

## Low drop power Schottky rectifier

## Main product characteristics

I <sub>F(AV)</sub>	2 A
V <sub>RRM</sub>	25 V
T <sub>j</sub> (max)	150° C
V <sub>F</sub> (max)	0.375 V

### Features and benefits

- Very low forward voltage drop for less power dissipation
- Optimized conduction/reverse losses trade-off which means the highest efficiency in the applications
- Avalanche capability specified

### **Description**

Single Schottky rectifier suited to switched mode power supplies and high frequency DC to DC converters.

Packaged in SMB, SMB flat for thermal resistance characteristic improvement, this device is especially intended for use in parallel with MOSFETs in synchronous rectification.

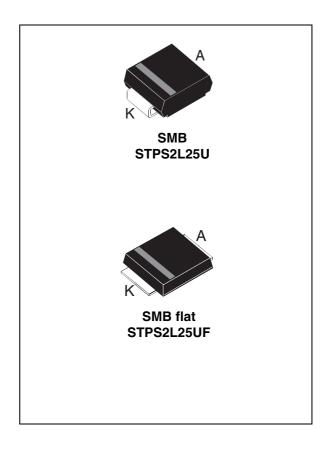


Table 1. Absolute ratings (limiting values)

Symbol	Parameter			Value	Unit
V <sub>RRM</sub>	Repetitive peak reverse v	Repetitive peak reverse voltage			V
1	I <sub>F(AV)</sub> Average forward current	SMB	$T_L = 125^{\circ} \text{ C}  \delta = 0.5$	2	А
'F(AV)		SMB flat	$T_L = 135^{\circ} \text{ C}  \delta = 0.5$		
I <sub>FSM</sub>	Surge non repetitive forward current $t_p = 10 \text{ ms sinusoidal}$		75	Α	
P <sub>ARM</sub>	Repetitive peak avalanche power $t_p = 1 \mu s Tj = 25^{\circ} C$		t <sub>p</sub> = 1 μs Tj = 25° C	1500	W
T <sub>stg</sub>	Storage temperature range			-65 to + 150	°C
T <sub>j</sub>	Operating junction temperature <sup>(1)</sup>			150	°C

<sup>1.</sup>  $\frac{dPtot}{dTi} < \frac{1}{Rth(i-a)}$  condition to avoid thermal runaway for a diode on its own heatsink

Characteristics STPS2L25

## 1 Characteristics

Table 2. Thermal resistance

Symbol	Parameter		Value	Unit
D. Jungtion to load	Junction to lead	SMB	25	°C/W
R <sub>th(j-l)</sub>	Junction to lead	SMB flat	15	C/VV

Table 3. Static electrical characteristics

Symbol	Parameter	Test Conditions		Min.	Тур.	Max.	Unit
I <sub>R</sub> <sup>(1)</sup> Reverse leakage current	Deverage legisers gurrent	T <sub>j</sub> = 25° C	$V_R = V_{RRM}$			90	μΑ
	neverse leakage current	T <sub>j</sub> = 125° C			15	30	mA
V <sub>F</sub> <sup>(1)</sup> Forward voltage drop		T <sub>j</sub> = 25° C	I <sub>F</sub> = 2 A			0.45	V
	Forward voltage drap	T <sub>j</sub> = 125° C			0.325	0.375	
	Polward voltage drop	T <sub>j</sub> = 25° C	1 - 4 4			0.53	
		T <sub>j</sub> = 125° C	I <sub>F</sub> = 4 A		0.43	0.51	

<sup>1.</sup> Pulse test: tp = 380  $\mu$ s,  $\delta$  < 2%

To evaluate the maximum conduction losses, use the following equation:

$$P = 0.24 \text{ x I}_{F(AV)} + 0.068 \text{ I}_{F}^{2}_{(RMS)}$$

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Figure 1. Average forward power dissipation Figure 2. Average forward current versus versus average forward current ambient temperature ( $\delta$  = 0.5) SMB

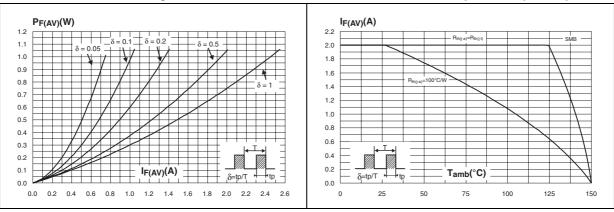


Figure 3. Average forward current versus ambient temperature ( $\delta$  = 0.5) SMB flat

Figure 4. Non repetitive surge peak forward current versus overload duration (maximum values) SMB

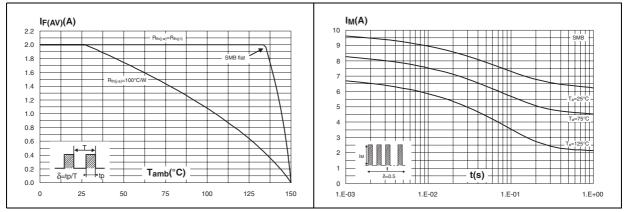
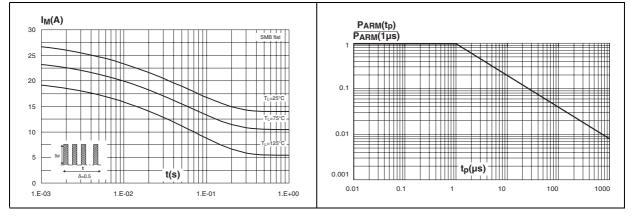


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values) SMB flat

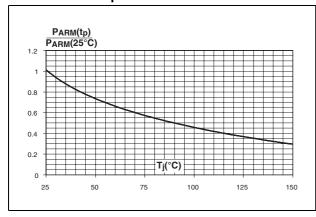
Figure 6. Normalized avalanche power derating versus pulse duration



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Figure 7. Normalized avalanche power derating versus junction temperature

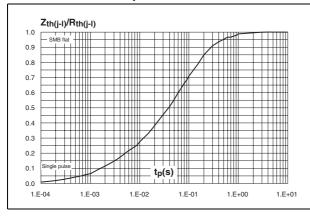
Figure 8. Relative variation of thermal impedance junction to ambient versus pulse duration - SMB



 $Z_{th(j-a)}/R_{th(j-a)}$ 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0.0 1.E-02 1.E-01 1.E+00 1.E+01 1.E+02 1.E+03

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)



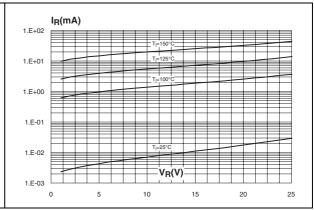
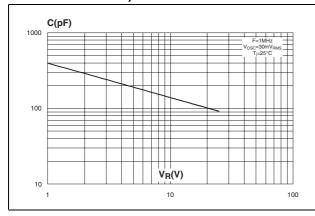
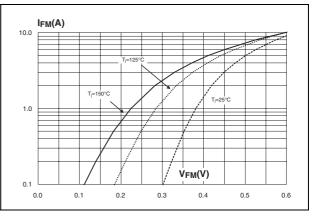


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

Figure 12. Forward voltage drop versus forward current (typical values)

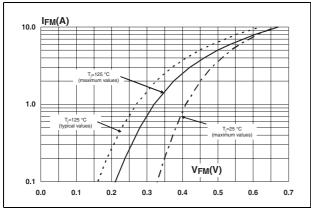




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Figure 13. Forward voltage drop versus forward current (maximum values, high level)

Figure 14. Forward voltage drop versus forward current (maximum values, low level)



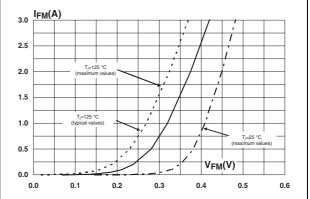
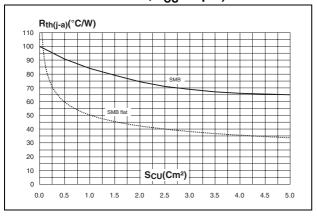


Figure 15. Thermal resistance junction to ambient versus copper surface under each lead (epoxy printed board FR4,  $e_{CU}$ =35 $\mu$ m)



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**Package information** STPS2L25

#### **Package information** 2

Epoxy meets UL94, V0

Table 4. **SMB** dimensions

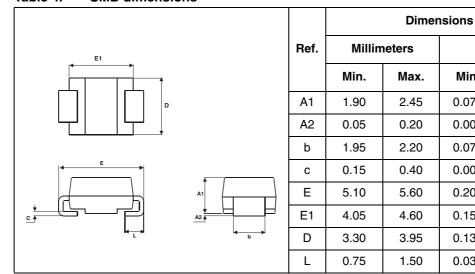
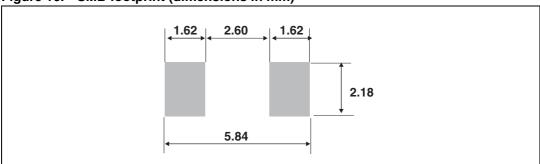


Figure 16. SMB footprint (dimensions in mm)



Inches

Max.

0.096

0.008

0.087

0.016

0.220

0.181

0.156

0.059

Min.

0.075

0.002

0.077

0.006

0.201

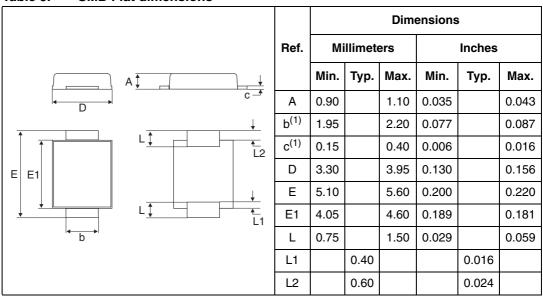
0.159

0.130

0.030

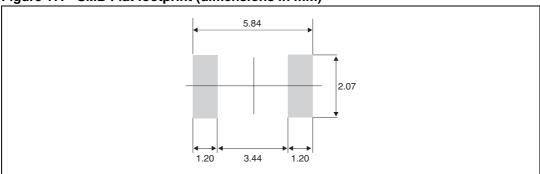
STPS2L25 Package information

Table 5. SMB Flat dimensions



<sup>1.</sup> Applies to plated leads

Figure 17. SMB Flat footprint (dimensions in mm)



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.

Ordering information STPS2L25

# 3 Ordering information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPS2L25U	G23	SMB	0.107 g	2500	Tape and reel
STPS2L25UF	FG23	SMB flat	0.50 g	5000	Tape and reel

# 4 Revision history

Date	Revision	Changes
July 2003	4A	Last update
08-Feb-2007	5	Reformatted to current standard. Added ECOPACK statement. Added SMB flat package.

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