



## STTH3003CW

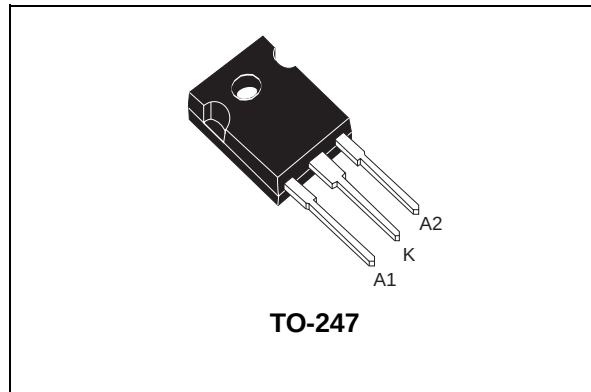
### HIGH FREQUENCY SECONDARY RECTIFIER

#### MAJOR PRODUCT CHARACTERISTICS

|                |          |
|----------------|----------|
| $I_{F(AV)}$    | 2 x 15 A |
| $V_{RRM}$      | 300 V    |
| $T_j (max)$    | 175 °C   |
| $V_F (max)$    | 1 V      |
| $t_{rr} (max)$ | 40 ns    |

#### FEATURES AND BENEFITS

- COMBINES HIGHEST RECOVERY AND REVERSE VOLTAGE PERFORMANCE
- ULTRA-FAST, SOFT AND NOISE-FREE RECOVERY



#### DESCRIPTION

Dual center tap Fast Recovery Epitaxial Diodes suited for Switch Mode Power Supply and high frequency DC to DC converters.

Packaged in TO-247 this device is intended for secondary rectification.

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

| Symbol              | Parameter                              |                                   |                         | Value    | Unit |
|---------------------|----------------------------------------|-----------------------------------|-------------------------|----------|------|
| V <sub>RRM</sub>    | Repetitive peak reverse voltage        |                                   |                         | 300      | V    |
| I <sub>F(RMS)</sub> | RMS forward current                    |                                   |                         | 30       | A    |
| I <sub>F(AV)</sub>  | Average forward current                | T <sub>c</sub> = 135°C<br>δ = 0.5 | Per diode<br>Per device | 15<br>30 | A    |
| I <sub>FSM</sub>    | Surge non repetitive forward current   | tp = 10 ms sinusoidal             |                         | 140      | A    |
| I <sub>RSM</sub>    | Non repetitive peak reverse current    | tp = 20 μs square                 |                         | 7        | A    |
| T <sub>stg</sub>    | Storage temperature range              |                                   |                         | -65 +175 | °C   |
| T <sub>j</sub>      | Maximum operating junction temperature |                                   |                         | +175     | °C   |

**THERMAL RESISTANCES**

| Symbol        | Parameter        |           | Value | Unit                 |
|---------------|------------------|-----------|-------|----------------------|
| $R_{th(j-c)}$ | Junction to case | Per diode | 2.0   | $^{\circ}\text{C/W}$ |
|               |                  | Total     | 1.05  |                      |
| $R_{th(c)}$   |                  | Coupling  | 0.1   |                      |

**STATIC ELECTRICAL CHARACTERISTICS (per diode)**

| Symbol     | Parameter               | Tests conditions     |                             | Min. | Typ. | Max. | Unit          |
|------------|-------------------------|----------------------|-----------------------------|------|------|------|---------------|
| $I_R^*$    | Reverse leakage current | $V_R = 300\text{ V}$ | $T_j = 25^{\circ}\text{C}$  |      |      | 40   | $\mu\text{A}$ |
|            |                         |                      | $T_j = 125^{\circ}\text{C}$ |      | 40   | 400  |               |
| $V_F^{**}$ | Forward voltage drop    | $I_F = 15\text{ A}$  | $T_j = 25^{\circ}\text{C}$  |      |      | 1.25 | $\text{V}$    |
|            |                         |                      | $T_j = 125^{\circ}\text{C}$ |      | 0.85 | 1    |               |

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

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

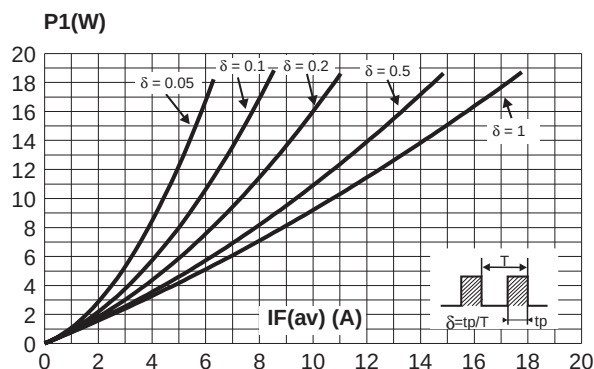
To evaluate the maximum conduction losses use the following equation :

$$P = 0.75 \times I_{F(AV)} + 0.017 I_F^2 (RMS)$$

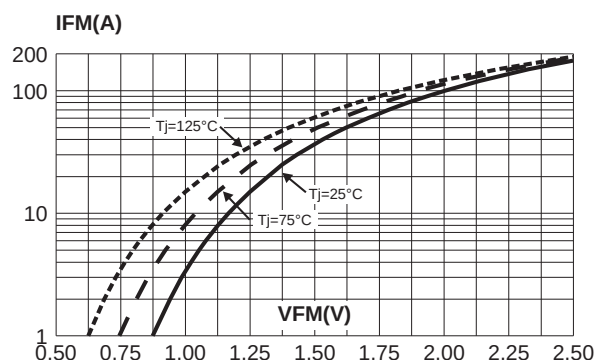
**RECOVERY CHARACTERISTICS**

| Symbol              | Tests conditions                                     |                                                      |                     | Min.                   | Typ. | Max. | Unit |
|---------------------|------------------------------------------------------|------------------------------------------------------|---------------------|------------------------|------|------|------|
| trr                 | 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  |      | 30   | ns   |
|                     | I <sub>F</sub> = 1 A                                 | dI <sub>F</sub> /dt = - 50 A/μs V <sub>R</sub> = 30V |                     |                        |      | 40   |      |
| tfr                 | I <sub>F</sub> = 15 A dI <sub>F</sub> /dt = 100 A/μs |                                                      |                     | T <sub>j</sub> = 25°C  |      | 300  | ns   |
| V <sub>FP</sub>     | V <sub>FR</sub> = 1.1 x V <sub>F</sub> max.          |                                                      |                     |                        |      | 3.5  | V    |
| S <sub>factor</sub> | V <sub>CC</sub> = 200 V I <sub>F</sub> = 15 A        |                                                      |                     | T <sub>j</sub> = 125°C |      | 0.3  | -    |
| I <sub>RM</sub>     | dI <sub>F</sub> /dt = 200A/μs                        |                                                      |                     |                        |      |      | 8.5  |

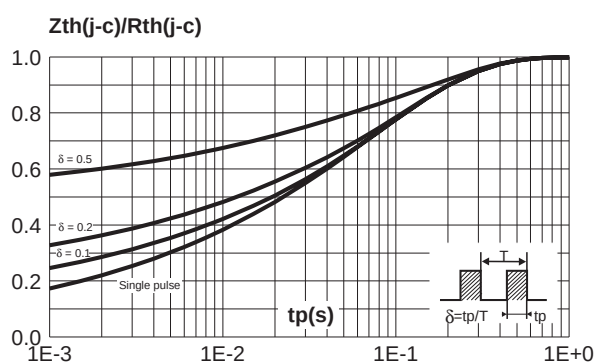
**Fig. 1:** Conduction losses versus average current (per diode).



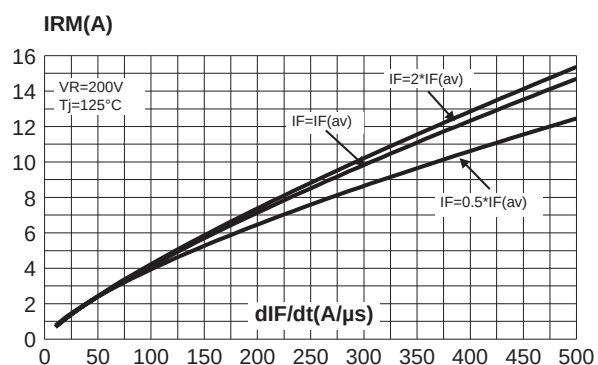
**Fig. 2:** Forward voltage drop versus forward current (maximum values, per diode).



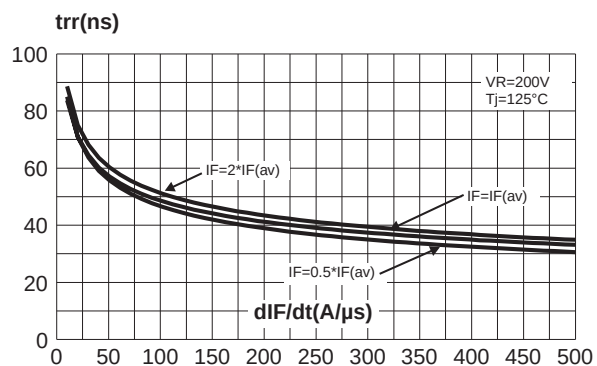
**Fig. 3:** Relative variation of thermal impedance junction to case versus pulse duration.



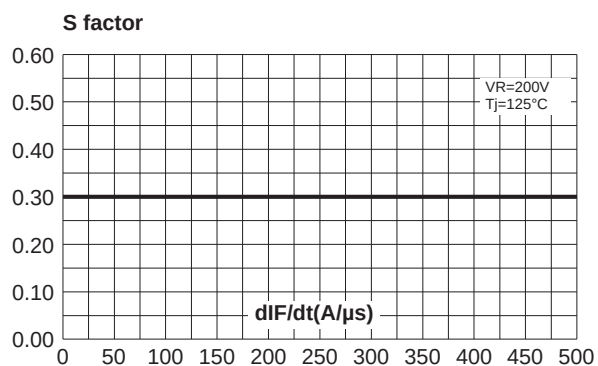
**Fig. 4:** Peak reverse recovery current versus  $dI_F/dt$  (90% confidence, per diode).



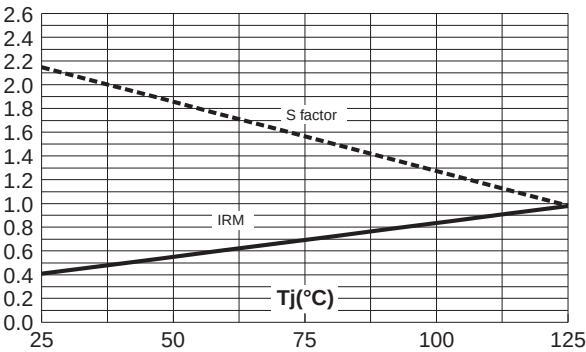
**Fig. 5:** Reverse recovery time versus  $dI_F/dt$  (90% confidence, per diode).



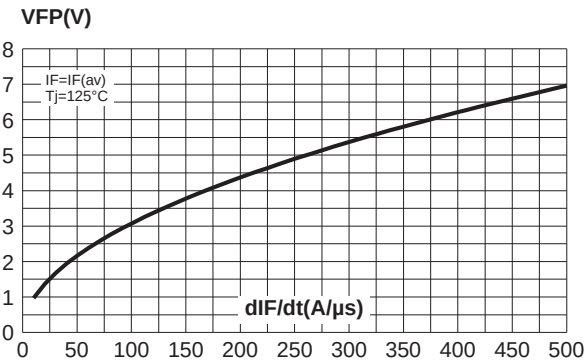
**Fig. 6:** Softness factor versus  $dI_F/dt$  (typical values, per diode).



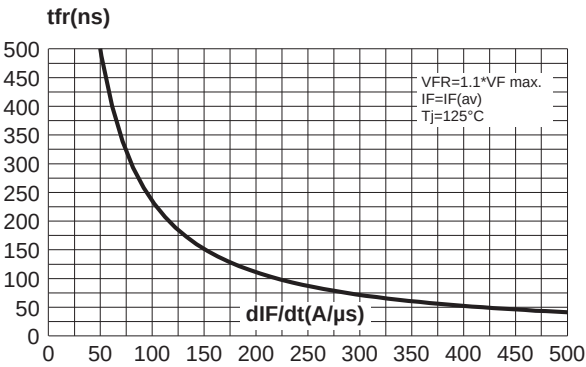
**Fig. 7:** Relative variation of dynamic parameters versus junction temperature (reference:  $T_j = 125^{\circ}\text{C}$ ).



**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**  
**TO-247**

| REF. | DIMENSIONS  |       |       |        |       |       |
|------|-------------|-------|-------|--------|-------|-------|
|      | Millimeters |       |       | Inches |       |       |
|      | Min.        | Typ.  | Max.  | Min.   | Typ.  | Max.  |
| A    | 4.85        |       | 5.15  | 0.191  |       | 0.203 |
| D    | 2.20        |       | 2.60  | 0.086  |       | 0.102 |
| E    | 0.40        |       | 0.80  | 0.015  |       | 0.031 |
| F    | 1.00        |       | 1.40  | 0.039  |       | 0.055 |
| F1   |             | 3.00  |       |        | 0.118 |       |
| F2   |             | 2.00  |       |        | 0.078 |       |
| F3   | 2.00        |       | 2.40  | 0.078  |       | 0.094 |
| F4   | 3.00        |       | 3.40  | 0.118  |       | 0.133 |
| G    |             | 10.90 |       |        | 0.429 |       |
| H    | 15.45       |       | 15.75 | 0.608  |       | 0.620 |
| L    | 19.85       |       | 20.15 | 0.781  |       | 0.793 |
| L1   | 3.70        |       | 4.30  | 0.145  |       | 0.169 |
| L2   |             | 18.50 |       |        | 0.728 |       |
| L3   | 14.20       |       | 14.80 | 0.559  |       | 0.582 |
| L4   |             | 34.60 |       |        | 1.362 |       |
| L5   |             | 5.50  |       |        | 0.216 |       |
| M    | 2.00        |       | 3.00  | 0.078  |       | 0.118 |
| V    |             | 5°    |       |        | 5°    |       |
| V2   |             | 60°   |       |        | 60°   |       |
| Dia. | 3.55        |       | 3.65  | 0.139  |       | 0.143 |

| Ordering code | Marking    | Package | Weight | Base qty | Delivery mode |
|---------------|------------|---------|--------|----------|---------------|
| STTH3003CW    | STTH3003CW | TO-247  | 4.36g  | 30       | Tube          |

- Cooling method: by conduction (C)
- Recommended torque value: 0.8 N.m.
- Maximum torque value: 1.0 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>

