

MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

STTH3R02S-MS

Product specification

Description

The STTH3R02S-MS uses new 200 V planar Pt doping technology, and it is specially suited for switching mode base drive and transistor circuits.

Packaged in SMC, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection.

Features

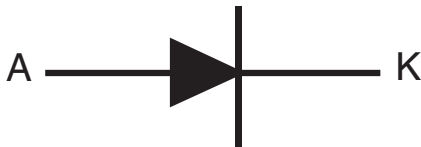
- Very low conduction losses
- Negligible switching losses
- Low forward and reverse recovery times
- High junction temperature

Reference News

STTH3R02S-MS	MARKING
 DO-214AB(SMC)	

Device summary

$I_{F(AV)}$	3 A
V_{RRM}	200 V
$T_J(max)$	175 °C
$V_F (typ)$	0.7 V
$t_{rr} (typ)$	16 ns



Absolute ratings (limiting values at $T_J = 25^{\circ}C$, unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		200	V
I_{FRM}	Repetitive peak forward current	$t_p = 5 \mu s, F = 5 \text{ kHz}$	110	A
$I_{F(RMS)}$	Forward rms current	SMC	70	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$	SMC $T_c = 110^{\circ}C$	3	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10 \text{ ms Sinusoidal}$	75	A
T_{stg}	Storage temperature range		-65 to + 175	$^{\circ}C$
T_J	Maximum operating junction temperature		175	$^{\circ}C$
T_L	Maximum lead temperature for soldering during 10 s at 4 mm from case		230	$^{\circ}C$

Thermal resistance

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	SMC	20	°C/W

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
		$T_j = 125\text{ °C}$			3	30	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 9\text{ A}$			1.20	V
		$T_j = 25\text{ °C}$	$I_F = 3\text{ A}$		0.89	1.0	
		$T_j = 100\text{ °C}$			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:

$$P = 0.68 \times I_{F(AV)} + 0.04 I_F^2(RMS)$$

Dynamic Characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	$I_F = 1\text{ A}$, $dI_F/dt = -50\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$, $T_j = 25\text{ °C}$		24	30	ns
		$I_F = 1\text{ A}$, $dI_F/dt = -100\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$, $T_j = 25\text{ °C}$		16	20	
I_{RM}	Reverse recovery current	$I_F = 3\text{ A}$, $dI_F/dt = -200\text{ A}/\mu\text{s}$, $V_R = 160\text{ V}$, $T_j = 125\text{ °C}$		3.5	4.5	A
t_{fr}	Forward recovery time	$I_F = 3\text{ A}$, $dI_F/dt = 100\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$, $T_j = 25\text{ °C}$ $I_F = 3\text{ A}$, $dI_F/dt = 100\text{ A}/\mu\text{s}$,		40		ns
V_{FP}	Forward recovery voltage	$T_j = 25\text{ °C}$		1.9		V

Figure 1. peak current versus duty cycle

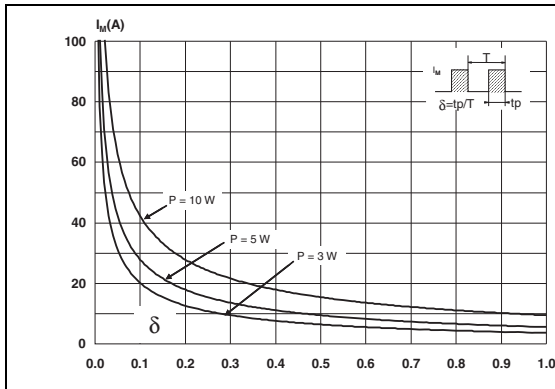


Figure 2. Forward voltage drop versus forward current (typical values)

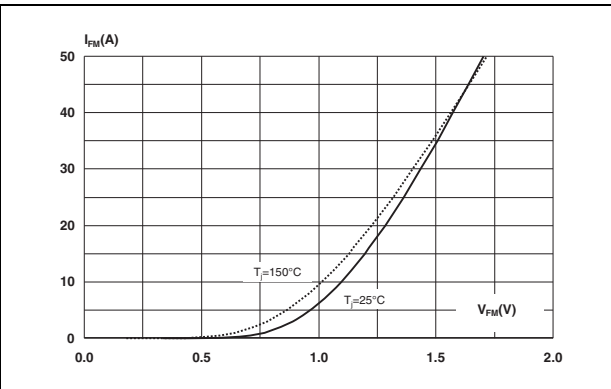


Figure 3. Forward voltage drop versus forward current (maximum values)

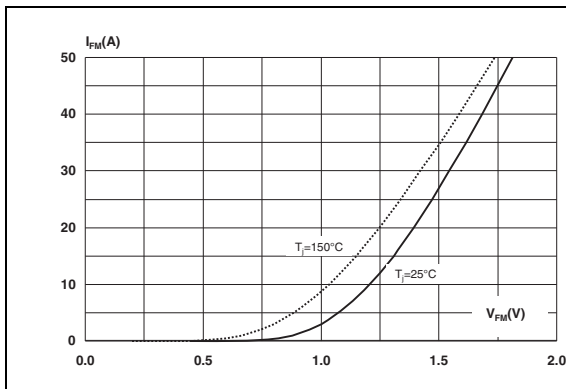


Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration - SMC

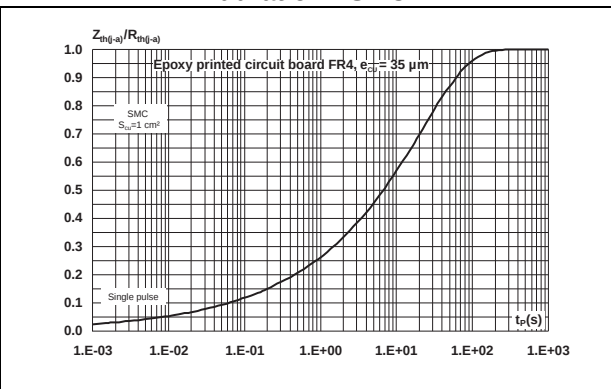


Figure 5. Junction capacitance versus reverse applied voltage (typical values)

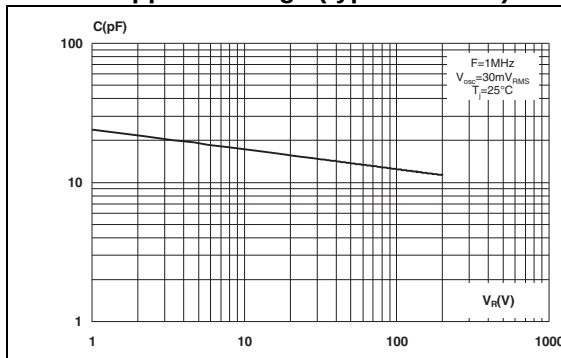


Figure 6. Reverse recovery charges versus dI_F/dt (typical values)

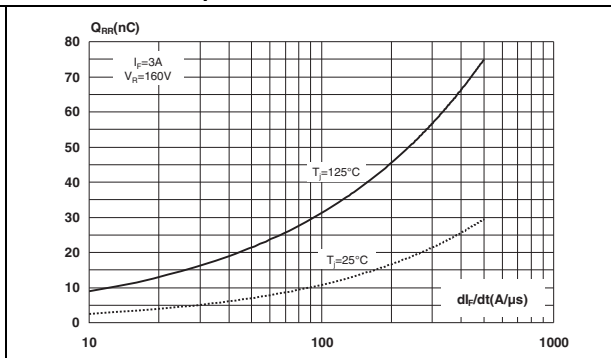


Figure 7. Reverse recovery time versus dl_F/dt (typical values)

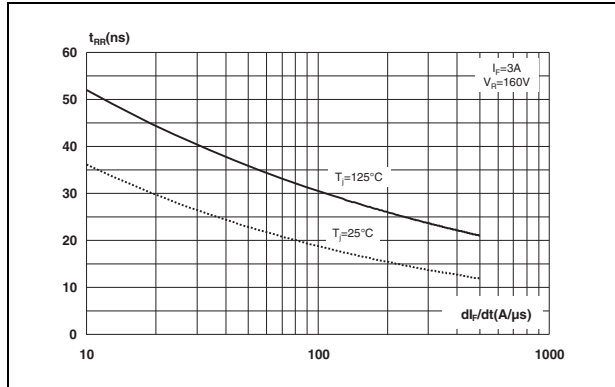


Figure 8. Peak reverse recovery current versus dl_F/dt (typical values)

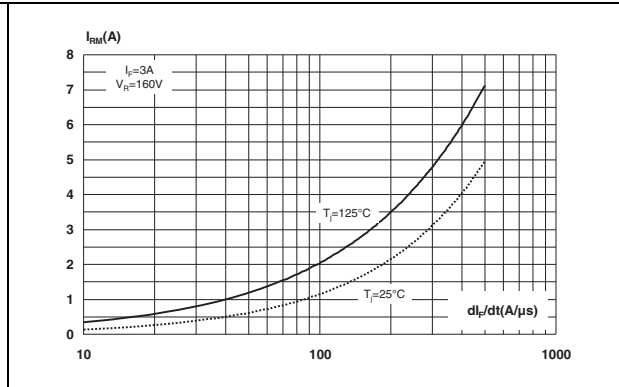


Figure 9. Dynamic parameters versus junction temperature

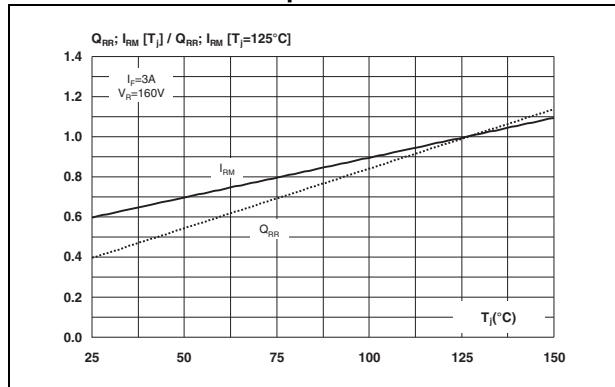
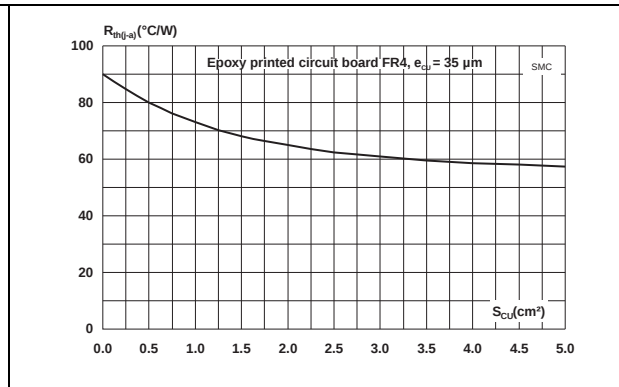
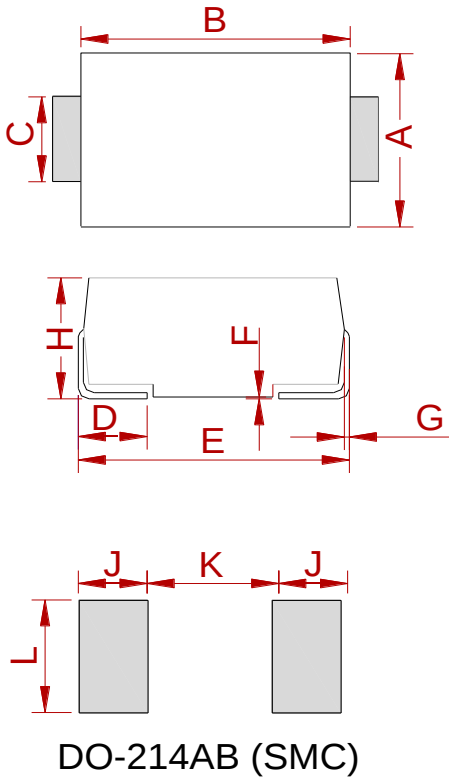


Figure 11. Thermal resistance versus copper surface under each lead for SMC



PACKAGE MECHANICAL DATA



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	5.75	6.25	0.226	0.246
B	6.90	7.40	0.272	0.291
C	2.75	3.25	0.108	0.128
D	0.95	1.52	0.037	0.060
E	7.70	8.20	0.303	0.323
F	0.051	0.203	0.002	0.008
G	0.15	0.31	0.006	0.012
H	2.15	2.62	0.085	0.103
J	2.40		0.094	
K		4.20		0.165
L	3.30		0.130	

REEL SPECIFICATION

P/N	PKG	QTY
STTH3R02S-MS	DO-214AB (SMC)	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.