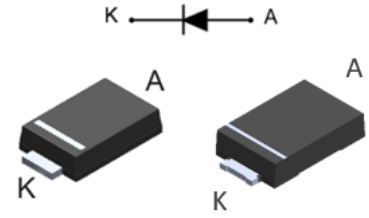
STPS3L40

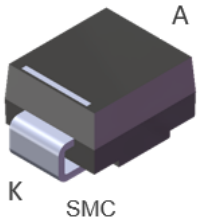
Datasheet

40 V, 3 A low drop Schottky rectifier



SMB Flat

SMB Flat Notch



SMC

Features

- Negligible switching losses
- Low forward voltage drop
- Low thermal resistance
- Avalanche rated
- ECOPACK2 component

Applications

- Telecom power supply
- Set-top box power supply
- TV power supply
- Battery charger

Description

Schottky rectifier suited for switch mode power supplies and high frequency DC to DC converters.

Packaged in SMB Flat Notch, SMB Flat and SMC, the STPS3L40 is ideal for surface mounting and used in DC/DC chargers.

Product status
STPS3L40

Product summary	
Symbol	**Value**
$I_{F(AV)}$	3 A
V_{RRM}	40 V
$T_{j(max.)}$	150 °C
$V_{F(typ.)}$	0.40 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			40	V
$I_{F(AV)}$	Average forward current, δ = 0.5, square wave	SMB Flat, SMB Flat Notch	T_L = 120 °C	3	A
		SMC	T_L = 115 °C		
I_{FSM}	Surge non repetitive forward current		t_p = 10 ms sinusoidal	75	A
P_{ARM}	Repetitive peak avalanche power		t_p = 10 µs, T_j = 125 °C	95	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 Flat, SMB Flat Notch	15	°C/W
		SMC	18	

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	$V_R = V_{RRM}$	-		100	µA
		T_j = 125 °C		-	16	40	mA
V_F(1)	Forward voltage drop	T_j = 25 °C	I_F = 3 A	-		0.50	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:

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

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

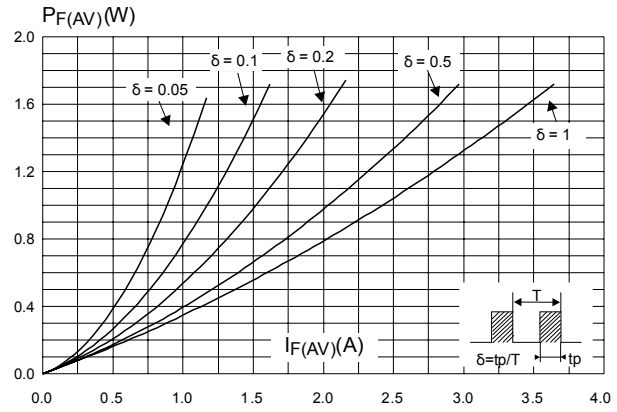


Figure 2. Average forward current versus ambient temperature (δ = 0.5) (SMC)

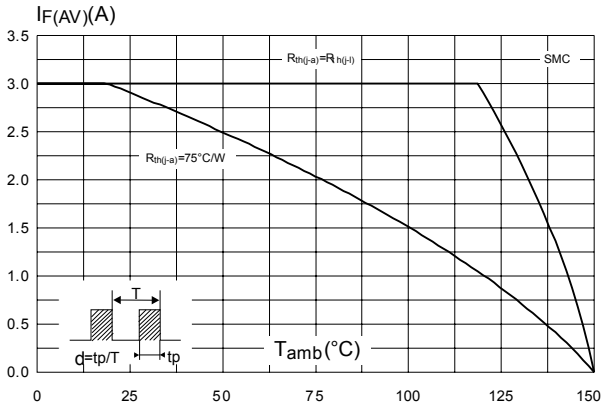


Figure 3. Average forward current versus ambient temperature (δ = 0.5, SMB Flat)

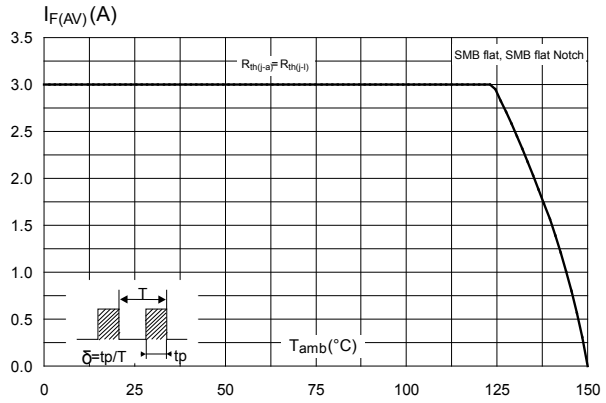


Figure 4. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

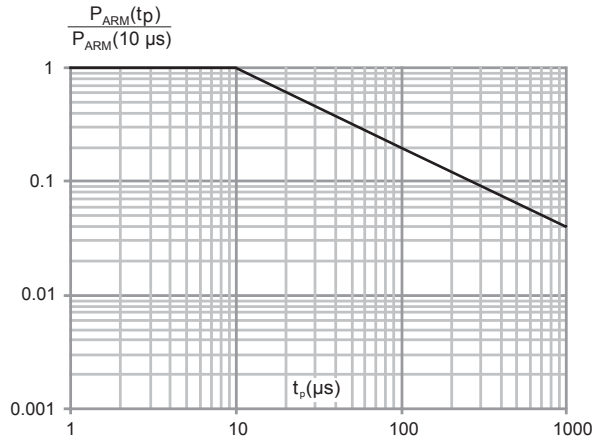


Figure 5. Relative variation of thermal impedance junction to ambient versus pulse duration (SMC)

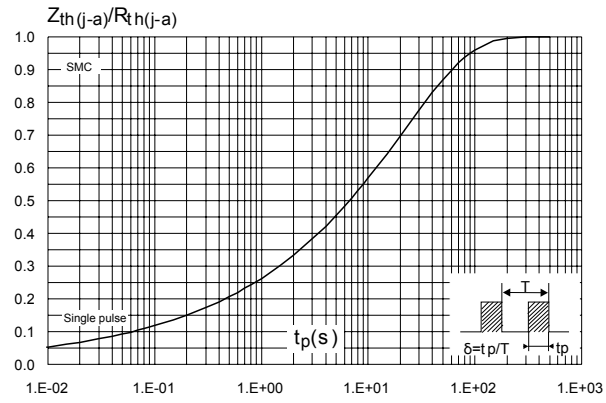


Figure 6. Relative variation of thermal impedance junction to lead versus pulse duration (SMB flat, SMB flat Notch)

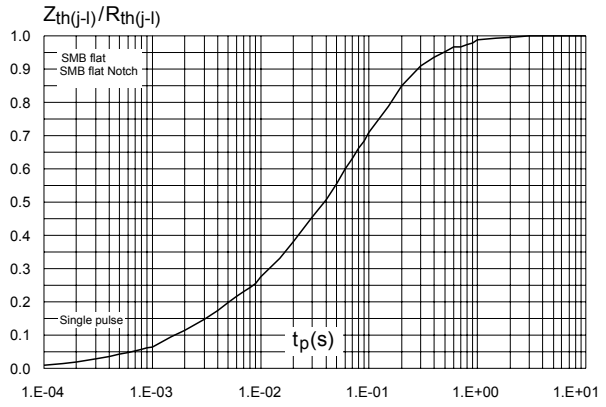


Figure 7. Reverse leakage current versus reverse voltage applied (typical values)

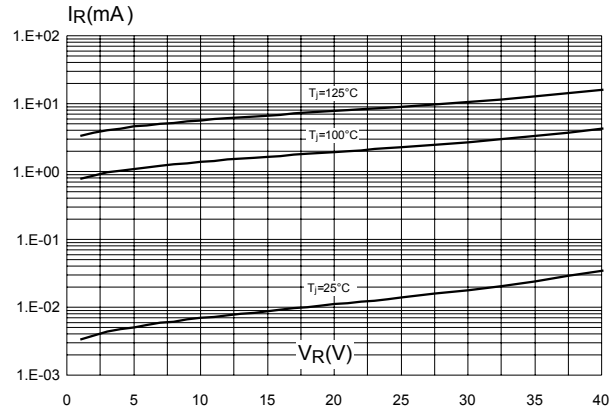


Figure 8. Junction capacitance versus reverse voltage applied (typical values)

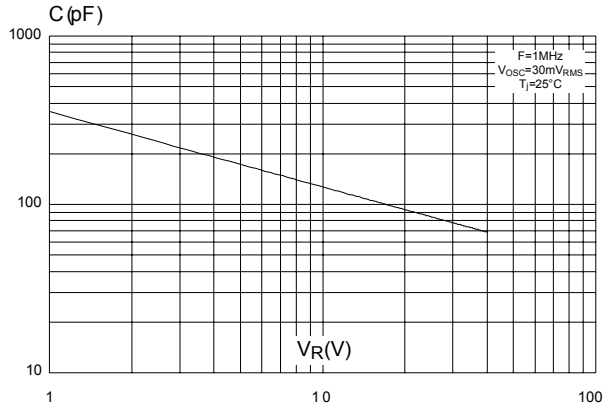


Figure 9. Forward voltage drop versus forward current

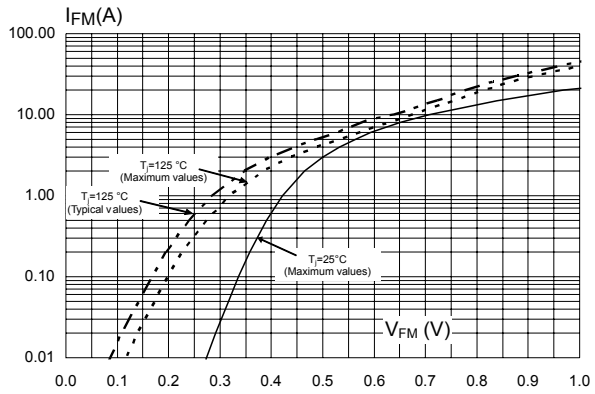


Figure 10. Thermal resistance junction to ambient versus copper surface under each lead (SMB flat, SMB flat Notch)

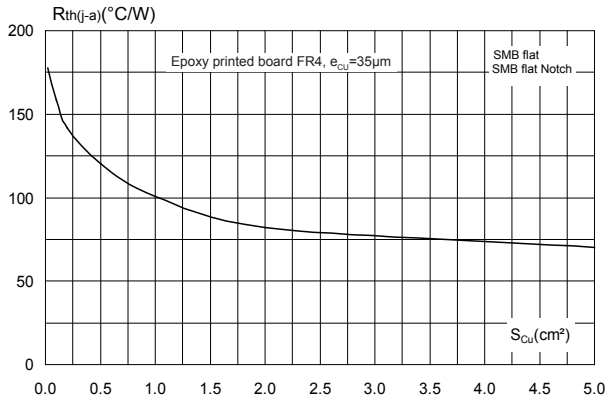
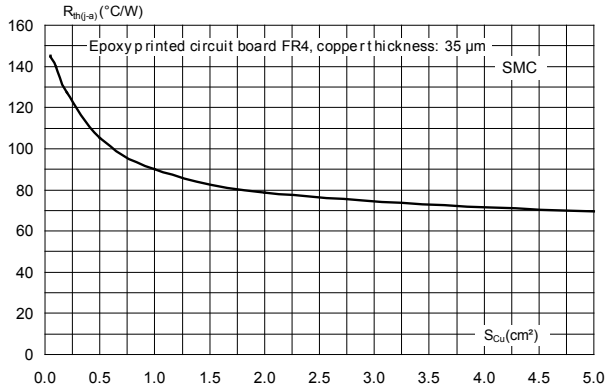


Figure 11. Thermal resistance junction to ambient versus copper surface under each lead (SMC)



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 Flat package information

- Epoxy meets UL94, V0
- Lead-free package

Figure 12. SMB Flat package outline

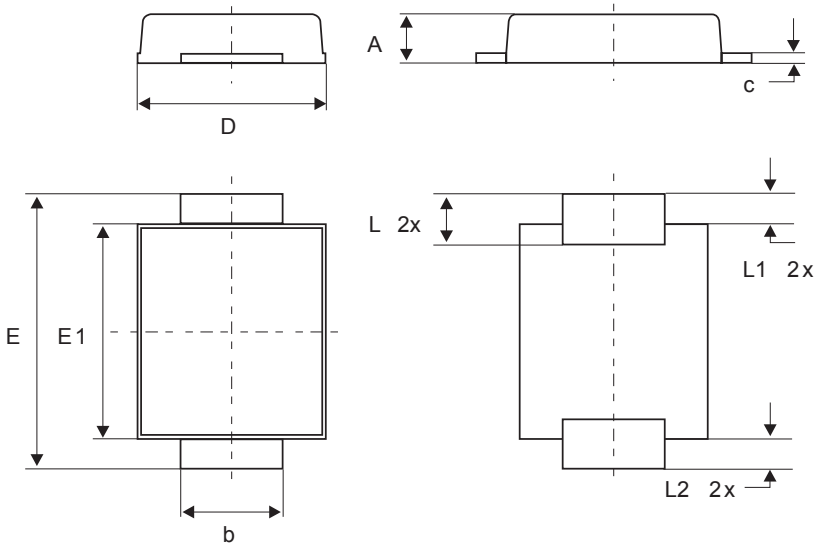
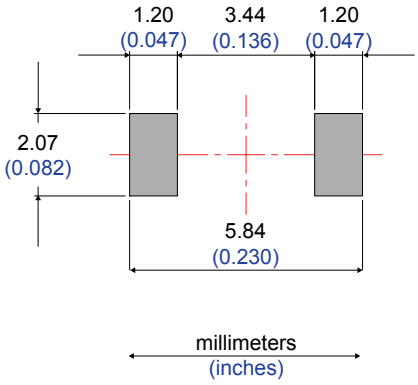


Table 4. SMB Flat mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.10	0.035		0.044
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
L1		0.40			0.016	
L2		0.60			0.024	

Figure 13. Footprint recommendations, dimensions in mm (inches)



2.2 SMB Flat Notch package information

- Epoxy meets UL94, V0
- Lead-free package

Figure 14. SMB Flat Notch package outline

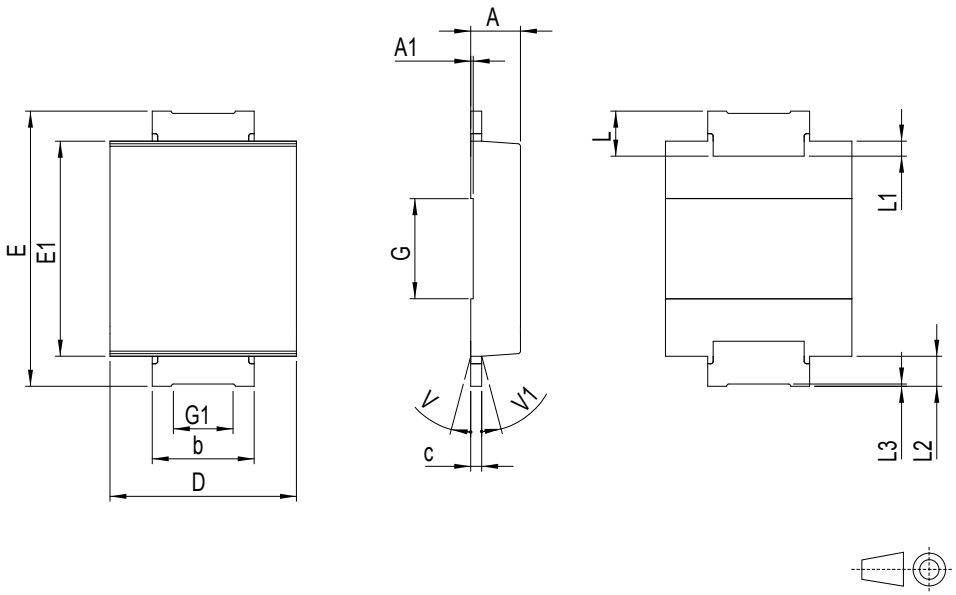
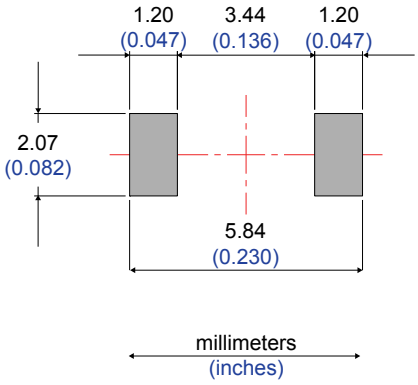


Table 5. SMB Flat Notch mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.10	0.035		0.043
A1		0.05			0.002	
b	1.95		2.20	0.077		0.087
c	0.15		0.40	0.006		0.016
D	3.30		3.95	0.130		0.156
E	5.20		5.60	0.205		0.220
E1	4.05		4.60	0.159		0.181
G		2.00			0.079	
G1		1.20			0.047	
L	0.75		1.20	0.030		0.047
L1		0.30			0.012	
L2		0.60			0.024	
L3	0.02			0.001		
V			8°			8°
V1			8°			8°

Figure 15. Footprint recommendations, dimensions in mm (inches)



2.3 SMC package information

- Epoxy meets UL94, V0

Figure 16. **SMC package outline**

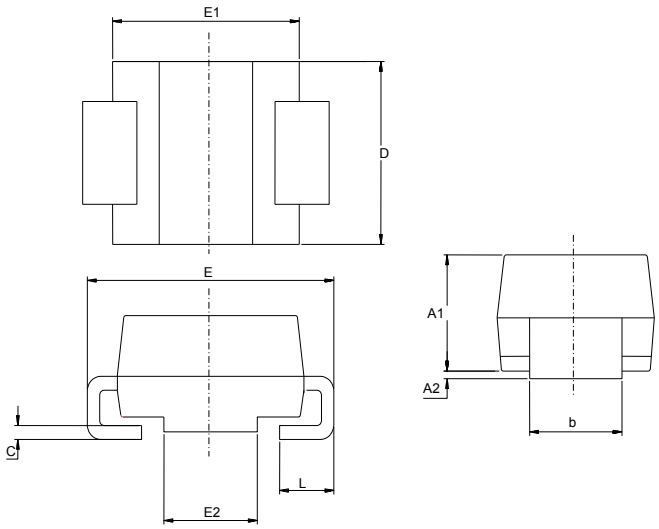
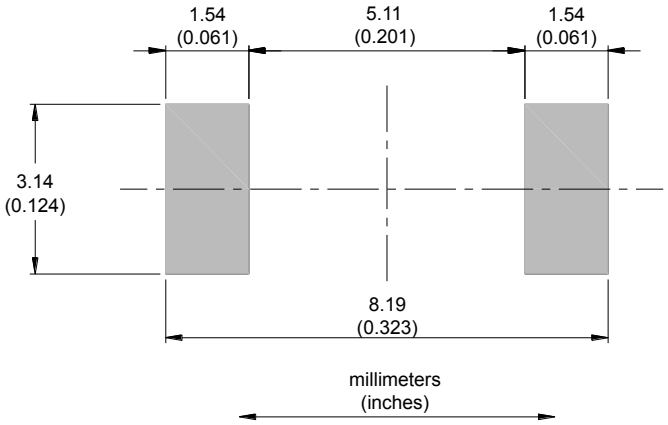


Table 6. **SMC package mechanical data**

Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.0748	0.0965
A2	0.05	0.20	0.0020	0.0079
b	2.90	3.20	0.1142	0.1260
c	0.15	0.40	0.0059	0.0157
D	5.55	6.25	0.2185	0.2461
E	7.75	8.15	0.3051	0.3209
E1	6.60	7.15	0.2598	0.2815
E2	4.40	4.70	0.1732	0.1850
L	0.75	1.50	0.0295	0.0591

Figure 17. **SMC recommended footprint**



3 Ordering information

Table 7. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS3L40UFN	B34	SMB Flat Notch	0.056 g	5 000	Tape and reel
STPS3L40UF	FS3L4	SMB Flat	0.050 g	5000	Tape and reel
STPS3L40S	S3L4	SMC	0.243 g	10 000	Tape and reel

Revision history

Table 8. **Document revision history**

Date	Version	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.
31-Jan-2020	5	Added Section 2.2 SMB Flat Notch package information.