



STTH120L06TV

TURBO 2 ULTRAFast HIGH VOLTAGE RECTIFIER

Table 1: Main Product Characteristics

| | |
|----------------|-----------------|
| $I_{F(AV)}$ | 2 x 60 A |
| V_{RRM} | 600 V |
| T_j | 150°C |
| V_F (typ) | 0.95 V |
| t_{rr} (max) | 70 ns |

FEATURES AND BENEFITS

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

DESCRIPTION

The STTH120L06TV, which is using ST Turbo 2 600V technology, is specially suited for use in switching power supplies, and industrial applications, as rectification and free-wheeling diode.

Table 2: Order Codes

| Part Number | Marking |
|---------------|---------------|
| STTH120L06TV1 | STTH120L06TV1 |

Table 3: Absolute Ratings (limiting values, per diode)

| Symbol | Parameter | | Value | Unit |
|--------------|---|------------------------------------|--------------|------|
| V_{RRM} | Repetitive peak reverse voltage | | 600 | V |
| $I_{F(RMS)}$ | RMS forward voltage | | 120 | A |
| $I_{F(AV)}$ | Average forward current $\delta = 0.5$ | $T_c = 65^\circ\text{C}$ Per diode | 60 | A |
| I_{FSM} | Surge non repetitive forward current | $t_p = 10\text{ms}$ sinusoidal | 500 | A |
| T_{stg} | Storage temperature range | | -55 to + 150 | °C |
| T_j | Maximum operating junction temperature | | 150 | °C |

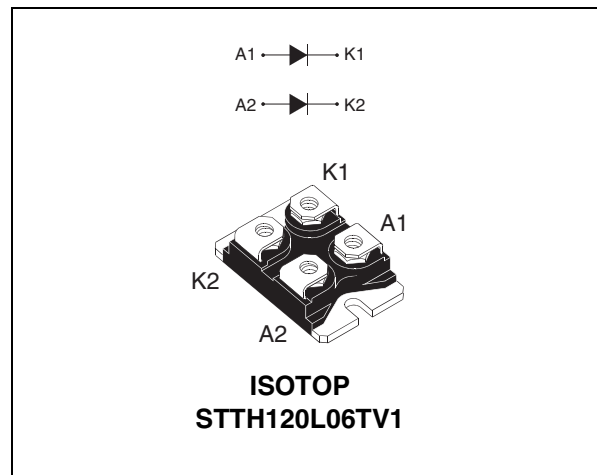


Table 4: Thermal Resistance

| Symbol | Parameter | | Value (max.) | Unit |
|---------------|------------------|-----------|--------------|-----------------------------|
| $R_{th(j-c)}$ | Junction to case | Per diode | 0.98 | $^{\circ}\text{C}/\text{W}$ |
| | | Total | 0.54 | |
| $R_{th(c)}$ | Coupling | | 0.1 | $^{\circ}\text{C}/\text{W}$ |

When the diodes 1 and 2 are used simultaneously:

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

Table 5: Static Electrical Characteristics (per diode)

| Symbol | Parameter | Test conditions | | Min. | Typ | Max. | Unit |
|------------|-------------------------|-----------------------------|--------------------|------|------|------|---------------|
| I_R^* | Reverse leakage current | $T_j = 25^{\circ}\text{C}$ | $V_R = V_{RRM}$ | | | 50 | μA |
| | | $T_j = 125^{\circ}\text{C}$ | | | 50 | 500 | |
| V_F^{**} | Forward voltage drop | $T_j = 25^{\circ}\text{C}$ | $I_F = 60\text{A}$ | | | 1.55 | V |
| | | $T_j = 150^{\circ}\text{C}$ | | | 0.95 | 1.2 | |

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

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

To evaluate the conduction losses use the following equation: $P = 0.93 \times I_{F(AV)} + 0.0045 I_F^2(\text{RMS})$

Table 6: Dynamic Characteristics (per diode)

| Symbol | Parameter | Test conditions | | Min. | Typ | Max. | Unit |
|----------|--------------------------|-----------------------------|--|------|-----|------|------|
| t_{rr} | Reverse recovery time | $T_j = 25^{\circ}\text{C}$ | $I_F = 0.5\text{A}$ $I_{rr} = 0.25\text{A}$ $I_R = 1\text{A}$ | | | 70 | ns |
| | | | $I_F = 1\text{A}$ $di_F/dt = 50 \text{ A}/\mu\text{s}$ $V_R = 30\text{V}$ | | 75 | 105 | |
| I_{RM} | Reverse recovery current | $T_j = 125^{\circ}\text{C}$ | $I_F = 60\text{A}$ $V_R = 400\text{V}$ $di_F/dt = 100 \text{ A}/\mu\text{s}$ | | 14 | 19 | A |
| t_{fr} | Forward recovery time | $T_j = 25^{\circ}\text{C}$ | $I_F = 60\text{A}$ $di_F/dt = 200 \text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$ | | | 500 | ns |
| V_{FP} | Forward recovery voltage | $T_j = 25^{\circ}\text{C}$ | $I_F = 60\text{A}$ $di_F/dt = 200 \text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$ | | 3 | | V |

Figure 1: Conduction losses versus average forward current (per diode)

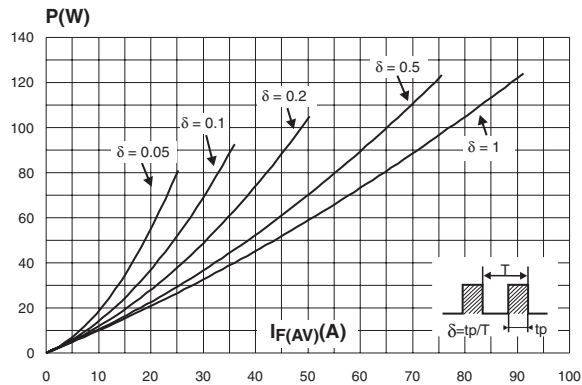


Figure 2: Forward voltage drop versus forward current (per diode)

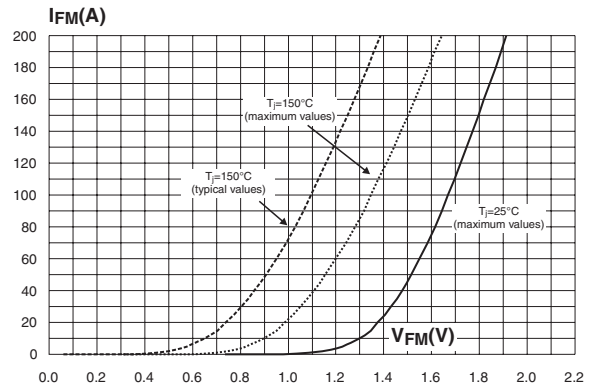


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration

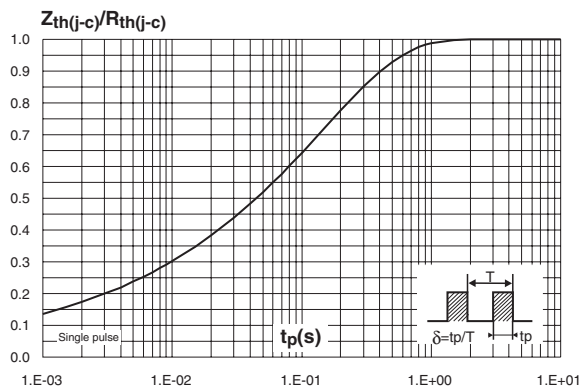


Figure 4: Peak reverse recovery current versus diF/dt (typical values, per diode)

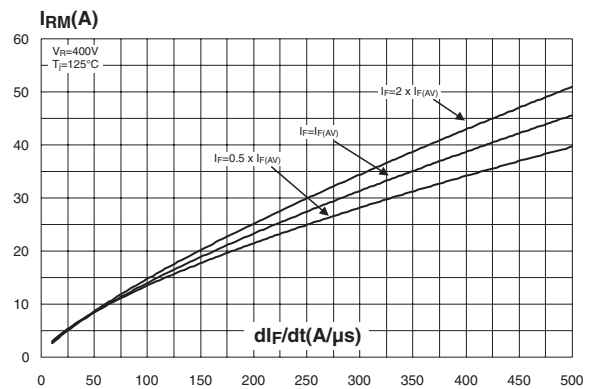


Figure 5: Reverse recovery time versus diF/dt (typical values, per diode)

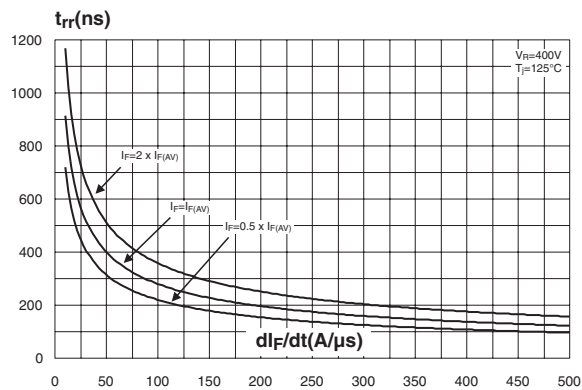


Figure 6: Reverse recovery charges versus diF/dt (typical values, per diode)

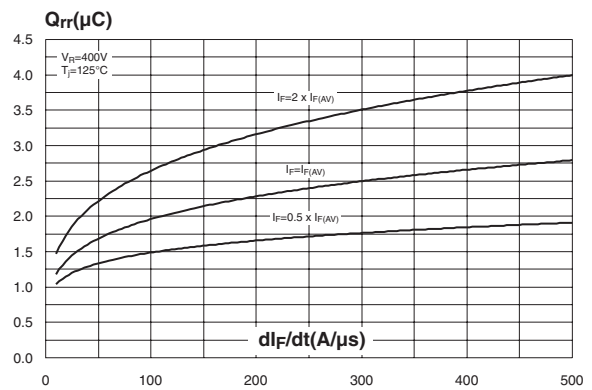


Figure 7: Reverse recovery softness factor versus di_F/dt (typical values, per diode)

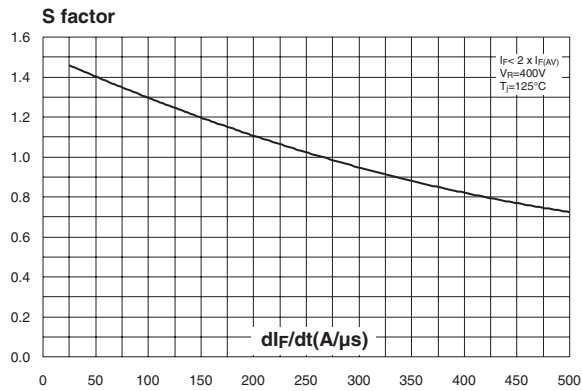


Figure 8: Relative variations of dynamic parameters versus junction temperature

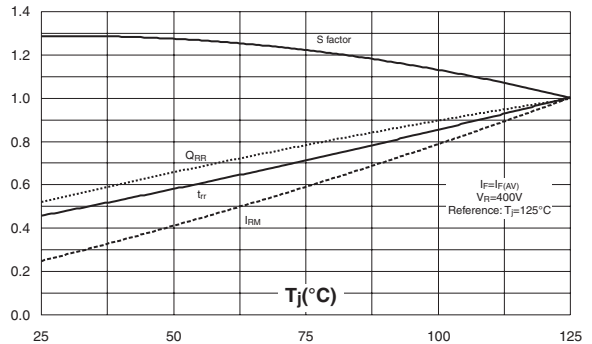


Figure 9: Transient peak forward voltage versus di_F/dt (typical values, per diode)

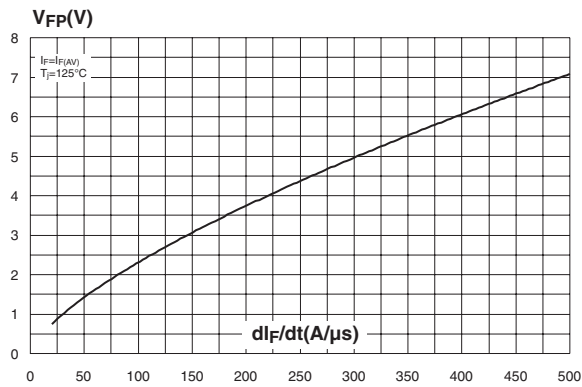


Figure 10: Forward recovery time versus di_F/dt (typical values, per diode)

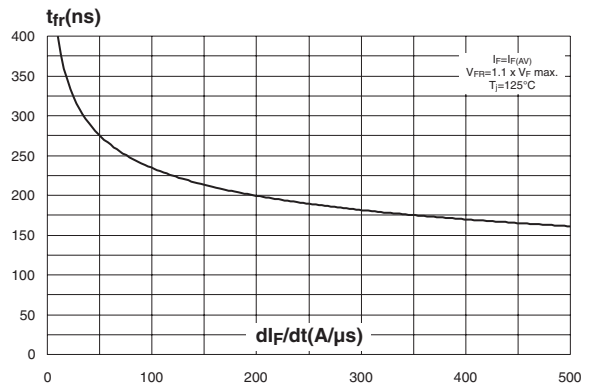


Figure 11: Junction capacitance versus reverse voltage applied (typical values, per diode)

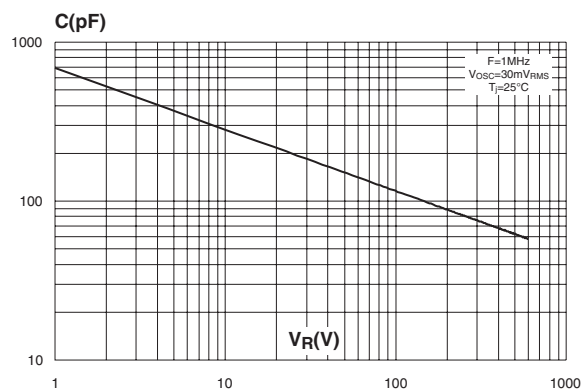


Figure 12: ISOTOP Package Mechanical Data

| REF. | DIMENSIONS | | | |
|------|-------------|-------|------------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 11.80 | 12.20 | 0.465 | 0.480 |
| A1 | 8.90 | 9.10 | 0.350 | 0.358 |
| B | 7.8 | 8.20 | 0.307 | 0.323 |
| C | 0.75 | 0.85 | 0.030 | 0.033 |
| C2 | 1.95 | 2.05 | 0.077 | 0.081 |
| D | 37.80 | 38.20 | 1.488 | 1.504 |
| D1 | 31.50 | 31.70 | 1.240 | 1.248 |
| E | 25.15 | 25.50 | 0.990 | 1.004 |
| E1 | 23.85 | 24.15 | 0.939 | 0.951 |
| E2 | 24.80 typ. | | 0.976 typ. | |
| G | 14.90 | 15.10 | 0.587 | 0.594 |
| G1 | 12.60 | 12.80 | 0.496 | 0.504 |
| G2 | 3.50 | 4.30 | 0.138 | 0.169 |
| F | 4.10 | 4.30 | 0.161 | 0.169 |
| F1 | 4.60 | 5.00 | 0.181 | 0.197 |
| P | 4.00 | 4.30 | 0.157 | 0.69 |
| P1 | 4.00 | 4.40 | 0.157 | 0.173 |
| S | 30.10 | 30.30 | 1.185 | 1.193 |

Table 7: Ordering Information

| Ordering type | Marking | Package | Weight | Base qty | Delivery mode |
|---------------|---------------|---------|--------------------------|---------------------|---------------|
| STTH120L06TV1 | STTH120L06TV1 | ISOTOP | 27 g (without screws) | 10 (with screws) | Tube |

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)

Table 8: Revision History

| Date | Revision | Description of Changes |
|-------------|----------|------------------------|
| 07-Sep-2004 | 1 | First issue |

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