

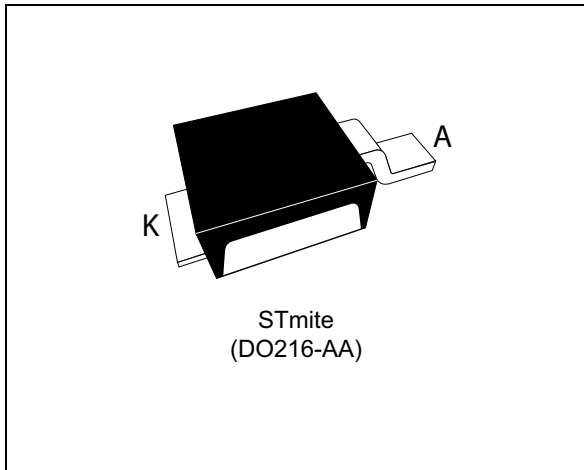


# THE DATASHEET OF STPS120M



## Power Schottky rectifier

Datasheet - production data



### Description

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

Packaged in STmite, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications. Due to the small size of the package this device fits battery powered equipment (cellular, notebook, PDA's, printers) as well chargers and PCMCIA cards.

**Table 1. Device summary**

Symbol	Value
$I_{F(AV)}$	1 A
$V_{RRM}$	20 V
$T_j$ (max)	150 °C
$V_F$ (typ)	0.36 V

### Features

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low forward voltage drop for higher efficiency and extended battery life
- Low thermal resistance
- Avalanche capability specified

# 1 Characteristics

**Table 2. Absolute ratings (limiting values at T<sub>amb</sub> = 25 °C, unless otherwise specified)**

Symbol	Parameter	Value	Unit	
V <sub>R</sub> RM	Repetitive peak reverse voltage	20	V	
I <sub>F</sub> (RMS)	Forward rms current	2	A	
I <sub>F</sub> (AV)	Average forward current, δ = 0.5, square wave	T <sub>c</sub> = 140 °C	1	A
I <sub>F</sub> SM	Surge non repetitive forward current	t <sub>p</sub> = 8.3 ms sinusoidal	50	A
P <sub>ARM</sub> <sup>(1)</sup>	Repetitive peak avalanche power	T <sub>j</sub> = 125 °C, t <sub>p</sub> = 10 μs	100	W
T <sub>stg</sub>	Storage temperature range	-65 to +150	°C	
T <sub>j</sub>	Maximum operating junction temperature <sup>(2)</sup>	150	°C	

- For pulse time duration deratings, please refer to [Figure 3](#). 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".
- $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$  condition to avoid thermal runaway for a diode on its own heatsink

**Table 3. Thermal resistance**

Symbol	Parameter	Value	Unit
R <sub>th(j-c)</sub>	Junction to case	20	°C/W
R <sub>th(j-a)</sub> <sup>(1)</sup>	Junction to ambient	250	°C/W

- Mounted with minimum recommended pad size, PC board FR4.

**Table 4. Static electrical characteristics**

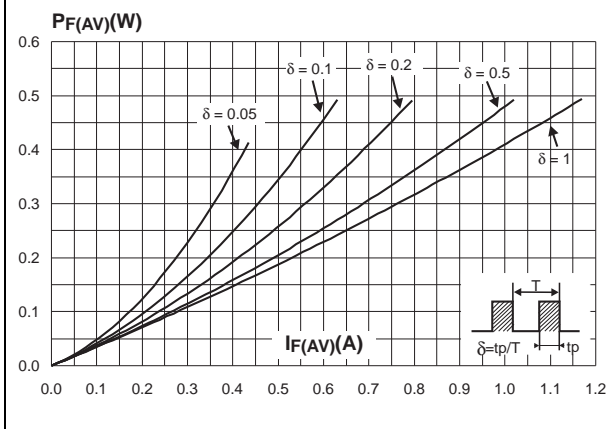
Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit	
I <sub>R</sub> <sup>(1)</sup>	Reverse leakage current	T <sub>j</sub> = 25 °C	V <sub>R</sub> = V <sub>R</sub> RM	-	1.3	3.9	μA
		T <sub>j</sub> = 100 °C		-	275	850	
		T <sub>j</sub> = 25 °C	V <sub>R</sub> = 10 V	-	0.6	2.0	
		T <sub>j</sub> = 100 °C		-	145	450	
		T <sub>j</sub> = 25 °C	V <sub>R</sub> = 5 V	-	0.4	1.0	
		T <sub>j</sub> = 100 °C		-	105	300	
V <sub>F</sub> <sup>(1)</sup>	Forward voltage drop	T <sub>j</sub> = 25 °C	I <sub>F</sub> = 1 A	-	0.44	0.49	V
		T <sub>j</sub> = 100 °C		-	0.36	0.41	
		T <sub>j</sub> = 25 °C	I <sub>F</sub> = 2 A	-	0.48	0.54	
		T <sub>j</sub> = 100 °C		-	0.42	0.48	

- Pulse test: t<sub>p</sub> = 380 μs, δ < 2%

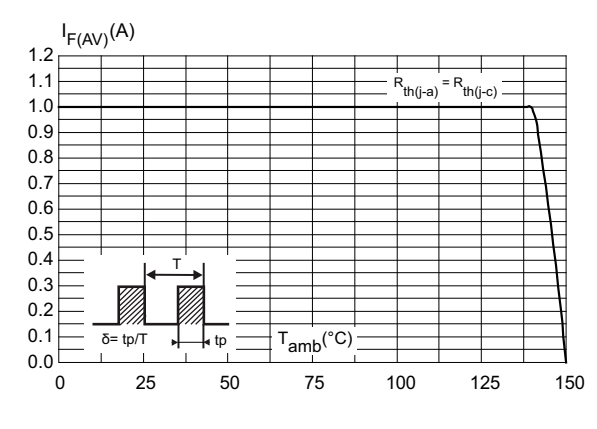
To evaluate the conduction losses use the following equation:

$$P = 0.34 \times I_{F(AV)} + 0.07 \times I_{F(RMS)}^2$$

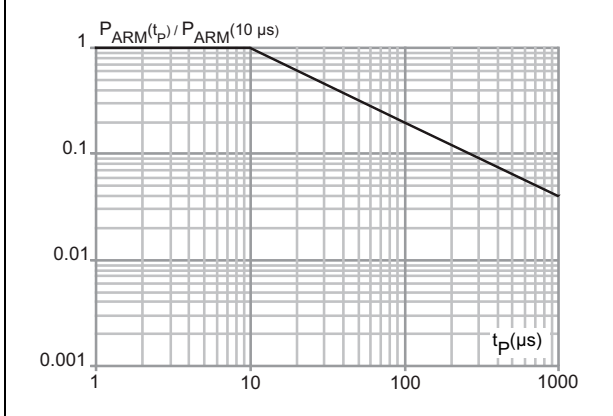
**Figure 1. Average forward power dissipation versus average forward current**



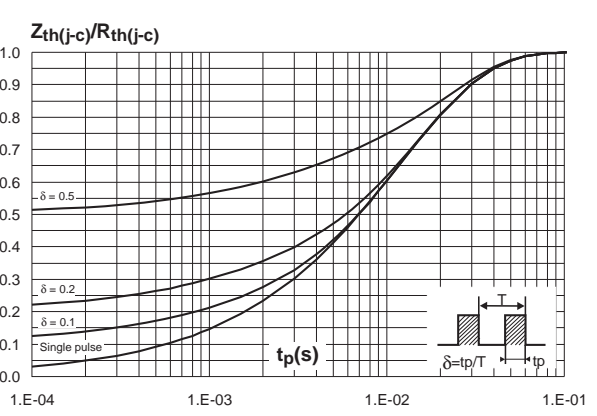
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )**



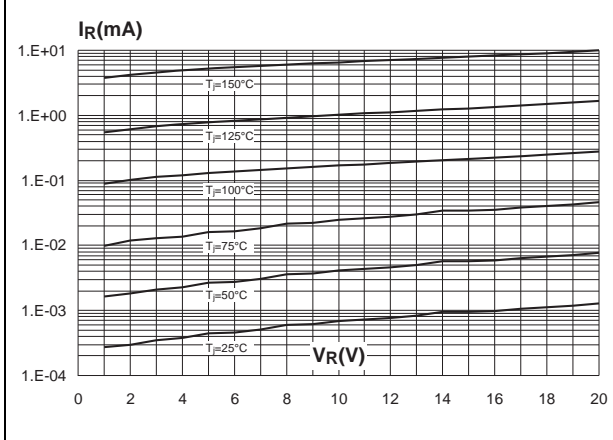
**Figure 3. Normalized avalanche power derating versus pulse duration ( $T_j = 125^\circ\text{C}$ )**



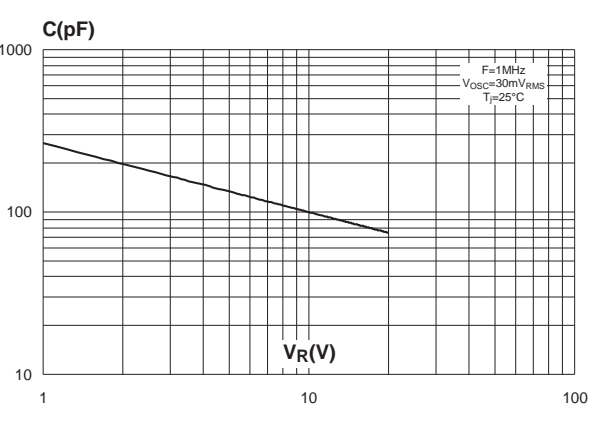
**Figure 4. Relative variation of thermal impedance junction to case versus pulse duration**



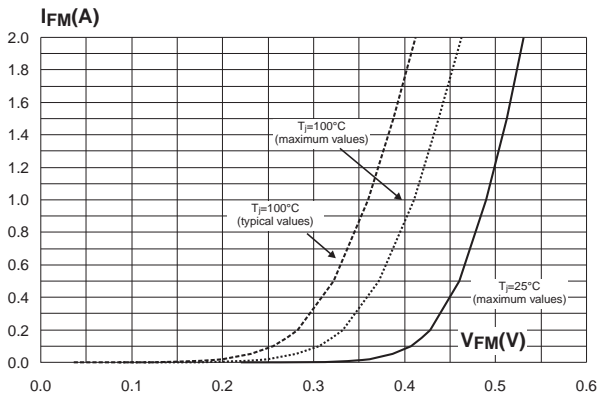
**Figure 5. Reverse leakage current versus reverse reverse voltage applied (typical values)**



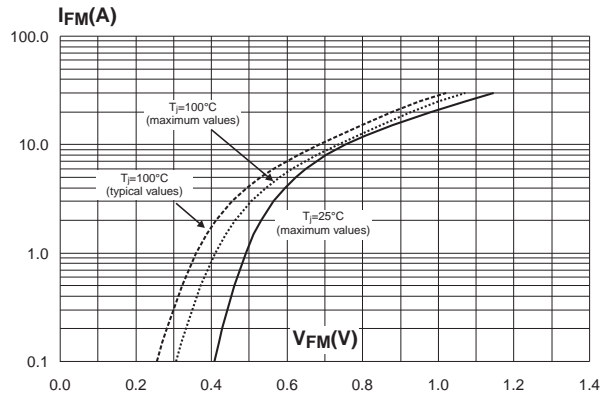
**Figure 6. Junction capacitance versus reverse voltage applied (typical values)**



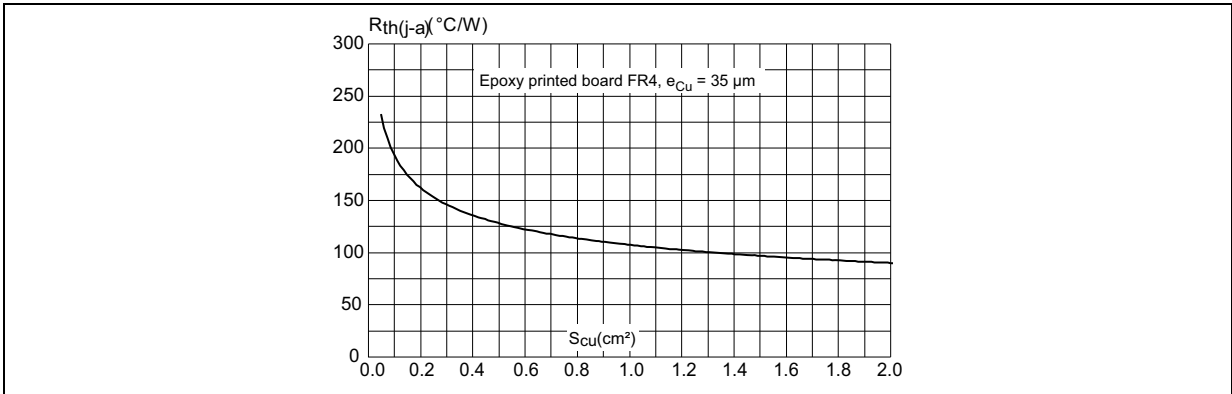
**Figure 7. Forward voltage drop versus forward current (low level)**



**Figure 8. Forward voltage drop versus forward current (high level)**



**Figure 9. Thermal resistance junction to ambient versus copper surface under tab (typical values)**



## 2 Package information

- Epoxy meets UL94, V0

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### 2.1 STmite package information

Figure 10. STmite package outline

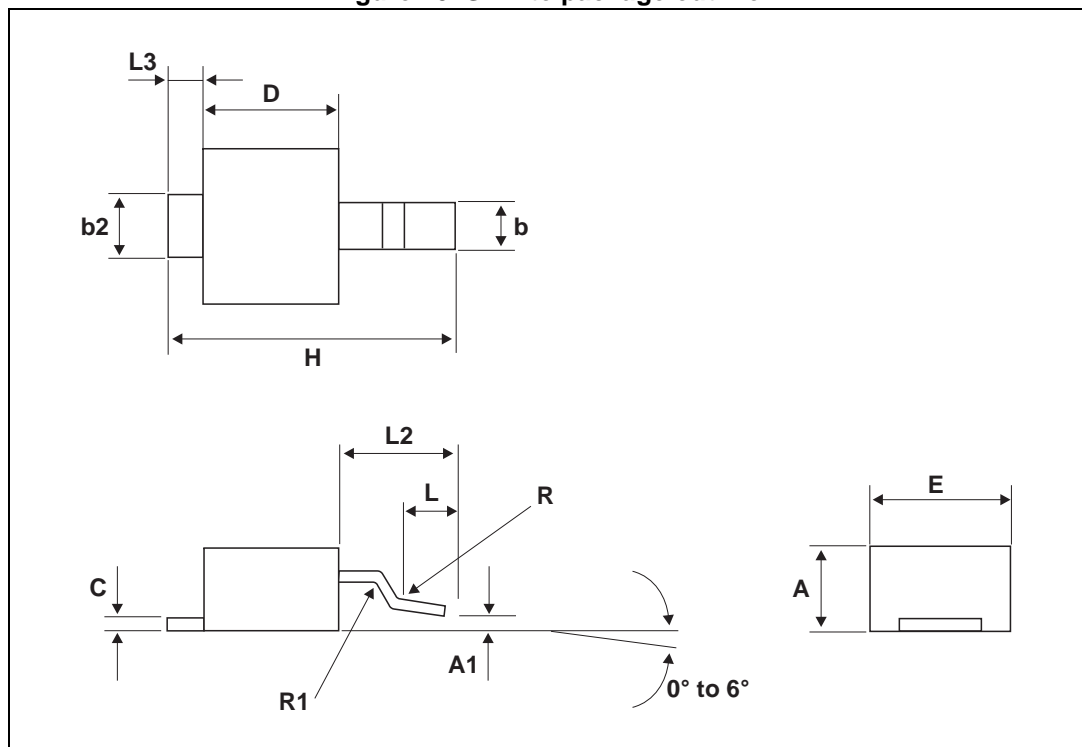
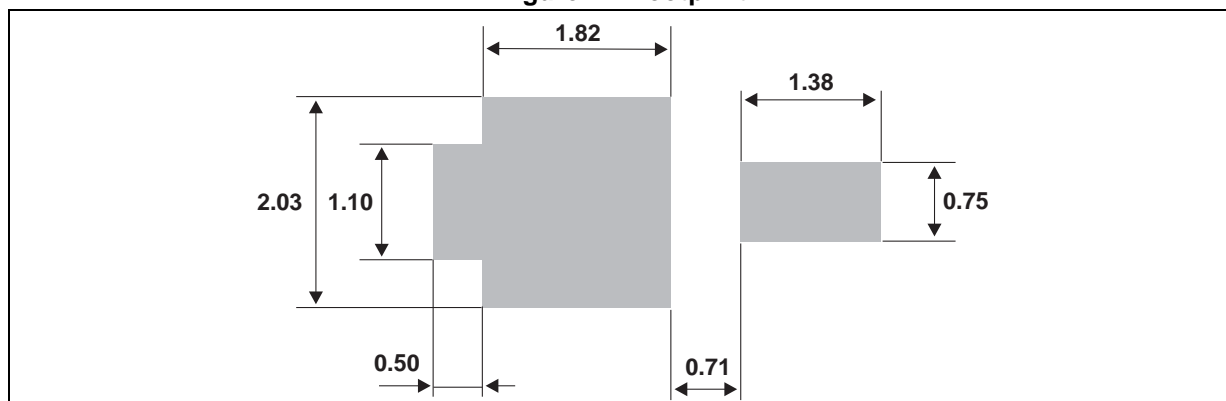


Table 5. STmite package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.85	1.00	1.15	0.033	0.039	0.045
A1	-0.05		0.05	-0.002		0.002
b	0.40		0.65	0.016		0.025
b2	0.70		1.00	0.027		0.039
c	0.10		0.25	0.004		0.010
D	1.75	1.90	2.05	0.069	0.007	0.081
E	1.75	1.90	2.05	0.069	0.007	0.081
H	3.60	3.75	3.90	0.142	0.148	0.154
L	0.50	0.63	0.80	0.020	0.025	0.031
L2	1.20	1.35	1.50	0.047	0.053	0.059
L3		0.50			0.019	
R	0.07			0.003		
R1	0.07			0.03		

Figure 11. Footprint



### 3 Ordering information

**Table 6. Ordering information**

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS120M	120	STmite	15.5 mg	12000	Tape and reel

### 4 Revision history

**Table 7. Document revision history**

Date	Revision	Changes
Jul-2003	2A	Last update.
13-Sep-2004	3	STmite package dimensions reference A1 change: from blank (min) to -0.05mm and from 0.10 (max) to 0.05mm.
16-Feb-2011	4	Migrated from EDOCS.
20-Jul-2015	5	Updated <a href="#">Table 4</a> and reformatted to current standard.

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