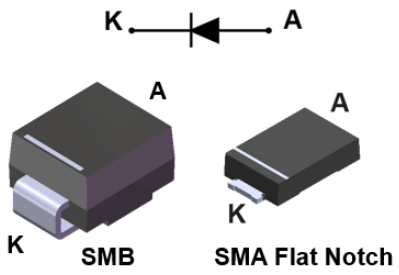
STPS2L25

Datasheet

25 V, 2 A low drop power Schottky rectifier



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
- ECOPACK2 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 SMA Flat Notch or 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	SMB	T_L = 125 °C	2	A
		SMA Flat Notch	T_L = 130 °C		
I_{FSM}	Surge non repetitive forward current	SMB	t_p = 10 ms sinusoidal	75	A
		SMA Flat Notch		90	
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	SMB	25	°C/W
		SMA Flat Notch	20	

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

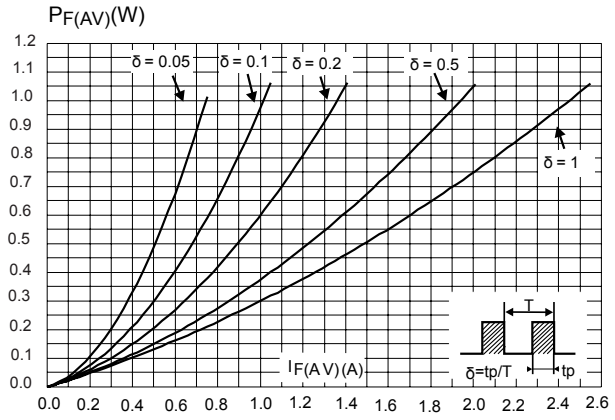


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

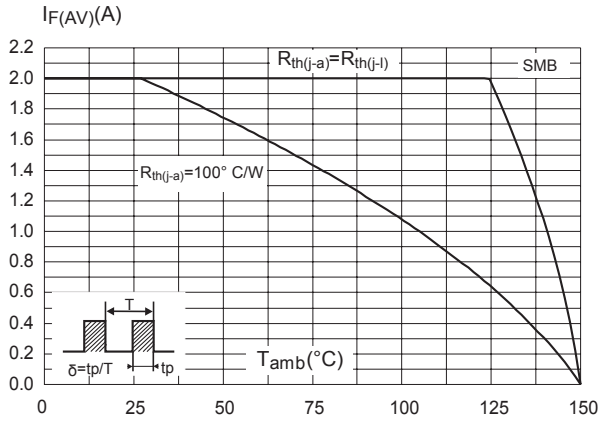


Figure 3. Normalized avalanche power derating versus junction temperature (T_j = 125 °C)

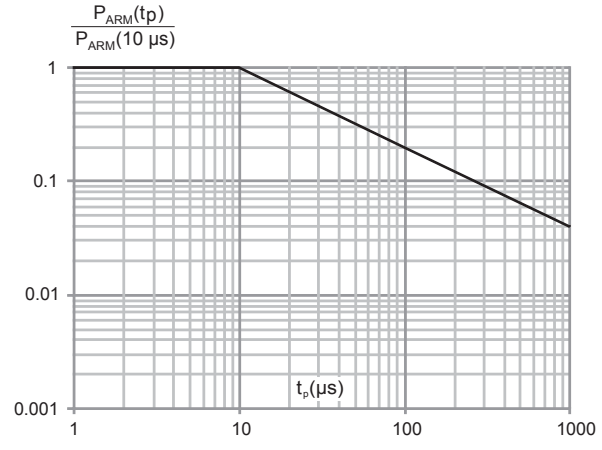


Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration

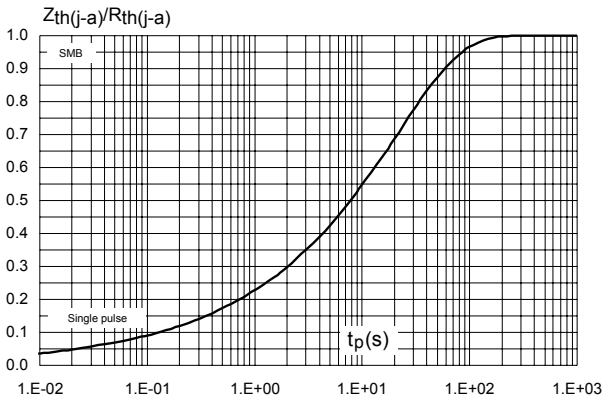


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

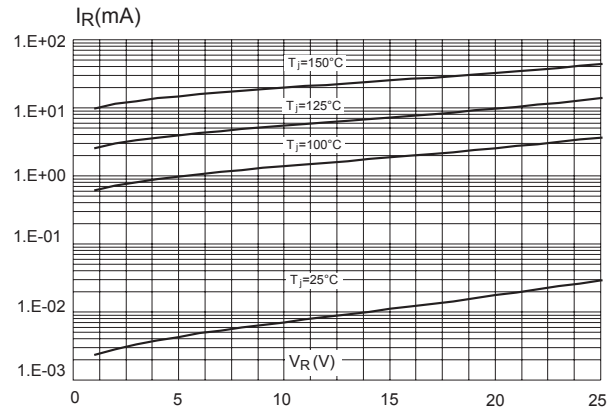


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

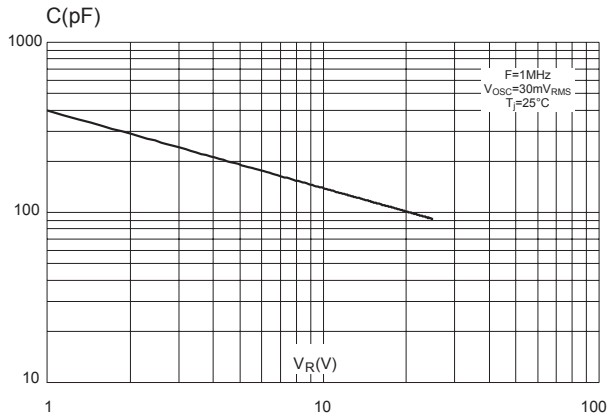


Figure 7. Forward voltage drop versus forward current (high level)

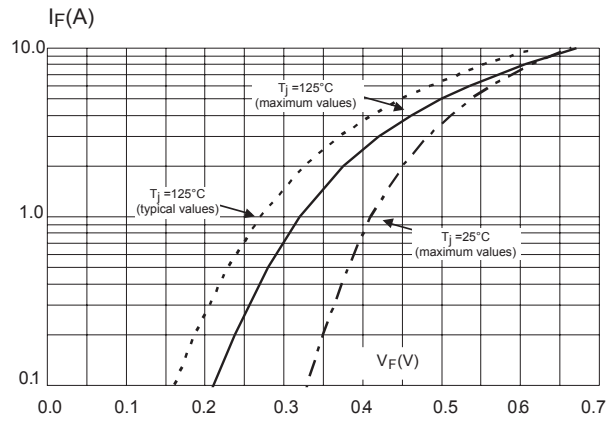


Figure 8. Forward voltage drop versus forward current (low level)

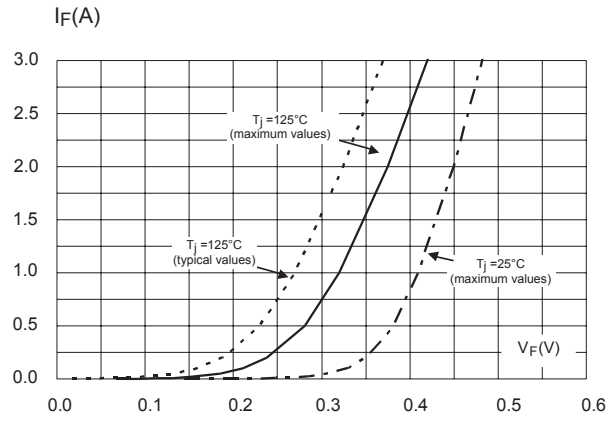


Figure 9. Forward voltage drop versus forward current (typical values)

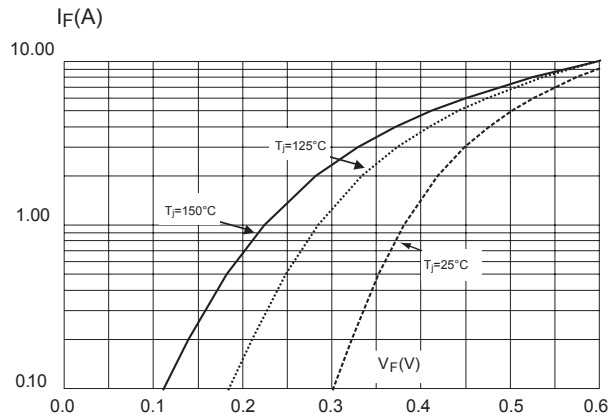


Figure 10. Thermal resistance junction to ambient versus copper surface under each lead

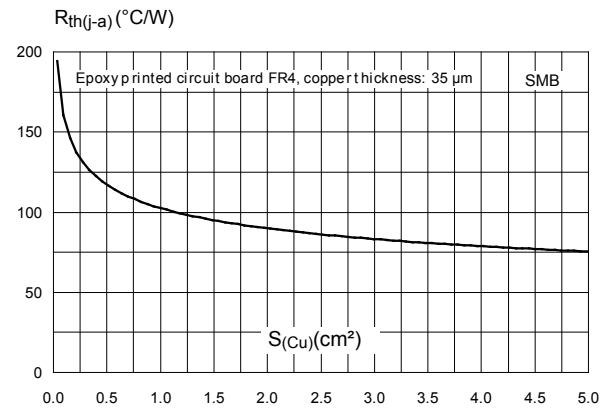
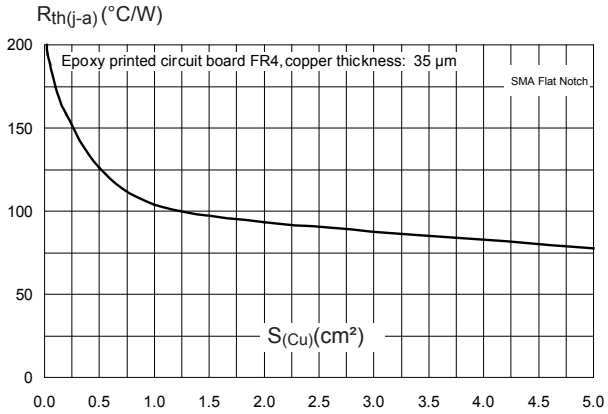


Figure 11. Thermal resistance junction to ambient versus copper surface under each lead (SMA Flat Notch)



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 12. SMB package outline

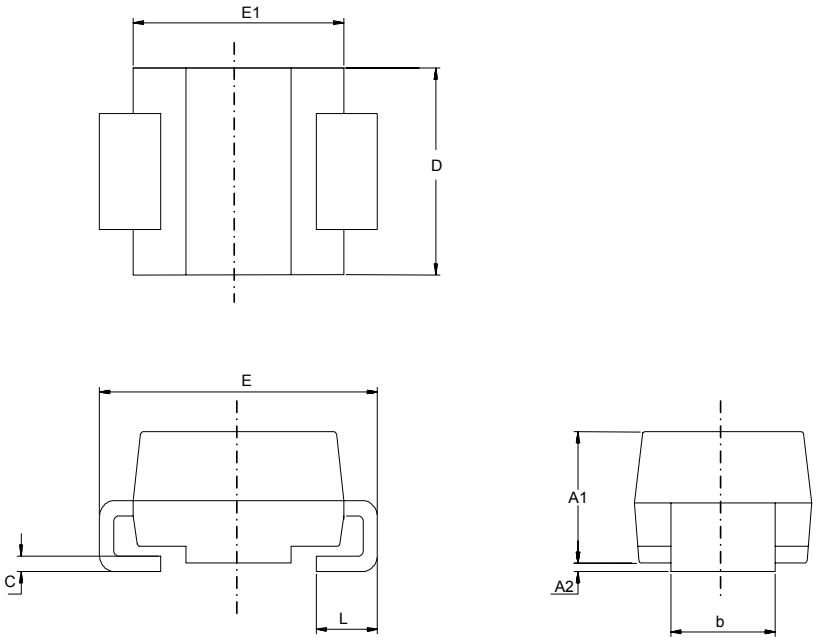
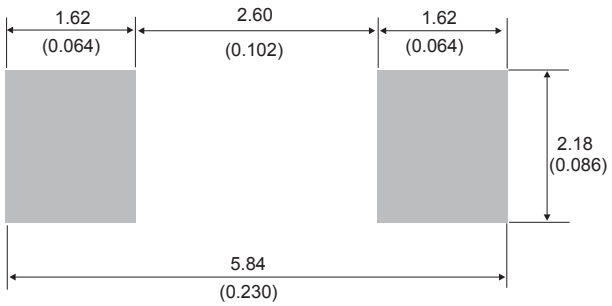


Table 4. SMB package mechanical data

Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.074	0.097
A2	0.05	0.20	0.001	0.008
b	1.95	2.20	0.076	0.087
c	0.15	0.40	0.005	0.016
D	3.30	3.95	0.129	0.156
E	5.10	5.60	0.200	0.221
E1	4.05	4.60	0.159	0.182
L	0.75	1.50	0.029	0.060

Figure 13. SMB recommended footprint



2.2 SMA Flat Notch package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Band indicates cathode

Figure 14. SMA Flat Notch package outline

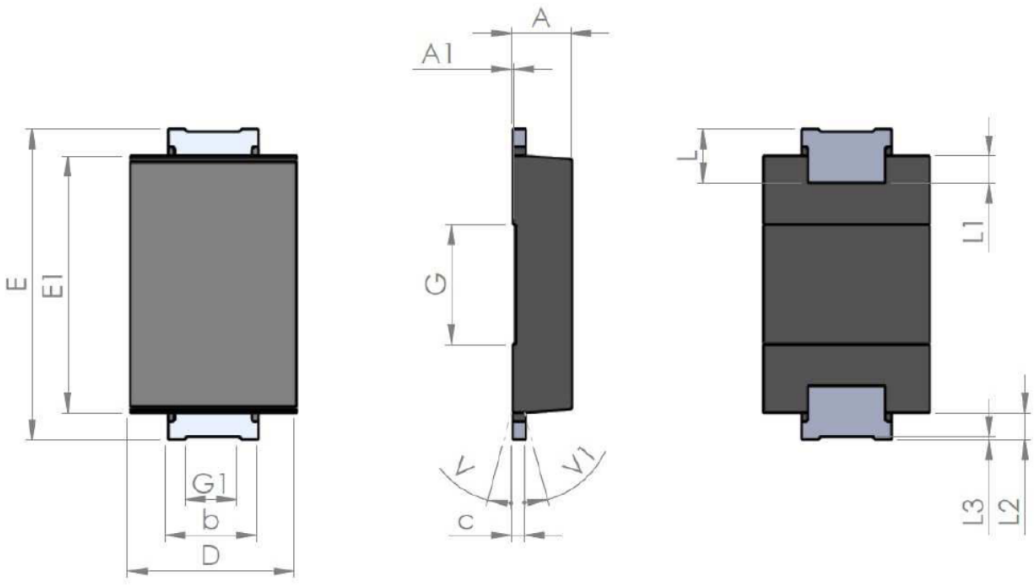
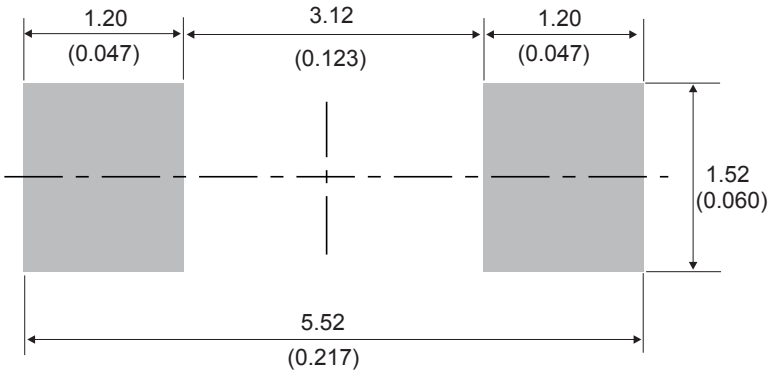


Table 5. SMA Flat Notch package mechanical data

Ref.	Dimensions					
	Millimeters			Inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A1	0.90		1.10	0.035		0.044
A1		0.05			0.002	
b	1.25		1.65	0.049		0.065
C	0.15		0.40	0.005		0.016
D	2.25		2.90	0.088		0.115
E	5.00		5.35	0.196		0.211
E1	3.95		4.60	0.155		0.182
G		2.00			0.079	
G1		0.85			0.033	
L	0.75		1.20	0.029		
L1		0.45			0.018	
L2		0.45			0.018	
L3		0.05			0.002	
V			8°			8°
V1			8°			8°

Figure 15. SMA Flat Notch recommended footprint in mm (inches)



3 Ordering information

Table 6. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS2L25U	G23	SMB	0.107 g	2500	Tape and reel
STPS2L25AFN	A22	SMA Flat Notch	0.039 g	10 000	Tape and reel

Revision history

Table 7. 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.
27-Sep-2019	7	Added Section 2.2 SMA Flat Notch package information.

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