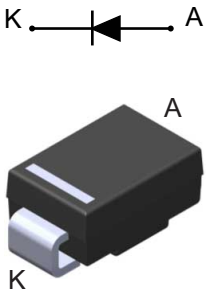
STPS2L25

Datasheet

25 V power Schottky rectifier



SMB

Features

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

Applications

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

Description

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

Packaged in SMB for thermal resistance characteristic improvement, the STPS2L25 is ideal for use in parallel with MOSFETs in synchronous rectification.

Product status
STPS2L25

Product summary	
Symbol	**Value**
$I_{F(AV)}$	2 A
V_{RRM}	25 V
$T_{j(max.)}$	150 °C
$V_{F(typ.)}$	0.325 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		25	V
$I_{F(RMS)}$	Forward rms current		10	A
$I_{F(AV)}$	Average forward current, δ = 0.5 square wave	T_L = 125 °C	2	A
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	108	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	25	°C/W

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 °C	$V_R = V_{RRM}$	-		90	µA
		T_j = 125 °C		-	15	30	mA
V_F(1)	Forward voltage drop	T_j = 25 °C	I_F = 2 A	-		0.450	V
		T_j = 125 °C		-	0.325	0.375	
		T_j = 25 °C	I_F = 4 A	-		0.530	
		T_j = 125 °C		-	0.430	0.510	

1. *Pulse test: t_p = 380 µs, δ < 2%*

To evaluate the conduction losses, use the following equation:

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

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

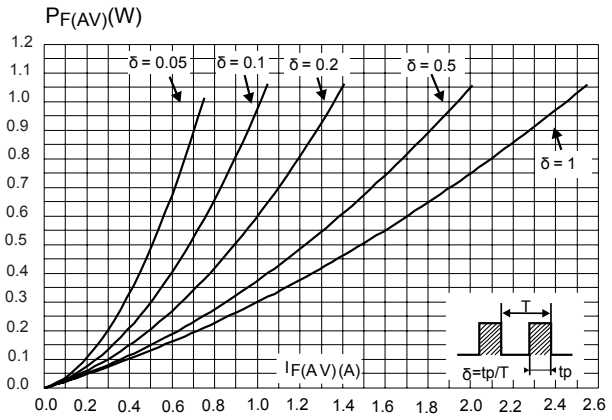


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

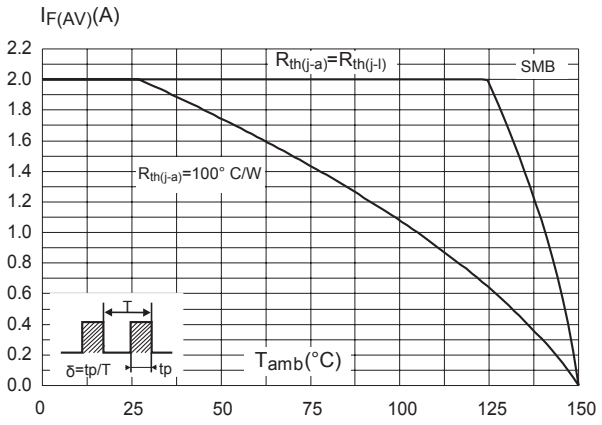


Figure 3. Normalized avalanche power derating versus junction temperature (T_j = 125 °C)

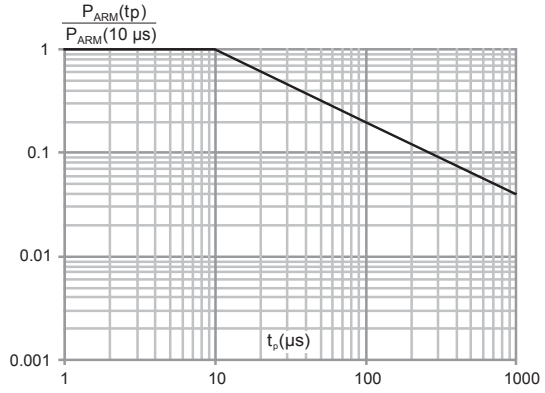


Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration

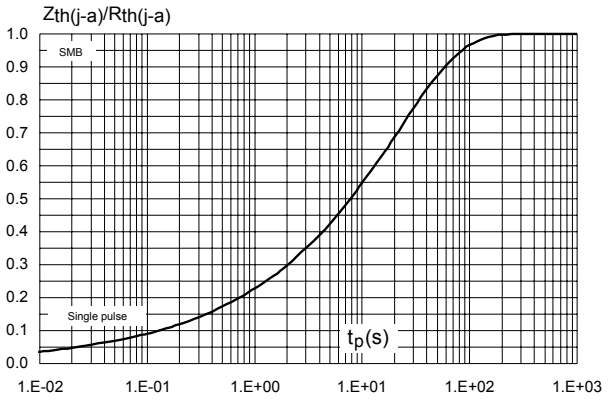


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

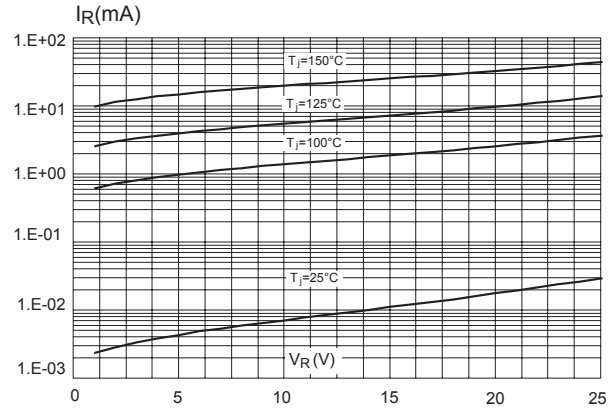


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

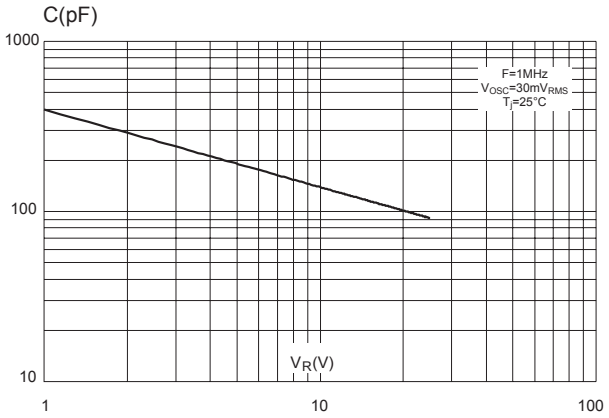


Figure 7. Forward voltage drop versus forward current (high level)

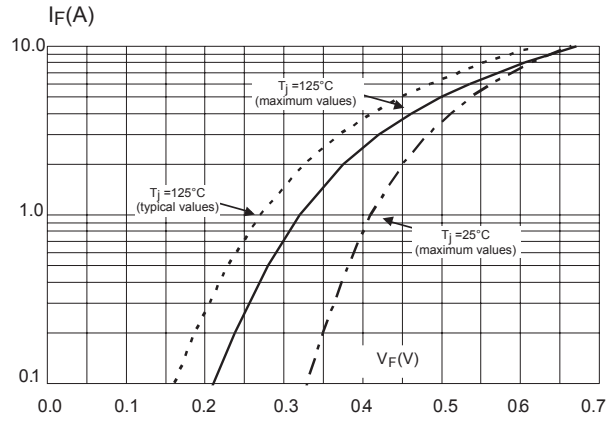


Figure 8. Forward voltage drop versus forward current (low level)

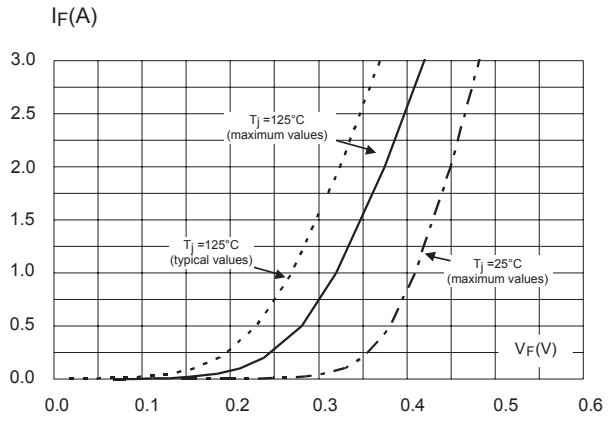


Figure 9. Forward voltage drop versus forward current (typical values)

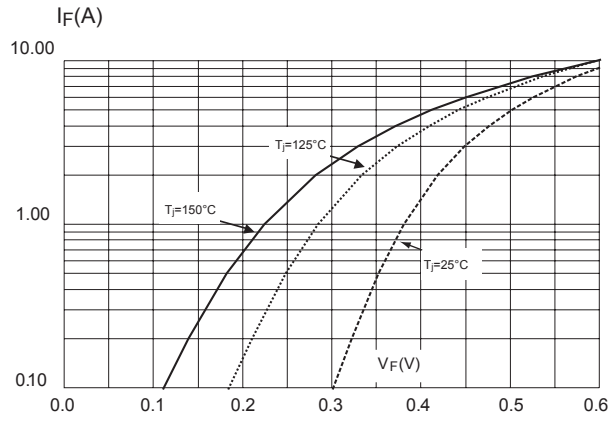
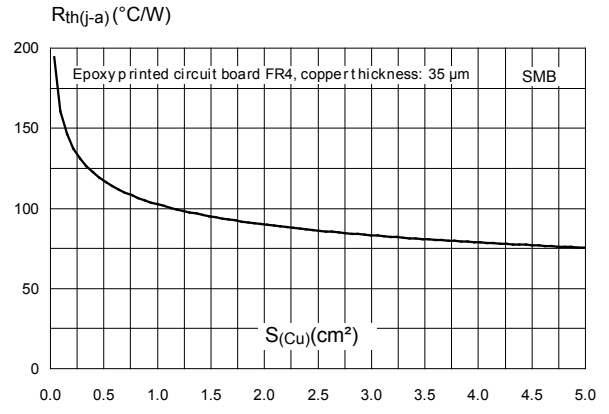


Figure 10. Thermal resistance junction to ambient versus copper surface under each lead



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

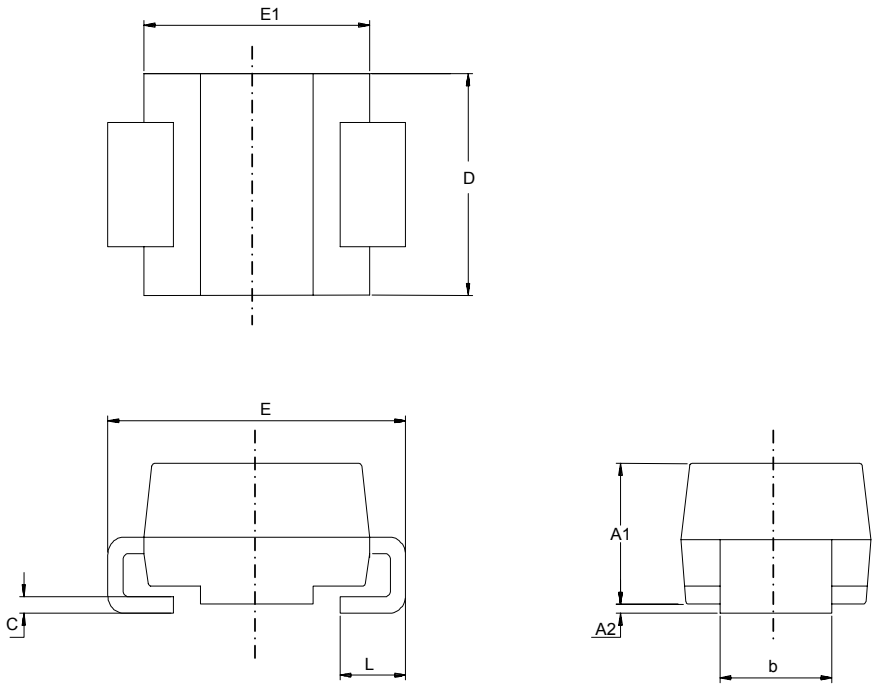
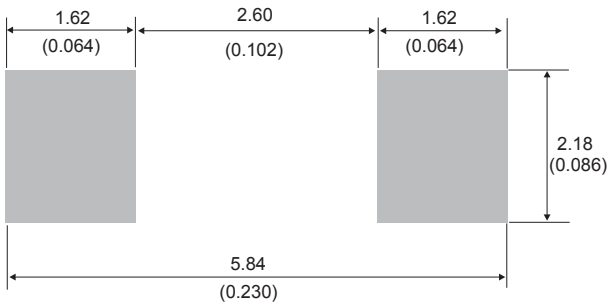


Table 4. SMB package mechanical data

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



3 Ordering information

Table 5. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS2L25U	G23	SMB	0.107 g	2500	Tape and reel

Revision history

Table 6. **Document revision history**

Date	Version	Changes
Jul-2003	4A	Last update.
08-Feb-2007	5	Reformatted to current standard. Added ECOPACK statement. Added SMB flat package.
09-Oct-2018	6	Updated Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified) and Figure 3. Normalized avalanche power derating versus junction temperature (T_j = 125 °C). Removed SMB flat package.