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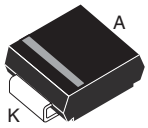
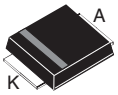
STPS3L40

Power Schottky rectifier

Datasheet - production data



SMC
STPS3L40S



SMBflat
STPS3L40UF

Description

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

Table 1. Device summary

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

Features

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

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			40	V
$I_{F(AV)}$	Average forward current	SMC	T_L = 120 °C δ = 0.5	3	A
		SMBflat	T_L = 130 °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 Tj = 25 °C	1300	W
T_{stg}	Storage temperature range			-65 to + 175	°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

Table 3. Thermal resistance

Symbol	Parameter		Value	Unit
$R_{th(j-l)}$	Junction to lead	SMC	18	°C/W
		SMBflat	10	

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$		100	µA
		T_j = 125 °C		16	40	mA
V_F (1)	Forward voltage drop	T_j = 25 °C	I_F = 3 A		0.5	V
		T_j = 125 °C		0.40	0.44	
		T_j = 25 °C	I_F = 6 A		0.62	
		T_j = 125 °C		0.52	0.58	

1. Pulse test: t_p = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:

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

Figure 1. Average forward power dissipation versus average forward current

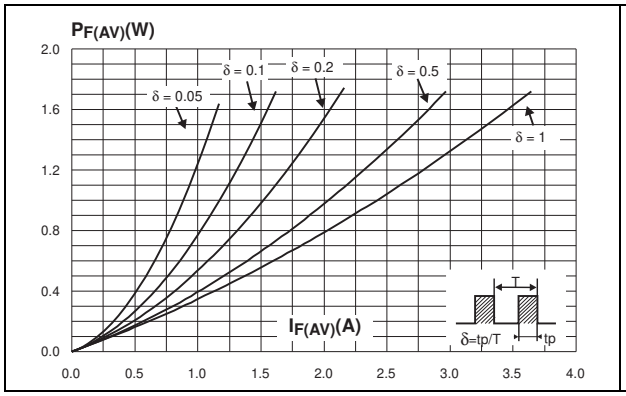


Figure 2. Average forward current versus ambient temperature (δ = 0.5) - SMC

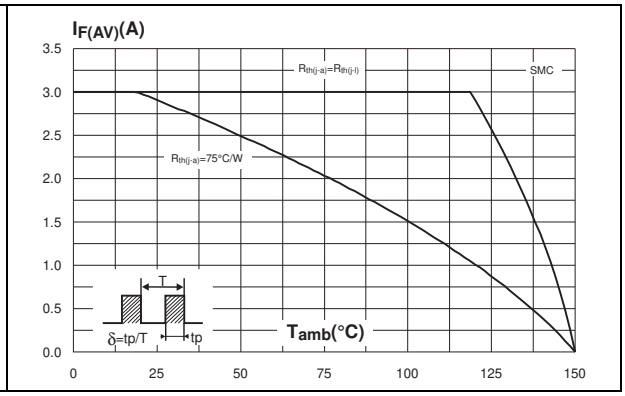


Figure 3. Average forward current versus ambient temperature (δ = 0.5) SMBflat

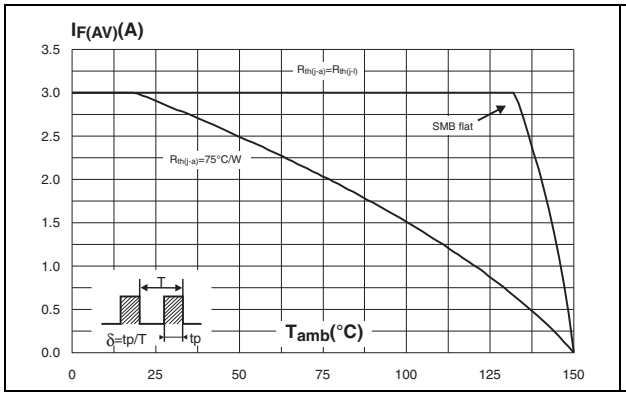


Figure 4. Non repetitive surge peak forward current versus overload duration (maximum values) SMC

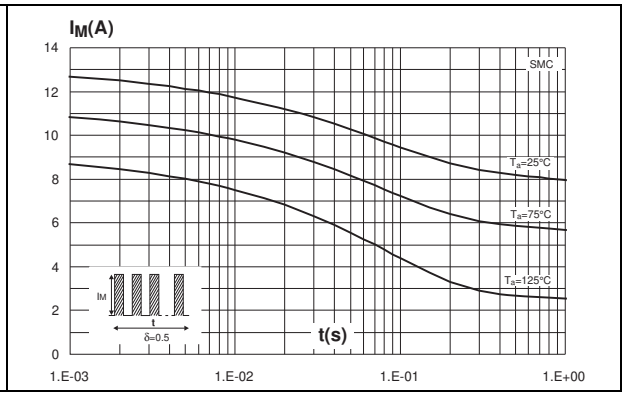


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values) SMBflat

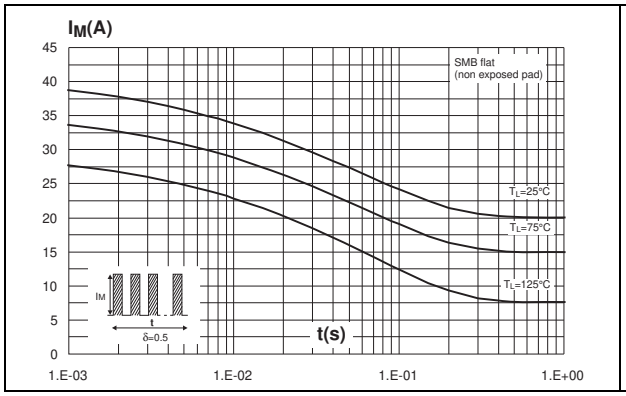


Figure 6. Normalized avalanche power derating versus pulse duration

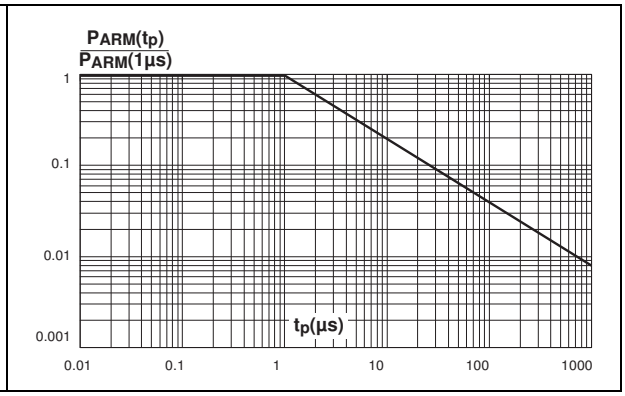


Figure 7. Normalized avalanche power derating versus junction temperature

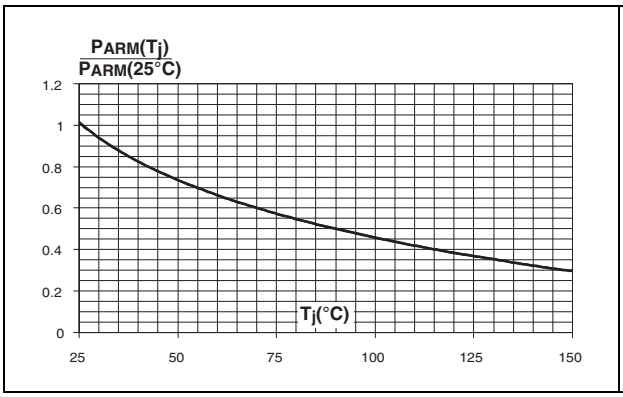


Figure 8. Relative variation of thermal impedance junction to ambient versus pulse duration - SMC

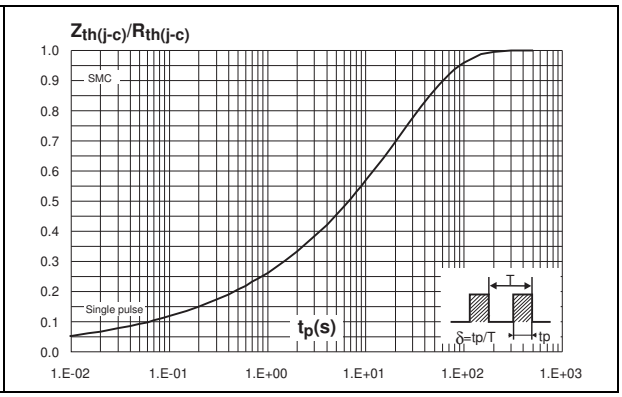


Figure 9. Relative variation of thermal impedance junction to lead versus pulse duration - SMBflat

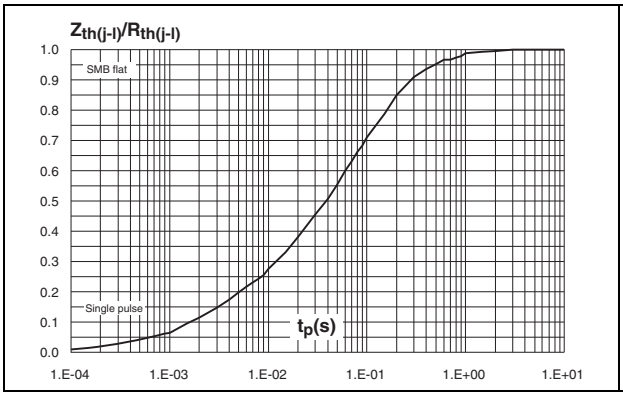


Figure 10. Reverse leakage current versus reverse voltage applied (typical values)

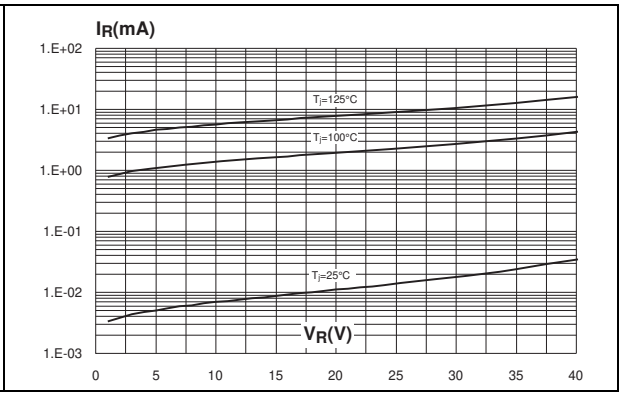


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

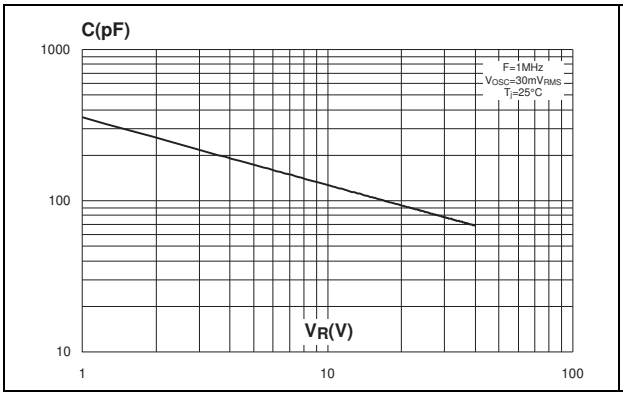


Figure 12. Forward voltage drop versus forward current

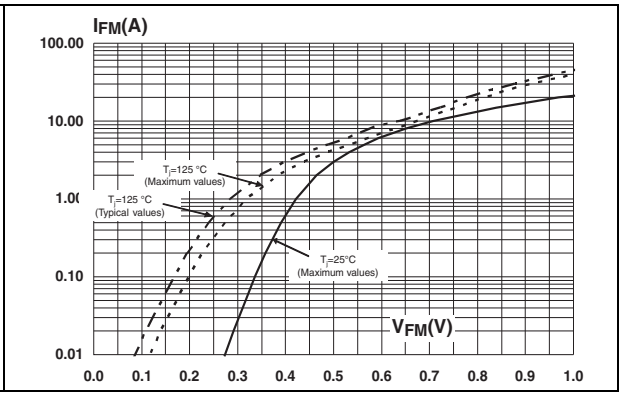
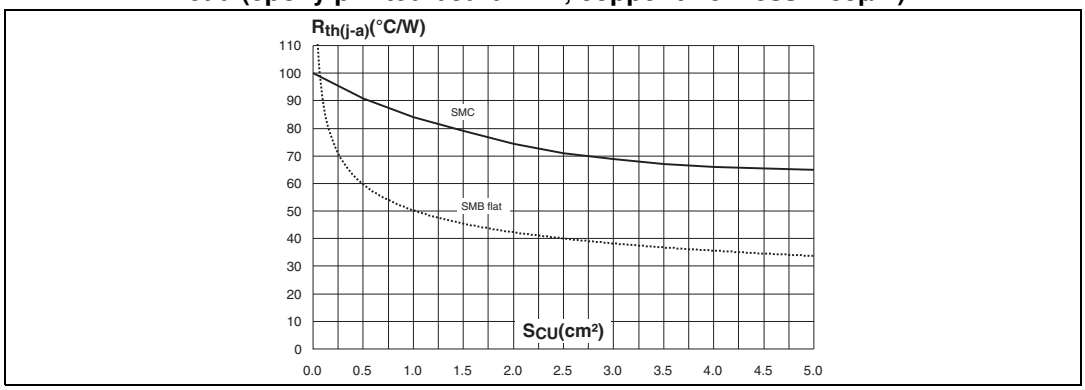


Figure 13. Thermal resistance junction to ambient versus copper surface under each lead (epoxy printed board FR4, copper thickness = 35µm)

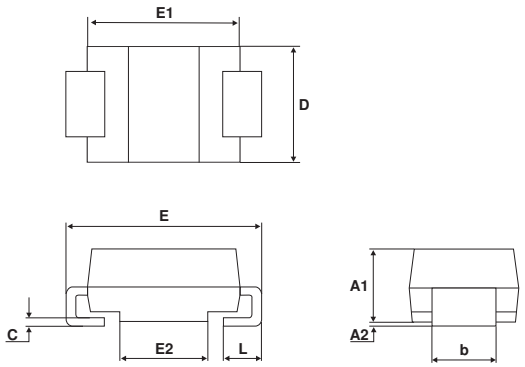


2 Package information

- Epoxy meets UL94,V0
- Lead-free packages

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.

Table 5. SMC package 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	2.90	3.2	0.114	0.126
c	0.15	0.40	0.006	0.016
D	5.55	6.25	0.218	0.246
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
L	0.75	1.40	0.030	0.063

Figure 14. SMC footprint dimensions in mm (inches)

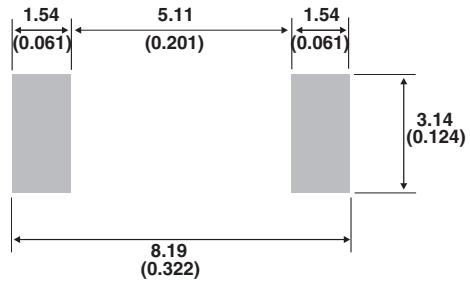
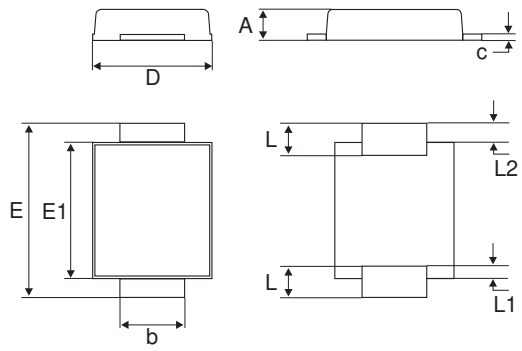


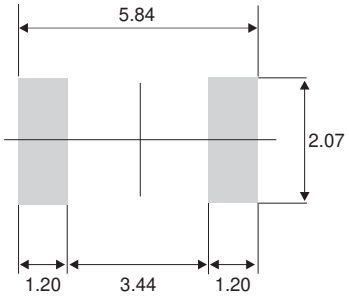
Table 6. SMBflat dimensions



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. SMBflat footprint (dimensions in mm)



3 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS3L40S	S3L4	SMC	0.24 g	2500	Tape and reel
STPS3L40UF	FS3L4	SMBflat	0.05 g	5000	Tape and reel

4 Revision history

Table 8. Document revision history

Date	Revision	Description of changes
Jul-2003	2A	Last update.
08-Feb-2007	3	Reformatted to current standard. Added ECOPACK statement. Added SMBflat package.
20-May-2013	4	Updated SMC package information. Updated ECOPACK statement. Corrected Y axis labels of *Figure 12*.

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