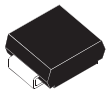
STPS2150

Power Schottky rectifier

Main product characteristics

$I_{F(AV)}$	2 A
V_{RRM}	150 V
T_j (max)	175° C
V_F(max)	0.67 V



SMA
(JEDEC DO-214AC)
STPS2150A

DO-15

STPS2150

Description

150 V Power Schottky rectifier are suited for switch mode power supplies on up to 24 V rails and high frequency converters.

Packaged in SMA and Axial, this device is intended for use in consumer and computer applications like TV, STB, PC and DVD where low drop forward voltage is required to reduce power dissipation.

Order Codes

Part Number	Marking
STPS2150A	2150
STPS2150	STPS2150
STPS2150RL	STPS2150

Features and benefits

- Negligible switching losses
- Low forward voltage drop for higher efficiency and extented battery life
- Low thermal resistance
- Surface mount miniature package
- Avalanche capability specified

Table 1. Absolute Ratings (limiting values)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			150	V
$I_{F(RMS)}$	RMS forward voltage			15	A
$I_{F(AV)}$	Average forward current	SMA	T_L = 145° C δ = 0.5	2	A
		DO-15	T_L = 130° C δ = 0.5		
I_{FSM}	Surge non repetitive forward current	SMA	t_p = 10 ms sinusoidal	75	A
		DO-15		150	
P_{ARM}	Repetitive peak avalanche power		tp = 1 µs Tj = 25° C	2400	W
T_{stg}	Storage temperature range			-65 to + 175	° C
T_j	Maximum operating junction temperature[1]			175	° C

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

1 Characteristics

Table 2. Thermal resistance

Symbol	Parameter			Value	Unit
$R_{th(j-l)}$	Junction to lead		SMA	20	° C/W
		Lead length = 10 mm	DO-15	30	

Table 3. Static electrical characteristics

Symbol	Parameter	Tests conditions		Min.	Typ	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25° C	$V_R = V_{RRM}$		0.5	1.5	µA
		T_j = 125° C			0.5	1.5	mA
V_F (2)	Forward voltage drop	T_j = 25° C	I_F = 2 A		0.78	0.82	V
		T_j = 125° C			0.62	0.67	
		T_j = 25° C	I_F = 4 A		0.86	0.89	
		T_j = 125° C			0.70	0.75	

1. t_p = 5 ms, δ < 2%
2. t_p = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation: $P = 0.59 \times I_{F(AV)} + 0.04\ I_F{}^2{}_{(RMS)}$

Figure 1. Average forward power dissipation versus average forward current

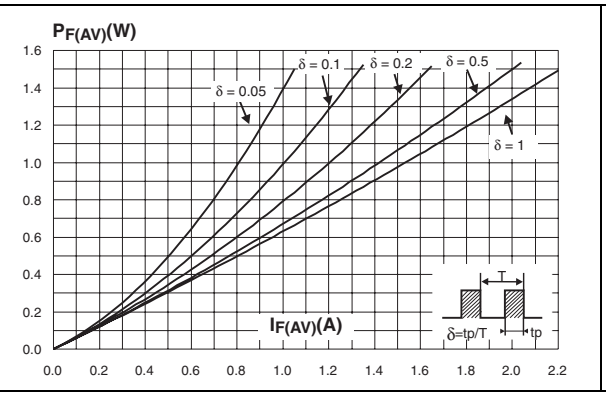


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

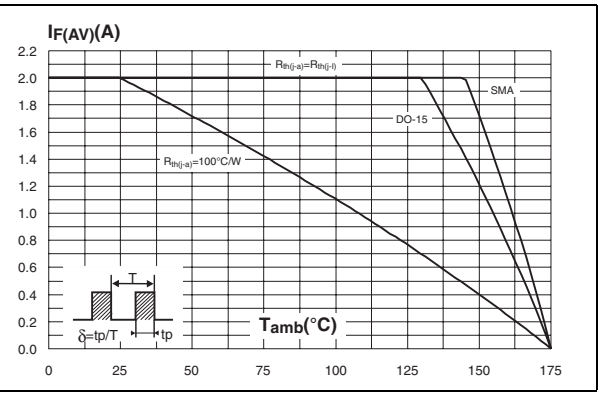


Figure 3. Normalized avalanche power derating versus pulse duration

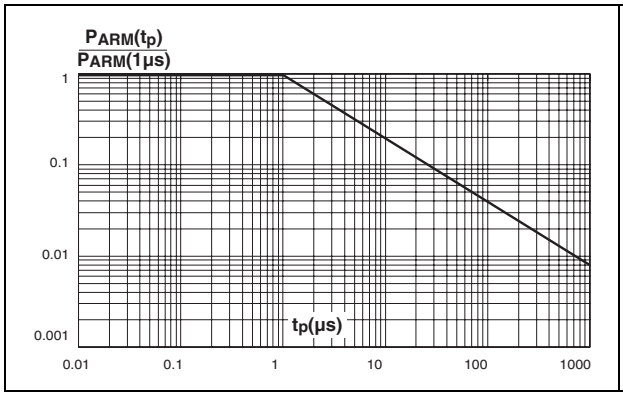


Figure 4. Normalized avalanche power derating versus junction temperature

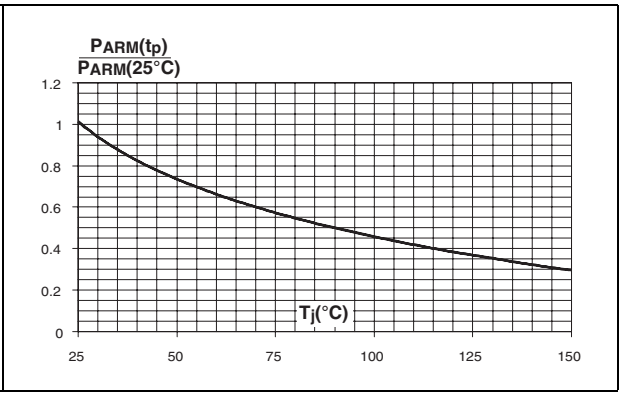


Figure 5. Non repetitive surge peak forward current versus overload duration - maximum values (SMA)

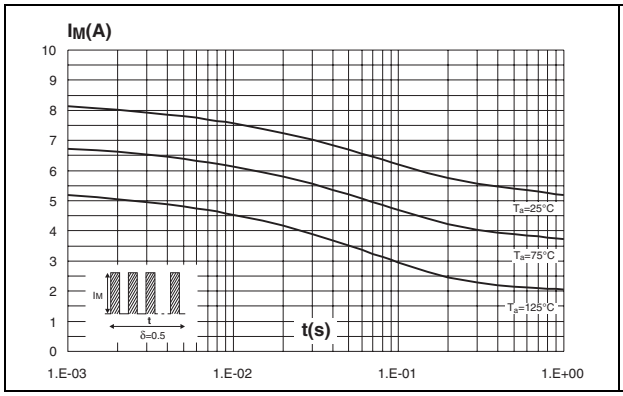


Figure 6. Non repetitive surge peak forward current versus overload duration - maximum values (DO-15)

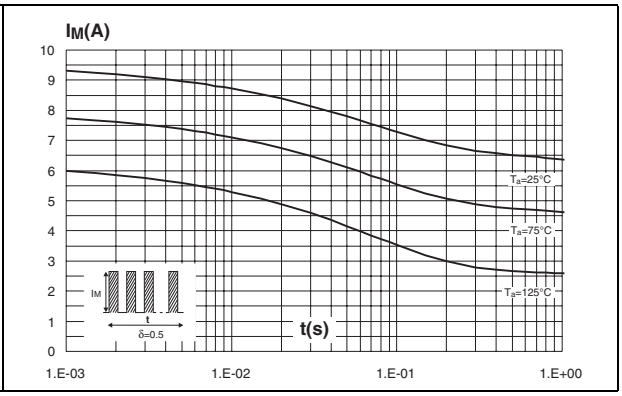


Figure 7. Relative variation of thermal impedance junction to ambient versus pulse duration - epoxy printed circuit board, e_{Cu} = 35 µm, recommended pad layout (SMA)

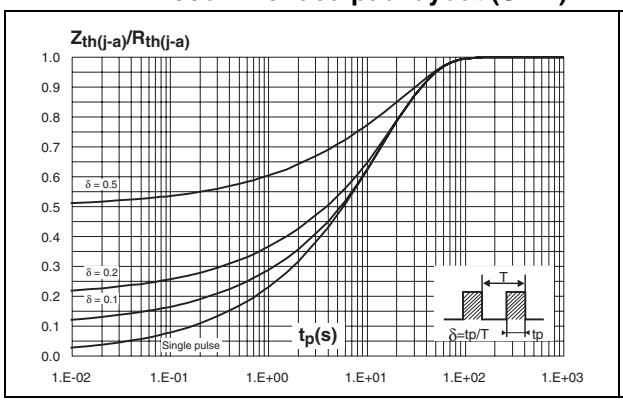


Figure 8. Relative variation of thermal impedance junction to ambient versus pulse duration (DO-15)

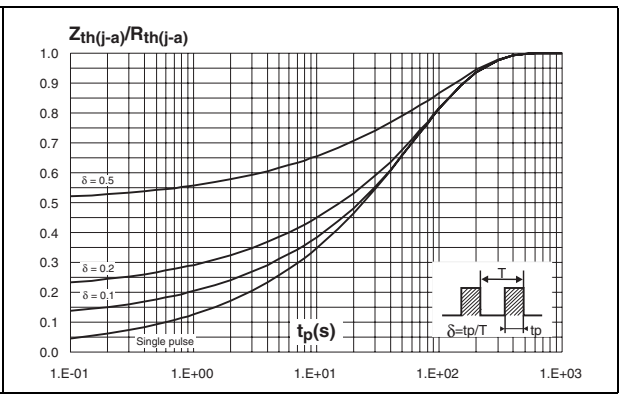


Figure 9. Reverse leakage current versus reverse voltage applied (typical values)

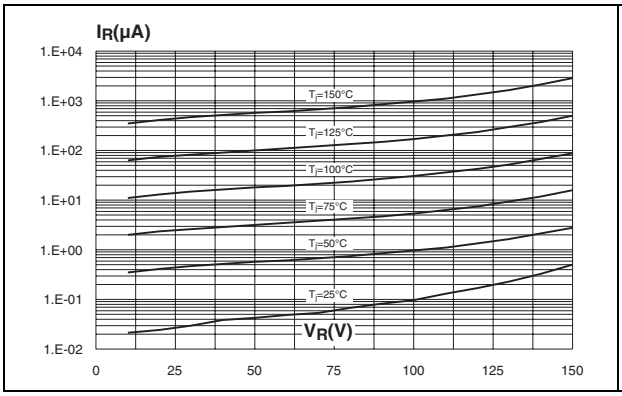


Figure 10. Junction capacitance versus reverse voltage applied (typical values)

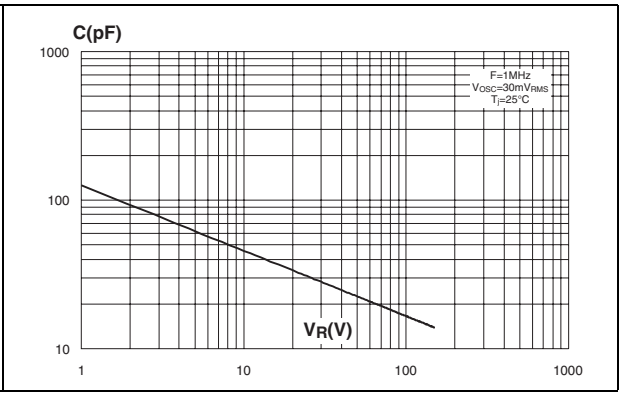


Figure 11. Forward voltage drop versus forward current - maximum values, high level

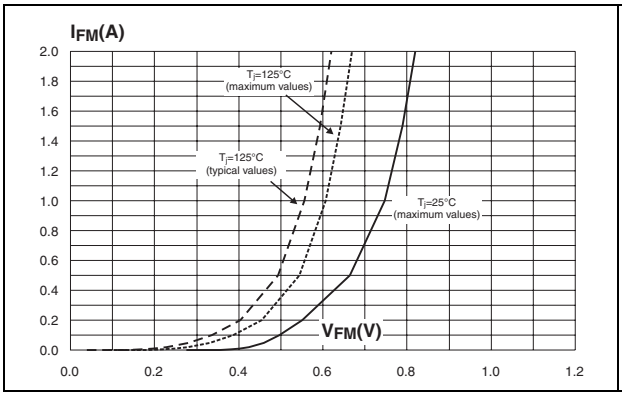


Figure 12. Forward voltage drop versus forward current - maximum values, low level

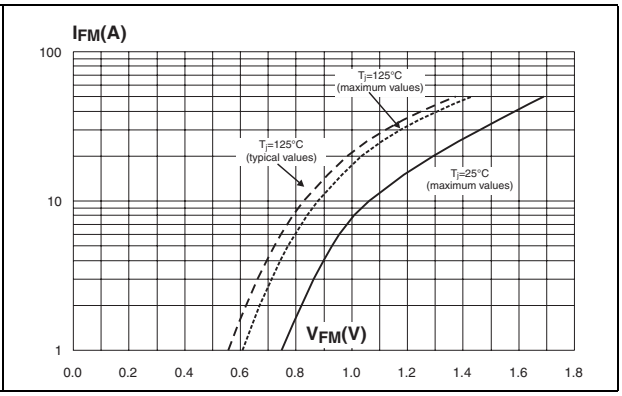


Figure 13. Thermal resistance junction to ambient versus copper surface under each lead - Epoxy printed circuit board FR4, e_{Cu} = 35 µm (SMA)

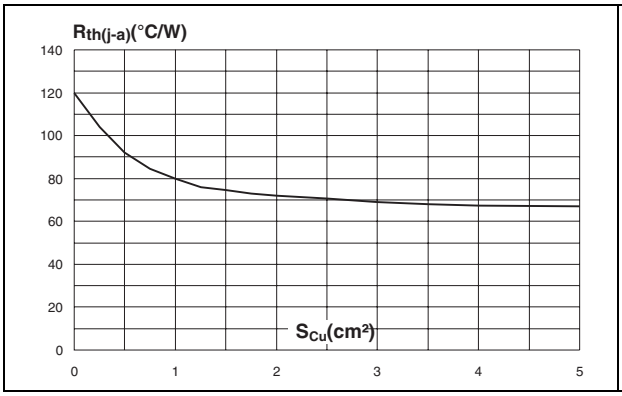
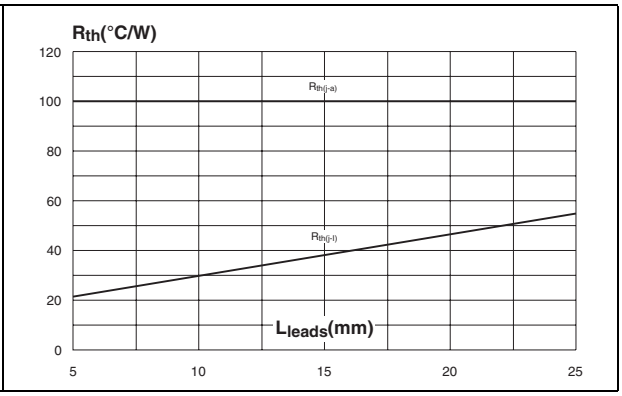


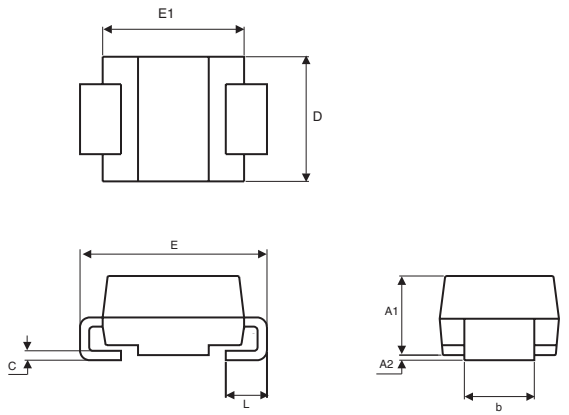
Figure 14. Thermal resistance versus lead length (DO-15)



2 Package information

Band shows cathode. Epoxy meets UL94, V0.

Table 4. SMA Package dimensions



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 15. SMA Foot Print Dimensions (in mm)

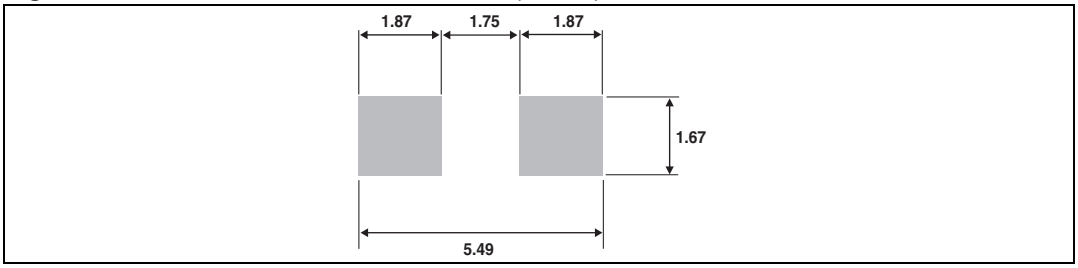
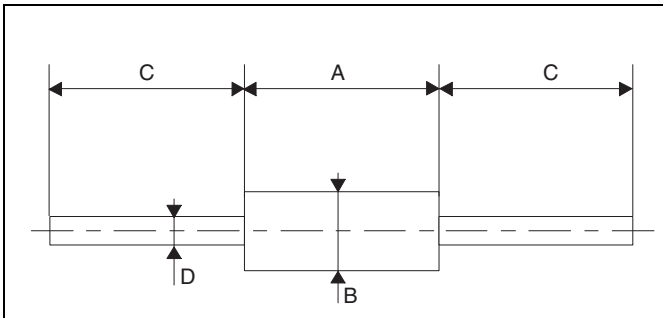


Table 5. DO-15 Package dimensions



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	6.05	6.75	0.238	0.266
B	2.95	3.53	0.116	0.139
C	26	31	1.024	1.220
D	0.71	0.88	0.028	0.035

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

3 Ordering information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPS2150A	2150	SMA	0.068 g	5000	Tape and reel
STPS2150	STPS2150	DO-15	0.4 g	2000	Ammopack
STPS2150RL	STPS2150	DO-15	0.4 g	5000	Tape and reel

4 Revision history

Date	Revision	Description of Changes
Jul-2003	3A	Last update.
Aug-2004	4	SMA package dimensions update. Reference A1 max. changed from 2.70mm (0.106inc.) to 2.03mm (0.080).
31-May-2006	5	Reformatted to current standard. Added ECOPACK statement. Updated SMA footprint in Figure 15. Changed nF to pF in Figure 10.

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