STPS2L40

Low drop power Schottky rectifier

Main product characteristics

$I_{F(AV)}$	2 A
V_{RRM}	40 V
T_j (max)	150° C
V_F(max)	0.34 V

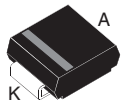
Features and Benefits

- Very small conduction losses
- Negligible switching losses
- Low forward voltage drop
- Surface mount miniature package
- Avalanche capability specified

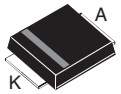
Description

Single chip Schottky rectifiers suited to Switched Mode Power Supplies and high frequency DC to DC converters.

Packaged in SMB, and low profile SMB, this device is especially intended for surface mounting and used in low voltage, high frequency inverters, free wheeling and polarity protection applications.



SMB
STPS2L40U



SMB flat
STPS2L40UF

Order codes

Part number	marking
STPS2L40U	GD4
STPS2L40UF	FGD4

Table 1. Absolute Ratings (limiting values)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			40	V
$I_{F(AV)}$	Average forward current	SMB	T_L = 130° C δ = 0.5	2	A
		SMB flat	T_L = 140° C δ = 0.5		
I_{FSM}	Surge non repetitive forward current		t_p = 10 ms sinusoidal	75	A
P_{ARM}	Repetitive peak avalanche power		t_p = 1 µs T_j = 25° C	2200	W
T_{stg}	Storage temperature range			-65 to + 150	° C
T_j	Operating junction temperature (1)			150	° C

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

1 Characteristics

Table 2. Thermal resistances

Symbol	Parameter		Value	Unit
$R_{th\ (j-l)}$	Junction to lead	SMB	20	° C/W
		SMB flat	10	

Table 3. Static electrical characteristics

Symbol	Tests Conditions	Tests Conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25° C	V_R = 40 V			220	µA
		T_j = 100° C				20	mA
		T_j = 125° C			38	80	mA
V_F(1)	Forward voltage drop	T_j = 25° C	I_F = 1 A			0.39	V
		T_j = 125° C			0.25	0.28	
		T_j = 25° C	I_F = 2 A			0.43	
		T_j = 125° C			0.31	0.34	
		T_j = 25° C	I_F = 4 A			0.5	V
		T_j = 125° C			0.39	0.45	

1. Pulse test: t_p = 380 µs, δ < 2

To evaluate the conduction losses use the following equation:
$P = 0.22 \times I_{F(AV)} + 0.06\ I_F{}^2{}_{(RMS)}$

Figure 1. Average forward power dissipation versus average forward current

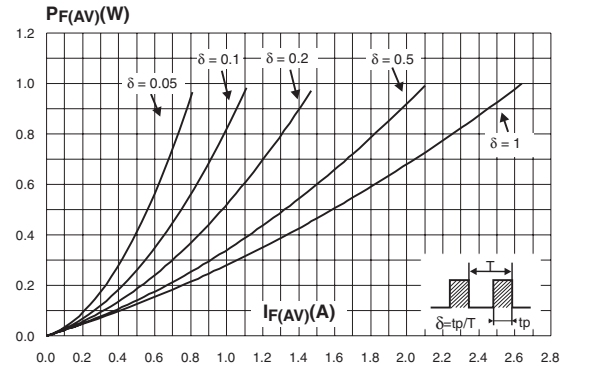


Figure 2. Average forward current versus ambient temperature (δ = 0.5) SMB

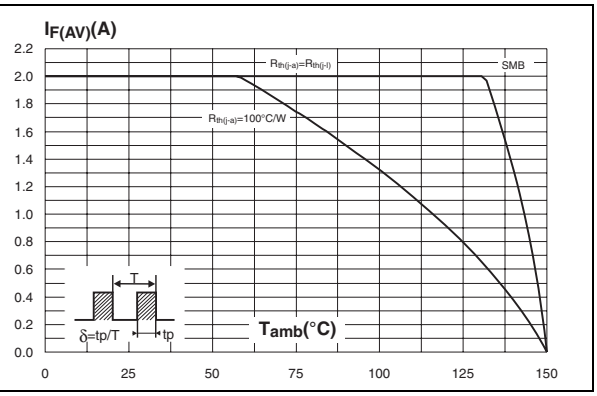


Figure 3. Average forward current versus ambient temperature (δ = 0.5) SMB flat

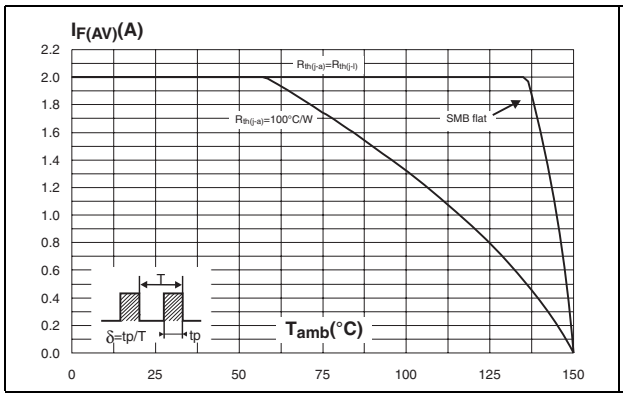


Figure 4. Non repetitive surge peak forward current versus overload duration (maximum values) SMB

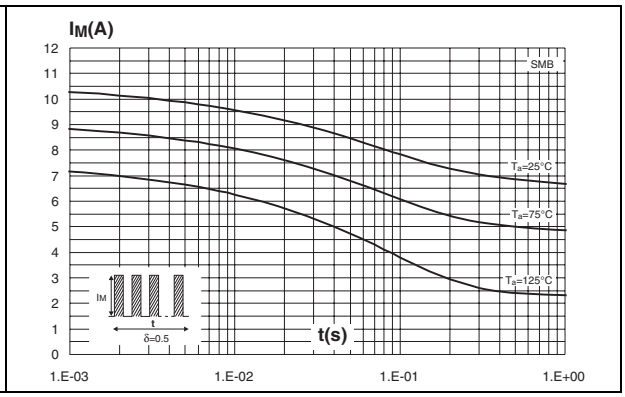


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values) SMB flat

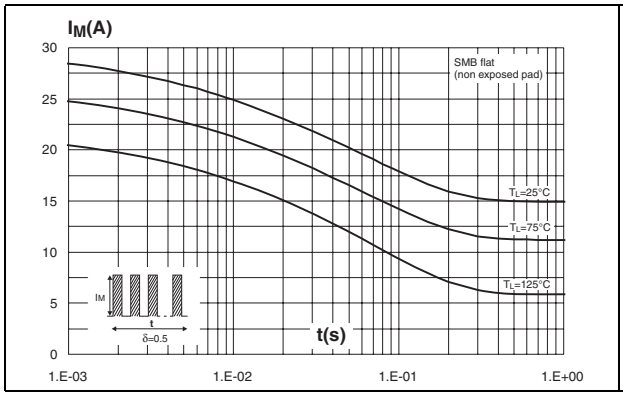


Figure 6. Normalized avalanche power derating versus pulse duration

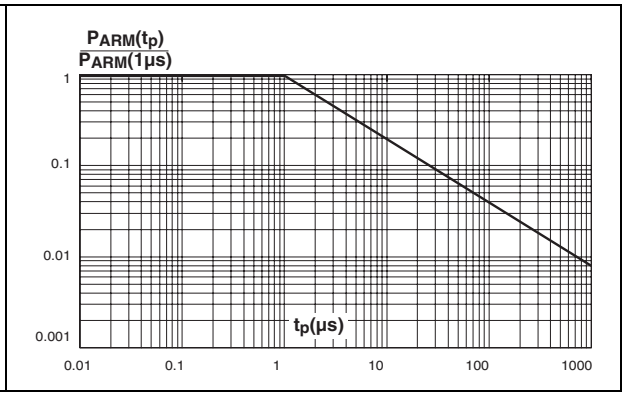


Figure 7. Normalized avalanche power derating versus junction temperature

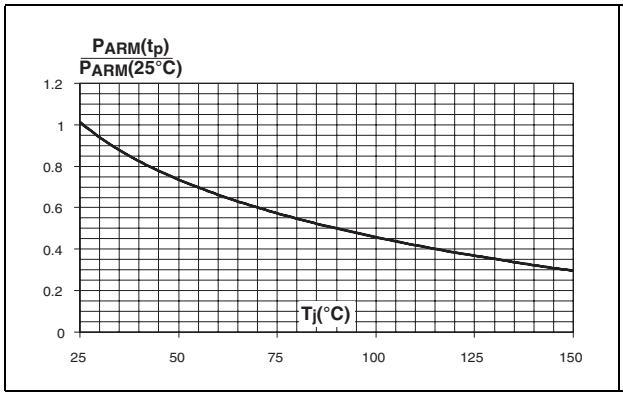


Figure 8. Relative variation of thermal impedance junction to ambient versus pulse duration - SMB

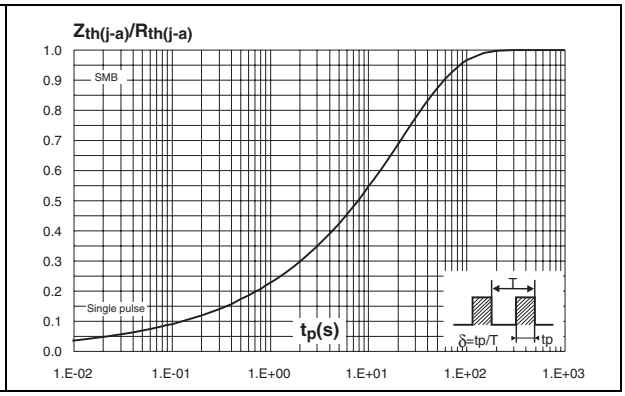


Figure 9. Relative variation of thermal impedance junction to lead versus pulse duration - SMB flat

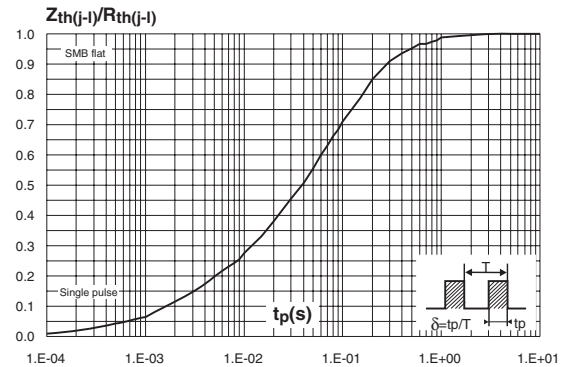


Figure 10. Reverse leakage current versus reverse voltage applied (typical values)

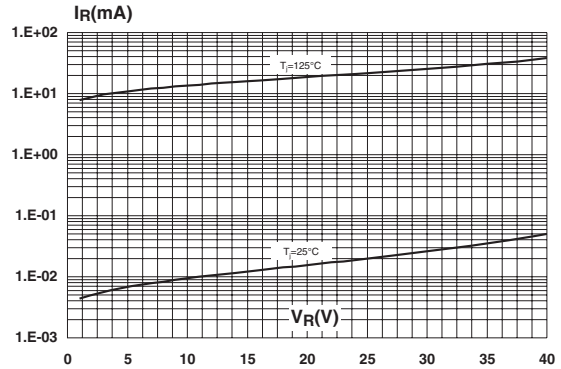


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

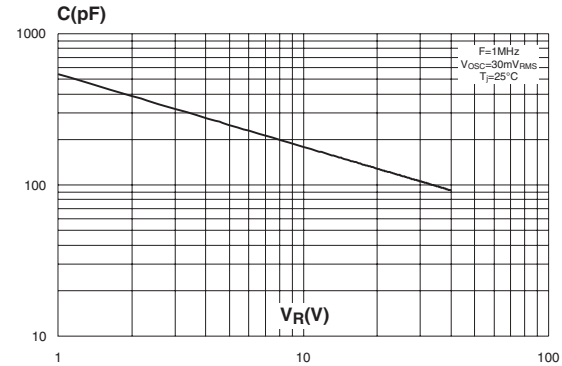


Figure 12. Forward voltage drop versus forward current (high level)

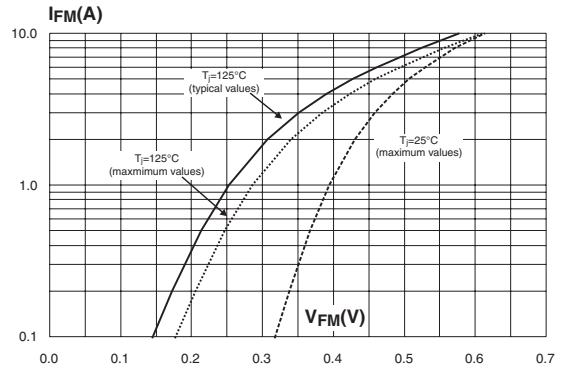


Figure 13. Forward voltage drop versus forward current (low level)

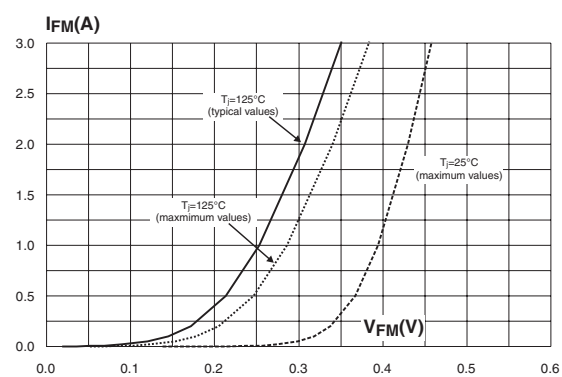
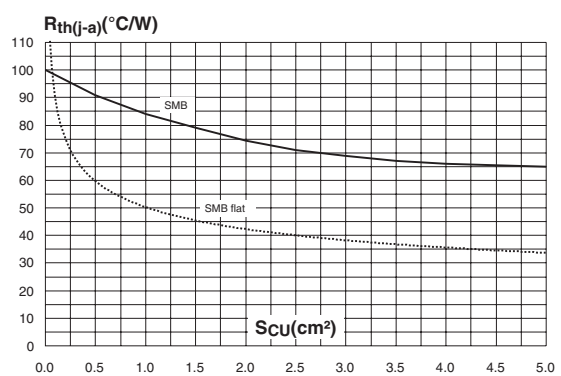


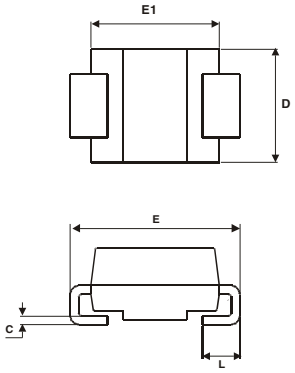
Figure 14. Thermal resistance junction to ambient versus copper surface under each lead (epoxy printed board FR4, e_{CU}=35µm)



2 Package Information

- Epoxy meets UL94,V0

Table 4. SMB 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
E	5.10	5.60	0.201	0.220
E1	4.05	4.60	0.159	0.181
D	3.30	3.95	0.130	0.156
L	0.75	1.50	0.030	0.059

Figure 15. SMB footprint (dimensions in mm)

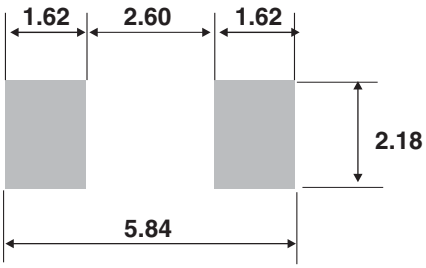
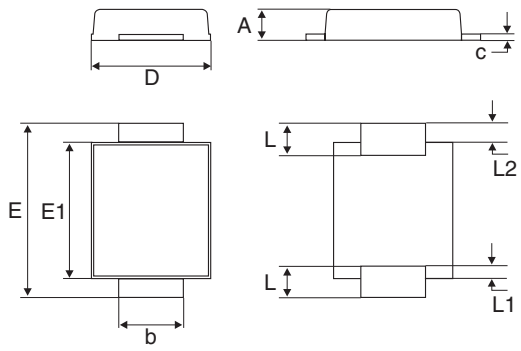


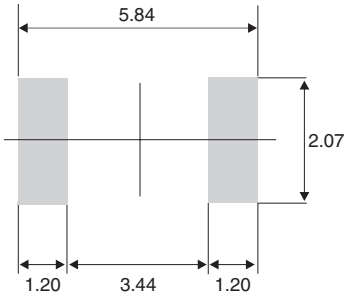
Table 5. SMB Flat dimensions



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 16. 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.

3 Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPS2L40U	GD4	SMB	0.107 g	2500	Tape and reel
STPS2L40UF	FGD4	SMB flat	0.50 g	5000	Tape and reel

4 Revision history

Date	Revision	Description of Changes
Jul-2003	2A	Last update.
31-Jan-2007	3	Reformatted to current standard. Added ECOPACK statement. Added SMB flat package.

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