



STTH302S

HIGH EFFICIENCY ULTRAFAST DIODE

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	3A
V_{RRM}	200 V
$T_j(\text{max})$	175 °C
$V_F(\text{max})$	0.75 V
$t_{rr}(\text{max})$	35 ns

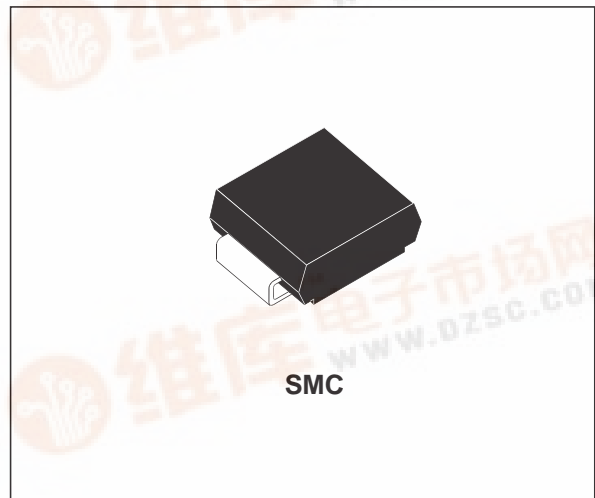
FEATURES AND BENEFITS

- 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)

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	200	V
$I_{F(AV)}$	Average forward current	$T_I = 107^\circ\text{C} \quad \delta = 0.5$	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10 \text{ ms Sinusoidal}$	A
T_{stg}	Storage temperature range	- 65 + 175	°C
T_j	Maximum operating junction temperature	175	°C

THERMAL PARAMETERS

Symbol	Parameter	Maximum	Unit
$R_{th(j-l)}$	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	μA
		$T_j = 125^\circ\text{C}$			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.

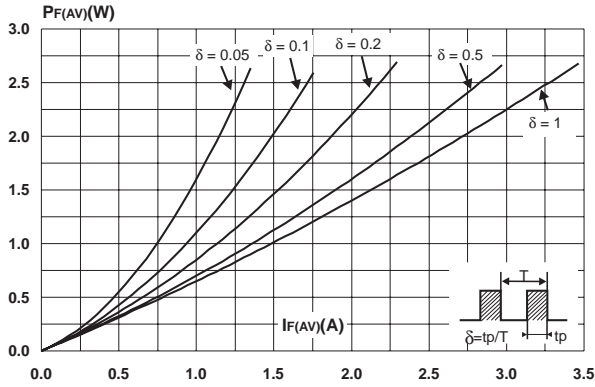


Fig. 2: Average forward current versus ambient temperature ($\delta = 0.5$).

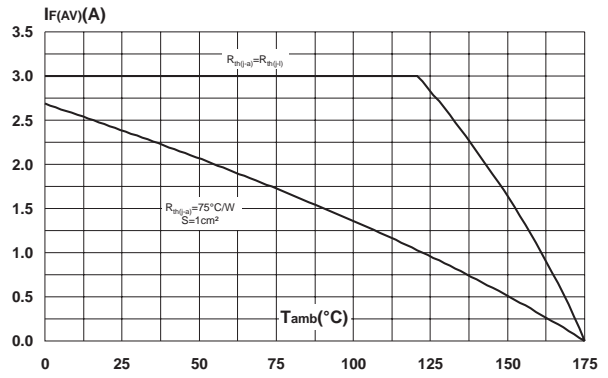


Fig. 3: Relative variation of thermal impedance junction ambient versus pulse duration (Printed circuit board epoxy FR4).

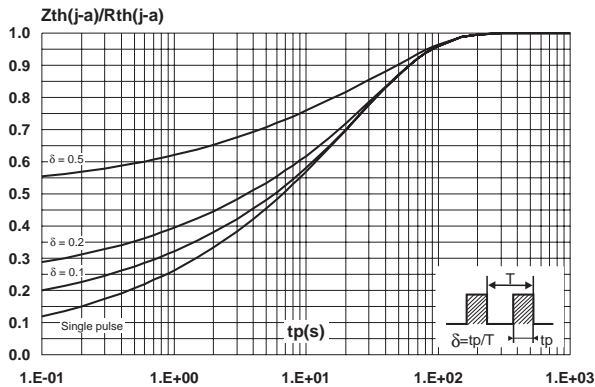


Fig. 4: Forward voltage drop versus forward current.

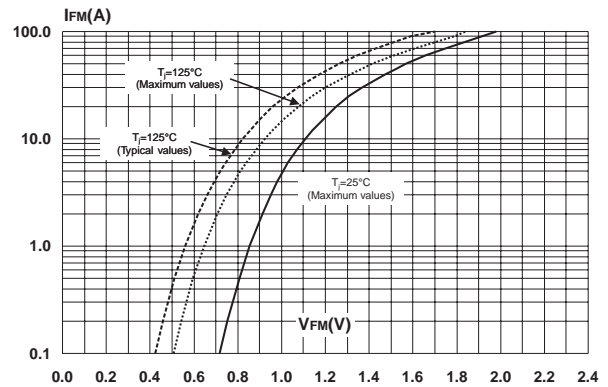


Fig. 5: Junction capacitance versus reverse voltage applied (typical values).

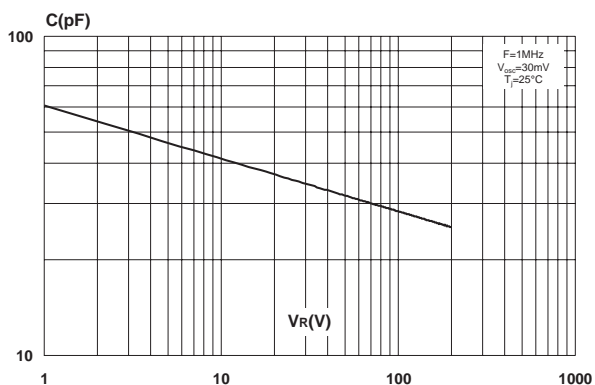


Fig. 6: Reverse recovery time versus di/dt (90% confidence).

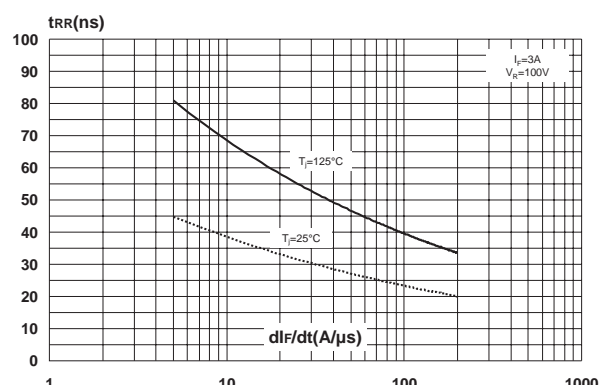


Fig. 7: Peak reverse recovery current versus di_F/dt (90% confidence).

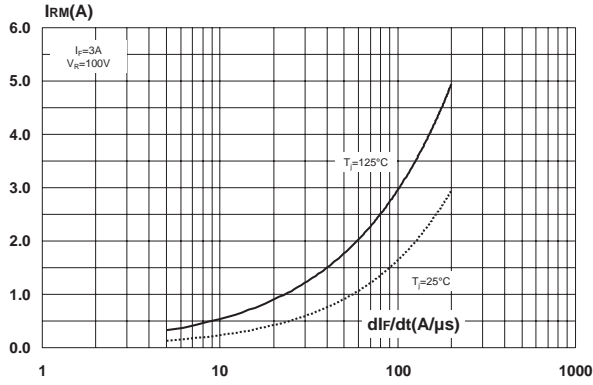


Fig. 8: Reverse recovery charges versus di_F/dt (90% confidence).

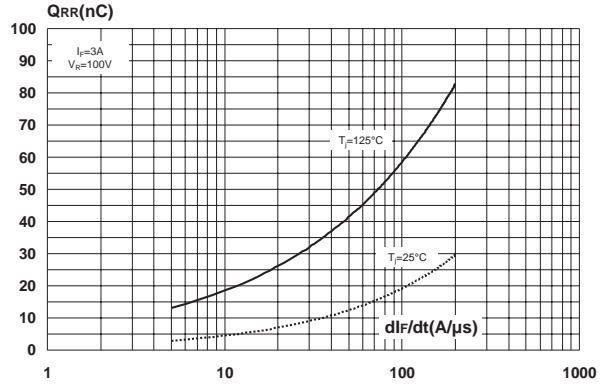


Fig. 9: Relative variations of dynamic parameters versus junction temperature.

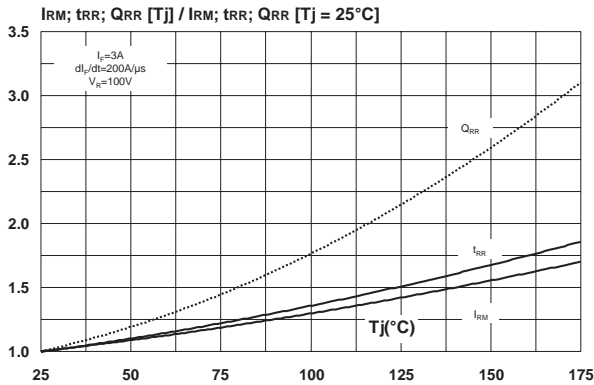
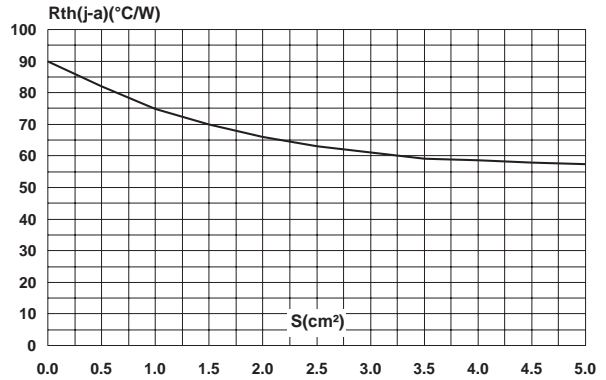
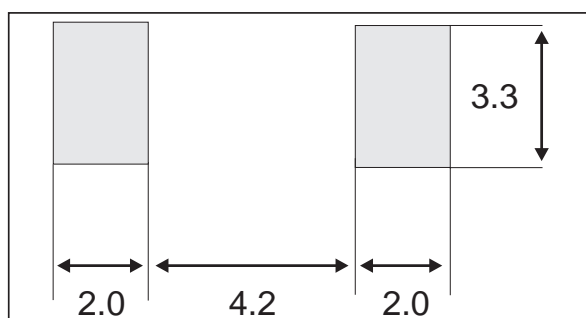


Fig. 10: Thermal resistance junction to ambient versus copper surface under each lead (epoxy FR4, $e = 35\mu\text{m}$).



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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