

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)

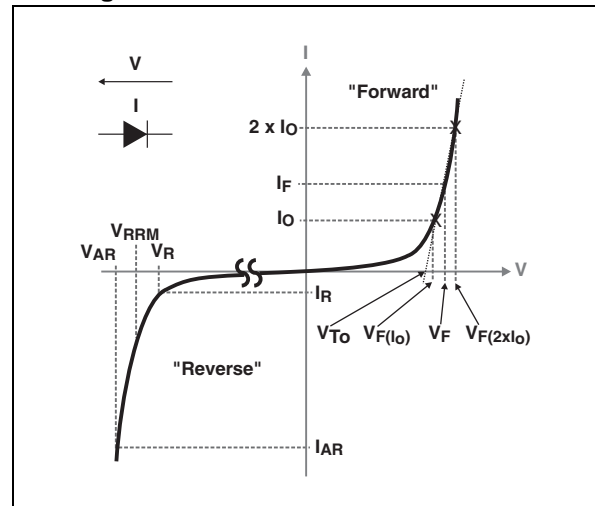


Table 1. Device summary

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

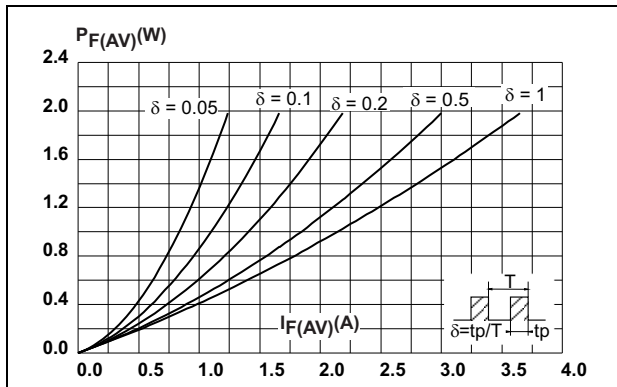


Figure 3. Average forward current versus ambient temperature ($\delta = 0.5$)

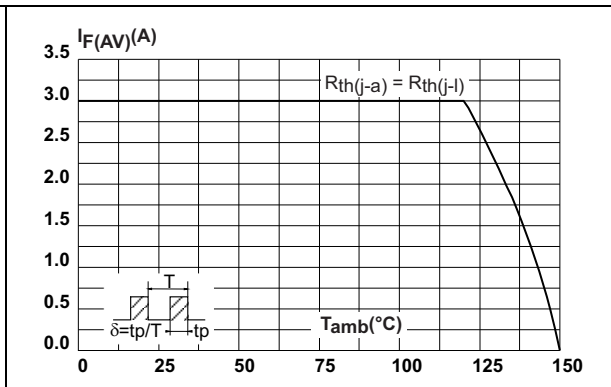


Figure 4. Normalized avalanche power derating versus pulse duration

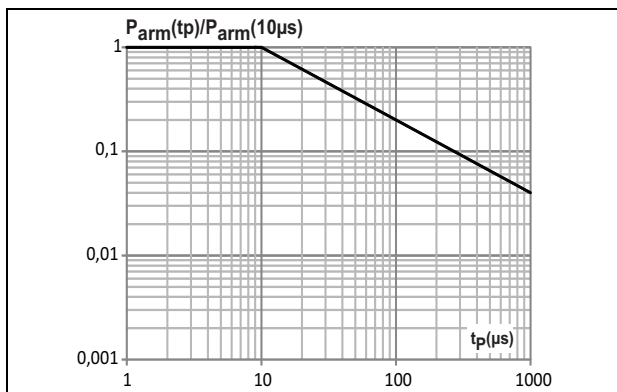


Figure 5. Relative variation of thermal impedance junction to lead versus pulse duration

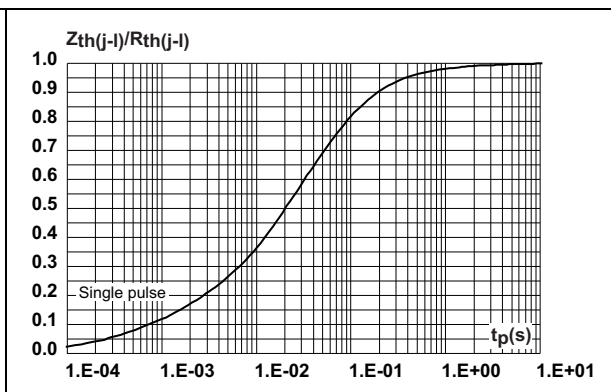


Figure 6. Reverse leakage current versus reverse voltage applied (typical values)

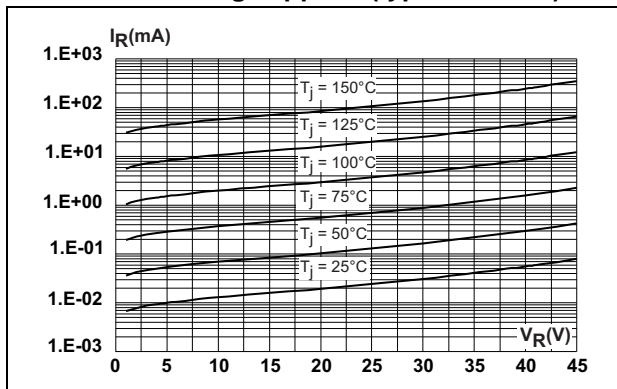


Figure 7. Junction capacitance versus reverse voltage applied (typical values)

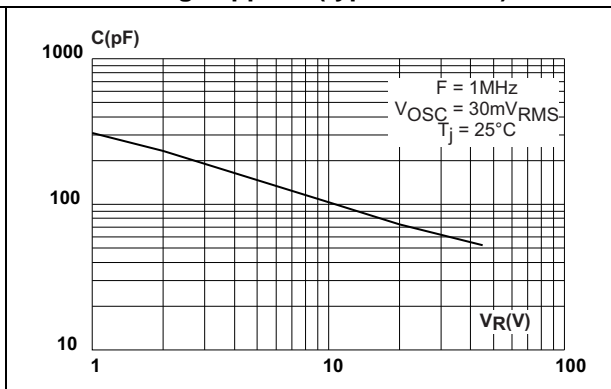


Figure 8. Forward voltage drop versus forward current (typical values)

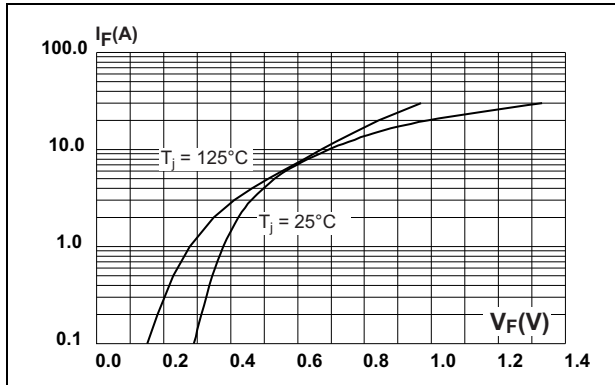


Figure 9. Forward voltage drop versus forward current (maximum values)

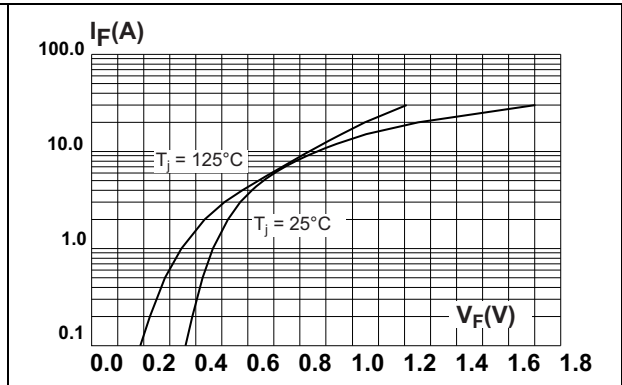


Figure 10. Thermal resistance junction to ambient versus copper surface under each lead (typical values)

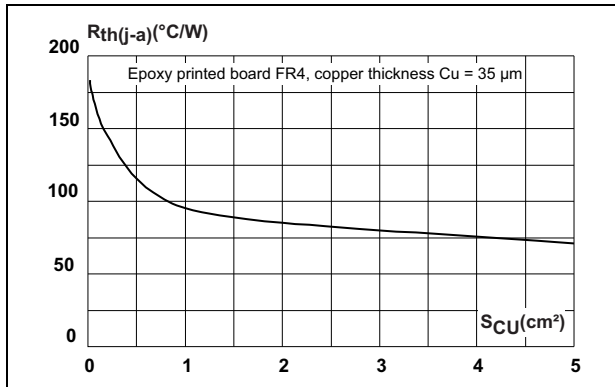
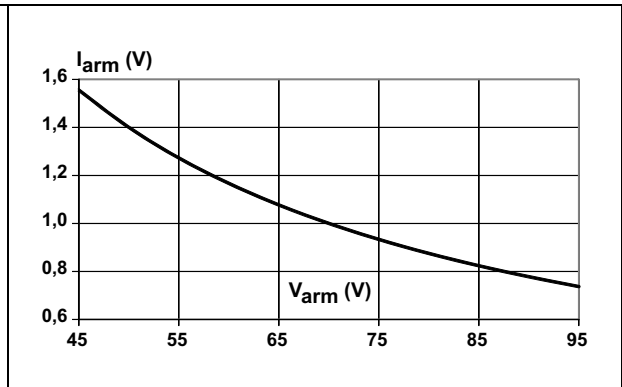


Figure 11. Reverse safe operating area ($t_p < 10 \mu\text{s}$ and $T_j < 125^\circ\text{C}$)



2 Package information

- Epoxy meets UL94,V0
- Lead-free packages

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

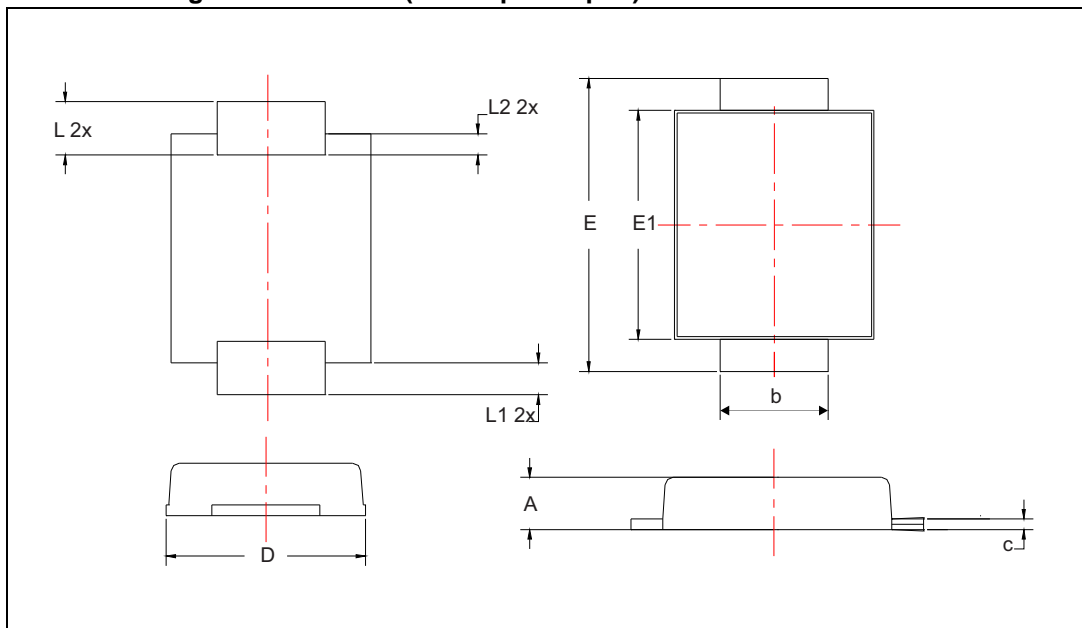
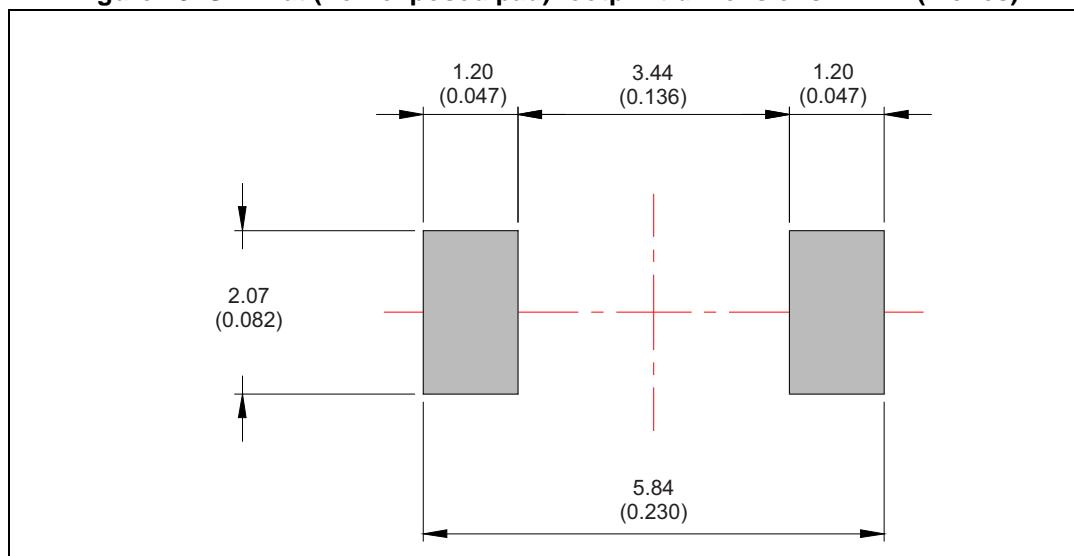


Table 5. SMAflat (non-exposed pad) dimension values

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 .

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