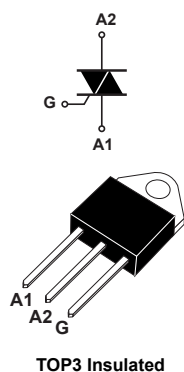


40 A standard Triacs in TOP3 package



Features

- On-state current ($I_{T(RMS)}$): 40 A
- Max. blocking voltage (V_{DRM}/V_{RRM}): 1200 V
- Gate current (I_{GT}): 200 mA
- Commutation at 10 V/ μ s: up to 142 A/ms
- Noise immunity: 500 V/ μ s
- Insulated package:
 - 2500 V rms (UL recognized: E81734)

Application

- Motor control
- Induction motor speed control

Description

The TPDVxx40 series use high performance alternistor technology.

Featuring very high commutation levels and high surge current capability, this family is well adapted to power control for inductive loads (motor, transformer...).



Product status link

[TPDV640RG](#)

[TPDV840RG](#)

[TPDV1240RG](#)

Product summary

| | |
|-------------------|--------------------|
| $I_{T(RMS)}$ | 40 A |
| V_{DRM}/V_{RRM} | TPDV640RG: 600 V |
| | TPDV840RG: 800 V |
| | TPDV1240RG: 1200 V |
| I_{GT} | 200 mA |

1 Characteristics

Table 1. Absolute maximum ratings (limiting values)

| Symbol | Parameters | | | Value | Unit |
|-------------------------------------|--|-------------------------|-------------------------|-------------|------------------|
| I _{T(RMS)} | RMS on-state current (180° conduction angle) | | T _c = 75 °C | 40 | A |
| I _{TSM} | Non repetitive surge peak on-state current | t _p = 2.5 ms | T _j = 25 °C | 590 | A |
| | | t _p = 8.3 ms | | 370 | |
| | | t _p = 10 ms | | 250 | |
| I ² t | I ² t value for fusing | t _p = 10 ms | T _j = 25 °C | 610 | A ² s |
| di/dt | Critical rate of rise of on-state current I _G = 500 mA, di _G /dt = 1 A/μs | Repetitive f = 50 Hz | | 20 | A/μs |
| | | Non repetitive | | 100 | |
| V _{DRM} , V _{RRM} | Repetitive surge peak off-state voltage | TPDV640 | T _j = 125 °C | 600 | V |
| | | TPDV840 | | 800 | |
| | | TPDV1240 | | 1200 | |
| I _{GM} | Peak gate current | t _p = 20 μs | | 8 | A |
| P _{GM} | Peak gate power dissipation | | | 40 | W |
| V _{GM} | Peak positive gate voltage | | | 16 | V |
| P _{G(AV)} | Average 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 at 2 mm from case | | | 260 | °C |
| V _{INS} ⁽¹⁾ | Insulation RMS voltage, 1 minute | | | 2500 | V |

1. A1, A2, gate terminals to case for 1 minute.

Table 2. Electrical characteristics ($T_j = 25\text{ °C}$, unless otherwise specified)

| Symbol | Parameters | Quadrant | | Value | Unit |
|-------------------------------------|---|-------------------------|------|-------|------|
| I _{GT} | V _D = 12 V, R _L = 33 Ω | I - II - III | Max. | 200 | mA |
| V _{GT} | | I - II - III | Max. | 1.5 | V |
| V _{GD} | V _D = V _{DRM} , R _L = 3.3 kΩ, T _j = 125 °C | I - II - III | Min. | 0.2 | V |
| t _{GT} | V _D = V _{DRM} , I _G = 500 mA, dI _G /dt = 3 A/μs | I - II - III | Typ. | 2.5 | μs |
| I _H ⁽¹⁾ | I _T = 500 mA | | Typ. | 50 | mA |
| I _L | I _G = 1.2 I _{GT} | I - III | Typ. | 100 | mA |
| | | II | Typ. | 200 | |
| dV/dt | V _D = 67 % V _{DRM} gate open, T _j = 125 °C | | Min. | 500 | V/μs |
| V _{TM} ⁽¹⁾ | I _{TM} = 56 A, t _p = 380 μs | | Max. | 1.8 | V |
| I _{DRM} /I _{RRM} | V _{DRM} = V _{RRM} | T _j = 25 °C | Max. | 20 | μA |
| | | T _j = 125 °C | | 8 | mA |
| (dI/dt) _c ⁽¹⁾ | (dI/dt) _c = 200 A/ms, T _j = 125 °C | | Min. | 35 | A/ms |
| | (dI/dt) _c = 10 A/ms, T _j = 125 °C | | | 142 | |

1. For both polarities of A2 referenced to A1

Table 3. Thermal resistance

| Symbol | Parameters | Value | Unit |
|---------------|--|-------|------|
| $R_{th(j-c)}$ | Junction to case (DC) | 1.2 | °C/W |
| | Junction to case (AC) for 360 ° conduction angle (f = 50 Hz) | 0.9 | |
| $R_{th(j-a)}$ | Junction to ambient | 50 | |

1.1 Characteristics (curves)

Figure 1. Max. rms power dissipation versus on-state rms current ($f = 50\text{Hz}$, curves limited by $(di/dt)_c$)

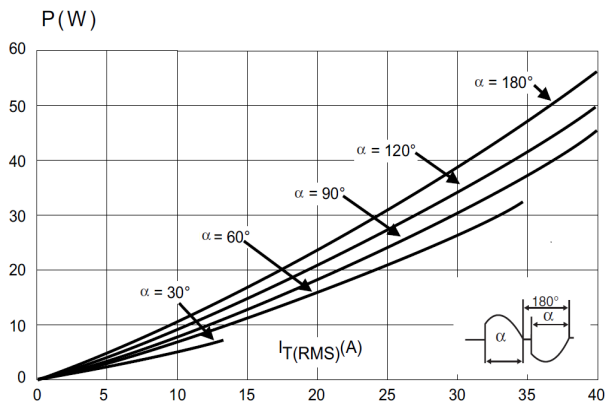


Figure 2. Max. rms power dissipation and max. allowable temperatures (T_{amb} and T_{case}) for various R_{th}

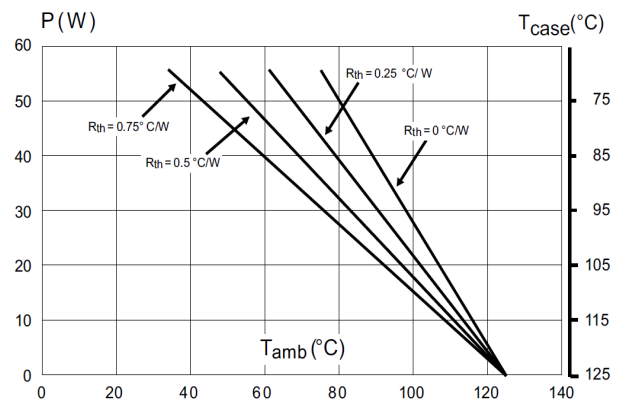


Figure 3. On-state rms current versus case temperature

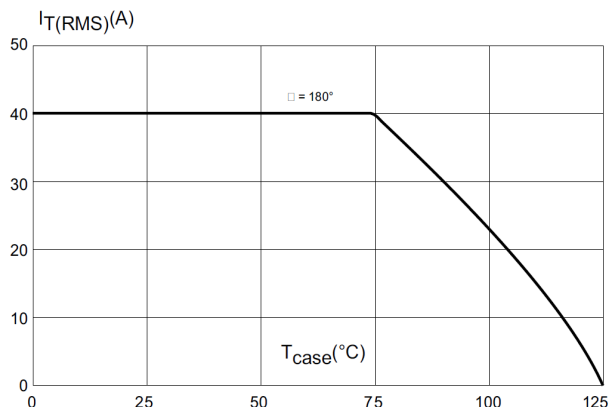


Figure 4. Relative variation of thermal impedance versus pulse duration

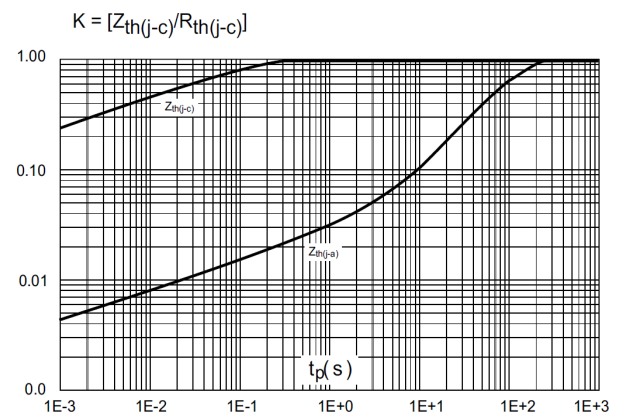


Figure 5. Relative variation of gate trigger current and holding current versus junction temperature

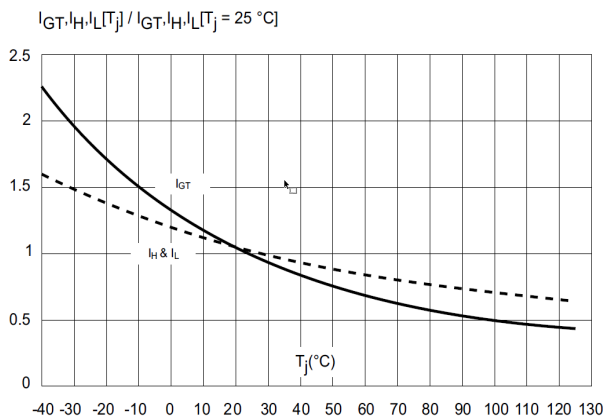


Figure 6. Non-repetitive surge peak on-state current versus number of cycles

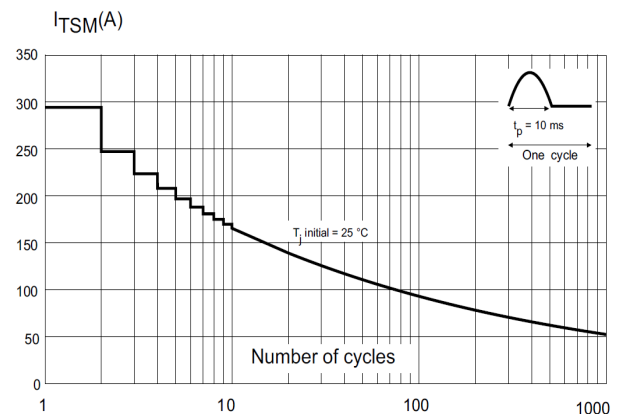


Figure 7. Non-repetitive surge peak on-state current for a sinusoidal pulse and corresponding values of I^2t

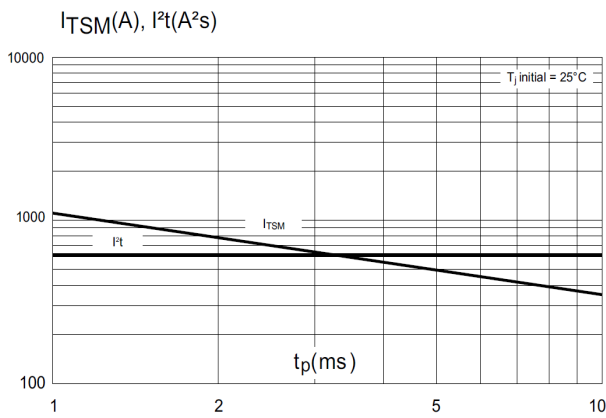


Figure 8. On-state characteristics (maximum values)

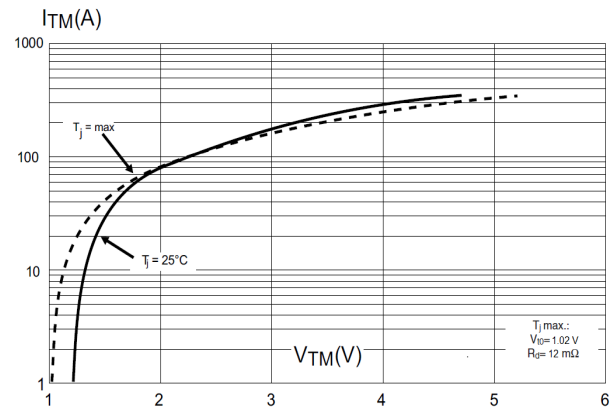
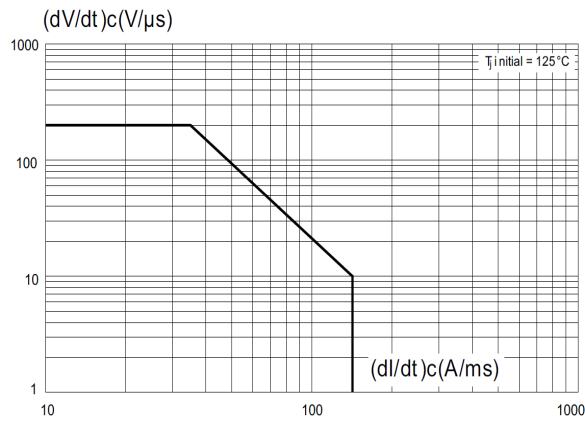


Figure 9. Safe operating area below curve



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.

2.1 Package information

- **ECOPACK** (lead-free plating and halogen free package compliance)
- Lead-free package leads finishing
- Halogen-free molding compound resin meets UL94 standard level V0
- Recommended torque: 1.05 N·m (max. torque: 1.2 N·m)

Figure 10. Package outline

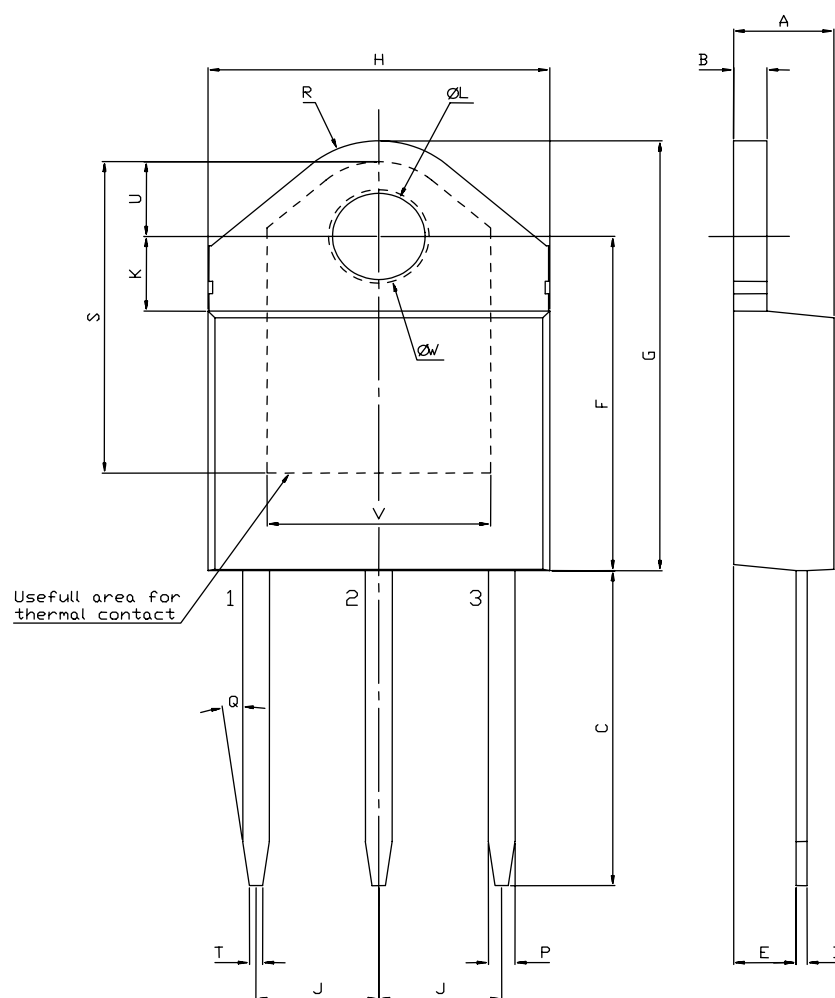


Table 4. Mechanical data

| Ref. | Dimensions | | | | | |
|------|------------|------|-------|-----------------------|--------|--------|
| | mm | | | Inches ⁽¹⁾ | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 4.40 | | 4.60 | 0.1732 | | 0.1811 |
| B | 1.45 | | 1.55 | 0.0571 | | 0.0610 |
| C | 14.35 | | 15.60 | 0.5650 | | 0.6142 |
| D | 0.50 | | 0.70 | 0.0197 | | 0.0276 |
| E | 2.70 | | 2.90 | 0.1063 | | 0.1142 |
| F | 15.80 | | 16.50 | 0.6220 | | 0.6496 |
| G | 20.40 | | 21.10 | 0.8031 | | 0.8307 |
| H | 15.10 | | 15.50 | 0.5945 | | 0.6102 |
| J | 5.40 | | 5.65 | 0.2126 | | 0.2224 |
| K | 3.40 | | 3.65 | 0.1339 | | 0.1437 |
| L | 4.08 | | 4.17 | 0.1606 | | 0.1642 |
| P | 1.10 | | 1.30 | 0.0430 | | 0.0510 |
| R | | 4.60 | | | 0.1811 | |

1. Inches given for reference only



3 Ordering information

Table 5. Ordering information

| Order code | Marking | Package | Weight | Base qty. | Delivery mode |
|------------|----------|-----------|--------|-----------|---------------|
| TPDV640RG | TPDV640 | TOP3 Ins. | 4.5 g | 30 | Tube |
| TPDV840RG | TPDV840 | | | | |
| TPDV1240RG | TPDV1240 | | | | |

Revision history

Table 6. Document revision history

| Date | Revision | Changes |
|-------------|----------|--|
| 30-Mar-2011 | 1 | Initial release. |
| 10-Jun-2015 | 2 | Updated <i>Table 3</i> . Updated <i>Figure 9</i> . Format updated to current standard. |
| 06-Oct-2023 | 3 | Updated Section 2.1 Package information . |

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