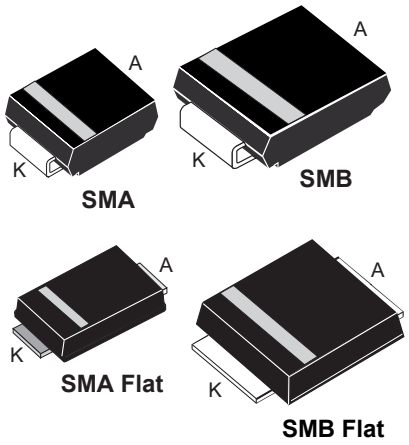
STPS2H100

Datasheet

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 component

Description

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

Packaged in SMA, SMA Flat, SMB and SMB Flat, the STPS2H100 is ideal for use in lighting and telecom power applications.

Product status link	
STPS2H100	
Product summary	
Symbol	**Value**
$I_{F(AV)}$	2 A
V_{RRM}	100 V
T_j (max.)	175 °C
V_F (max.)	0.65 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	SMA	T_l = 130 °C, δ = 0.5	2	A
		SMB	T_l = 135 °C, δ = 0.5		
		SMA Flat	T_l = 145 °C, δ = 0.5		
		SMB Flat	T_l = 150 °C, δ = 0.5		
I_{FSM}	Surge non repetitive forward current		t_p = 10 ms sinusoidal	75	A
P_{ARM}	Repetitive peak avalanche power		t_p = 10 µs, T_j = 125 °C	173	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 parameters

Symbol	Parameter		Max. value	Unit
$R_{th(j-l)}$	Junction to lead	SMA	30	°C/W
		SMA Flat	20	
		SMB	25	
		SMB Flat	15	

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		1.00	µA
		T_j = 125 °C		-	0.40	1.00	mA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 2 A	-		0.79	V
		T_j = 125 °C		-	0.60	0.65	
		T_j = 25 °C	I_F = 4 A	-		0.88	
		T_j = 125 °C		-	0.69	0.74	

1. *Pulse test: t_p = 5 ms, δ < 2%*
2. *Pulse test: t_p = 380 µs, δ < 2%*

To evaluate the conduction losses, use the following equation:

$P = 0.56 \times I_{F(AV)} + 0.045 \times I_F{}^2{}_{(RMS)}$

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

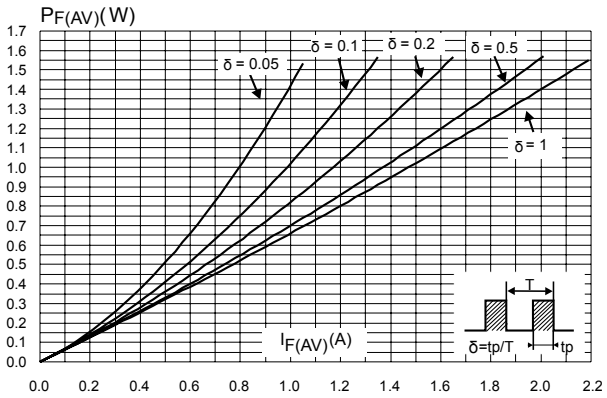


Figure 2. Average forward current versus ambient temperature (δ = 0.5, SMA / SMB)

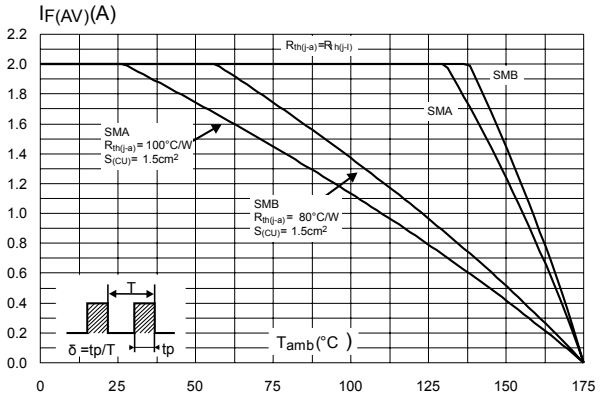


Figure 3. Average forward current versus ambient temperature (δ = 0.5, SMB Flat)

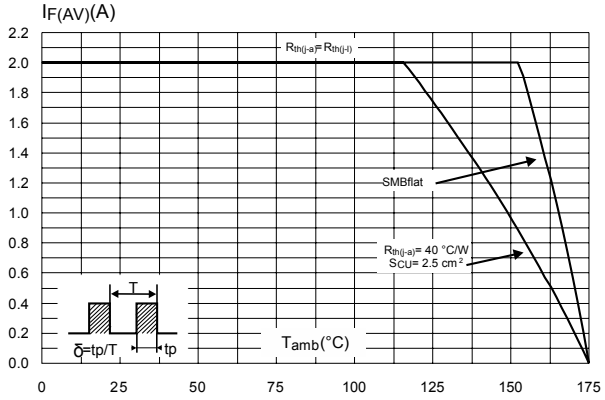


Figure 4. Average forward current versus ambient temperature (δ = 0.5, SMA Flat)

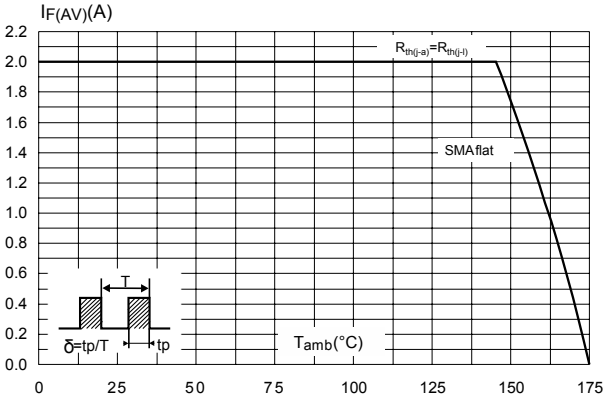


Figure 5. Normalized avalanche power derating versus junction temperature (T_j = 125 °C)

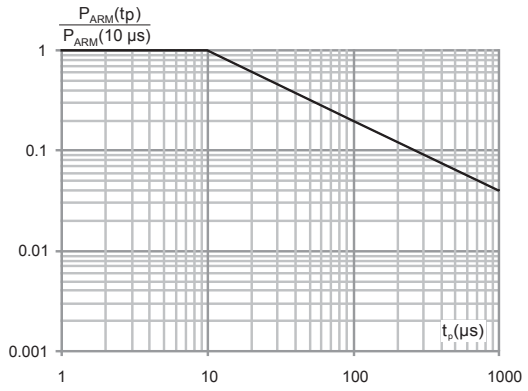


Figure 6. Relative variation of thermal impedance junction to ambient versus pulse duration (SMA)

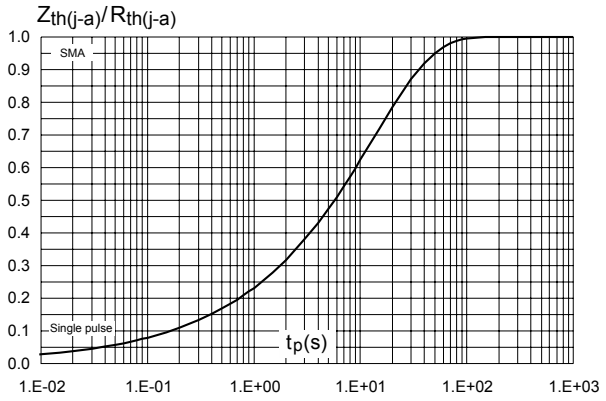


Figure 7. Relative variation of thermal impedance junction to lead versus pulse duration (SMA Flat)

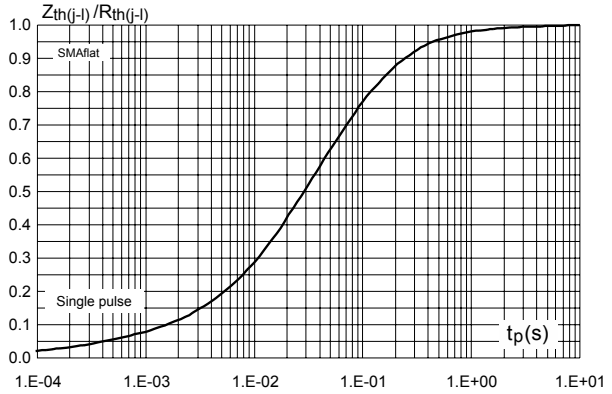


Figure 8. Relative variation of thermal impedance junction to ambient versus pulse duration (SMB)

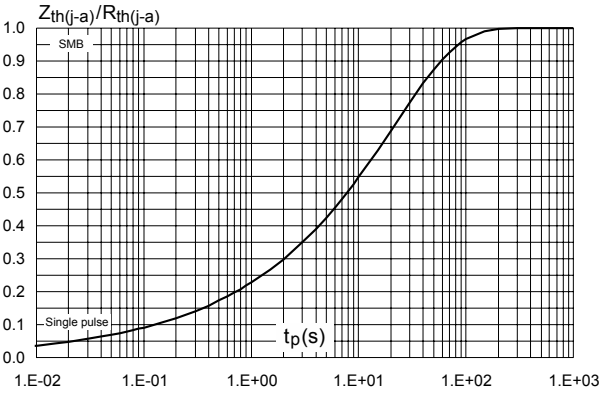


Figure 9. Relative variation of thermal impedance junction to lead versus pulse duration (SMB Flat)

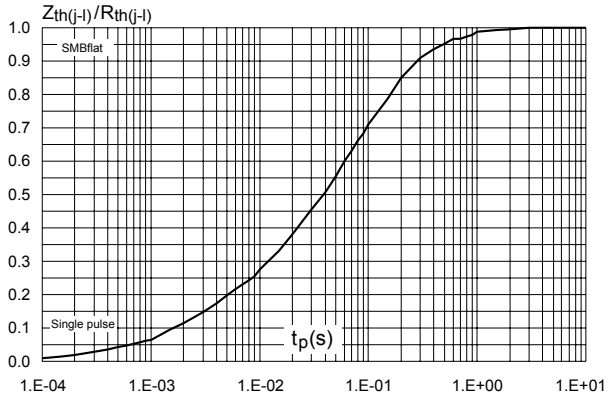


Figure 10. Reverse leakage current versus reverse voltage applied (typical values)

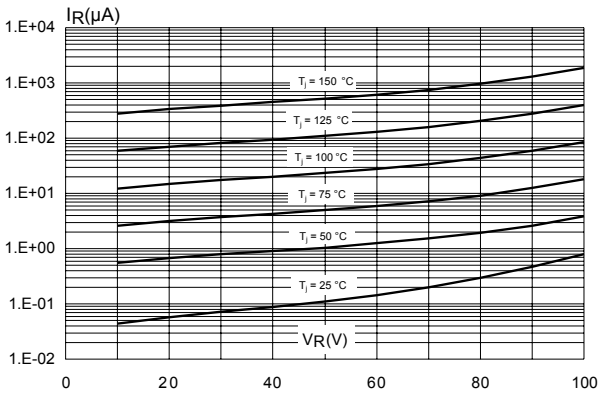


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

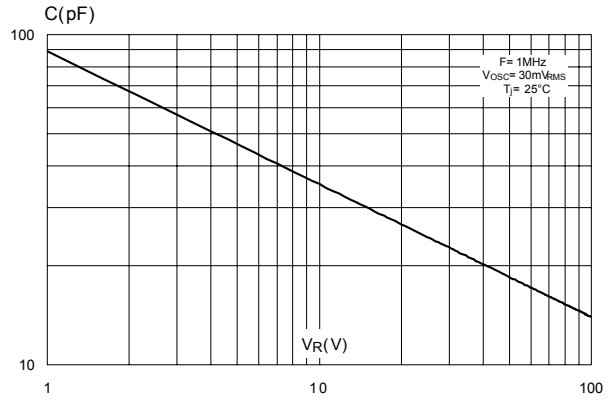


Figure 12. Forward voltage drop versus forward current (low level)

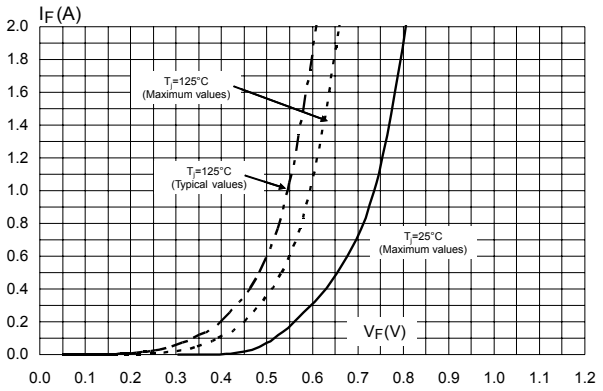


Figure 13. Forward voltage drop versus forward current (high level)

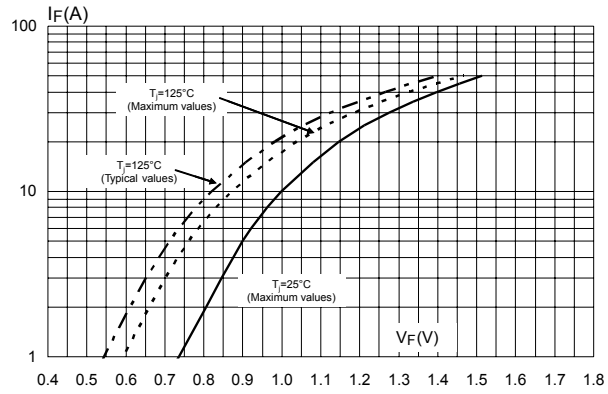


Figure 14. Thermal resistance junction to ambient versus copper surface under each lead (SMA)

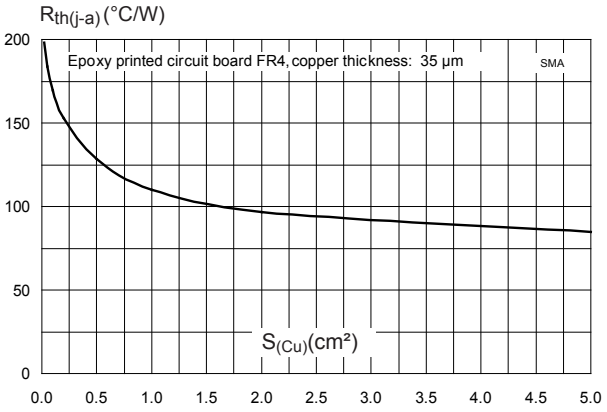


Figure 15. Thermal resistance junction to ambient versus copper surface under each lead (SMA Flat)

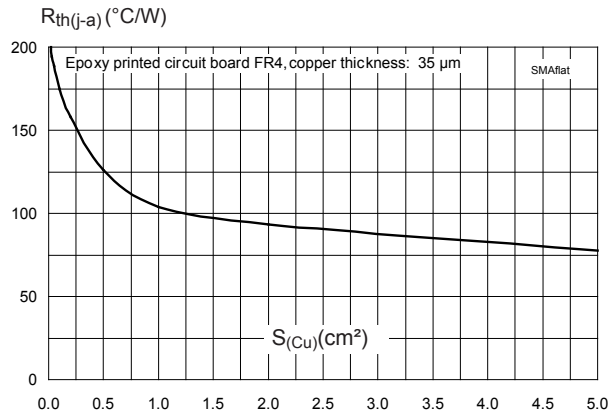


Figure 16. Thermal resistance junction to ambient versus copper surface under each lead (SMB)

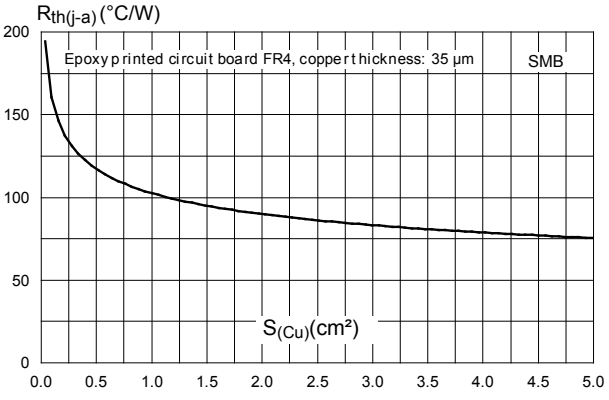
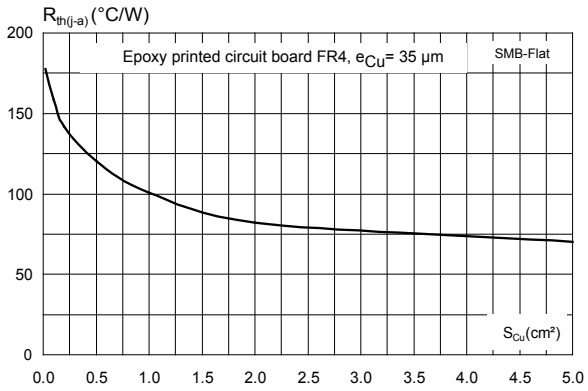


Figure 17. Thermal resistance junction to ambient versus copper surface under each lead (SMB Flat)



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 SMA Flat package information

- Epoxy meets UL94, V0
- Lead-free package

Figure 18. SMA Flat package outline

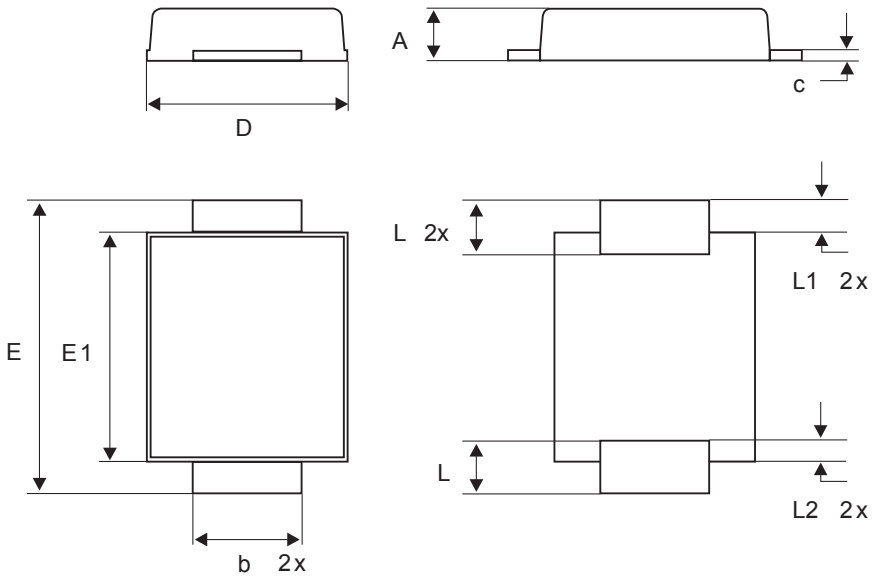
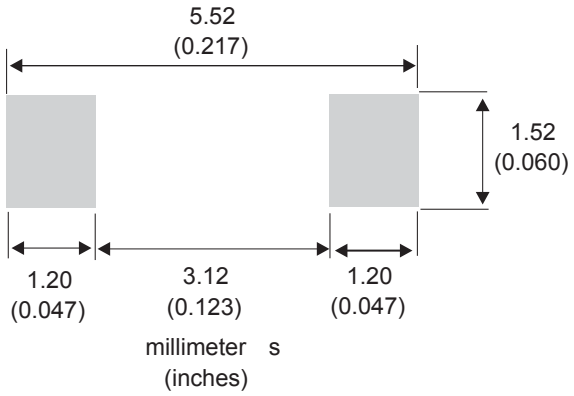


Table 4. SMA Flat package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.10	0.075		0.097
b	1.25		1.65	0.049		0.065
c	0.15		0.40	0.006		0.016
D	2.25		2.95	0.089		0.116
E	4.80		5.60	0.189		0.220
E1	3.95		4.60	0.156		0.181
L	0.75		1.50	0.030		0.059
L1		0.50			0.020	
L2		0.50			0.020	

Figure 19. **SMA Flat recommended footprint in mm (inches)**



2.2 SMA package information

- Epoxy meets UL94, V0
- Lead-free package

Figure 20. SMA package outline

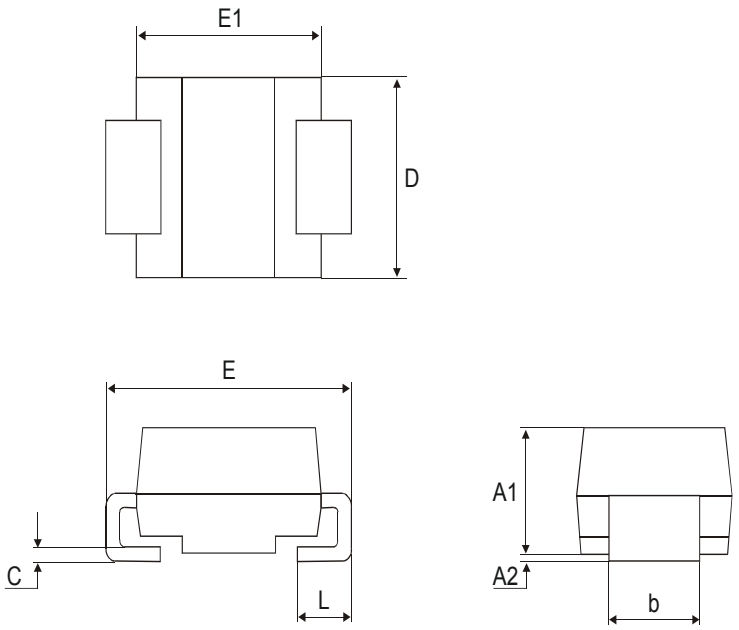
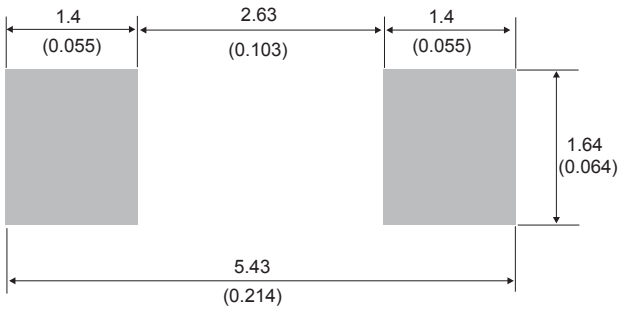


Table 5. SMA package mechanical data

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 21. **SMA recommended footprint in mm (inches)**



2.3 SMB package information

- Epoxy meets UL94, V0
- Lead-free package

Figure 22. SMB package outline

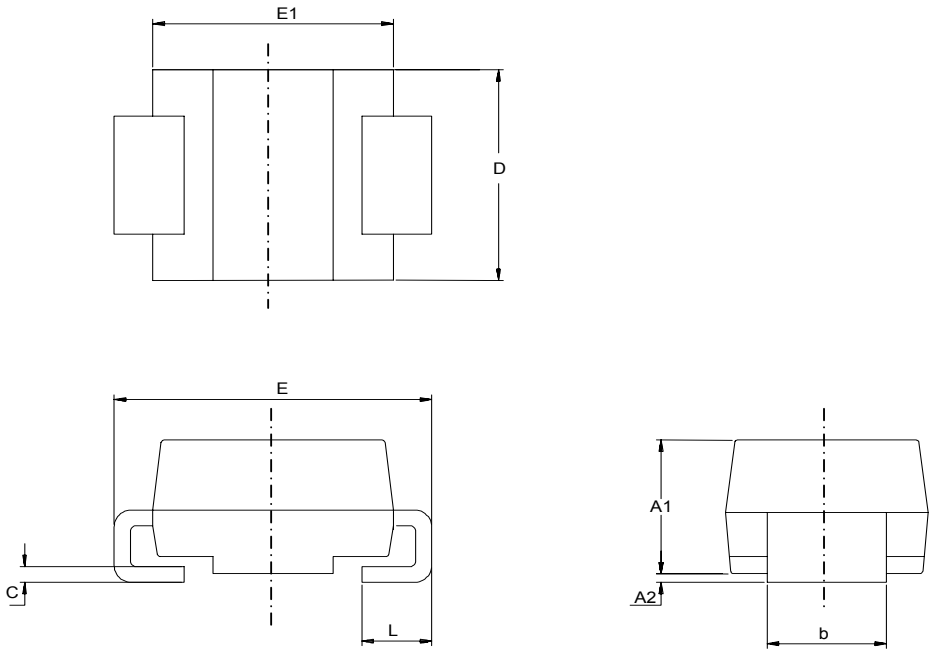
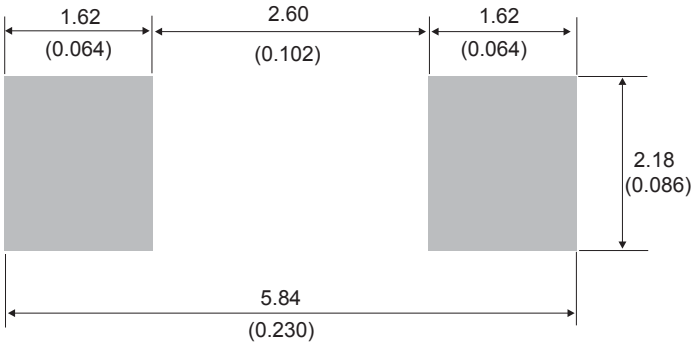


Table 6. SMB package mechanical data

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 23. **SMB recommended footprint**



2.4 SMB Flat package information

- Epoxy meets UL94, V0
- Lead-free package

Figure 24. SMB Flat package outline

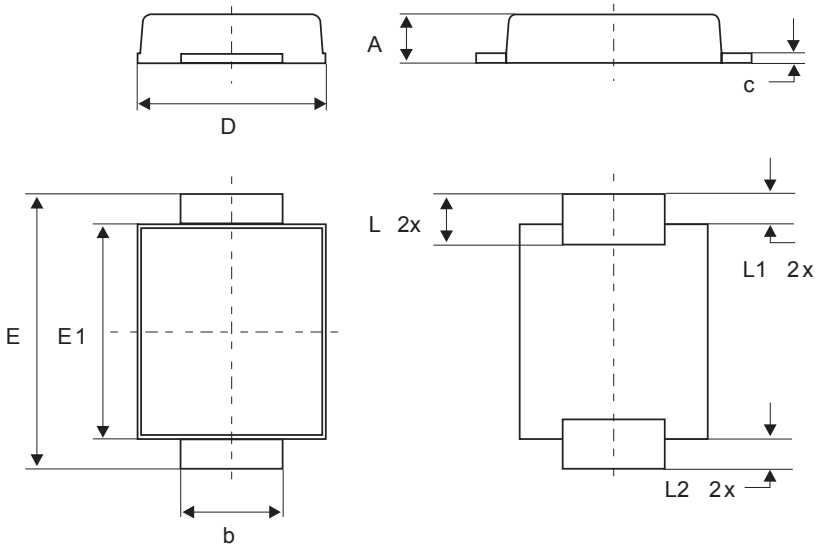
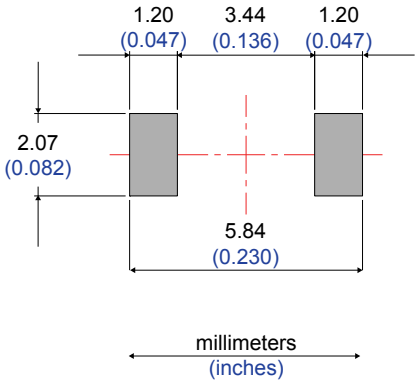


Table 7. SMB Flat mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	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 25. Footprint recommendations, dimensions in mm (inches)



3 Ordering Information

Table 8. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS2H100A	S21	SMA	0.068 g	5000	Tape and reel
STPS2H100AF	F21	SMA Flat	0.035 g	10000	Tape and reel
STPS2H100U	G21	SMB	0.107 g	2500	Tape and reel
STPS2H100UF	FG21	SMB Flat	0.050 g	5000	Tape and reel

Revision history

Table 9. **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 (0.106 inches) to 2.03 mm (0.080 inches).
08-Feb-2007	6	Reformatted to current standards. Added ECOPACK statement. Added SMBflat package.
15-Feb-2010	7	Updated weight for SMBflat in Table 9.
24-Jun-2013	8	Added SMAflat package
17-May-2018	9	Removed figure 6. Updated Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified) and Section ● Description. Minor text changes to improve readability.