

MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

STTH1R02x-MS

Product specification

Description

The STTH1R02x-MS uses 's new 200 V planar Pt doping technology, and it is specially suited for switching mode base drive and transistor circuits.

Packaged in SMA, SMB, the STTH1R02x-MS is ideal for use low voltage, high frequency inverters, free wheeling and polarity protection

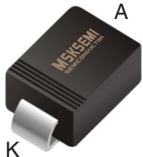
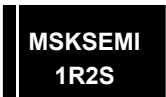
Features

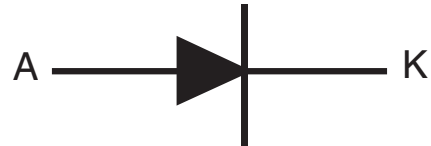
- Very low conduction losses
- Negligible switching losses
- Low forward voltage drop
- High junction temperature

Applications

- Switching diode
- LED Lighting
- Auxiliary power supply
- Flyback diode

Reference News

STTH1R02A-MS	MARKING
 DO-214AC(SMA)	
STTH1R02U-MS	MARKING
 DO-214AA(SMB)	



Device summary

Symbol	Value
$I_F(AV)$	1.5 A
V_{RRM}	200 V
$T_{j(max.)}$	175 °C
$V_F(typ.)$	0.7 V
$t_{rr}(typ.)$	15 ns

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

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			200	V
$I_F(AV)$	Average forward current $\delta = 0.5$, square wave	SMA, SMB	$T_L = 150\text{ °C}$	1.5	A
I_{FSM}	Surge non repetitive forward current		$t_p = 10\text{ ms sinusoidal}$	60	A
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Operating junction temperature			+175	°C

Thermal resistance

Symbol	Parameter		Max. value	Unit
$R_{th(j-l)}$	Junction to lead	SMA, SMB	30	°C/W

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	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$	-		3	μA
		$T_j = 125\text{ °C}$		-	2	20	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 1.5\text{ A}$	-	0.89	1.00	V
		$T_j = 100\text{ °C}$		-	0.76	0.85	
		$T_j = 150\text{ °C}$		-	0.70	0.80	

1. Pulse test: $t_p = 5\text{ ms}$, $\delta < 2\%$

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

To evaluate the conduction losses, use the following equation:

$$P = 0.68 \times I_F(AV) + 0.08 \times I_F^2(RMS)$$

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

Dynamic characteristics ($T_j = 25\text{ °C}$ unless otherwise stated)

Symbol	Parameters	Test conditions	Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	$I_F = 1\text{ A}$, $dI_F/dt = -50\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$	-	23	30	ns
		$I_F = 1\text{ A}$, $dI_F/dt = -100\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$	-	15	20	
I_{RM}	Reverse recovery current	$I_F = 1.5\text{ A}$, $dI_F/dt = -200\text{ A}/\mu\text{s}$, $V_R = 160\text{ V}$, $T_j = 125\text{ °C}$	-	3	4	A
t_{fr}	Forward recovery time	$I_F = 1.5\text{ A}$, $dI_F/dt = 100\text{ A}/\mu\text{s}$, $V_{FR} = 1.1\text{ V}_{F(max.)}$	-	50		ns
V_{FP}	Forward recovery voltage	$I_F = 1.5\text{ A}$, $dI_F/dt = 100\text{ A}/\mu\text{s}$	-	2.1		V

Characteristics (curves)

Figure 1. Peak current versus duty cycle

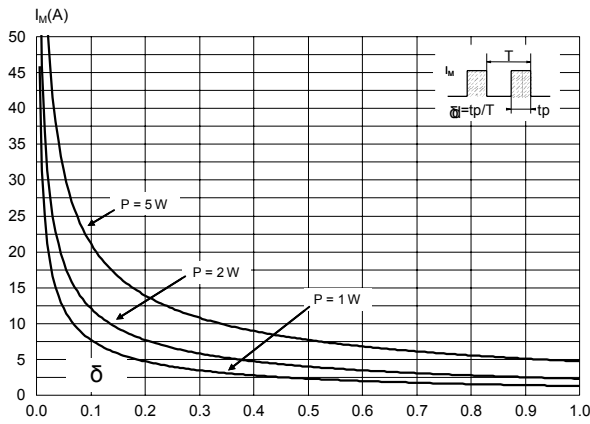


Figure 2. Forward voltage drop versus forward current (typical values)

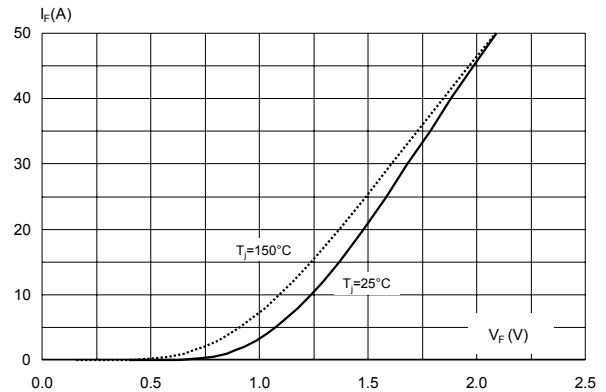


Figure 3. Forward voltage drop versus forward current (maximum values)

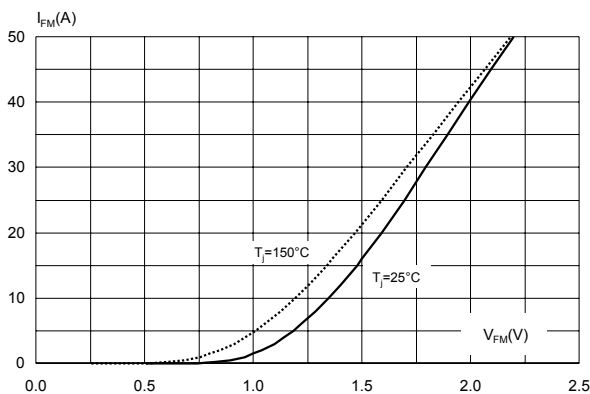


Figure 4. Relative variation of thermal impedance junction to lead versus pulse duration (SMA)

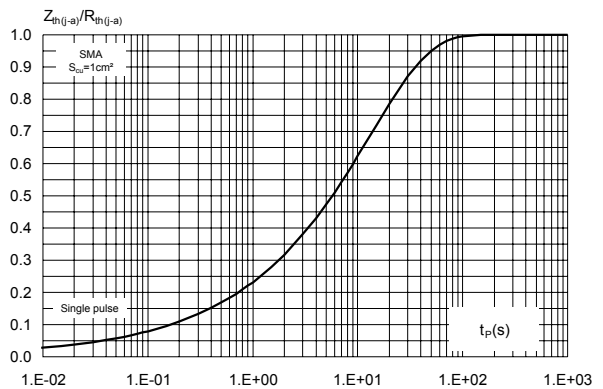


Figure 5. Relative variation of thermal impedance junction to lead versus pulse duration (SMB)

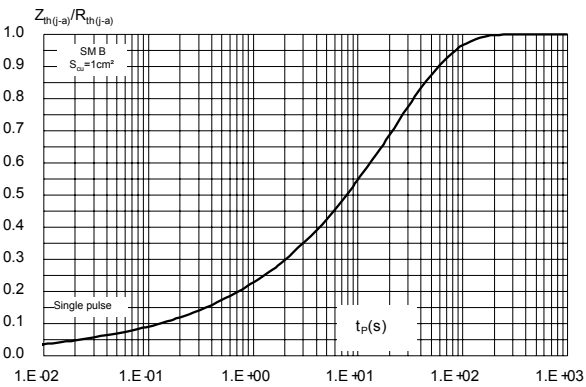


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

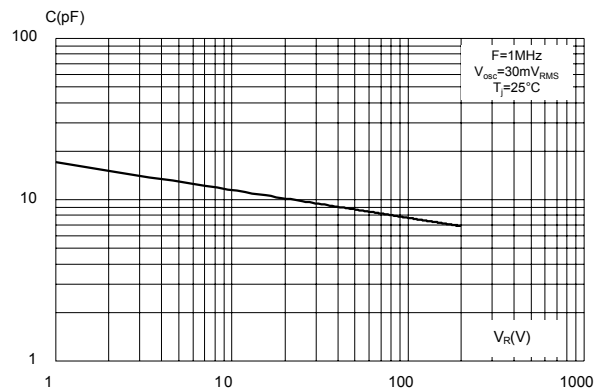


Figure 7. Reverse recovery charges versus dl_F/dt (typical values)

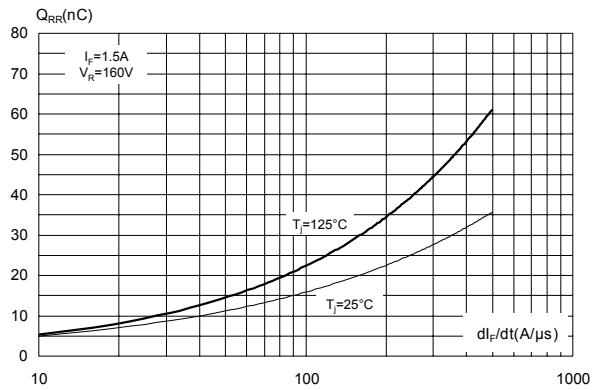


Figure 8. Reverse recovery time versus dl_F/dt (typical values)

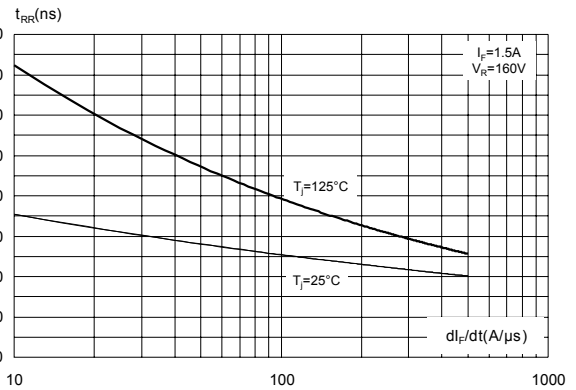


Figure 9. Peak reverse recovery current versus dl_F/dt (typical values)

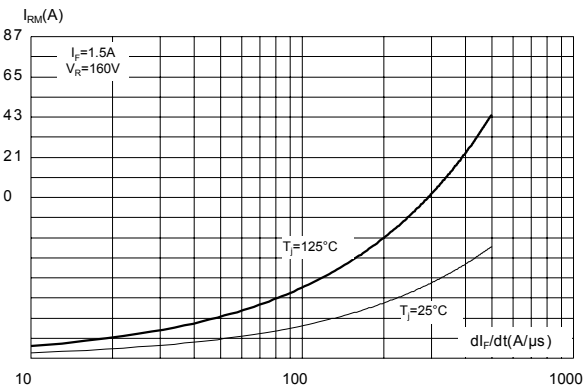


Figure 10. Relative variations of dynamic parameters versus junction temperature

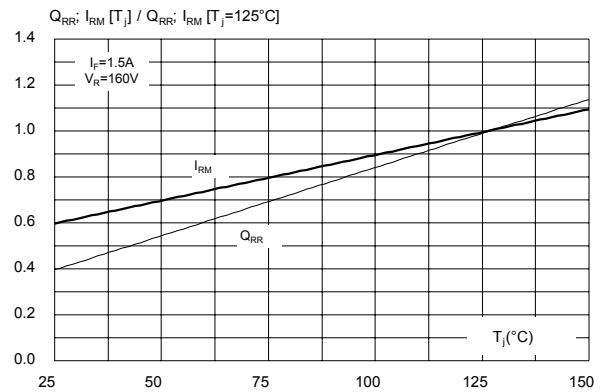


Figure 11. Thermal resistance junction to ambient versus copper surface under each lead (typical values)

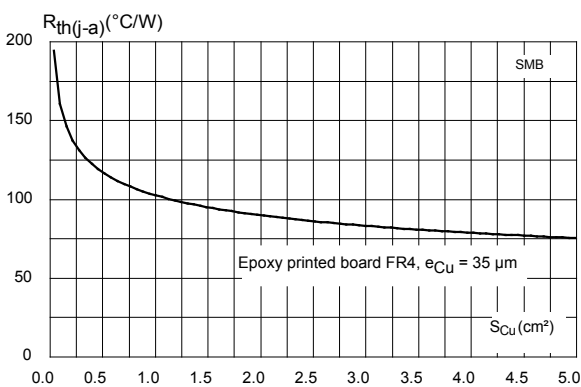
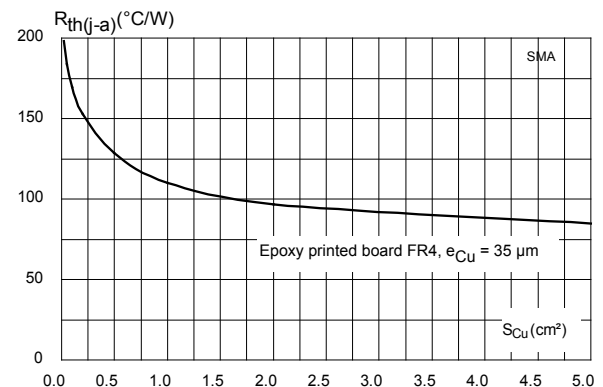
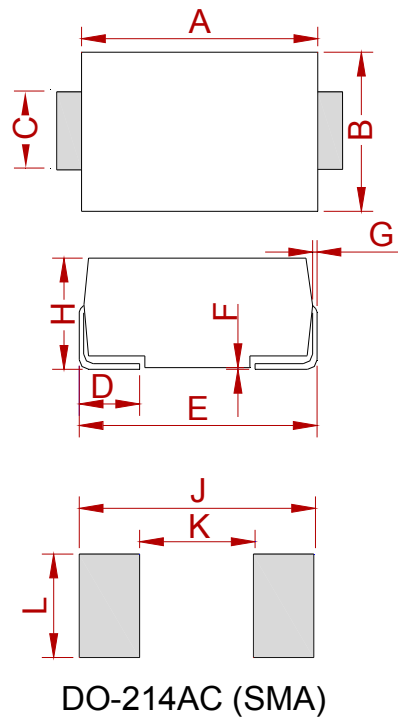


Figure 12. Thermal resistance junction to ambient versus copper surface under each lead (typical values)



PACKAGE MECHANICAL DATA

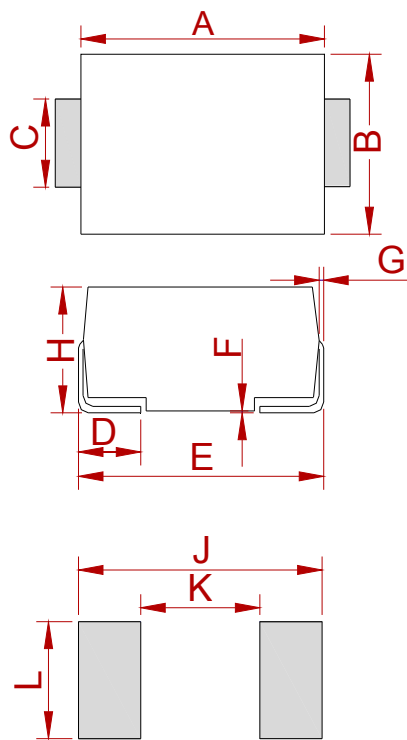


Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.25	4.65	0.167	0.183
B	2.50	2.90	0.098	0.114
C	1.35	1.65	0.053	0.065
D	0.76	1.52	0.030	0.060
E	4.93	5.28	0.194	0.208
F	0.051	0.203	0.002	0.008
G	0.15	0.31	0.006	0.012
H	1.98	2.41	0.078	0.095
J	6.50		0.256	
K		2.30		0.090
L	1.70		0.067	

REEL SPECIFICATION

P/N	PKG	QTY
STTH1R02A-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	

REELSPECIFICATION

P/N	PKG	QTY
STTH1R02U-MS	DO-214AA (SMB)	2500

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.