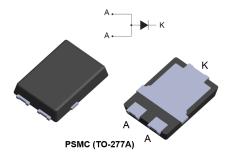


30 V power Schottky rectifier



Features

- Low profile design package height of 1.1 mm typ.
- · Wettable flanks for automatic visual inspection
- · Low forward voltage drop
- Avalanche capability
- ECOPACK[®]2 compliant

Applications

- · Battery charger
- Telecom
- DC / DC converter
- · Cordless appliance
- SSD

Description

This 30 V Schottky barrier rectifier has been optimized for use in high frequency miniature DC/DC converters, reverse battery protection, battery chargers and adaptors.

Packaged in PSMC (TO-277A), the STPS1230SF provides a high level of performance in a compact and flat package which can withstand high operating junction temperature.

Product status link					
STPS1230SF					
Product summary					
Symbol	Symbol Value				
I _{F(AV)}	12 A				
V _{RRM}	30 V				
T _j (max.)	150 °C				
V _F (typ.)	0.40 V				



1 Characteristics

Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified, anode terminals short-circuited)

Symbol	Paramete	Value	Unit	
V _{RRM}	Repetitive peak reverse voltage	30	V	
I _{F(AV)}	Average forward current, δ = 0.5 square	12	Α	
I _{FSM}	Surge non repetitive forward current $t_p = 10 \text{ ms sinusoidal}$		230	Α
P _{ARM}	Repetitive peak avalanche power	90	W	
T _{stg}	Storage temperature range	-65 to +175	°C	
Tj	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	Typ. value	Unit
$R_{th(j-c)}$	Junction to case	2	°C/W

For more information, please refer to the following application note:

AN5088: Rectifiers thermal management, handling and mounting recommendations

Table 3. Static electrical characteristics (anode terminals short-circuited)

Symbol	Parameter	Test conditions		Min.	Тур.	Max.	Unit
ı (1)	I _R ⁽¹⁾ Reverse leakage current	T _j = 25 °C	\ \ -\\	-		360	μA
'R'		T _j = 125 °C	$V_R = V_{RRM}$	-	40	120	mA
V _F ⁽²⁾	Forward voltage drop	T _j = 25 °C	I _F = 6 A	-		0.45	V
		T _j = 125 °C		-	0.30	0.36	
		T _j = 25 °C	I _F = 12 A	-		0.51	
		T _j = 125 °C		-	0.40	0.45	

- 1. Pulse test: t_p = 5 ms, δ < 2%
- 2. Pulse test: $t_p = 380 \ \mu s, \ \delta < 2\%$

To evaluate the conduction losses, use the following equation:

 $P = 0.27 \times I_{F(AV)} + 0.015 \times I_{F^{2}(RMS)}$

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 in a power diode

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1.1 Characteristics curves

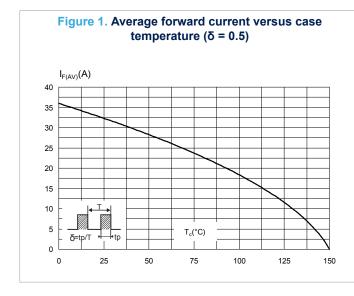
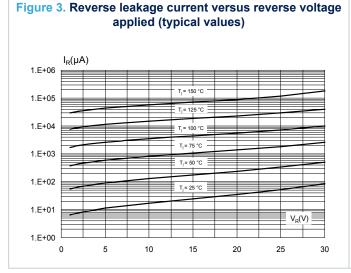


Figure 2. Relative variation of thermal impedance junction to case versus pulse duration $Z_{\text{th(j-c)}}/R_{\text{th(j-c)}}$ 1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 t_P(s) 0.1 0.0 1.E-03 1.E-04 1.E-02 1.E-01 1.E+00



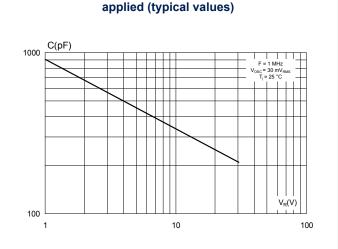
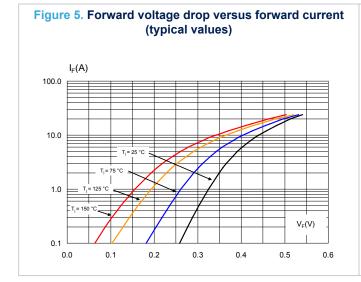


Figure 4. Junction capacitance versus reverse voltage

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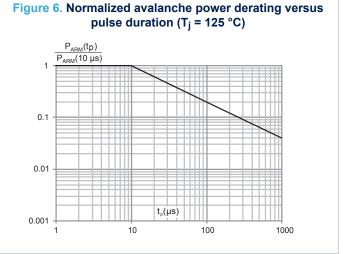
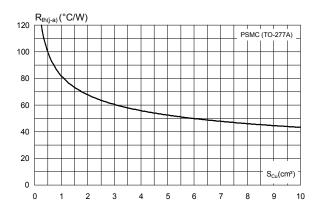


Figure 7. Thermal resistance junction to ambient versus copper surface under tab (typical values, epoxy printed board FR4, e_{Cu} = 35 μ m) (PSMC (TO-277A))



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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 PSMC (TO-277A) package information

- Epoxy meets UL94,V0
- Cooling method : by conduction (C)

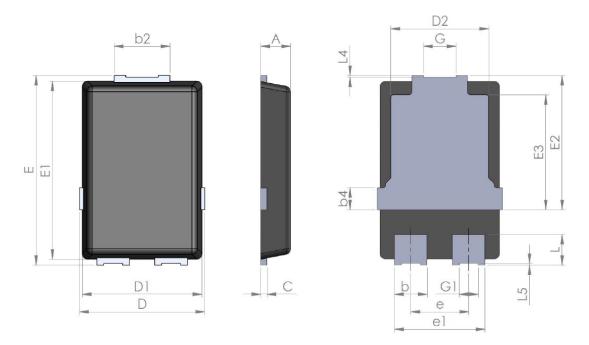


Figure 8. PSMC (TO-277A) package outline

Table 4. PSMC (TO-277A) package mechanical data

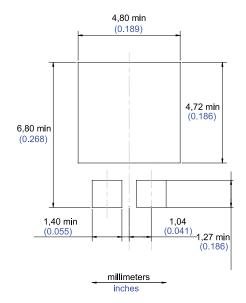
	Dimensions					
Ref.		Millimeters		Incl	nes (for reference o	nly)
	Min.	Тур.	Max.	Min.	Тур.	Max.
Α	1.00	1.10	1.20	0.039	0.043	0.047
b	1.05	1.20	1.35	0.041	0.047	0.053
b2	1.90	2.05	2.20	0.075	0.081	0.087
b4		0.75			0.029	
С	0.15	0.23	0.40	0.006	0.009	0.016
D	4.45	4.60	4.75	0.175	0.181	0.187
D1	4.25	4.40	4.45	0.167	0.173	0.175
D2	3.40	3.60	3.70	0.134	0.142	0.146

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	Dimensions						
Ref.		Millimeters			Inches (for reference only)		
	Min.	Тур.	Max.	Min.	Тур.	Max.	
E	6.35	6.50	6.65	0.250	0.256	0.262	
E1	6.05	6.10	6.15	0.238	0.240	0.242	
E2	4.50	4.60	4.70	0.177	0.181 0.185		
E3		3.94			1.55		
е		2.13			0.084		
e1		3.33			0.131		
G		1.20			0.047		
G1		0.70			0.027		
L	0.90	1.05	1.24	0.035	0.041	0.049	
L4	0.02			0.0008			
L5	0.02			0.0008			

Figure 9. PSMC (TO-277A) package footprint in mm (in inches)



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3 Ordering information

Table 5. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS1230SF	PS1230	PSMC (TO-277A)	90 mg	6000	Tape and Reel

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Revision history

Table 6. Document revision history

Date	Version	Changes
27-Jul-2018	1	Initial release.

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