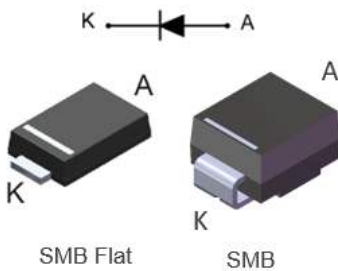


## 3 A - 100 V power Schottky rectifier



### Features

- 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

### Applications

- Switching diode
- SMPS
- DC/DC converter
- LED lighting

### Description

This 100 V power Schottky rectifier is ideal for switch mode power supplies, for 12 V rails and high frequency converters.

Packaged in SMB and SMB Flat, the **STPS3H100** is optimized for use in consumer and computer applications where low drop forward voltage is required to reduce power dissipation.

#### Product status link

[STPS3H100](#)

#### 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	
$V_{RRM}$	Repetitive peak reverse voltage		100	V	
$I_{F(AV)}$	Average forward current, $\delta = 0.5$ square wave	SMB $T_I = 115\text{ °C}$	3	A	
		SMB Flat $T_I = 140\text{ °C}$			
$I_{FSM}$	Surge non repetitive forward current		$t_p = 10\text{ ms}$ sinusoidal	75	A
$P_{ARM}$	Repetitive peak avalanche power		$t_p = 10\text{ }\mu\text{s}$ , $T_j = 125\text{ °C}$	172	W
$T_{stg}$	Storage temperature range		-65 to +175	°C	
$T_j$	Maximum operating junction temperature <sup>(1)</sup>		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		Max. value	Unit
$R_{th(j-l)}$	Junction to lead	SMB	25	°C/W
		SMB Flat	15	

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	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$	-		1.00	$\mu\text{A}$
		$T_j = 125\text{ °C}$		-	0.40	1.00	mA
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 3\text{ A}$	-		0.84	V
		$T_j = 125\text{ °C}$		-	0.63	0.68	
		$T_j = 25\text{ °C}$	$I_F = 6\text{ A}$	-		0.92	
		$T_j = 125\text{ °C}$		-	0.71	0.76	

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

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

To evaluate the conduction losses, use the following equation:

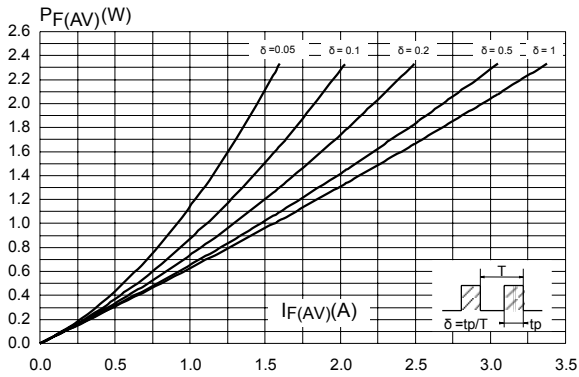
$$P = 0.6 \times I_{F(AV)} + 0.027 \times I_{F(RMS)}^2$$

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

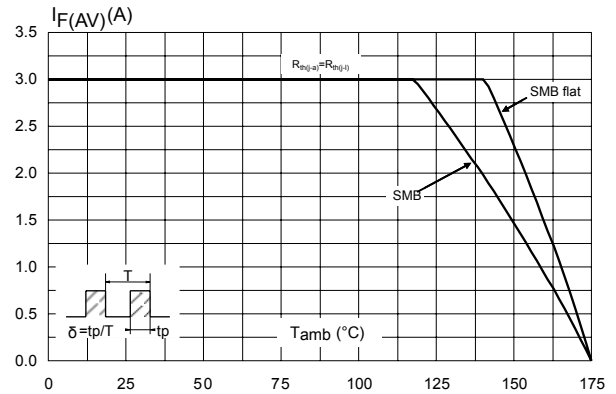
- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

## 1.1 Characteristics (curves)

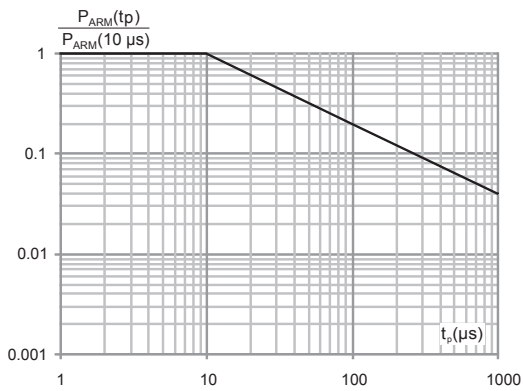
**Figure 1. Average forward power dissipation versus average forward current**



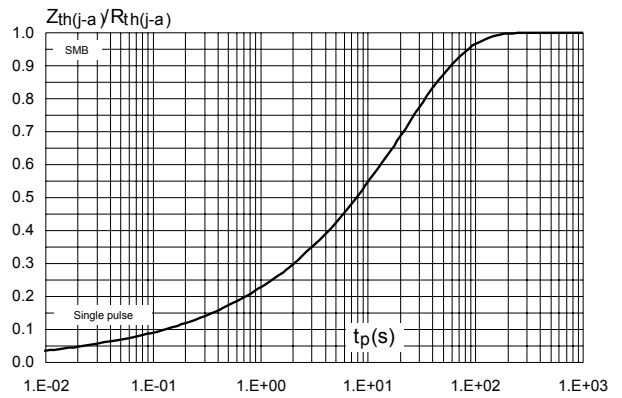
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )**



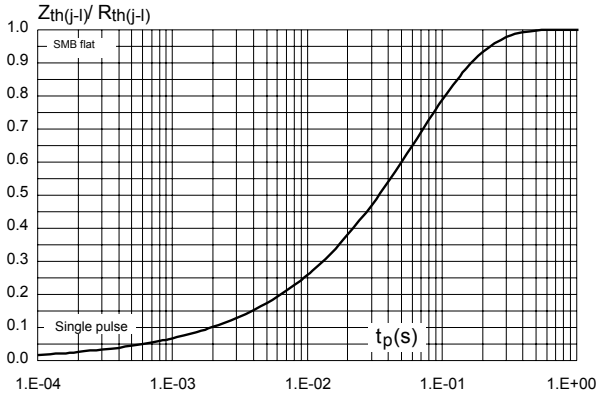
**Figure 3. Normalized avalanche power derating versus pulse duration ( $T_j = 125^\circ\text{C}$ )**



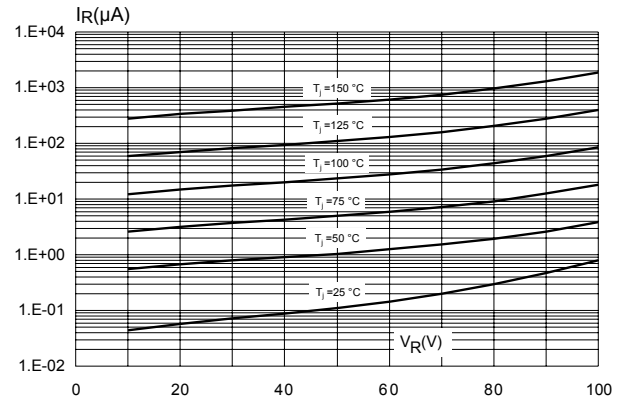
**Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration (SMB)**



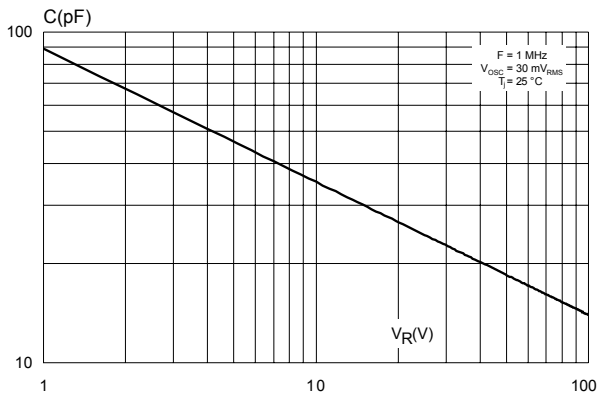
**Figure 5. Relative variation of thermal impedance junction to lead versus pulse duration (SMB Flat)**



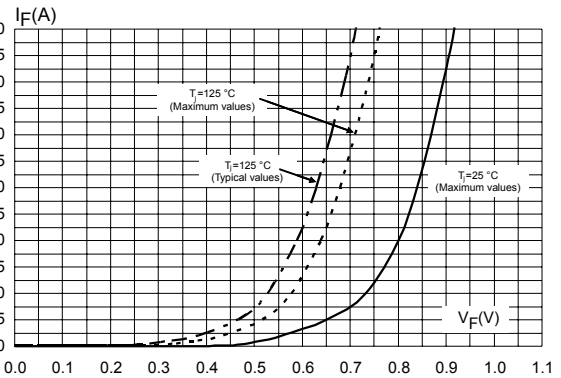
**Figure 6. Reverse leakage current versus reverse voltage applied (typical values)**



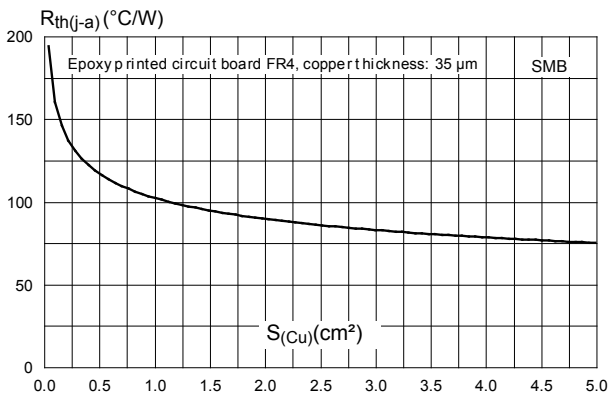
**Figure 7. Junction capacitance versus reverse voltage applied (typical values)**



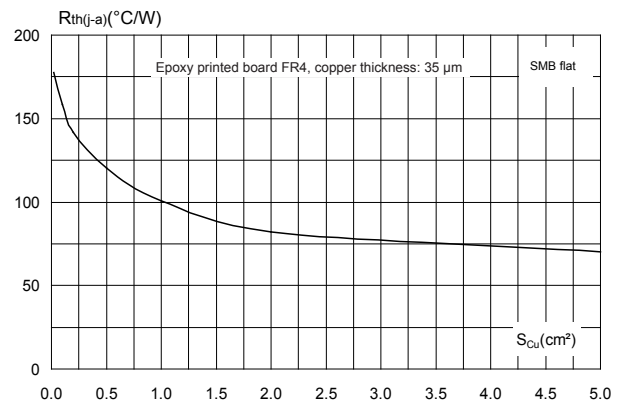
**Figure 8. Forward voltage drop versus forward current**



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



**Figure 10. Thermal resistance junction to ambient versus copper surface under each lead (SMB flat)**



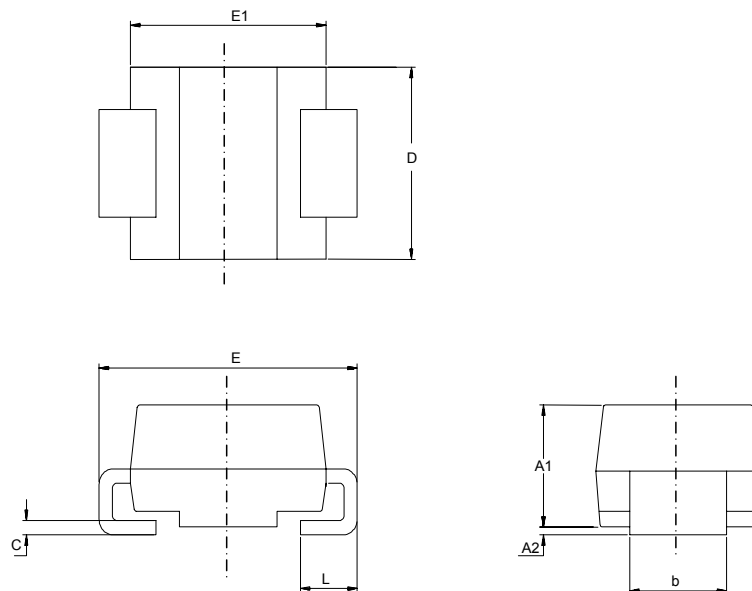
## 2 Package information

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 package information

- Epoxy meets UL94, V0
- Lead-free package

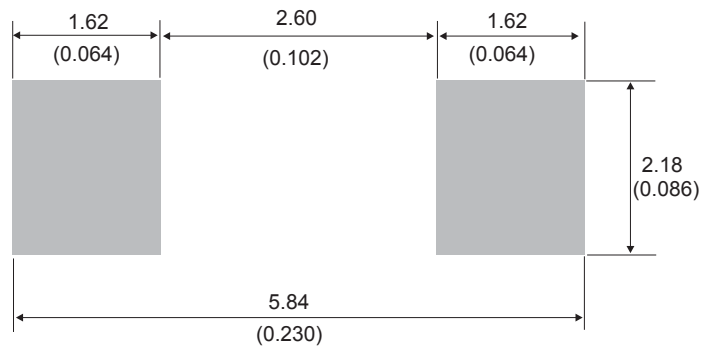
**Figure 11. SMB package outline**



**Table 4. SMB package mechanical data**

Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.0748	0.0965
A2	0.05	0.20	0.0020	0.0079
b	1.95	2.20	0.0768	0.0867
c	0.15	0.40	0.0059	0.0157
D	3.30	3.95	0.1299	0.1556
E	5.10	5.60	0.2008	0.2205
E1	4.05	4.60	0.1594	0.1811
L	0.75	1.50	0.0295	0.0591

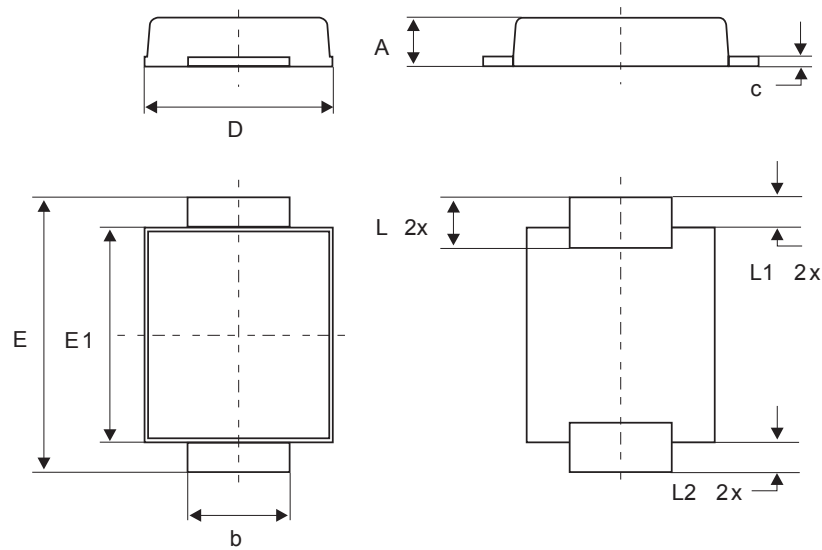
**Figure 12. SMB recommended footprint**



## 2.2 SMB Flat package information

- Epoxy meets UL94, V0
- Lead-free package

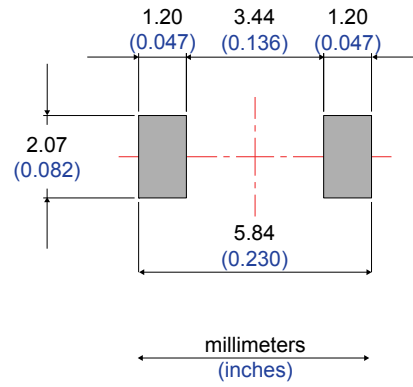
**Figure 13. SMB Flat package outline**



**Table 5. 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 14. Footprint recommendations, dimensions in mm (inches)**





### 3 Ordering information

**Table 6. Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS3H100U	G31	SMB	0.107 g	2500	Tape and reel
STPS3H100UF	FG31	SMB Flat	0.050 g	5000	Tape and reel

## Revision history

**Table 7. Document revision history**

Date	Version	Changes
15-Jan-2010	1	First issue.
27-Sept-2018	2	Updated cover page. Updated <a href="#">Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified)</a> . Removed figure 3, figure 4, figure 5 and figure 6. Minor text changes to improve readability.
14-Janv-2020	3	Updated <a href="#">Figure 3</a> . Minor text changes to improve readability.

**IMPORTANT NOTICE – PLEASE READ CAREFULLY**

STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST’s terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers’ products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. For additional information about ST trademarks, please refer to [www.st.com/trademarks](http://www.st.com/trademarks). All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2020 STMicroelectronics – All rights reserved