

## TURBO 2 ULTRAFAST HIGH VOLTAGE RECTIFIER

### MAIN PRODUCT CHARACTERISTICS

|                |             |
|----------------|-------------|
| $I_{F(AV)}$    | 8 A         |
| $V_{RRM}$      | 600 V       |
| $I_R (max)$    | 200 $\mu A$ |
| $T_j (max)$    | 175 °C      |
| $V_F (max)$    | 1.05 V      |
| $t_{rr} (max)$ | 105 ns      |

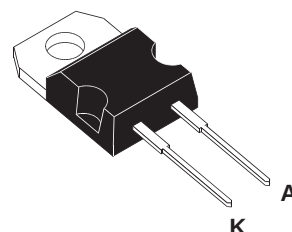
### FEATURES AND BENEFITS

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

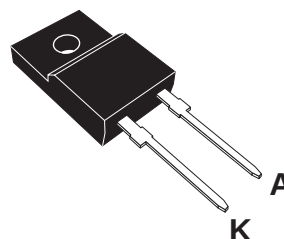
### DESCRIPTION

The STTH8L06FP, which is using ST Turbo2 600V technology, is specially suited as boost diode in discontinuous or critical mode power factor corrections.

The device, available in TO-220AC and TO-220FPAC, is also intended for use as a free wheeling diode in power supplies and other power switching applications.



TO-220AC  
STTH8L06D



TO-220FPAC  
STTH8L06FP

### ABSOLUTE RATINGS (limiting values)

| Symbol       | Parameter                              |            |                                         | Value      | Unit |
|--------------|----------------------------------------|------------|-----------------------------------------|------------|------|
| $V_{RRM}$    | Repetitive peak reverse voltage        |            |                                         | 600        | V    |
| $I_{F(RMS)}$ | RMS forward current                    |            |                                         | 30         | A    |
| $I_{F(AV)}$  | Average forward current                | TO-220AC   | $T_c = 150^{\circ}C \quad \delta = 0.5$ | 8          | A    |
|              |                                        | TO-220FPAC | $T_c = 100^{\circ}C \quad \delta = 0.5$ |            |      |
| $I_{FSM}$    | Surge non repetitive forward current   | tp = 10 ms | Sinusoidal                              | 120        | A    |
| $T_{stg}$    | Storage temperature range              |            |                                         | - 65 + 175 | °C   |
| $T_j$        | Maximum operating junction temperature |            |                                         | + 175      | °C   |

## THERMAL PARAMETERS

| Symbol        | Parameter        |            | Maximum | Unit |
|---------------|------------------|------------|---------|------|
| $R_{th(j-c)}$ | Junction to case | TO-220AC   | 2.5     | °C/W |
|               |                  | TO-220FPAC | 5       |      |

## STATIC ELECTRICAL CHARACTERISTICS

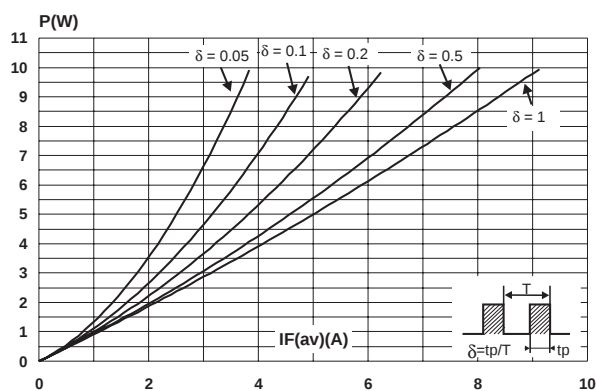
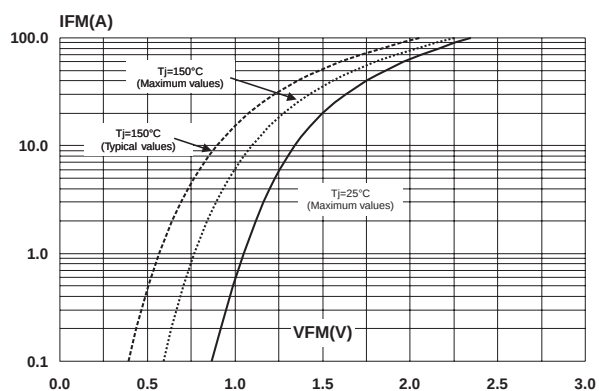
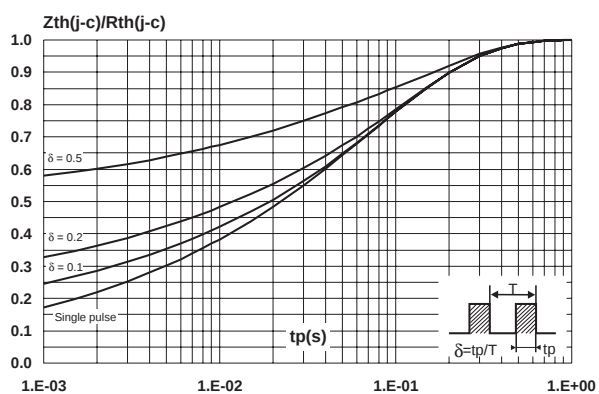
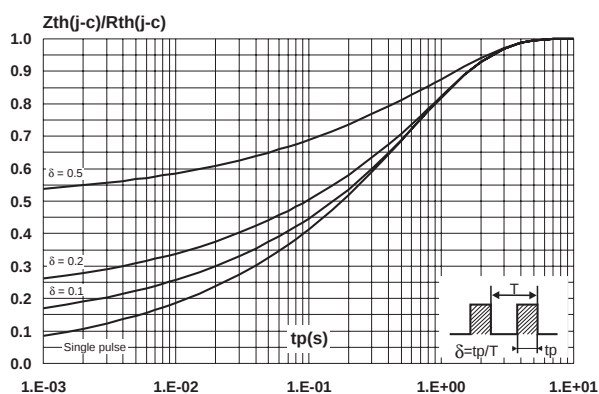
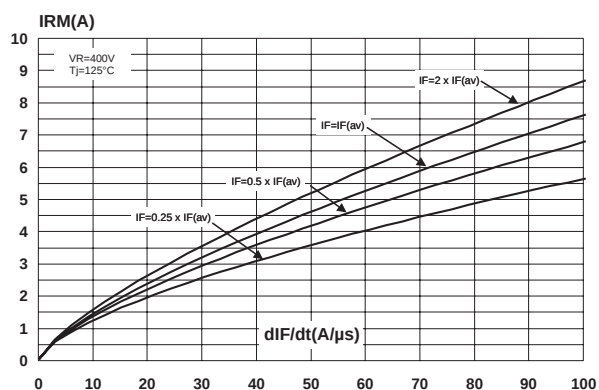
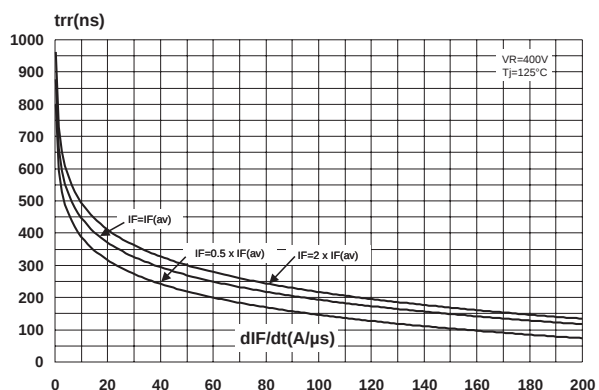
| Symbol | Parameter               | Tests conditions |                     | Min. | Typ. | Max. | Unit    |
|--------|-------------------------|------------------|---------------------|------|------|------|---------|
| $I_R$  | Reverse leakage current | $V_R = 600V$     | $T_j = 25^\circ C$  |      |      | 8    | $\mu A$ |
|        |                         |                  | $T_j = 150^\circ C$ |      | 16   | 200  |         |
| $V_F$  | Forward voltage drop    | $I_F = 8 A$      | $T_j = 25^\circ C$  |      |      | 1.3  | V       |
|        |                         |                  | $T_j = 150^\circ C$ |      | 0.85 | 1.05 |         |

To evaluate the maximum conduction losses use the following equation :

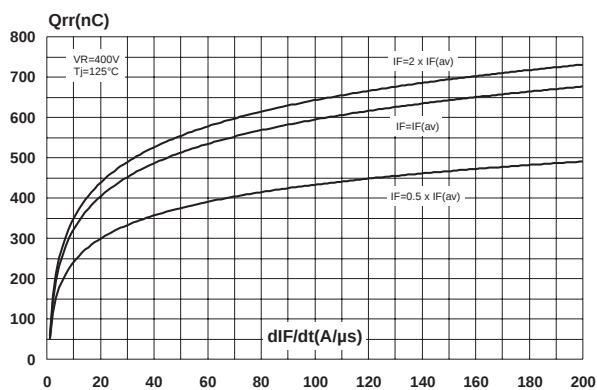
$$P = 0.89 \times I_{F(AV)} + 0.022 I_F^2 (RMS)$$

## DYNAMIC ELECTRICAL CHARACTERISTICS

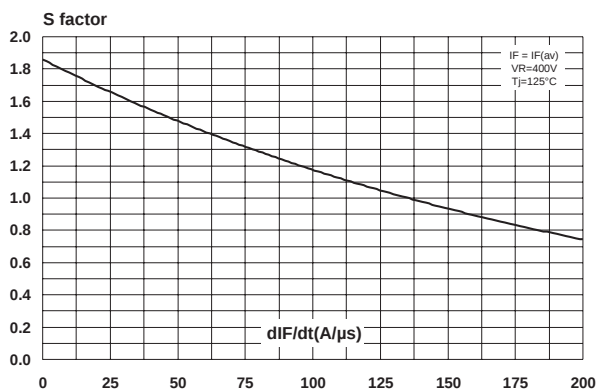
| Symbol   | Parameter             | Tests conditions                                                      |                    | Min. | Typ. | Max. | Unit |
|----------|-----------------------|-----------------------------------------------------------------------|--------------------|------|------|------|------|
| trr      | Reverse recovery time | $I_F = 1 A$ $di_F/dt = 50 A/\mu s$<br>$V_R = 30V$                     | $T_j = 25^\circ C$ |      | 75   | 105  | ns   |
| tfr      | Forward recovery time | $I_F = 8 A$ $di_F/dt = 100 A/\mu s$<br>$V_{FR} = 1.1 \times V_{Fmax}$ | $T_j = 25^\circ C$ |      |      | 150  | ns   |
| $V_{FP}$ | Peak forward voltage  | $I_F = 8 A$ $di_F/dt = 100 A/\mu s$                                   | $T_j = 25^\circ C$ |      |      | 6    | V    |

**Fig. 1:** Conduction losses versus average current.**Fig. 2:** Forward voltage drop versus forward current.**Fig. 3-1:** Relative variation of thermal impedance junction to case versus pulse duration (TO-220AC)**Fig. 3-2:** Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAC)**Fig. 4:** Peak reverse recovery current versus  $dI_F/dt$  (90% confidence).**Fig. 5:** Reverse recovery time versus  $dI_F/dt$  (90% confidence).

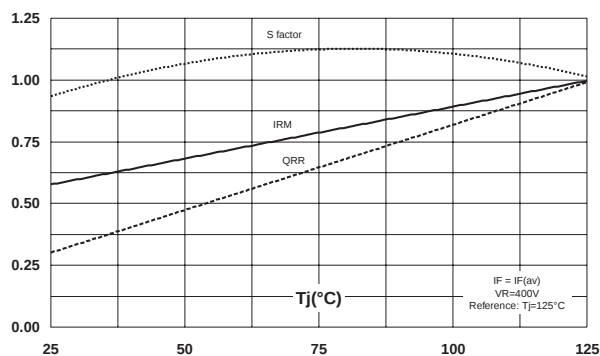
**Fig. 6:** Reverse recovery charges versus  $di_F/dt$  (90% confidence).



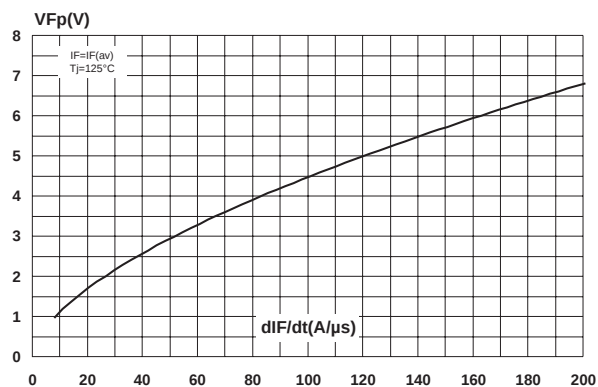
**Fig. 7:** Softness factor versus  $di_F/dt$  (typical values).



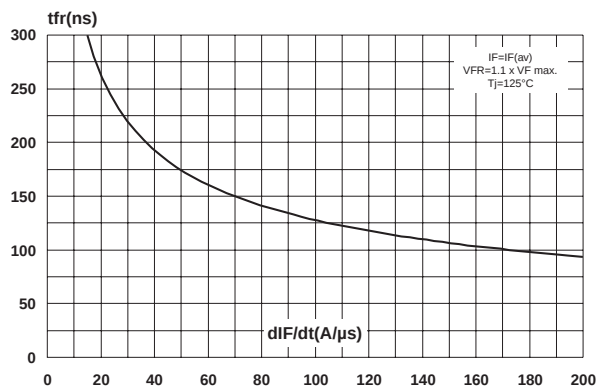
**Fig. 8:** Relative variations of dynamic parameters versus junction temperature.



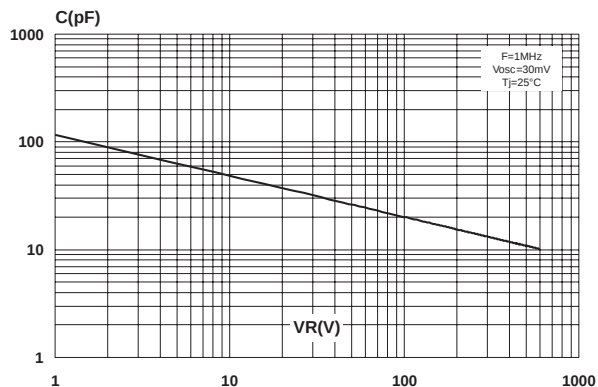
**Fig. 9:** Transient peak forward voltage versus  $di_F/dt$  (90% confidence).

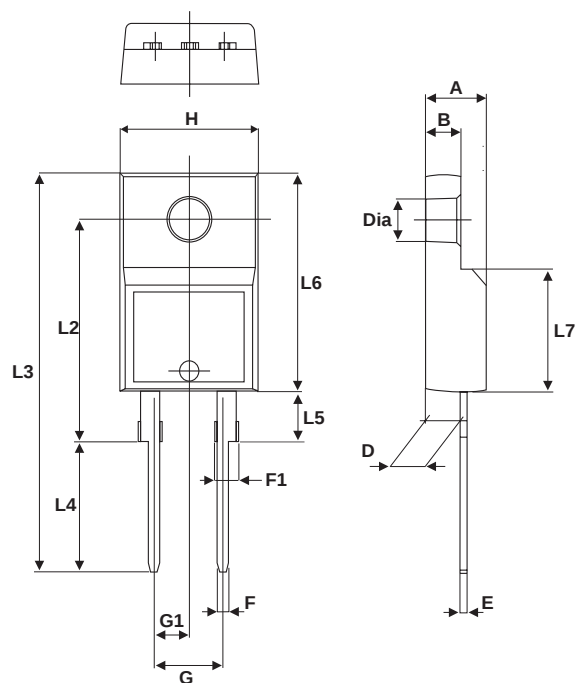


**Fig. 10:** Forward recovery time versus  $di_F/dt$  (90% confidence).



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



**PACKAGE MECHANICAL DATA**  
 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 |

**PACKAGE MECHANICAL DATA**  
 TO-220FPAC

| REF. | DIMENSIONS  |      |           |       |
|------|-------------|------|-----------|-------|
|      | Millimeters |      | Inches    |       |
|      | Min.        | Max. | Min.      | Max.  |
| A    | 4.4         | 4.6  | 0.173     | 0.181 |
| B    | 2.5         | 2.7  | 0.098     | 0.106 |
| D    | 2.5         | 2.75 | 0.098     | 0.108 |
| E    | 0.45        | 0.70 | 0.018     | 0.027 |
| F    | 0.75        | 1    | 0.030     | 0.039 |
| F1   | 1.15        | 1.70 | 0.045     | 0.067 |
| G    | 4.95        | 5.20 | 0.195     | 0.205 |
| G1   | 2.4         | 2.7  | 0.094     | 0.106 |
| H    | 10          | 10.4 | 0.393     | 0.409 |
| L2   | 16 Typ.     |      | 0.63 Typ. |       |
| L3   | 28.6        | 30.6 | 1.126     | 1.205 |
| L4   | 9.8         | 10.6 | 0.386     | 0.417 |
| L5   | 2.9         | 3.6  | 0.114     | 0.142 |
| L6   | 15.9        | 16.4 | 0.626     | 0.646 |
| L7   | 9.00        | 9.30 | 0.354     | 0.366 |
| Dia. | 3.00        | 3.20 | 0.118     | 0.126 |

| Ordering code | Marking    | Package    | Weight | Base qty | Delivery mode |
|---------------|------------|------------|--------|----------|---------------|
| STTH8L06D     | STTH8L06D  | TO-220AC   | 1.9 g  | 50       | Tube          |
| STTH8L06FP    | STTH8L06FP | TO-220FPAC | 1.7 g  | 50       | Tube          |

- Epoxy meets UL 94,V0
- Recommended torque value (TO-220AC): 0.55 Nm
- Maximum torque value (TO-220AC / TO-220FPAC): 0.7 Nm

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