

## ULVF™ power Schottky rectifier

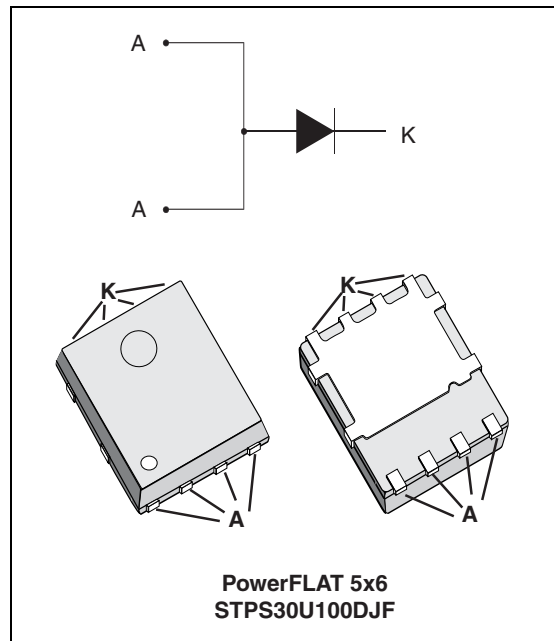
### Features

- High current capability
- Ultralow forward voltage drop
- Low thermal resistance
- High frequency operation
- High integration

### Description

The STPS30U100DJF is a power Schottky rectifier featuring an ultralow forward voltage drop (ULVF), suited for high frequency switch mode power supply and DC to DC converters.

Packaged in PowerFLAT™, this device is intended to be used in notebook, game station and desktop adapters, providing these applications with good efficiency at both low and high load. Its low profile was especially designed to be used in applications with space-saving constraints.



**Table 1. Device summary**

Symbol	Value
$I_{F(AV)}$	30 A
$V_{RRM}$	100 V
$T_j (max)$	150 °C
$V_F(typ)$	0.69 V

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# 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	$T_C = 75^\circ\text{C}, \delta = 0.5$	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10 \text{ ms sine-wave}$	A
$T_{stg}$	Storage temperature range	-65 to + 150	$^\circ\text{C}$
$T_j$	Maximum operating junction temperature <sup>(1)</sup>	150	$^\circ\text{C}$

1.  $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$  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	$^\circ\text{C/W}$

**Table 4. Static electrical characteristics (anode terminals short circuited)**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 125^\circ\text{C}$ $V_R = 70 \text{ V}$	-	8	-	mA
		$T_j = 25^\circ\text{C}$	-	-	170	$\mu\text{A}$
		$T_j = 125^\circ\text{C}$ $V_R = V_{RRM}$	-	20	45	mA
$V_F^{(2)}$	Forward voltage drop	$T_j = 125^\circ\text{C}$ $I_F = 5 \text{ A}$	-	0.38	0.42	V
		$T_j = 125^\circ\text{C}$ $I_F = 10 \text{ A}$	-	0.475	0.53	
		$T_j = 25^\circ\text{C}$	-	-	0.855	
		$T_j = 125^\circ\text{C}$ $I_F = 30 \text{ A}$	-	0.69	0.77	

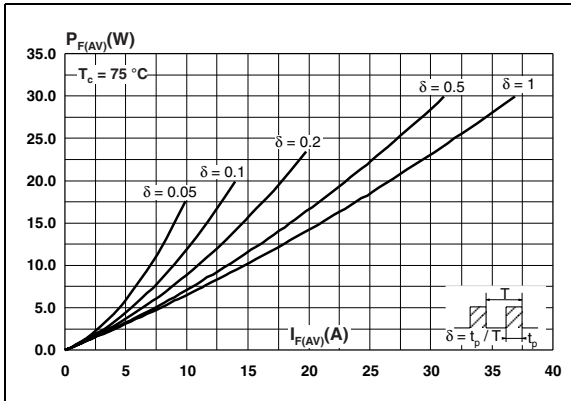
1. Pulse test:  $t_p = 5 \text{ ms}, \delta < 2\%$

2. Pulse test:  $t_p = 380 \mu\text{s}, \delta < 2\%$

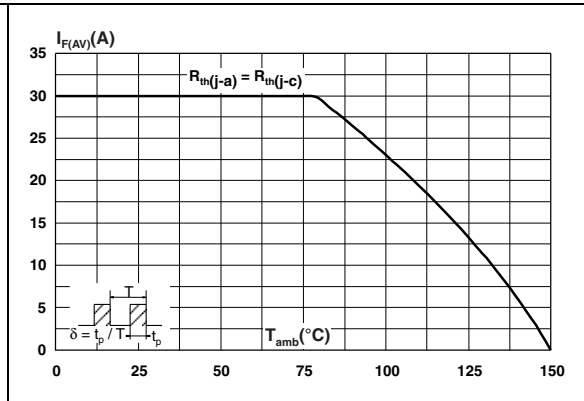
To evaluate the maximum conduction losses use the following equation:

$$P = 0.590 \times I_{F(AV)} + 0.006 \times I_{F(RMS)}^2$$

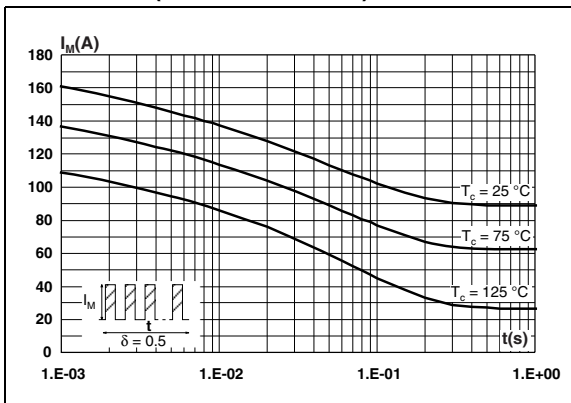
**Figure 1. Average forward power dissipation versus average forward current (maximum values)**



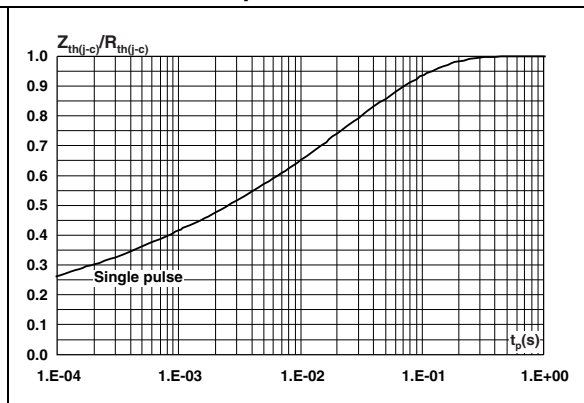
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )**



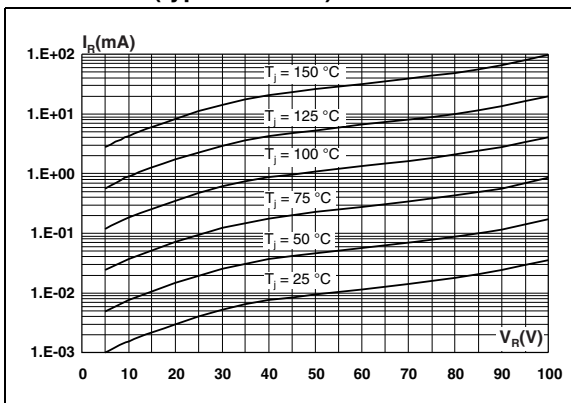
**Figure 3. Non repetitive surge peak forward current versus overload duration (maximum values)**



**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)**

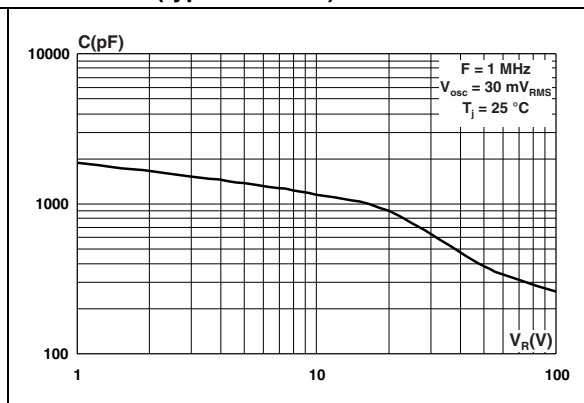


Figure 7. Forward voltage drop versus forward current

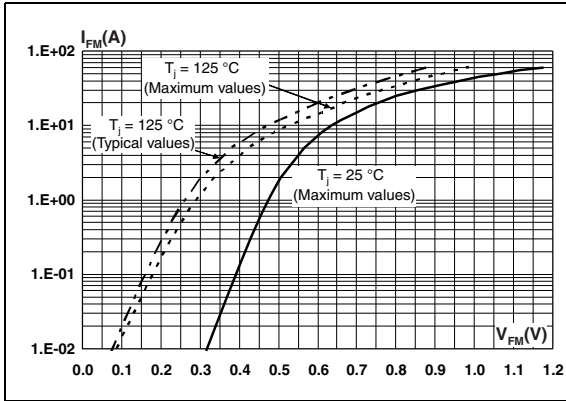
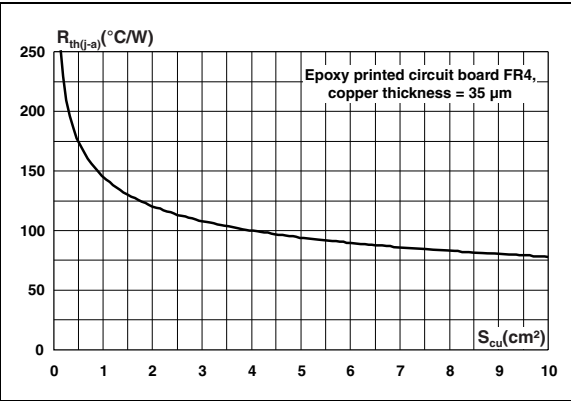


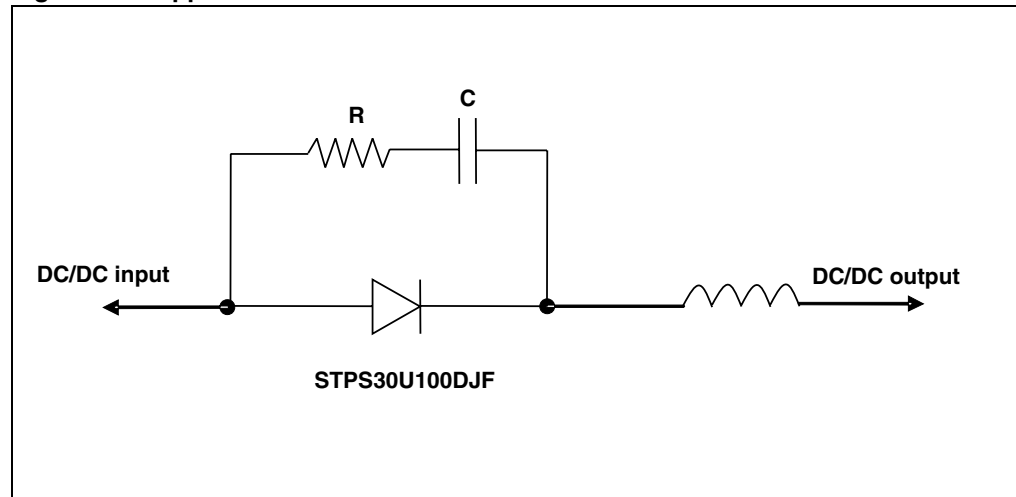
Figure 8. Thermal resistance, junction to ambient, versus copper surface under tab



## 2 Application information

It is mandatory to ensure a peak reverse voltage below the  $V_{RRM}$  absolute rating. Therefore ST recommends the use of an RC clamping snubber circuit in parallel with the STPS30U100DJF device.

**Figure 9. Application schematic**



### 3 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](http://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 10. Footprint (dimensions in mm)**

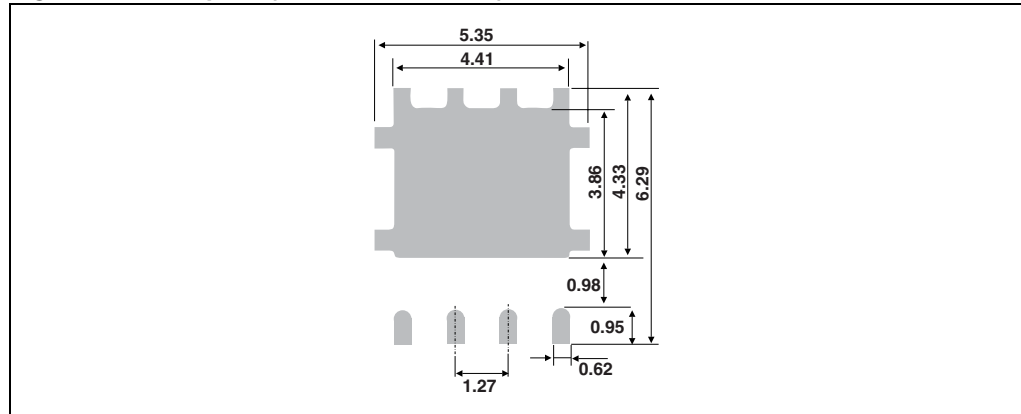
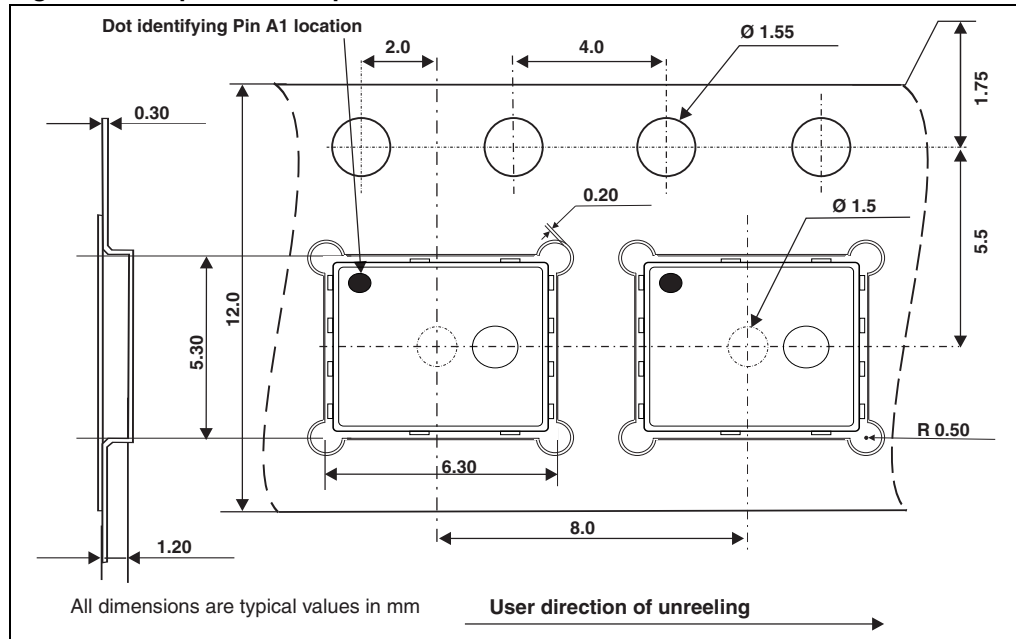


Figure 11. Tape and reel specifications



## 4 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS30U100DJF-TR	PS30 U100	PowerFLAT 5x6	95 mg	3000	Tape and reel

## 5 Revision history

Table 7. Document revision history

Date	Revision	Changes
02-Nov-2010	1	First issue.
09-Dec-2010	2	Added "maximum" to conduction loss calculation in <a href="#">Section 1 on page 2</a> .
20-May-2011	3	Added reference E in <a href="#">Table 5</a> . Updated package graphics. Updated base quantity and marking in <a href="#">Table 6</a> . Added <a href="#">Figure 11</a> .

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