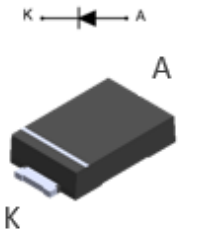
STPS5H100UFN

Datasheet

5 A - 100 V power Schottky rectifier



SMB Flat Notch

Features

- Low profile design – package height of 1.1 mm
- Wettable flanks for automatic visual inspection
- Low forward voltage drop
- Avalanche capability
- ECOPACK2 compliant

Applications

- Switching diode
- Notebook adapter
- LED lighting
- DC/DC converter

Description

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

Packaged in SMB Flat Notch, the STPS5H100UFN provides a high level of performance in a compact and flat package which can withstand very high operating junction temperature.

Product status link
STPS5H100UFN

Product summary	
Symbol	**Value**
$I_{F(AV)}$	5 A
V_{RRM}	100 V
T_j (max.)	175 °C
V_F (typ.)	0.545 V

1 Characteristics

Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		100	V
$I_{F(AV)}$	Average forward current, δ = 0.5 square wave	T_L = 115 °C	5	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	190	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs, T_j = 125 °C	518	W
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Maximum operating junction temperature(1)		+175	°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.	Unit
$R_{th(j-l)}$	Junction to lead	6.6	°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

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		8	µA
		T_j = 125 °C		-	1.5	5	mA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 2.5 A	-		0.640	V
		T_j = 125 °C		-	0.480	0.540	
		T_j = 25 °C	I_F = 5 A	-		0.745	
		T_j = 125 °C		-	0.545	0.610	

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

To evaluate the conduction losses, use the following equation:

$P = 0.470 \times I_{F(AV)} + 0.028 \times I_F{}^2{}_{(RMS)}$

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

1.1 Characteristics (curves)

Figure 1. Reverse leakage current versus reverse voltage applied (typical values)

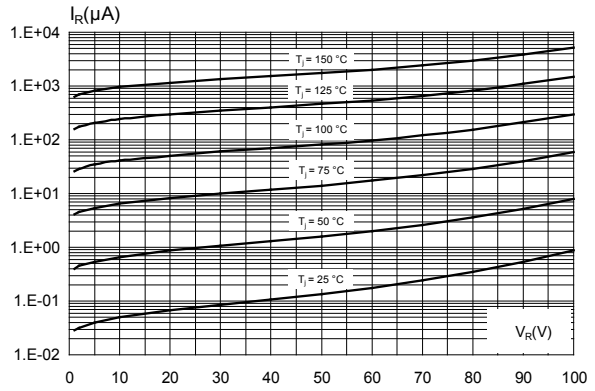


Figure 2. Junction capacitance versus reverse voltage applied (typical values)

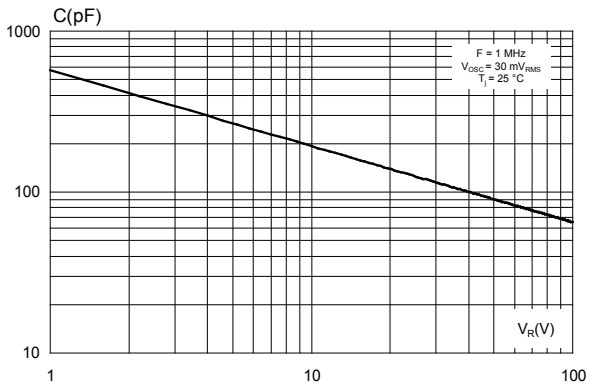


Figure 3. Forward voltage drop versus forward current (typical values)

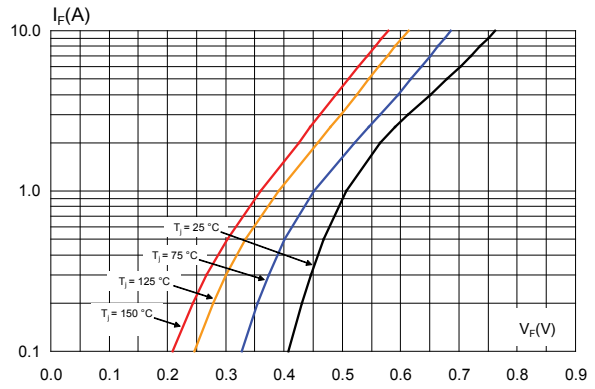


Figure 4. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

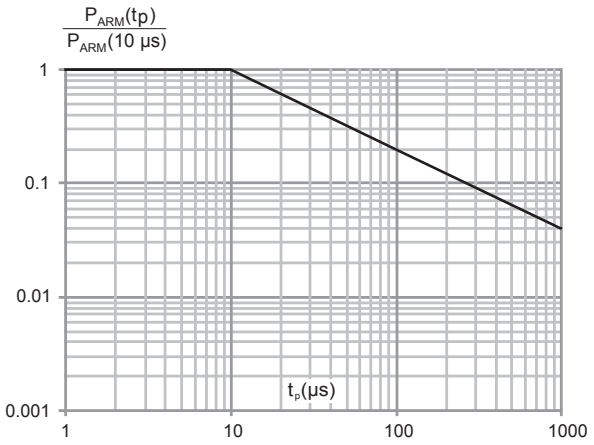
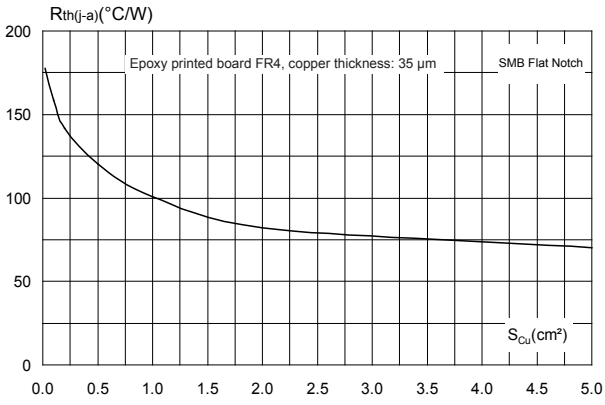


Figure 5. Thermal resistance junction to ambient versus copper surface under each lead (SMB Flat Notch)



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 SMB Flat Notch package information

- Epoxy meets UL94, V0
- Lead-free package

Figure 6. SMB Flat Notch package outline

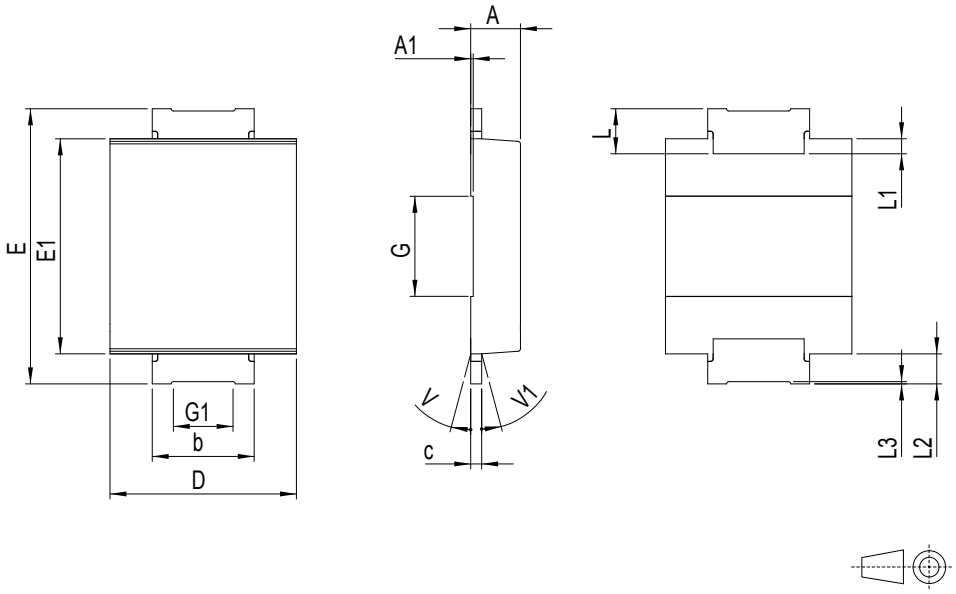
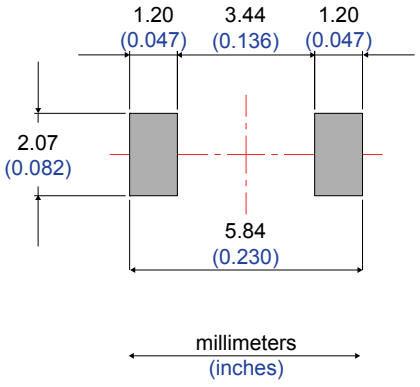


Table 4. SMB Flat Notch mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.10	0.035		0.043
A1		0.05			0.002	
b	1.95		2.20	0.077		0.087
c	0.15		0.40	0.006		0.016
D	3.30		3.95	0.130		0.156
E	5.20		5.60	0.205		0.220
E1	4.05		4.60	0.159		0.181
G		2.00			0.079	
G1		1.20			0.047	
L	0.75		1.20	0.030		0.047
L1		0.30			0.012	
L2		0.60			0.024	
L3	0.02			0.001		
V			8°			8°
V1			8°			8°

Figure 7. Footprint recommendations, dimensions in mm (inches)



3 Ordering information

Table 5. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS5H100UFN	B51	SMB Flat Notch	0.056 g	5000	Tape and Reel

Revision history

Table 6. **Document revision history**

Date	Version	Changes
31-Jan-2020	1	Initial release.

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