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Jameco Part Number 2036445

TURBO 2 ULTRAFast HIGH VOLTAGE RECTIFIER
Table 1: Main Product Characteristics

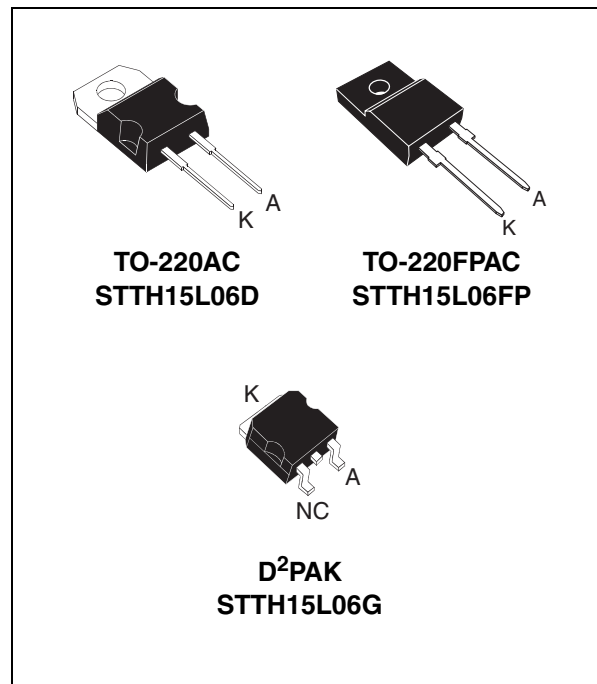
| | |
|----------------|-------------------|
| $I_{F(AV)}$ | Up to 20 A |
| V_{RRM} | 600 V |
| T_j | 175°C |
| V_F (typ) | 0.95 V |
| t_{rr} (max) | 55 ns |

FEATURES AND BENEFITS

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

DESCRIPTION

The STTH15L06, which is using ST Turbo 2 600V technology, is specially suited for use in switching power supplies, and industrial applications, as rectification and discontinuous mode PFC boost diode.


Table 2: Order Codes

| Part Number | Marking |
|---------------|-------------|
| STTH15L06D | STTH15L06D |
| STTH15L06G | STTH15L06G |
| STTH15L06G-TR | STTH15L06G |
| STTH15L06FP | STTH15L06FP |

Table 3: Absolute Ratings (limiting values)

| Symbol | Parameter | | Value | Unit | |
|--------------|----------------------------------------|----------------------------------|----------------------------------------------------------------------------------------------|----------|---|
| V_{RRM} | Repetitive peak reverse voltage | | 600 | V | |
| $I_{F(RMS)}$ | RMS forward voltage | | 30 | A | |
| $I_{F(AV)}$ | Average forward current | TO-220AC / D ² PAK | $T_c = 140^\circ\text{C} \quad \delta = 0.5$ $T_c = 120^\circ\text{C} \quad \delta = 0.5$ | 15 20 | A |
| | | TO-220FPAC | $T_c = 90^\circ\text{C} \quad \delta = 0.5$ | 15 | |
| | Surge non repetitive forward current | $t_p = 10\text{ms}$ sinusoidal | 130 | A | |
| T_{stg} | Storage temperature range | | -65 to + 175 | °C | |
| T_j | Maximum operating junction temperature | | 175 | °C | |

Table 4: Thermal Resistance

| Symbol | Parameter | | Value (max.) | Unit |
|---------------|------------------|-------------------------------|--------------|------|
| $R_{th(j-c)}$ | Junction to case | TO-220AC / D ² PAK | 1.7 | °C/W |
| | | TO-220FPAC | 4 | |

Table 5: Static Electrical Characteristics (per diode)

| Symbol | Parameter | Test conditions | | Min. | Typ | Max. | Unit |
|------------|-------------------------|---------------------------|--------------------|------|-----|------|---------------|
| I_R^* | Reverse leakage current | $T_j = 25^\circ\text{C}$ | $V_R = V_{RRM}$ | | | 15 | μA |
| | | $T_j = 150^\circ\text{C}$ | | 40 | 400 | | |
| V_F^{**} | Forward voltage drop | $T_j = 25^\circ\text{C}$ | $I_F = 15\text{A}$ | | | 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: $P = 0.94 \times I_{F(AV)} + 0.017 I_F^2(\text{RMS})$

Table 6: Dynamic Characteristics

| Symbol | Parameter | Test conditions | | | Min. | Typ | Max. | Unit |
|----------|--------------------------|---------------------------|-------------------------------------------------------------------------------------------|--|------|-----|------|------|
| t_{rr} | Reverse recovery time | $T_j = 25^\circ\text{C}$ | $I_F = 0.5\text{A}$ $I_{rr} = 0.25\text{A}$ $I_R = 1\text{A}$ | | | 55 | ns | |
| | | | $I_F = 1\text{A}$ $di_F/dt = 50\text{ A}/\mu\text{s}$ $V_R = 30\text{V}$ | | 60 | 85 | | |
| I_{RM} | Reverse recovery current | $T_j = 125^\circ\text{C}$ | $I_F = 15\text{A}$ $V_R = 400\text{V}$ $di_F/dt = 100\text{ A}/\mu\text{s}$ | | 8.5 | 12 | A | |
| t_{fr} | Forward recovery time | $T_j = 25^\circ\text{C}$ | $I_F = 15\text{A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$ | | | 300 | ns | |
| V_{FP} | Forward recovery voltage | $T_j = 25^\circ\text{C}$ | $I_F = 15\text{A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$ | | 3 | | V | |

Figure 1: Conduction losses versus average forward current

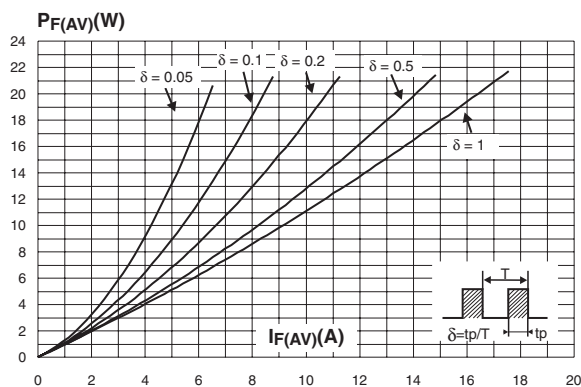


Figure 2: Forward voltage drop versus forward current

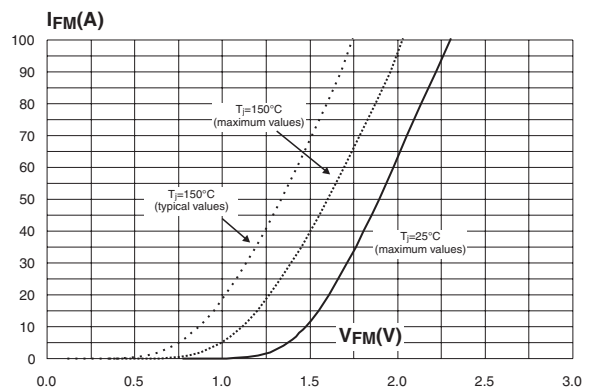


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration (TO-220AC & D²PAK)

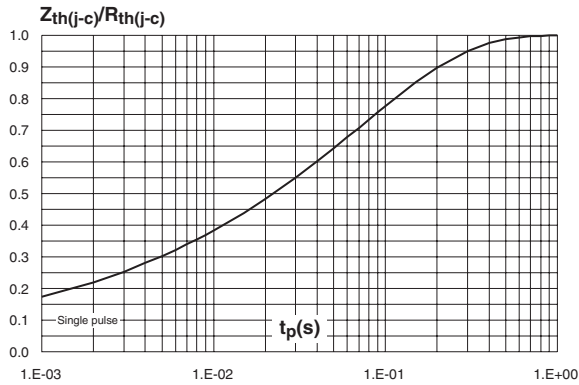


Figure 4: Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAC)

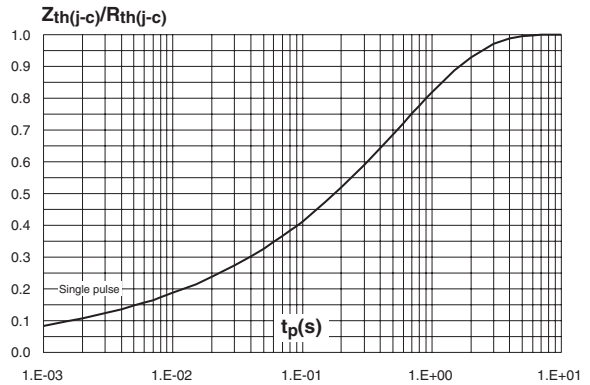


Figure 5: Peak reverse recovery current versus di_F/dt (typical values)

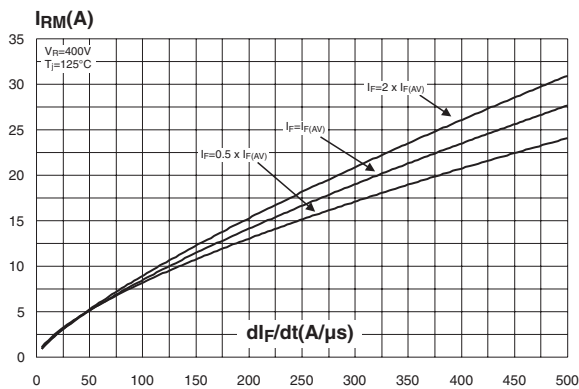


Figure 6: Reverse recovery time versus di_F/dt (typical values)

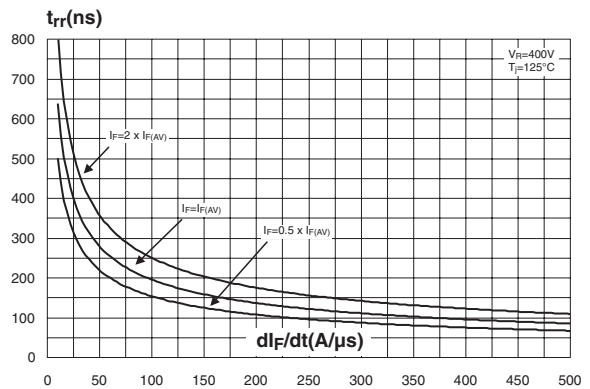


Figure 7: Reverse recovery charges versus di_F/dt (typical values)

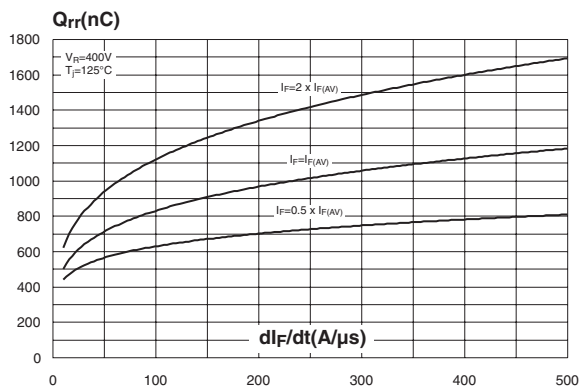


Figure 8: Reverse recovery softness factor versus di_F/dt (typical values)

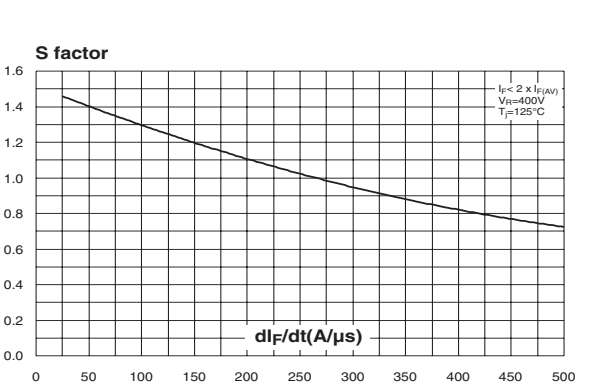


Figure 9: Relative variations of dynamic parameters versus junction temperature

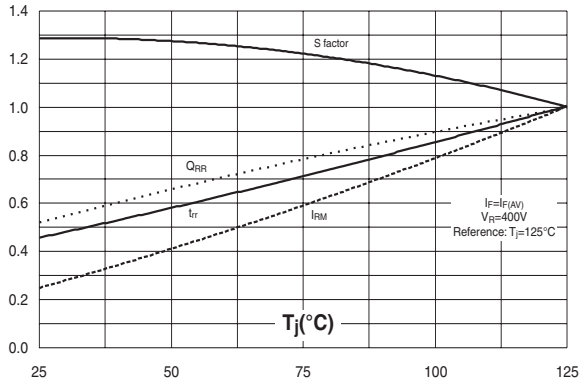


Figure 10: Transient peak forward voltage versus di_F/dt (typical values)

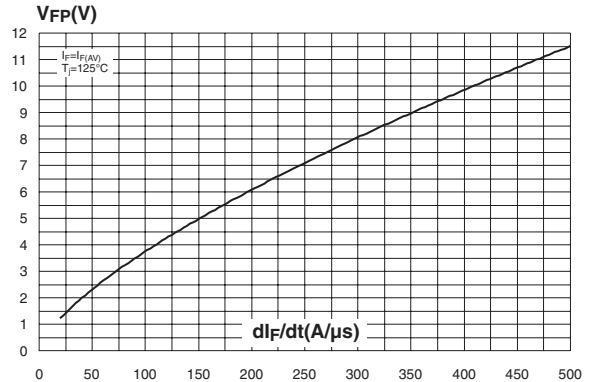


Figure 11: Forward recovery time versus di_F/dt (typical values)

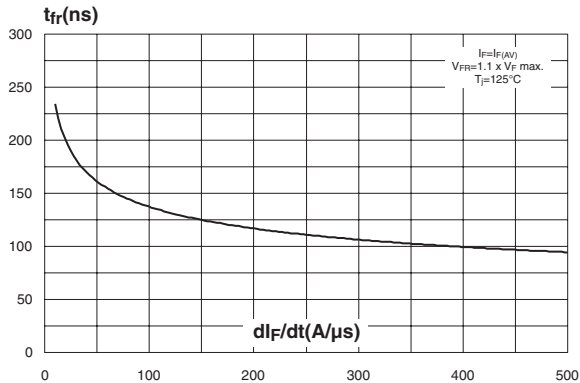


Figure 12: Junction capacitance versus reverse voltage applied (typical values)

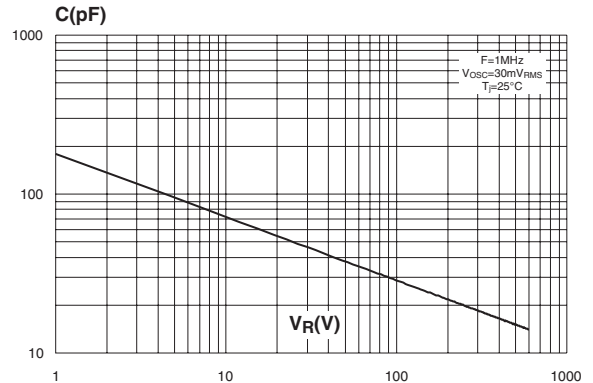


Figure 13: Thermal resistance junction to ambient versus copper surface under tab (epoxy FR4, $e_{CU} = 35\mu m$) (D²PAK)

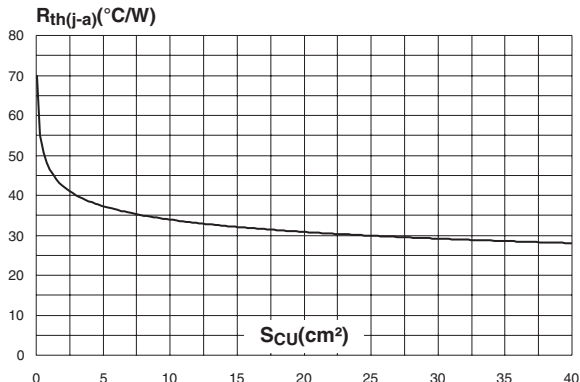


Figure 14: D²PAK Package Mechanical Data

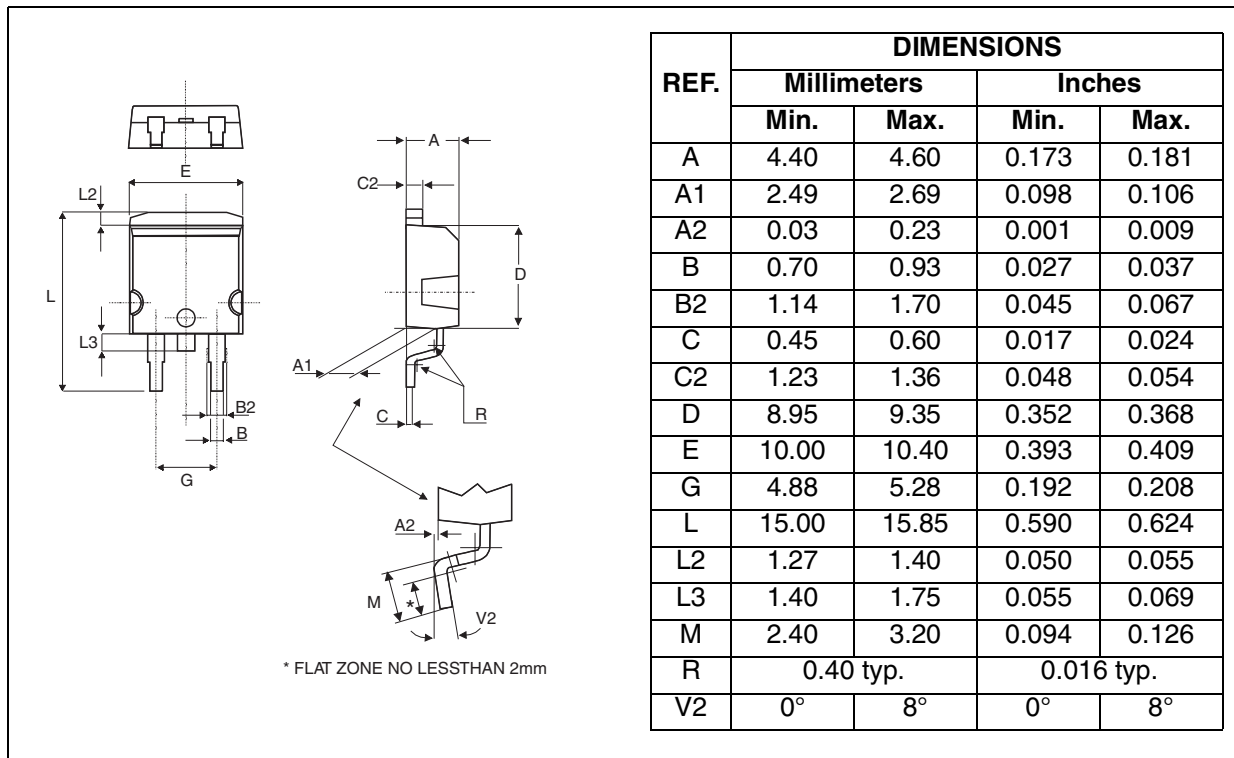


Figure 15: D²PAK Foot Print Dimensions (in millimeters)

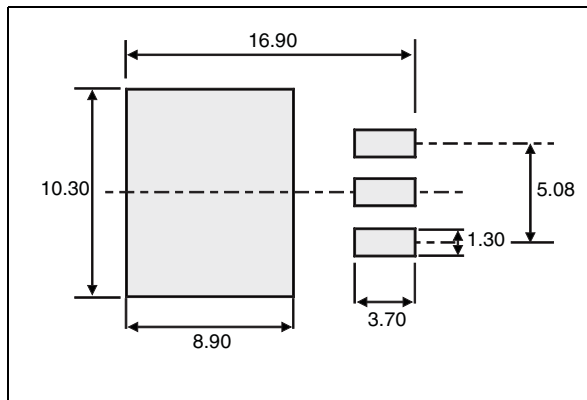


Figure 16: TO-220FPAC Package Mechanical Data

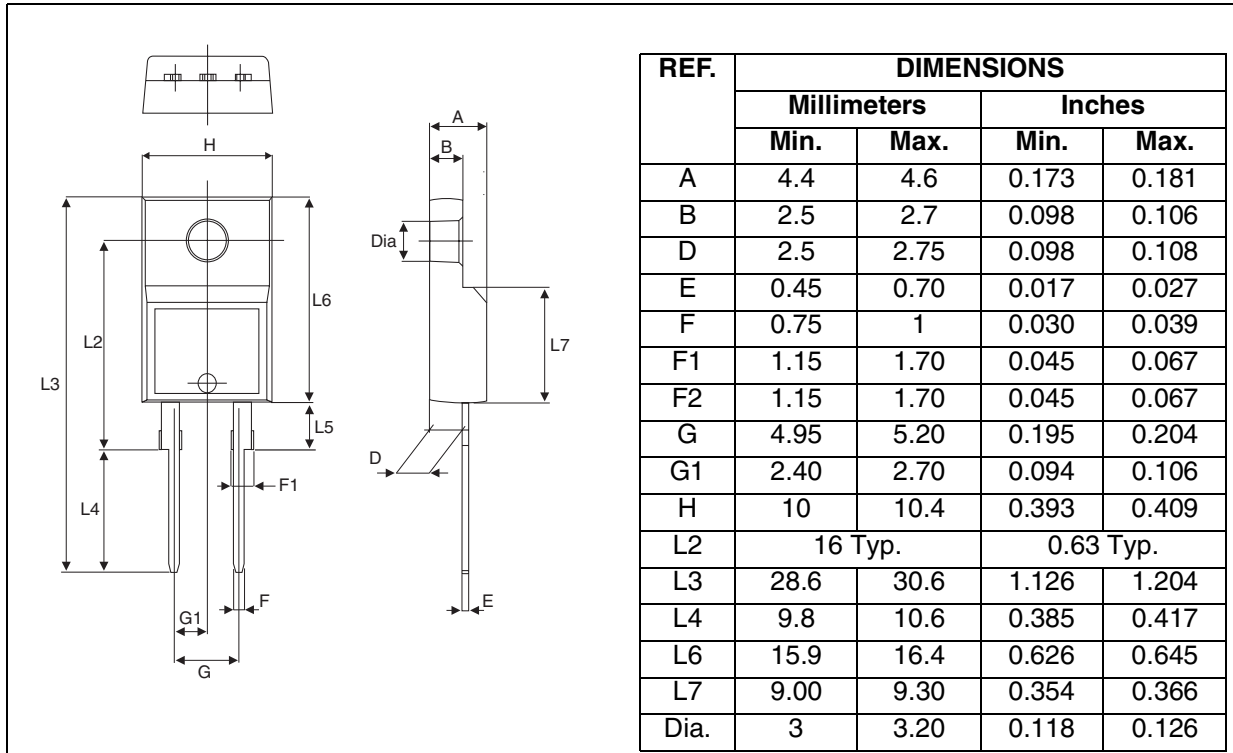


Figure 17: TO-220AC Package Mechanical Data

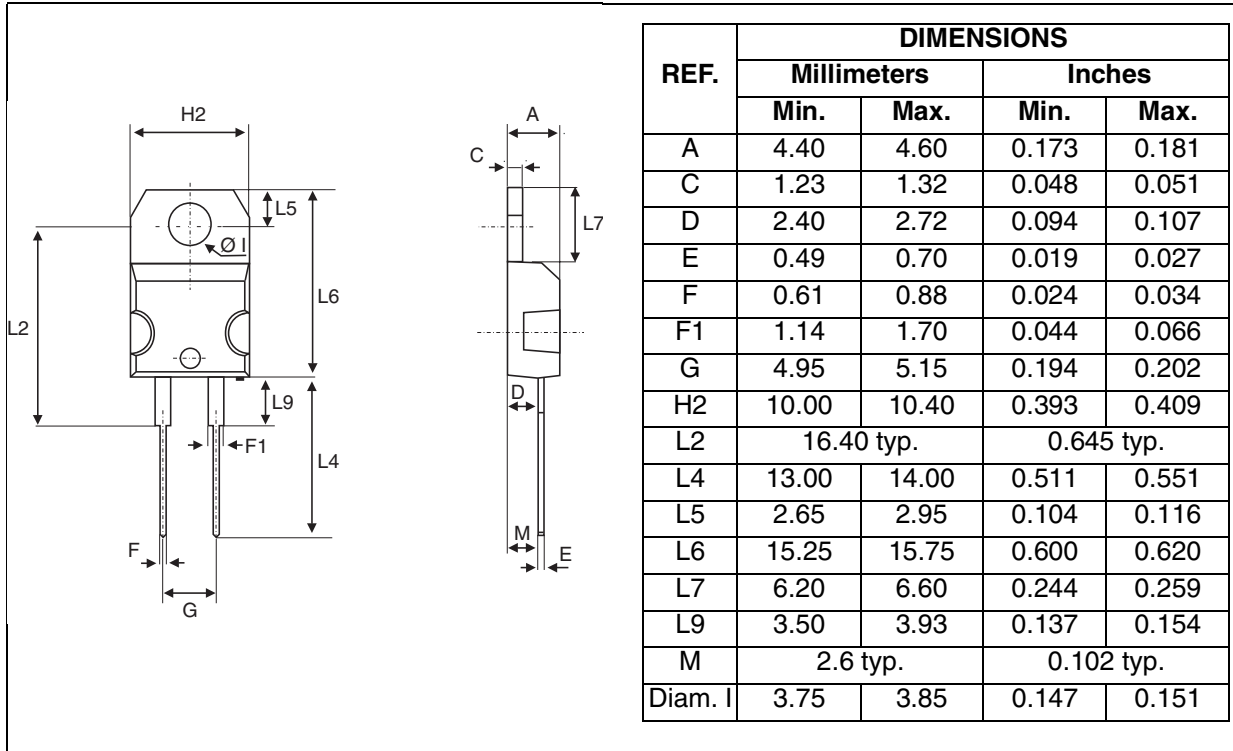


Table 7: Ordering Information

| Ordering type | Marking | Package | Weight | Base qty | Delivery mode |
|---------------|-------------|--------------------|--------|----------|---------------|
| STTH15L06D | STTH15L06D | TO-220AC | 1.90 g | 50 | Tube |
| STTH15L06G | STTH15L06G | D ² PAK | 1.48 g | 50 | Tube |
| STTH15L06G-TR | STTH15L06G | D ² PAK | 1.48 g | 1000 | Tape & eel |
| STTH15L06FP | STTH15L06FP | TO-220FPAC | 1.70 g | 50 | Tube |

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.8 m.N. (TO-220FPAC) / 0.55 m.N. (TO-220AC)
- Maximum torque value: 1.0 m.N. (TO-220FPAC) / 0.70 m.N. (TO-220AC)

Table 8: Revision History

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

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