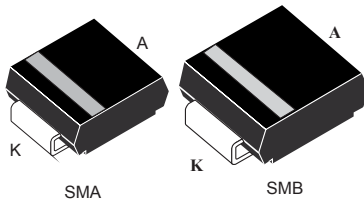


## Automotive high voltage power Schottky rectifier



### Features

- AEC-Q101 qualified
- Negligible switching losses
- High junction temperature capability
- Low leakage current
- Good trade off between leakage current and forward voltage drop
- Avalanche capability specified
- ECOPACK<sup>®</sup>2 compliant component
- PPAP capable
- $V_{RRM}$  guaranteed from  $-40^{\circ}\text{C}$  to  $+175^{\circ}\text{C}$

### Description

Schottky rectifiers packaged in SMA or SMB, and designed for high frequency miniature switched mode power supplies as DC/DC converters for automotive applications. It is particularly suited for LED lighting applications, ADAS power, and ECU (Engine Control Unit) in automotive environment.

Product status	
STPS1H100-Y	
Product summary	
Symbol	Value
$I_{F(AV)}$	1 A
$V_{RRM}$	100 V
$T_j$ (range)	$-40^{\circ}\text{C}$ to $+175^{\circ}\text{C}$
$V_{F(max.)}$	0.62 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(RMS)</sub>	Forward rms current		10	A	
I <sub>F(AV)</sub>	Average forward current, δ = 0.5	SMA	T <sub>L</sub> = 150 °C	1	A
		SMB	T <sub>L</sub> = 155 °C		
I <sub>FSM</sub>	Surge non repetitive forward current		t <sub>p</sub> = 10 ms sinusoidal	50	A
P <sub>ARM</sub>	Repetitive peak avalanche power		t <sub>p</sub> = 10 μs, T <sub>j</sub> = 125 °C	108	W
T <sub>stg</sub>	Storage temperature range		-65 to +175	°C	
T <sub>j</sub>	Maximum operating junction temperature <sup>(1)</sup>		+175	°C	

1. (dP<sub>tot</sub>/dT<sub>j</sub>) < (1/R<sub>th(j-a)</sub>) condition to avoid thermal runaway for a diode on its own heatsink.

**Table 2. Thermal parameters**

Symbol	Parameter		Max. value	Unit
R <sub>th(j-l)</sub>	Junction to lead	SMA	30	°C/W
		SMB	25	

**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>	-		4	μA
		T <sub>j</sub> = 125 °C		-	0.2	0.5	mA
V <sub>F</sub> <sup>(2)</sup>	Forward voltage drop	T <sub>j</sub> = 25 °C	I <sub>F</sub> = 1 A	-		0.77	V
		T <sub>j</sub> = 125 °C		-	0.58	0.62	
		T <sub>j</sub> = 25 °C	I <sub>F</sub> = 2 A	-		0.86	
		T <sub>j</sub> = 125 °C		-	0.65	0.70	

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

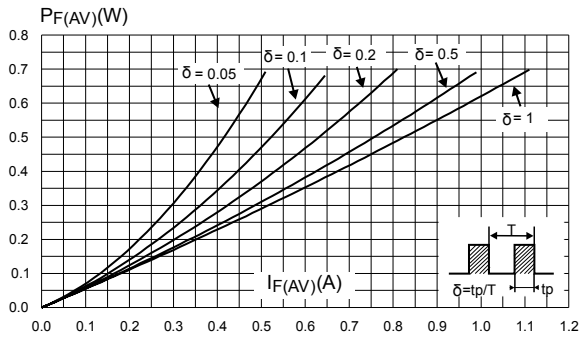
2. Pulse test: t<sub>p</sub> = 380 μs, δ < 2%

To evaluate the conduction losses, use the following equation:

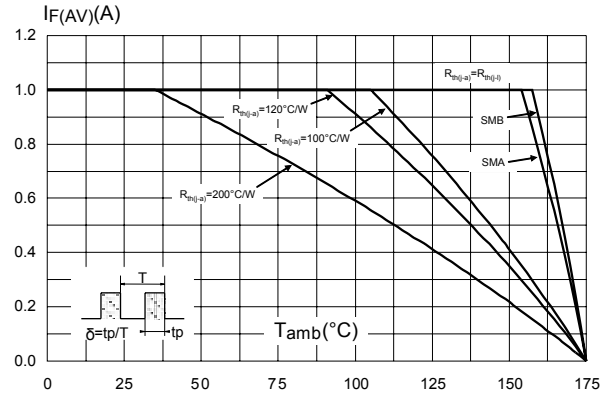
$$P = 0.54 \times I_{F(AV)} + 0.08 \times I_{F(RMS)}^2$$

### 1.1 Characteristics (curves)

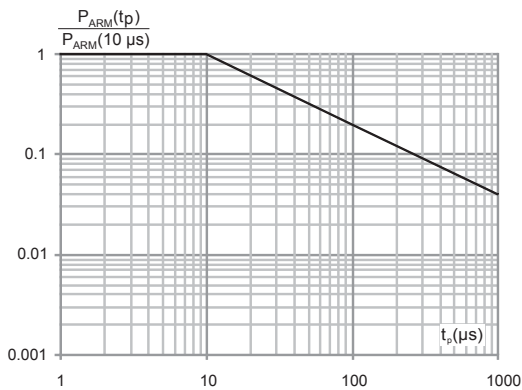
**Figure 1. Average forward power dissipation versus average forward current**



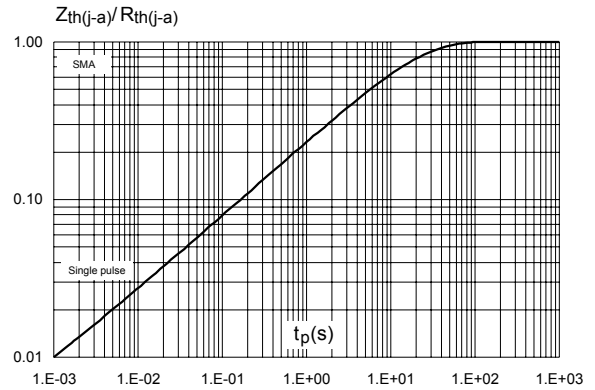
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )**



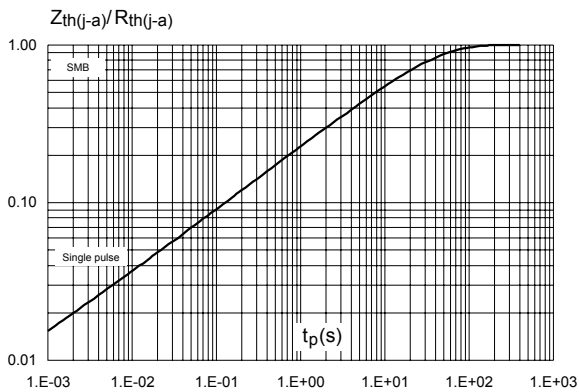
**Figure 3. Normalized avalanche power derating versus junction temperature ( $T_j = 125^{\circ}C$ )**



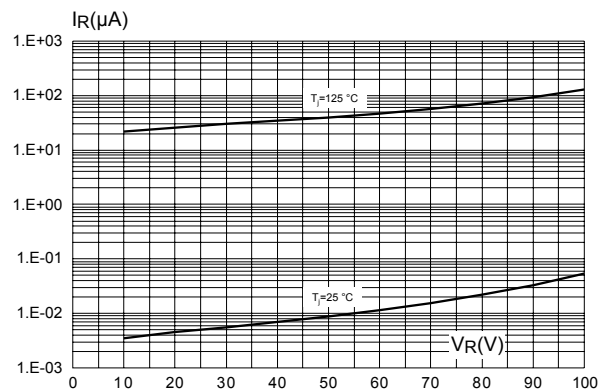
**Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration (SMA)**



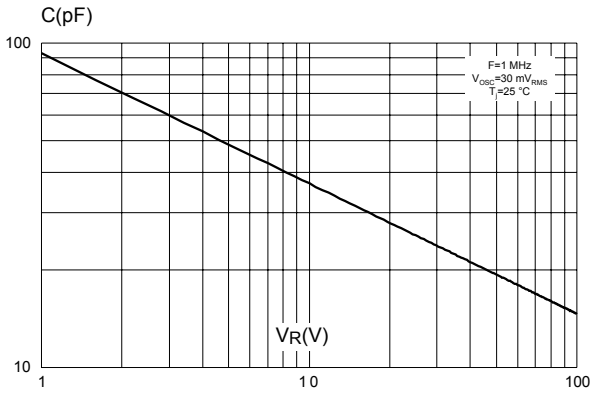
**Figure 5. Relative variation of thermal impedance junction to ambient versus pulse duration (SMB)**



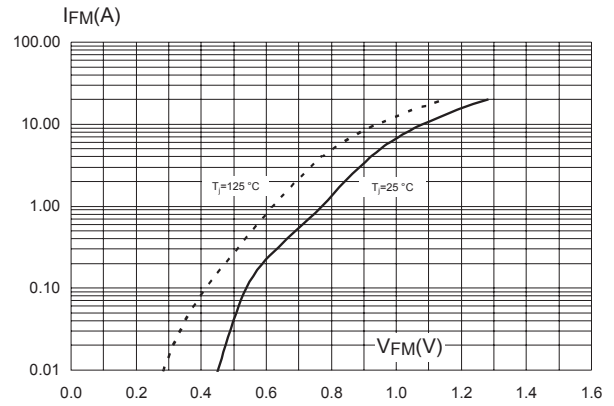
**Figure 6. Reverse leakage current versus reverse voltage applied (typical values)**



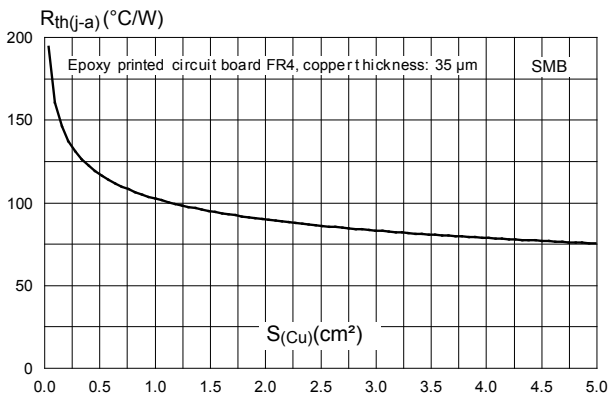
**Figure 7. Junction capacitance versus reverse voltage applied (typical values)**



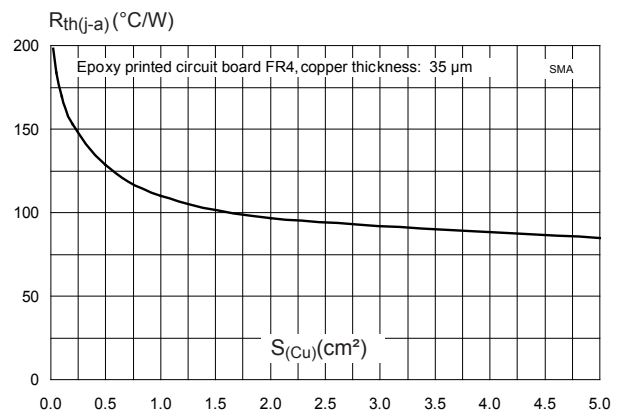
**Figure 8. Forward voltage drop versus forward current (maximum values)**



**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 (SMA)**



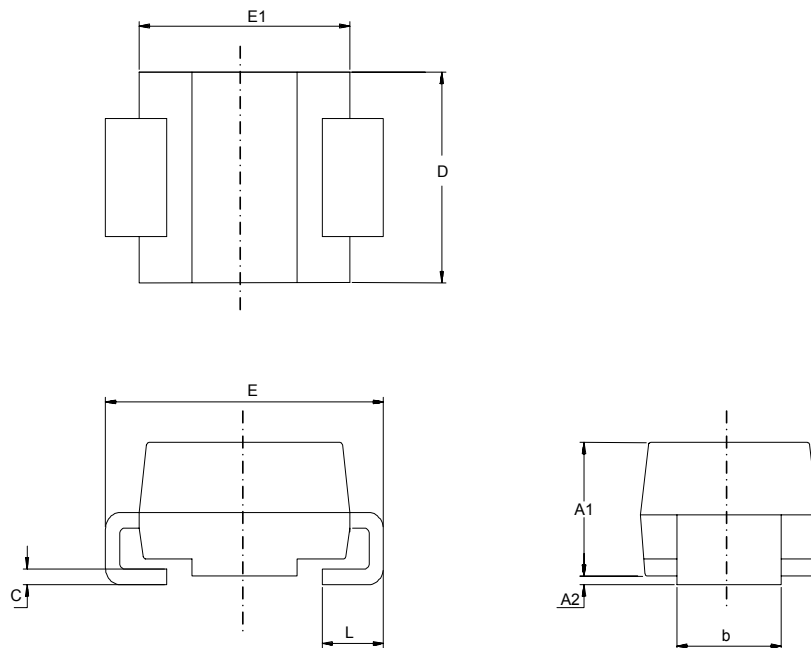
## 2 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK<sup>®</sup> is an ST trademark.

### 2.1 SMB package information

- Epoxy meets UL94, V0
- Lead-free package

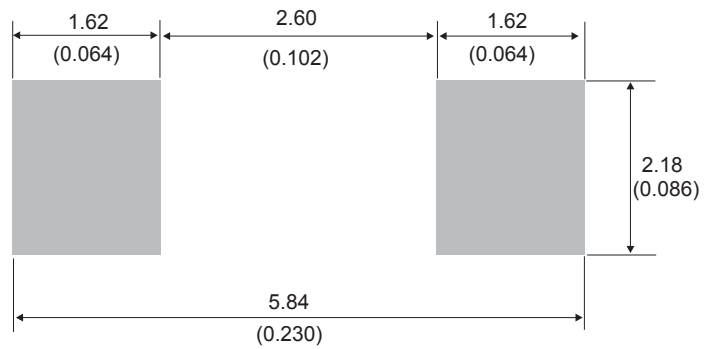
**Figure 11. SMB package outline**



**Table 4. SMB package mechanical data**

Ref.	Dimensions			
	Millimeters		Inches	
	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

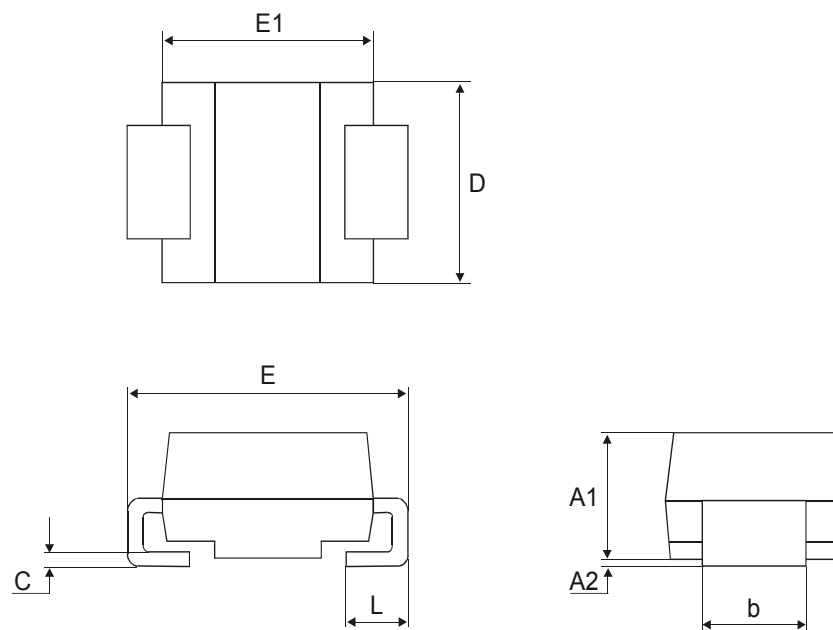
**Figure 12. SMB recommended footprint**



## 2.2 SMA package information

- Epoxy meets UL94, V0
- Lead-free package

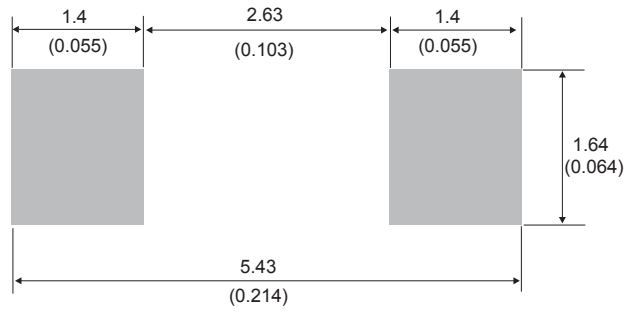
**Figure 13. SMA package outline**



**Table 5. SMA package mechanical data**

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.097
A2	0.05	0.20	0.002	0.008
b	1.25	1.65	0.049	0.065
c	0.15	0.40	0.006	0.016
D	2.25	2.90	0.089	0.114
E	4.80	5.35	0.189	0.211
E1	3.95	4.60	0.156	0.181
L	0.75	1.50	0.030	0.059

**Figure 14. SMA recommended footprint in mm (inches)**





### 3 Ordering Information

**Table 6. Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS1H100AY	S11Y	SMA	0.068 g	5000	Tape and reel
STPS1H100UY	G11Y	SMB	0.107	2500	

## Revision history

**Table 7. Document revision history**

Date	Version	Changes
3-Dec-2010	1	Initial release.
10-Apr-2018	2	Update Figure 3 "Normalized avalanche power derating versus pulse duration" with $P_{ARM}$ 10 $\mu$ s curve.

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