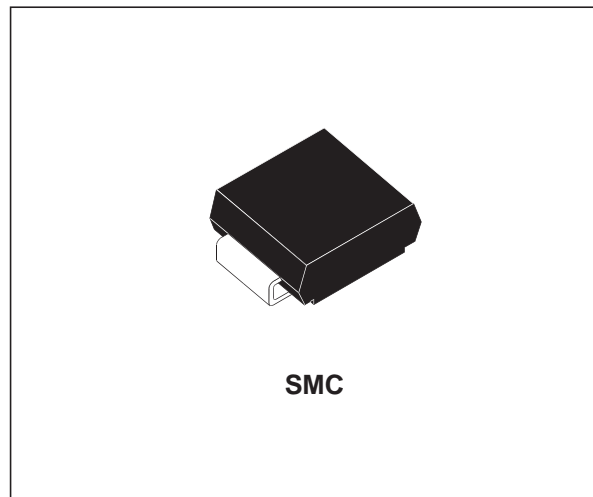


**HIGH EFFICIENCY ULTRAFAST DIODE**
**MAIN PRODUCT CHARACTERISTICS**

<b>I<sub>F(AV)</sub></b>	<b>3A</b>
<b>V<sub>RRM</sub></b>	<b>200 V</b>
<b>T<sub>j</sub> (max)</b>	<b>175 °C</b>
<b>V<sub>F</sub> (max)</b>	<b>0.75 V</b>
<b>t<sub>rr</sub> (max)</b>	<b>35 ns</b>

**FEATURES AND BENEFITS**

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


**DESCRIPTION**

The STTH302S, which is using ST's new 200V planar technology, is specially suited for switching mode base drive & transistor circuits.

The device is also intended for use as a free wheeling diode in power supplies and other power switching applications.

**ABSOLUTE RATINGS** (limiting values)

<b>Symbol</b>	<b>Parameter</b>		<b>Value</b>	<b>Unit</b>
V <sub>RRM</sub>	Repetitive peak reverse voltage		200	V
I <sub>F(AV)</sub>	Average forward current	T <sub>I</sub> = 107°C δ = 0.5	3	A
I <sub>FSM</sub>	Surge non repetitive forward current	t <sub>p</sub> = 10 ms Sinusoidal	100	A
T <sub>stg</sub>	Storage temperature range		- 65 + 175	°C
T <sub>j</sub>	Maximum operating junction temperature		175	°C

**THERMAL PARAMETERS**

<b>Symbol</b>	<b>Parameter</b>	<b>Maximum</b>	<b>Unit</b>
R <sub>th(j-l)</sub>	Junction to lead	20	°C/W

## STTH302S

### STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
$I_R^*$	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			3	$\mu\text{A}$
		$T_j = 125^\circ\text{C}$			4	75	
$V_F^{**}$	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 3\text{ A}$			0.95	V
		$T_j = 125^\circ\text{C}$	$I_F = 3\text{ A}$		0.66	0.75	

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

\*\*  $t_p = 380\mu\text{s}$ ,  $\delta < 2\%$

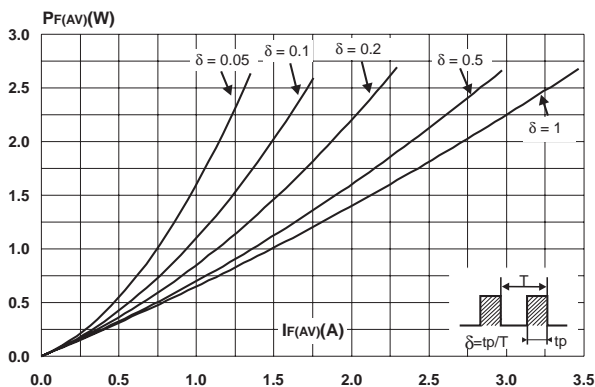
To evaluate the maximum conduction losses use the following equation :

$$P = 0.60 \times I_{F(AV)} + 0.05 I_{F(RMS)}^2$$

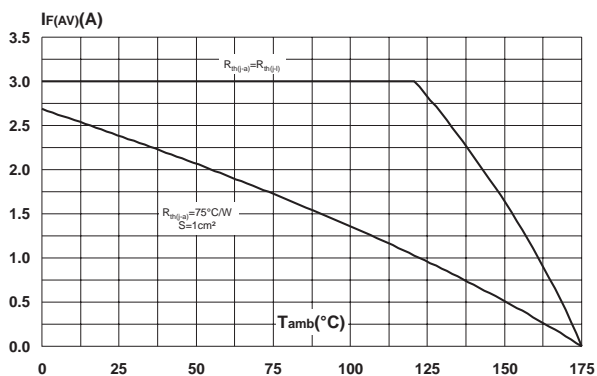
### DYNAMIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
$t_{rr}$	Reverse recovery time	$T_j = 25^\circ\text{C}$	$I_F = 1\text{ A}$ $I_{rr} = -50\text{ A}/\mu\text{s}$ $V_R = 30\text{V}$			35	ns
$t_{fr}$	Forward recovery time	$T_j = 25^\circ\text{C}$	$I_F = 3\text{ A}$ $dI_F/dt = 50\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$		70		ns
$V_{FP}$	Forward recovery voltage	$T_j = 25^\circ\text{C}$	$I_F = 3\text{ A}$ $dI_F/dt = 50\text{ A}/\mu\text{s}$		1.6		V

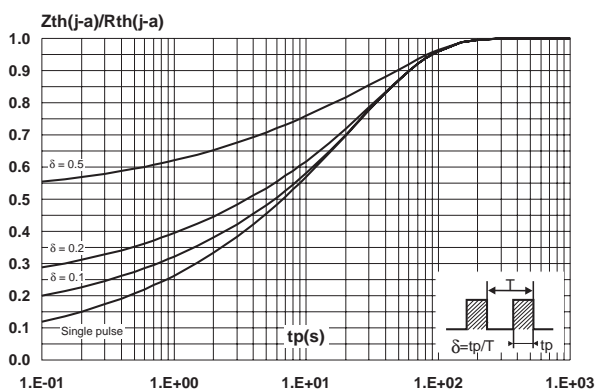
**Fig. 1:** Average forward power dissipation versus average forward current.



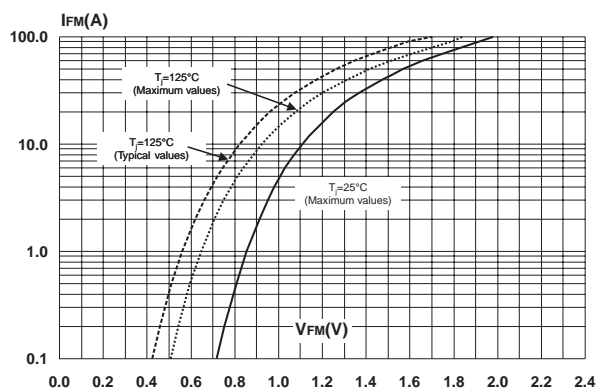
**Fig. 2:** Average forward current versus ambient temperature ( $\delta = 0.5$ ).



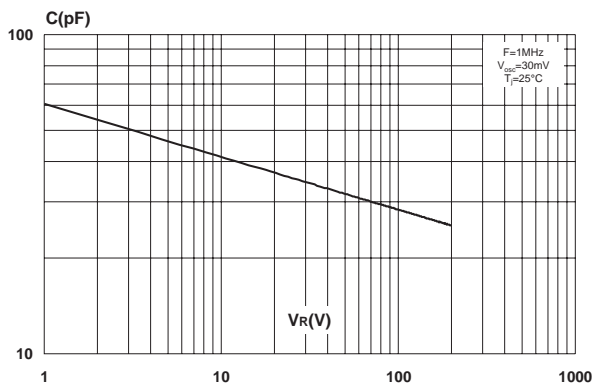
**Fig. 3:** Relative variation of thermal impedance junction ambient versus pulse duration (Printed circuit board epoxy FR4).



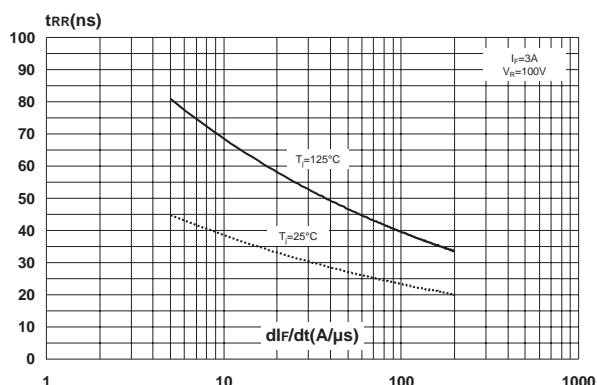
**Fig. 4:** Forward voltage drop versus forward current.



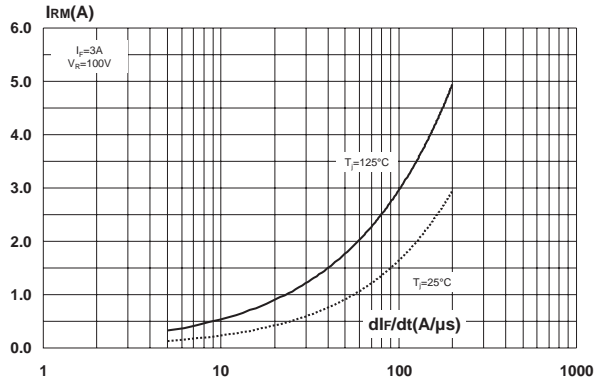
**Fig. 5:** Junction capacitance versus reverse voltage applied (typical values).



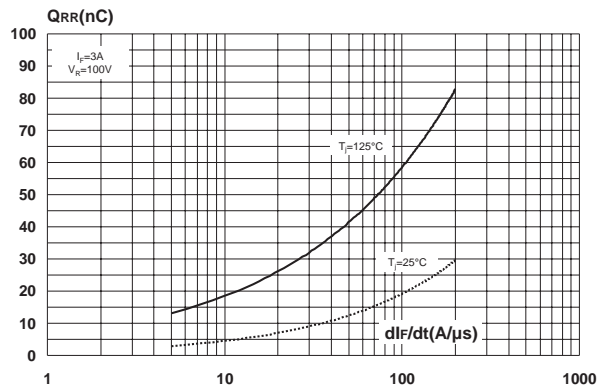
**Fig. 6:** Reverse recovery time versus  $di_F/dt$  (90% confidence).



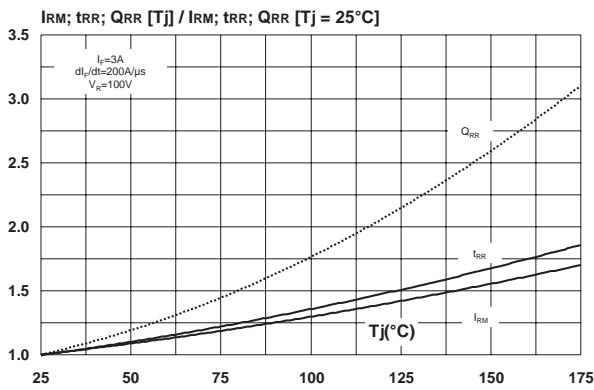
**Fig. 7:** Peak reverse recovery current versus  $di_F/dt$  (90% confidence).



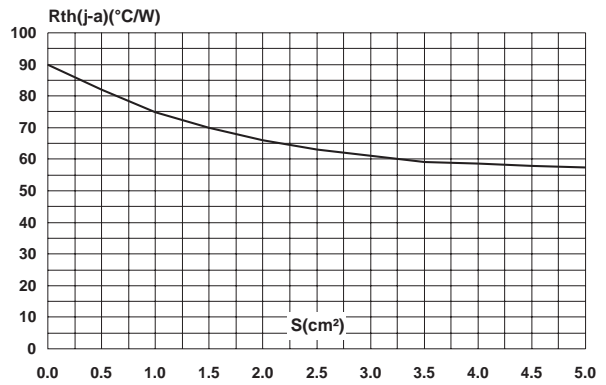
**Fig. 8:** Reverse recovery charges versus  $di_F/dt$  (90% confidence).



**Fig. 9:** Relative variations of dynamic parameters versus junction temperature.



**Fig. 10:** Thermal resistance junction to ambient versus copper surface under each lead (epoxy FR4,  $e = 35\mu\text{m}$ ).

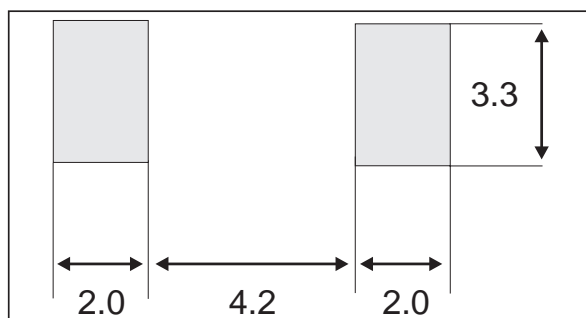


## PACKAGE MECHANICAL DATA

### SMC

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.096
A2	0.05	0.20	0.002	0.008
b	2.90	3.2	0.114	0.126
c	0.15	0.41	0.006	0.016
E	7.75	8.15	0.305	0.321
E1	6.60	7.15	0.260	0.281
E2	4.40	4.70	0.173	0.185
D	5.55	6.25	0.218	0.246
L	0.75	1.60	0.030	0.063

## FOOTPRINT



Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH302S	U32	SMC	0.245 g	2500	Tape & reel

- Epoxy meets UL 94,V0

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