

**TURBO 2 ULTRAFAST HIGH VOLTAGE RECTIFIER**
**MAIN PRODUCT CHARACTERISTICS**

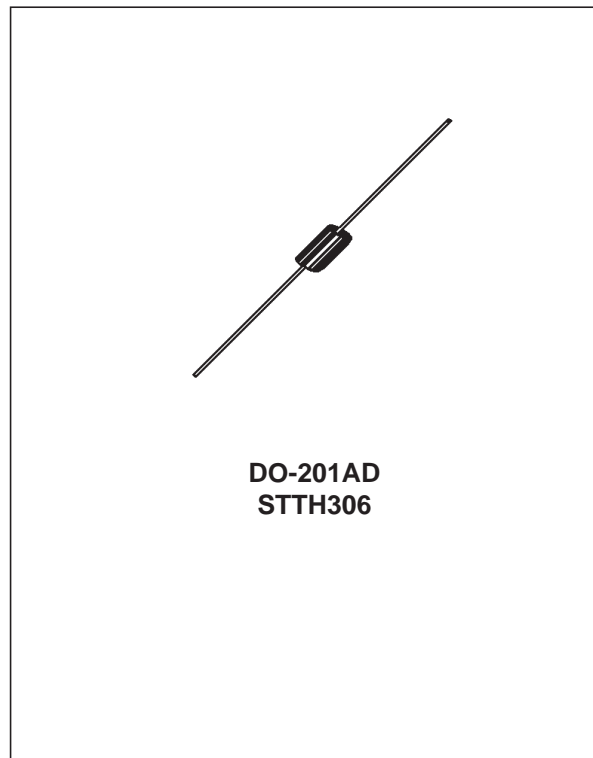
|                             |               |
|-----------------------------|---------------|
| <b>I<sub>F(AV)</sub></b>    | <b>3 A</b>    |
| <b>V<sub>RRM</sub></b>      | <b>600 V</b>  |
| <b>T<sub>j</sub> (max)</b>  | <b>175 °C</b> |
| <b>V<sub>F</sub> (max)</b>  | <b>1.25 V</b> |
| <b>t<sub>rr</sub> (max)</b> | <b>30 ns</b>  |

**FEATURES AND BENEFITS**

- Ultrafast switching
- Low reverse recovery current
- Reduces switching & conduction losses
- Low thermal resistance

**DESCRIPTION**

The STTH306, which is using ST Turbo 2 600V technology, is specially suited for use in switching power supplies, inverters and as a free wheeling diode.


**ABSOLUTE RATINGS** (limiting values)

| <b>Symbol</b>       | <b>Parameter</b>                       |                                      | <b>Value</b> | <b>Unit</b> |
|---------------------|--|--------------------------------------|--------------|-------------|
| V <sub>RRM</sub>    | Repetitive peak reverse voltage        |                                      | 600          | V           |
| I <sub>F(RMS)</sub> | RMS forward current                    |                                      | 8            | A           |
| I <sub>F(AV)</sub>  | Average forward current                | T <sub>I</sub> = 80°C    δ = 0.5     | 3            | A           |
| I <sub>FSM</sub>    | Surge non repetitive forward current   | t <sub>p</sub> = 10 ms    Sinusoidal | 55           | A           |
| T <sub>stg</sub>    | Storage temperature range              |                                      | - 65 + 175   | °C          |
| T <sub>j</sub>      | Maximum operating junction temperature |                                      | + 175        | °C          |

## THERMAL PARAMETERS

| Symbol        | Parameter           | Maximum | Unit |
|---------------|---------------------|---------|------|
| $R_{th(j-l)}$ | Junction to lead    | 20      | °C/W |
| $R_{th(j-a)}$ | Junction to ambient | 75      |      |

## STATIC ELECTRICAL CHARACTERISTICS

| Symbol | Parameter               | Tests conditions |                     | Min. | Typ. | Max. | Unit    |
|--------|-------------------------|------------------|---------------------|------|------|------|---------|
| $I_R$  | Reverse leakage current | $V_R = 600V$     | $T_j = 25^\circ C$  |      |      | 3    | $\mu A$ |
|        |                         |                  | $T_j = 150^\circ C$ |      | 15   | 100  |         |
| $V_F$  | Forward voltage drop    | $I_F = 3 A$      | $T_j = 25^\circ C$  |      |      | 1.7  | V       |
|        |                         |                  | $T_j = 150^\circ C$ |      | 1.0  | 1.25 |         |

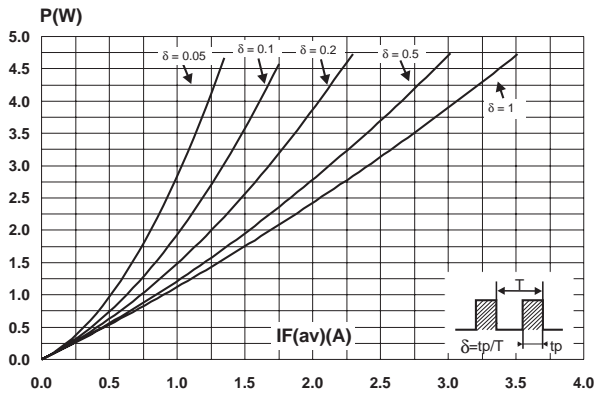
To evaluate the maximum conduction losses use the following equation :

$$P = 1.03 \times I_{F(AV)} + 0.09 I_{F(RMS)}^2$$

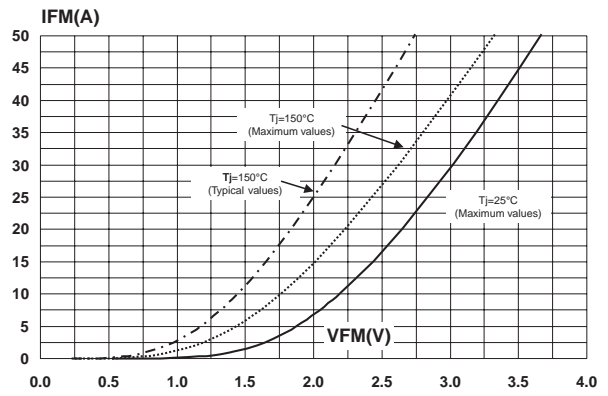
## DYNAMIC ELECTRICAL CHARACTERISTICS

| Symbol   | Tests conditions                                |                    | Min. | Typ. | Max. | Unit |
|----------|---|--------------------|------|------|------|------|
| $t_{rr}$ | $I_F = 0.5 A$ $I_{rr} = 0.25 A$ $I_R = 1 A$     | $T_j = 25^\circ C$ |      |      | 30   | ns   |
|          | $I_F = 1 A$ $di_F/dt = -50 A/\mu s$ $V_R = 30V$ |                    |      | 35   |      |      |
| $t_{fr}$ | $I_F = 3 A$ $di_F/dt = 100 A/\mu s$             | $T_j = 25^\circ C$ |      |      | 100  | ns   |
| $V_{FP}$ | $V_{FR} = 1.1 \times V_{Fmax}$                  |                    |      |      | 10   | V    |

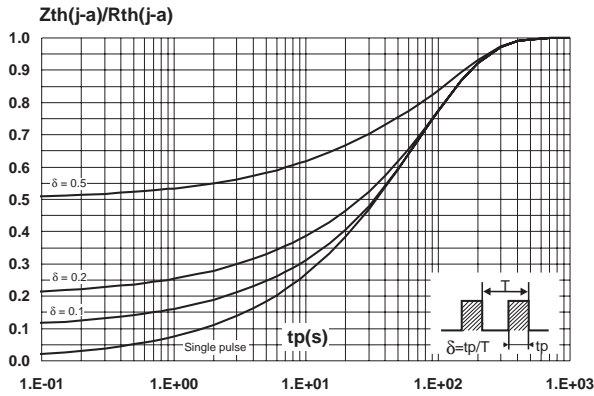
**Fig. 1:** Conduction losses versus average current.



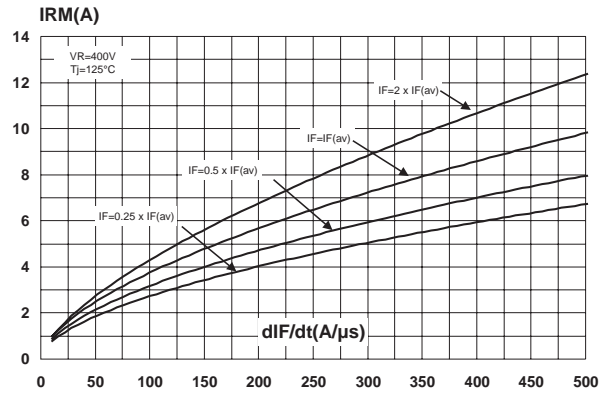
**Fig. 2:** Forward voltage drop versus forward current.



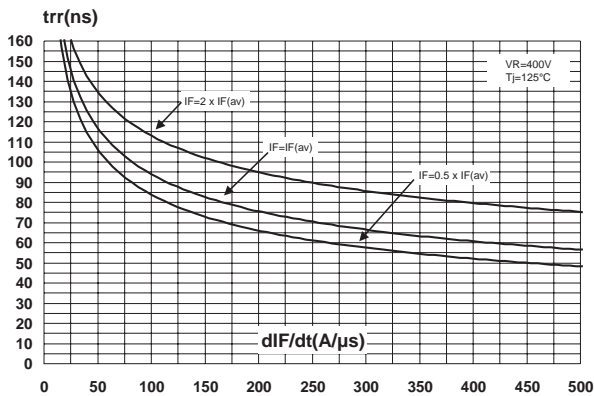
**Fig. 3:** Relative variation of thermal impedance junction ambient versus pulse duration (epoxy FR4, Leads = 10mm)



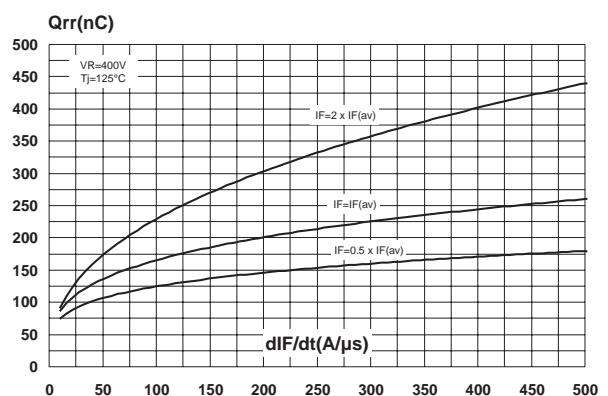
**Fig. 4:** Peak reverse recovery current versus  $di_F/dt$  (90% confidence).



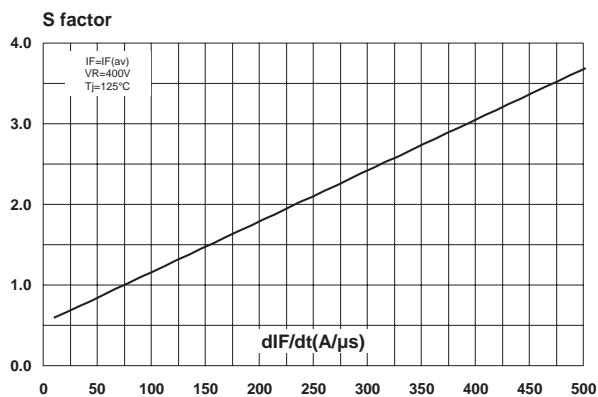
**Fig. 5:** Reverse recovery time versus  $di_F/dt$  (90% confidence).



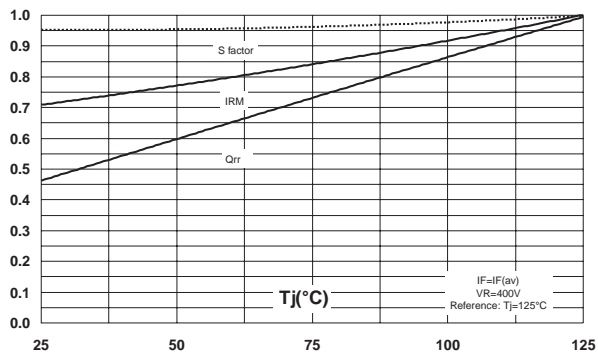
**Fig. 6:** Reverse recovery charges versus  $di_F/dt$  (90% confidence).



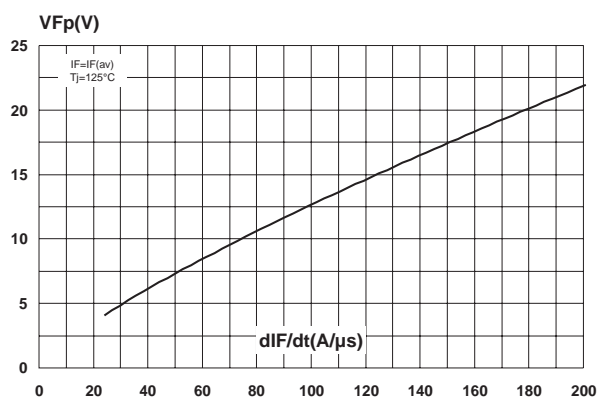
**Fig. 7:** Softness factor versus  $di_F/dt$  (typical values).



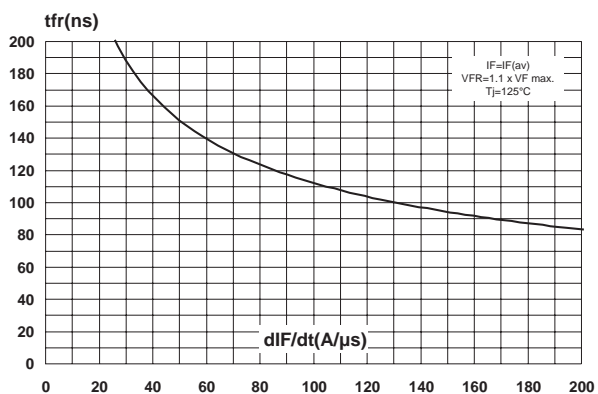
**Fig. 8:** Relative variation of dynamic parameters versus junction temperature.



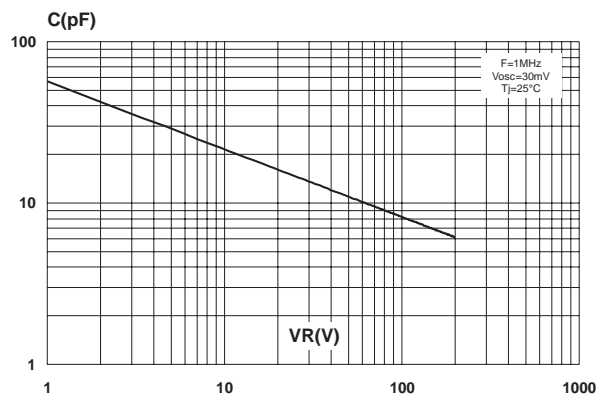
**Fig. 9:** Transient peak forward voltage versus  $di_F/dt$  (90% confidence).



**Fig. 10:** Forward recovery time versus  $di_F/dt$  (90% confidence).



**Fig. 11:** Junction capacitance versus reverse voltage applied (typical values).



**PACKAGE MECHANICAL DATA**  
 DO-201AD

| REF. | DIMENSIONS  |      |        |       | NOTES   |
|------|-------------|------|--------|-------|---|
|      | Millimeters |      | Inches |       |   |
|      | Min.        | Max. | Min.   | Max.  |   |
| A    |             | 9.50 |        | 0.374 | 1 - The lead diameter $\varnothing D$ is not controlled over zone E<br><br>2 - The minimum length which must stay straight between the right angles after bending is 0.59"(15 mm) |
| B    | 25.40       |      | 1.000  |       |   |
| C    |             | 5.30 |        | 0.209 |   |
| D    |             | 1.30 |        | 0.051 |   |
| E    |             | 1.25 |        | 0.049 |   |

| Ordering code | Marking | Package  | Weight | Base qty | Delivery mode |
|---------------|---------|----------|--------|----------|---------------|
| STTH306       | STTH306 | DO-201AD | 1.12 g | 600      | Ammopack      |
| STTH306RL     | STTH306 | DO-201AD | 1.12 g | 1900     | Tape & reel   |

- Epoxy meets UL 94,V0

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