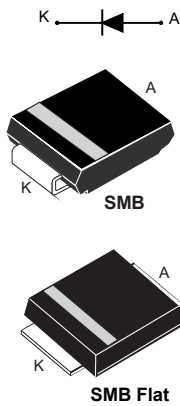


100 V power Schottky rectifier



Features

- Negligible switching losses
- High junction temperature capability
- Low leakage current
- Good trade-off between leakage current and forward voltage drop
- Avalanche capability specified
- ECOPACK[®]2 compliant

Applications

- Switching diode
- Battery charger
- SMPS
- DC/DC converter
- Telecom power
- 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 $T_j = 115\text{ °C}$	3	A	
		SMB Flat $T_j = 140\text{ °C}$			
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 ⁽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 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	μA
		$T_j = 125\text{ °C}$		-	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:

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

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

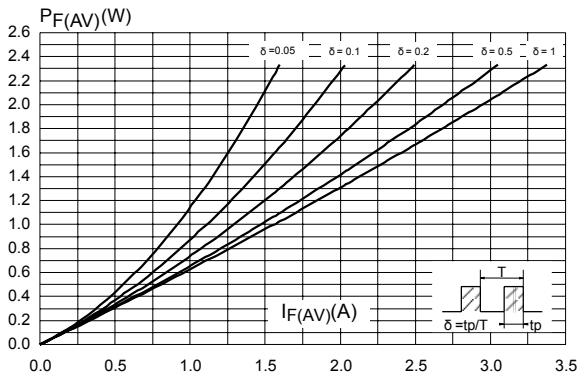


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$)

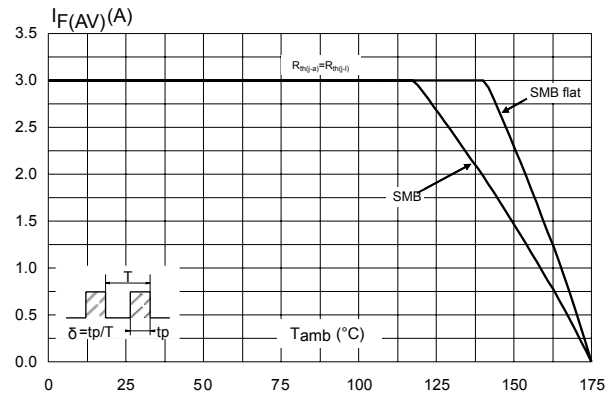


Figure 3. Normalized avalanche power derating versus junction temperature ($T_j = 125$ °C)

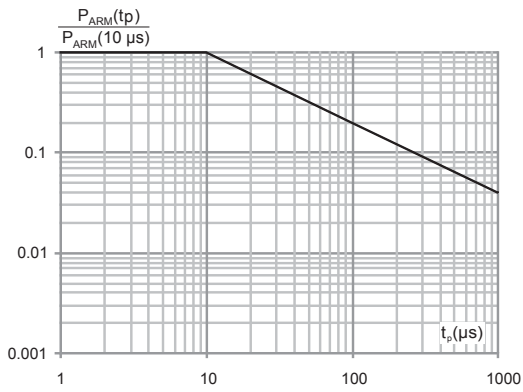


Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration (SMB)

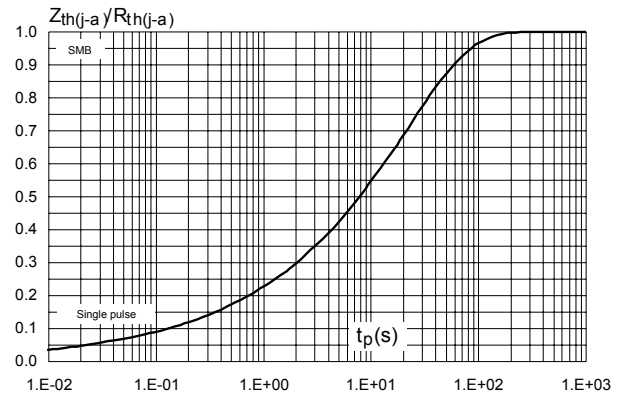


Figure 5. Relative variation of thermal impedance junction to lead versus pulse duration (SMB Flat)

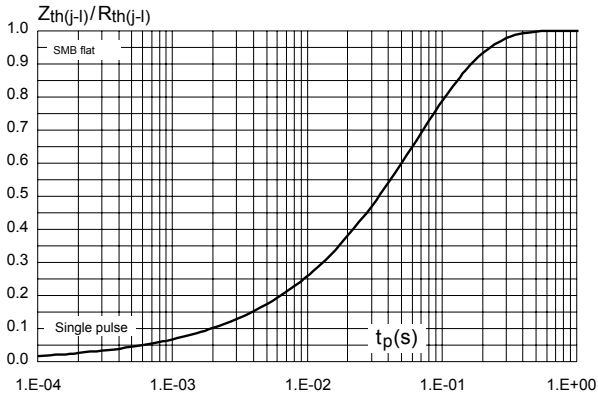


Figure 6. Reverse leakage current versus reverse voltage applied (typical values)

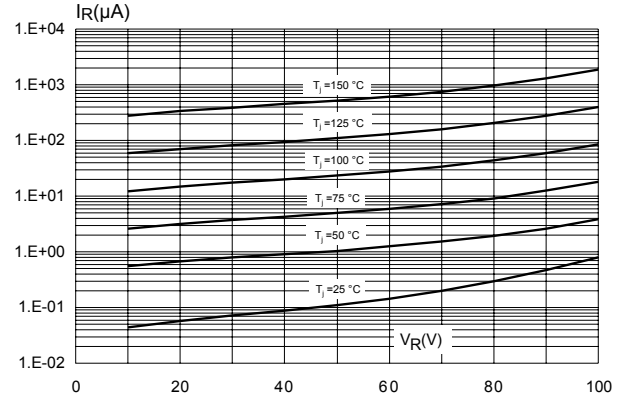


Figure 7. Junction capacitance versus reverse voltage applied (typical values)

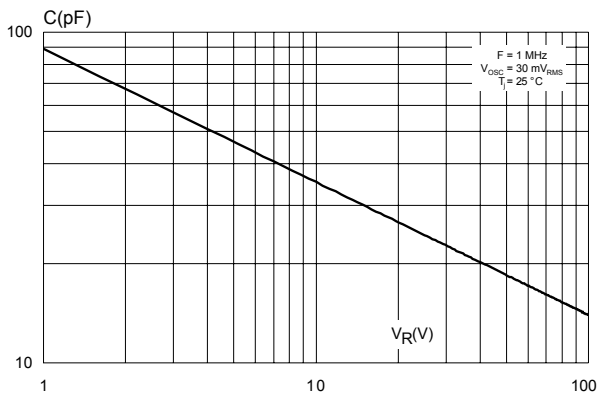


Figure 8. Forward voltage drop versus forward current

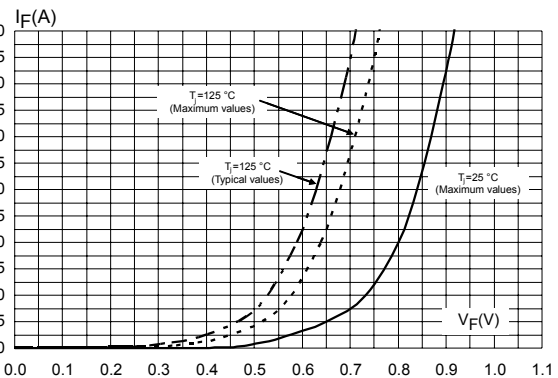


Figure 9. Thermal resistance junction to ambient versus copper surface under each lead (SMB)

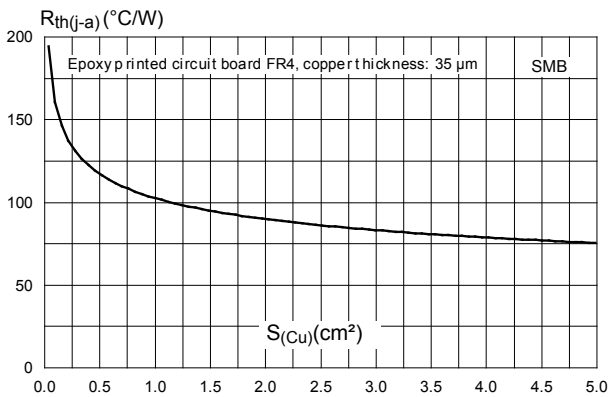
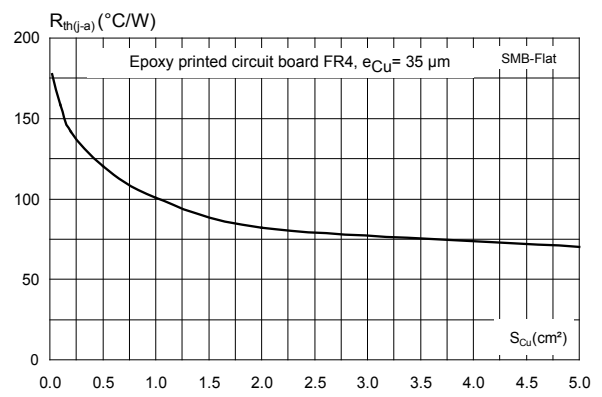


Figure 10. Thermal resistance junction to ambient versus copper surface under each lead (SMB Flat)



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. ECOPACK® is an ST trademark.

2.1 SMB package information

- Epoxy meets UL94, V0
- Lead-free package

Figure 11. SMB package outline

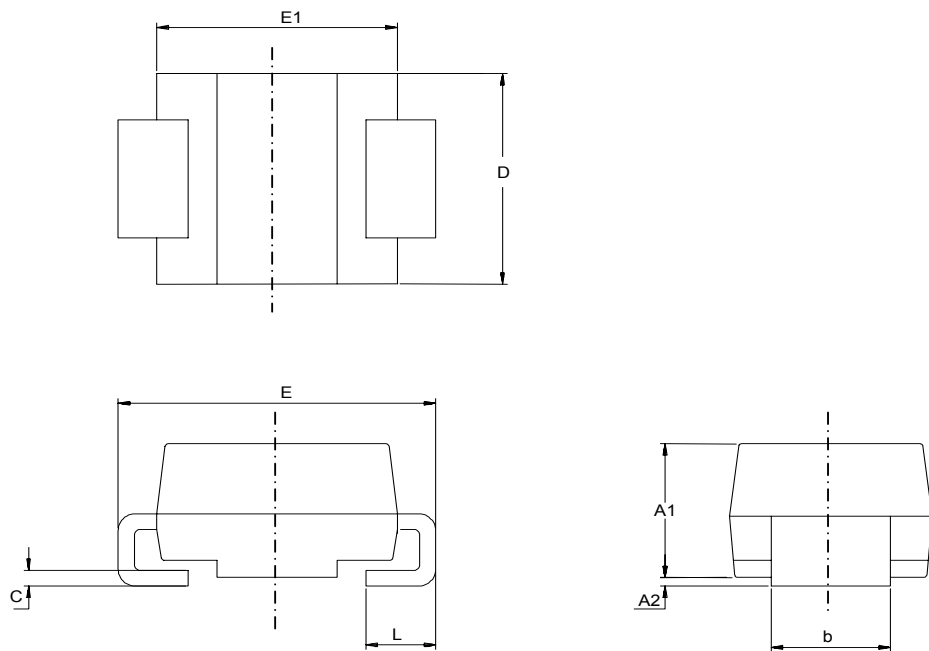


Table 4. SMB package mechanical data

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

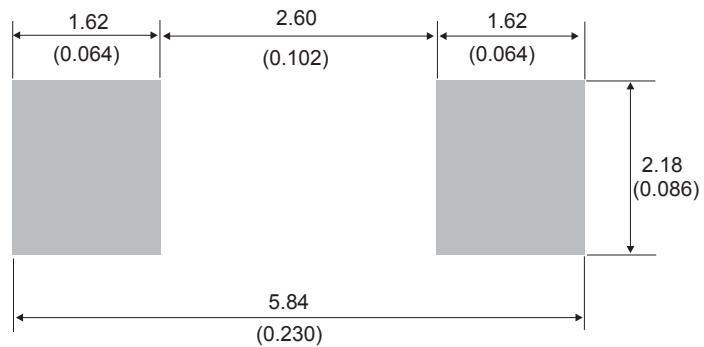
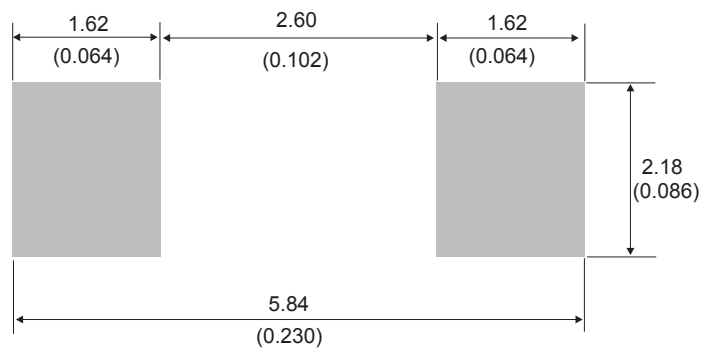


Table 5. SMB package mechanical data

Ref.	Dimensions			
	Millimeters		Inches ⁽¹⁾	
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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

1. For reference only

Figure 13. SMB recommended footprint



2.2 SMB Flat package information

- Epoxy meets UL94, V0
- Lead-free package

Figure 14. SMB Flat package outline

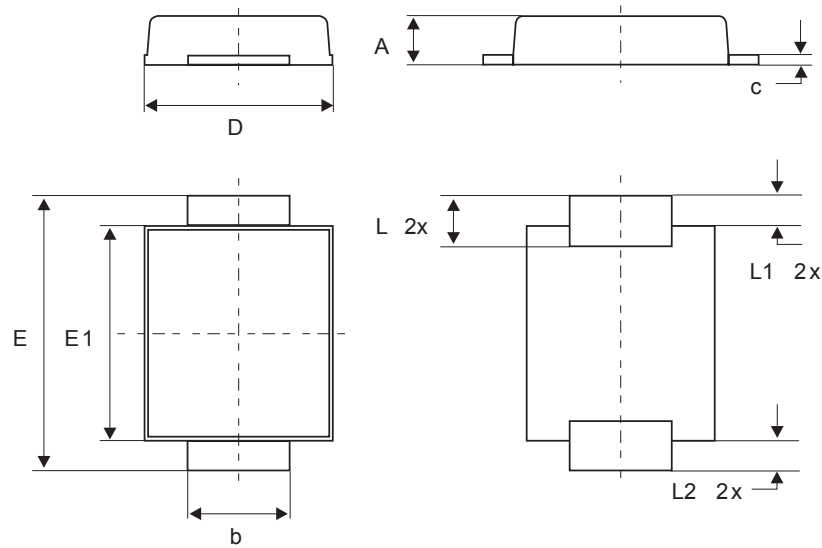
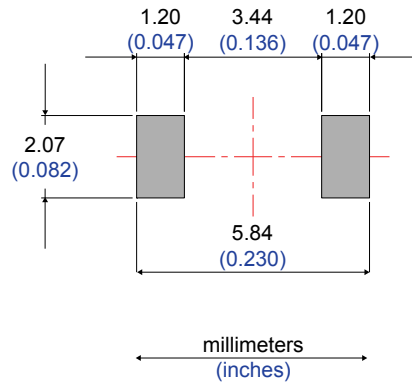


Table 6. SMB Flat mechanical data

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 15. Footprint recommendations, dimensions in mm (inches)



3 Ordering information

Table 7. 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 8. Document revision history

Date	Version	Changes
15-Jan-2010	1	First issue.
27-Sept-2018	2	Updated cover page. Updated Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified) . Removed figure 3, figure 4, figure 5 and figure 6. Minor text changes to improve readability.

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