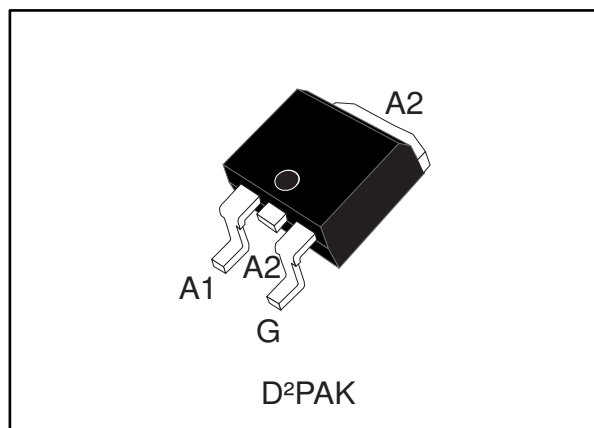


12 A Snubberless™ Triac

Datasheet - production data



Description

Available in SMD, the T1235T-8G Triac can be used for the on/off or phase angle control function in general purpose AC switching where high commutation capability is required. This device can be used without a snubber RC circuit when the limits defined are respected.

D²PAK package is UL94-V0 flammability resin compliance.

Package environmentally friendly Ecopack®2 graded (RoHS and Halogen Free compliance).

Snubberless™ is a trademark of STMicroelectronics.

Features

- High static dV/dt
- High dynamic turn-off commutation (dI/dt)_c
- 150 °C maximum T_j
- Three quadrants
- Surge capability V_{DSM}, V_{RSM} = 900 V

Benefits

- High immunity to turn-on thanks to high static dV/dt
- Better turn-off in high temperature environments thanks to (dI/dt)_c
- Increase of thermal margin due to extended working T_j up to 150 °C
- Good thermal resistance due to non-insulated tab

Applications

- General purpose AC line load switching
- Motor control circuits
- Home appliances
- Heating
- Lighting
- Inrush current limiting circuits
- Overvoltage crowbar protection

Figure 1: Functional diagram

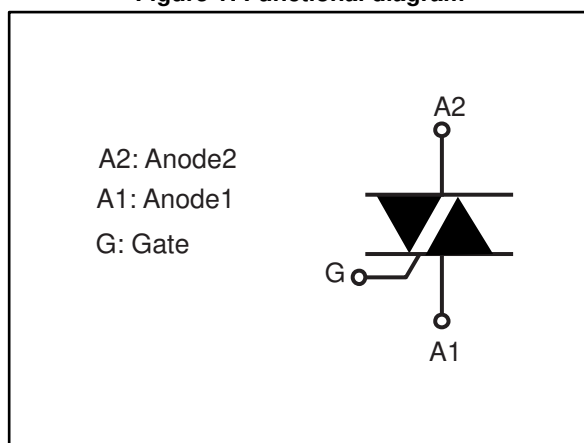


Table 1: Device summary

| Symbol | Value | Unit |
|------------------------------------|-------|------|
| I _{T(RMS)} | 12 | A |
| V _{DRM} /V _{RSM} | 800 | V |
| V _{DSM} /V _{RSM} | 900 | V |
| I _{GT} | 35 | mA |

1 Characteristics

Table 2: Absolute maximum ratings (limiting values)

| Symbol | Parameter | | Value | Unit | |
|-------------------|---|-------------------------|------------------------|-------------|------------------|
| $I_{T(RMS)}$ | RMS on-state current (full sine wave) | | $T_c = 124\text{ °C}$ | 12 | A |
| I_{TSM} | Non repetitive surge peak on-state current, T_j initial = 25 °C | | $t_p = 16.7\text{ ms}$ | 95 | A |
| | | | $t_p = 20\text{ ms}$ | 90 | |
| I^2t | I^2t value for fusing | | T_j initial = 25 °C | 54 | A ² s |
| di/dt | Critical rate of rise of on-state current, $I_G = 2 \times I_{GT}$, $t_r \leq 100\text{ ns}$ | | $f = 100\text{ Hz}$ | 100 | A/ μ s |
| V_{DRM}/V_{RRM} | Repetitive peak off-state voltage | | $T_j = 150\text{ °C}$ | 600 | V |
| | | | $T_j = 125\text{ °C}$ | 800 | V |
| V_{DSM}/V_{RSM} | Non Repetitive peak off-state voltage | | $t_p = 10\text{ ms}$ | 900 | V |
| 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} | Storage junction temperature range | | | -40 to +150 | °C |
| T_j | Operating junction temperature range | | | -40 to +150 | °C |

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

| Symbol | Test conditions | Quadrants; T_j | | Value | Unit | |
|-------------------|--|-----------------------|-----------------------|-------|------------|------|
| I_{GT} | $V_D = 12\text{ V}$, $R_L = 33\text{ }\Omega$ | I - II - III | Min. | 1.75 | mA | |
| | $V_D = 12\text{ V}$, $R_L = 33\text{ }\Omega$ | I - II - III | Max. | 35 | mA | |
| V_{GT} | $V_D = 12\text{ V}$, $R_L = 33\text{ }\Omega$ | I - II - III | Max. | 1.3 | V | |
| V_{GD} | $V_D = V_{DRM}$, $R_L = 3.3\text{ k}\Omega$, $T_j = 150\text{ °C}$ | I - II - III | Min. | 0.2 | V | |
| I_L | $I_G = 1.2 \times I_{GT}$ | I - III | Max. | 60 | mA | |
| | $I_G = 1.2 \times I_{GT}$ | II | Max. | 80 | mA | |
| $I_H^{(1)}$ | $I_T = 500\text{ mA}$, gate open | | Max. | 40 | mA | |
| $dV/dt^{(1)}$ | $V_D = 536\text{ V}$, gate open | $T_j = 125\text{ °C}$ | Min. | 2000 | V/ μ s | |
| | $V_D = 402\text{ V}$, gate open | $T_j = 150\text{ °C}$ | Min. | 1000 | V/ μ s | |
| $(di/dt)_c^{(1)}$ | Without snubber, $(dV/dt)_c > 20\text{ V}/\mu$ s | | $T_j = 125\text{ °C}$ | Min. | 12 | A/ms |
| | | | $T_j = 150\text{ °C}$ | Min. | 6 | A/ms |

Notes:

⁽¹⁾For both polarities of A2 referenced to A1.

Table 4: Static characteristics

| Symbol | Test conditions | T _j | | Value | Unit |
|------------------------------------|--|----------------|------|-------|------|
| V _{TM} ⁽¹⁾ | I _T = 17 A, t _p = 380 μs | 25 °C | Max. | 1.6 | V |
| V _{TO} ⁽¹⁾ | Threshold on-state voltage | 150 °C | Max. | 0.85 | V |
| R _D ⁽¹⁾ | Dynamic resistance | 150 °C | Max. | 50 | mΩ |
| I _{DRM} /I _{RPM} | V _{DRM} = V _{RPM} = 800 V | 25 °C | Max. | 5 | μA |
| | | 125 °C | | 1 | mA |
| | V _{DRM} = V _{RPM} = 600 V | 150 °C | Max. | 3.1 | mA |

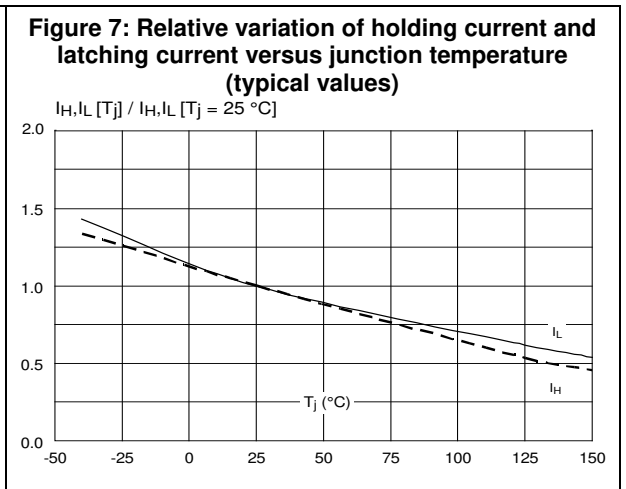
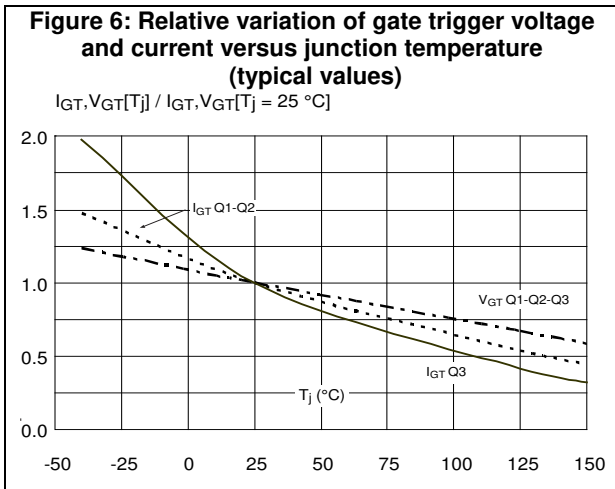
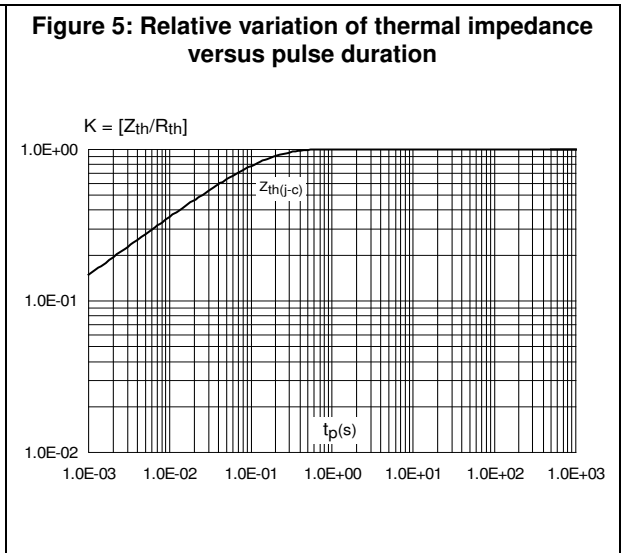
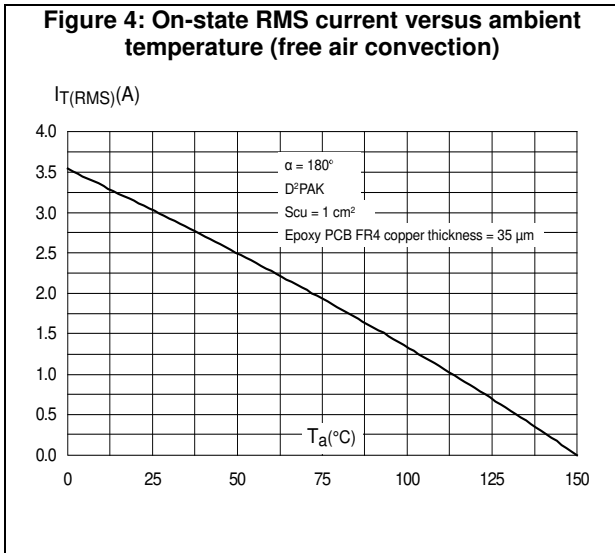
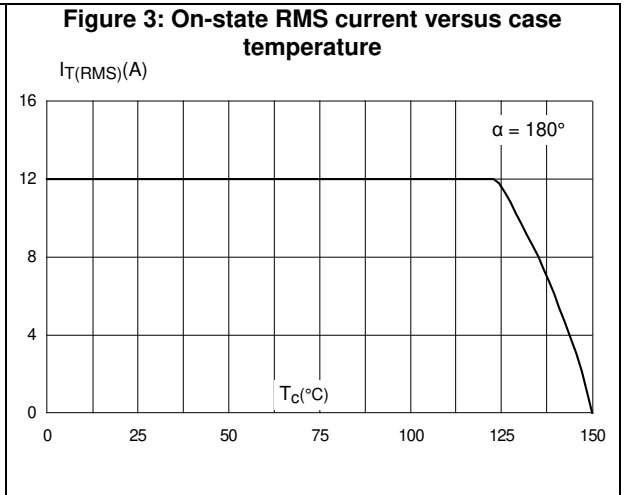
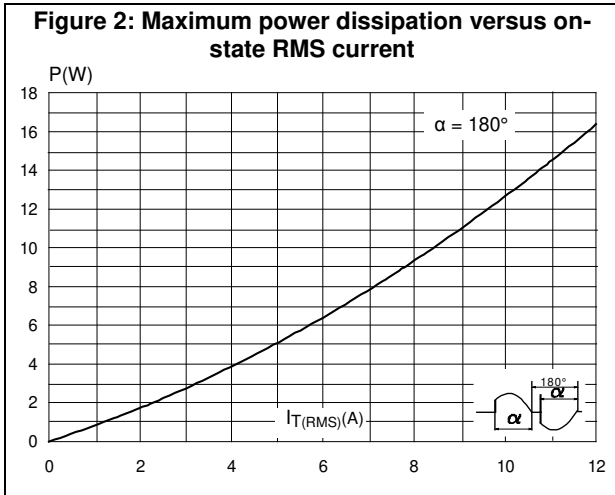
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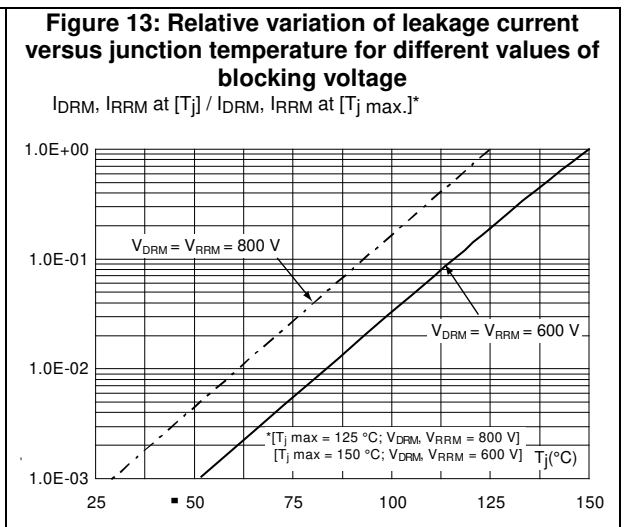
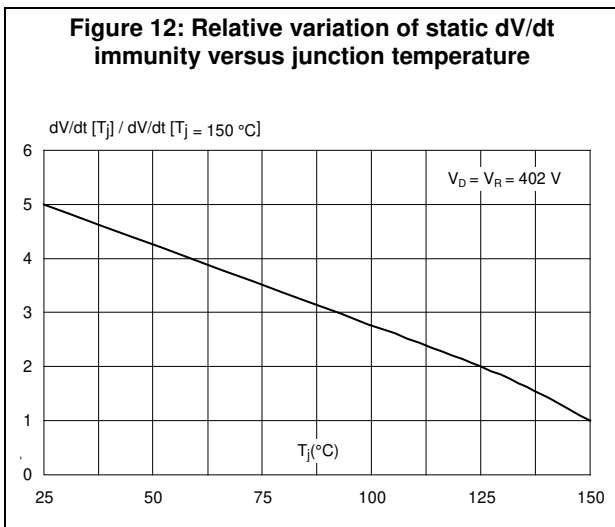
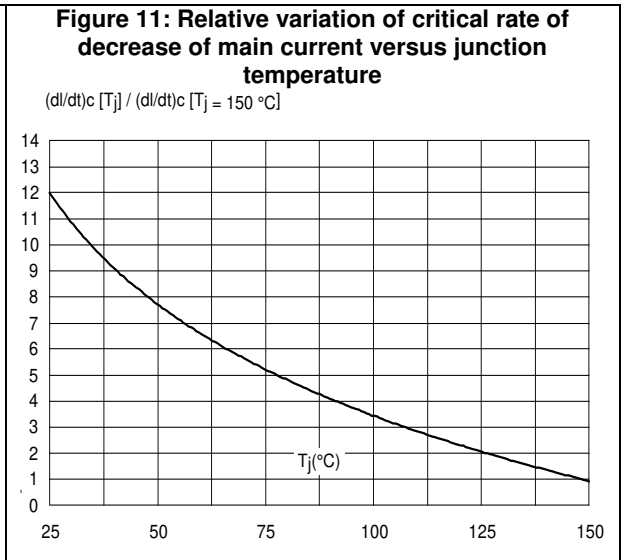
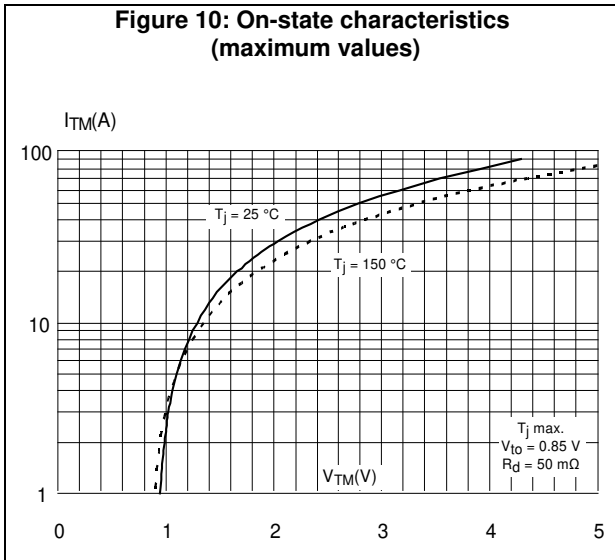
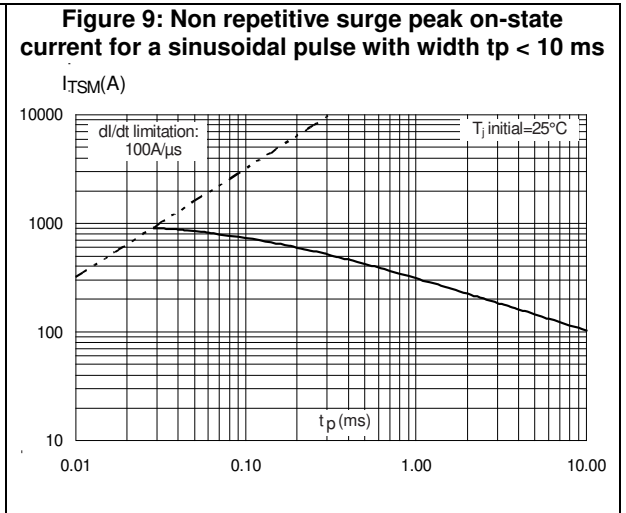
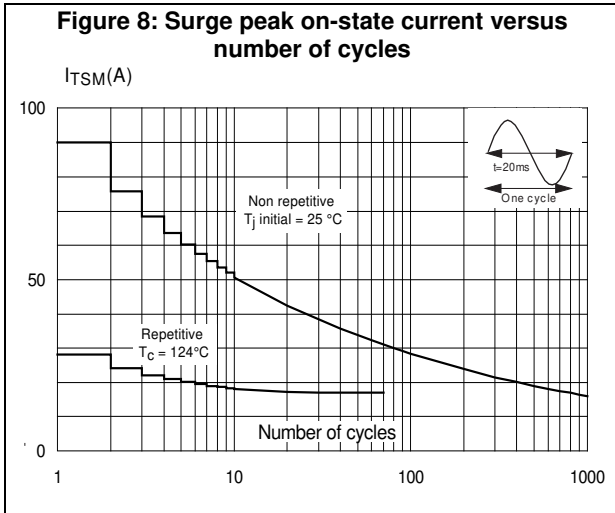
⁽¹⁾For both polarities of A2 referenced to A1.

Table 5: Thermal resistance

| Symbol | Parameter | | | Value | Unit |
|----------------------|-----------------------|--------------------|------|-------|------|
| R _{th(j-c)} | Junction to case (AC) | D ² PAK | Max. | 1.6 | °C/W |

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 UL standard level V0

2.1 D²PAK package information

Figure 14: D²PAK package outline

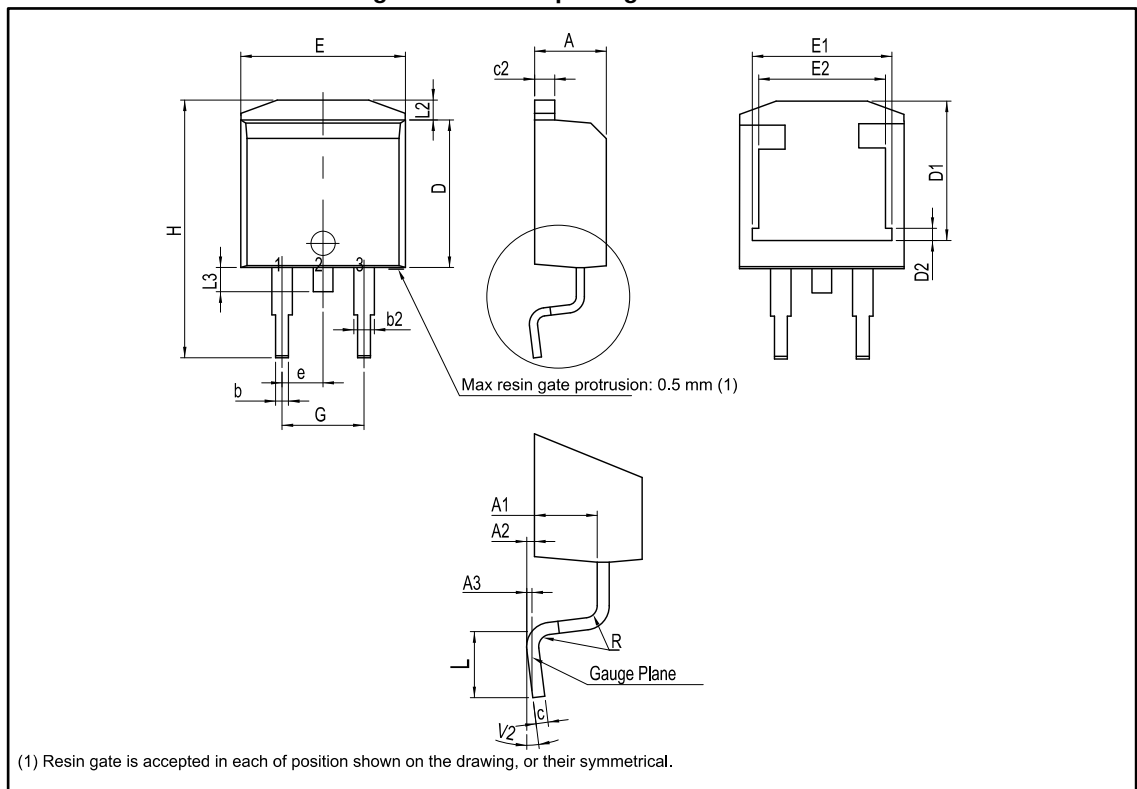


Table 6: D²PAK package mechanical data

| Ref. | Dimensions | | | | | |
|------|-------------|------|-------|-----------------------|--------|--------|
| | Millimeters | | | Inches ⁽¹⁾ | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 4.30 | | 4.60 | 0.1693 | | 0.1811 |
| A1 | 2.49 | | 2.69 | 0.0980 | | 0.1059 |
| A2 | 0.03 | | 0.23 | 0.0012 | | 0.0091 |
| A3 | | 0.25 | | | 0.0098 | |
| b | 0.70 | | 0.93 | 0.0276 | | 0.0366 |
| b2 | 1.25 | | 1.7 | 0.0492 | | 0.0669 |
| c | 0.45 | | 0.60 | 0.0177 | | 0.0236 |
| c2 | 1.21 | | 1.36 | 0.0476 | | 0.0535 |
| D | 8.95 | | 9.35 | 0.3524 | | 0.3681 |
| D1 | 7.50 | | 8.00 | 0.2953 | | 0.3150 |
| D2 | 1.30 | | 1.70 | 0.0512 | | 0.0669 |
| e | 2.54 | | | 0.1 | | |
| E | 10.00 | | 10.28 | 0.3937 | | 0.4047 |
| E1 | 8.30 | | 8.70 | 0.3268 | | 0.3425 |
| E2 | 6.85 | | 7.25 | 0.2697 | | 0.2854 |
| G | 4.88 | | 5.28 | 0.1921 | | 0.2079 |
| H | 15 | | 15.85 | 0.5906 | | 0.6240 |
| L | 1.78 | | 2.28 | 0.0701 | | 0.0898 |
| L2 | 1.27 | | 1.40 | 0.0500 | | 0.0551 |
| L3 | 1.40 | | 1.75 | 0.0551 | | 0.0689 |
| R | | 0.40 | | | 0.0157 | |
| V2 | 0° | | 8° | 0° | | 8° |

Notes:⁽¹⁾Dimensions in inches are given for reference only

Figure 15: D²PAK recommended footprint (dimensions are in mm)

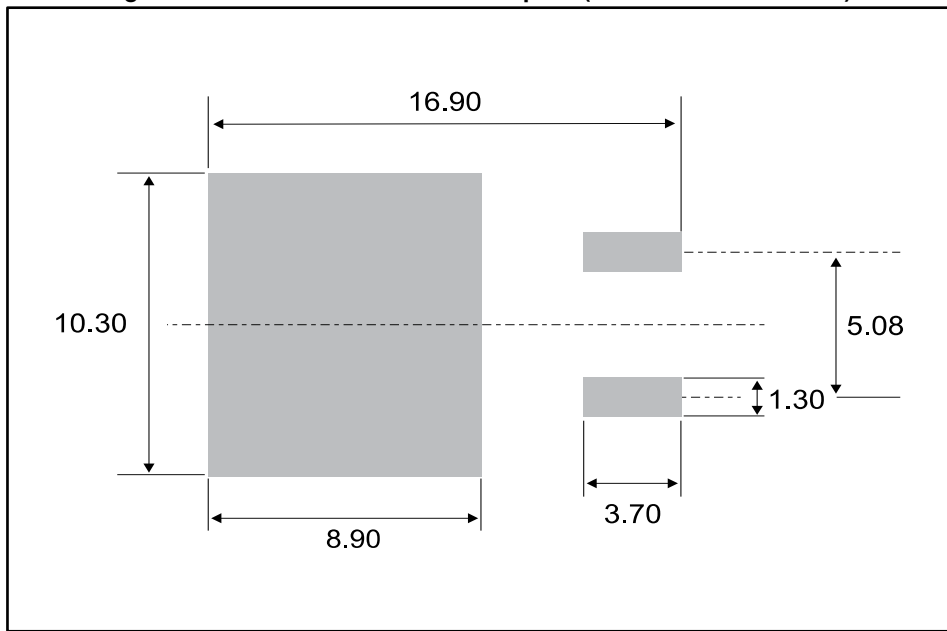
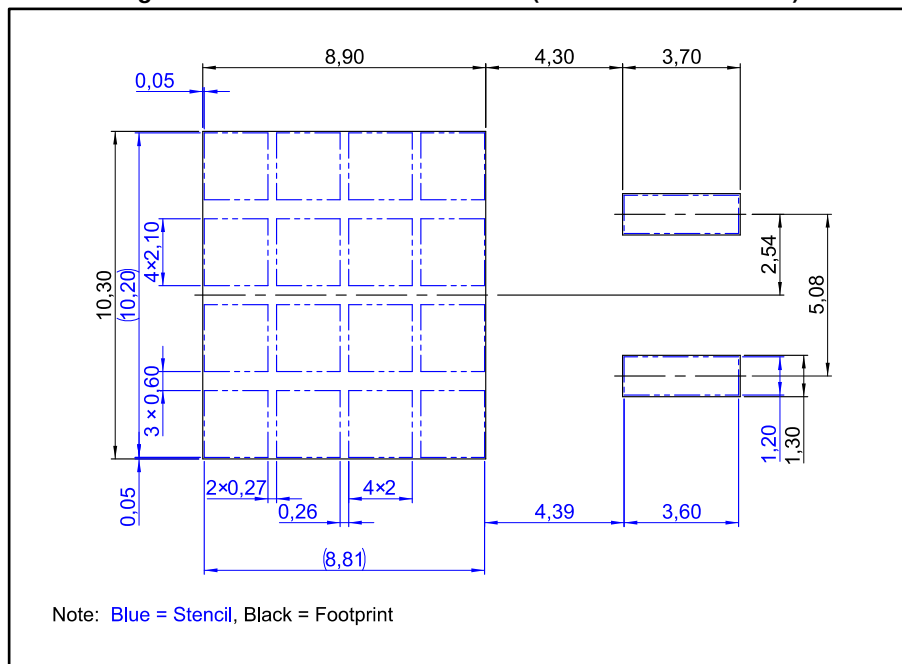


Figure 16: D²PAK stencil definitions (dimensions are in mm)



3 Ordering information

Figure 17: Ordering information scheme

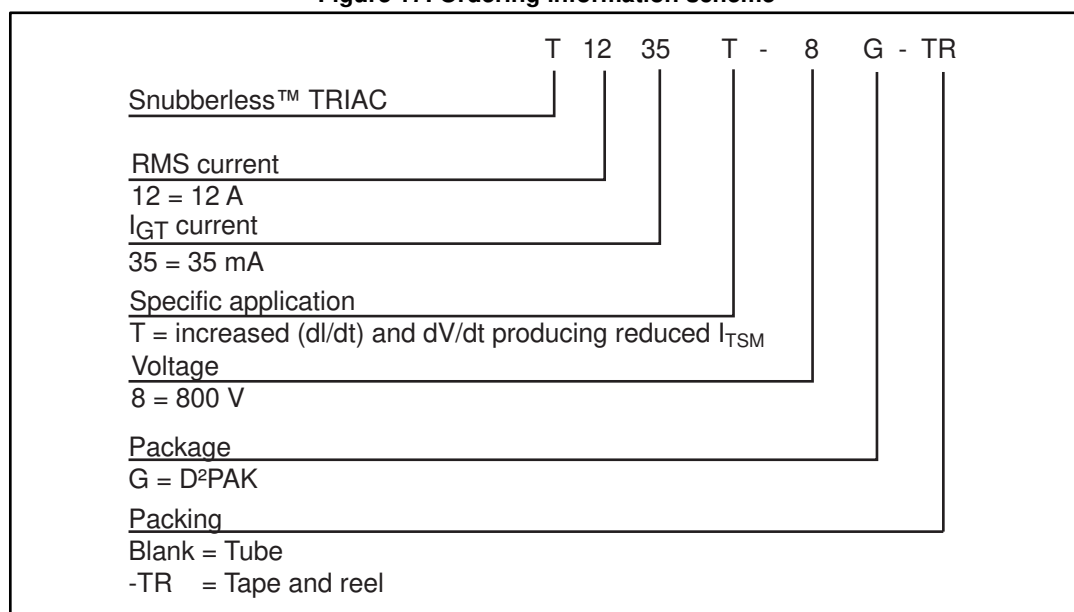


Table 7: Ordering information

| Order code | Marking | Package | Weight | Base qty. | Delivery mode |
|--------------|-----------|--------------------|--------|-----------|---------------|
| T1235T-8G-TR | T1235T-8G | D ² PAK | 1.38 g | 1000 | Tape and reel |
| T1235T-8G | | | | 50 | Tube |

4 Revision history

Table 8: Document revision history

| Date | Revision | Changes |
|-------------|----------|------------------|
| 19-Dec-2017 | 1 | Initial release. |

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