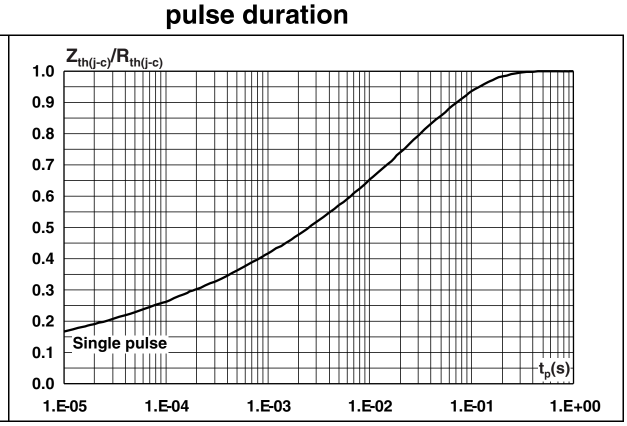


Figure 8. Reverse leakage current versus reverse voltage applied (typical values)

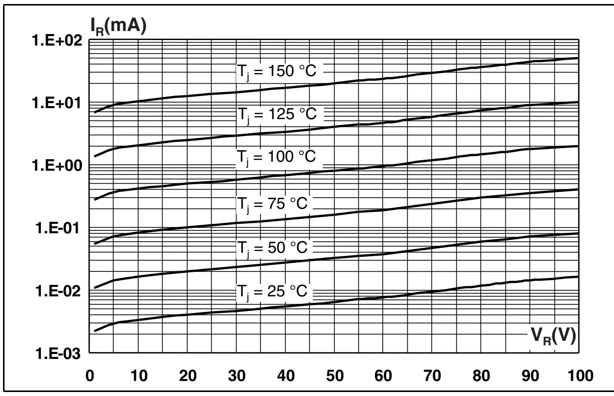


Figure 9. Junction capacitance versus reverse voltage applied (typical values)

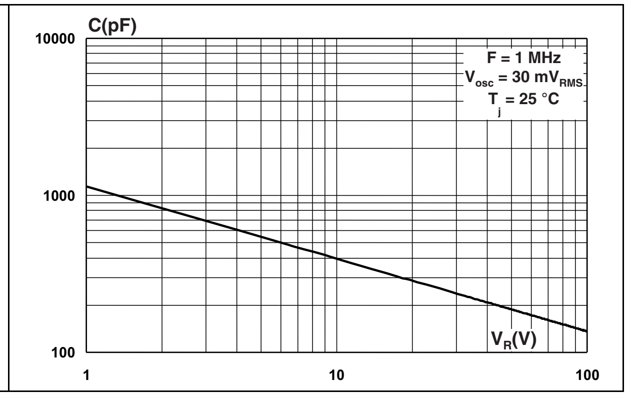


Figure 10. Forward voltage drop versus forward current

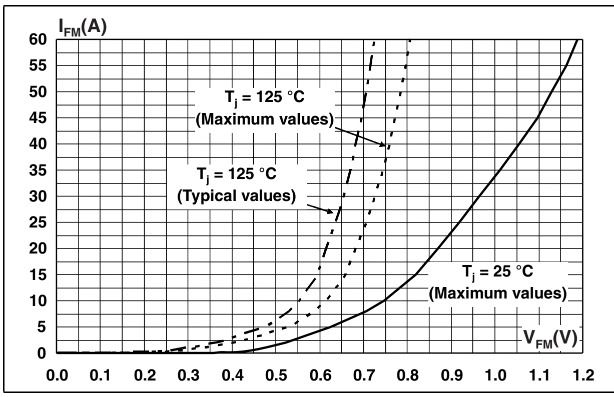


Figure 11. Thermal resistance junction to ambient versus copper surface under tab

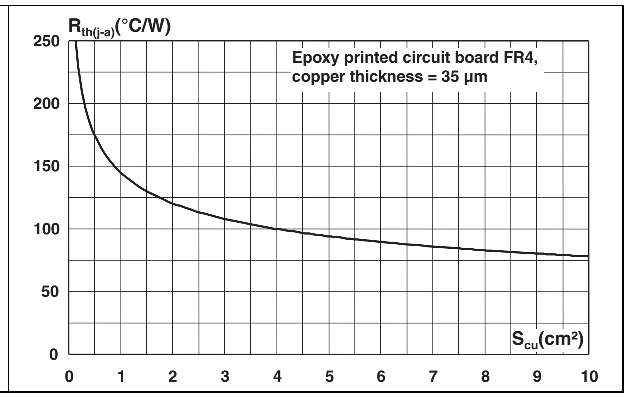
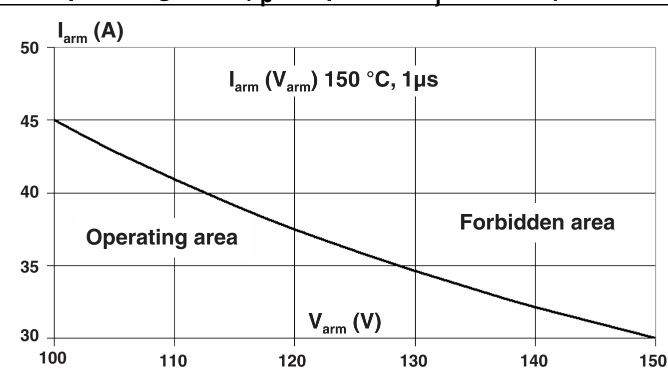


Figure 12. Reverse safe operating area (t_p < 1 µs and T_j < 150 °C)

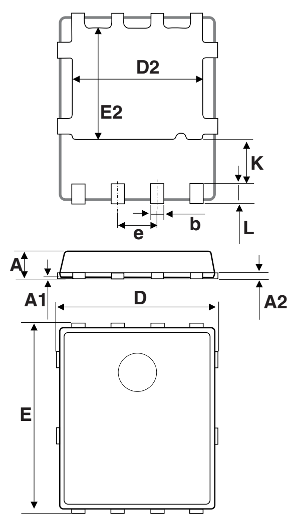


2 Package information

- Epoxy meets UL94,V0
- Lead-free package

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.

Table 5. PowerFLAT 5x6 dimensions



Ref.	Dimensions					
	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
D		5.20			0.205	
D2	4.11		4.31	0.162		0.170
e		1.27			0.050	
E		6.15			0.242	
E2	3.50		3.70	0.138		0.146
L	0.50		0.80	0.020		0.031
K	1.275		1.575	0.050		0.062

Figure 13. Footprint (dimensions in mm)

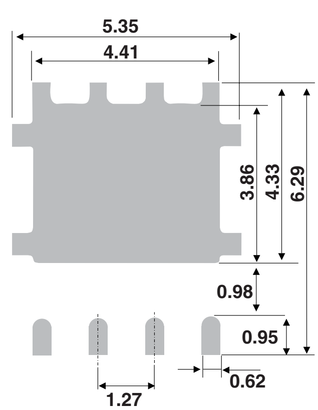
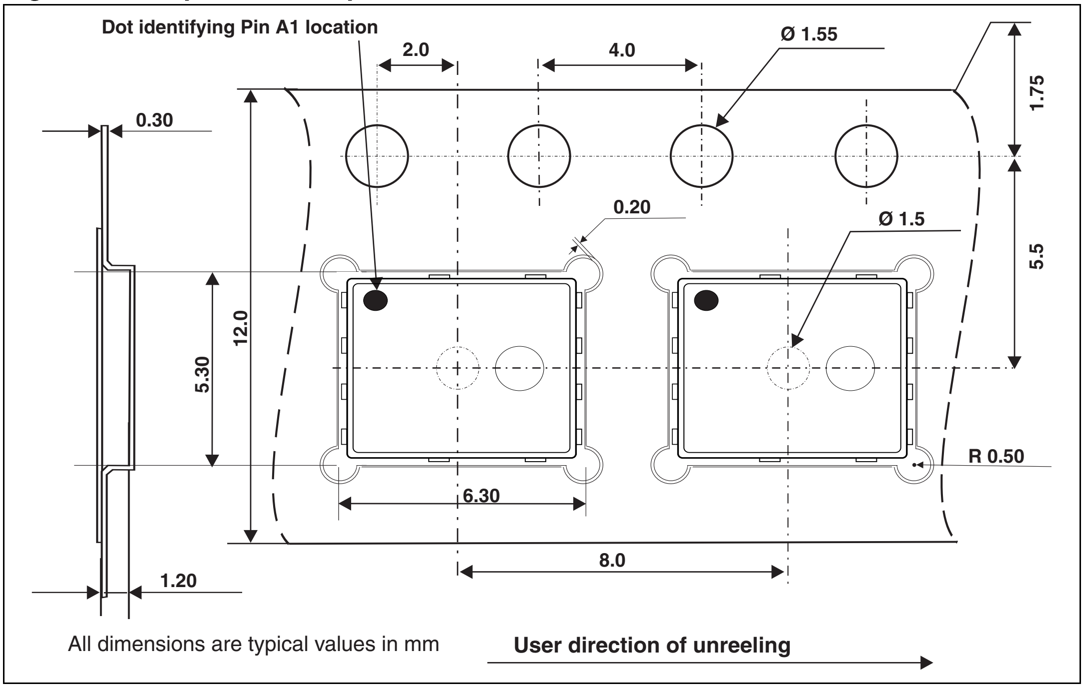


Figure 14. Tape and reel specifications



3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS30M100DJF-TR	PS30 M100	PowerFLAT 5x6	95 mg	3000	Tape and reel

4 Revision history

Table 7. Document revision history

Date	Revision	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.*