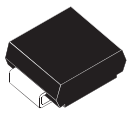
STPS1L30

LOW DROP POWER SCHOTTKY RECTIFIER

Table 1: Main Product Characteristics

$I_{F(AV)}$	1 A
V_{RRM}	30 V
T_j (max)	150°C
V_F(max)	0.3 V

SMA
(JEDEC DO-214AC)
STPS1L30A



SMB
(JEDEC DO-214AA)
STPS1L30U

FEATURES AND BENEFITS

- Very low forward voltage drop for less power dissipation
- Optimized conduction/reverse losses trade-off which means the highest yield in the applications
- Surface mount miniature packages
- Avalanche capability specified

DESCRIPTION

Single Schottky rectifier suited to Switched Mode Power Supplies and high frequency DC to DC converters, freewheel diode and integrated circuit latch up protection.
Packaged in SMA and SMB, this device is especially intended for use in parallel with MOSFETs in synchronous rectification.

Table 2: Order Codes

Part Number	Marking
STPS1L30A	GB3
STPS1L30U	G23

Table 3: Absolute Ratings (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		30	V
$I_{F(RMS)}$	RMS forward voltage		10	A
$I_{F(AV)}$	Average forward current	T_L = 135°C δ = 0.5	1	A
I_{FSM}	Surge non repetitive forward current	tp = 10ms sinusoidal	75	A
I_{RRM}	Repetitive peak reverse current	tp = 2µs F = 1kHz square	1	A
I_{RSM}	Non repetitive peak reverse current	tp = 100µs square	1	A
P_{ARM}	Repetitive peak avalanche power	tp = 1µs Tj = 25°C	1500	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		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
$R_{th(j-l)}$	Junction to lead	SMA	30	°C/W
		SMB	25	

Table 5: Static Electrical Characteristics

Symbol	Parameter	Tests conditions		Min.	Typ	Max.	Unit
I_R *	Reverse leakage current	T_j = 25°C	$V_R = V_{RRM}$			200	µA
		T_j = 100°C			6	15	mA
V_F *	Forward voltage drop	T_j = 25°C	I_F = 1A			0.395	V
		T_j = 125°C			0.26	0.3	
		T_j = 25°C	I_F = 2A			0.445	
		T_j = 125°C			0.325	0.375	

Pulse test: * tp = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation: $P = 0.225 \times I_{F(AV)} + 0.075\ I_F{}^2{}_{(RMS)}$

Figure 1: Average forward power dissipation versus average forward current

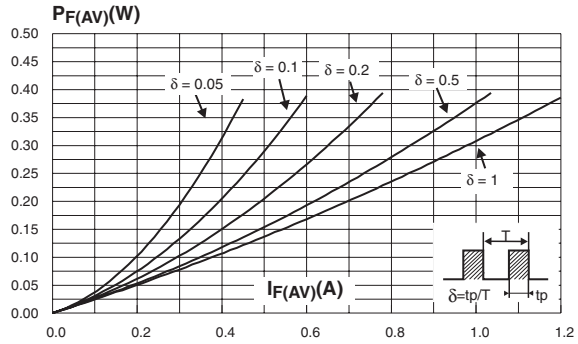


Figure 2: Average forward current versus ambient temperature (δ = 0.5)

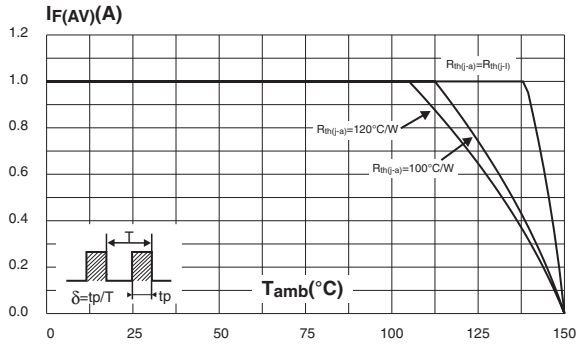


Figure 3: Normalized avalanche power derating versus pulse duration

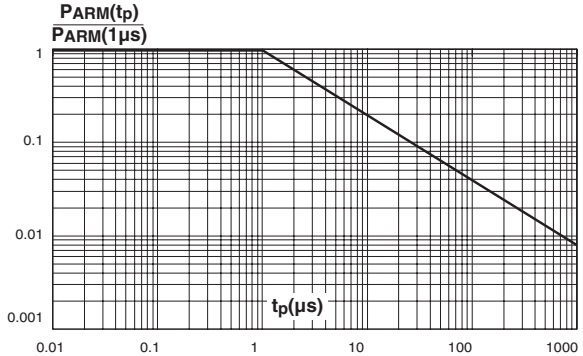


Figure 4: Normalized avalanche power derating versus junction temperature

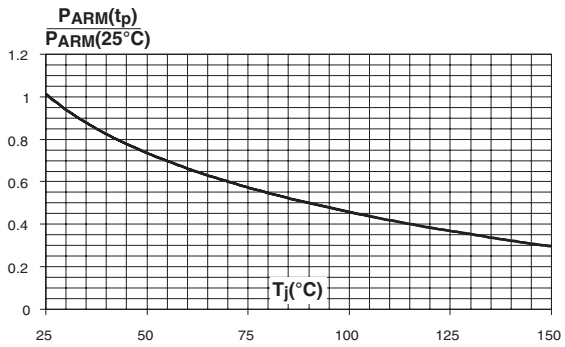


Figure 5: Non repetitive surge peak forward current versus overload duration (maximum values) (SMA)

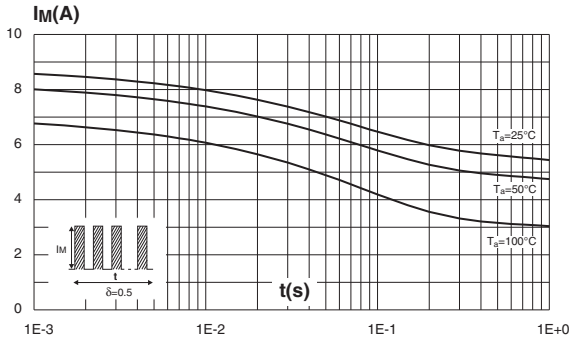


Figure 6: Non repetitive surge peak forward current versus overload duration (maximum values) (SMB)

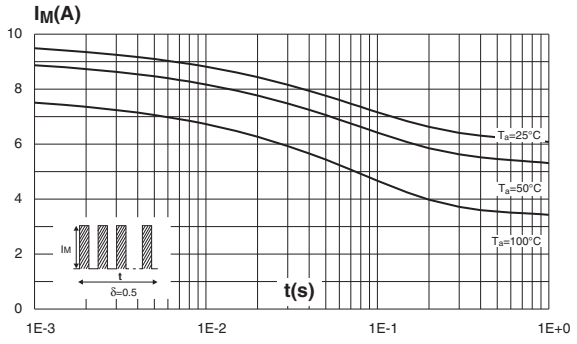


Figure 7: Relative variation of thermal impedance junction to ambient versus pulse duration (epoxy printed circuit board, e(Cu)=35µm, recommended pad layout) (SMA)

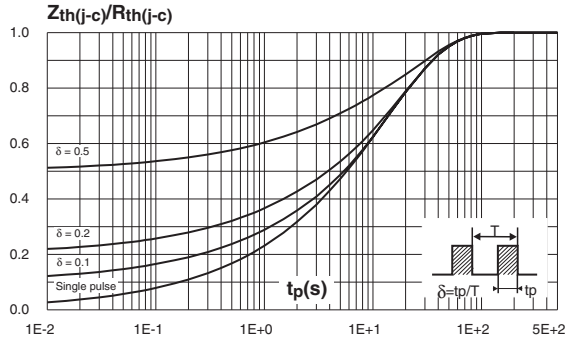


Figure 8: Relative variation of thermal impedance junction to ambient versus pulse duration (epoxy printed circuit board, e(Cu)=35µm, recommended pad layout) (SMB)

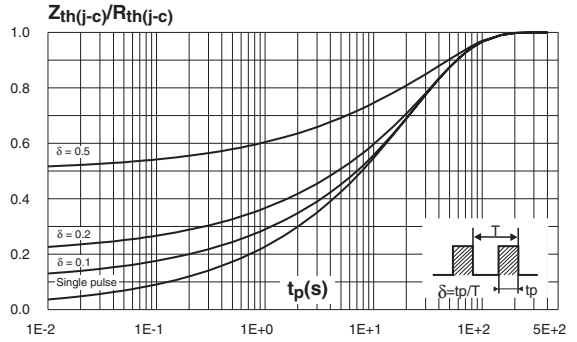


Figure 9: Reverse leakage current versus reverse voltage applied (typical values)

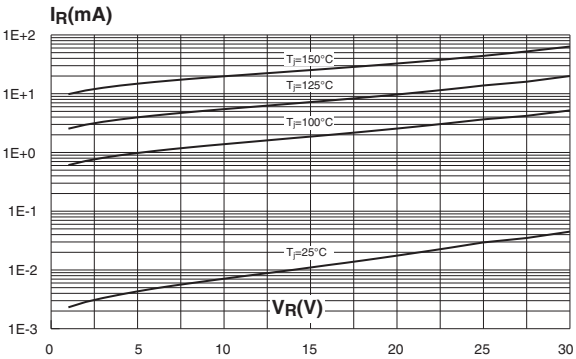


Figure 10: Junction capacitance versus reverse voltage applied (typical values)

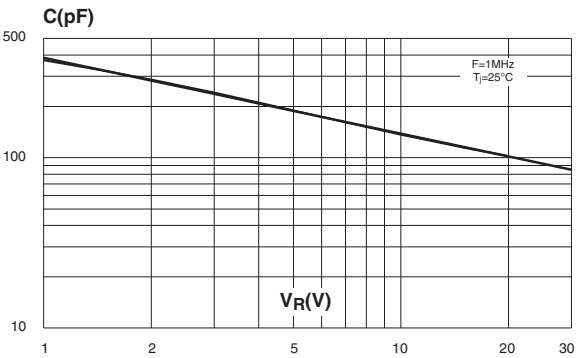


Figure 11: Forward voltage drop versus forward current (typical values, high level)

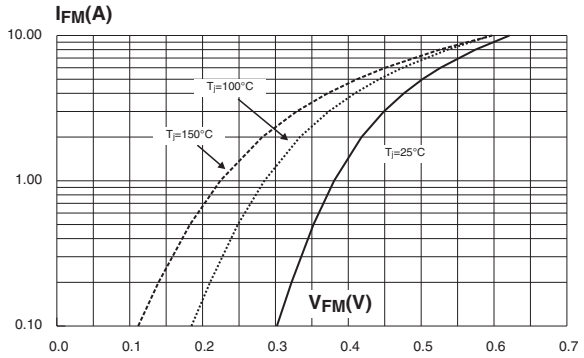


Figure 12: Forward voltage drop versus forward current (maximum values, low level)

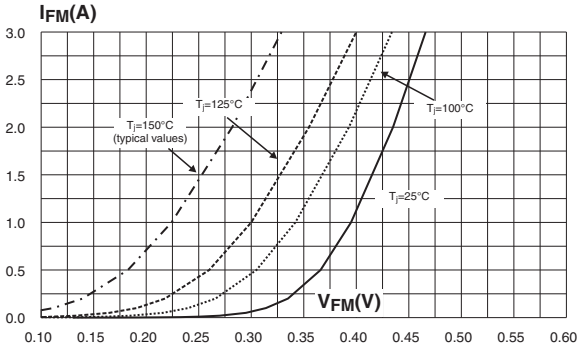


Figure 13: Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, copper thickness: 35µm) (SMA)

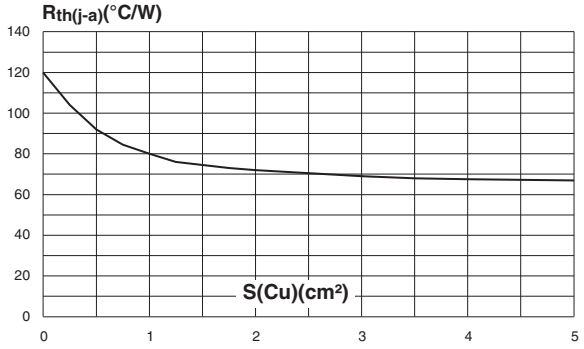


Figure 14: Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, copper thickness: 35µm) (SMB)

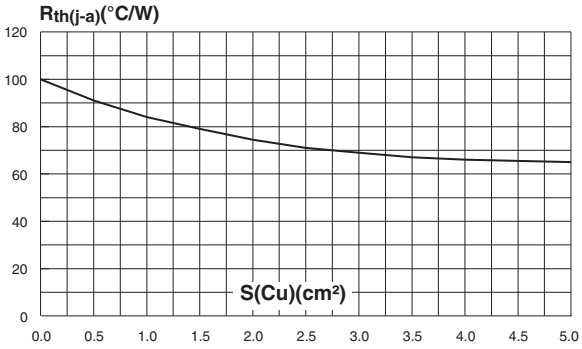
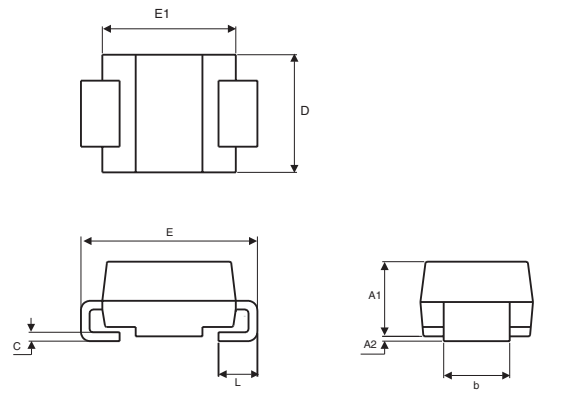


Figure 15: SMA Package Mechanical Data



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.03	0.075	0.080
A2	0.05	0.20	0.002	0.008
b	1.25	1.65	0.049	0.065
c	0.15	0.41	0.006	0.016
E	4.80	5.60	0.189	0.220
E1	3.95	4.60	0.156	0.181
D	2.25	2.95	0.089	0.116
L	0.75	1.60	0.030	0.063

Figure 16: SMA Foot Print Dimensions
(in millimeters)

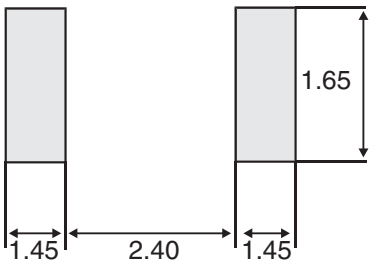
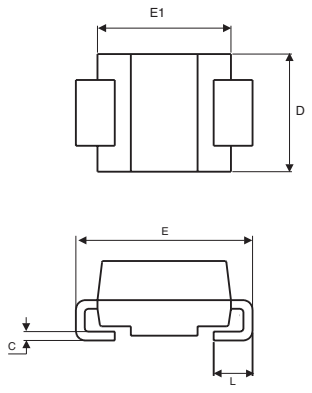


Figure 17: SMB Package Mechanical Data



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.096
A2	0.05	0.20	0.002	0.008
b	1.95	2.20	0.077	0.087
c	0.15	0.41	0.006	0.016
E	5.10	5.60	0.201	0.220
E1	4.05	4.60	0.159	0.181
D	3.30	3.95	0.130	0.156
L	0.75	1.60	0.030	0.063

Figure 18: SMB Foot Print Dimensions
(in millimeters)

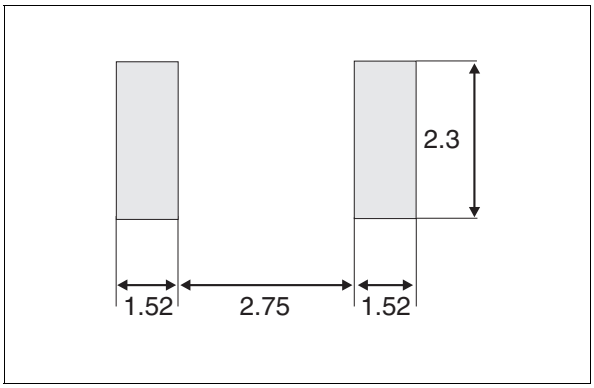


Table 6: Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPS1L30A	GB3	SMA	0.068 g	5000	Tape & reel
STPS1L30U	G23	SMB	0.107 g	2500	Tape & reel

- Band indicates cathode
- Epoxy meets UL94, V0

Table 7: Revision History

Date	Revision	Description of Changes
Jul-2003	5A	Last update.
Aug-2004	6	SMA package dimensions update. Reference A1 max. changed from 2.70mm (0.106inc.) to 2.03mm (0.080).