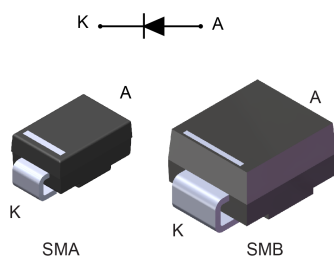


1 A - 30 V power Schottky rectifier



Features

- Very low forward voltage drop for less power dissipation
- Optimized conduction/reverse losses trade-off which means the highest yield in the applications
- Surface mount miniature packages
- Avalanche rated
- ECOPACK®2 compliant

Applications

- Cordless appliance
- SSD
- Battery charger
- Telecom power
- DC / DC converter

Description

Single Schottky rectifiers designed for high frequency miniature switched mode power supplies such as adaptors and on board DC/DC converters.

Packaged in SMA or SMB, the **STPS130** is ideal for use in parallel with MOSFETs in synchronous and low voltage secondary rectification.

Product status	
STPS130	
Product summary	
Symbol	Value
$I_{F(AV)}$	1 A
V_{RRM}	30 V
$T_{j(max.)}$	150 °C
$V_{F(typ.)}$	0.37 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	30	V
$I_{F(RMS)}$	Forward rms current	7	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$, square wave	$T_L = 130\text{ °C}$ 1	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10\text{ ms}$ sinusoidal 45	A
P_{ARM}	Repetitive peak avalanche power	$t_p = 10\text{ }\mu\text{s}$, $T_j = 125\text{ °C}$ 86	W
T_{stg}	Storage temperature range	-65 to +150	°C
T_j	Maximum operating junction temperature ⁽¹⁾	+150	°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	SMA 30	°C/W
		SMB 23	

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	$T_j = 25\text{ °C}$	-		10	μA
		$T_j = 125\text{ °C}$	-	1.5	10	mA
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	-		0.55	V
		$T_j = 125\text{ °C}$	-	0.37	0.46	
		$T_j = 25\text{ °C}$	-		0.63	
		$T_j = 125\text{ °C}$	-	0.45	0.55	

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:

$$P = 0.37 \times I_{F(AV)} + 0.090 \times I_{F(RMS)}^2$$

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

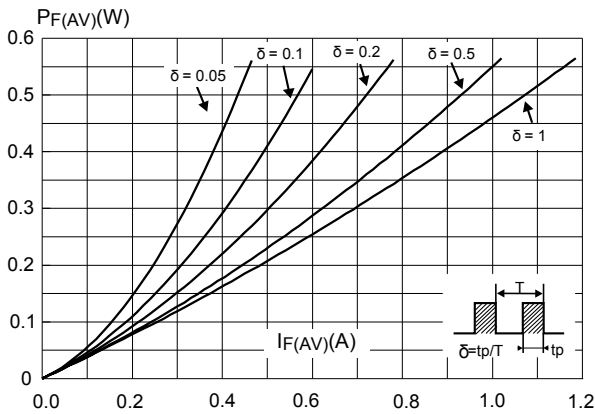


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$)

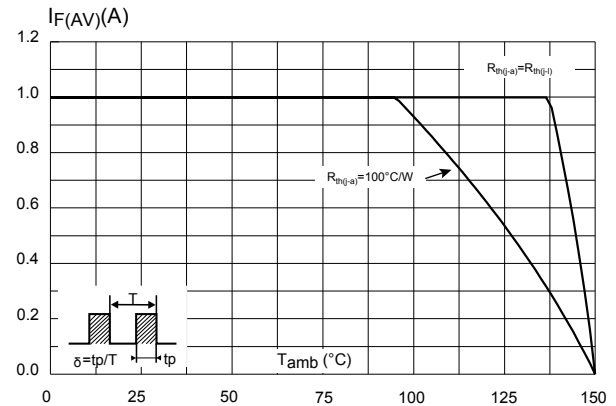


Figure 3. Normalized avalanche power derating versus pulse duration ($T_j = 125^\circ\text{C}$)

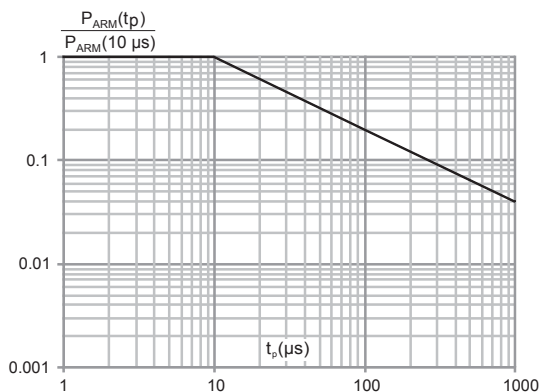


Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration (SMB)

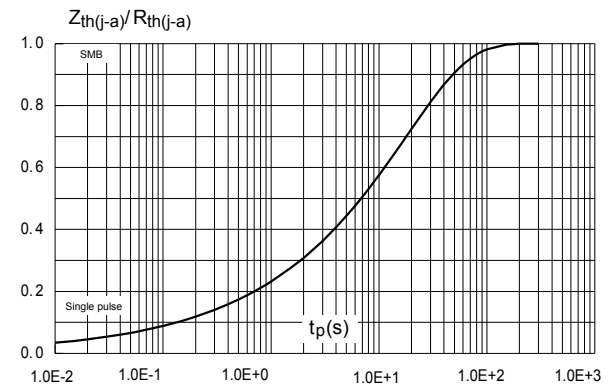


Figure 5. Relative variation of thermal impedance junction to ambient versus pulse duration (SMA)

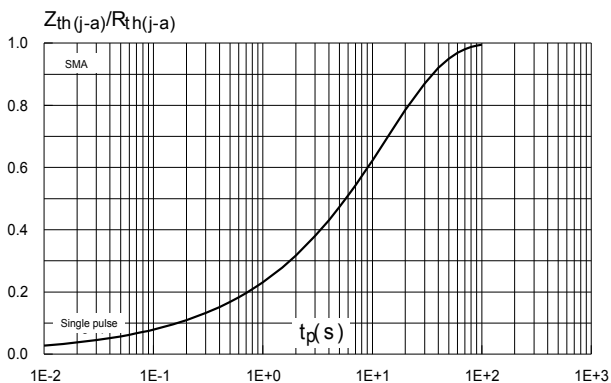


Figure 6. Reverse leakage current versus reverse voltage applied (typical values)

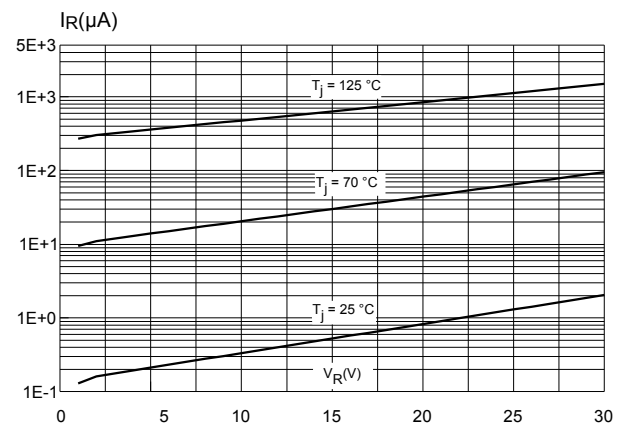
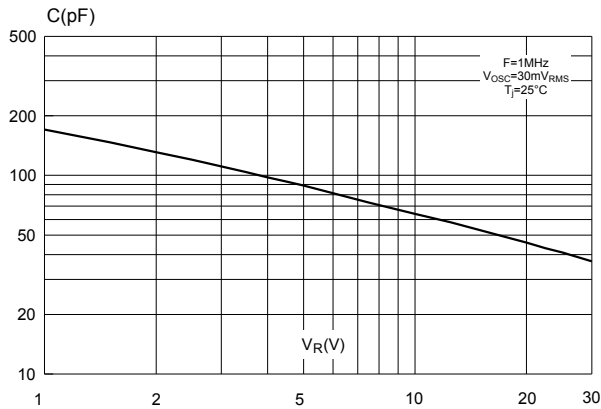
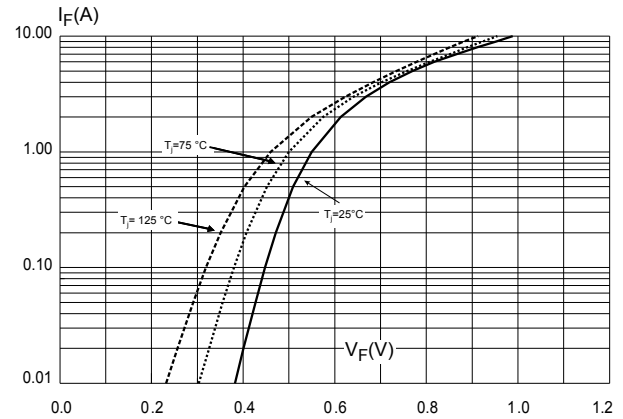
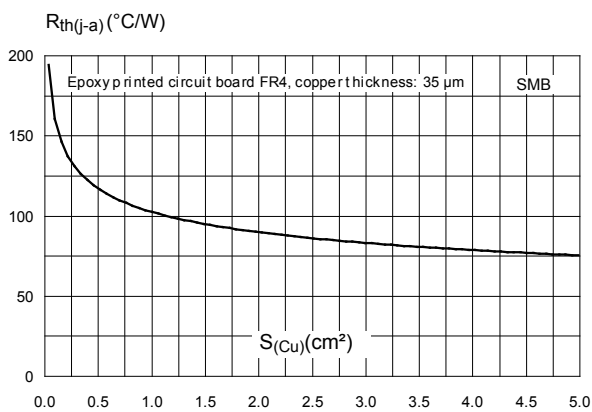
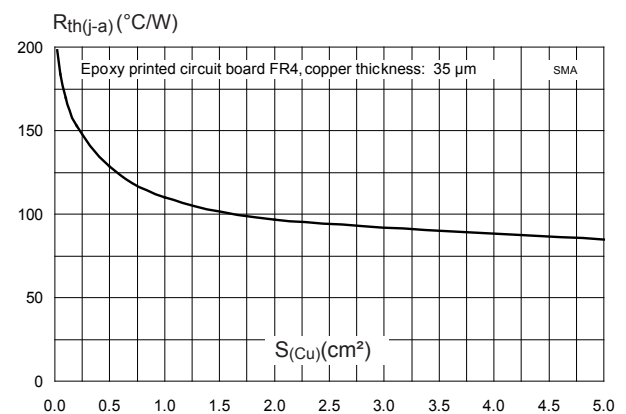


Figure 7. Junction capacitance versus reverse voltage applied (typical values)

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®** 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

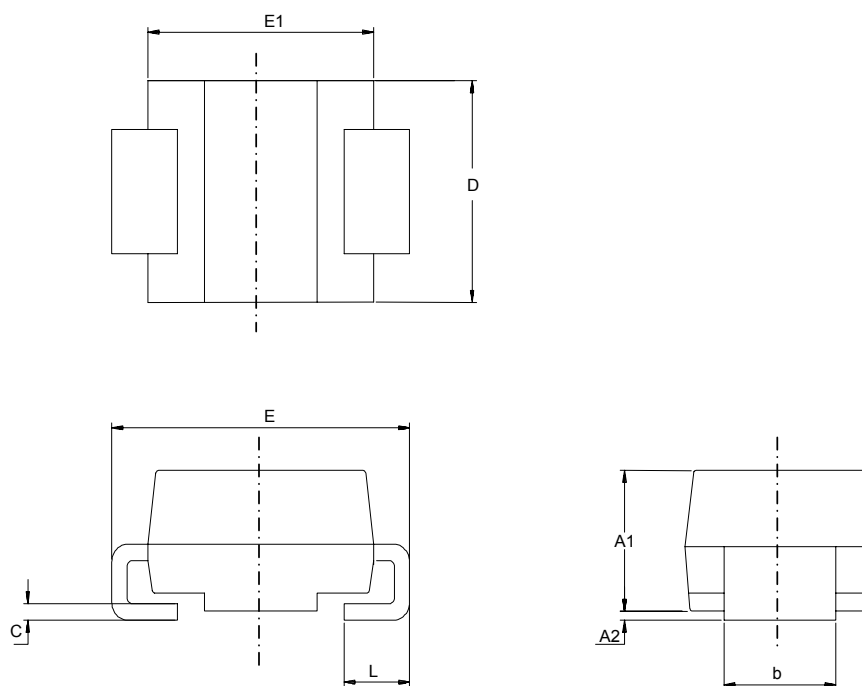
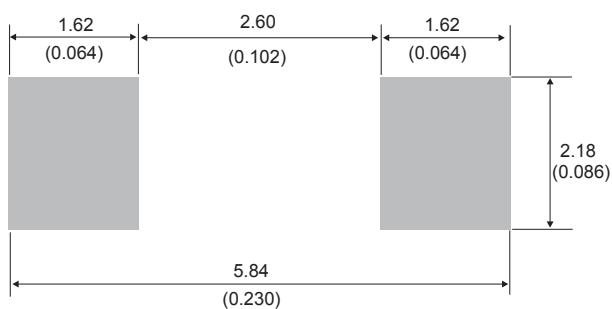


Table 4. SMB package mechanical data

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


2.2 SMA package information

- Epoxy meets UL94, V0
- Cooling method : by conduction (C)

Figure 13. SMA package outline

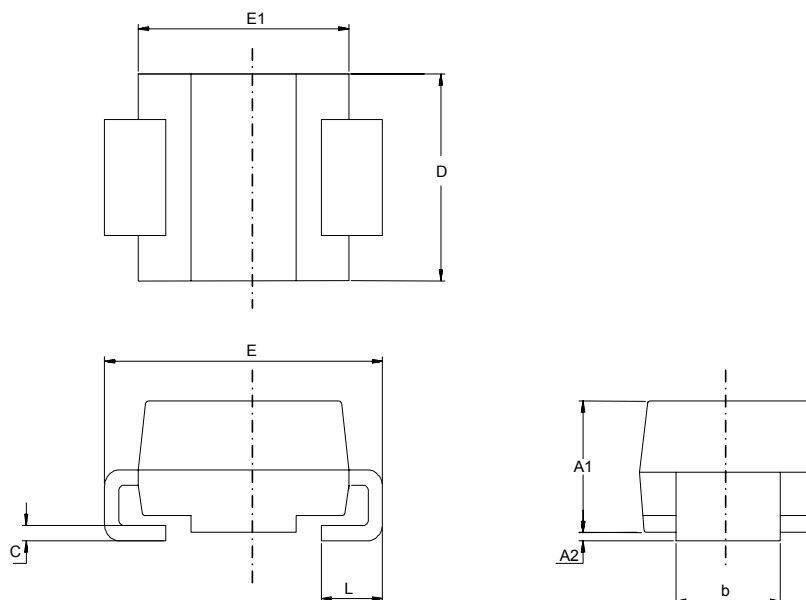
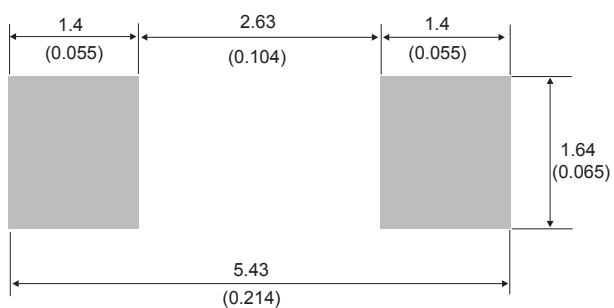


Table 5. SMA package mechanical data

Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	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
STPS130A	S130	SMA	0.068 g	5000	Tape and reel
STPS130U	G12	SMB	0.107 g	2500	Tape and reel

Revision history

Table 7. Document revision history

Date	Version	Changes
Jul-2003	4A	Last update.
Aug-2004	5	SMA package dimensions update. Reference A1 max changed from 2.70 mm (0.106 inc.) to 2.03 mm (0.080 inc).
21-Nov-2018	6	Updated Table 3. Static electrical characteristics and Figure 3. Normalized avalanche power derating versus pulse duration (T_j = 125 °C) .

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