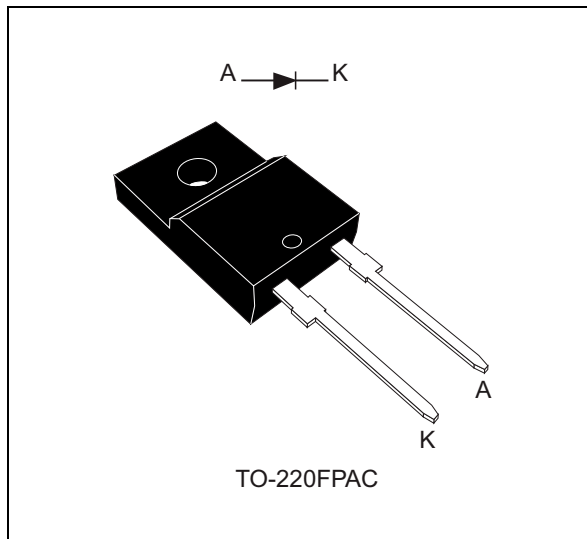


Turbo 2 ultrafast high voltage rectifier

Datasheet – production data



Features

- Ultrafast switching
- Low reverse current
- Reduces switching and conduction losses
- Low thermal resistance
- Insulated package TO-220FPAC:
 - Insulated voltage: 2000 V_{RMS} sine

Description

The STTH15AC06 uses ST Turbo 2 600 V technology and is suited as a boost diode in air conditioning equipment for continuous mode interleaved power factor correction.

The device is also intended for use as a freewheeling diode in power supplies and other power switching applications.

Table 1. Device summary

| Symbol | Value |
|----------------|--------|
| $I_{F(AV)}$ | 15 A |
| V_{RRM} | 600 V |
| t_{rr} (typ) | 40 ns |
| V_F (typ) | 1.15 V |
| T_j (max) | 175 °C |

1 Characteristics

Table 2. Absolute ratings (limiting values at 25 °C, unless otherwise specified)

| Symbol | Parameter | Value | Unit | |
|--------------|--|--------------------------|------|---|
| V_{RRM} | Repetitive peak reverse voltage | 600 | V | |
| $I_{F(RMS)}$ | Forward rms current | 30 | A | |
| $I_{F(AV)}$ | Average forward current | 15 | A | |
| I_{FSM} | Surge non repetitive forward current | $t_p = 10$ ms sinusoidal | 120 | A |
| T_{stg} | Storage temperature range | -65 to +175 | °C | |
| T_j | Maximum operating junction temperature | 175 | °C | |

Table 3. Thermal parameters

| Symbol | Parameter | Value | Unit |
|---------------|------------------|-------|------|
| $R_{th(j-c)}$ | Junction to case | 4.4 | °C/W |

Table 4. Static electrical characteristics

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|-------------|-------------------------|-----------------|-----------------|------|------|---------|
| $I_R^{(1)}$ | Reverse leakage current | $T_j = 25$ °C | $V_R = V_{RRM}$ | | 2 | μ A |
| | | $T_j = 150$ °C | | 20 | 200 | |
| $V_F^{(2)}$ | Forward voltage drop | $T_j = 25$ °C | $I_F = 15$ A | | 1.9 | V |
| | | $T_j = 150$ °C | | 1.15 | 1.50 | |

1. Pulse test: $t_p = 5$ ms, $\delta < 2\%$
2. Pulse test: $t_p = 380$ μ s, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 1.2 \times I_{F(AV)} + 0.02 I_{F(RMS)}^2$$

Table 5. 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 | | 30 | ns | |
| | | | | 40 | 55 | | |
| I_{RM} | Reverse recovery current | $T_j = 125$ °C | $I_F = 15$ A, $V_R = 400$ V, $di_F/dt = -100$ A/ μ s | | 4.4 | 6 | A |
| t_{fr} | Forward recovery time | $T_j = 25$ °C | $I_F = 15$ A, $V_{FR} = 1.6$ V, $di_F/dt = 100$ A/ μ s | | 300 | ns | |
| V_{FP} | Forward recovery voltage | | | | 2.5 | V | |

Figure 1. Average forward power dissipation versus average forward current

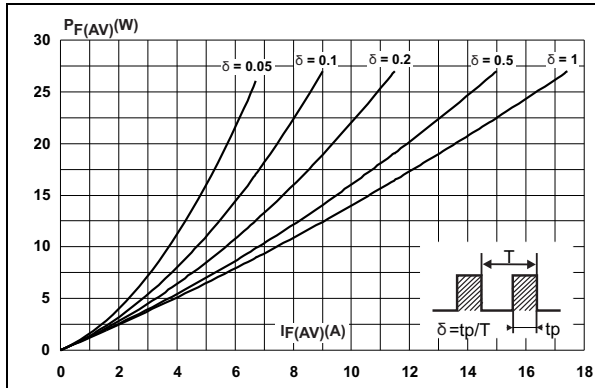


Figure 2. Forward voltage drop versus forward current (typical values)

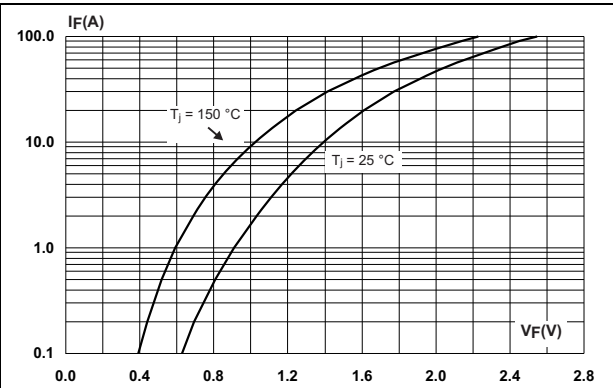


Figure 3. Forward voltage drop versus forward current (maximum values)

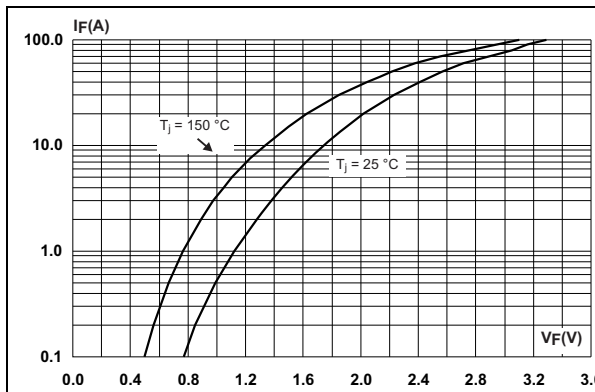


Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration

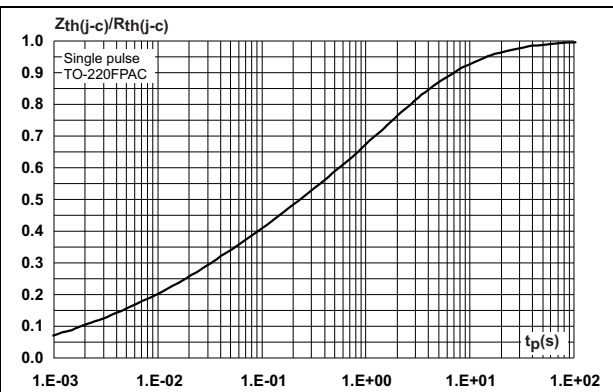


Figure 5. Peak reverse recovery current versus di_F/dt (typical values)

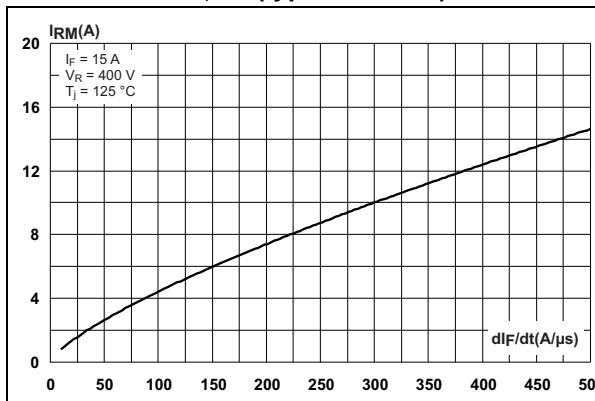


Figure 6. Reverse recovery time versus di_F/dt (typical values)

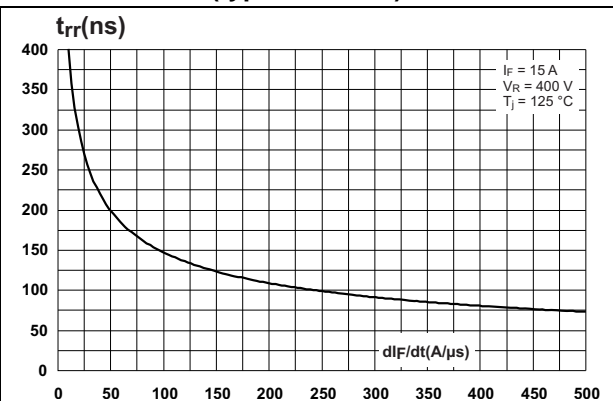


Figure 7. Reverse recovery charges versus di_F/dt (typical values)

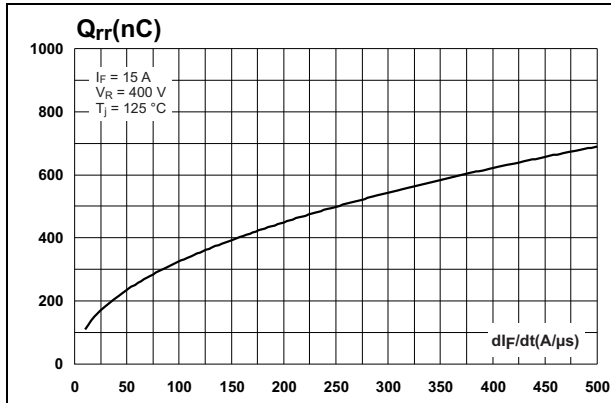


Figure 8. Reverse recovery softness factor versus di_F/dt (typical values)

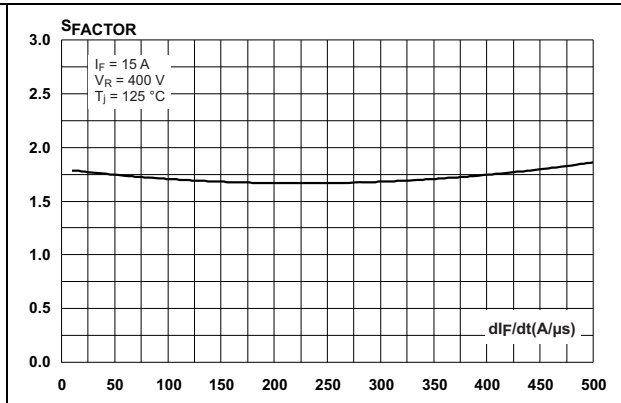


Figure 9. Relative variations of dynamic parameters versus junction temperature

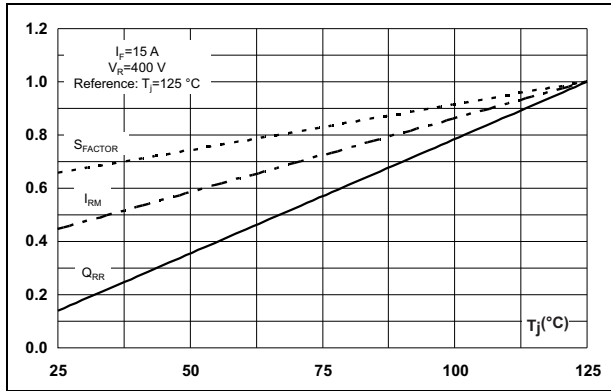


Figure 10. Transient peak forward voltage versus di_F/dt (typical values)

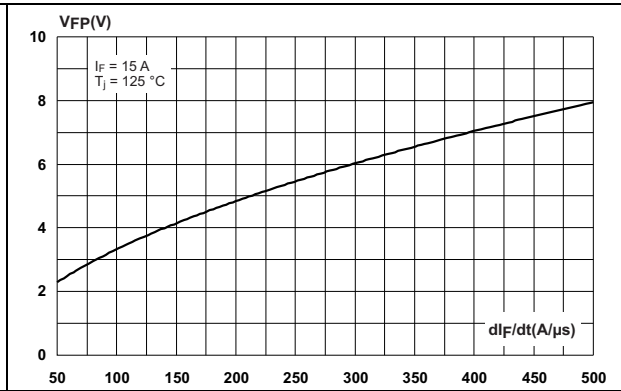


Figure 11. Forward recovery time versus di_F/dt (typical values)

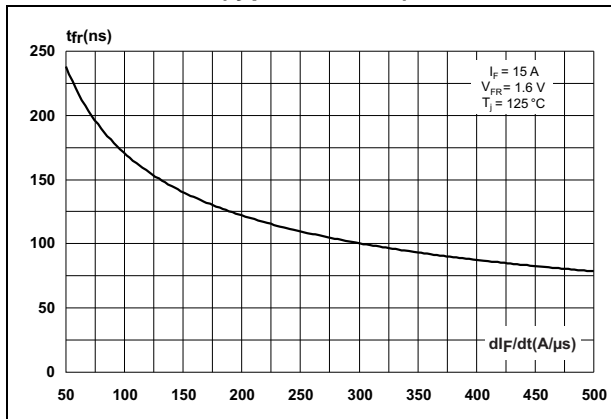
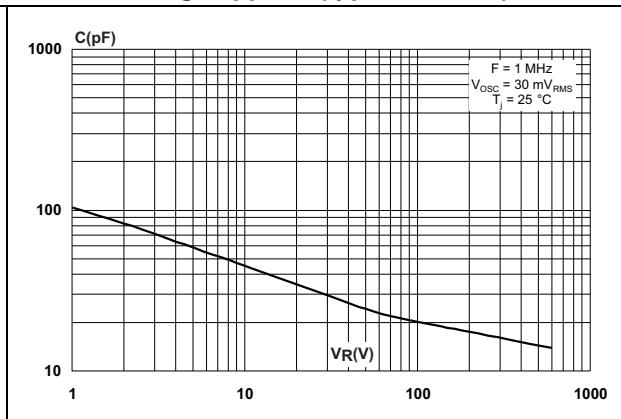


Figure 12. Junction capacitance versus reverse voltage applied (typical values)



2 Package information

- Epoxy meets UL94, V0
- Recommended torque value for TO-220FPAC: 0.55 N·m
- Maximum torque value for TO-220FPAC: 0.7 N·m

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK[®] packages, depending on their level of environmental compliance. ECOPACK[®] specifications, grade definitions and product status are available at: www.st.com. ECOPACK[®] is an ST trademark.

2.1 TO-220FPAC package information

Figure 13. TO-220FPAC package outline

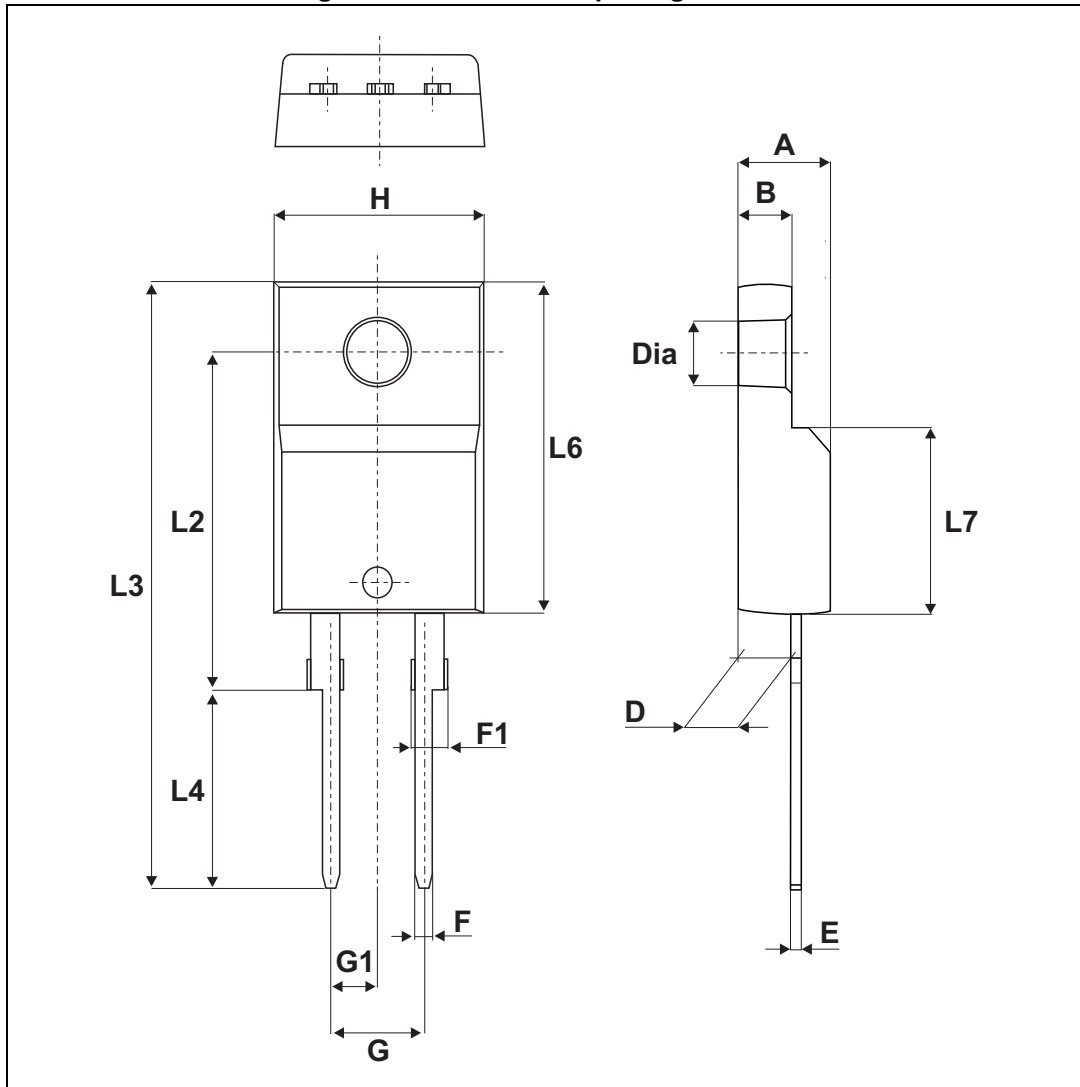


Table 6. TO-220FPAC package mechanical data

| Ref. | Dimensions | | | | | |
|------|-------------|---------|------|--------|-----------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | 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 |
| 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 |

3 Ordering information

Table 7. Ordering information

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|--------------|--------------|------------|--------|----------|---------------|
| STTH15AC06FP | STTH15AC06FP | TO-220FPAC | 1.8 g | 50 | Tube |

4 Revision history

Table 8. Document revision history

| Date | Revision | Changes |
|-------------|----------|--|
| 17-Apr-2014 | 1 | First release. |
| 24-Apr-2015 | 2 | Updated Features and Table 3 . |

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