

Low drop power Schottky rectifier

Features

- Low cost device with low drop forward voltage for less power dissipation
- Optimized conduction/reverse losses trade-off which lead to the highest yield in the applications
- Surface mount miniature packages
- Avalanche capability specified

Description

Single Schottky rectifier suited to switched mode power supplies and high frequency DC to DC converters, freewheel diode and integrated circuit latch up protection.

Packaged in SMA and low profile SMA and SMB, this device is especially intended for use in parallel with MOSFETs in synchronous rectification.

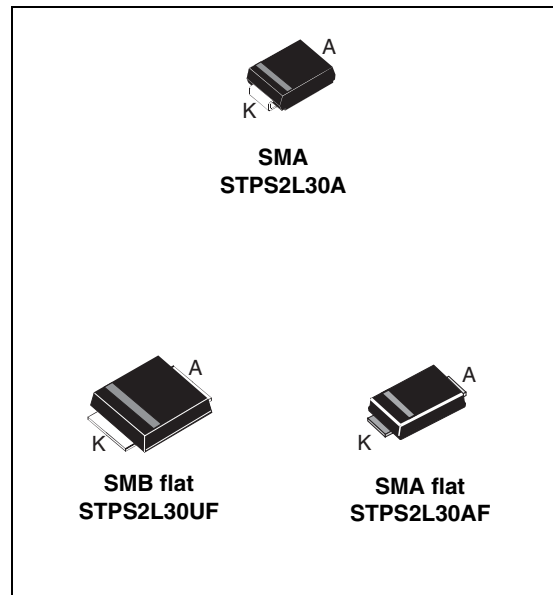


Table 1. Device summary

$I_{F(AV)}$	2 A
V_{RRM}	30 V
$T_j(\text{max})$	150 °C
$V_F(\text{max})$	0.375 V

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter		Value	Unit	
V_{RRM}	Repetitive peak reverse voltage		30	V	
$I_{F(AV)}$	Average forward current	SMA flat	2	A	
		SMA			$T_L = 130\text{ °C } \delta = 0.5$
		SMB flat			$T_L = 120\text{ °C } \delta = 0.5$
I_{FSM}	Surge non repetitive forward current		$t_p = 10\text{ ms sinusoidal}$	75	A
P_{ARM}	Repetitive peak avalanche power		$t_p = 1\text{ }\mu\text{s } T_j = 25\text{ °C}$	1500	W
T_{stg}	Storage temperature range		-65 to + 150	°C	
T_j	Operating junction temperature ⁽¹⁾		150	°C	

1. $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$ 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 flat	20	°C/W
		SMA	30	
		SMB flat	15	

Table 4. Static electrical characteristics

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$			200	μA
		$T_j = 100\text{ °C}$			6	15	mA
$V_F^{(1)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 2\text{ A}$			0.45	V
		$T_j = 125\text{ °C}$			0.325	0.375	
		$T_j = 25\text{ °C}$	$I_F = 4\text{ A}$			0.53	
		$T_j = 125\text{ °C}$			0.43	0.51	

1. Pulse test: $t_p = 380\text{ }\mu\text{s}$, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 0.24 \times I_{F(AV)} + 0.068 I_{F(RMS)}^2$$

Figure 1. Average forward power dissipation versus average forward current

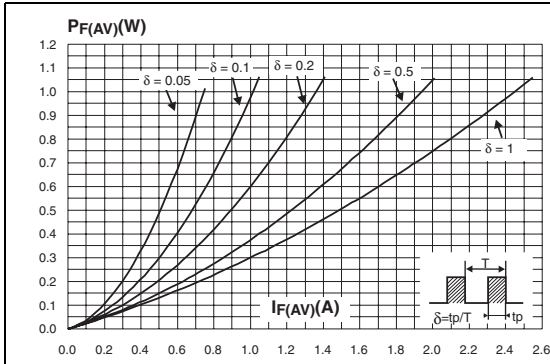


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$) SMA

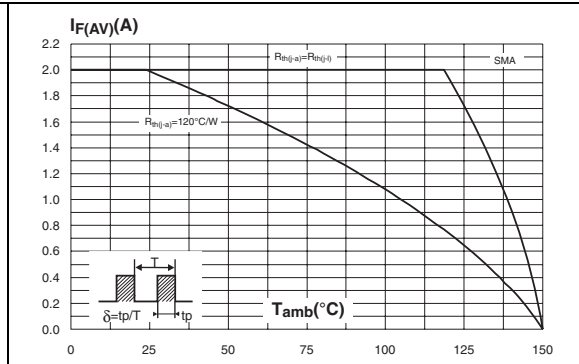


Figure 3. Average forward current versus ambient temperature ($\delta = 0.5$) SMB flat

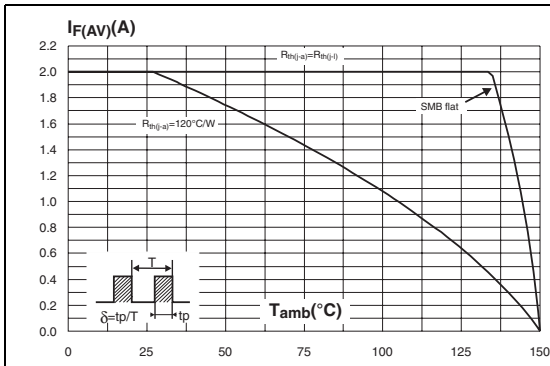


Figure 4. Average forward current versus ambient temperature ($\delta = 0.5$) SMA flat

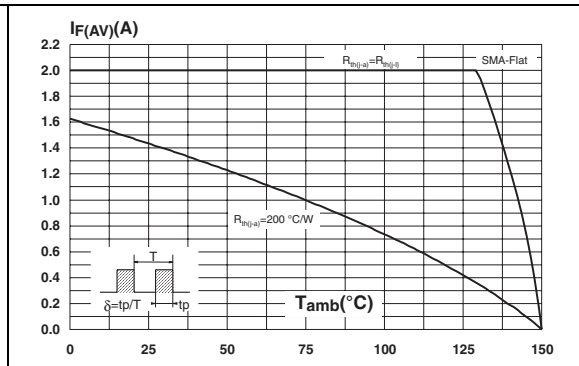


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values) SMA

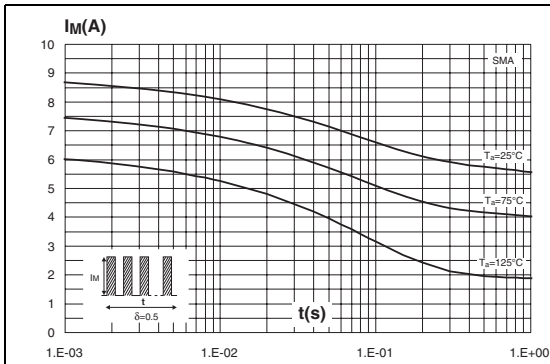


Figure 6. Non repetitive surge peak forward current versus overload duration (maximum values) SMB flat

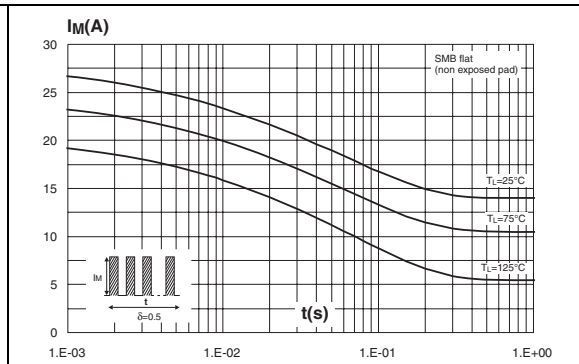


Figure 7. Non repetitive surge peak forward current versus overload duration (maximum values) SMA flat

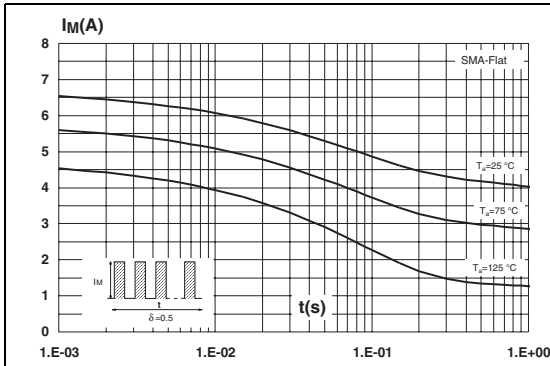


Figure 8. Normalized avalanche power derating versus pulse duration

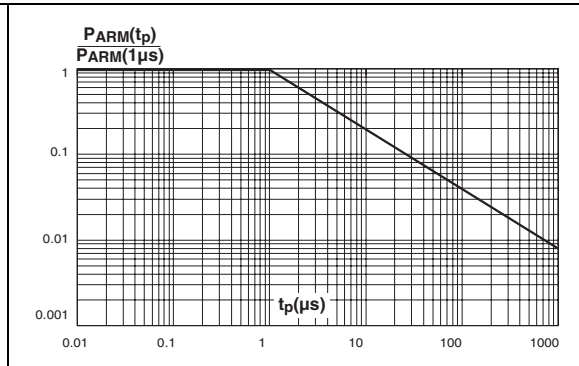


Figure 9. Normalized avalanche power derating versus junction temperature

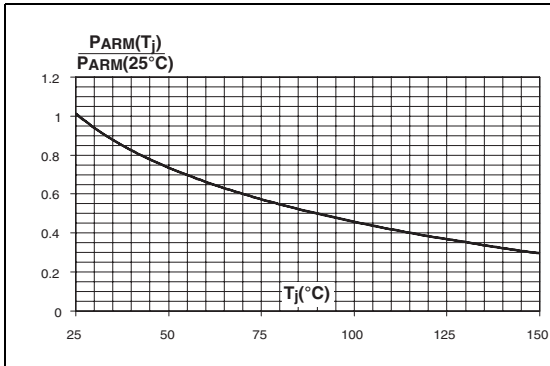


Figure 10. Relative variation of thermal impedance, junction to ambient, versus pulse duration - SMA

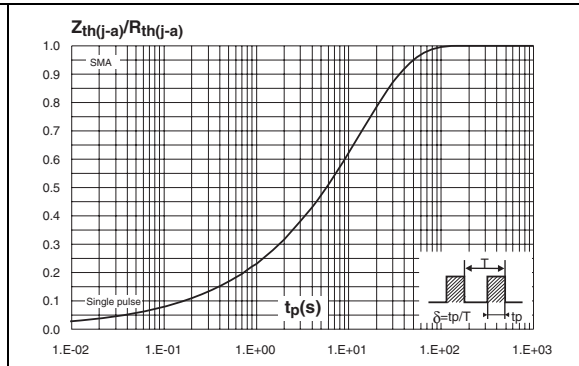


Figure 11. Relative variation of thermal impedance junction to lead versus pulse duration - SMB flat

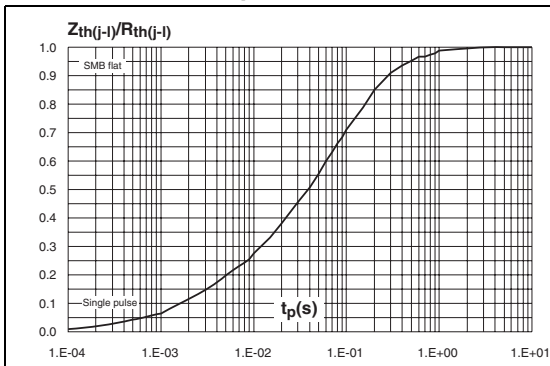


Figure 12. Relative variation of thermal impedance junction to ambient versus pulse duration - SMA flat

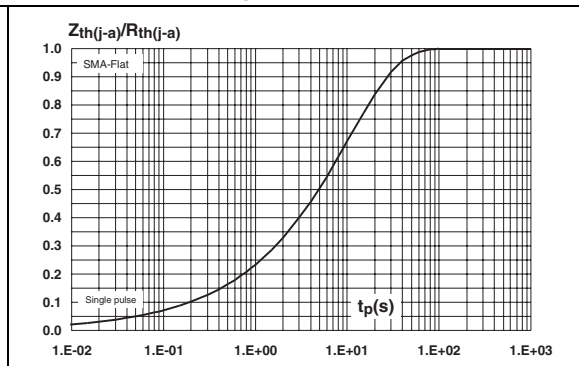


Figure 13. Reverse leakage current versus reverse voltage applied (typical values)

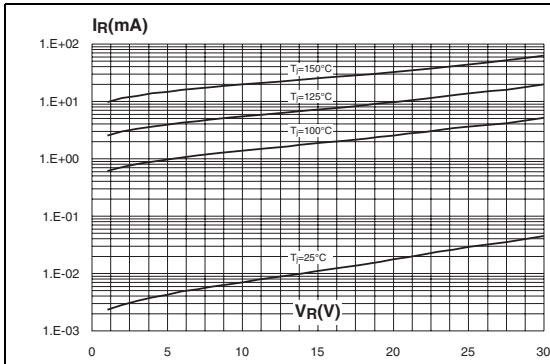


Figure 14. Junction capacitance versus reverse voltage applied (typical values)

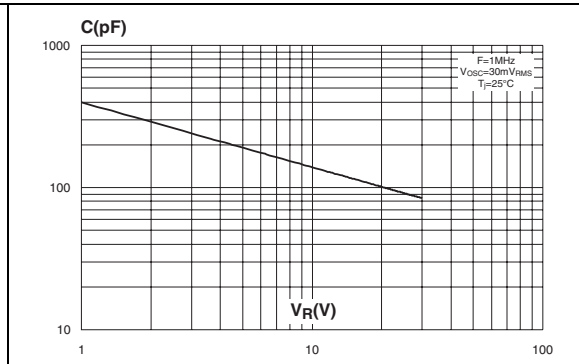


Figure 15. Forward voltage drop versus forward current (high level)

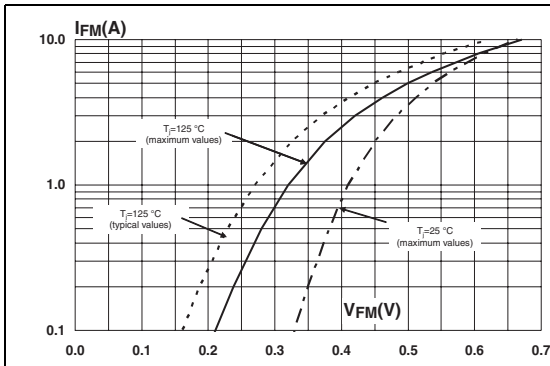


Figure 16. Forward voltage drop versus forward current (low level)

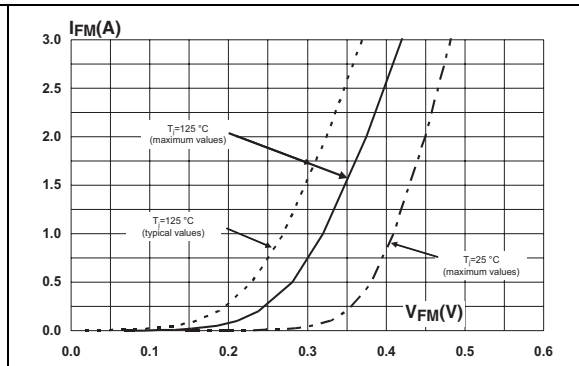


Figure 17. Thermal resistance junction to ambient versus copper surface under each lead (epoxy printed board FR4, copper thickness = 35 μm) (SMA, SMB flat)

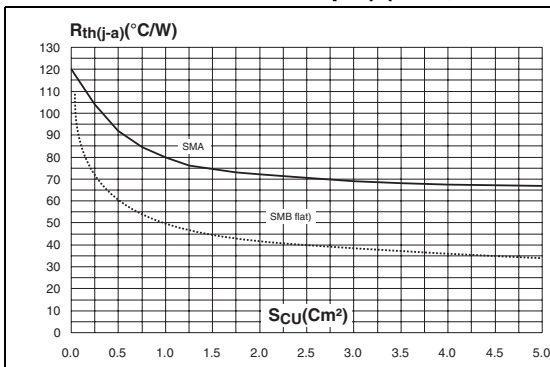
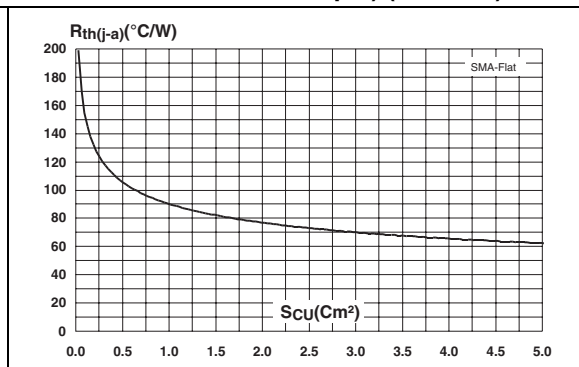


Figure 18. Thermal resistance junction to ambient versus copper surface under each lead (epoxy printed board FR4, copper thickness = 35 μm) (SMA flat)



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.

Table 5. SMA 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 19. SMA footprint (dimensions in mm)

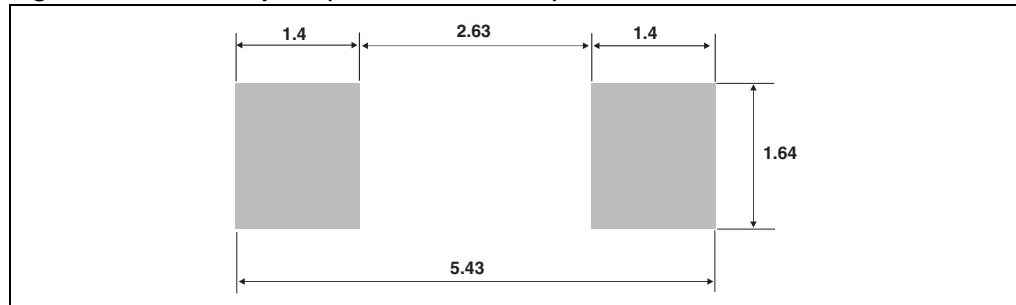


Table 6. SMA flat (non exposed pad) dimensions

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 20. SMA flat (non exposed pad) footprint dimensions

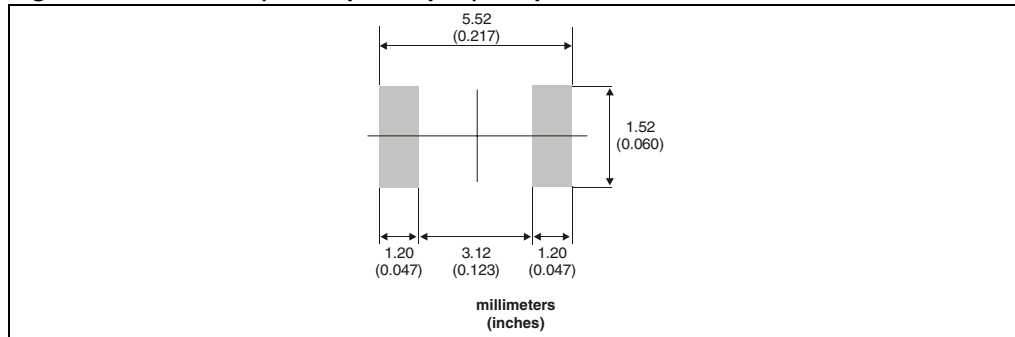
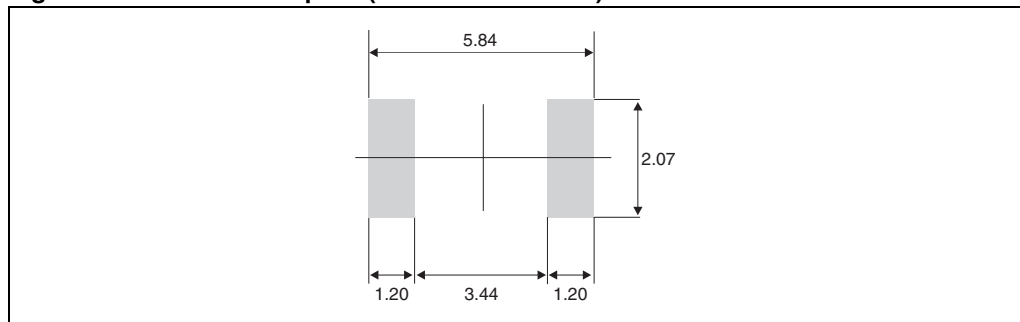


Table 7. SMB flat dimensions

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.10	0.035		0.043
b ⁽¹⁾	1.95		2.20	0.077		0.087
c ⁽¹⁾	0.15		0.40	0.006		0.016
D	3.30		3.95	0.130		0.156
E	5.10		5.60	0.200		0.220
E1	4.05		4.60	0.189		0.181
L	0.75		1.50	0.029		0.059
L1		0.40			0.016	
L2		0.60			0.024	

1. Applies to plated leads

Figure 21. SMB flat footprint (dimensions in mm)



3 Ordering information

Table 8. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS2L30A	G30	SMA	0.068 g	5000	Tape and reel
STPS2L30UF	FG30	SMB flat	0.050 g	5000	Tape and reel
STPS2L30AF	F30	SMA flat	0.035 g	10000	Tape and reel

4 Revision history

Table 9. Document revision history

Date	Revision	Changes
Jul-2003	3A	Last update.
Aug-2004	4	SMA package dimensions update. Reference A1 max. changed from 2.70mm (0.106inc.) to 2.03mm (0.080).
31-Jan-2007	5	Reformatted to current standard. Added ECOPACK statement. Added SMB flat package.
23-Apr-2008	6	Reformatted to current standards. Added SMA flat package.

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