

Features

- 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 a tiny SMAflat package, this device has been optimized for use in compact chargers.

Figure 1. Electrical characteristics^(a)

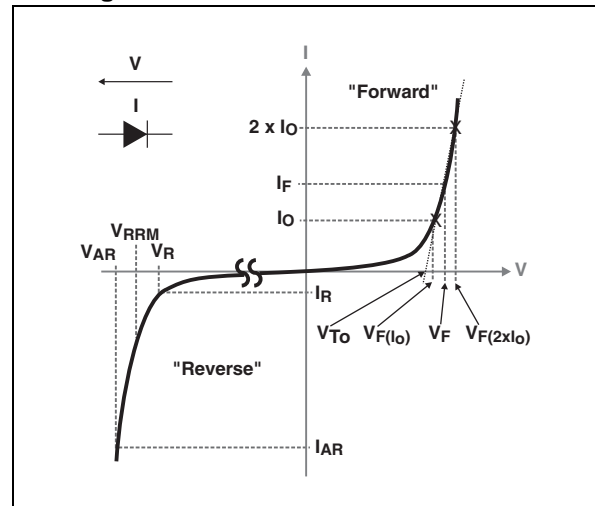


Table 1. Device summary

Symbol	value
$I_{F(AV)}$	3 A
V_{RRM}	45 V
T_j (max)	150 °C
V_F (typ)	0.462 V

- a. V_{ARM} and I_{ARM} must respect the reverse safe operating area defined in [Figure 11](#). V_{AR} and I_{AR} are pulse measurements ($t_p < 10 \mu s$). V_R , I_R , V_{RRM} and V_F are static characteristics

1 Characteristics

Table 2. Absolute ratings (limiting values at 25 °C, unless otherwise specified)

Symbol	Parameter	Test conditions	Value	Unit
V_{RRM}	Repetitive peak reverse voltage		45	V
$I_{F(AV)}$	Average forward current	$T_L = 120\text{ °C}$ $\delta = 0.5$	3	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10\text{ ms}$ sinusoidal	75	A
$P_{ARM}^{(1)}$	Repetitive peak avalanche power	$t_p = 10\text{ }\mu\text{s}$ $T_j = 125\text{ °C}$	70	W
$V_{ARM}^{(2)}$	Maximum repetitive peak avalanche voltage	$t_p < 10\text{ }\mu\text{s}$, $T_j < 125\text{ °C}$, $I_{AR} < 1.4\text{ A}$	50	V
$V_{ASM}^{(2)}$	Maximum single pulse peak avalanche voltage	$t_p < 10\text{ }\mu\text{s}$, $T_j < 125\text{ °C}$, $I_{AR} < 1.4\text{ A}$	50	V
T_{stg}	Storage temperature range		-65 to + 175	°C
T_j	Operating junction temperature ⁽³⁾		150	°C

1. For pulse time duration deratings, please refer to [Figure 4](#). More details regarding the avalanche energy measurements and diode validation in the avalanche are provided in the STMicroelectronics Application notes AN1768, "Admissible avalanche power of Schottky diodes" and AN2025, "Converter improvement using Schottky rectifier avalanche specification".
2. Refer to [Figure 11](#)
3. $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal resistance

Symbol	Parameter	Value	Unit
$R_{th(j-l)}$	Thermal resistance junction to lead	15	°C/W

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$	80	300	μA
		$T_j = 125\text{ °C}$		66	135	mA
$V_F^{(1)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 3\text{ A}$	0.462	0.57	V
		$T_j = 125\text{ °C}$		0.41	0.51	

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

To evaluate the conduction losses use the following equation:

$$P = 0.36 \times I_{F(AV)} + 0.05 I_{F(RMS)}^2$$

Figure 2. Average forward power dissipation versus average forward current

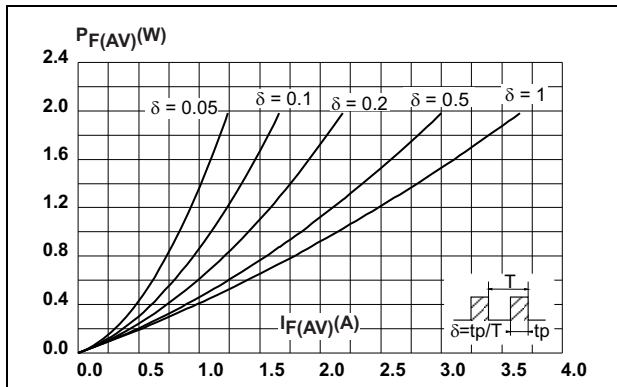


Figure 3. Average forward current versus ambient temperature ($\delta = 0.5$)

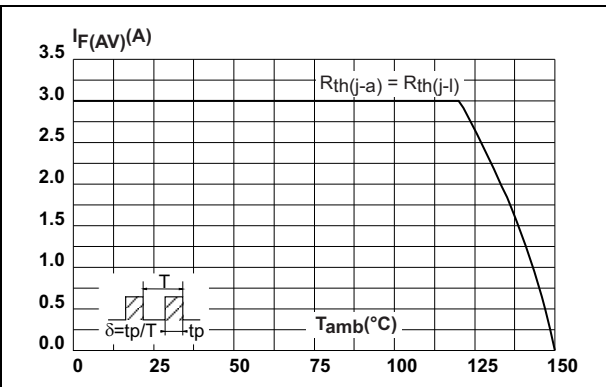


Figure 4. Normalized avalanche power derating versus pulse duration

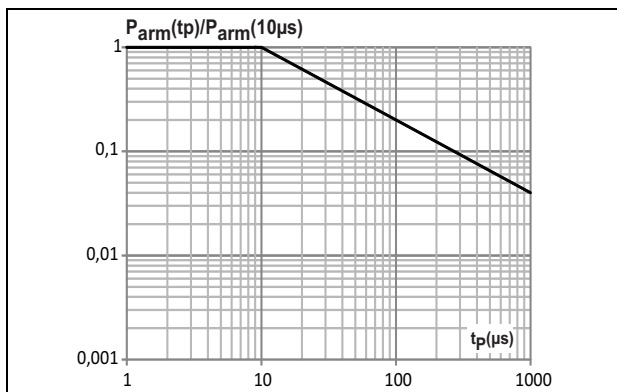


Figure 5. Relative variation of thermal impedance junction to lead versus pulse duration

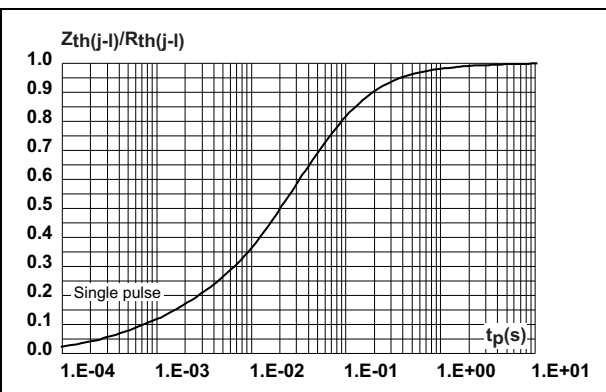


Figure 6. Reverse leakage current versus reverse voltage applied (typical values)

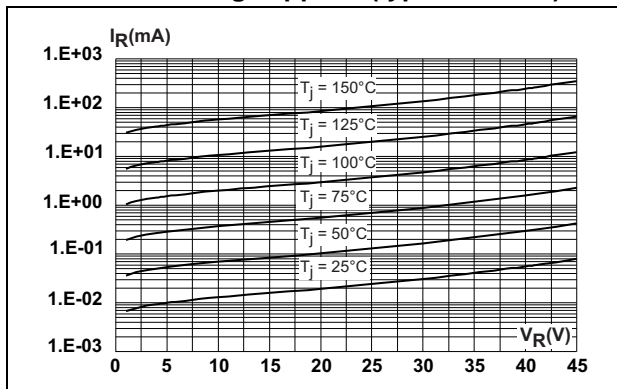


Figure 7. Junction capacitance versus reverse voltage applied (typical values)

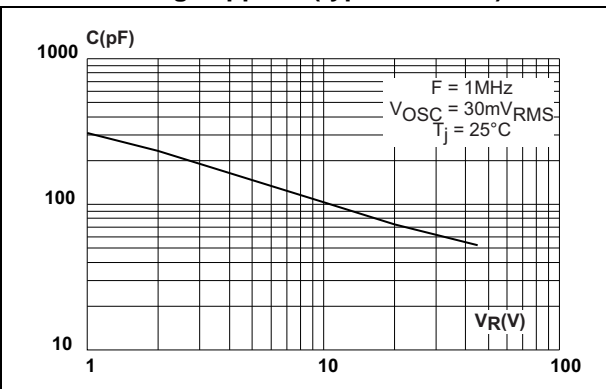


Figure 8. Forward voltage drop versus forward current (typical values)

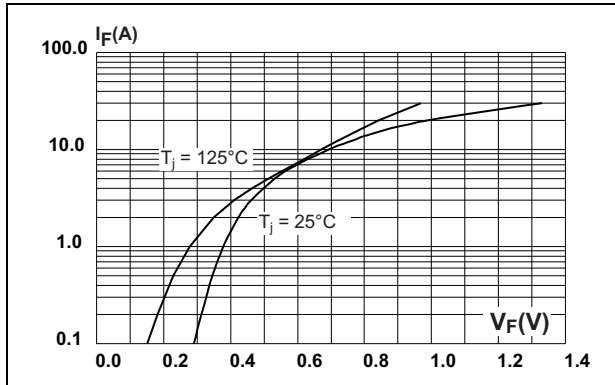


Figure 9. Forward voltage drop versus forward current (maximum values)

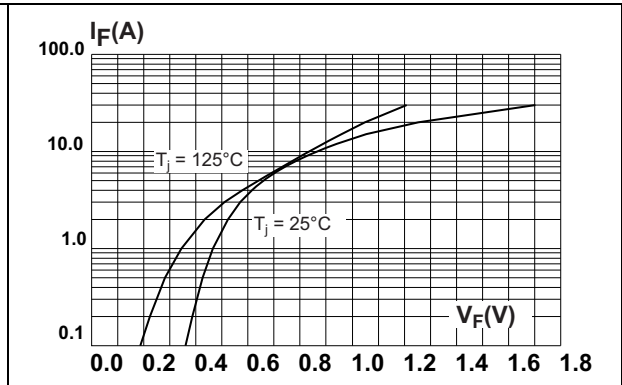


Figure 10. Thermal resistance junction to ambient versus copper surface under each lead (typical values)

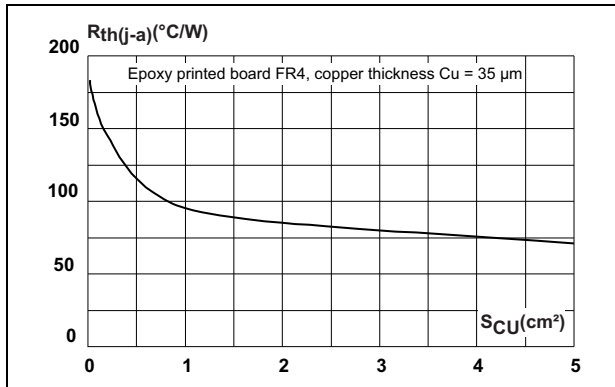
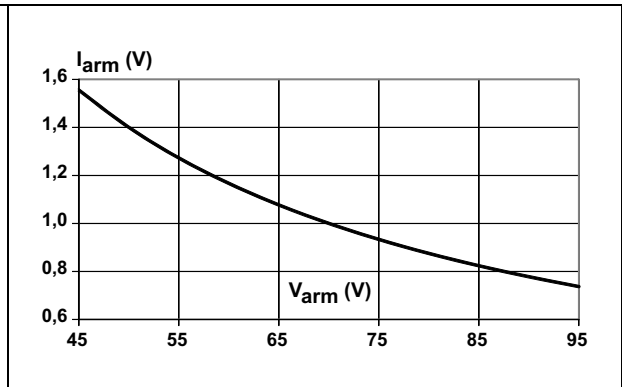


Figure 11. Reverse safe operating area ($t_p < 10 \mu\text{s}$ and $T_j < 125^\circ\text{C}$)



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.

Figure 12. SMAflat (non-exposed pad) dimension definitions

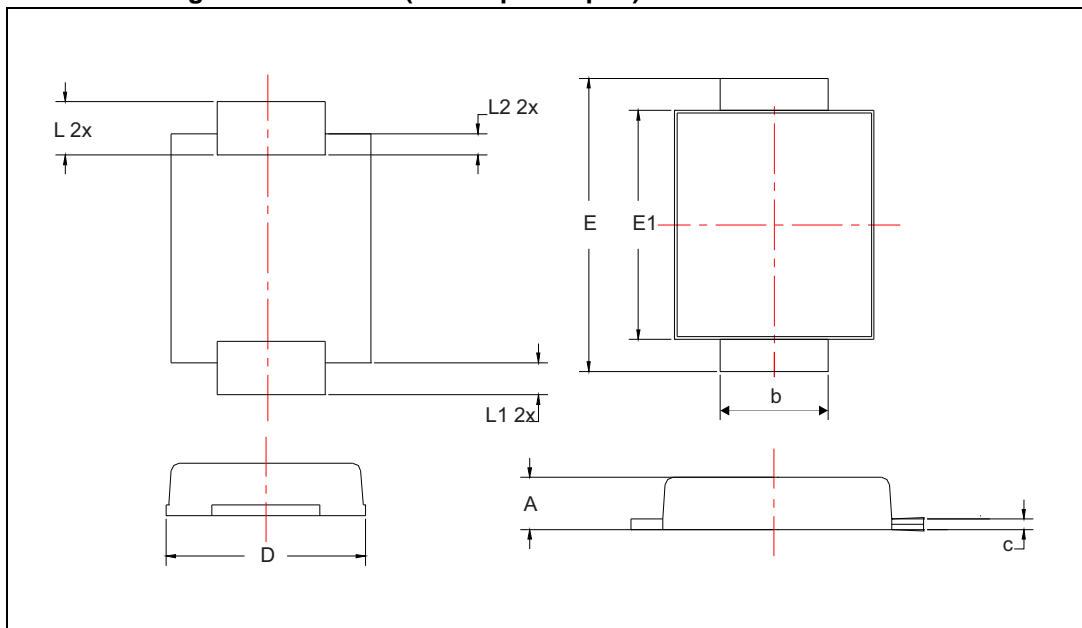
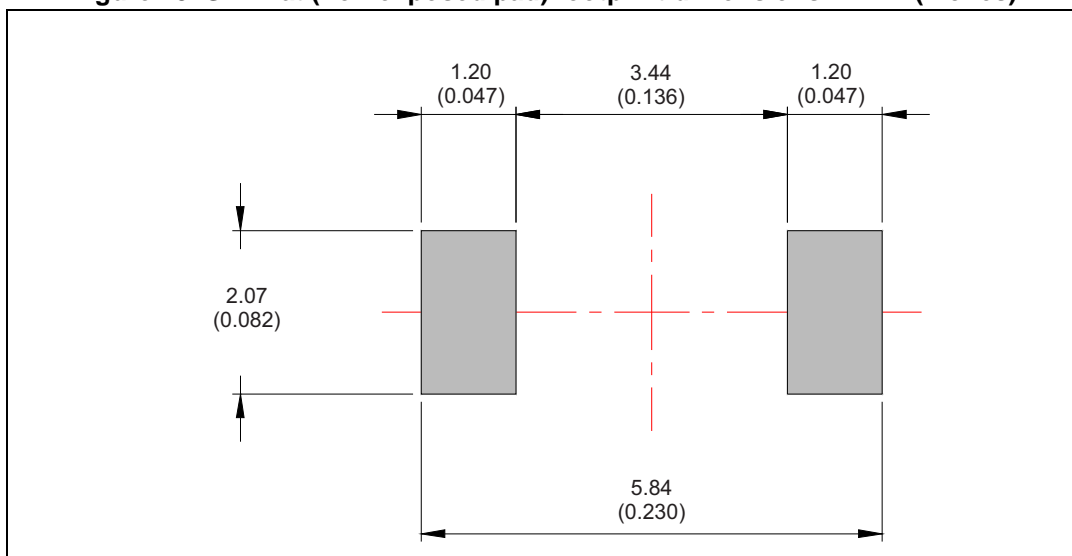


Table 5. SMAflat (non-exposed pad) dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.10	0.035		0.043
b	1.25		1.65	0.049		0.065
c	0.15		0.40	0.006		0.016
D	2.25		2.95	0.088		0.116
E	4.80		5.60	0.189		0.220
E1	3.95		4.60	0.155		0.181
L	0.75		1.50	0.029		0.059
L1		0.50			0.020	
L2		0.50			0.020	

Figure 13. SMAflat (non-exposed pad) footprint dimensions in mm (inches)



3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS3L45AF	F3L45	SMAflat (non-exposed pad)	0.035 g	10000	Tape and reel

4 Revision history

Table 7. Document revision history

Date	Revision	Description of changes
08-Jul-2013	1	First release.
03-Feb-2014	2	Updated Table 5 , Figure 12 and Figure 13 .

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

ST PRODUCTS ARE NOT DESIGNED OR AUTHORIZED FOR USE IN: (A) SAFETY CRITICAL APPLICATIONS SUCH AS LIFE SUPPORTING, ACTIVE IMPLANTED DEVICES OR SYSTEMS WITH PRODUCT FUNCTIONAL SAFETY REQUIREMENTS; (B) AERONAUTIC APPLICATIONS; (C) AUTOMOTIVE APPLICATIONS OR ENVIRONMENTS, AND/OR (D) AEROSPACE APPLICATIONS OR ENVIRONMENTS. WHERE ST PRODUCTS ARE NOT DESIGNED FOR SUCH USE, THE PURCHASER SHALL USE PRODUCTS AT PURCHASER'S SOLE RISK, EVEN IF ST HAS BEEN INFORMED IN WRITING OF SUCH USAGE, UNLESS A PRODUCT IS EXPRESSLY DESIGNATED BY ST AS BEING INTENDED FOR "AUTOMOTIVE, AUTOMOTIVE SAFETY OR MEDICAL" INDUSTRY DOMAINS ACCORDING TO ST PRODUCT DESIGN SPECIFICATIONS. PRODUCTS FORMALLY ESCC, QML OR JAN QUALIFIED ARE DEEMED SUITABLE FOR USE IN AEROSPACE BY THE CORRESPONDING GOVERNMENTAL AGENCY.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2014 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[STMicroelectronics:](#)

[STPS3L45AF](#)