

Features

- High static and dynamic commutation
- Three quadrants
- Snubberless device
- Package is RoHS (2002/95/EC) compliant
- Tab insulated, voltage = 2500 V rms
- UL certified (ref. file E81734)

Applications

- General purpose AC line load switching
- Home appliances:
 - Fan
 - Pump
 - Solenoid
- Lighting
- Heaters
- Inrush current limiting circuits
- Overvoltage crowbar protection circuits

Description

Available in TO220AB-Ins. (ceramic insulated), the T1620T-8I, and T1635T-8I Triacs can be used as on/off or phase angle function controllers in general purpose AC switching.

These devices can be used without snubber (R + C networks) if the datasheet limits are respected.

Provides insulation rated at 2500 V rms (TO-220AB insulated package).

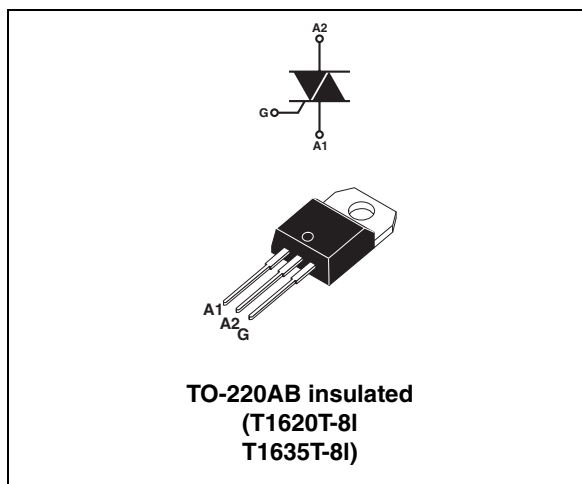


Table 1. Device summary

| Order code | Quadrants | Value I_{GT} (mA) |
|------------|--------------|---------------------|
| T1620T-8I | I - II - III | 20 |
| T1635T-8I | I - II - III | 35 |

TM: Snubberless is a trademark of STMicroelectronics

1 Characteristics

Table 2. Absolute maximum rating ($T_j = 25\text{ °C}$, unless otherwise specified)

| Symbol | Parameter | | Value | Unit | |
|--------------------|--|-------------------------|------------------------|-------------|-------------|
| $I_{T(RMS)}$ | On-state rms current (full sine wave) | | $T_c = 108\text{ °C}$ | 16 | A |
| | | | $T_c = 119\text{ °C}$ | 12 | |
| I_{TSM} | Non repetitive surge peak on-state current (full cycle, T_j initial = 25 °C) | F = 50 Hz | $t_p = 20\text{ ms}$ | 120 | A |
| | | F = 60 Hz | $t_p = 16.7\text{ ms}$ | 126 | |
| I^2t | I^2t Value for fusing | | $t_p = 10\text{ ms}$ | 95 | A^2s |
| V_{DRM}/V_{RRM} | Repetitive peak off-state voltage, gate open | | $T_j = 150\text{ °C}$ | 600 | V |
| | | | $T_j = 125\text{ °C}$ | 800 | |
| V_{DSM}, V_{RSM} | Non repetitive surge peak off-state voltage | $t_p = 10\text{ ms}$ | $T_j = 25\text{ °C}$ | 900 | V |
| di/dt | Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$ | | F = 100 Hz | 100 | A/ μs |
| I_{GM} | Peak gate current | $t_p = 20\text{ }\mu s$ | $T_j = 150\text{ °C}$ | 4 | A |
| $P_{G(AV)}$ | Average gate power dissipation | | $T_j = 150\text{ °C}$ | 1 | W |
| T_{stg} T_j | Storage junction temperature range | | | -40 to +150 | $^{\circ}C$ |
| | Operating junction temperature range | | | -40 to +150 | |
| T_L | Lead temperature for soldering during 10 s (at 4 mm from case for TO220AB-ins.) | | | 260 | $^{\circ}C$ |
| V_{ins} (rms) | Insulation rms voltage, 1 minute, TO220AB ceramic insulated | | | 2500 | V |

Table 3. Electrical characteristics ($T_j = 25\text{ °C}$, unless otherwise specified)

| Symbol | Test conditions | Quadrant | | Value | | Unit | |
|-------------------|---|--------------|------|-----------------------|--------|---------------|------------------|
| | | | | T1620T | T1635T | | |
| $I_{GT}^{(1)}$ | $V_D = 12\text{ V}$, $R_L = 30\ \Omega$ | I - II - III | MIN. | 1 | 1.75 | mA | |
| | | I - II - III | MAX. | 20 | 35 | mA | |
| V_{GT} | $V_D = 12\text{ V}$, $R_L = 30\ \Omega$ | All | MAX. | 1.3 | | V | |
| V_{GD} | $V_D = 800\text{ V}$, $R_L = 3.3\text{ k}\Omega$, $T_j = 125\text{ °C}$ | All | MIN. | 0.2 | | V | |
| $I_H^{(1)}$ | $I_T = 500\text{ mA}$ | | MAX. | 25 | 45 | mA | |
| I_L | $I_G = 1.2 I_{GT}$ | I - III | MAX. | 35 | 55 | mA | |
| | | II | | 40 | 65 | | |
| $dV/dt^{(1)}$ | $V_D = 67\% \times 800\text{ V}$ gate open | | MIN. | $T_j = 125\text{ °C}$ | 1000 | 2000 | V/ μs |
| | $V_D = 67\% \times 600\text{ V}$ gate open | | | $T_j = 150\text{ °C}$ | 500 | 1000 | |
| $(dI/dt)_c^{(1)}$ | $(dV/dt)_c = \text{snubberless} (> 20\text{ V}/\mu\text{s})$ | | MIN. | $T_j = 125\text{ °C}$ | 6 | 16 | A/ms |
| | | | | $T_j = 150\text{ °C}$ | 4.5 | 12 | |
| t_{GT} | gate controlled turn on time $I_{TM} = 13\text{ A}$, $V_D = 400\text{ V}$, $I_G = 100\text{ mA}$, $dI_G/dt = 100\text{ mA}/\mu\text{s}$, $R_L = 30\ \Omega$ | I - II - III | TYP. | 2 | | μs | |

1. For both polarities of A2 referenced to A1

Table 4. Static characteristics

| Symbol | Test conditions | | | Value | Unit |
|------------------------|---|-----------------------|------|-------|------------------|
| $V_{TM}^{(1)}$ | $I_{TM} = 22.6\text{ A}$, $t_p = 380\ \mu\text{s}$ | $T_j = 25\text{ °C}$ | MAX. | 1.55 | V |
| $V_{to}^{(1)}$ | Threshold voltage | $T_j = 150\text{ °C}$ | MAX. | 0.85 | V |
| $R_d^{(1)}$ | Dynamic resistance | $T_j = 150\text{ °C}$ | MAX. | 30 | $\text{m}\Omega$ |
| I_{DRM} I_{RRM} | $V_{DRM} = V_{RRM} = 800\text{ V}$ | $T_j = 25\text{ °C}$ | MAX. | 5 | μA |
| | | $T_j = 125\text{ °C}$ | | 1 | mA |
| | $V_{DRM} = V_{RRM} = 600\text{ V}$ | $T_j = 150\text{ °C}$ | | 3.6 | |

1. for both polarities of A2 referenced to A1

Table 5. Thermal resistance

| Symbol | Parameter | Value | Unit |
|---------------|-----------------------|-------|-----------------------------|
| $R_{th(j-c)}$ | Junction to case (AC) | 2.1 | $^{\circ}\text{C}/\text{W}$ |
| $R_{th(j-a)}$ | Junction to ambient | 60 | $^{\circ}\text{C}/\text{W}$ |

Figure 1. Maximum power dissipation versus on-state rms current (full cycle)

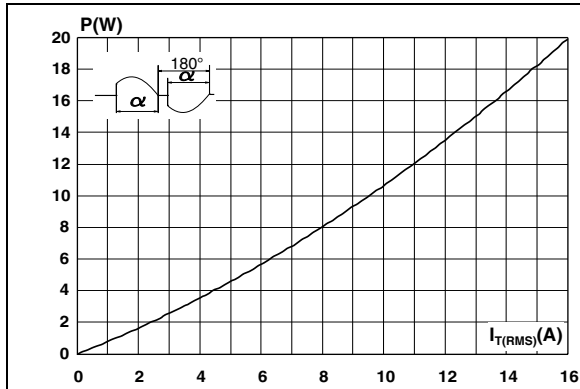


Figure 2. On-state rms current versus case temperature (full cycle)

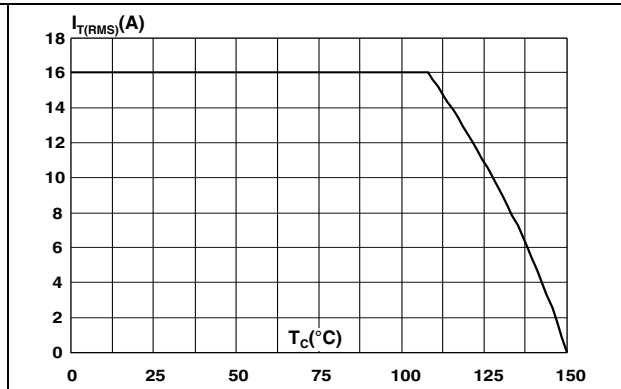


Figure 3. On-state rms current versus ambient temperature (free air convection)

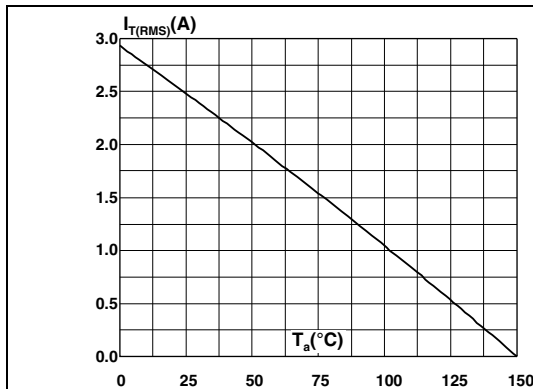


Figure 4. Relative variation of thermal impedance versus pulse duration

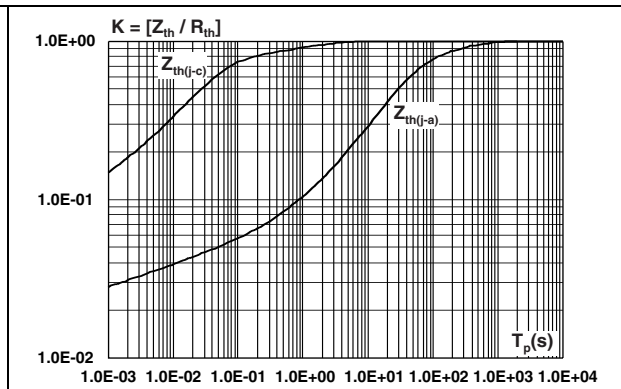


Figure 5. On-state characteristics (maximum values)

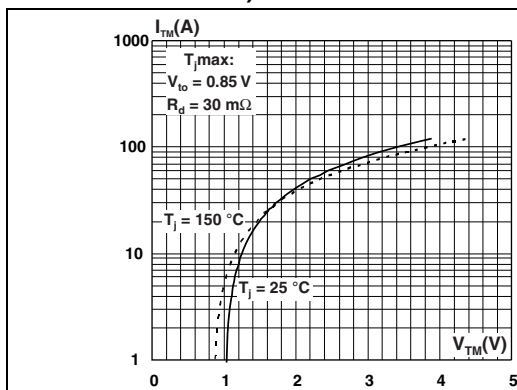


Figure 6. Surge peak on-state current versus number of cycles

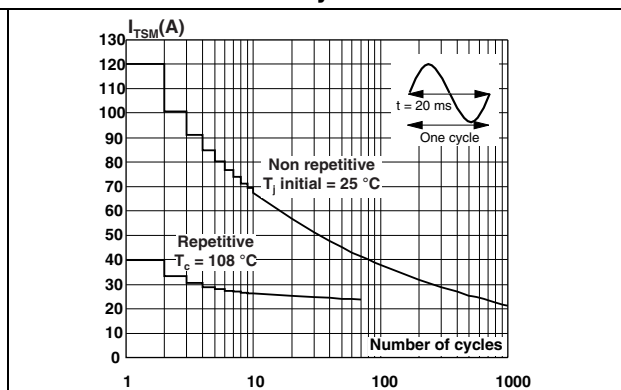


Figure 7. Non repetitive surge peak on-state current and corresponding values of I^2t

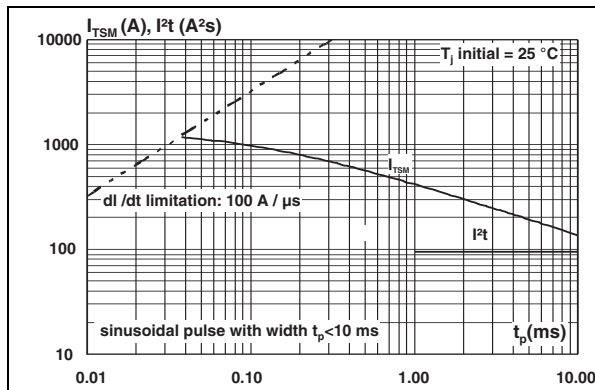


Figure 8. Relative variation of gate trigger current versus junction temperature

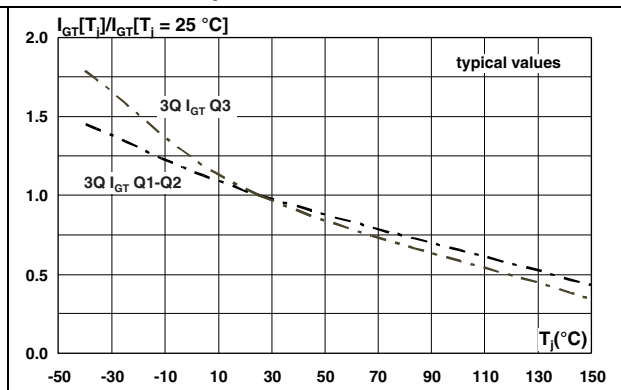


Figure 9. Relative variation of gate trigger voltage versus junction temperature

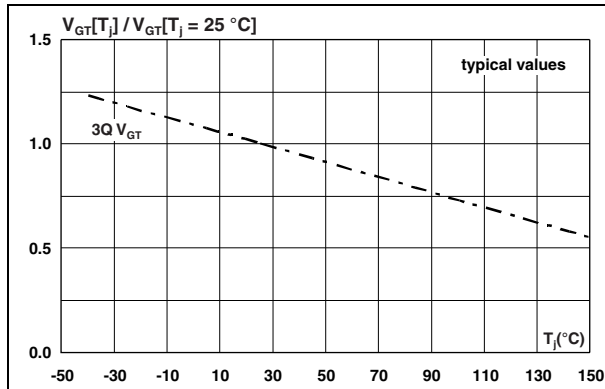


Figure 10. Relative variation of holding current and latching current versus junction temperature

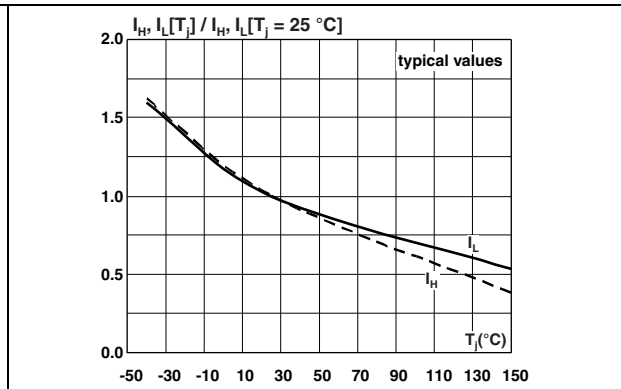


Figure 11. Relative variation of critical rate of decrease of main current (di/dt)_c versus reapplied (dV/dt)_c

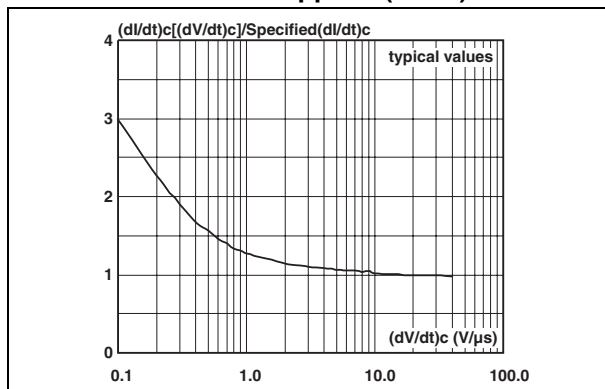


Figure 12. Relative variation of critical rate of decrease of main current (di/dt)_c versus junction temperature

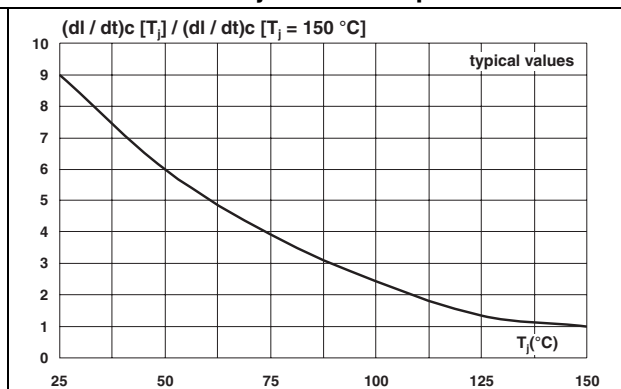
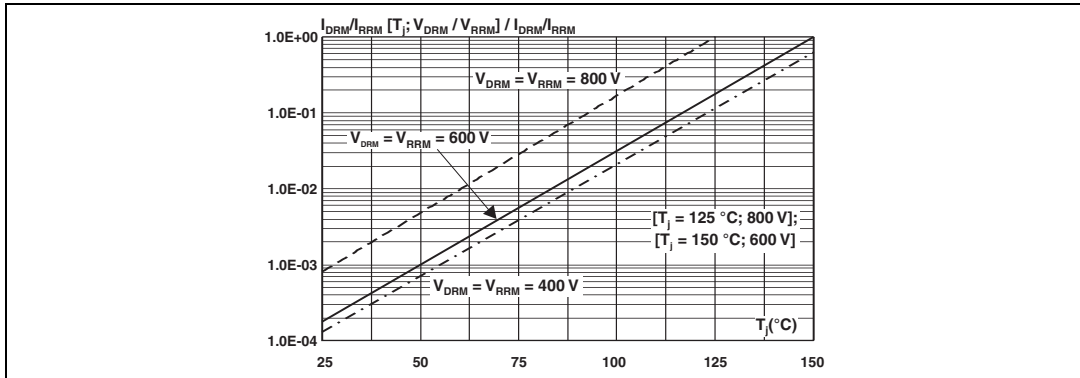


Figure 13. Relative variation of leakage current versus junction temperature for different values of blocking voltage



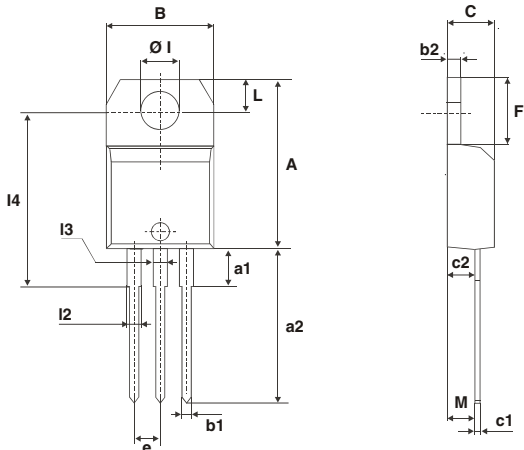
2 Package information

- Epoxy meets UL94, V0
- Recommended torque value: 0.4 to 0.6 N-m

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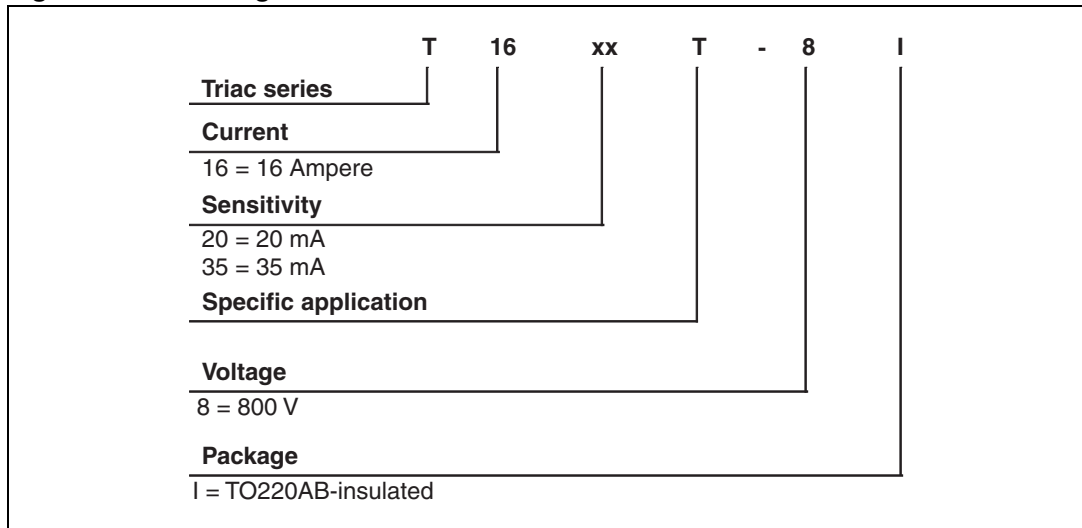
Table 6. TO-220AB insulated dimensions

| Ref. | Dimensions | | | | | |
|------|-------------|-------|-------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 15.20 | | 15.90 | 0.598 | | 0.625 |
| a1 | | 3.75 | | | 0.147 | |
| a2 | 13.00 | | 14.00 | 0.511 | | 0.551 |
| B | 10.00 | | 10.40 | 0.393 | | 0.409 |
| b1 | 0.61 | | 0.88 | 0.024 | | 0.034 |
| b2 | 1.23 | | 1.32 | 0.048 | | 0.051 |
| C | 4.40 | | 4.60 | 0.173 | | 0.181 |
| c1 | 0.49 | | 0.70 | 0.019 | | 0.027 |
| c2 | 2.40 | | 2.72 | 0.094 | | 0.107 |
| e | 2.40 | | 2.70 | 0.094 | | 0.106 |
| F | 6.20 | | 6.60 | 0.244 | | 0.259 |
| ØI | 3.75 | | 3.85 | 0.147 | | 0.151 |
| I4 | 15.80 | 16.40 | 16.80 | 0.622 | 0.646 | 0.661 |
| L | 2.65 | | 2.95 | 0.104 | | 0.116 |
| I2 | 1.14 | | 1.70 | 0.044 | | 0.066 |
| I3 | 1.14 | | 1.70 | 0.044 | | 0.066 |
| M | | 2.60 | | | 0.102 | |



3 Ordering information scheme

Figure 14. Ordering information scheme



4 Ordering information

Table 7. Ordering information

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|------------|-----------|-----------------------|--------|----------|---------------|
| T1620T-8I | T1620T-8I | TO-220AB insulated | 2.3 | 50 | Tube |
| T1635T-8I | T1635T-8I | TO-220AB insulated | 2.3 | 50 | Tube |

5 Revision history

Table 8. Document revision history

| Date | Revision | Changes |
|-------------|----------|---------------------------|
| 20-Jan-2012 | 1 | First issue. |
| 25-Apr-2012 | 2 | Updated UL certification. |

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