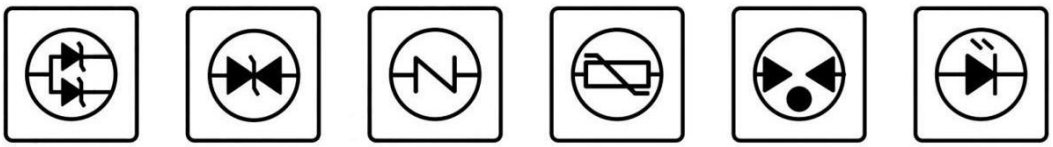
MSKSEMI 美森科
SEMICONDUCTOR



STPST2H100xx-MS

Product specification

STPST2H100xx-MS

100 V - 2 A power Schottky trench rectifier

Description

This 2 A, 100 V rectifier is based on trench technology that achieves the best-in class VF/IR trade-off for a given silicon surface.

Integrated in flat and space-saving packages, this STPST2H100xx-MS trench rectifier is intended to be used in high frequency miniature switched mode power supplies. It is also an ideal candidate for auxiliary power supply in telecom, server, or smart metering. trench rectifiers are adapted to freewheeling, OR-ring or reverse polarity protection applications, and can be the perfect companion device to our transistors, drivers, or ST VIPer products.

Features

- High junction temperature capability
- Low forward voltage drop
- Low recovery charges
- Reduces conduction, reverse and switching losses
- Avalanche tested
- Flat packages

Applications

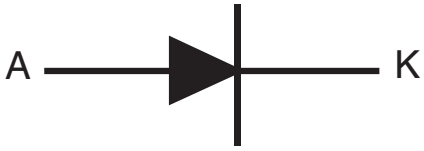
- DC/DC converter
- LED lighting
- Flyback topology
- Auxiliary power supply
- Switch mode power supply (SMPS)

Reference News

STPST2H100ZF-MS	MARKING
 SOD-123FL	MSKSEMI T02

STPST2H100AF-MS	MARKING
 SMAF	MSKSEMI T2H1

STPST2H100UF-MS	MARKING
 SMBF	MSKSEMI T2H1



Device summary

$I_{F(AV)}$	2 A
V_{RRM}	100 V
T_j (max.)	175 °C
V_F (typ.)	0.620 V

Absolute ratings (limiting values at 25 °C, unless otherwise specified)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			100	V
$I_{F(AV)}$	Average forward current, δ = 0.5, square wave	SOD-123FL	T_L = 140 °C	2	A
		SMAF	T_L = 140 °C		
		SMBF	T_L = 150 °C		
I_{FSM}	Surge non repetitive forward current	SOD-123FL	t_p = 10 ms sinusoidal	35	A
		SMAF			
		SMBF			
I_{AS}	Single pulse avalanche current(1)	T_j = 25°C, L = 300 µH, V_{DD} = 15 V		3	A
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Maximum operating junction temperature(2)			+175	°C

1. *Please refer to Figure 1 and Figure 2 for the unclamped inductive switching test circuit, and waveform.*
2. *$(dP_{tot}/dT_j) < (1/R_{th(j-a)})$ condition to avoid thermal runaway for a diode on its own heatsink.*

Thermal resistance parameter

Symbol	Parameter		Typ.value	Unit
$R_{th(j-l)}$	Junction to lead	SOD-123FL	15	°C/W
		SMAF	14	
		SMBF	11	

For more information, please refer to the following application note:

- AN5088: Rectifiers thermal management, handling and mounting recommendations

Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 125 °C	V_R = 70 V	-	0.25	0.75	mA
		T_j = 25 °C	V_R = 100 V	-		2.7	µA
		T_j = 125 °C		-	0.45	1.5	mA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 1 A	-	0.590	0.655	V
		T_j = 125 °C		-	0.520	0.575	
		T_j = 25 °C	I_F = 2 A	-	0.725	0.805	
		T_j = 125 °C		-	0.620	0.670	

1. *Pulse test: t_p = 5 ms, δ < 2%*
2. *Pulse test: t_p = 380 µs, δ < 2%*

To evaluate the conduction losses, use the following equation: P = 0.480 x $I_{F(AV)}$ + 0.095 x $I_{F^2(RMS)}$

For more information, please refer to the following application notes related to the power losses :

- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

Figure 1. Current and voltage waveforms for avalanche energy test across D.U.T (device under test)

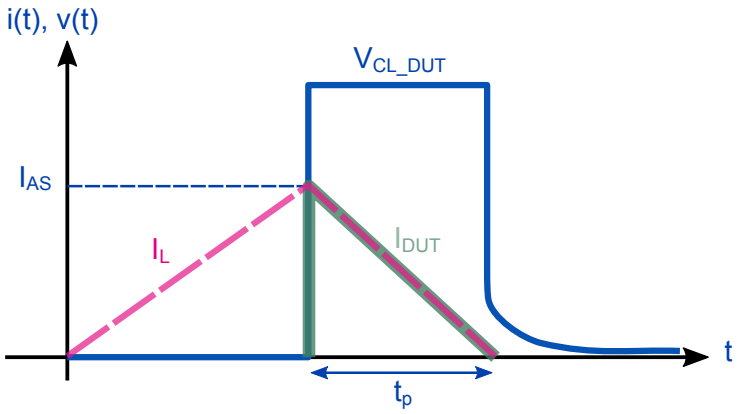
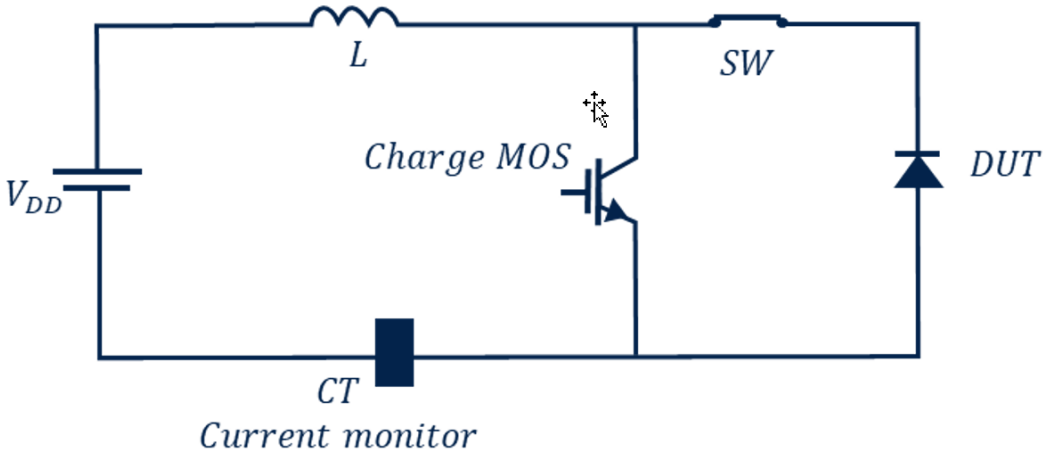


Figure 2. Unclamped Inductive Switching Test circuit



$$E_{AS} = \frac{1}{2} \times L \times {I_{AS}}^2 \times \left(\frac{V_{CLDUT}}{V_{CLDUT} - V_{DD}} \right) \cong \frac{1}{2} \times L \times {I_{AS}}^2$$

$$t_p = \left(\frac{L \times I_{AS}}{V_{CLDUT} - V_{DD}} \right)$$

Characteristics (curves)

Figure 3. Average forward current versus lead temperature (δ = 0.5)

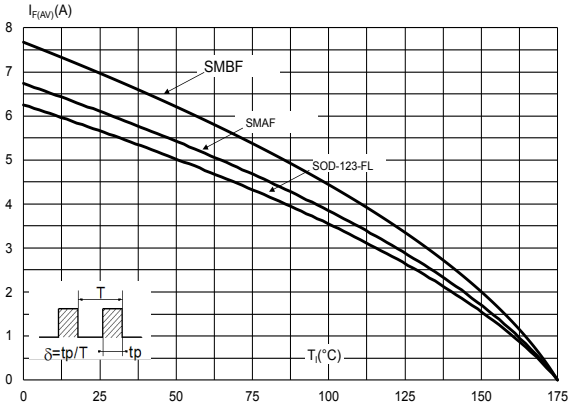


Figure 4. Relative variation of thermal impedance junction to lead versus pulse duration (SOD-123FL)

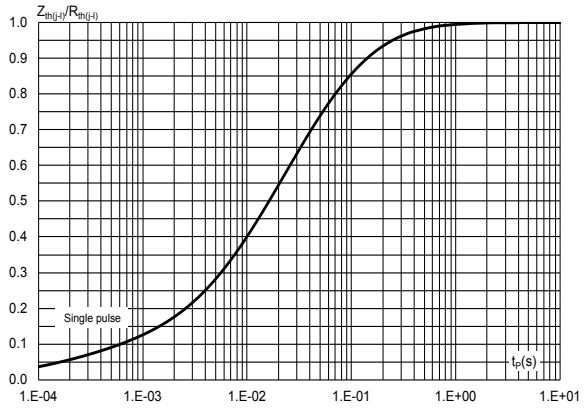


Figure 5. Relative variation of thermal impedance junction to lead versus pulse duration (SMAF)

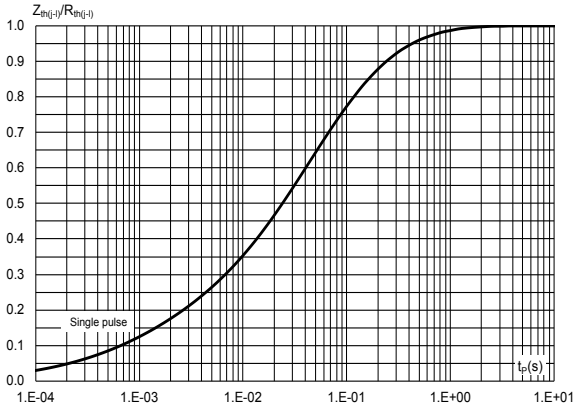


Figure 6. Relative variation of thermal impedance junction to lead versus pulse duration (SMBF)

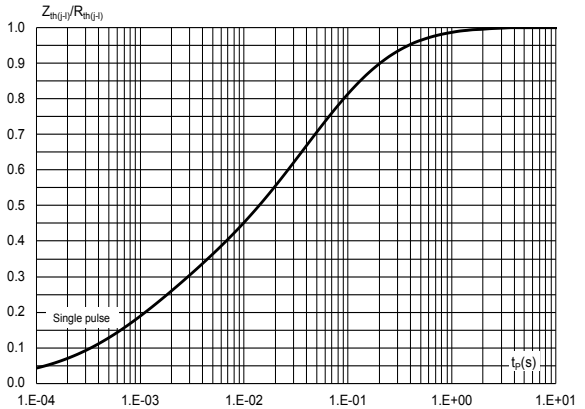


Figure 7. Reverse leakage current versus reverse voltage applied (typical values)

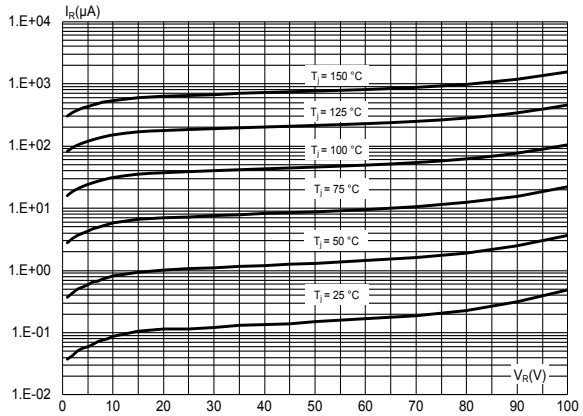


Figure 8. Junction capacitance versus reverse voltage applied (typical values)

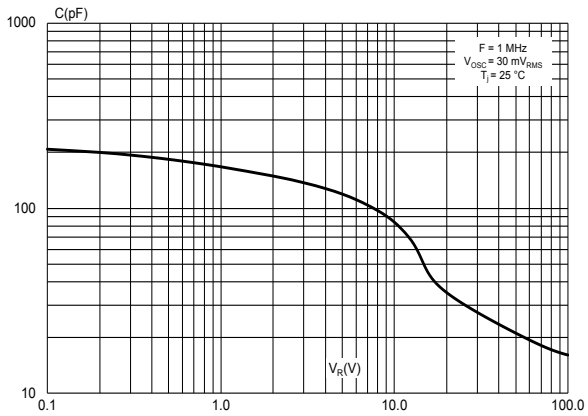


Figure 9. Forward voltage drop versus forward current (typical values)

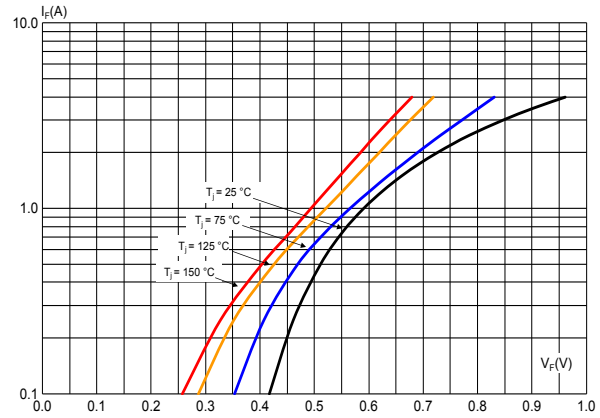


Figure 10. Thermal resistance junction to ambient versus copper surface under each lead (typical values, epoxy printed board FR4, e_{Cu}= 70 µm)

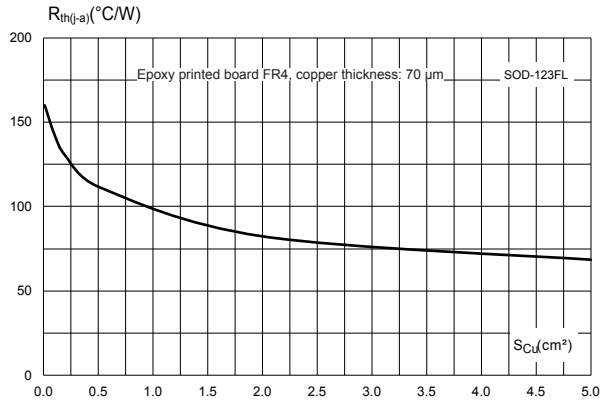


Figure 11. Thermal resistance junction to ambient versus copper surface under each lead (typical values, epoxy printed board FR4, e_{Cu}= 70 µm)

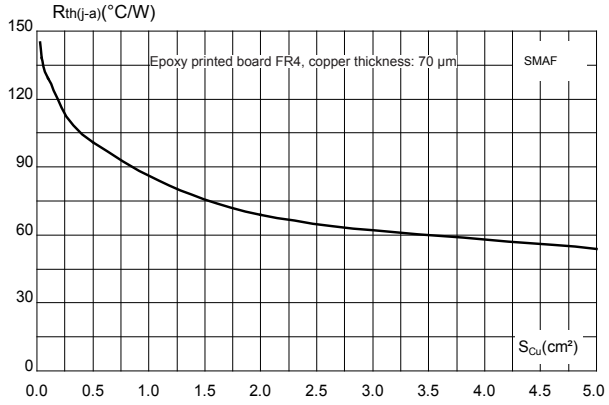
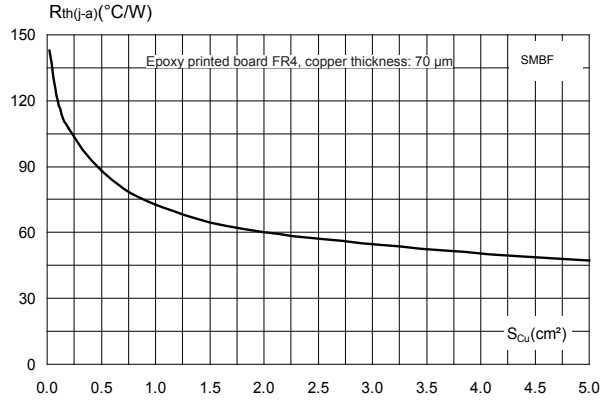
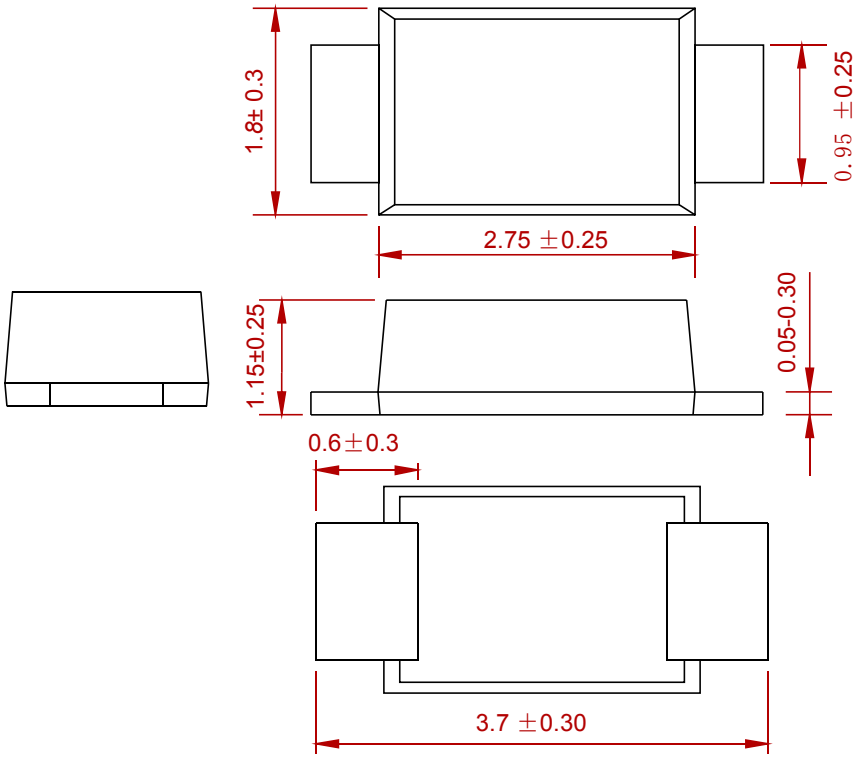


Figure 12. Thermal resistance junction to ambient versus copper surface under each lead (typical values, epoxy printed board FR4, e_{Cu}= 70 µm)



PACKAGE MECHANICAL DATA



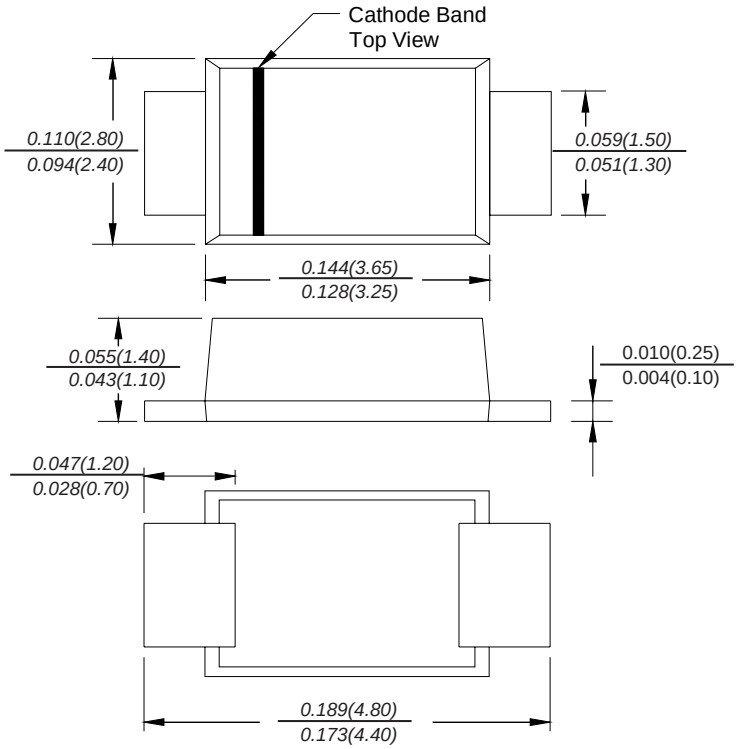
Dimensions in millimeters

REEL SPECIFICATION

P/N	PKG	QTY
STPST2H100ZF-MS	SOD-123FL	3000

PACKAGE MECHANICAL DATA

SMAF

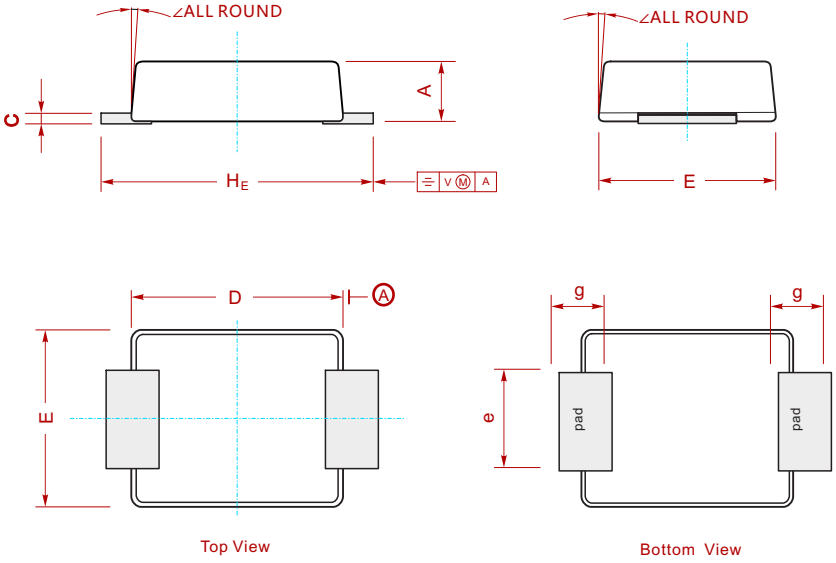


Dimensions in inches and (millimeters)

REEL SPECIFICATION

P/N	PKG	QTY
STPST2H100AF-MS	SMAF	3000

PACKAGEECHANICALDATA



UNIT		A	C	D	E	H_E	e	g	∠
mm	max	1.3	0.26	4.4	3.7	5.5	2.2	1.0	9°
	min	1.1	0.18	4.2	3.5	5.1	1.9		
mil	max	51	10	173	146	216	86	40	
	min	43	7	165	138	200	75		

Order information

P/N	PKG	QTY
STPST2H100UF-MS	SMBF	5000

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