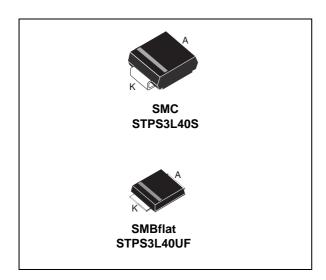


Power Schottky rectifier

Datasheet - production data



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

Characteristics STPS3L40

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reve	erse voltage		40	V
1	Average forward	SMC	$T_L = 120 {}^{\circ}\text{C} \delta = 0.5$	3	А
I _{F(AV)}	current	SMBflat	T _L = 130 °C δ = 0.5	3	
I _{FSM}	Surge non repetitive forward current		t _p = 10 ms sinusoidal	75	Α
P _{ARM}	Repetitive peak avalanche power $t_p = 1 \mu s$ 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			
В	Junction to lead	SMC	18	°C/W
R _{th(j-l)} Junction to lead	Junction to lead	SMBflat	10	C/VV

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Тур.	Max.	Unit
I _R ⁽¹⁾ Reverse leakage current	T _j = 25 °C	V V		100	μA	
'R`	Reverse leakage current	T _j = 125 °C	$V_R = V_{RRM}$	16	40	mA
	V _F ⁽¹⁾ Forward voltage drop	T _j = 25 °C	I _F = 3 A		0.5	
V (1)		T _j = 125 °C		0.40	0.44	V
V _F ` ′		T _j = 25 °C	I _F = 6 A		0.62	V
	T _j = 125 °C	I IF - U A	0.52	0.58		

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

To evaluate the conduction losses use the following equation:

$$P = 0.30 \text{ x I}_{F(AV)} + 0.047 \text{ I}_{F}^{2}_{(RMS)}$$



STPS3L40 Characteristics

Figure 1. Average forward power dissipation versus average forward current

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

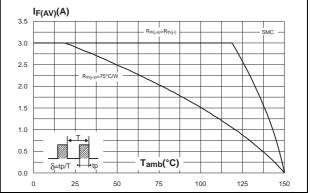
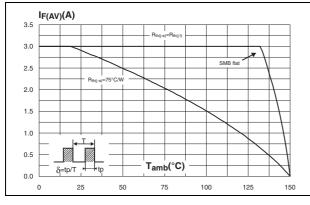


Figure 3. Average forward current versus ambient temperature ($\delta = 0.5$) SMBflat

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



Im(A)

14

12

10

8

6

4

2

1.E-03

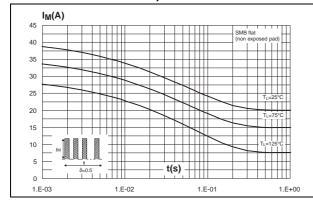
1.E-02

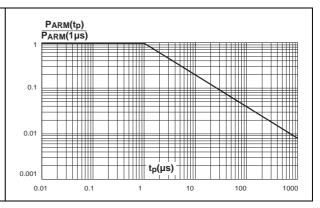
1.E-01

1.E+00

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

Figure 6. Normalized avalanche power derating versus pulse duration

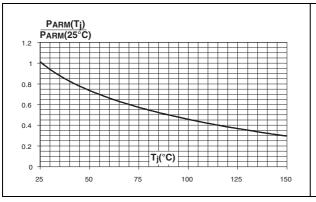




Characteristics STPS3L40

Figure 7. Normalized avalanche power derating versus junction temperature

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



Zth(j-c)/Rth(j-c)

1.0

0.9

SMC

0.8

0.7

0.6

0.5

0.4

0.3

0.2

0.1

Single pulse

1.E-02

1.E-01

1.E+00

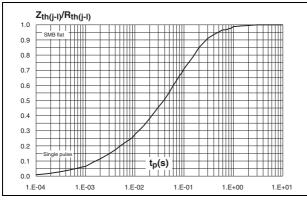
1.E+01

1.E+02

1.E+03

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)



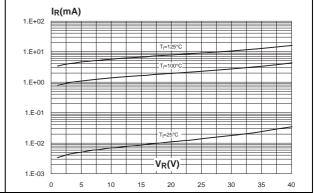
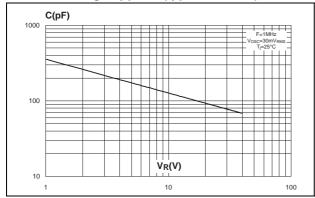
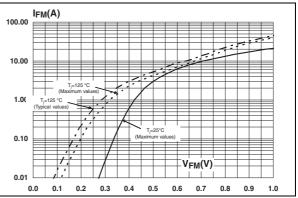


Figure 11. Junction capacitance versus reverse Figure 12. Forward voltage drop versus forward voltage applied (typical values) current

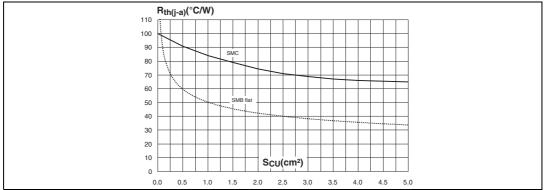




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Figure 13. Thermal resistance junction to ambient versus copper surface under each lead (epoxy printed board FR4, copper thickness = 35µm)



Package information STPS3L40

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.

E E A1 A2† b

Table 5. SMC package dimensions

	Dimensions			
Ref	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
С	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)

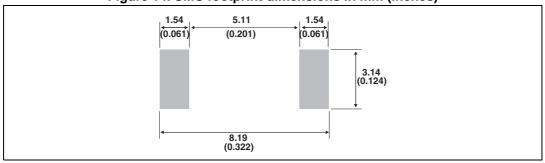
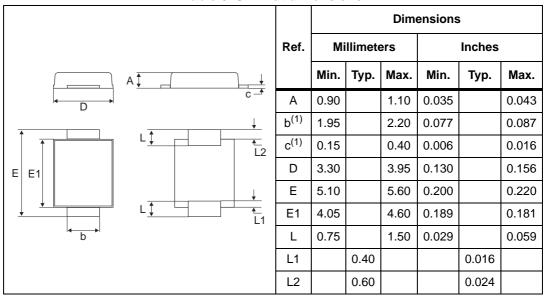
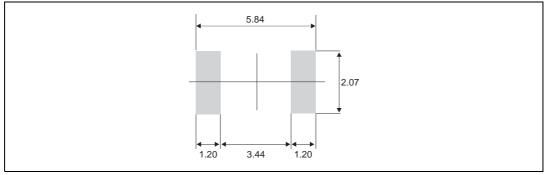


Table 6. SMBflat dimensions



1. Applies to plated leads

Figure 15. SMBflat footprint (dimensions in mm)



Ordering information STPS3L40

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 <i>Figure 12</i> .

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