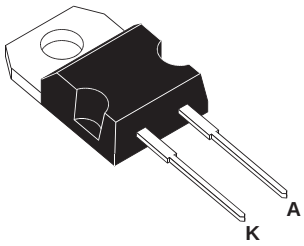
# STTH1506D/DI

## TURBO 2 ULTRA-FAST HIGH VOLTAGE RECTIFIER

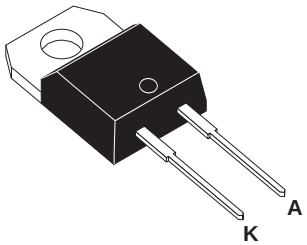
**PRELIMINARY DATASHEET**

### MAJOR PRODUCTS CHARACTERISTICS

| | |
|---|---|
| $I_{F(AV)}$ | **15 A** |
| $V_{RRM}$ | **600 V** |
| **Tj (max)** | **175 °C** |
| $V_F$ **(max)** | **1.9 V** |
| **trr (max)** | **50 ns** |




**TO-220AC**
**STTH1506D**




**Insulated TO-220AC**
**STTH1506DI**

### FEATURES AND BENEFITS

- COMBINES HIGHEST RECOVERY AND VOLTAGE PERFORMANCE.
- ULTRA-FAST, SOFT AND NOISE-FREE RECOVERY FOR LOW SIDE EFFECTS.
- LOW INDUCTANCE, LOW CAPACITANCE, ALLOWS SIMPLIFIED LAYOUT.
- INSULATED VERSION: TO-220AC
  Insulated voltage = 2500 $V_{RMS}$
  Capacitance = 7 pF

### ABSOLUTE RATINGS (limiting values)

| Symbol | Parameter | | | Value | Unit |
|---|---|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | | | 600 | V |
| $I_{F(RMS)}$ | RMS forward current | TO-220AC<br>Insulated TO-220AC | | 30<br>24 | A |
| $I_{F(AV)}$ | Average forward current<br>$\delta = 0.5$ | TO-220AC<br>Insulated TO-220AC | Tc = 92°C<br>Tc = 55°C | 15 | A |
| $I_{FSM}$ | Surge non repetitive forward current | | tp = 10 ms<br>sinusoidal | 85 | A |
| $T_{stg}$ | Storage temperature range | | | -65 +175 | °C |
| Tj | Maximum operating junction temperature | | | + 175 | °C |

## THERMAL RESISTANCES

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $R_{th\ (j-c)}$ | Junction to case thermal resistance | TO-220AC | 2.2 | °C/W |
| | | Insulated TO-220AC | 3.2 | |

## STATIC ELECTRICAL CHARACTERISTICS

| Symbol | Parameter | Tests Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $I_R$ * | Reverse leakage current | $V_R$ = 600 V | Tj = 25°C | | | 100 | µA |
| | | | Tj = 125°C | | 10 | 400 | |
| $V_F$ ** | Forward voltage drop | $I_F$ = 15 A | Tj = 25°C | | | 2.4 | V |
| | | | Tj = 125°C | | 1.5 | 1.9 | |

Pulse test : * tp = 5 ms, δ < 2 %

** tp = 380 µs, δ < 2%

To evaluate the maximum conduction losses use the following equation :
$P = 1.3 \times I_{F(AV)} + 0.04\ I_{F(RMS)}^2$

## DYNAMIC ELECTRICAL CHARACTERISTICS

| Symbol | Tests Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| trr | $I_F$ = 0.5 A Irr = 0.25 A $I_R$ = 1 A | Tj = 25°C | | | 35 | ns |
| | $I_F$ = 1 A $dI_F/dt$ = - 50 A/µs $V_R$ = 30 V | | | | 50 | |
| $I_{RM}$ | $V_R$ = 400 V $I_F$ = 15 A $dI_F/dt$ = 200 A/µs | Tj = 125°C | | | 9.5 | A |
| $S_{factor}$ | | | | 1 | | - |
| tfr | $I_F$ = 15 A $dI_F/dt$ = 120 A/µs $V_{FR}$ = 1.1 x $V_F$ max | Tj = 25°C | | | 200 | ns |
| $V_{FP}$ | | | | | 6 | V |
| Qrr | $V_R$ = 400V $I_F$ = 15 A $dI_F/dt$ = -200 A/µs | Tj = 125°C | | 380 | | nC |

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

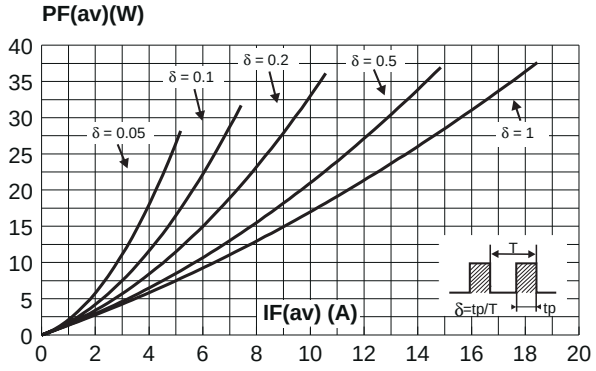



**Fig. 2:** Forward voltage drop versus forward current.

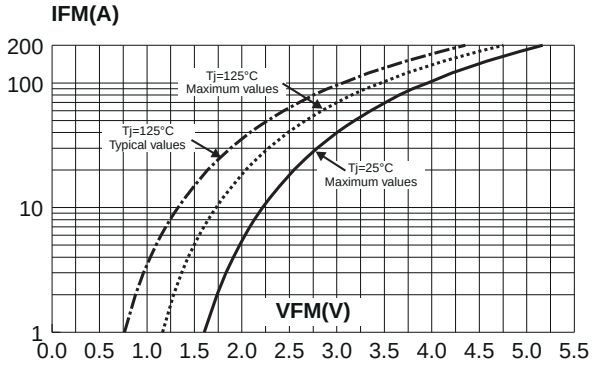



**Fig. 3:** Relative variation of thermal impedance junction to case versus pulse duration.

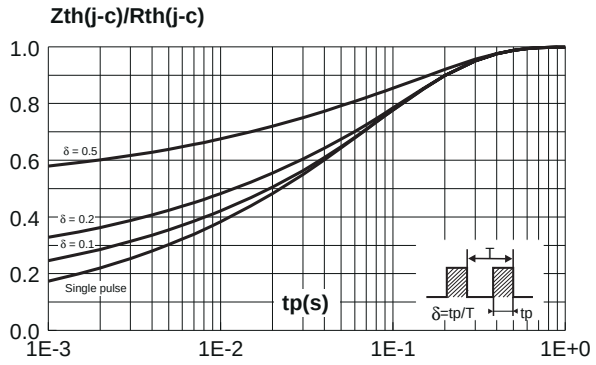



**Fig. 4:** Peak reverse recovery current versus $dI_F/dt$ (90% confidence).

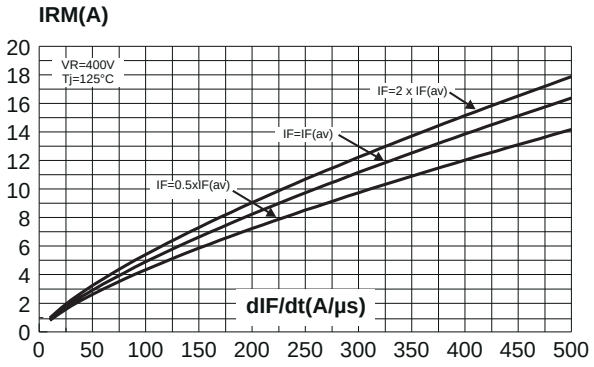



**Fig. 5:** Reverse recovery time $dI_F/dt$ (90% confidence).

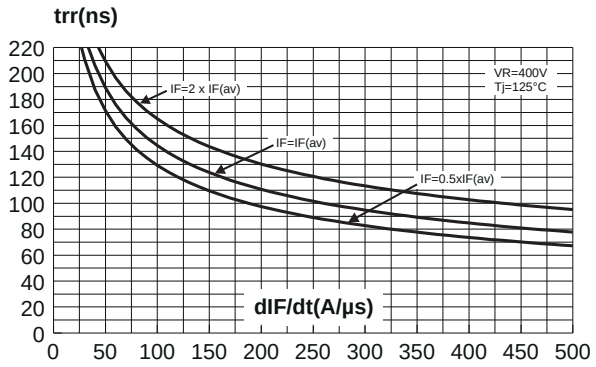



**Fig. 6:** Reverse charges versus $dI_F/dt$ (90% confidence).

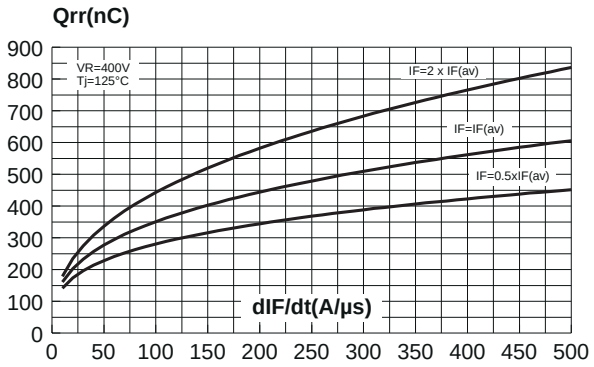


**Fig. 7:** Softness factor (tb/ta) versus $dI_F/dt$ (typical values)

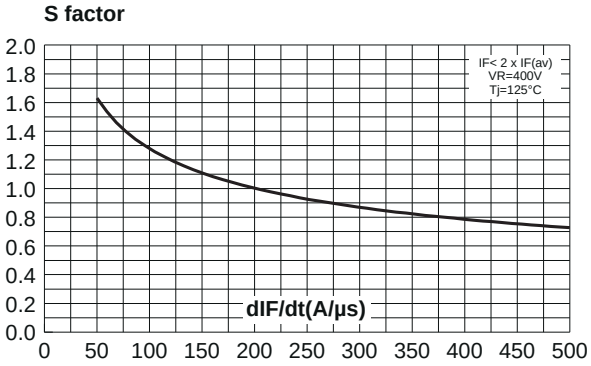



**Fig. 8:** Relative variation of dynamic parameters versus junction temperature (Reference: Tj=125°C)

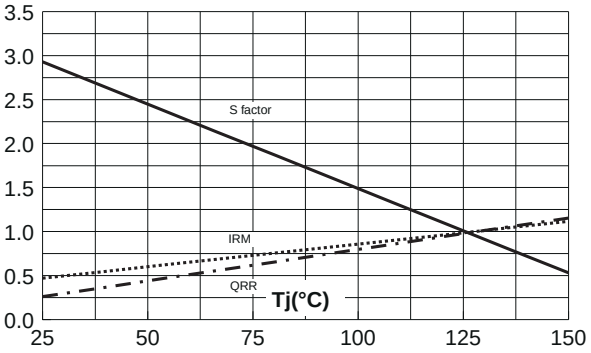



**Fig. 9:** Transient peak forward voltage versus $dI_F/dt$ (90% confidence).

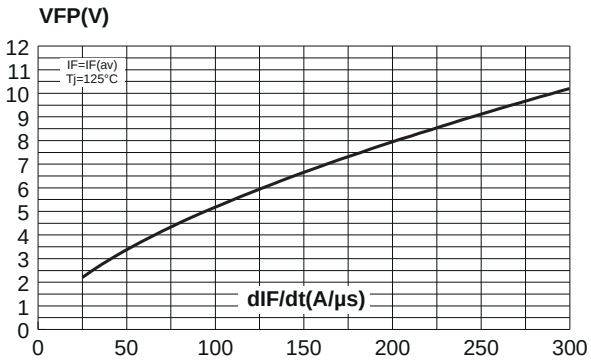
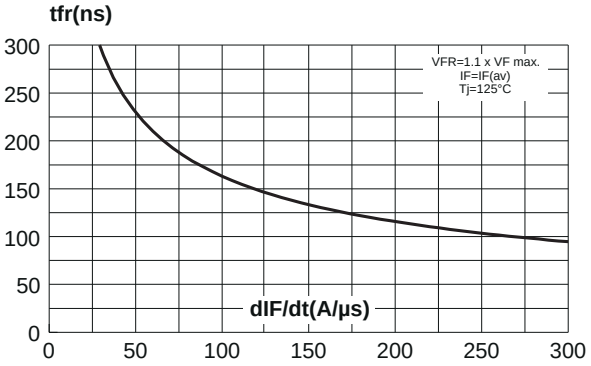
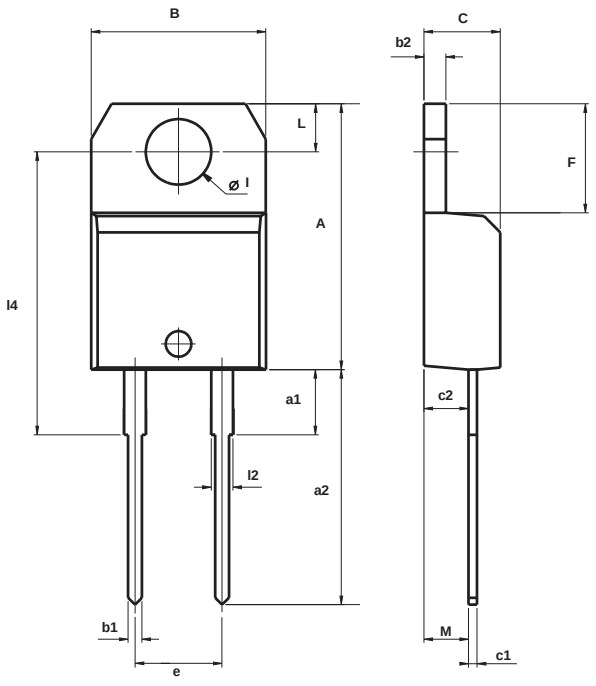



**Fig. 10:** Forward recovery time versus $dI_F/dt$ (90% confidence).



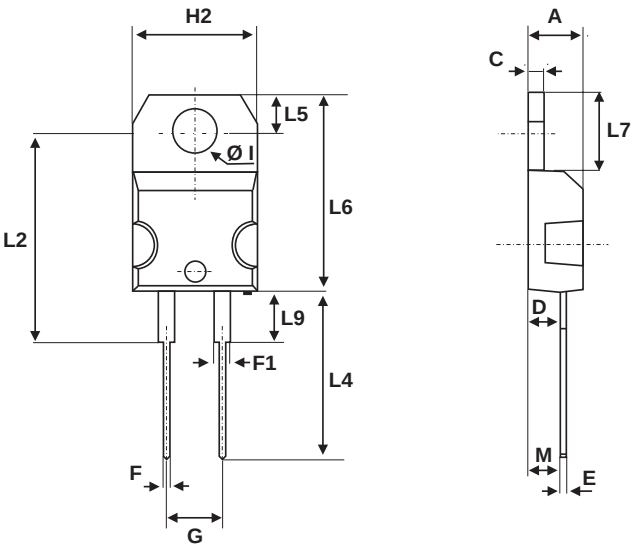
**PACKAGE MECHANICAL DATA**
TO-220AC (Iso.)




| REF. | DIMENSIONS | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 15.20 | | 15.90 | 0.598 | | 0.625 |
| a1 | | 3.75 | | | 0.147 | |
| a2 | 13.00 | | 14.00 | 0.511 | | 0.551 |
| B | 10.00 | | 10.40 | 0.393 | | 0.409 |
| b1 | 0.61 | | 0.88 | 0.024 | | 0.034 |
| b2 | 1.23 | | 1.32 | 0.048 | | 0.051 |
| C | 4.40 | | 4.60 | 0.173 | | 0.181 |
| c1 | 0.49 | | 0.70 | 0.019 | | 0.027 |
| c2 | 2.40 | | 2.72 | 0.094 | | 0.107 |
| e | 4.80 | | 5.40 | 0.189 | | 0.212 |
| F | 6.20 | | 6.60 | 0.244 | | 0.259 |
| I | 3.75 | | 3.85 | 0.147 | | 0.151 |
| l4 | 15.80 | 16.40 | 16.80 | 0.622 | 0.646 | 0.661 |
| L | 2.65 | | 2.95 | 0.104 | | 0.116 |
| l2 | 1.14 | | 1.70 | 0.044 | | 0.066 |
| M | | 2.60 | | | 0.102 | |

## PACKAGE MECHANICAL DATA

TO-220AC




| REF. | DIMENSIONS | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.40 | 4.60 | 0.173 | 0.181 |
| C | 1.23 | 1.32 | 0.048 | 0.051 |
| D | 2.40 | 2.72 | 0.094 | 0.107 |
| E | 0.49 | 0.70 | 0.019 | 0.027 |
| F | 0.61 | 0.88 | 0.024 | 0.034 |
| F1 | 1.14 | 1.70 | 0.044 | 0.066 |
| G | 4.95 | 5.15 | 0.194 | 0.202 |
| H2 | 10.00 | 10.40 | 0.393 | 0.409 |
| L2 | 16.40 typ. | | 0.645 typ. | |
| L4 | 13.00 | 14.00 | 0.511 | 0.551 |
| L5 | 2.65 | 2.95 | 0.104 | 0.116 |
| L6 | 15.25 | 15.75 | 0.600 | 0.620 |
| L7 | 6.20 | 6.60 | 0.244 | 0.259 |
| L9 | 3.50 | 3.93 | 0.137 | 0.154 |
| M | 2.6 typ. | | 0.102 typ. | |
| Diam. I | 3.75 | 3.85 | 0.147 | 0.151 |

| Ordering code | Marking | Package | Weight | Base qty | Delivery mode |
|---|---|---|---|---|---|
| STTH1506D | STTH1506D | TO-220AC | 1.86 g. | 50 | Tube |
| STTH1506DI | STTH1506DI | Insulated TO-220AC | 1.86 g. | 50 | Tube |

- Cooling method: C
- Recommended torque value: 0.8 N.m.
- Maximum torque value: 1 N.m.
- Epoxy meets UL94,V0