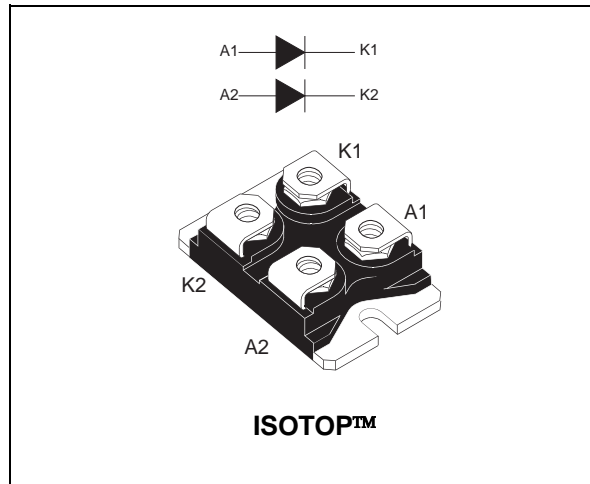


## HIGH FREQUENCY SECONDARY RECTIFIER

### MAJOR PRODUCT CHARACTERISTICS

$I_{F(AV)}$	2 x 60 A
$V_{RRM}$	300 V
$T_j$ (max)	150 °C
$V_F$ (max)	1 V
$t_{rr}$ (max)	70 ns



### FEATURES AND BENEFITS

- COMBINES HIGHEST RECOVERY AND REVERSE VOLTAGE PERFORMANCE
- ULTRA-FAST, SOFT AND NOISE-FREE RECOVERY
- INSULATED PACKAGE: ISOTOP  
Insulated voltage: 2500  $V_{RMS}$   
Capacitance: < 45 pF
- LOW INDUCTANCE AND LOW CAPACITANCE ALLOW SIMPLIFIED LAYOUT

### DESCRIPTION

Dual rectifiers suited for Switch Mode Power Supply and high frequency DC to DC converters.

Packaged in ISOTOP, this device is intended for use in low voltage, high frequency inverters, free wheeling operation, welding equipment and telecom power supplies.

### ABSOLUTE RATINGS (limiting values, per diode)

Symbol	Parameter		Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage		300	V
$I_{F(RMS)}$	RMS forward current		150	A
$I_{F(AV)}$	Average forward current	$T_c = 85^\circ\text{C}$ $\delta = 0.5$	Per diode 120	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10$ ms sinusoidal	600	A
$I_{RSM}$	Non repetitive peak reverse current	$t_p = 100$ $\mu\text{s}$ square	5	A
$T_{stg}$	Storage temperature range		- 55 to + 150	°C
$T_j$	Maximum operating junction temperature		150	°C

ISOTOP is a registered trademark of STMicroelectronics

## STTH12003TV

### THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
R <sub>th(j-c)</sub>	Junction to case	Per diode	0.8	°C/W
		Total	0.45	
R <sub>th(c)</sub>		Coupling	0.1	

When the diodes 1 and 2 are used simultaneously:

$$\Delta T_j (\text{diode 1}) = P (\text{diode 1}) \times R_{th(j-c)} (\text{per diode}) + P (\text{diode 2}) \times R_{th(c)}$$

### STATIC ELECTRICAL CHARACTERISTICS (per diode)

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
I <sub>R</sub> *	Reverse leakage current	V <sub>R</sub> = 300 V	T <sub>j</sub> = 25°C			120	μA
			T <sub>j</sub> = 125°C		0.12	1.2	mA
V <sub>F</sub> **	Forward voltage drop	I <sub>F</sub> = 60 A	T <sub>j</sub> = 25°C			1.25	V
			T <sub>j</sub> = 125°C		0.85	1	

Pulse test : \* t<sub>p</sub> = 5 ms, δ < 2 %

\*\* t<sub>p</sub> = 380 μs, δ < 2%

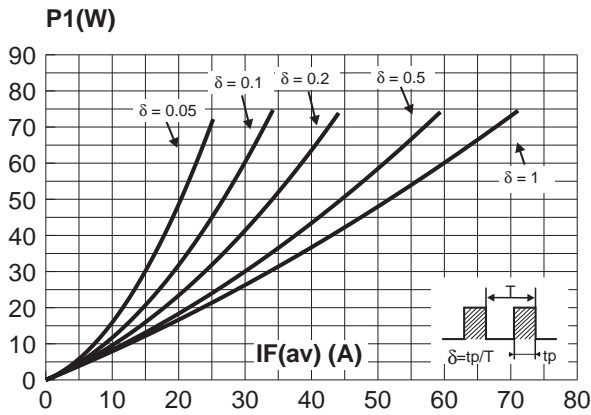
To evaluate the maximum conduction losses use the following equation:

$$P = 0.75 \times I_{F(AV)} + 0.0042 \times I_{F(RMS)}^2$$

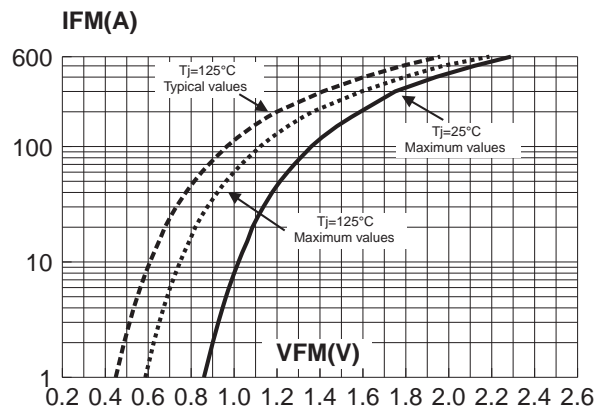
### RECOVERY CHARACTERISTICS

Symbol	Tests conditions		Min.	Typ.	Max.	Unit
t <sub>rr</sub>	I <sub>F</sub> = 0.5 A    I <sub>rr</sub> = 0.25 A    I <sub>R</sub> = 1A	T <sub>j</sub> = 25°C			55	ns
	I <sub>F</sub> = 1 A    dI <sub>F</sub> /dt = - 50 A/μs    V <sub>R</sub> = 30 V	T <sub>j</sub> = 25°C			70	
t <sub>fr</sub>	I <sub>F</sub> = 60 A    dI <sub>F</sub> /dt = 200 A/μs	T <sub>j</sub> = 25°C			600	ns
V <sub>FP</sub>	V <sub>FR</sub> = 1.1 x V <sub>F</sub> max.	T <sub>j</sub> = 25°C			5	V
S <sub>factor</sub>	V <sub>CC</sub> = 200 V    I <sub>F</sub> = 60 A	T <sub>j</sub> = 125°C		0.3		-
I <sub>RM</sub>	dI <sub>F</sub> /dt = 200 A/μs				14	A

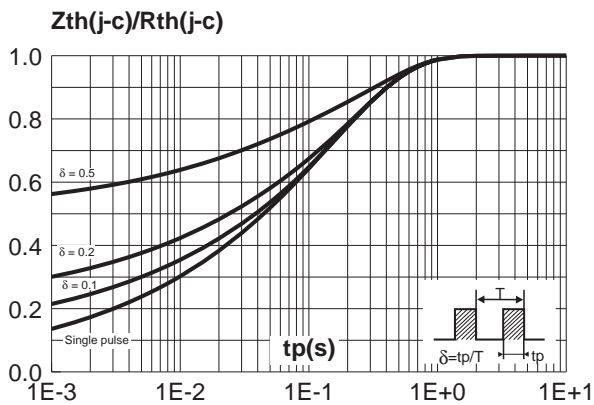
**Fig. 1:** Conduction losses versus average current (per diode).



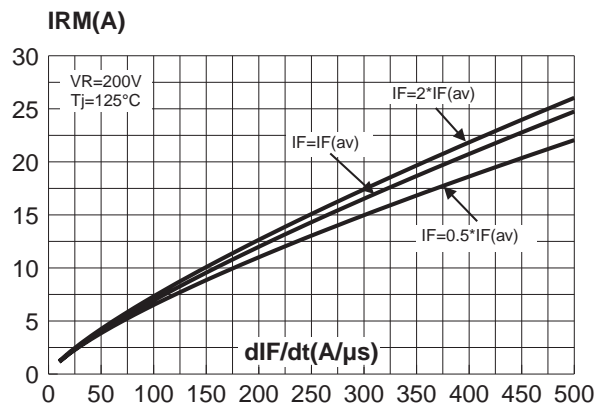
**Fig. 2:** Forward voltage drop versus forward current (per diode).



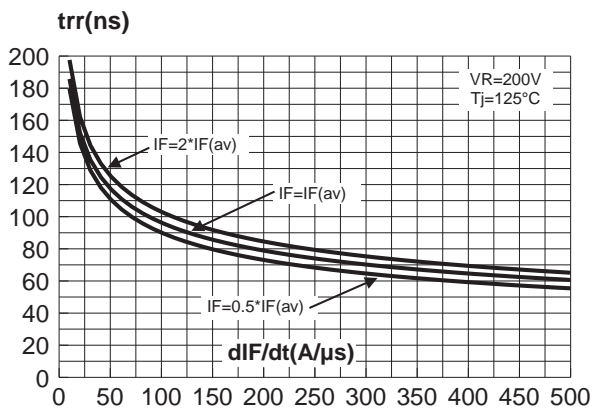
**Fig. 3:** Relative variation of thermal impedance junction to case versus pulse duration.



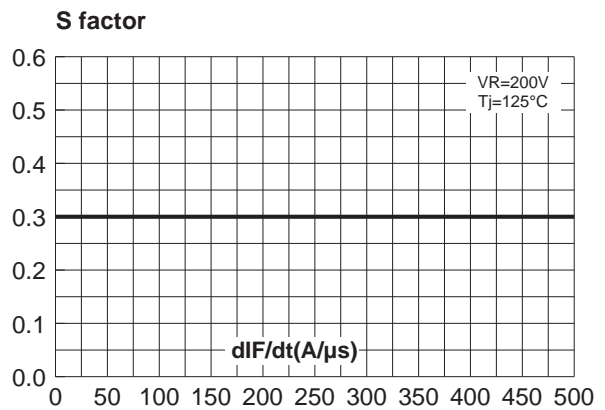
**Fig. 4:** Peak reverse recovery current versus  $dI_F/dt$  (90% confidence, per diode).



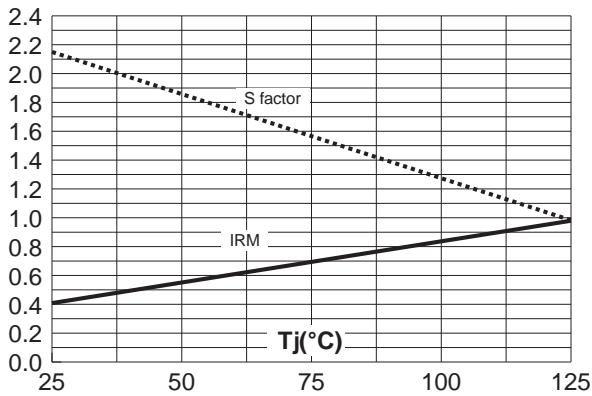
**Fig. 5:** Reverse recovery time versus  $dI_F/dt$  (90% confidence, per diode).



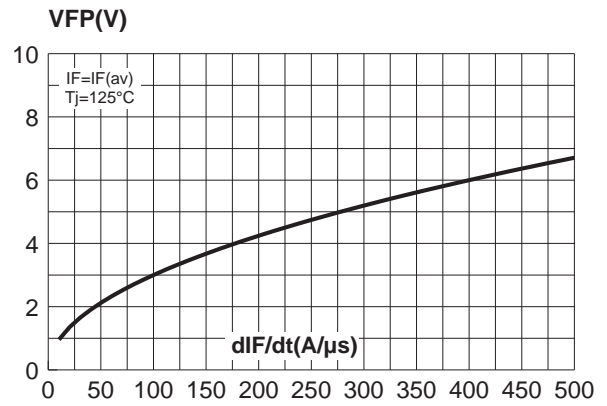
**Fig. 6:** Softness factor (tb/ta) versus  $dI_F/dt$  (typical values, per diode).



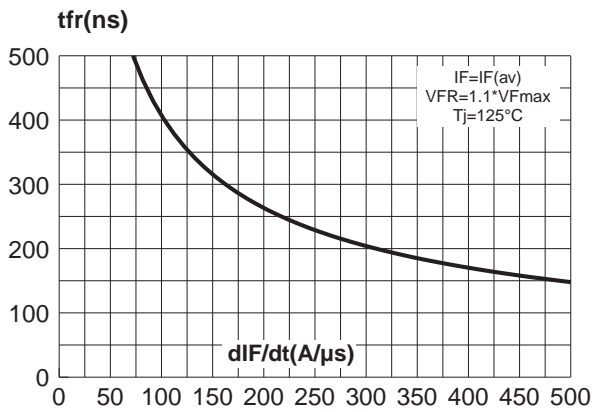
**Fig. 7:** Relative variation of dynamic parameters versus junction temperature (reference:  $T_j = 125^\circ\text{C}$ ).

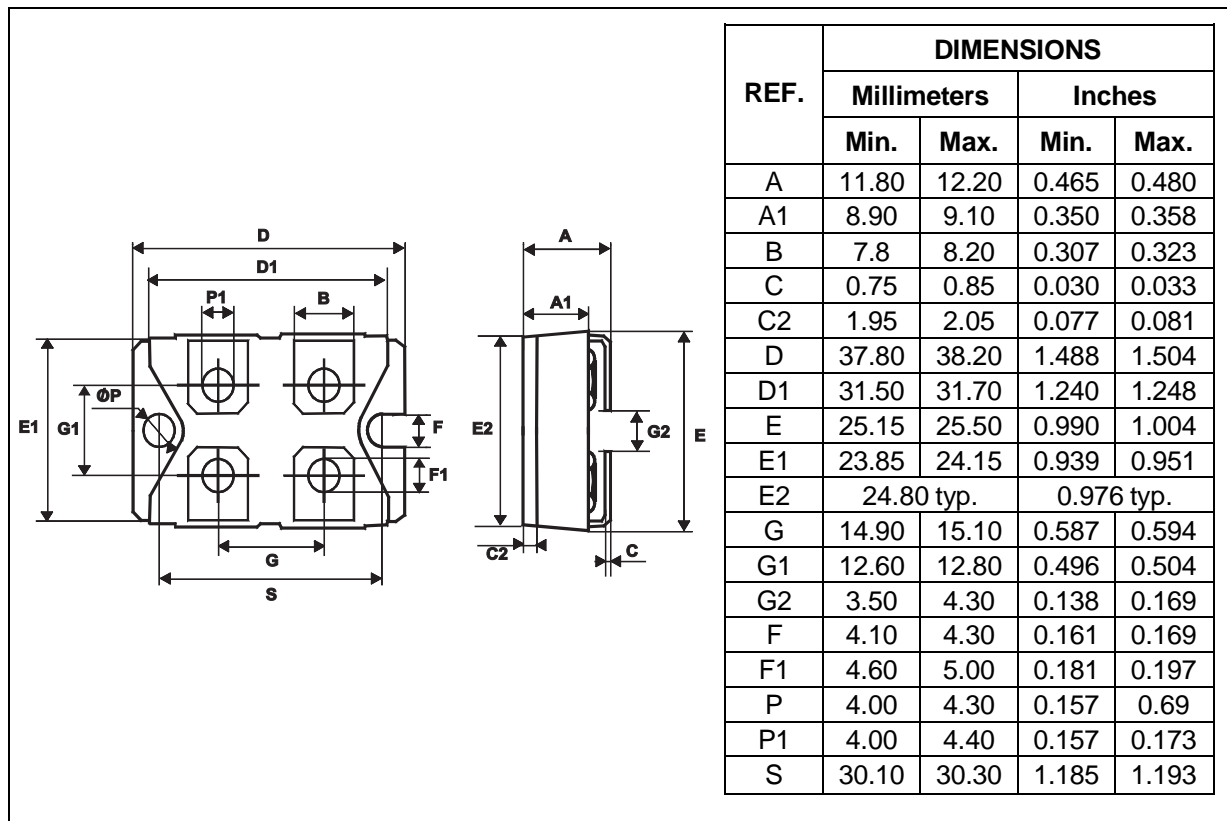


**Fig. 8:** Transient peak forward voltage versus  $dI_F/dt$  (90% confidence, per diode).



**Fig. 9:** Forward recovery time versus  $dI_F/dt$  (90% confidence, per diode).



**PACKAGE MECHANICAL DATA**  
 ISOTOP


■

Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH12003TV1	STTH12003TV	ISOTOP	27g without screws	10 with screws	Tube

- Cooling method: by conduction (C)
- Recommended torque value: 1.3 N.m.
- Maximum torque value: 1.5 N.m.
- Epoxy meets UL 94,V0

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics

© 1999 STMicroelectronics - Printed in Italy - All rights reserved.

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - China - Finland - France - Germany - Hong Kong - India - Italy - Japan - Malaysia  
 Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - U.S.A.

<http://www.st.com>