

## HIGH EFFICIENCY ULTRAFAST DIODE

### MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	1 A
$V_{RRM}$	200 V
$T_j (max)$	175 °C
$V_F (max)$	0.78 V
$t_{rr} (max)$	20 ns

### FEATURES AND BENEFITS

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

### DESCRIPTION

The STTH102, 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	$T_I = 130^{\circ}C$ $\delta = 0.5$	1	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10$ ms Sinusoidal	50	A
$T_{stg}$	Storage temperature range		- 65 + 175	°C
$T_j$	Maximum operating junction temperature		+ 175	°C

### THERMAL PARAMETERS

Symbol	Parameter	Maximum	Unit
$R_{th(j-a)}$	Junction to ambient*	50	°C/W

\* On infinite heatsink with 10mm length.

## STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
$I_R^*$	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			1	$\mu\text{A}$
		$T_j = 125^\circ\text{C}$			1	25	
$V_F^{**}$	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 1\text{A}$			0.97	V
		$T_j = 125^\circ\text{C}$			0.68	0.78	

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

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

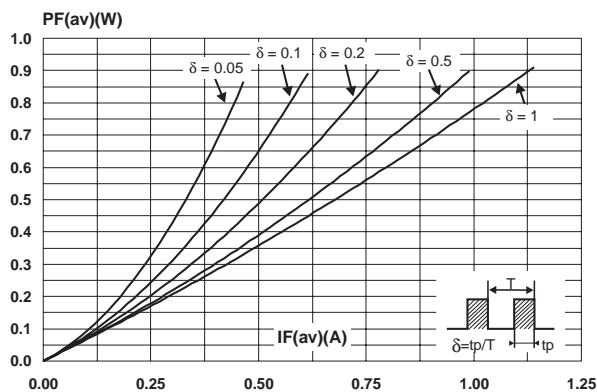
To evaluate the maximum conduction losses use the following equation :

$$P = 0.65 \times I_{F(AV)} + 0.130 \times I_{F(RMS)}^2$$

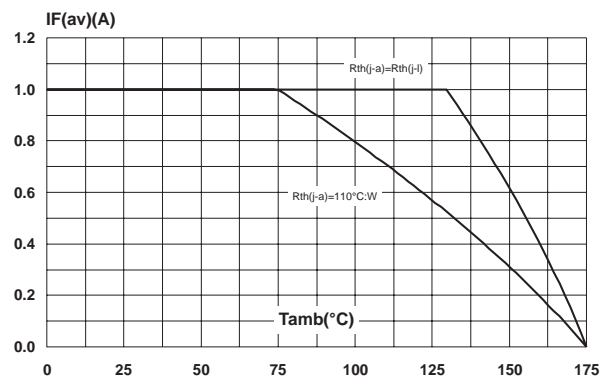
## DYNAMIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
$t_{rr}$	Reverse recovery time	$I_F = 0.5\text{A}$ $I_{rr} = 0.25\text{A}$ $I_R = 1\text{A}$	$T_j = 25^\circ\text{C}$		12	20	ns
$t_{fr}$	Forward recovery time	$I_F = 1\text{A}$ $dI_F/dt = 50\text{A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$	$T_j = 25^\circ\text{C}$		50		ns
$V_{FP}$	Forward recovery voltage		$T_j = 25^\circ\text{C}$		1.8		V

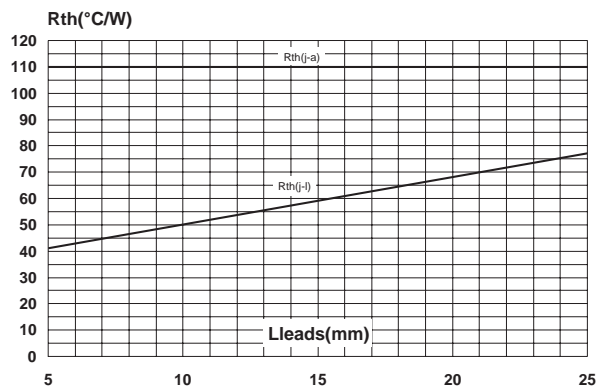
**Fig. 1:** Average forward power dissipation versus average forward current.



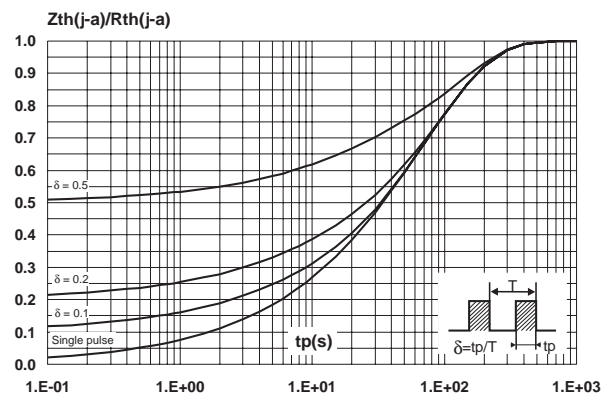
**Fig. 2:** Average forward current versus ambient temperature ( $\delta = 0.5$ ).



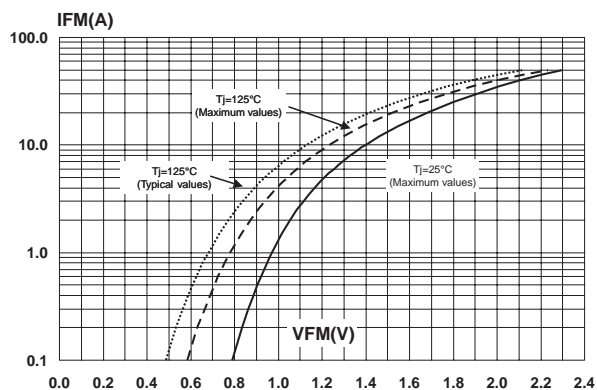
**Fig. 3:** Thermal resistance versus lead length.



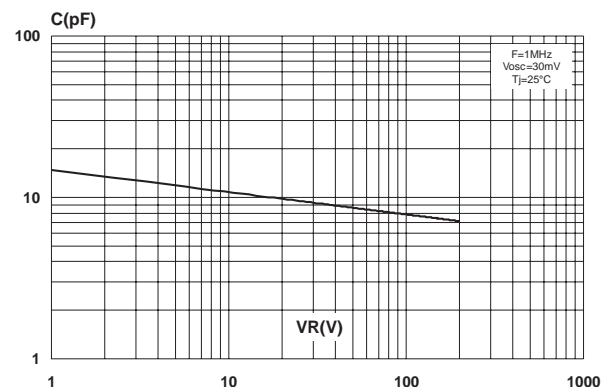
**Fig. 4:** Relative variation of thermal impedance junction ambient versus pulse duration (Printed circuit board epoxy FR4, Leads = 10mm).



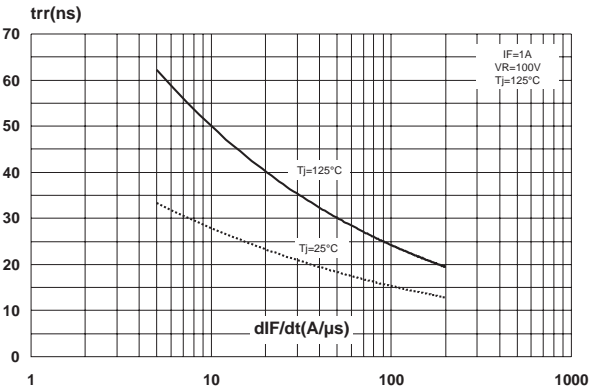
**Fig. 5:** Forward voltage drop versus forward current.



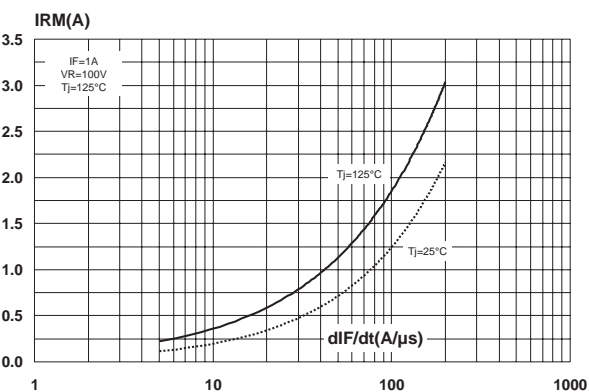
**Fig. 6:** Junction capacitance versus reverse voltage applied (typical values).



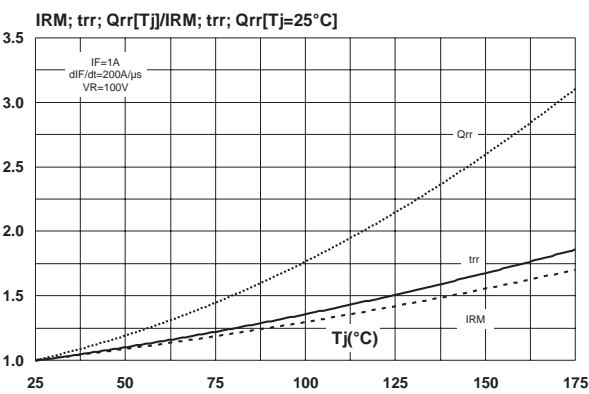
**Fig. 7:** Reverse recovery time versus  $dI_F/dt$  (90% confidence).



**Fig. 8:** Peak reverse recovery current versus  $dI_F/dt$  (90% confidence).



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



## PACKAGE MECHANICAL DATA

DO-41

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.1	5.20	0.160	0.205
B	2	2.71	0.080	0.107
C	25.4		1	
D	0.712	0.863	0.028	0.034

Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH102	STTH102	DO-41	0.34 g	2000	Ammopack
STTH102RL	STTH102	DO-41	0.34 g	5000	Tape & reel

- Cooling method: by conduction (method A)
- Epoxy meets UL 94,V0

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