

Power Schottky rectifier

Main product characteristics

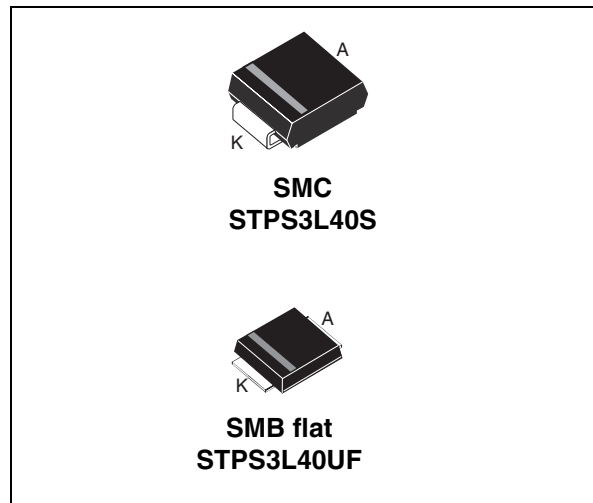
$I_{F(AV)}$	3 A
V_{RRM}	40 V
T_j (max)	150° C
V_F (max)	0.44 V

Features and Benefits

- Negligible switching losses
- Low thermal resistance
- Low forward voltage drop
- Avalanche capability specified

Description

Schottky rectifier suited for switched mode power supplies and high frequency DC to DC converters. Packaged in SMC, and low profile SMB, this device is intended for use in DC/DC chargers.



Order codes

Part Number	Marking
STPS3L40S	S3L4
STPS3L40UF	FS3L4

Table 1. Absolute Ratings (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		40	V
$I_{F(AV)}$	Average forward current	SMC	3	A
		SMB flat		
I_{FSM}	Surge non repetitive forward current		75	A
P_{ARM}	Repetitive peak avalanche power		1300	W
T_{stg}	Storage temperature range		-65 to + 175	°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

1 Characteristics

Table 2. Thermal resistance

Symbol	Parameter	Value	Unit
$R_{th(j-l)}$	Junction to lead	SMC	18
		SMB flat	10

Table 3. Static electrical characteristics

Symbol	Parameter	Test Conditions	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25^\circ C$	16	100	μA
		$T_j = 125^\circ C$		40	mA
$V_F^{(1)}$	Forward voltage drop	$T_j = 25^\circ C$	0.40	0.5	V
		$T_j = 125^\circ C$		0.44	
		$T_j = 25^\circ C$	0.52	0.62	
		$T_j = 125^\circ C$		0.58	

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

To evaluate the conduction losses use the following equation:

$$P = 0.30 \times I_{F(AV)} + 0.047 I_{F(RMS)}^2$$

Figure 1. Average forward power dissipation versus average forward current

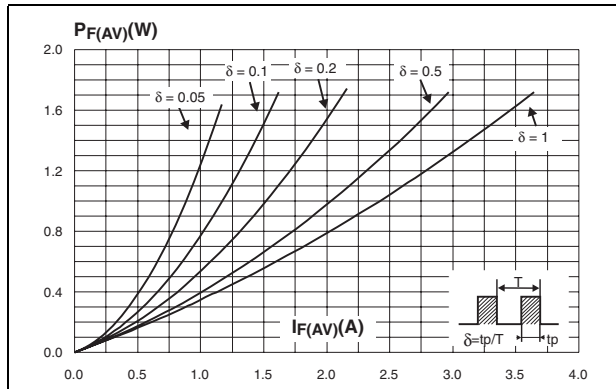


Figure 2. Average forward current versus ambient temperature (delta = 0.5) - SMC

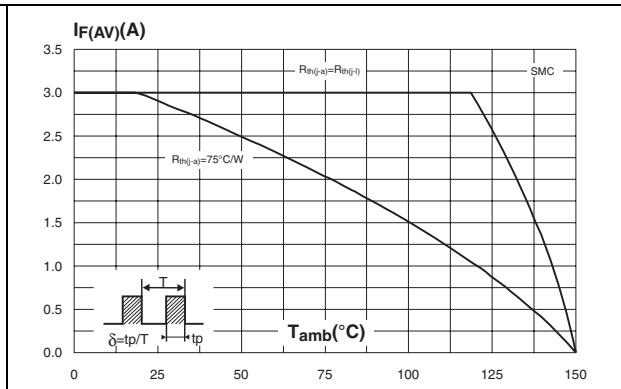


Figure 3. Average forward current versus ambient temperature ($\delta = 0.5$) SMB flat

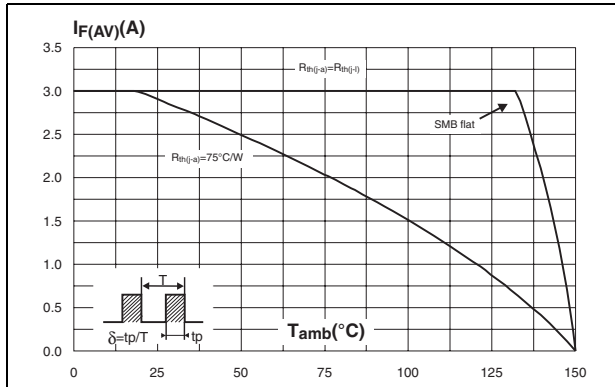


Figure 4. Non repetitive surge peak forward current versus overload duration (maximum values) SMC

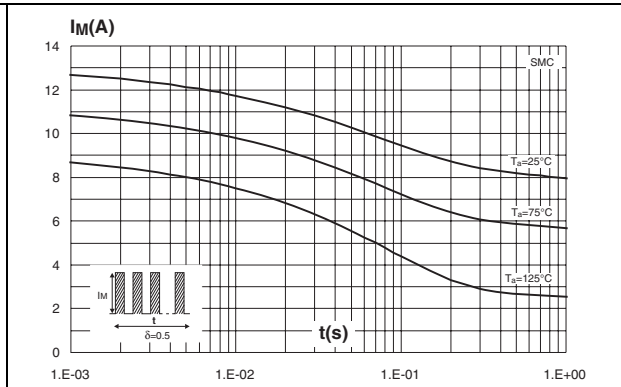


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values) SMB flat

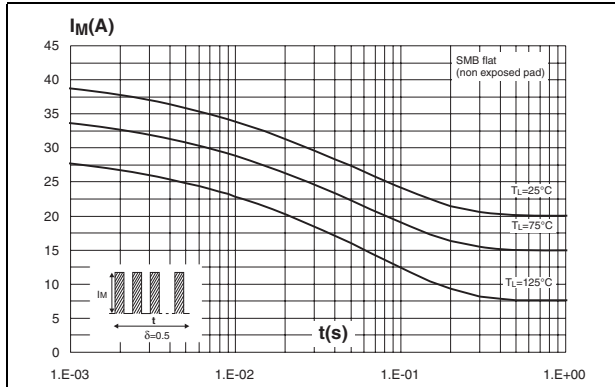


Figure 6. Normalized avalanche power derating versus pulse duration

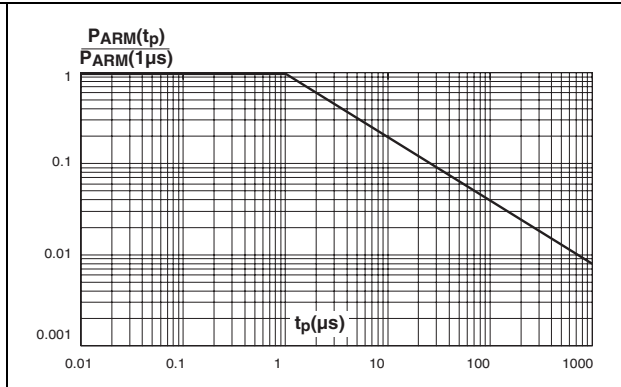


Figure 7. Normalized avalanche power derating versus junction temperature

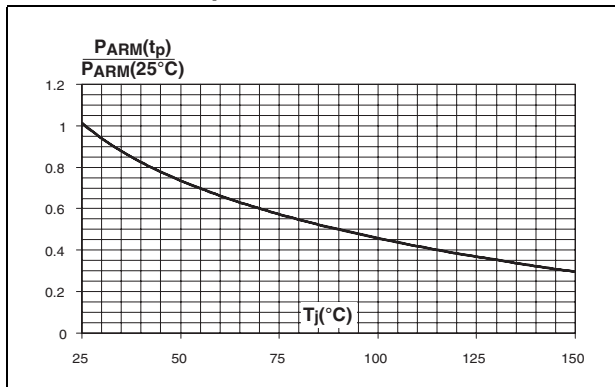


Figure 8. Relative variation of thermal impedance junction to ambient versus pulse duration - SMC

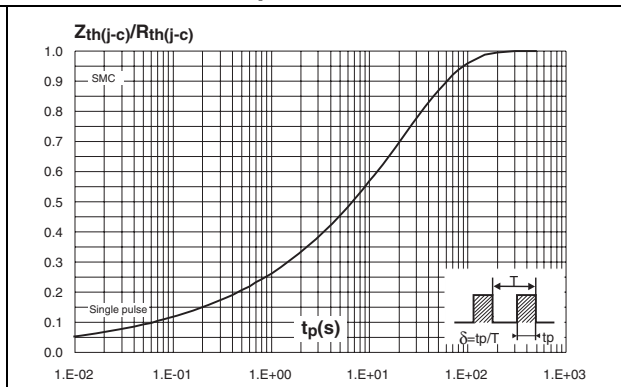


Figure 9. Relative variation of thermal impedance junction to lead versus pulse duration - SMB flat

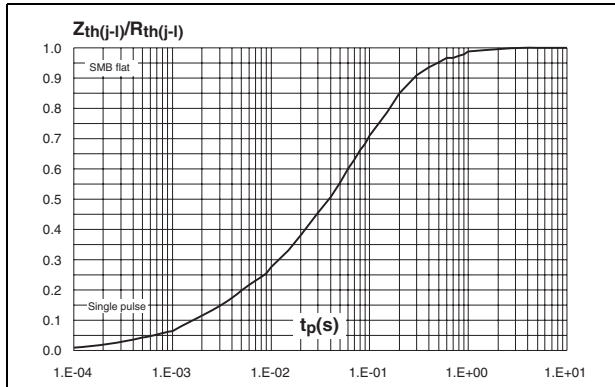


Figure 10. Reverse leakage current versus reverse voltage applied (typical values)

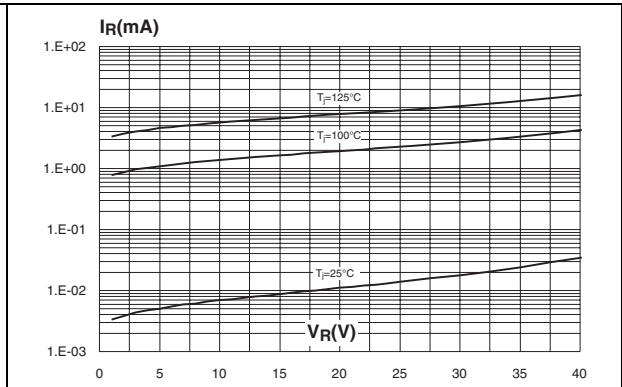


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

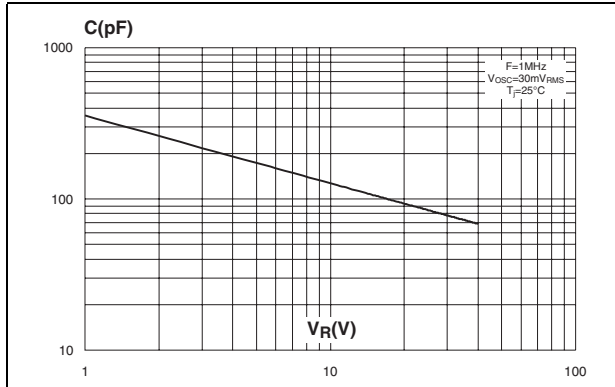


Figure 12. Forward voltage drop versus forward current

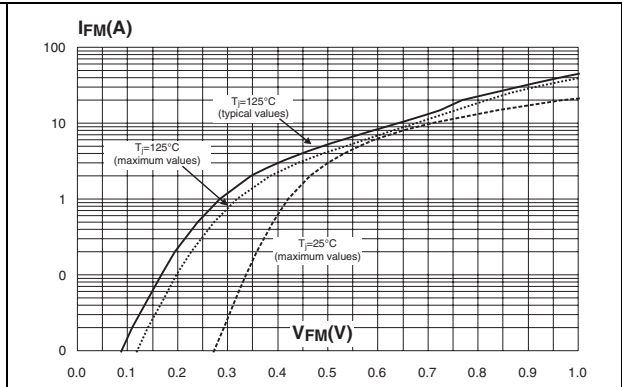
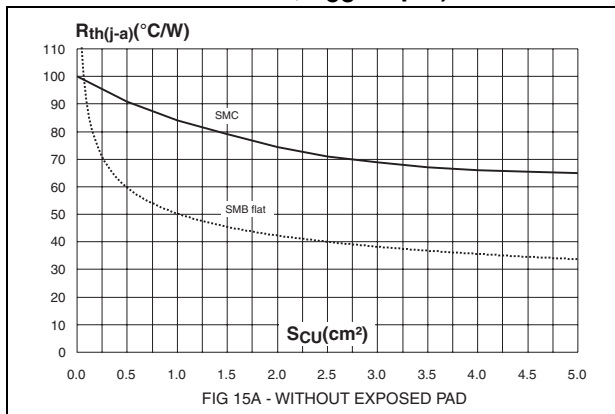


Figure 13. Thermal resistance junction to ambient versus copper surface under each lead (epoxy printed board FR4, $e_{CU}=35\mu m$)



2 Package Information

- Epoxy meets UL94,V0

Table 4. SMC package mechanical data

Ref	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.90	2.45	0.075	0.096
A2	0.05	0.20	0.002	0.008
b	2.90	3.2	0.114	0.126
c	0.15	0.41	0.006	0.016
E	7.75	8.15	0.305	0.321
E1	6.60	7.15	0.260	0.281
E2	4.40	4.70	0.173	0.185
D	5.55	6.25	0.218	0.246
L	0.75	1.40	0.030	0.063

Figure 14. SMC footprint (dimensions in mm)

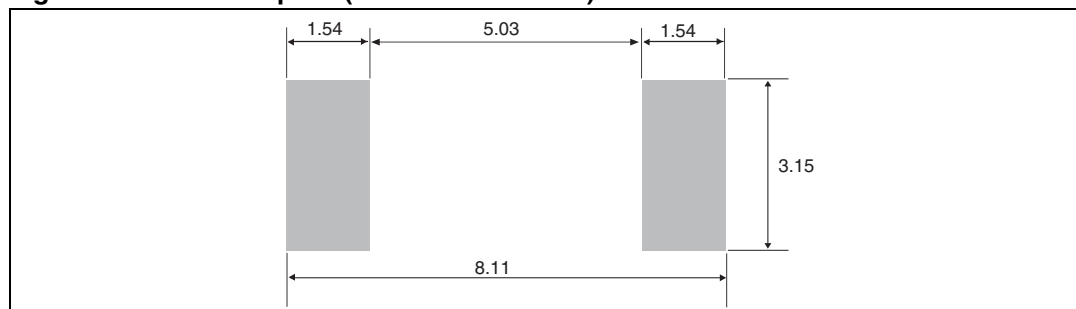
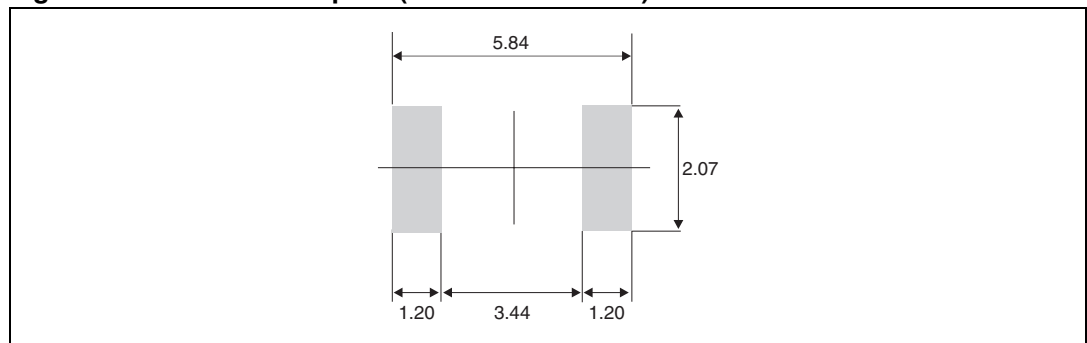


Table 5. SMB Flat dimensions

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 15. 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
STPS3L40S	S3L4	SMC	0.24 g	2500	Tape and reel
STPS3L40UF	FS3L4	SMB flat	0.50 g	5000	Tape and reel

4 Revision history

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

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