

MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

STPS1L30xx-MS

Product specification

Description

Schottky rectifiers designed for high frequency miniature switched mode power supplies such as adaptors and on board DC/DC converters.

Packaged in SMA, SMAF Notch or SMB, the STPS1L30xx-MS is ideal for use in parallel with MOSFETs in synchronous rectification.

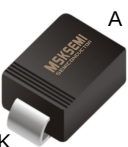
Features

- Negligible switching losses
- High junction temperature capability
- Low leakage current
- Good trade-off between leakage current and forward voltage drop
- Avalanche capability specified

Applications

- Cordless appliance
- SSD
- Battery charger
- Telecom power
- DC / DC converter

Reference News

STPS1L30A-MS	MARKING
 DO-214AC(SMA)	
STPS1L30U-MS	MARKING
 DO-214AA(SMB)	
STPS1L30AFN-MS	MARKING
 SMAF	



Device summary

Symbol	Value
$I_F(AV)$	1 A
V_{RRM}	30 V
$T_j(max.)$	150 °C
$V_F(typ.)$	0.26 V

Characteristics

Absolute Ratings (limiting values)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			30	V
$I_{F(RMS)}$	Forward rms current			10	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$, square wave	SMA	$T_L = 135\text{ }^{\circ}\text{C}$	1	A
		SMAF	$T_L = 140\text{ }^{\circ}\text{C}$		
		SMB	$T_L = 140\text{ }^{\circ}\text{C}$		
I_{FSM}	Surge non repetitive forward current	SMA	$t_p = 10\text{ ms sinusoidal}$	75	A
		SMAF		90	
		SMB		75	
P_{ARM}	Repetitive peak avalanche power		$t_p = 10\text{ }\mu\text{s}, T_j = 125\text{ }^{\circ}\text{C}$	110	W
T_{stg}	Storage temperature range			-65 to +150	$^{\circ}\text{C}$
T_j	Maximum operating junction temperature ⁽¹⁾			+150	$^{\circ}\text{C}$

1. $(dP_{tot}/dT_j) < (1/R_{th(j-a)})$ condition to avoid thermal runaway for a diode on its own heatsink.

Thermal resistance

Symbol	Parameter		Max. value	Unit
$R_{th(j-l)}$	Junction to lead	SMA	30	$^{\circ}\text{C/W}$
		SMAF	20	
		SMB	25	

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	$T_j = 25\text{ }^{\circ}\text{C}$	$V_R = V_{RRM}$	-		200	μA
		$T_j = 100\text{ }^{\circ}\text{C}$		-	6	15	mA
$V_F^{(1)}$	Forward voltage drop	$T_j = 25\text{ }^{\circ}\text{C}$	$I_F = 1\text{ A}$	-		0.395	V
		$T_j = 125\text{ }^{\circ}\text{C}$		-	0.260	0.300	
		$T_j = 25\text{ }^{\circ}\text{C}$	$I_F = 2\text{ A}$	-		0.445	
		$T_j = 125\text{ }^{\circ}\text{C}$		-	0.325	0.375	

1. Pulse test: $t_p = 380\text{ }\mu\text{s}$, $\delta < 2\%$

To evaluate the conduction losses, use the following equation:

$$P = 0.225 \times I_{F(AV)} + 0.075 \times I_{F(RMS)}^2$$

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

Characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current

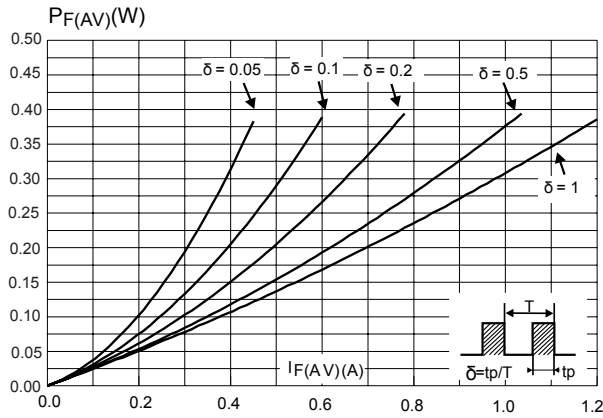


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$)

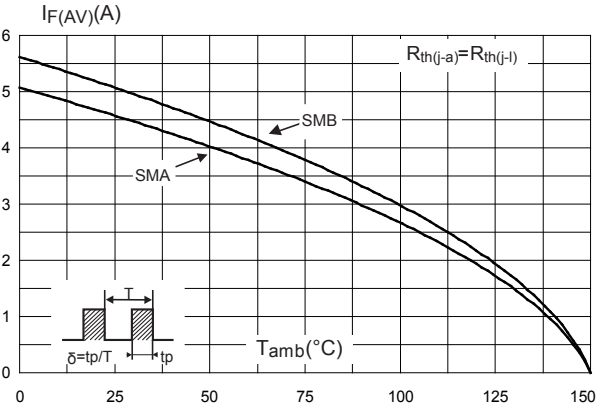


Figure 3. Normalized avalanche power derating versus junction temperature ($T_j = 125^\circ\text{C}$)

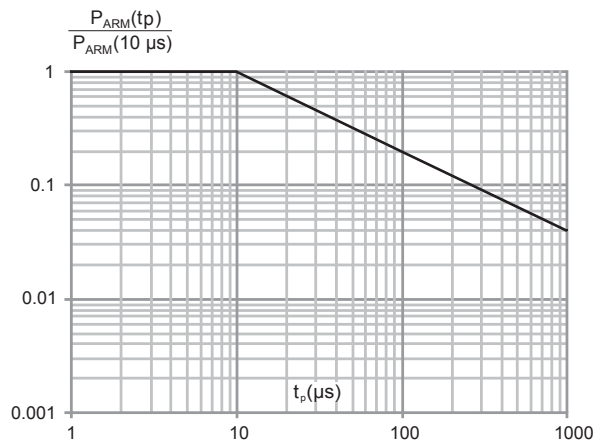


Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration (SMB)

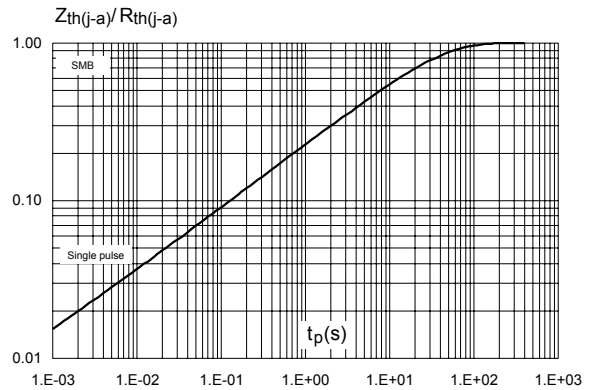


Figure 5. Relative variation of thermal impedance junction to ambient versus pulse duration (SMA)

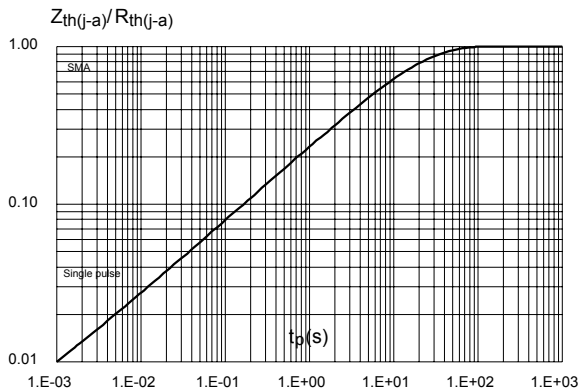


Figure 6. Reverse leakage current versus reverse voltage applied (typical values)

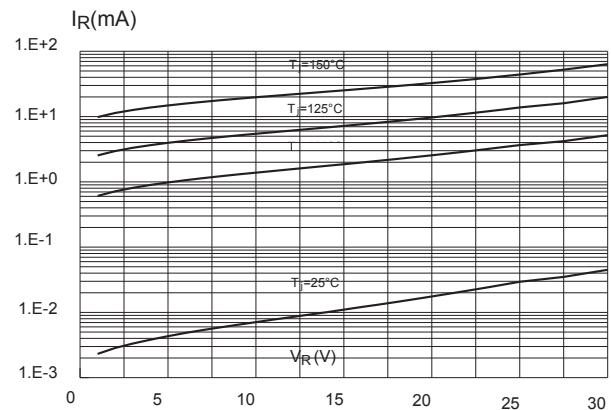


Figure 7. Junction capacitance versus reverse voltage applied (typical values)

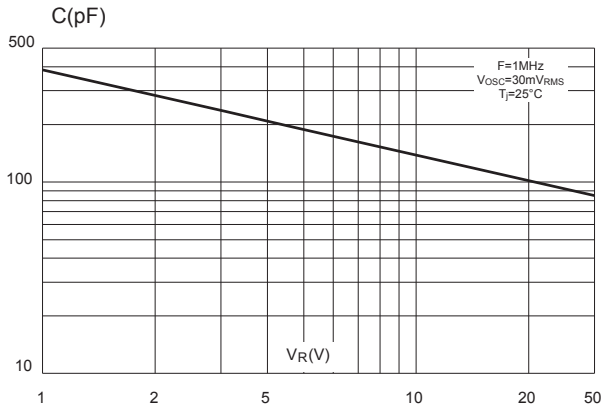


Figure 8. Forward voltage drop versus forward current (typical values, high level)

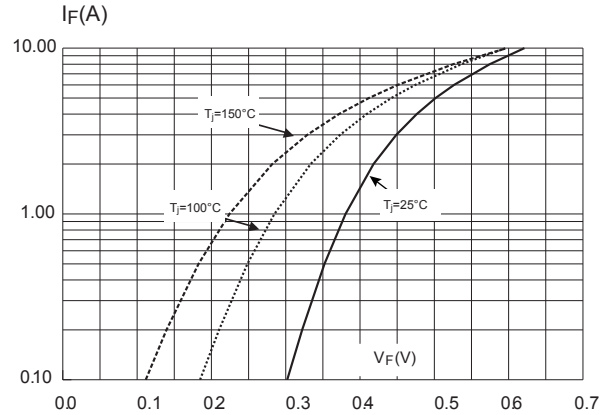


Figure 9. Forward voltage drop versus forward current (maximum values, low level)

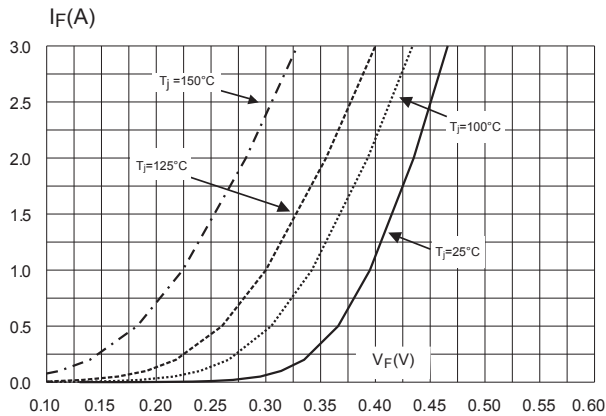


Figure 10. Thermal resistance junction to ambient versus copper surface under each lead (SMB)

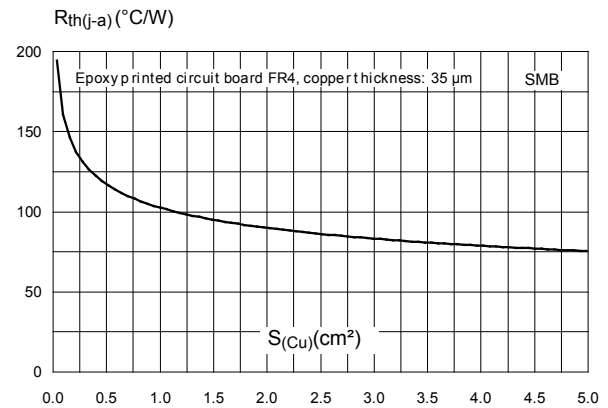


Figure 11. Thermal resistance junction to ambient versus copper surface under each lead (SMA)

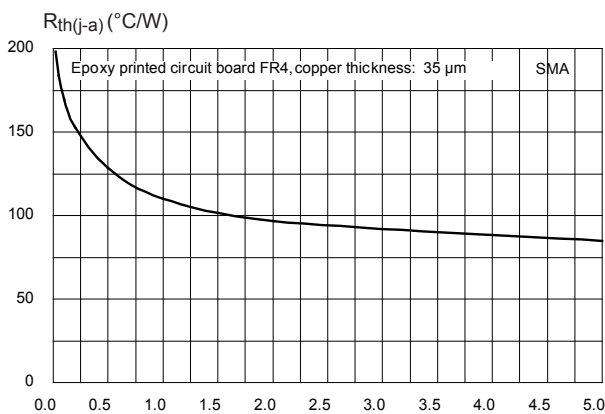
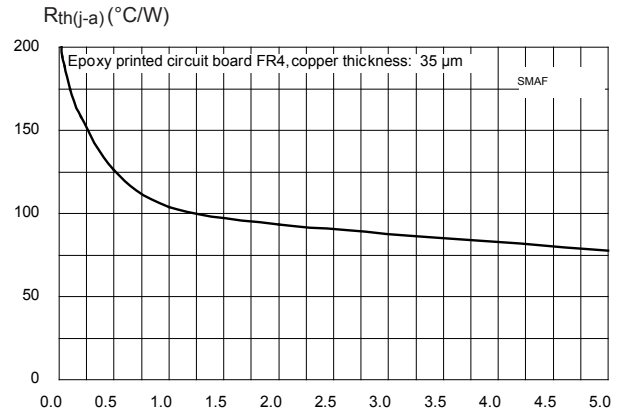
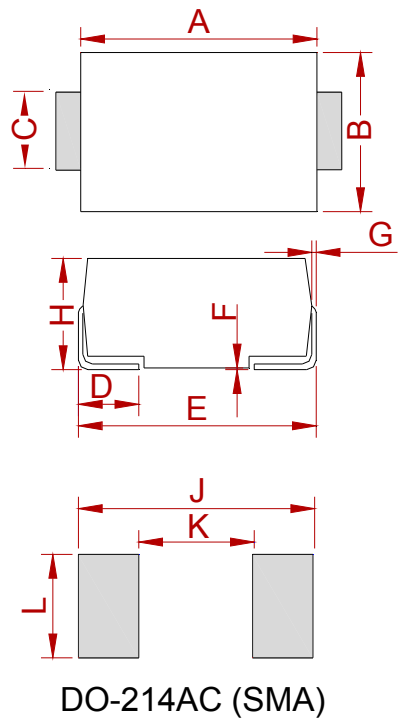


Figure 12. Thermal resistance junction to ambient versus copper surface under each lead (SMA Flat Notch)



PACKAGE MECHANICAL DATA

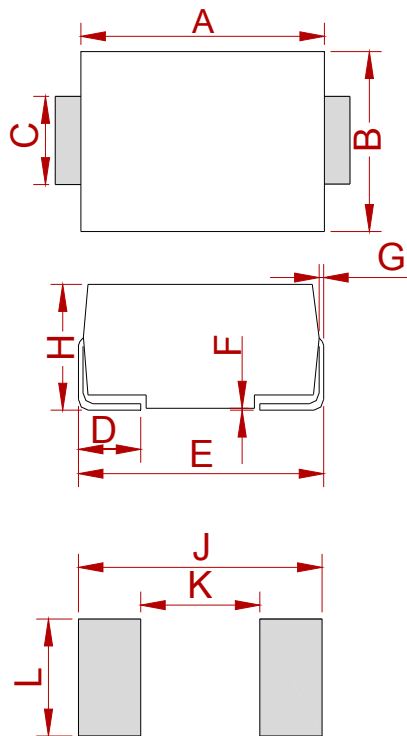


Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.25	4.65	0.167	0.183
B	2.50	2.90	0.098	0.114
C	1.35	1.65	0.053	0.065
D	0.76	1.52	0.030	0.060
E	4.93	5.28	0.194	0.208
F	0.051	0.203	0.002	0.008
G	0.15	0.31	0.006	0.012
H	1.98	2.41	0.078	0.095
J	6.50		0.256	
K		2.30		0.090
L	1.70		0.067	

REEL SPECIFICATION

P/N	PKG	QTY
STPS1L30A-MS	DO-214AC (SMA)	5000

PACKAGE MECHANICAL DATA



DO-214AA (SMB)

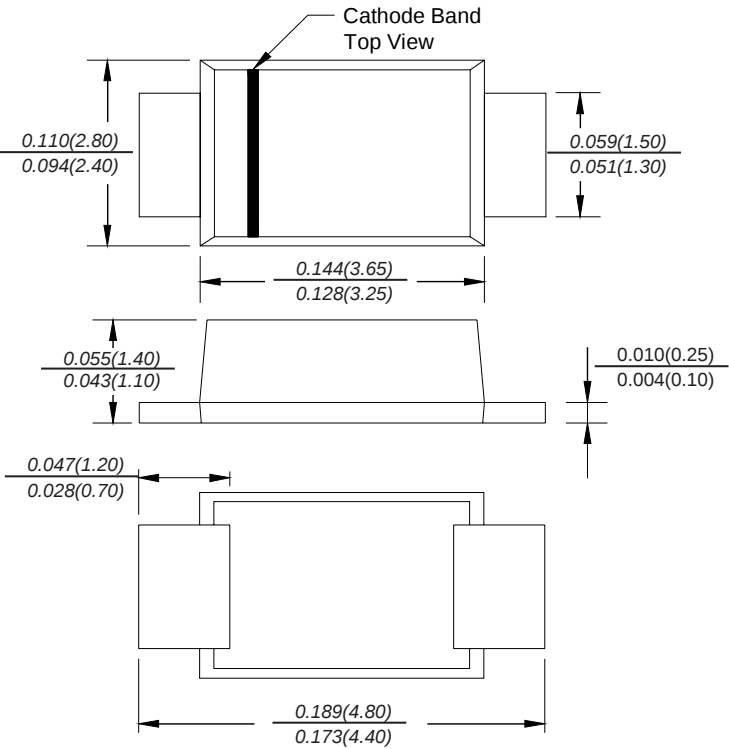
Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.25	4.75	0.167	0.187
B	3.30	3.94	0.130	0.155
C	1.85	2.21	0.073	0.087
D	0.76	1.52	0.030	0.060
E	5.08	5.59	0.200	0.220
F	0.051	0.203	0.002	0.008
G	0.15	0.31	0.006	0.012
H	2.11	2.44	0.083	0.096
J	6.80		0.270	
K		2.60		0.100
L	2.40		0.090	

REELS SPECIFICATION

P/N	PKG	QTY
STPS1L30U-MS	DO-214AA (SMB)	2500

PACKAGE MECHANICAL DATA

SMAF



Dimensions in inches and (millimeters)

REEL SPECIFICATION

P/N	PKG	QTY
STPS1L30AFN-MS	SMAF	3000

Attention

■ Any and all MSKSEMI Semiconductor products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your MSKSEMI Semiconductor representative nearest you before using any MSKSEMI Semiconductor products described or contained herein in such applications.

■ MSKSEMI Semiconductor assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specification of any and all MSKSEMI Semiconductor products described or contained herein.

■ Specifications of any and all MSKSEMI Semiconductor products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.

■ MSKSEMI Semiconductor strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.

■ In the event that any or all MSKSEMI Semiconductor products (including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.

■ No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of MSKSEMI Semiconductor.

■ Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. MSKSEMI Semiconductor believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringement of intellectual property rights or other rights of third parties.

■ Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the MSKSEMI Semiconductor product that you intend to use.