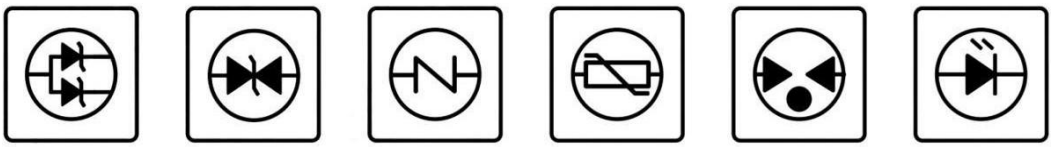
MSKSEMI 美森科
SEMICONDUCTOR



STTH3R04x-MS

Product specification

STTH3R04x-MS

Ultrafast recovery diode

Description

The STTH3R04x-MS series uses s new 400 V planar Pt doping technology. The STTH3R04x-MS is specially suited for switching mode base drive and transistor circuits.

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

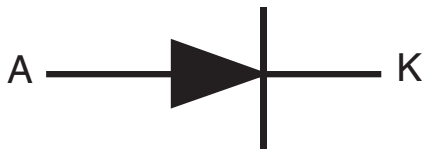
Features

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

Reference News

STTH3R04U-MS	MARKING
 DO-214AA(SMB)	MSKSEMI 3R4U

STTH3R04S-MS	MARKING
 DO-214AB(SMC)	MSKSEMI R4S



Device summary

$I_{F(AV)}$	3 A
V_{RRM}	400 V
$T_{j\ (max)}$	175 °C
$V_{F\ (typ)}$	0.9 V
$t_{rr\ (typ)}$	18 ns

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

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			400	V
$I_{F(AV)}$	Average forward current, δ = 0.5	SMB	T_{lead} = 70 °C	3.0	A
		SMC	T_{lead} = 100 °C		
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms Sinusoidal		60	A
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Maximum operating junction temperature(1)			175	°C

1. On infinite heatsink with 10 mm lead length

Thermal resistance

Symbol	Parameter		Value	Unit
$R_{th(j-l)}$	Junction to lead	SMB	25	°C/W
		SMC	17	

Static electrical characteristics

Symbol	Parameter	Test conditions		Min	Typ	Max	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$			5	µA
		T_j = 125 °C			5	50	
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 3.0 A			1.5	V
		T_j = 100 °C			1.0	1.25	
		T_j = 150 °C			0.9	1.15	

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:
$P = 0.9 \times I_{F(AV)} + 0.083 \times I_F{}^2{}_{(RMS)}$

Dynamic characteristics (Tj = 25 °C unless otherwise stated)

Symbol	Parameter	Test conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	I_F = 1 A, dI_F/dt = -50 A/µs, V_R = 30 V, T_j = 25 °C			35	ns
		I_F = 1 A, dI_F/dt = -100 A/µs, V_R = 30 V, T_j = 25 °C		18	25	
I_{RM}	Reverse recovery current	I_F = 3.0 A, dI_F/dt = -200 A/µs, V_R = 320 V, T_j = 125 °C		4	5.5	A
t_{fr}	Forward recovery time	I_F = 3.0 A dI_F/dt = 100 A/µs V_{FR} = 1.1 x V_{Fmax}, T_j = 25 °C			75	ns
V_{FP}	Forward recovery voltage	I_F = 3.0 A dI_F/dt = 100 A/µs		2.5		V

Figure 1. Conduction losses versus average forward current

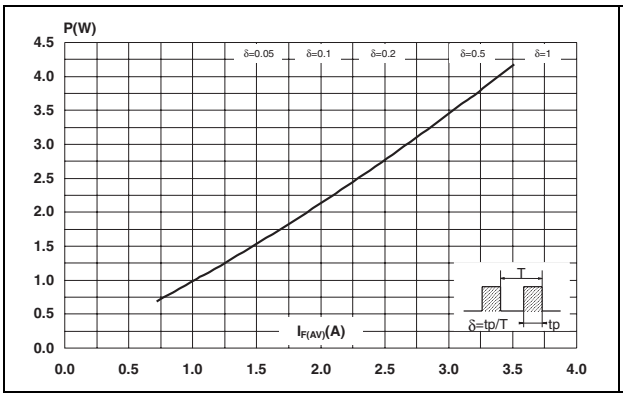


Figure 2. Forward voltage drop versus forward current

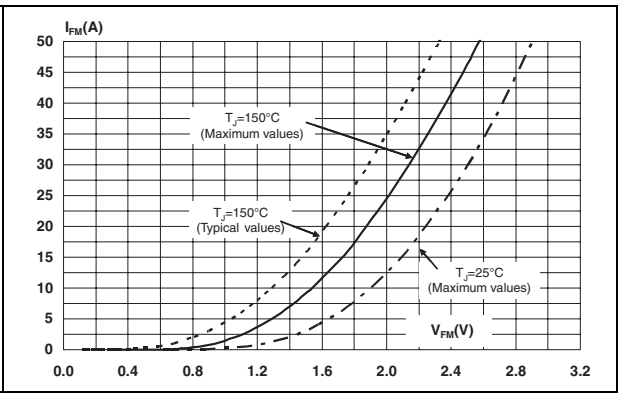


Figure 3. Relative variation of thermal impedance junction to ambient versus pulse duration, SMB (epoxy FR4, copper thickness = 35 µm)

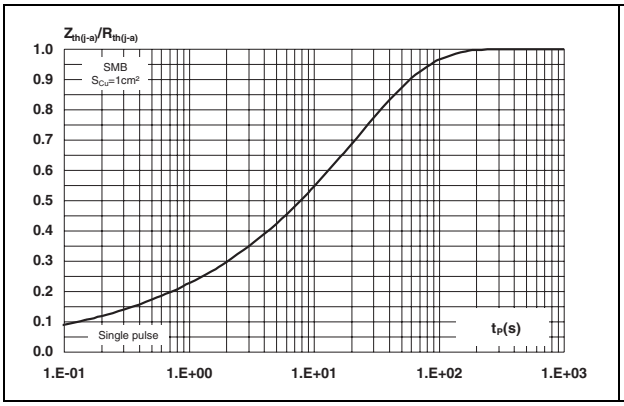


Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration, SMC

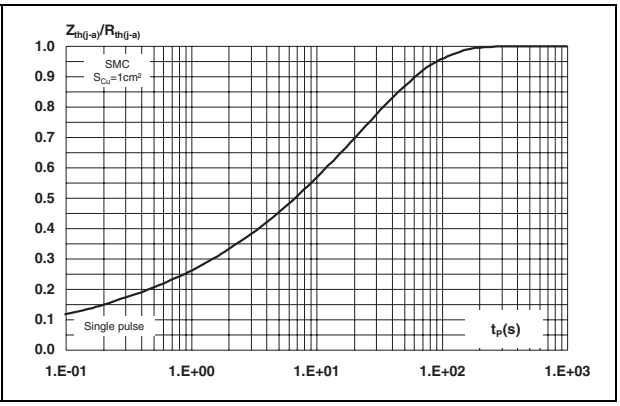


Figure 5. Junction capacitance versus reverse voltage applied (typical values)

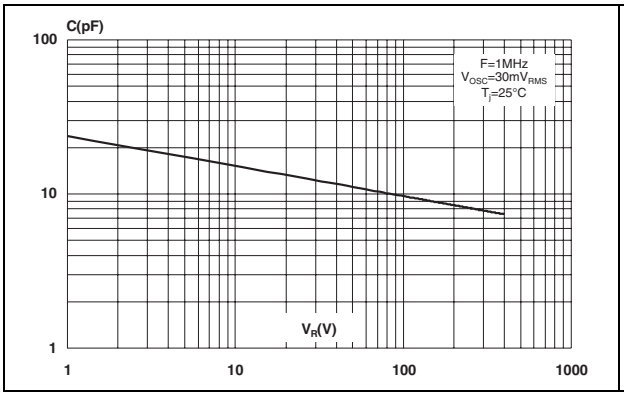


Figure 6. Reverse recovery charges versus dI_F/dt (typical values)

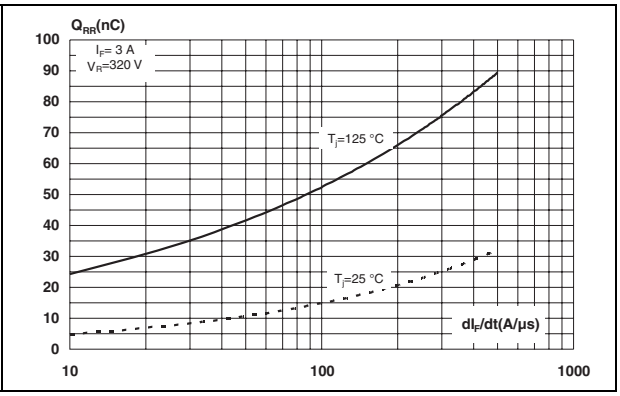


Figure 7. Reverse recovery time versus dI_F/dt (typical values)

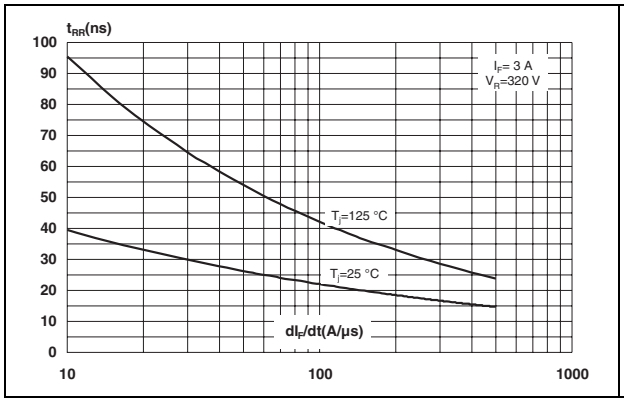


Figure 8. Peak reverse recovery current versus dI_F/dt (typical values)

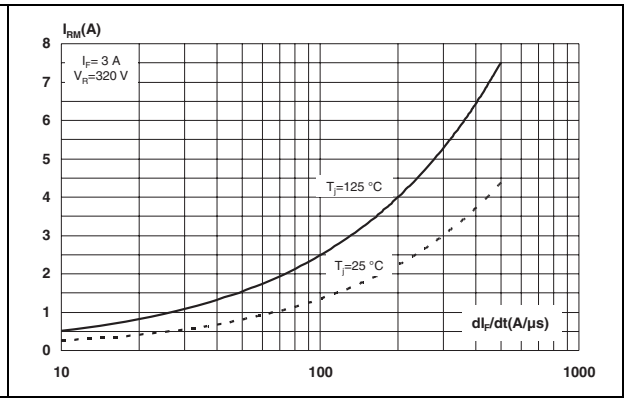


Figure 9. Relative variations of dynamic parameters versus junction temperature

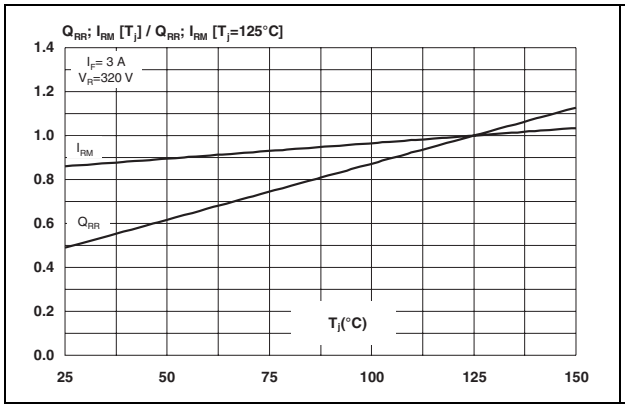


Figure 10. Transient peak forward voltage versus dI_F/dt (typical values)

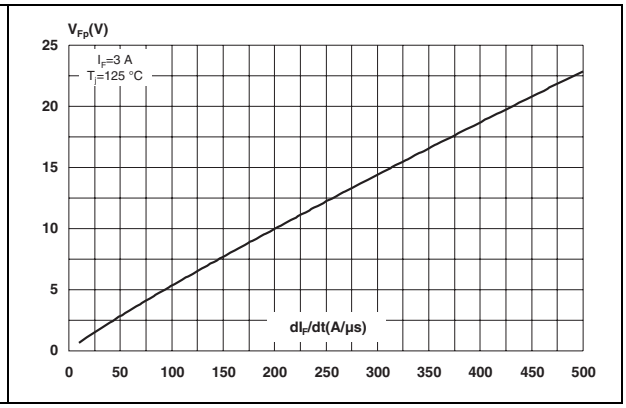


Figure 11. Forward recovery time versus dI_F/dt (typical values)

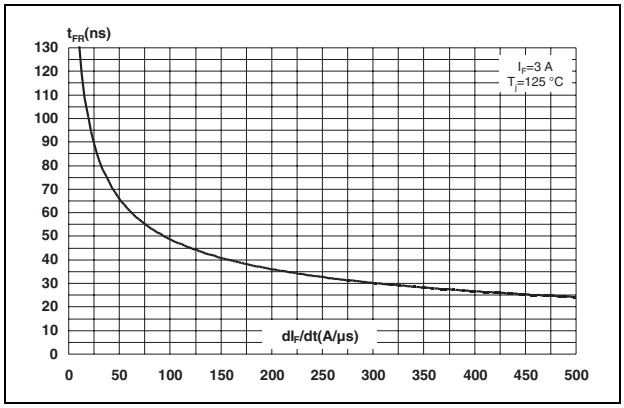
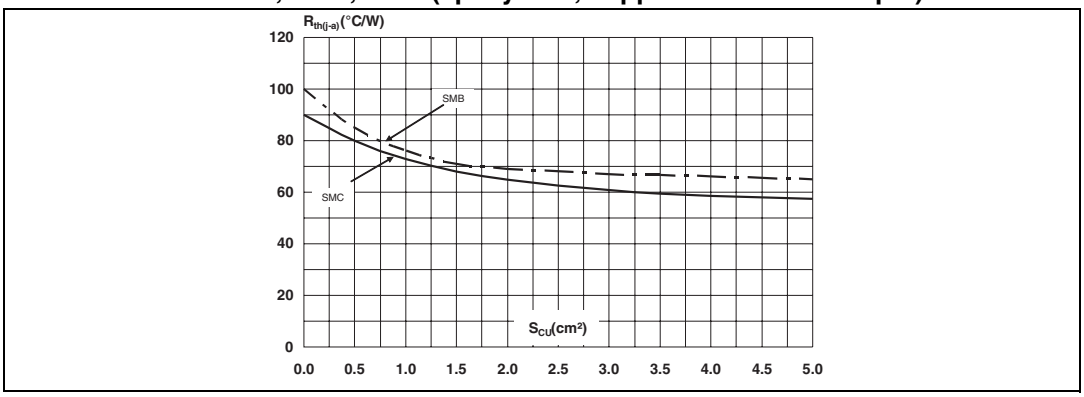
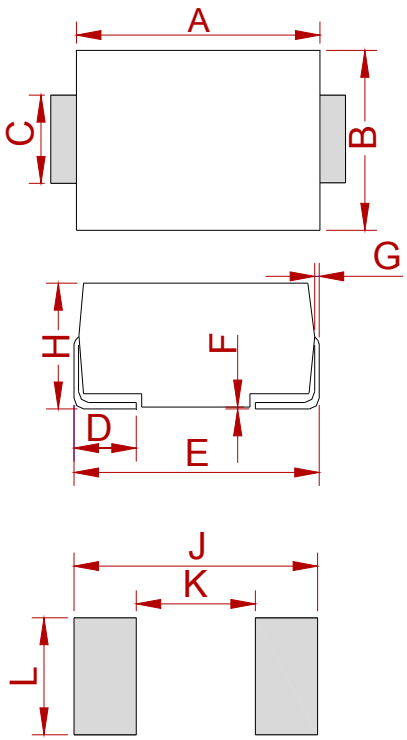


Figure 17. Thermal resistance junction to ambient versus copper surface under each lead, SMB, SMC (epoxy FR4, copper thickness = 35 µm)



PACKAGE MECHANICAL DATA



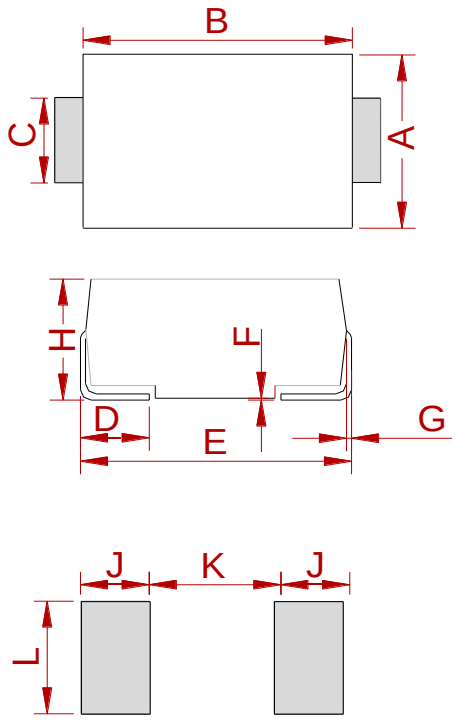
DO-214AA (SMB)

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
STTH3R04U-MS	DO-214AA (SMB)	2500

PACKAGE MECHANICAL DATA



DO-214AB (SMC)

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
STTH3R04S-MS	DO-214AB (SMC)	2500

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