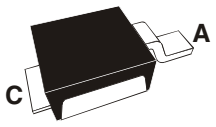
STPS1L20M

LOW DROP POWER SCHOTTKY RECTIFIER

Table 1: Main Product Characteristics

$I_{F(AV)}$	1 A
V_{RRM}	20 V
T_j (max)	150°C
V_F(max)	0.37 V



STmite
(DO216-AA)

FEATURES AND BENEFITS

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

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 2: Order Code

Part Number	Marking
STPS1L20M	1L2

Table 3: Absolute Ratings (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		20	V
$I_{F(RMS)}$	RMS forward voltage		2	A
$I_{F(AV)}$	Average forward current	T_c = 140°C δ = 0.5	1	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	50	A
P_{ARM}	Repetitive peak avalanche power	t^p = 1µs T^j = 25°C	1400	W
T_{stg}	Storage temperature range		-65 to + 150	°C
T_j	Maximum operating junction temperature *		150	°C
dV/dt	Critical rate of rise of reverse voltage (rated V_R, T_j = 25°C)		10000	V/µs

* : $\frac{dPtot}{dTj} > \frac{1}{Rth(j-a)}$ thermal runaway condition for a diode on its own heatsink

Table 4: Thermal Resistance

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case	20	°C/W
$R_{th(j-l)}$*	Junction to ambient	250	°C/W

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

Table 5: Static Electrical Characteristics

Symbol	Parameter	Tests conditions		Min.	Typ	Max.	Unit
I_R *	Reverse leakage current	T_j = 25°C	$V_R = V_{RRM}$		0.015	0.075	mA
		T_j = 85°C			0.9	4.5	
		T_j = 25°C	V_R = 10V		0.005	0.035	
		T_j = 85°C			0.45	2.5	
		T_j = 25°C	V_R = 5V		0.003	0.025	
		T_j = 85°C			0.3	1.6	
V_F *	Forward voltage drop	T_j = 25°C	I_F = 1A		0.38	0.43	V
		T_j = 85°C			0.32	0.37	
		T_j = 25°C	I_F = 3A		0.46	0.53	
		T_j = 85°C			0.42	0.49	

Pulse test: * tp = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation: $P = 0.31 \times I_{F(AV)} + 0.06\ I_F{}^2{}_{(RMS)}$

Figure 1: Conduction losses versus average current

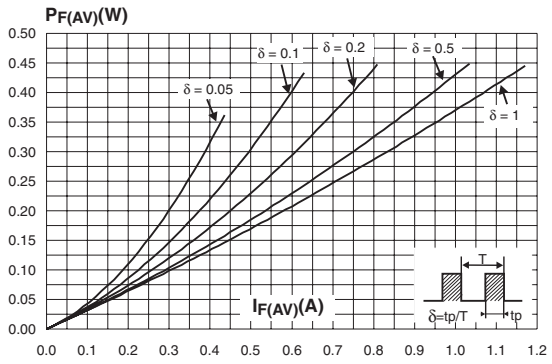


Figure 2: Average forward current versus ambient temperature (δ = 0.5)

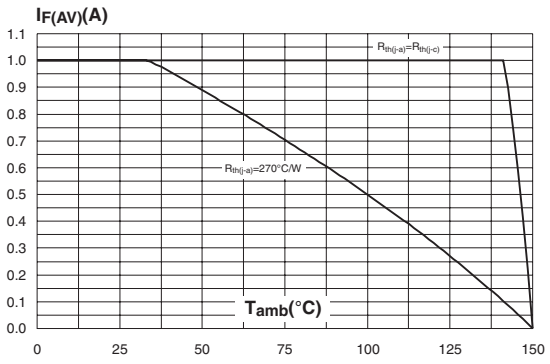


Figure 3: Normalized avalanche power derating versus pulse duration

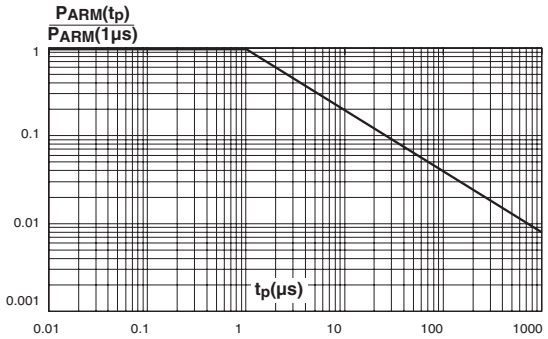


Figure 4: Normalized avalanche power derating versus junction temperature

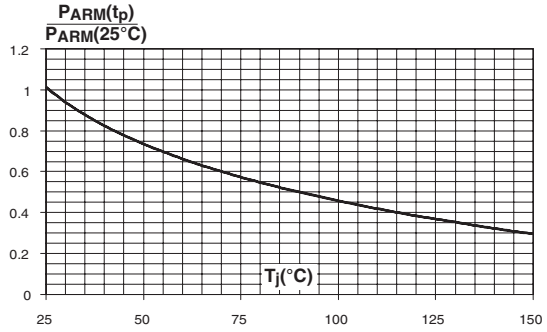


Figure 5: Non repetitive surge peak forward current versus overload duration (maximum values)

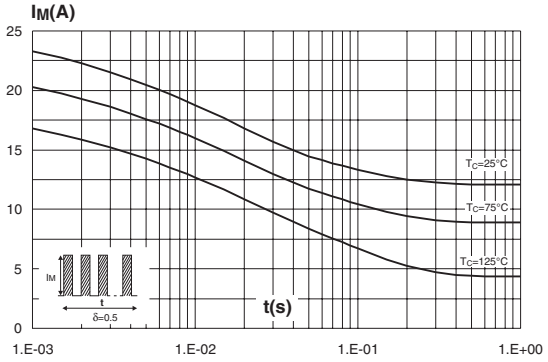


Figure 6: Relative variation of thermal impedance junction to ambient versus pulse duration

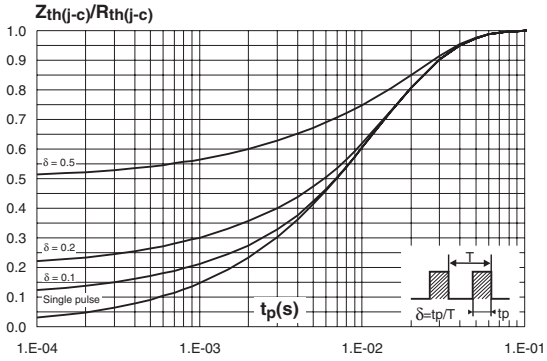


Figure 7: Reverse leakage current versus reverse voltage applied (typical values)

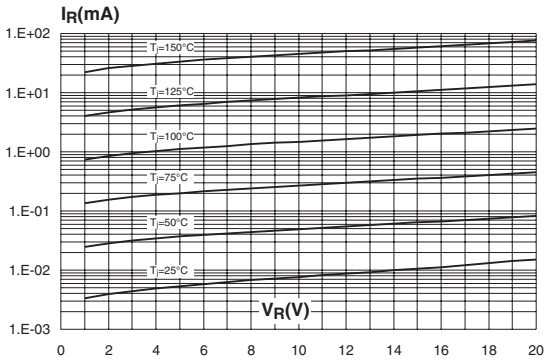


Figure 8: Reverse leakage current versus junction temperature (typical values)

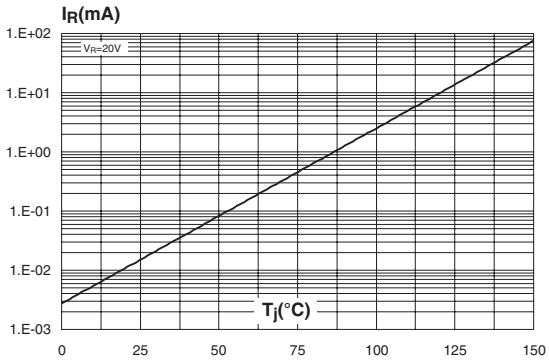


Figure 9: Junction capacitance versus reverse voltage applied (typical values)

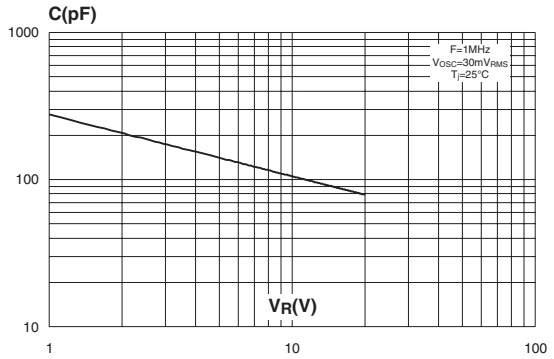


Figure 10: Forward voltage drop versus forward current

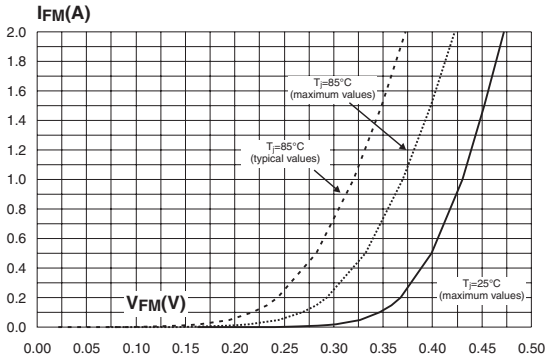


Figure 11: Thermal resistance junction to ambient versus copper surface under tab (epoxy printed board FR4, Cu = 35µm, typical values)

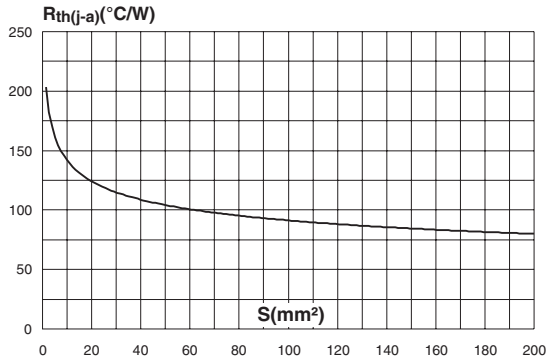
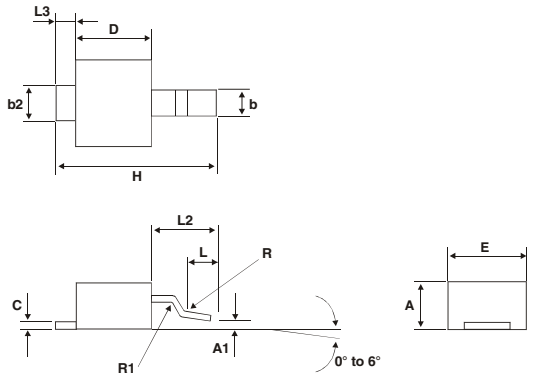


Figure 12: STmite Package Mechanical Data



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 ref			0.019 ref	
R	0.07			0.003		
R1	0.07			0.003		

Figure 13: Foot Print Dimensions (in millimeters)

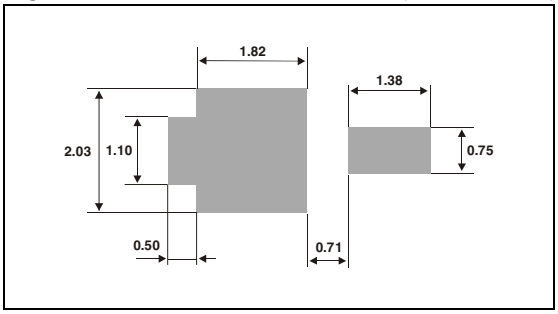


Table 6: Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPS1L20M	1L2	STmite	15.5 mg	12000	Tape & reel

Table 7: Revision History

Date	Revision	Description of 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.
29-Nov-2005	4	Page 2, table 5: conduction losses evaluation values changed: . From $P = 0.34 \times I_{F(AV)} + 0.07\ I_F{}^2{}_{(RMS)}$. To $P = 0.31 \times I_{F(AV)} + 0.06\ I_F{}^2{}_{(RMS)}$