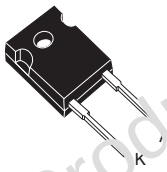
# STTH2006

## Turbo 2 ultrafast high voltage rectifier

## Main product characteristics

| | |
|---|---|
| $I_{F(AV)}$ | 20 A |
| $V_{RRM}$ | 600 V |
| $T_j$ | 175° C |
| $V_F$ (typ) | 1.0 V |
| $t_{rr}$ (max) | 50 ns |




DO-247
STTH2006W

## Features and benefits

- Ultrafast switching
- Low reverse current
- Low thermal resistance
- Reduces switching and conduction losses

## Description

The STTH2006 uses ST Turbo 2 600 V technology and is especially suited for use in switching power supplies, and industrial applications, such as rectification and continuous mode PFC boost diode.

## Order Codes

| Part Number | Marking |
|---|---|
| STTH2006W | STTH2006W |

**Table 1. Absolute Ratings (limiting values)**

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | | 600 | V |
| $I_{F(RMS)}$ | RMS forward voltage | | 50 | A |
| $I_{F(AV)}$ | Average forward current | $T_c$ = 120° C $\delta$ = 0.5 | 20 | A |
| $I_{FSM}$ | Surge non repetitive forward current | $t_p$ = 10 ms sinusoidal | 160 | A |
| $T_{stg}$ | Storage temperature range | | -65 to + 175 | ° C |
| $T_j$ | Maximum operating junction temperature | | 175 | ° C |

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# 1 Characteristics

**Table 2. Thermal resistance**

| Symbol | Parameter | Value (max). | Unit |
|---|---|---|---|
| $R_{th(j-c)}$ | Junction to case | 1.1 | °C/W |

**Table 3. Static electrical characteristic**

| Symbol | Parameter | Test conditions | | Min. | Typ | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $I_R$ (1) | Reverse leakage current | $T_j$ = 25° C | $V_R = V_{RRM}$ | | | 25 | µA |
| | | $T_j$ = 150° C | | | 80 | 800 | |
| $V_F$ (2) | Forward voltage drop | $T_j$ = 25° C | $I_F$ = 20 A | | | 1.75 | V |
| | | $T_j$ = 150° C | | | 1.00 | 1.35 | |

1. Pulse test: $t_p$ = 5 ms, δ < 2%
2. Pulse test: $t_p$ = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:
$P = 1.13 \times I_{F(AV)} + 0.011\ I_F{}^2{}_{(RMS)}$

**Table 4. Dynamic characteristics**

| Symbol | Parameter | Test conditions | | Min. | Typ | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $t_{rr}$ | Reverse recovery time | $T_j$ = 25° C | $I_F$ = 0.5 A $I_{rr}$ = 0.25 A $I_R$ =1 A | | | 50 | ns |
| | | | $I_F$ = 1 A $dI_F/dt$ = -50 A/µs $V_R$ =30 V | | 50 | 70 | |
| $I_{RM}$ | Reverse recovery current | $T_j$ = 125° C | $I_F$ = 30 A $V_R$ = 400 V $dI_F/dt$ = -100 A/µs | | 8 | 11 | A |
| $t_{fr}$ | Forward recovery time | $T_j$ = 25 °C | $I_F$ = 30 A $dI_F/dt$ = 100 A/µs $V_{FR}$ = 1.1 x $V_{Fmax}$ | | | 500 | ns |
| $V_{FP}$ | Forward recovery voltage | $T_j$ = 25° C | $I_F$ = 30 A $dI_F/dt$ = 100 A/µs $V_{FR}$ = 1.1 x $V_{Fmax}$ | | 2.5 | | V |

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**Figure 1. Conduction losses versus average forward current**

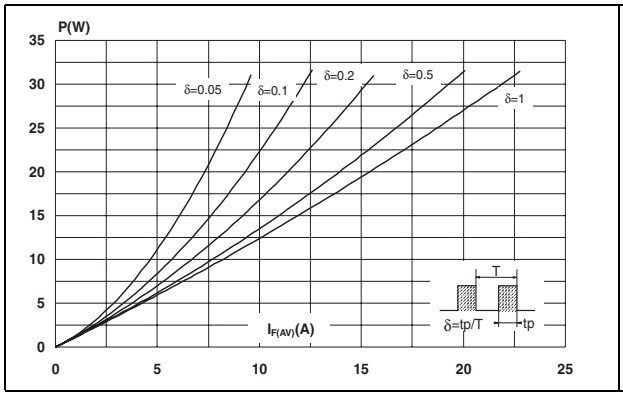



**Figure 2. Forward voltage drop versus forward current**

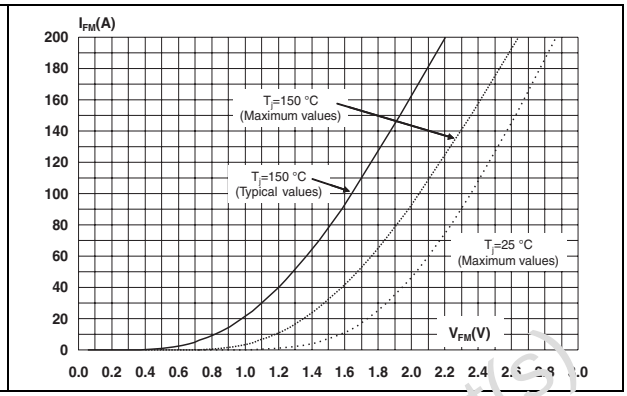



**Figure 3. Relative variation of thermal impedance junction to case versus pulse duration**

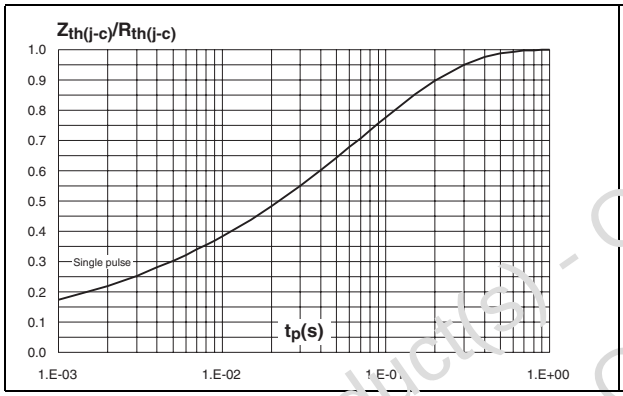



**Figure 4. Peak reverse recovery current versus $dI_F/dt$ (typical values)**

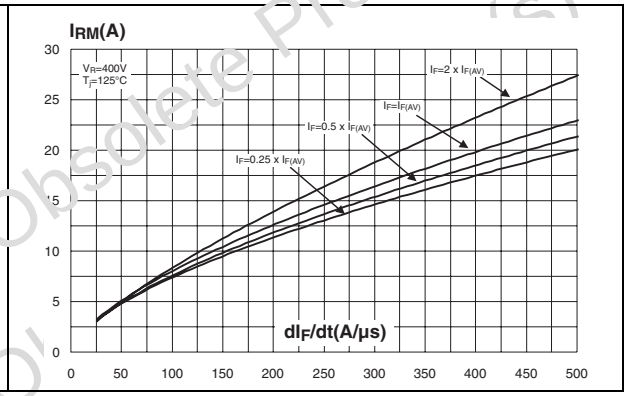



**Figure 5. Reverse recovery time versus $dI_F/dt$ (typical values)**

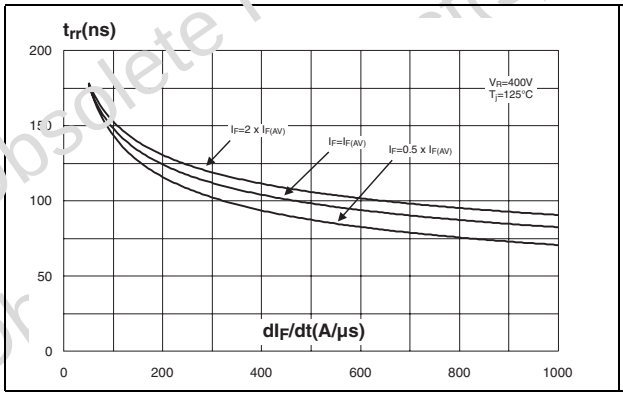
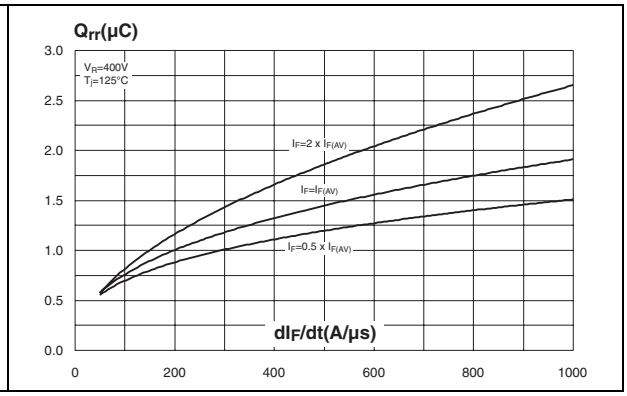



**Figure 6. Reverse recovery charges versus $dI_F/dt$ (typical values)**




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**Figure 7. Softness factor versus $dI_F/dt$ (typical values)**

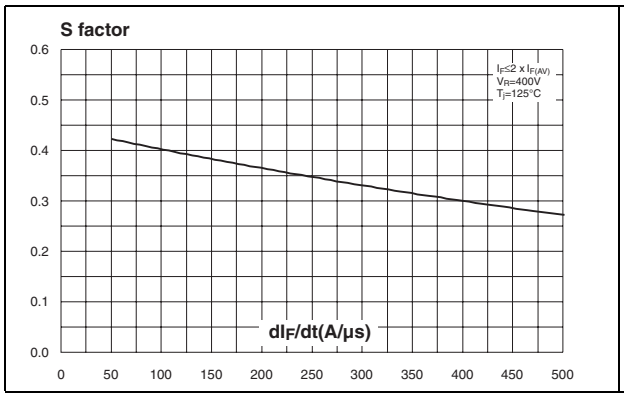



**Figure 8. Relative variations of dynamic parameters versus junction temperature**

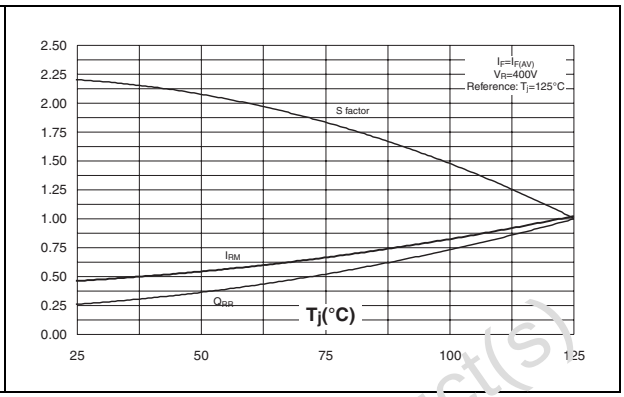



**Figure 9. Transient peak forward voltage versus $dI_F/dt$ (typical values)**

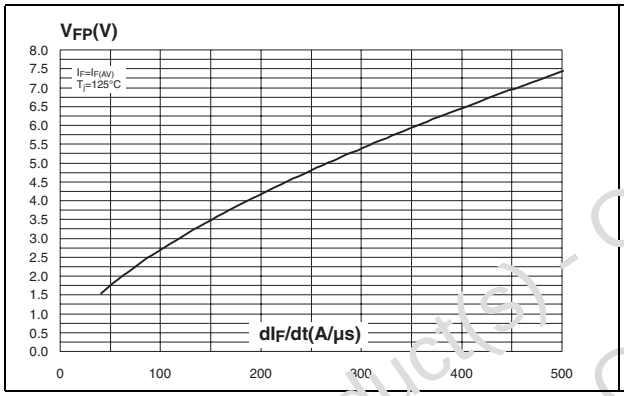



**Figure 10. Forward recovery time versus $dI_F/dt$ (typical values)**

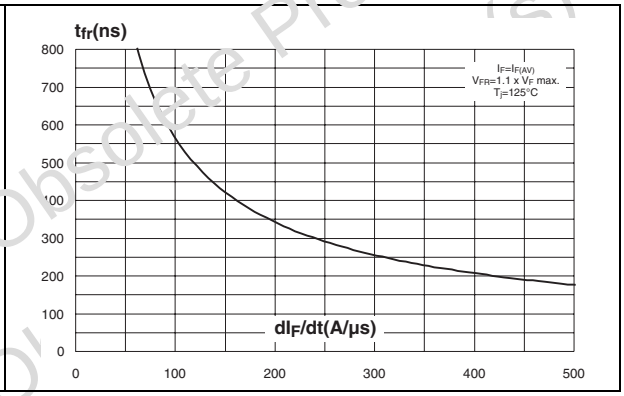
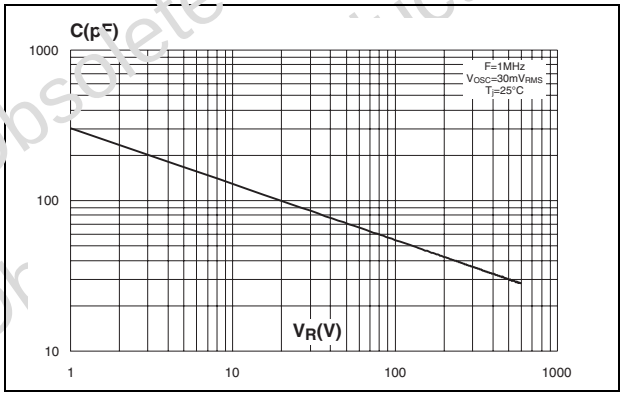



**Figure 11. Junction capacitance versus reverse voltage applied (typical values)**

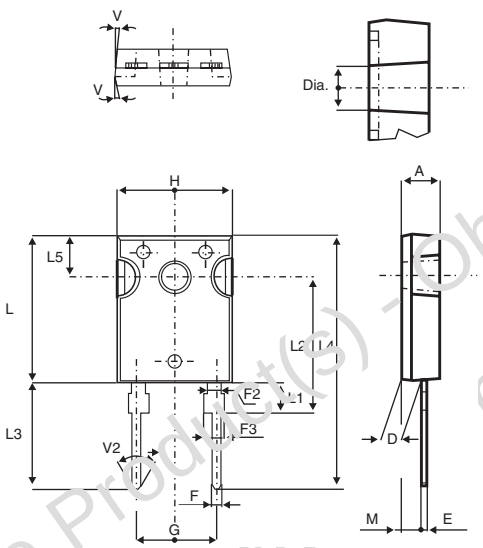



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# 2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.55 Nm
- Maximum torque value: 0.70 Nm

**Table 5. DO-247 Package dimensions**




| 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 |
| F2 | | 2.00 | | | 0.078 | |
| F3 | 2.00 | | 2.40 | 0.078 | | 0.094 |
| 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 |

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

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# 3 Ordering information

| Ordering type | Marking | Package | Weight | Base qty | Delivery mode |
|---|---|---|---|---|---|
| STTH2006W | STTH2006W | DO-247 | 4.40 g | 30 | Tube |

# 4 Revision history

| Date | Revision | Changes |
|---|---|---|
| 13-Jul-2006 | 1 | Initial release. |

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