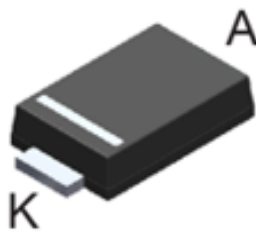



## Automotive 3 A - 100 V power Schottky rectifier



SMB Flat

### Features

- AEC-Q101 qualified revision C 
- Negligible switching losses
- High junction temperature capability
- Low leakage current
- Good trade-off between leakage current and forward voltage drop
- Avalanche capability specified
- ECOPACK2 compliant
- PPAP capable
- $V_{RRM}$  guaranteed from -40 to +175 °C

### Applications

- DC/DC converter
- Reverse polarity protection
- Freewheeling diodes
- Switching diode

### Description

This Schottky rectifier is packaged in SMB Flat designed for high frequency miniature switched mode power supplies such as adaptors and on board DC to DC converters for automotive applications.

#### Product status link

[STPS3H100-Y](#)

#### Product summary

$I_{F(AV)}$	3 A
$V_{RRM}$	100 V
$T_j$ (max.)	175 °C
$V_F$ (typ.)	0.63 V

# 1 Characteristics

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

Symbol	Parameter	Value	Unit	
V <sub>RRM</sub>	Repetitive peak reverse voltage, T <sub>j</sub> = -40 °C to +175 °C	100	V	
I <sub>F(AV)</sub>	Average forward current, δ = 0.5 square wave	T <sub>i</sub> = 125 °C	3	A
I <sub>FSM</sub>	Surge non repetitive forward current	t <sub>p</sub> = 10 ms sinusoidal	25	A
P <sub>ARM</sub>	Repetitive peak avalanche power	t <sub>p</sub> = 10 μs, T <sub>j</sub> = 125 °C	170	W
T <sub>stg</sub>	Storage temperature range	-65 to +175	°C	
T <sub>j</sub>	Maximum operating junction temperature range <sup>(1)</sup>	-40 to +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 parameter**

Symbol	Parameter	Typ. value	Unit
R <sub>th(j-l)</sub>	Junction to lead	15	°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 <sub>R</sub> <sup>(1)</sup>	Reverse leakage current	T <sub>j</sub> = 25 °C	V <sub>R</sub> = V <sub>RRM</sub>	-	1.00	μA	
		T <sub>j</sub> = 125 °C		-	0.40	1.00	mA
		T <sub>j</sub> = 150 °C		-	3.3		
V <sub>F</sub> <sup>(2)</sup>	Forward voltage drop	T <sub>j</sub> = 25 °C	I <sub>F</sub> = 3 A	-	0.84	V	
		T <sub>j</sub> = 125 °C		-	0.63		0.68
		T <sub>j</sub> = 25 °C	I <sub>F</sub> = 6 A	-	0.94		
		T <sub>j</sub> = 125 °C		-	0.71		0.80

1. Pulse test: t<sub>p</sub> = 5 ms, δ < 2%

2. Pulse test: t<sub>p</sub> = 380 μs, δ < 2%

To evaluate the conduction losses, use the following equation:

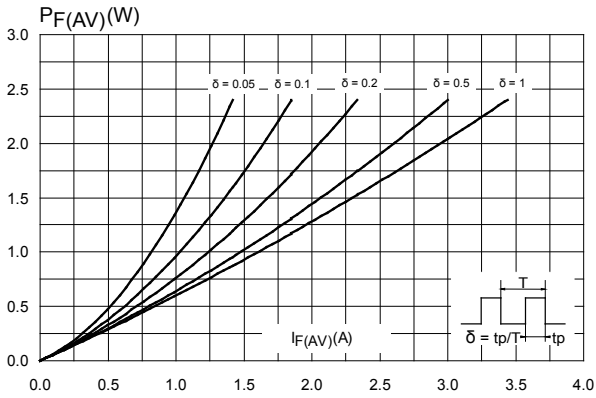
$$P = 0.56 \times I_{F(AV)} + 0.04 \times I_F^2_{(RMS)}$$

For more information, please refer to the following application notes related to the power losses :

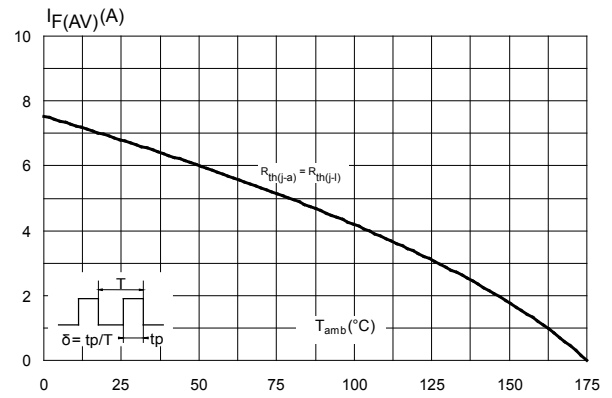
- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

## 1.1 Characteristics (curves)

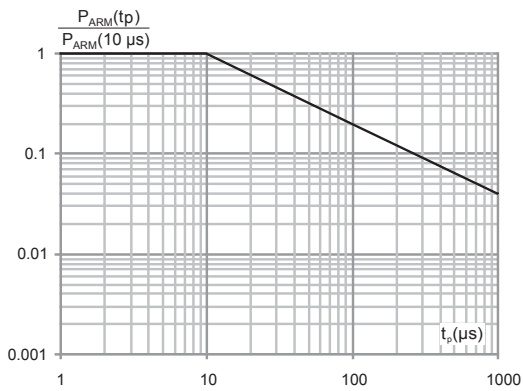
**Figure 1. Average forward power dissipation versus average forward current**



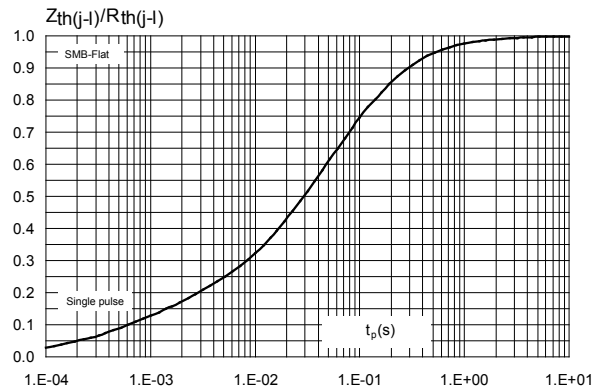
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )**



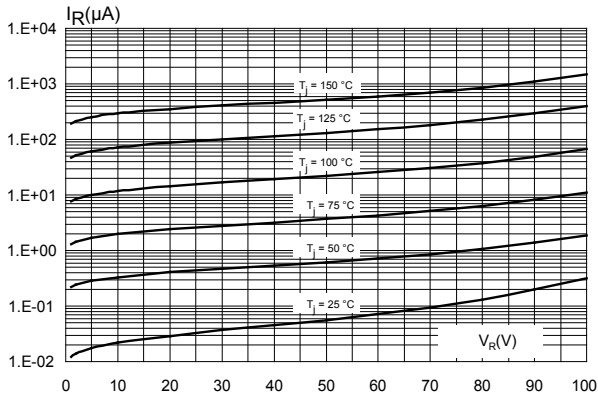
**Figure 3. Normalized avalanche power derating versus junction temperature ( $T_j = 125\text{ }^\circ\text{C}$ )**



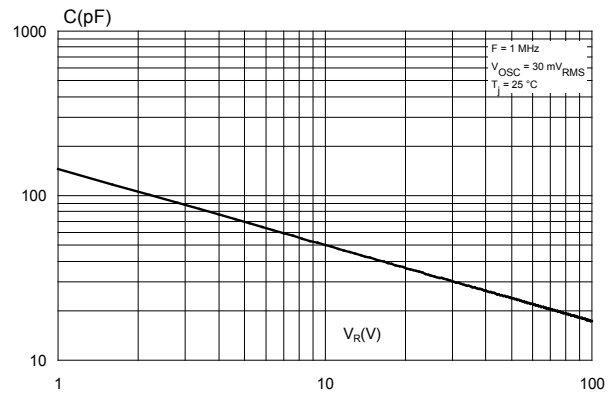
**Figure 4. Relative variation of thermal impedance junction to lead versus pulse duration**



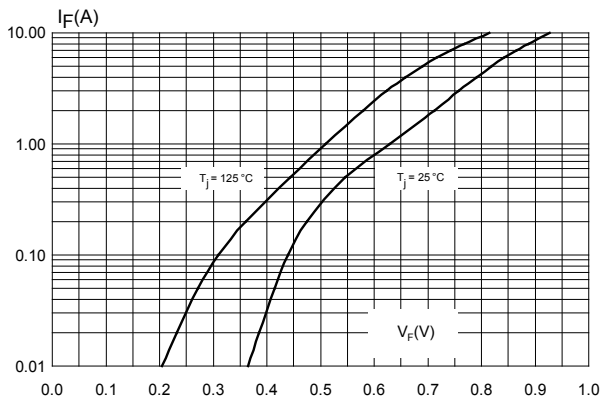
**Figure 5. Reverse leakage current versus reverse voltage applied (typical values)**



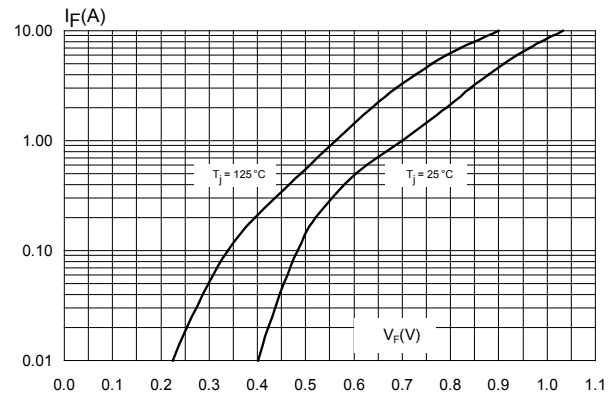
**Figure 6. Junction capacitance versus reverse voltage applied (typical values)**



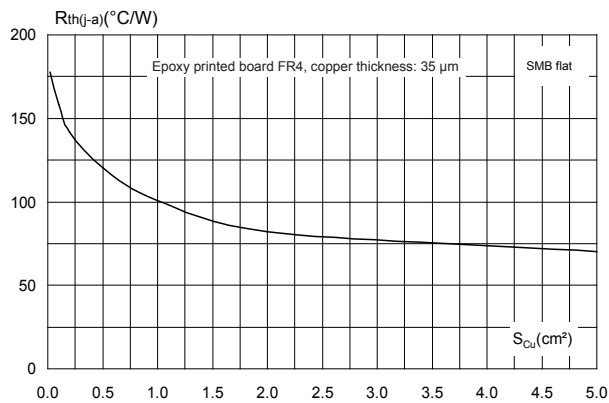
**Figure 7. Forward voltage drop versus forward current (typical values)**



**Figure 8. Forward voltage drop versus forward current (maximum values)**



**Figure 9. Thermal resistance junction to ambient versus copper surface under each lead (SMB flat, typical values)**



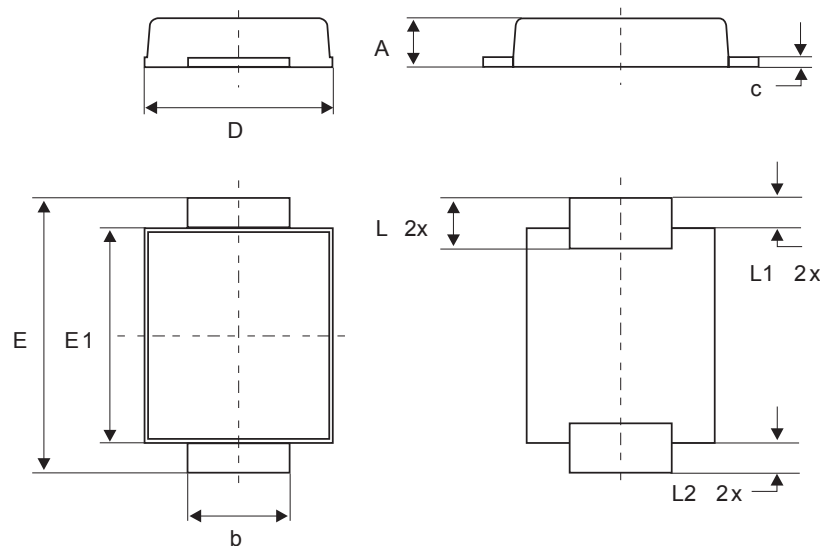
## 2 Package information

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](http://www.st.com). ECOPACK is an ST trademark.

### 2.1 SMB Flat package information

- Epoxy meets UL94, V0
- Lead-free package

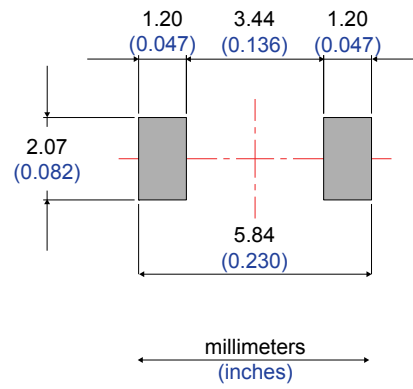
**Figure 10. SMB Flat package outline**



**Table 4. SMB Flat mechanical data**

Ref.	Dimensions					
	Millimeters			Inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.10	0.035		0.043
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	5.10		5.60	0.201		0.220
E1	4.05		4.60	0.159		0.181
L	0.75		1.50	0.030		0.059
L1		0.40			0.016	
L2		0.60			0.024	

**Figure 11. Footprint recommendations, dimensions in mm (inches)**



### 3 Ordering information

**Table 5. Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS3H100UFY	3H100Y	SMB Flat	0.050 g	5000	Tape and reel

## Revision history

**Table 6. Document revision history**

Date	Version	Changes
07-Nov-2016	1	Initial release.
14-Jan-2020	2	Updated <a href="#">Figure 3</a> . Minor text changes to improve readability.



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