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STTH4R02x-MS

Product specification

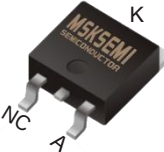
Description

The STTH4R02x-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 TO-252, SMB and SMC, this device is intended for use in low voltage, high frequency inverters, freewheeling and polarity protection.

Features

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

Reference News

STTH4R02U-MS	MARKING
 DO-214AA(SMB)	
STTH4R02S-MS	MARKING
 DO-214AB(SMC)	
STTH4R02B-MS	MARKING
 TO-252	



Device summary

Symbol	Value
$I_{F(AV)}$	4 A
V_{RRM}	200 V
V_F (typ)	0.76 V
$T_J(max)$	175 °C
t_{rr} (typ)	16 ns

Characteristics

Absolute Ratings (limiting values)

Symbol	Parameter			Value	Unit
V _{RRM}	Repetitive peak reverse voltage			200	V
I _{F(RMS)}	Forward rms current	TO-252		10	A
		SMB / SMC		70	
I _{F(AV)}	Average forward current, δ = 0.5, square wave	TO-252	T _c = 160 °C	4	A
		SMB / SMC	T _L = 95 °C		
I _{FSM}	Surge non repetitive forward current	t _p = 10 ms sinusoidal		70	A
T _{stg}	Storage temperature range			-65 to +175	°C
T _j	Maximum operating junction temperature			175	°C

Thermal resistance

Symbol	Parameter		Max.value	Unit
R _{th(j-c)}	Junction to case	TO-252	3.5	°C/W
R _{th(j-l)}	Junction to lead	SMB / SMC	20	

Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I _R ⁽¹⁾	Reverse leakage current	T _j = 25 °C	V _R = V _{RRM}	-		3	μA
		T _j = 125 °C		-	2	20	
V _F ⁽²⁾	Forward voltage drop	T _j = 25 °C	I _F = 12 A	-	1.15	1.25	V
			I _F = 4 A	-	0.95	1.05	
		T _j = 150 °C		-	0.76	0.83	

1. Pulse test: t_p = 5 ms, $\delta < 2\%$
2. Pulse test: t_p = 380 μs, $\delta < 2\%$

To evaluate the conduction losses, use the following equation:

$$P = 0.67 \times I_{F(AV)} + 0.04 \times I_{F(RMS)}^2$$

Dynamic electrical characteristics

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25\text{ }^{\circ}\text{C}$	$I_F = 1\text{ A}$ $di_F/dt = -50\text{ A}/\mu\text{s}$ $V_R = 30\text{ V}$	-	24	30	ns
			$I_F = 1\text{ A}$ $di_F/dt = -100\text{ A}/\mu\text{s}$ $V_R = 30\text{ V}$	-	16	20	
I_{RM}	Reverse recovery current	$T_j = 125\text{ }^{\circ}\text{C}$	$I_F = 4\text{ A}$ $di_F/dt = -200\text{ A}/\mu\text{s}$ $V_R = 160\text{ V}$	-	4.4	5.5	A
t_{fr}	Forward recovery time	$T_j = 25\text{ }^{\circ}\text{C}$	$I_F = 4\text{ A}$ $di_F/dt = 50\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$	-	80		ns
V_{FP}	Forward recovery voltage		$I_F = 4\text{ A}$ $di_F/dt = 50\text{ A}/\mu\text{s}$	-	1.6		V

Figure 1. Peak current versus duty cycle

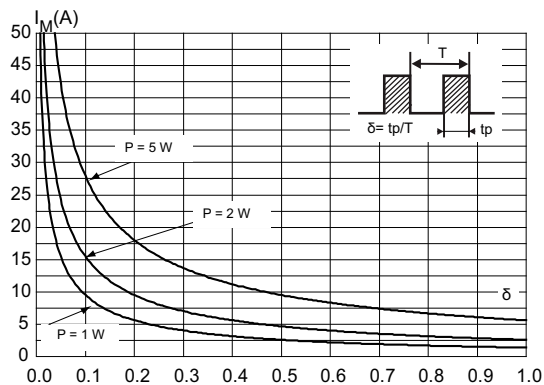


Figure 2. Forward voltage drop versus forward current (typical values)

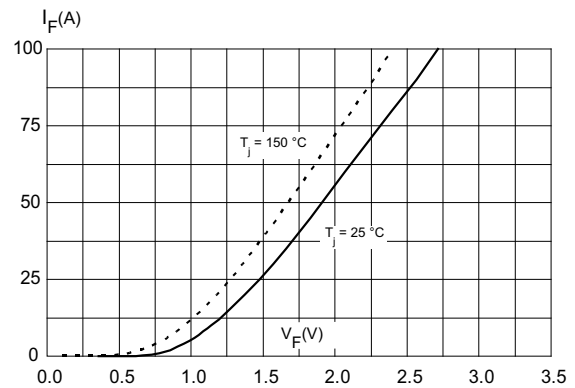


Figure 3. Forward voltage drop versus forward current (maximum values)

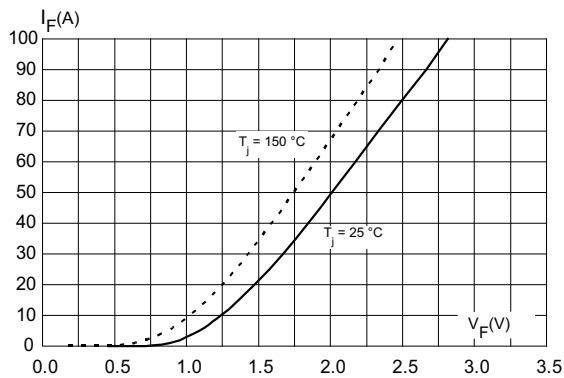


Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration

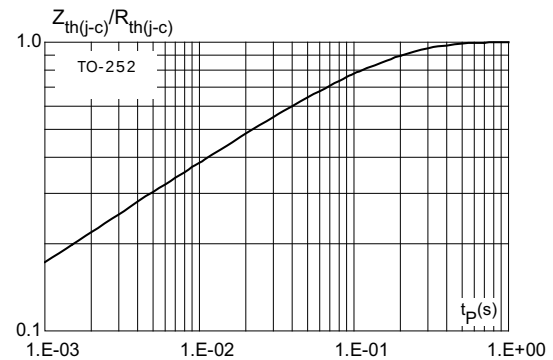


Figure 5. Relative variation of thermal impedance, junction to ambient, versus pulse duration (SMB)

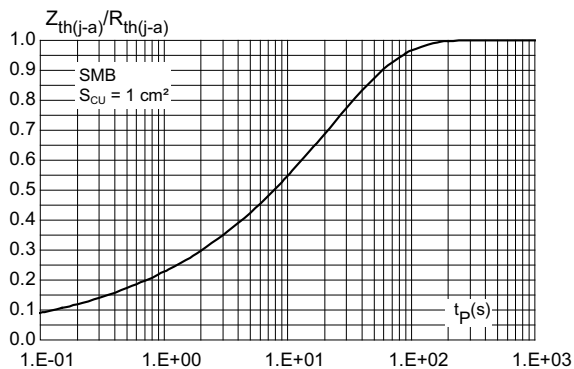


Figure 6. Relative variation of thermal impedance, junction to ambient, versus pulse duration (SMC)

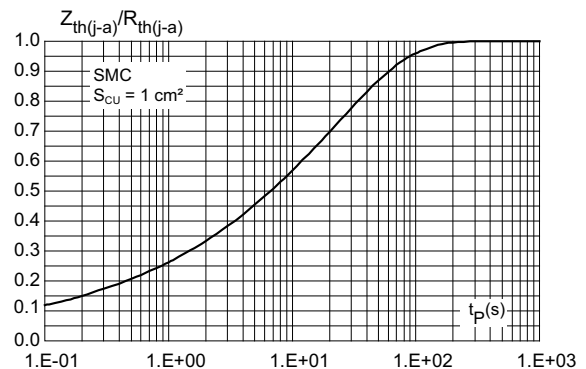


Figure 7. Junction capacitance versus reverse applied voltage (typical values)

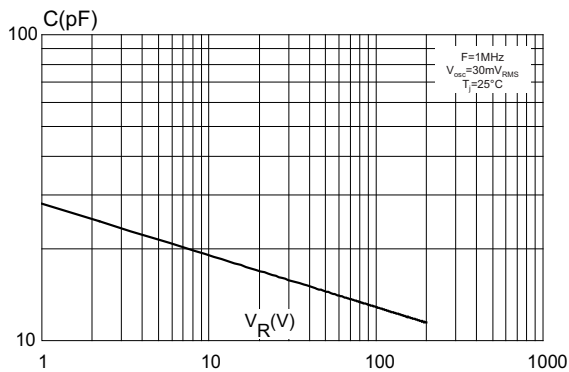


Figure 8. Reverse recovery charges versus dl_F/dt (typical values)

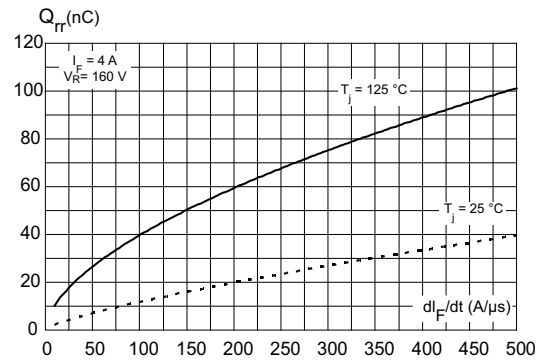


Figure 9. Reverse recovery time versus dl_F/dt (typical values)

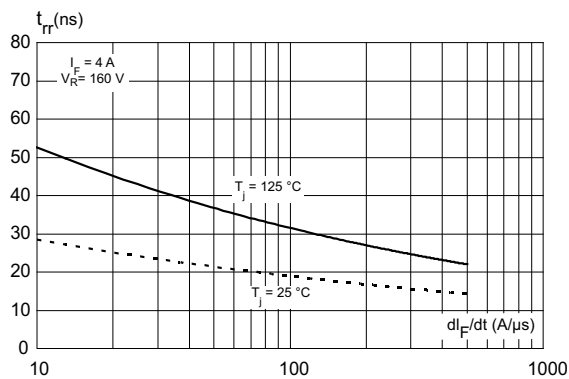


Figure 10. Peak reverse recovery current versus dl_F/dt (typical values)

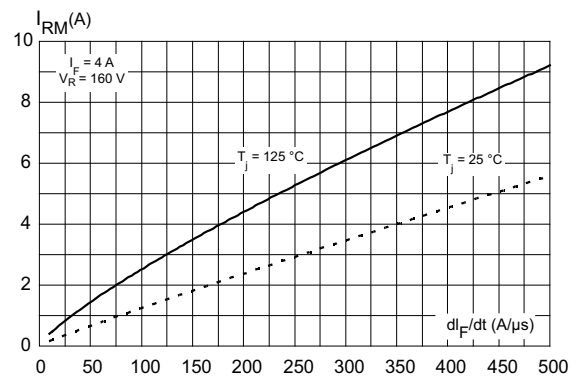


Figure 11. Dynamic parameters versus junction temperature (reference: $T_J = 125^\circ\text{C}$)

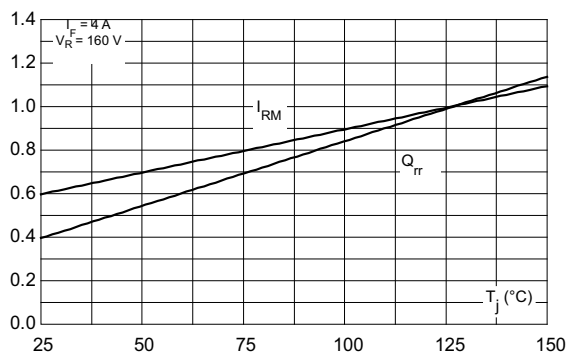


Figure 12. Thermal resistance, junction to ambient, versus copper lead surface area under each lead

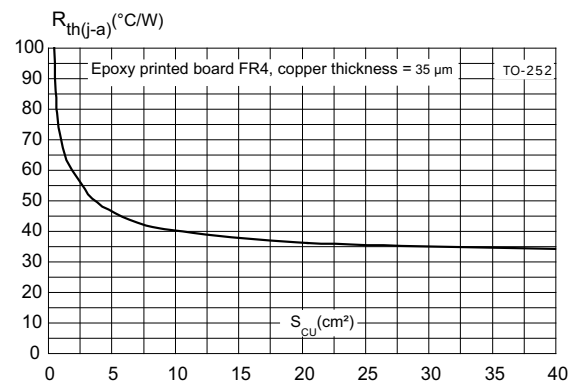


Figure 13. Thermal resistance, junction to ambient, versus copper surface under each lead

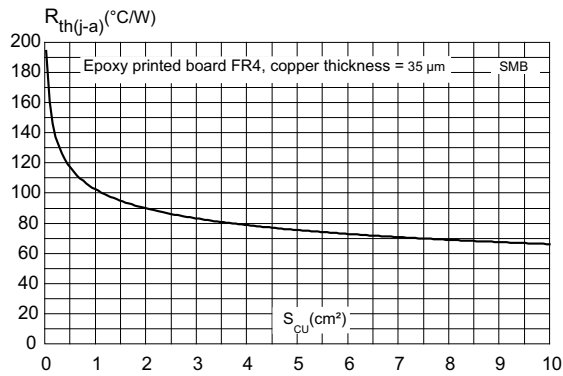
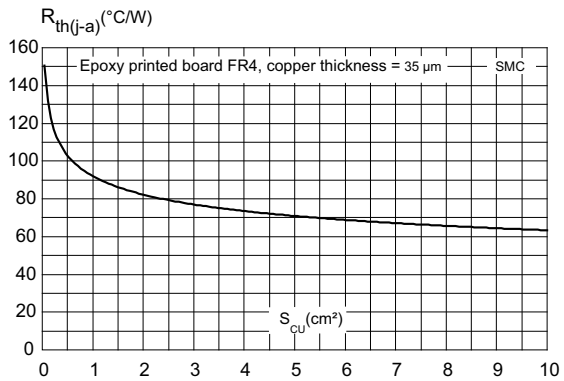
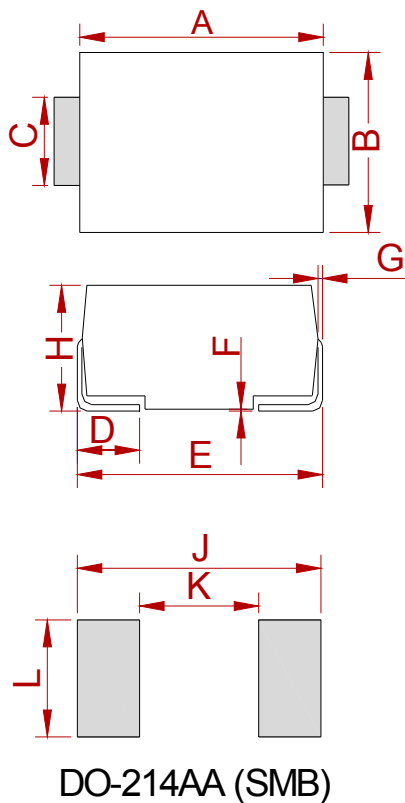


Figure 14. Thermal resistance, junction to ambient, versus copper surface under tab



PACKAGE MECHANICAL DATA

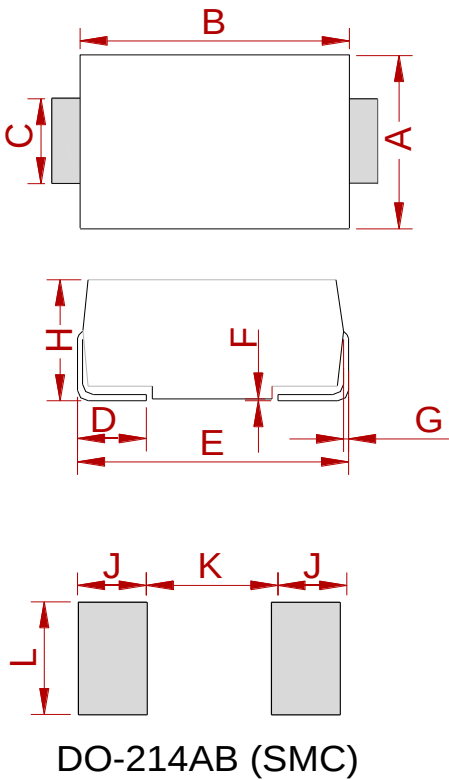


Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.25	4.75	0.167	0.187
B	3.30	3.94	0.130	0.155
C	1.85	2.21	0.073	0.087
D	0.76	1.52	0.030	0.060
E	5.08	5.59	0.200	0.220
F	0.051	0.203	0.002	0.008
G	0.15	0.31	0.006	0.012
H	2.11	2.44	0.083	0.096
J	6.80		0.270	
K		2.60		0.100
L	2.40		0.090	

REELSPECIFICATION

P/N	PKG	QTY
STTH4R02U-MS	DO-214AA (SMB)	2500

PACKAGE MECHANICAL DATA

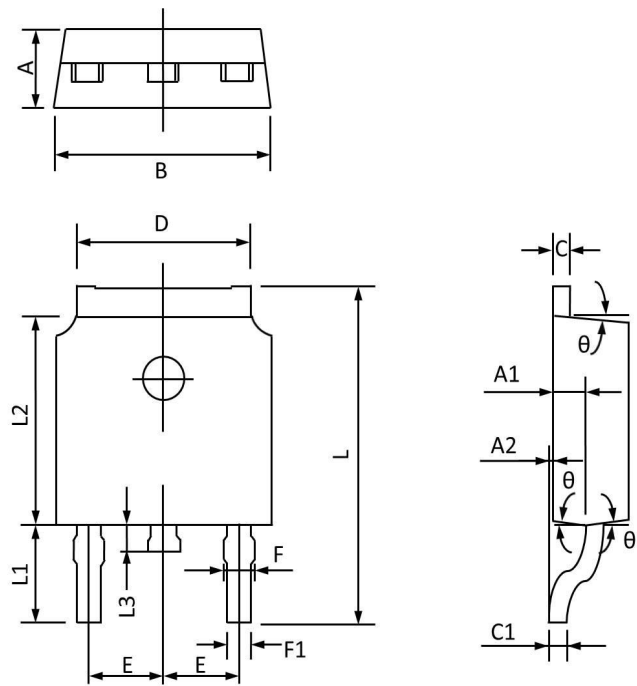


Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	5.75	6.25	0.226	0.246
B	6.90	7.40	0.272	0.291
C	2.75	3.25	0.108	0.128
D	0.95	1.52	0.037	0.060
E	7.70	8.20	0.303	0.323
F	0.051	0.203	0.002	0.008
G	0.15	0.31	0.006	0.012
H	2.15	2.62	0.085	0.103
J	2.40		0.094	
K		4.20		0.165
L	3.30		0.130	

REEL SPECIFICATION

P/N	PKG	QTY
STTH4R02S-MS	DO-214AB (SMC)	2500

TO252 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	2.450	2.150	0.096	0.085
A1	1.200	0.910	0.047	0.036
A2	0.150	0.000	0.006	0.000
B	6.800	6.300	0.268	0.248
C	0.580	0.350	0.023	0.014
C1	0.550	0.380	0.022	0.015
D	5.500	5.100	0.217	0.201
E	2.390	2.000	0.094	0.079
F	0.940	0.600	0.037	0.024
F1	0.860	0.500	0.034	0.020
L	10.400	9.400	0.409	0.370
L1	3.000	2.400	0.118	0.094
L2	6.200	5.300	0.244	0.209
L3	1.200	0.600	0.047	0.024
θ	9°	3°	9°	3°

REELSPECIFICATION

P/N	PKG	QTY
STTH4R02B-MS	TO-252	2500

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