STPS1H100

High voltage power Schottky rectifier

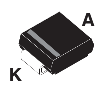
Features

- Negligible switching losses
- High junction temperature capability
- Low leakage current
- Good trade-off between leakage current and forward voltage drop
- Avalanche capability specified
- ECOPACK2® halogen-free component (SMAflat)

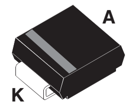
Description

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

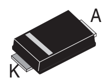
Packaged in SMA, SMAflat or SMB.



SMA
(JEDEC DO-214AC)
STPS1H100A



SMB
(JEDEC DO-214AA)
STPS1H100U



SMAflat
(JEDEC DO-221AC)
STPS1H100AF

Table 1. Device summary

$I_{F(AV)}$	1 A
V_{RRM}	100 V
T_j (max)	175 °C
V_F(max)	0.62 V

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		100	V
$I_{F(RMS)}$	RMS forward voltage		10	A
$I_{F(AV)}$	Average forward current	T_L = 160 °C δ = 0.5	1	A
I_{FSM}	Surge non repetitive forward current	t_p =10 ms sinusoidal	50	A
I_{RRM}	Repetitive peak reverse current	t_p = 2 µs F = 1 kHz square	1	A
I_{RSM}	Non repetitive peak reverse current	t_p = 100 µs square	1	A
P_{ARM}	Repetitive peak avalanche power	t_p = 1 µs T_j = 25 °C	1500	W
T_{stg}	Storage temperature range		-65 to + 175	°C
T_j	Maximum operating junction temperature (1)		175	°C
dV/dt	Critical rate of rise of reverse voltage		10000	V/µs

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal resistance

Symbol	Parameter		Value	Unit
$R_{th(j-l)}$	Junction to lead	SMA	30	°C/W
		SMB	25	
		SMAflat	25	

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$			4	µA
		T_j = 125 °C			0.2	0.5	mA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 1 A			0.77	V
		T_j = 125 °C			0.58	0.62	
		T_j = 25 °C	I_F = 2 A			0.86	
		T_j = 125 °C			0.65	0.7	

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

To evaluate the conduction losses use the following equation:
$P = 0.54 \times I_{F(AV)} + 0.08\, I_F{}^2{}_{(RMS)}$

Figure 1. Average forward power dissipation versus average forward current

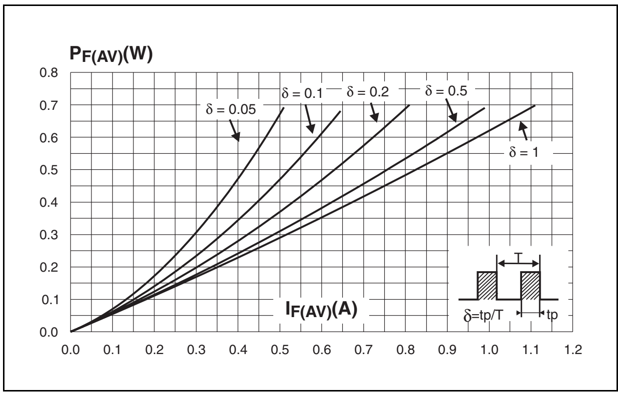


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

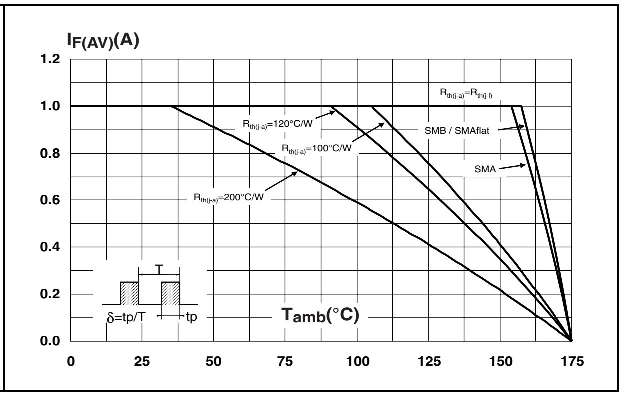


Figure 3. Normalized avalanche power derating versus pulse duration

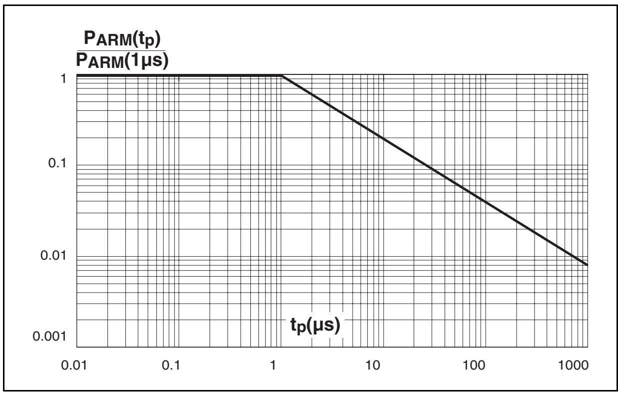


Figure 4. Normalized avalanche power derating versus junction temperature

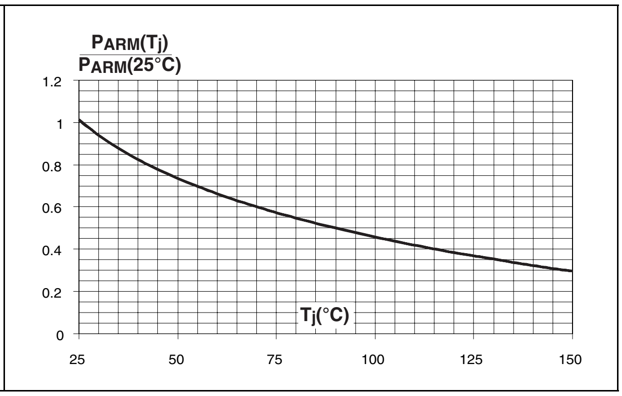


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values) (SMB)

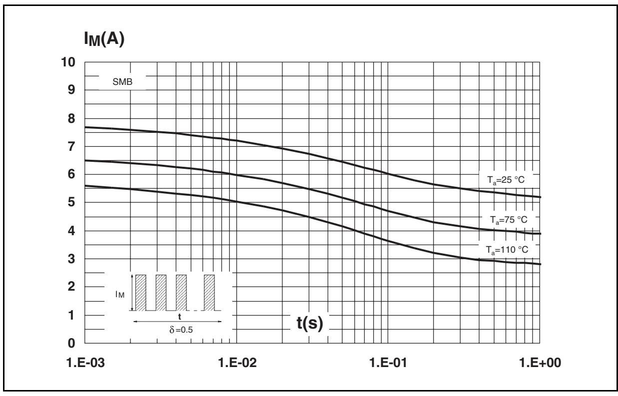


Figure 6. Non repetitive surge peak forward current versus overload duration (maximum values) (SMA)

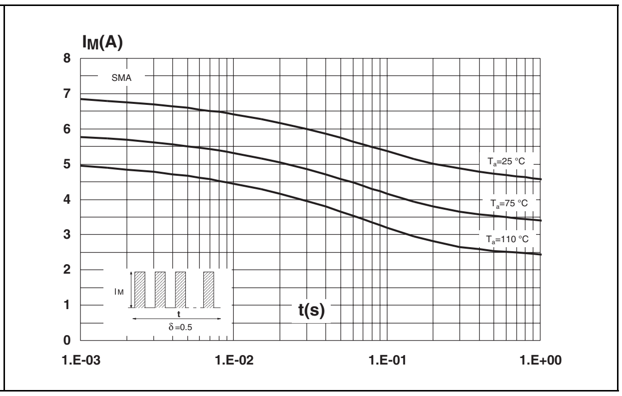


Figure 7. Non repetitive surge peak forward current versus overload duration (maximum values) (SMAflat)

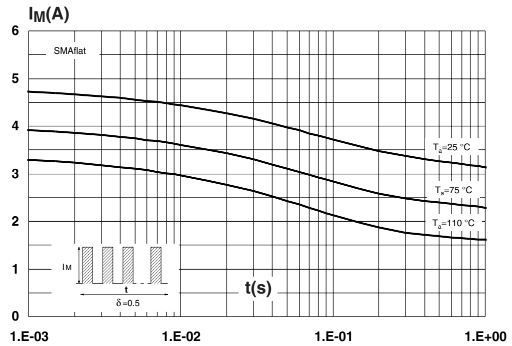


Figure 8. Relative variation of thermal impedance junction to ambient versus pulse duration (SMB)

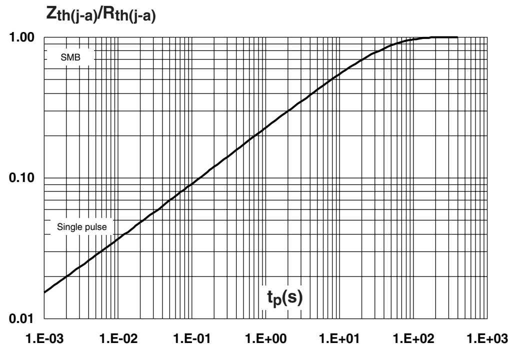


Figure 9. Relative variation of thermal impedance junction to ambient versus pulse duration (SMA)

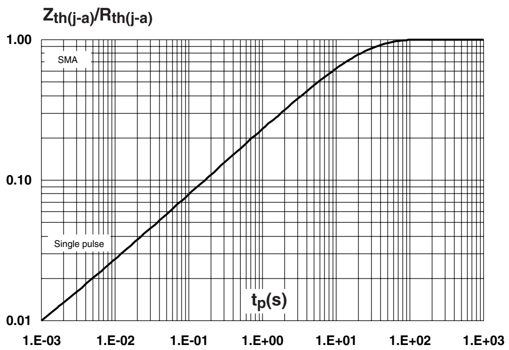


Figure 10. Relative variation of thermal impedance junction to ambient versus pulse duration (SMAflat)

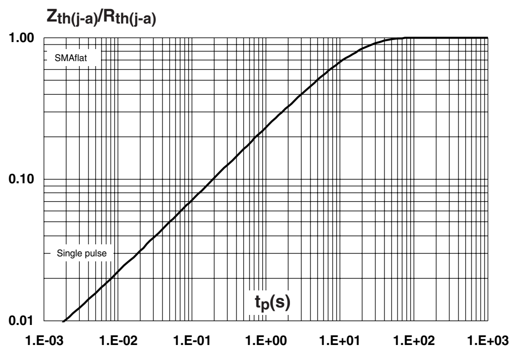


Figure 11. Reverse leakage current versus reverse voltage applied (typical values)

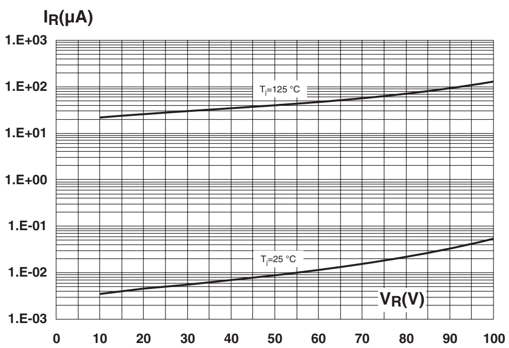


Figure 12. Junction capacitance versus reverse voltage applied (typical values)

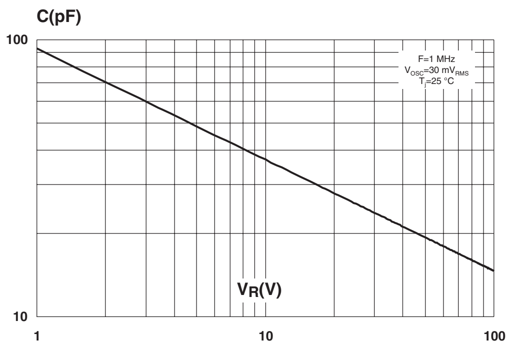


Figure 13. Forward voltage drop versus forward current (maximum values)

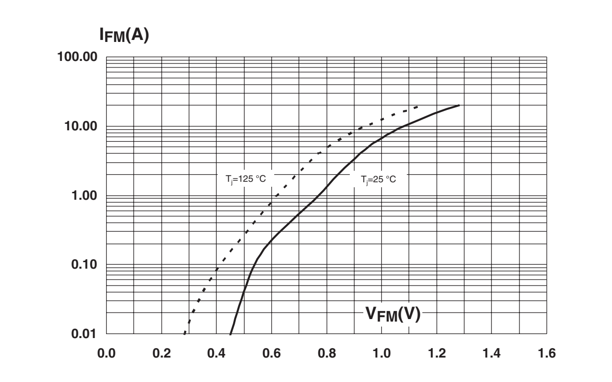


Figure 14. Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, copper thickness: 35 µm) (SMB)

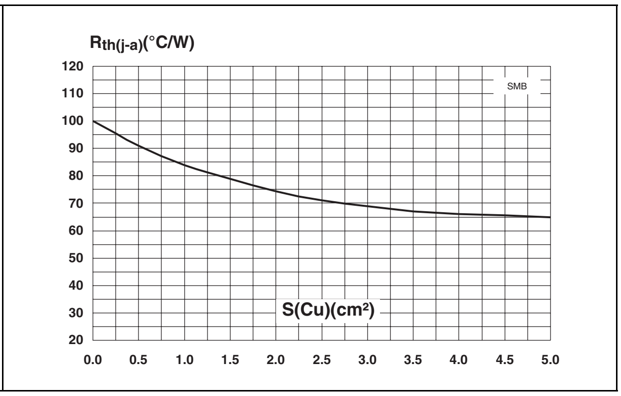


Figure 15. Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, copper thickness: 35 µm) (SMA)

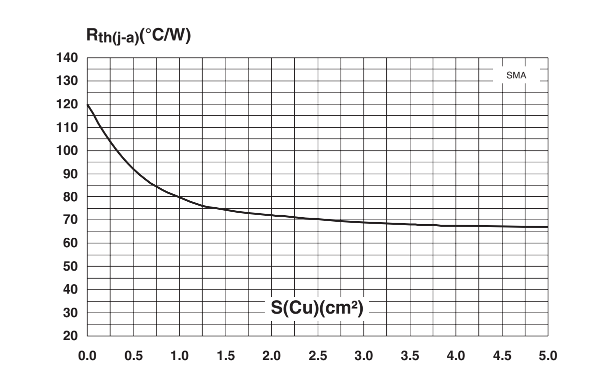
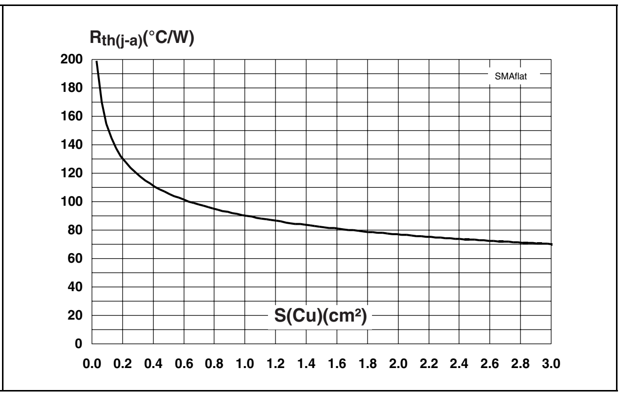


Figure 16. Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, copper thickness: 35 µm) (SMAflat)

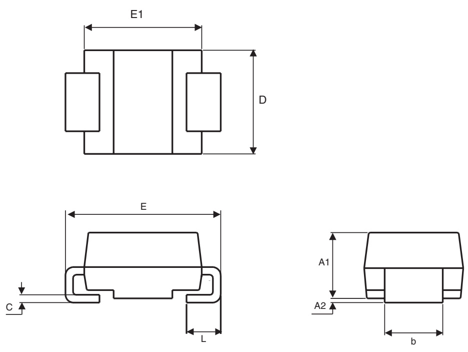


2 Package information

- Epoxy meets UL94, V0

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at *www.st.com*.

Figure 17. SMA package dimensions



Ref	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.094
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 18. SMA footprint dimensions in millimeters (inches)

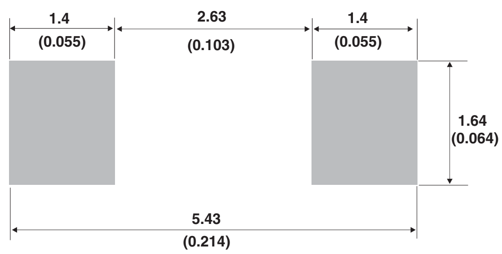


Figure 19. Marking information

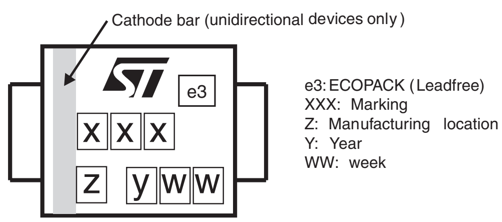
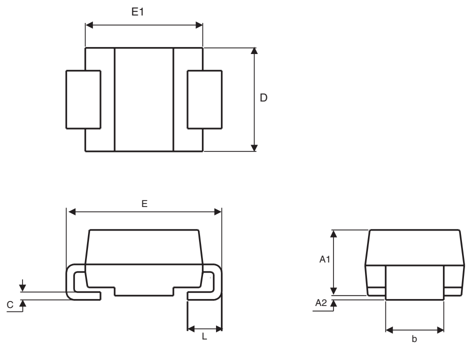


Figure 20. SMB package dimensions



Ref	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.096
A2	0.05	0.20	0.002	0.008
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

Figure 21. SMB footprint dimensions in millimeters (inches)

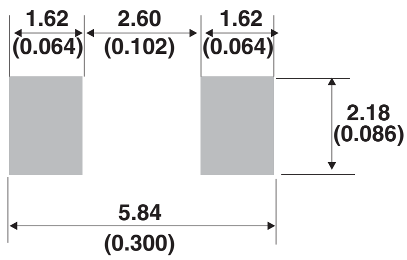


Figure 22. Marking information

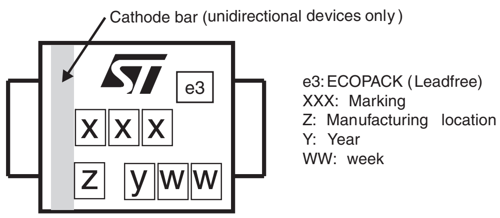
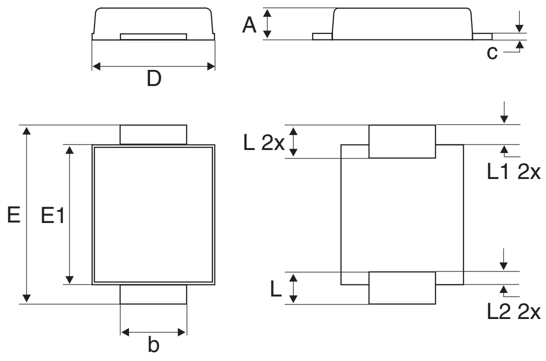


Table 5. SMAflat dimensions



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.10	0.035		0.043
b	1.25		1.65	0.049		0.065
c	0.15		0.40	0.006		0.016
D	2.25		2.95	0.088		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			0.019	
L2		0.50			0.019	

Figure 23. SMAflat footprint dimensions optimized for SMAflat(1)

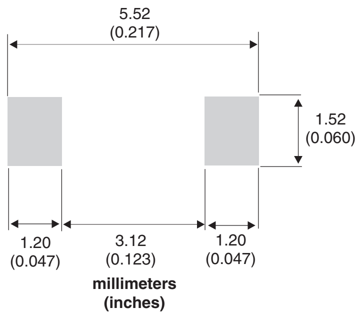
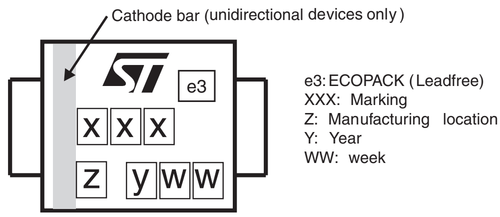


Figure 24. Marking information



1. SMA footprint may also be used.

3 Ordering information

Table 6. Ordering information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPS1H100A	S11	SMA	0.068 g	5000	Tape and reel
STPS1H100U	G11	SMB	0.107 g	2500	Tape and reel
STPS1H100AF	F11	SMAflat	0.035 g	10 000	Tape and reel

4 Revision history

Table 7. Document revision history

Date	Revision	Description of 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).
18-Sep-2008	6	Reformatted to current standards. Added SMAflat package.