STPS30U100DJF

ULVF™ power Schottky rectifier

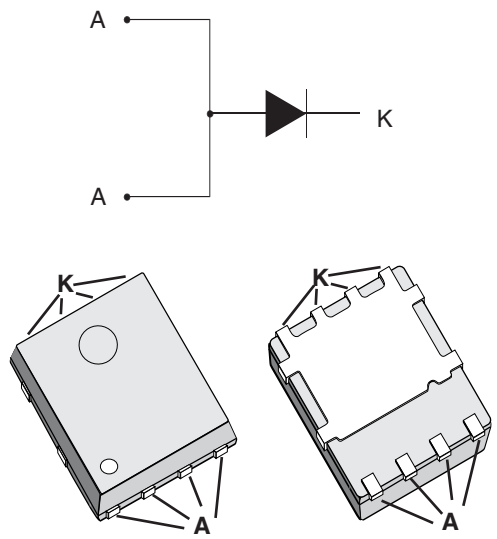
Features

- 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.



PowerFLAT 5x6
STPS30U100DJF

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°C, δ = 0.5	30	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sine-wave	200	A
T_{stg}	Storage temperature range		-65 to + 150	°C
T_j	Maximum operating junction temperature (1)		150	°C

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ 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 = 125 °C	V_R = 70 V	-	8	-	mA
		T_j = 25 °C	$V_R = V_{RRM}$	-	-	170	µA
		T_j = 125 °C		-	20	45	mA
V_F(2)	Forward voltage drop	T_j = 125 °C	I_F = 5 A	-	0.38	0.42	V
		T_j = 125 °C	I_F = 10 A	-	0.475	0.53	
		T_j = 25 °C	I_F = 30 A	-	-	0.855	
		T_j = 125 °C		-	0.69	0.77	

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

To evaluate the maximum conduction losses use the following equation:
$P = 0.590 \times I_{F(AV)} + 0.006 \times I_F{}^2{}_{(RMS)}$

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

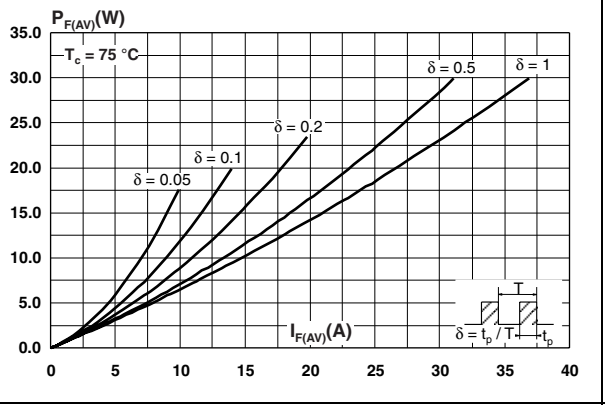


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

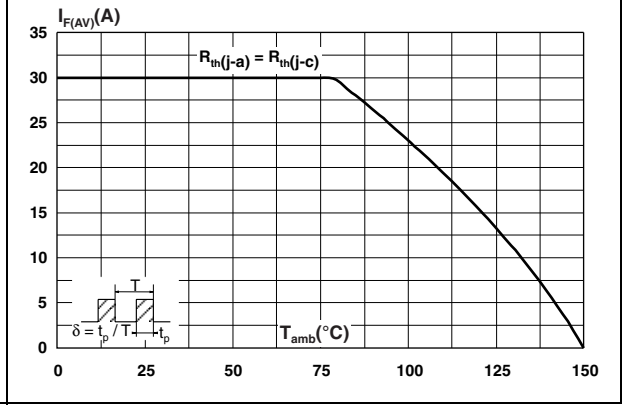


Figure 3. Non repetitive surge peak forward current versus overload duration (maximum values)

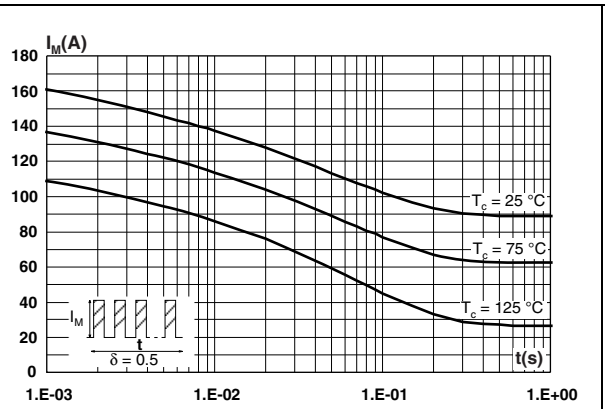


Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration

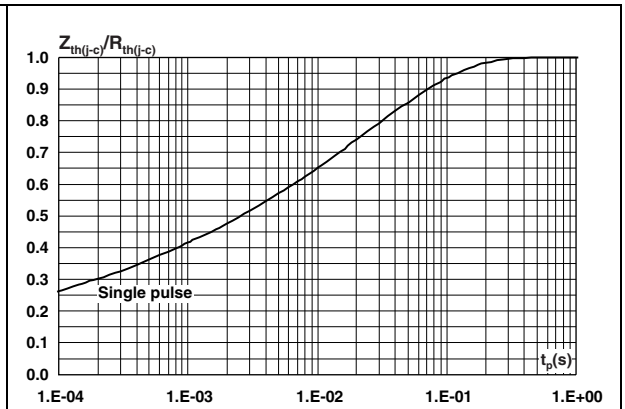


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

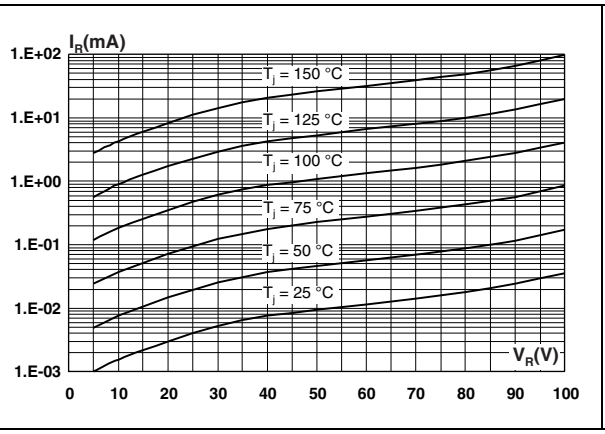


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

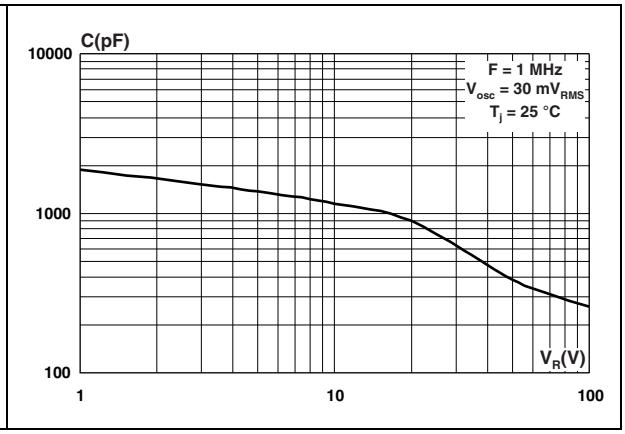


Figure 7. Forward voltage drop versus forward current

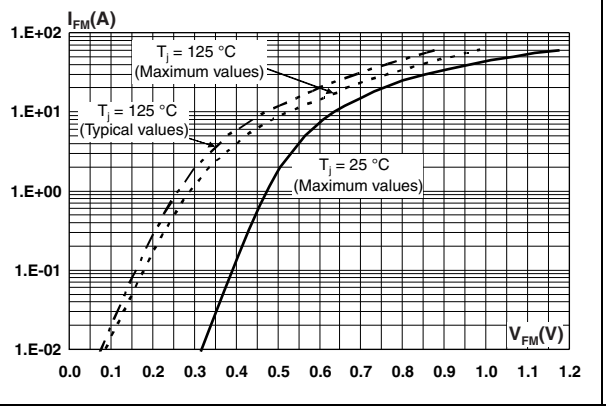
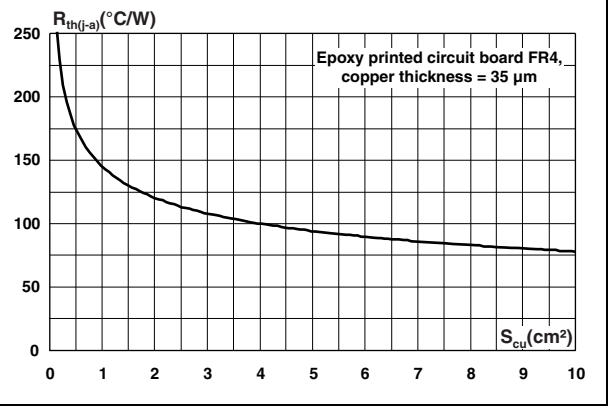


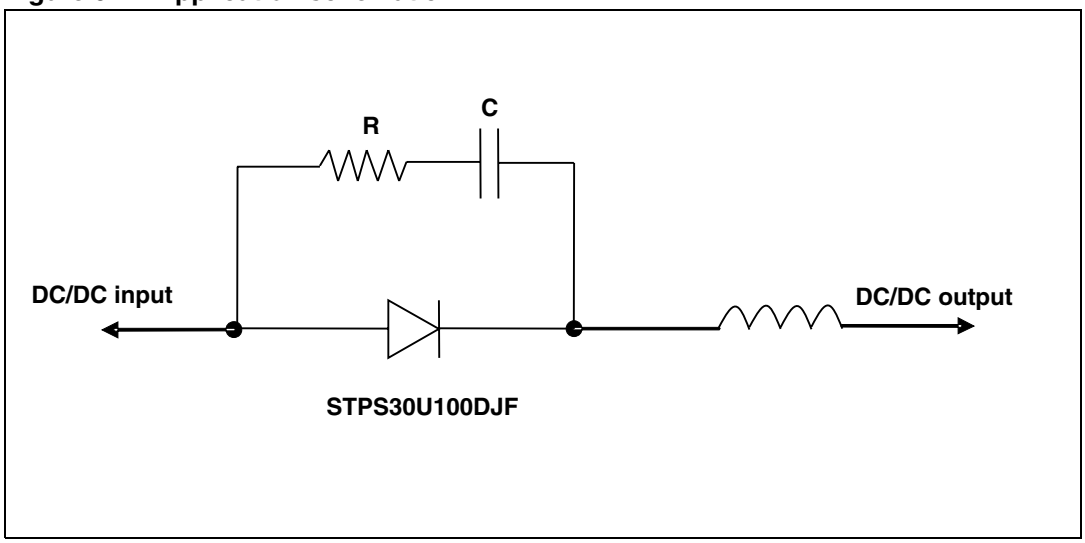
Figure 8. Thermal resistance, junction to ambient, versus copper surface under tab



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

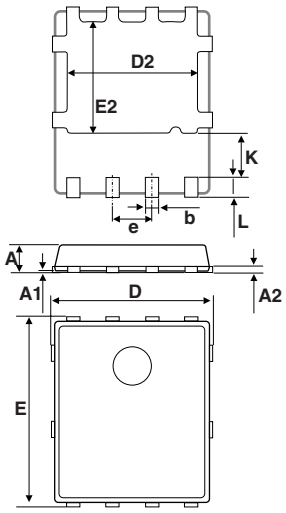


3 Package information

- 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. 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)

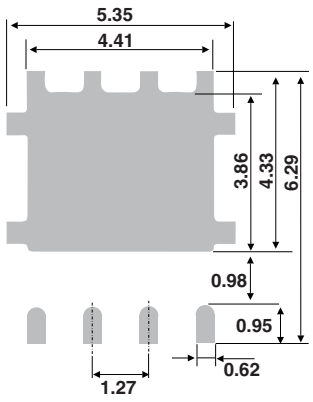
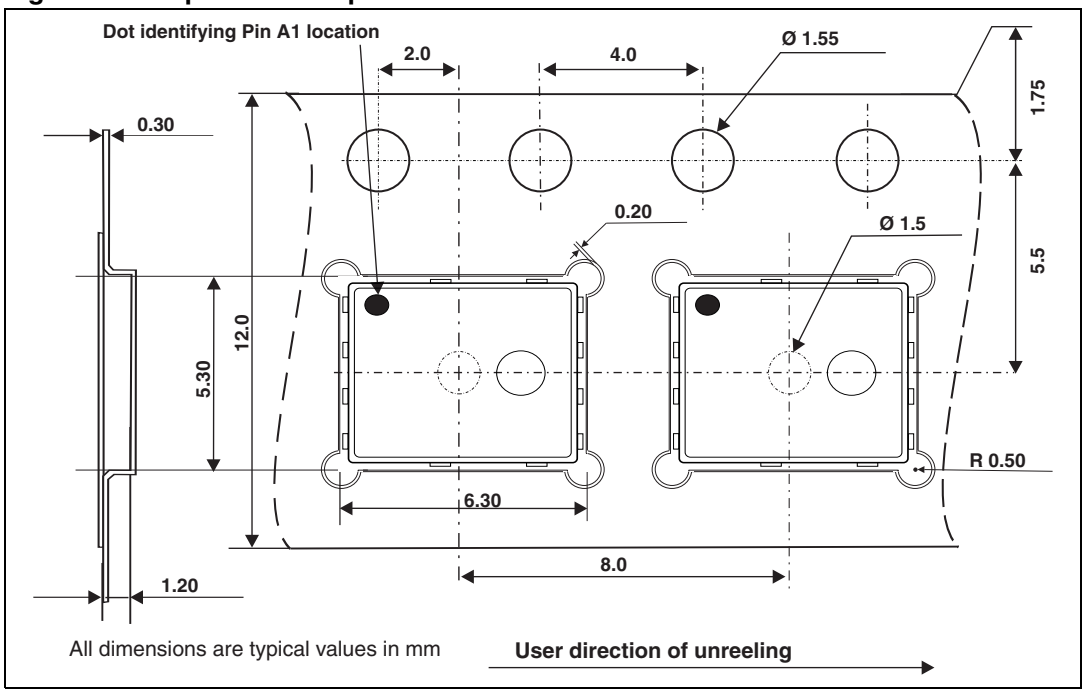


Figure 11. Tape and reel specifications



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 *Section 1 on page 2*.
20-May-2011	3	Added reference E in *Table 5*. Updated package graphics. Updated base quantity and marking in *Table 6*. Added *Figure 11*.

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