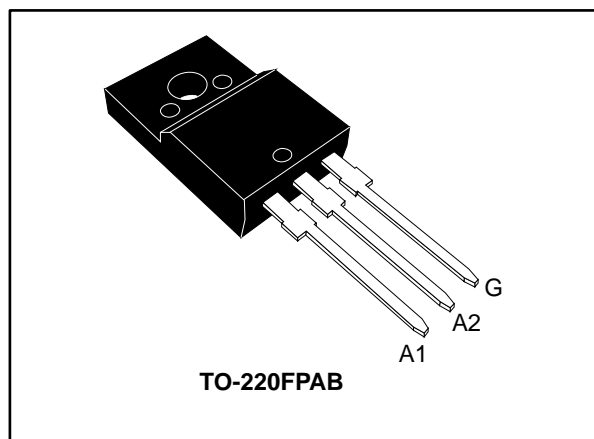


4 A logic level Triac

Datasheet - production data



Description

Based on ST's logic level technology providing high commutation performance, this device is suitable for use on AC low current loads. It is recommended for motor driving, electro valves, kitchen appliances, power tools and dishwashers. Available in a fully insulated package, it complies with standard UL1557.

Table 1: Device summary

| Symbol | Value | Unit |
|--------------------|------------|------|
| $I_{T(RMS)}$ | 4 | A |
| V_{DRM}/V_{RRM} | 600 | V |
| I_{GT} | 5 | mA |
| $T_j \text{ max.}$ | 125 | °C |
| Package | TO-220FPAB | |
| Ordering code | T405T-6FP | |

Features

- Three triggering quadrants Triac
- $V_{DRM} / V_{RRM} = 600 \text{ V}$
- UL certified device rated 2000 V_{RMS} (ref. file E81734)
- ECOPACK®2 compliant component
- Halogen-free molding, lead-free plating

Applications

- General purpose AC inductive loads
- Induction motor control circuits
- Small home appliances

Benefits

- Low gate consumption
- Direct drive from microcontroller
- Direct mounting on heat sink

1 Characteristics

Table 2: Absolute maximum ratings (limiting values)

| Symbol | Parameter | | Value | Unit | |
|--------------|--|---|-------------------------------------|-------------|------------------|
| $I_{T(RMS)}$ | RMS on-state current (full sine wave) | | $T_c = 104\text{ °C}$ | 4 | A |
| I_{TSM} | Non repetitive surge peak on-state current (full sine cycle) | $t_p = 16.7\text{ ms}$ | $T_j\text{ initial} = 25\text{ °C}$ | 31 | A |
| | | $t_p = 20\text{ ms}$ | | 30 | |
| I^2t | I^2t value for fusing | $t_p = 10\text{ ms}$ | $T_j\text{ initial} = 25\text{ °C}$ | 5.1 | A ² s |
| di/dt | Critical rate of rise of on-state current | $I_G = 2 \times I_{GT}$, $t_r \leq 100\text{ ns}$ | $f = 120\text{ Hz}$ | 50 | A/ μ s |
| I_{GM} | Peak gate current | $t_p = 20\text{ }\mu$ s | $T_j = 125\text{ °C}$ | 4 | A |
| P_{GM} | Maximum gate power dissipation | | | 1 | W |
| T_{stg} | Storage junction temperature range | | | -40 to +150 | °C |
| T_j | Operating junction temperature range | | | -40 to +125 | °C |
| T_L | Maximum lead temperature for soldering during 10 s | | | 260 | °C |
| V_{ins} | Insulation RMS voltage (60 seconds) | | | 2000 | V |

Table 3: Static electrical characteristics

| Symbol | Test conditions | T_j | | Value | Unit |
|------------------------|--|--------|------|-------|------------|
| V_{TM} | $I_{TM} = 5.5\text{ A}$, $t_p = 380\text{ }\mu$ s | 25 °C | Max. | 1.56 | V |
| V_{TO} | threshold on-state voltage | 125 °C | Max. | 0.9 | V |
| R_D | Dynamic resistance | 125 °C | Max. | 100 | m Ω |
| I_{DRM} I_{RRM} | $V_D = V_{DRM}$, $V_R = V_{RRM}$ | 25 °C | Max. | 5 | μ A |
| | | 125 °C | Max. | 1 | mA |

Table 4: Dynamic characteristics

| Symbol | Parameter | Quadrant | T_j | | Value | Unit |
|-------------------|--|--------------|--------|------|-------|------------|
| $I_{GT}^{(1)}$ | $V_D = 12\text{ V}$, $R_L = 30\text{ }\Omega$ | I - II - III | 25 °C | Max. | 5 | mA |
| V_{GT} | | | | Max. | 1.3 | V |
| V_{GD} | $V_D = V_{DRM}$, $R_L = 3.3\text{ k}\Omega$ | | 125 °C | Min. | 0.2 | V |
| I_L | $I_G = 1.2 \times I_{GT}$ | | 25 °C | Max. | 15 | mA |
| I_H | $I_{TM} = 100\text{ mA}$ | | | Max. | 10 | |
| $dV/dt^{(2)}$ | $V_D = V_R = 402\text{ V}$, gate open | | 125 °C | Min. | 20 | V/ μ s |
| $(di/dt)_c^{(2)}$ | $(dV/dt)_c = 0.1\text{ V}/\mu$ s | Min. | | 1.8 | A/ms | |

Notes:

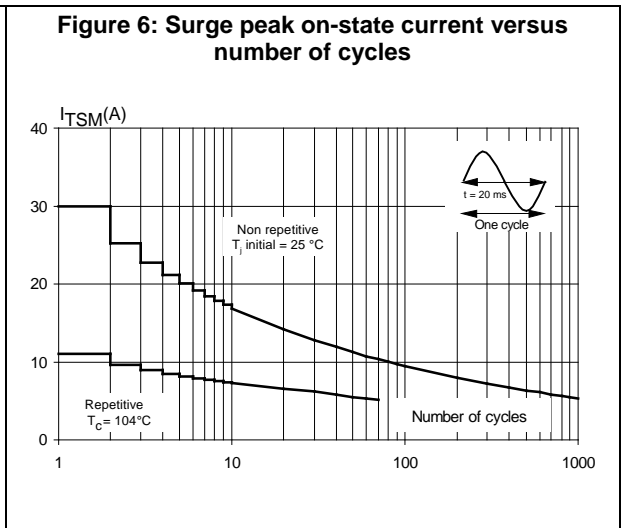
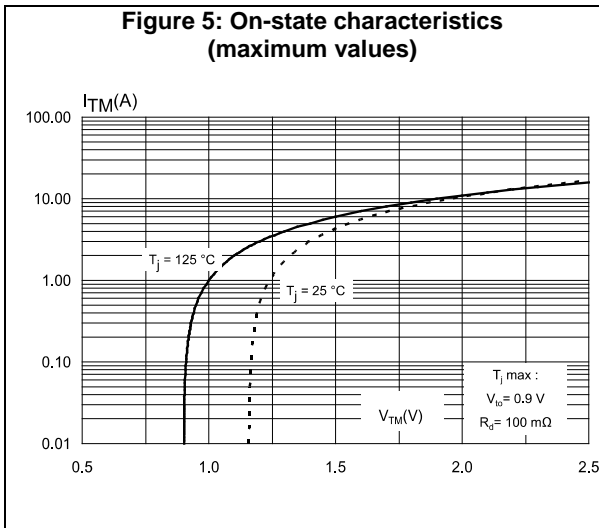
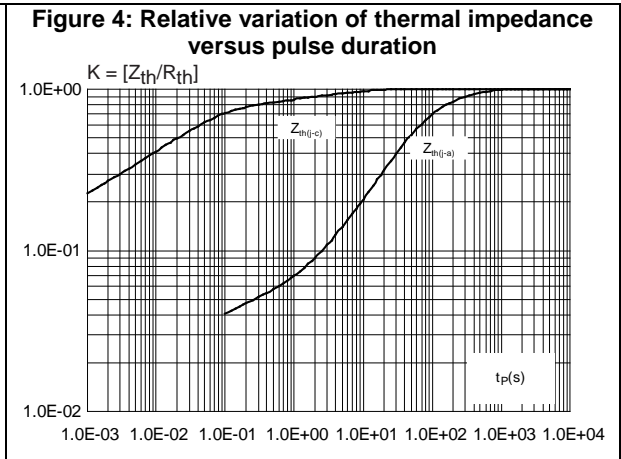
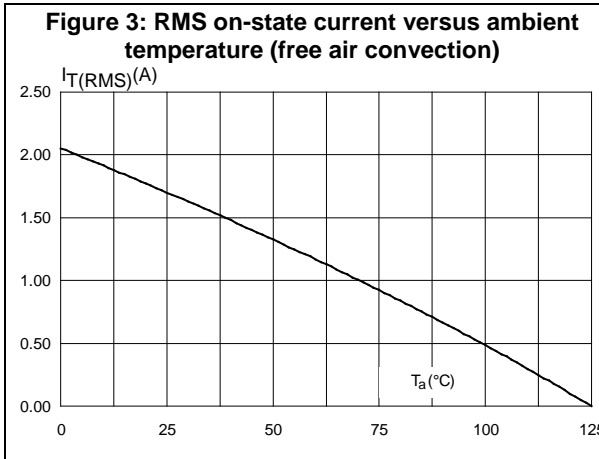
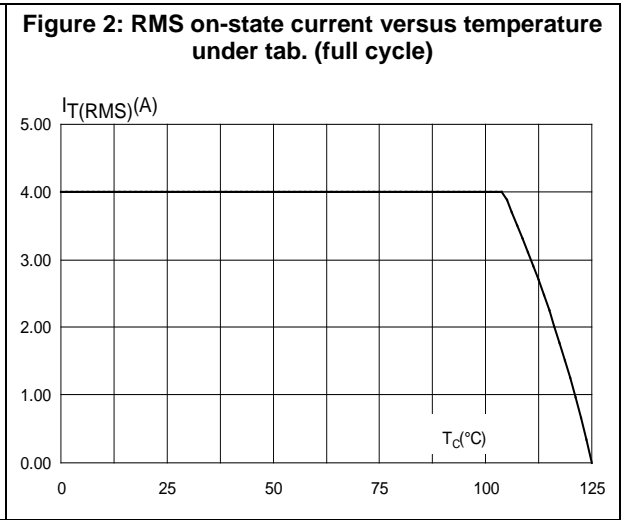
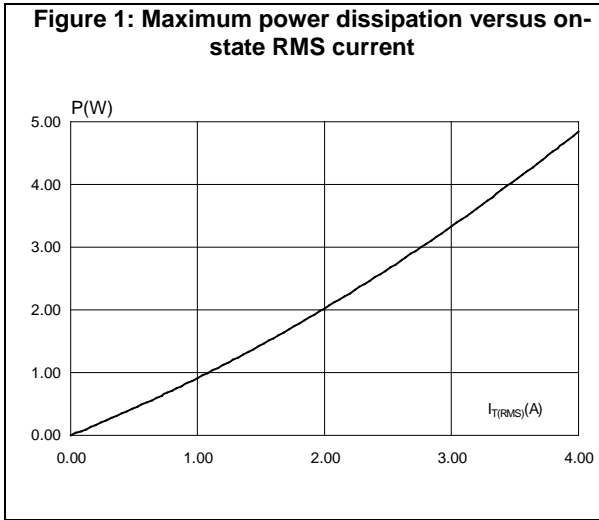
(1) Minimum I_{GT} is guaranteed at 5 % of I_{GT} max.

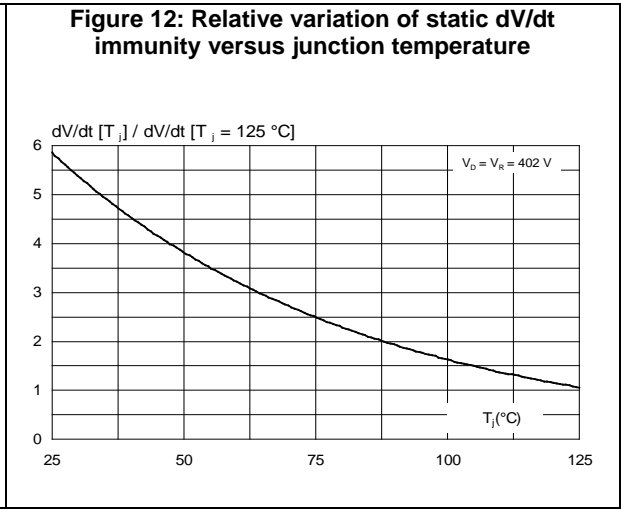
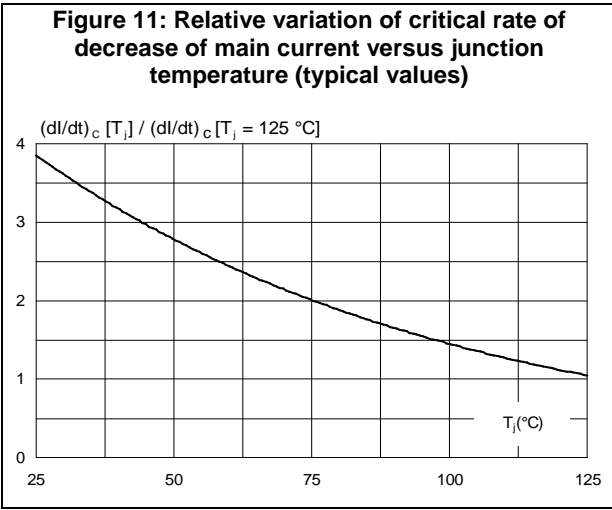
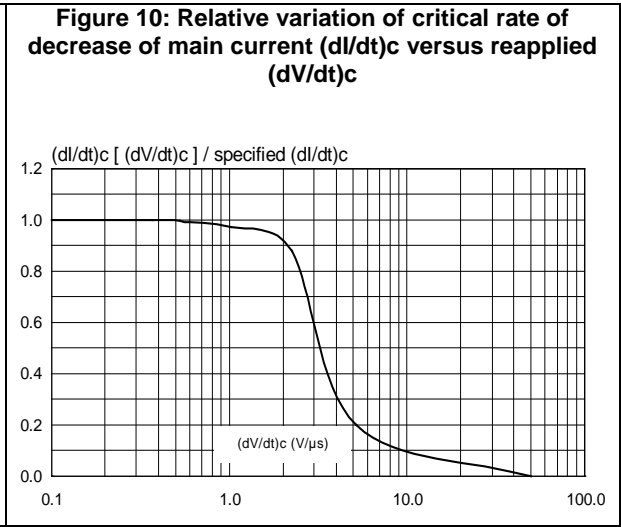
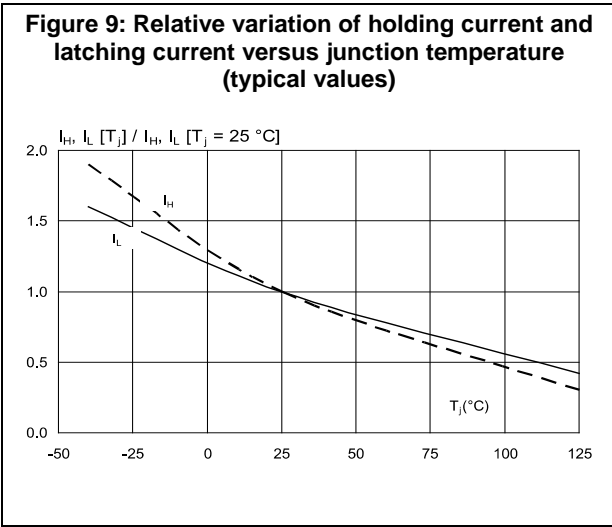
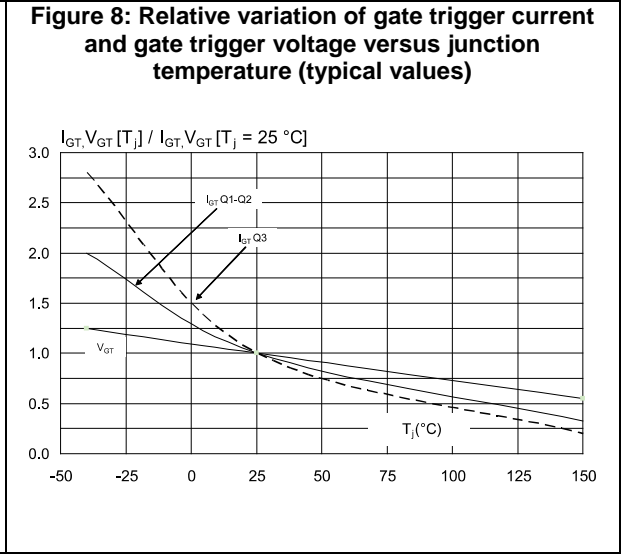
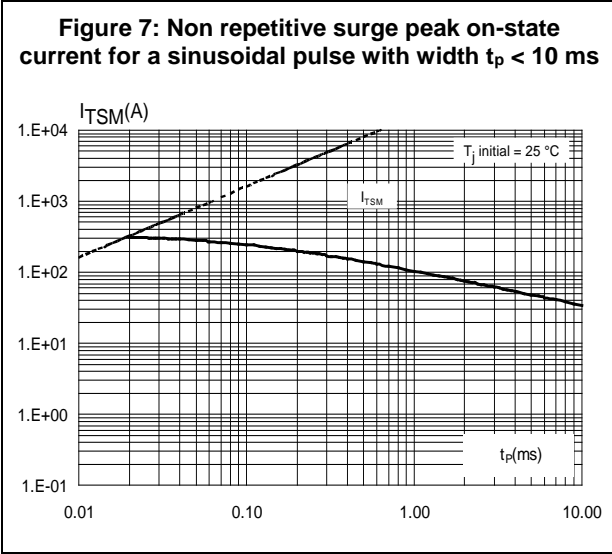
(2) For both polarities of A2 referenced to A1

Table 5: Thermal resistance

| Symbol | Parameter | Value | Unit |
|---------------|--|-------|------|
| $R_{th(j-c)}$ | Max. junction to case thermal resistance (AC) | 4.3 | °C/W |
| $R_{th(j-a)}$ | Typical junction to ambient thermal resistance | 60 | |

1.1 Characteristics (curves)





2 Package information

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.

- ECOPACK®2 compliant
- Lead-free package leads finishing
- Molding compound resin is halogen-free and meets UL94 level V0
- Recommended torque (for through-hole package): 0.4 to 0.6 N·m

2.1 TO-220FPAB package information

Figure 13: TO-220FPAB package outline

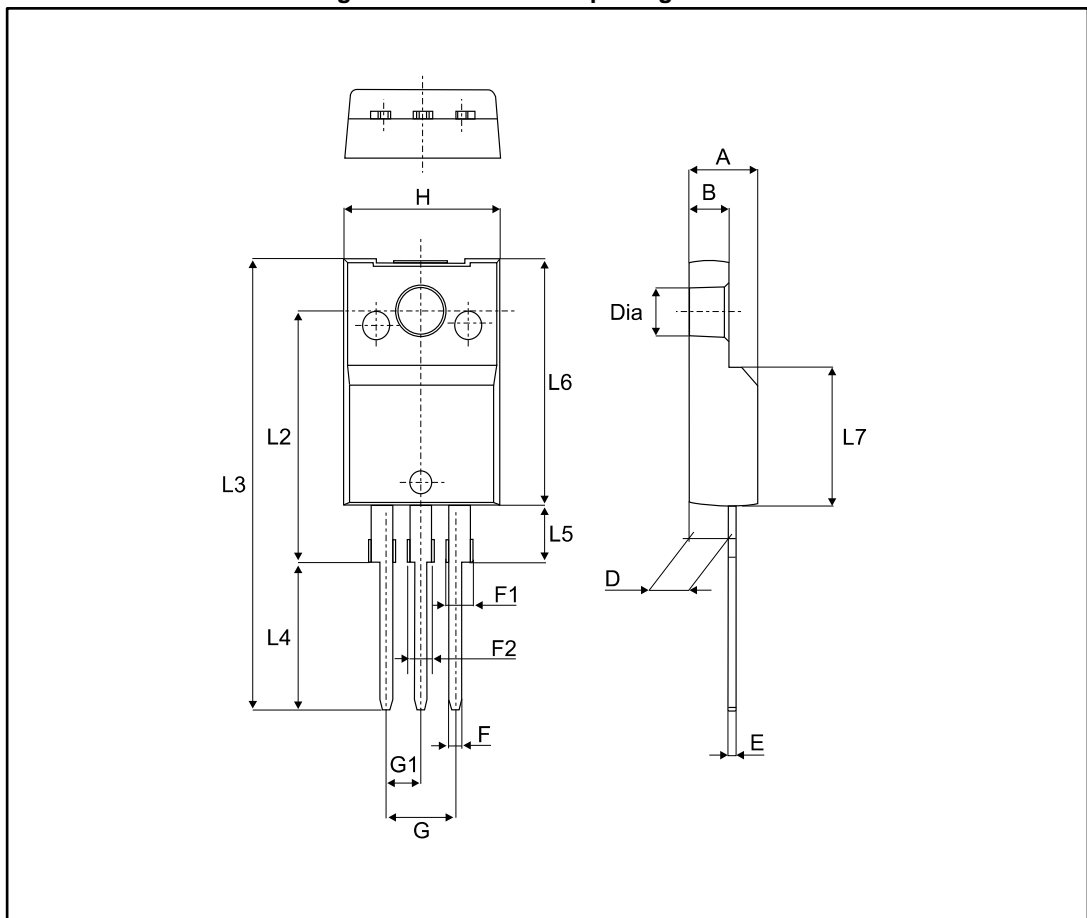


Table 6: TO-220FPAB package mechanical data

| Ref. | Dimensions | | | |
|------|-------------|-------|-------------|--------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.40 | 4.60 | 0.1739 | 0.1818 |
| B | 2.5 | 2.7 | 0.0988 | 0.1067 |
| D | 2.50 | 2.75 | 0.0988 | 0.1087 |
| E | 0.45 | 0.70 | 0.0178 | 0.0277 |
| F | 0.75 | 1.0 | 0.0296 | 0.0395 |
| F1 | 1.15 | 1.70 | 0.0455 | 0.0672 |
| F2 | 1.15 | 1.70 | 0.0455 | 0.0672 |
| G | 4.95 | 5.20 | 0.1957 | 0.2055 |
| G1 | 2.40 | 2.70 | 0.0949 | 0.1067 |
| H | 10.00 | 10.40 | 0.3953 | 0.4111 |
| L2 | 16.00 typ. | | 0.6324 typ. | |
| L3 | 28.60 | 30.60 | 1.1304 | 1.2095 |
| L4 | 9.80 | 10.6 | 0.3874 | 0.4190 |
| L5 | 2.90 | 3.60 | 0.1146 | 0.1423 |
| L6 | 15.90 | 16.40 | 0.6285 | 0.6482 |
| L7 | 9.00 | 9.30 | 0.3557 | 0.3676 |
| Dia | 3.0 | 3.20 | 0.1186 | 0.1265 |

3 Ordering information

Figure 14: Ordering information scheme

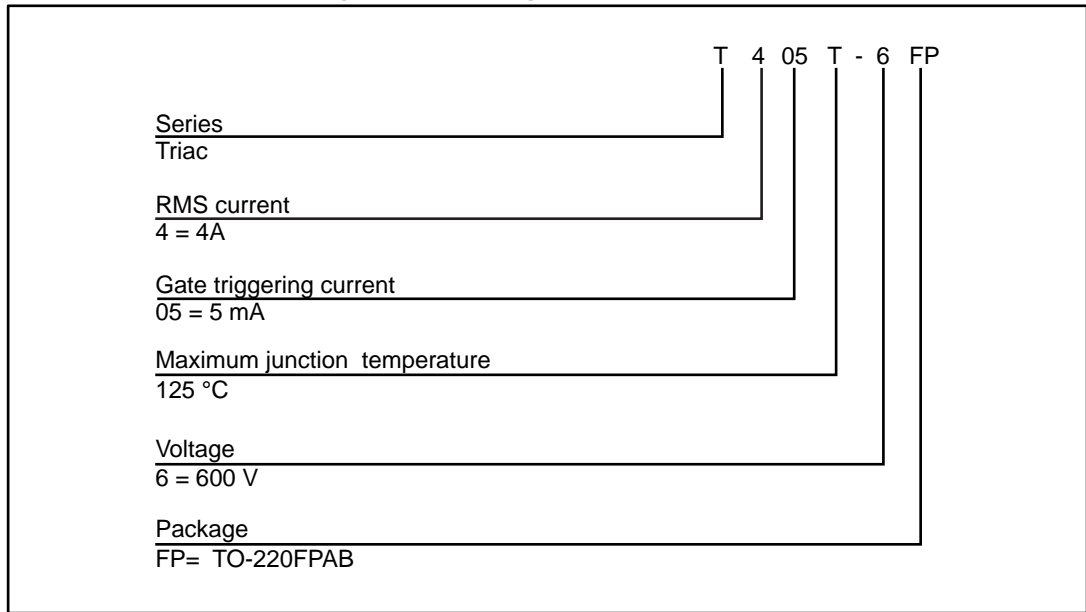


Table 7: Ordering information

| Order code | Marking | Package | Weight | Base qty. | Delivery mode |
|------------|-----------|------------|--------|-----------|---------------|
| T405T-6FP | T405T-6FP | TO-220FPAB | 2.0 g | 50 | Tube |

4 Revision history

Table 8: Document revision history

| Date | Revision | Changes |
|-------------|----------|------------------|
| 04-Nov-2016 | 1 | Initial release. |

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