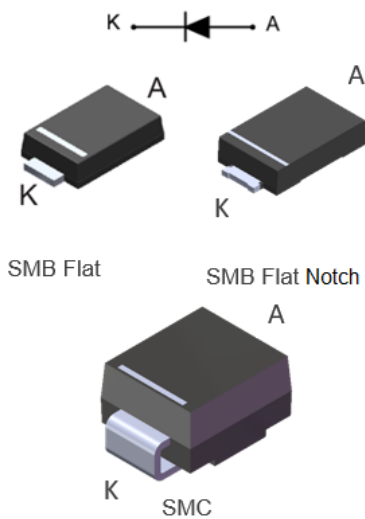


## 40 V, 3 A low drop Schottky rectifier



### 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, $\delta = 0.5$ , square wave	SMB Flat, SMB Flat Notch	$T_L = 120\text{ °C}$	3	A
		SMC	$T_L = 115\text{ °C}$		
$I_{FSM}$	Surge non repetitive forward current		$t_p = 10\text{ ms}$ sinusoidal	75	A
$P_{ARM}$	Repetitive peak avalanche power		$t_p = 10\text{ }\mu\text{s}$ , $T_j = 125\text{ °C}$	95	W
$T_{stg}$	Storage temperature range		-65 to +150	°C	
$T_j$	Maximum operating junction temperature <sup>(1)</sup>		+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	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$	-		100	$\mu\text{A}$
		$T_j = 125\text{ °C}$		-	16	40	mA
$V_F^{(1)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 3\text{ A}$	-		0.50	V
		$T_j = 125\text{ °C}$		-	0.40	0.44	
		$T_j = 25\text{ °C}$	$I_F = 6\text{ A}$	-		0.62	
		$T_j = 125\text{ °C}$		-	0.52	0.58	

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

To evaluate the conduction losses, use the following equation:

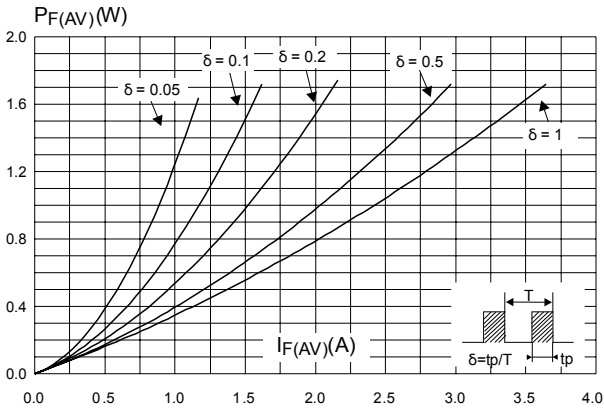
$$P = 0.30 \times I_{F(AV)} + 0.047 \times I_{F(RMS)}^2$$

For more information, please refer to the following application notes related to the power losses :

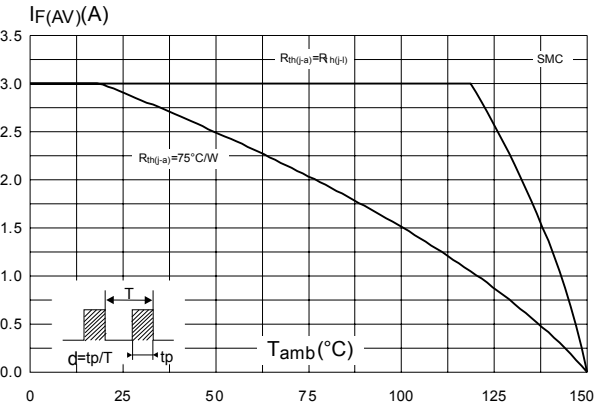
- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

### 1.1 Characteristics (curves)

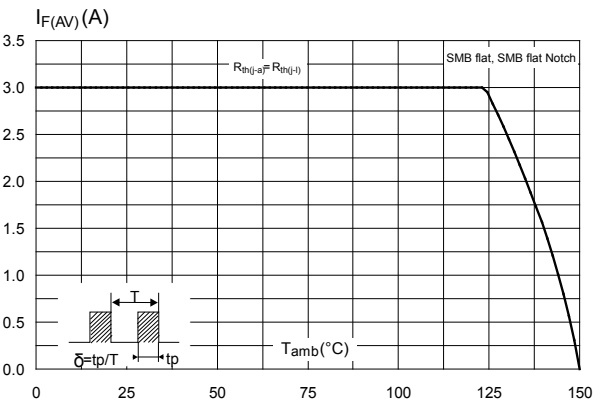
**Figure 1. Average forward power dissipation versus average forward current**



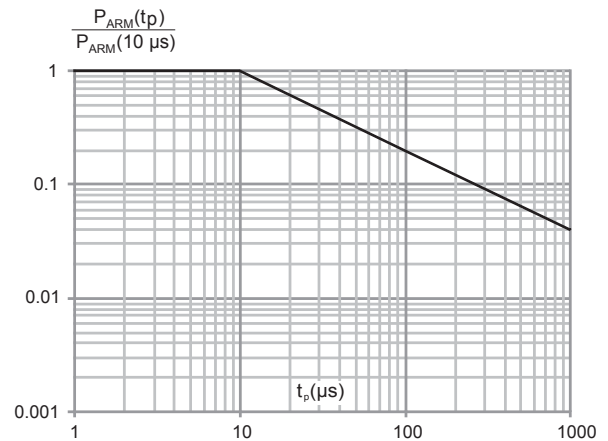
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ ) (SMC)**



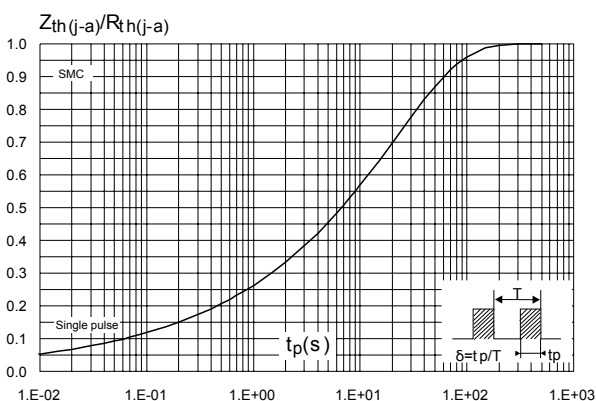
**Figure 3. Average forward current versus ambient temperature ( $\delta = 0.5$ , SMB Flat)**



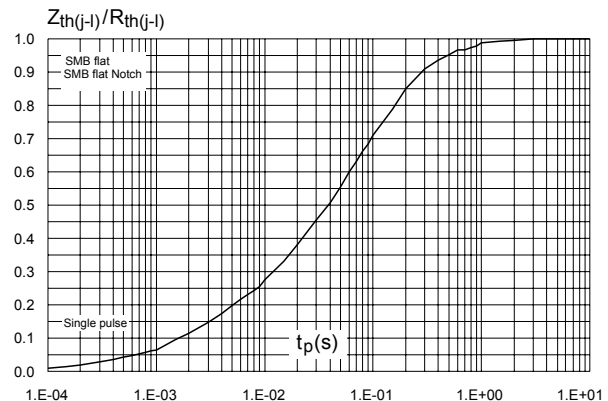
**Figure 4. Normalized avalanche power derating versus pulse duration ( $T_j = 125^\circ\text{C}$ )**



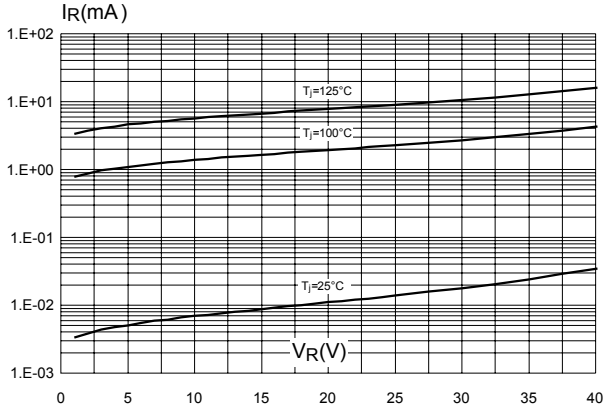
**Figure 5. Relative variation of thermal impedance junction to ambient versus pulse duration (SMC)**



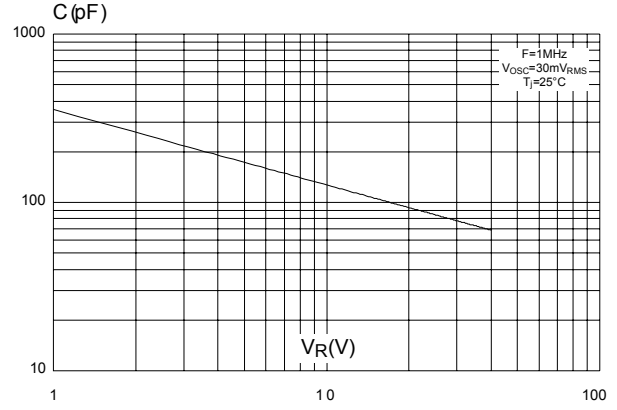
**Figure 6. Relative variation of thermal impedance junction to lead versus pulse duration (SMB flat, SMB flat Notch)**



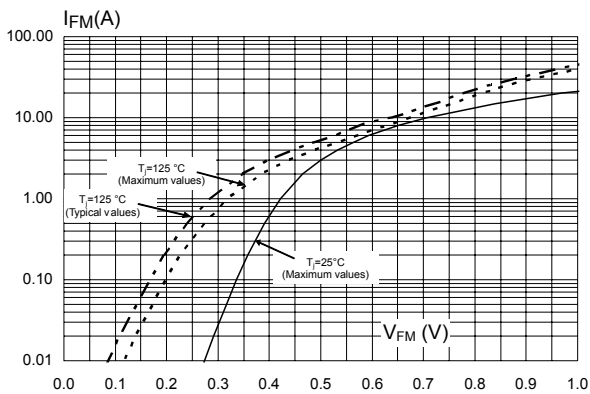
**Figure 7. Reverse leakage current versus reverse voltage applied (typical values)**



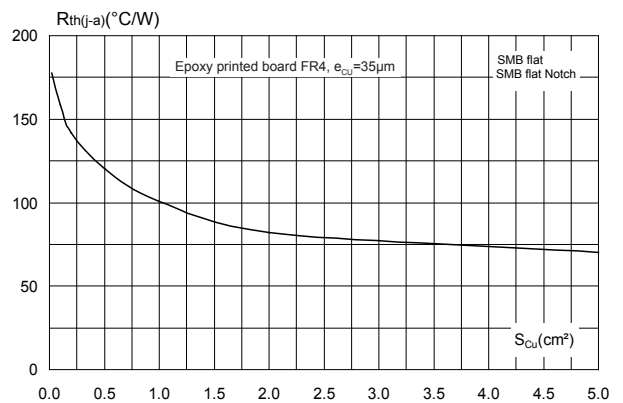
**Figure 8. Junction capacitance versus reverse voltage applied (typical values)**



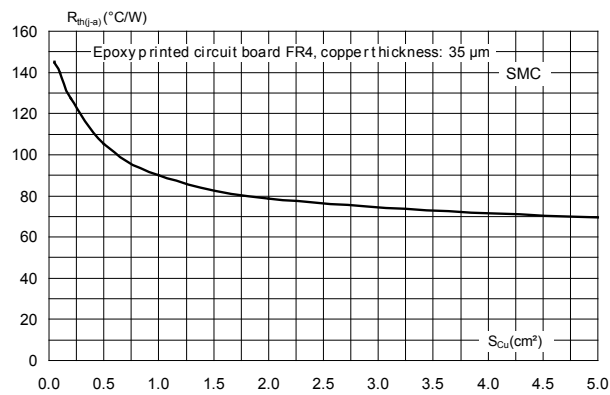
**Figure 9. Forward voltage drop versus forward current**



**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)**



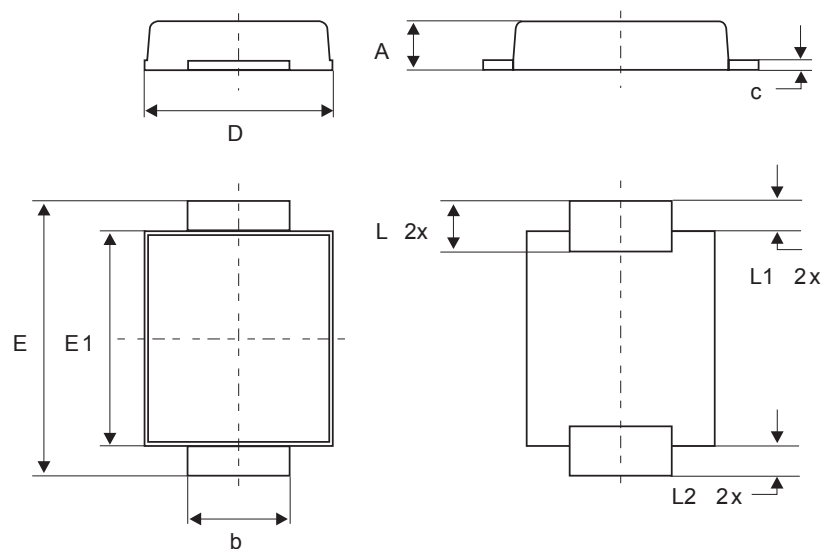
## 2 Package information

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](http://www.st.com). ECOPACK is an ST trademark.

### 2.1 SMB Flat package information

- Epoxy meets UL94, V0
- Lead-free package

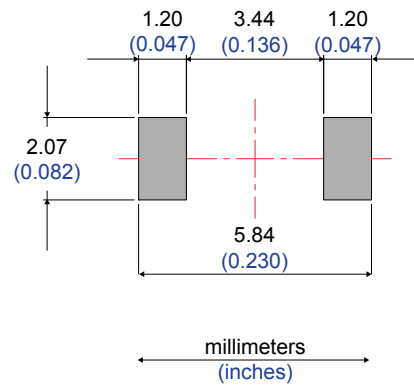
**Figure 12. SMB Flat package outline**



**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

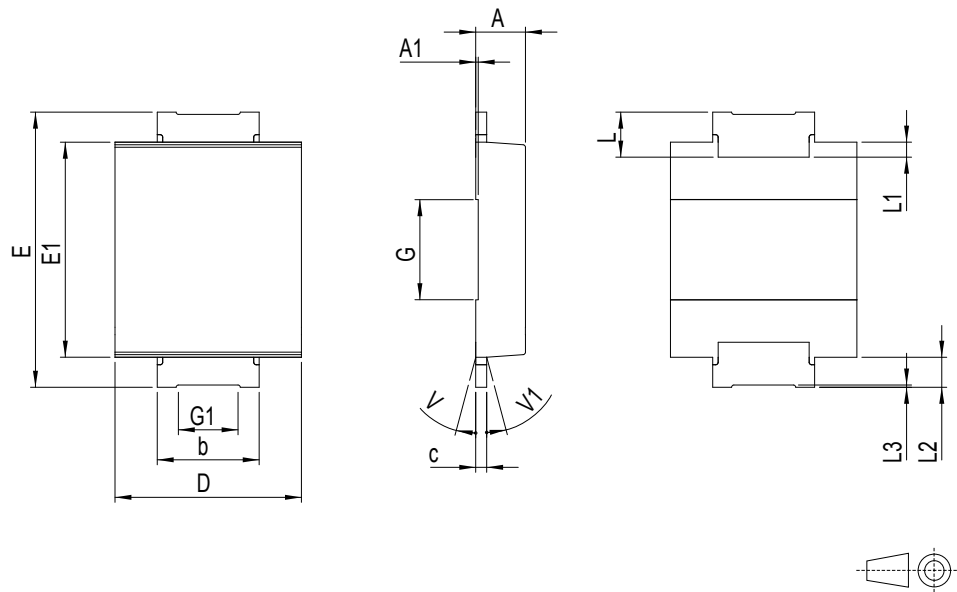
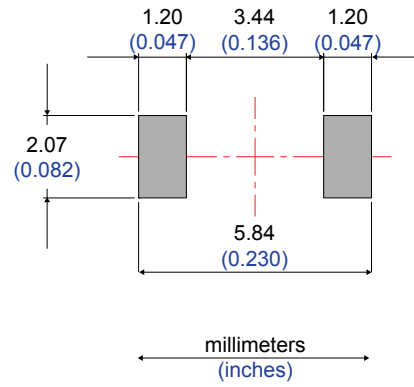


Table 5. SMB Flat Notch mechanical data

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)

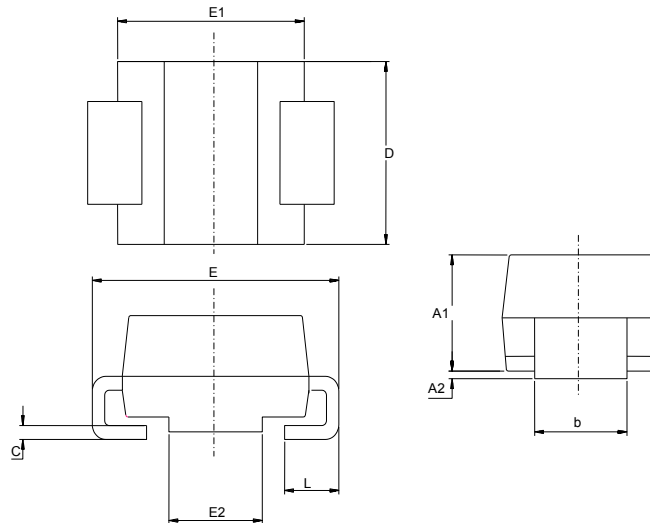




### 2.3 SMC package information

- Epoxy meets UL94, V0

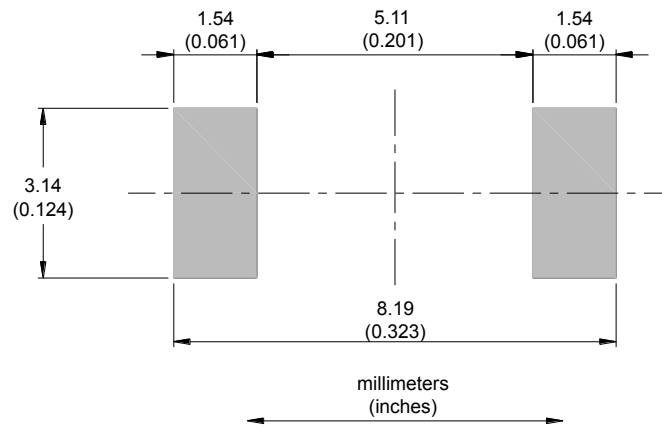
**Figure 16. SMC package outline**



**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 <a href="#">Section 2.2 SMB Flat Notch package information</a> .

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