

16 A standard SCRs

Features

- $I_{T(RMS)} = 16 \text{ A}$
- $V_{DRM}/V_{RRM} = 600 \text{ to } 1000 \text{ V}$
- $I_{GT} = 25 \text{ mA}$

Description

The standard TN16 / TYNx16 16 A SCRs series is suitable for general purpose applications.

Using clip assembly technology, they provide a superior performance in surge current capabilities.

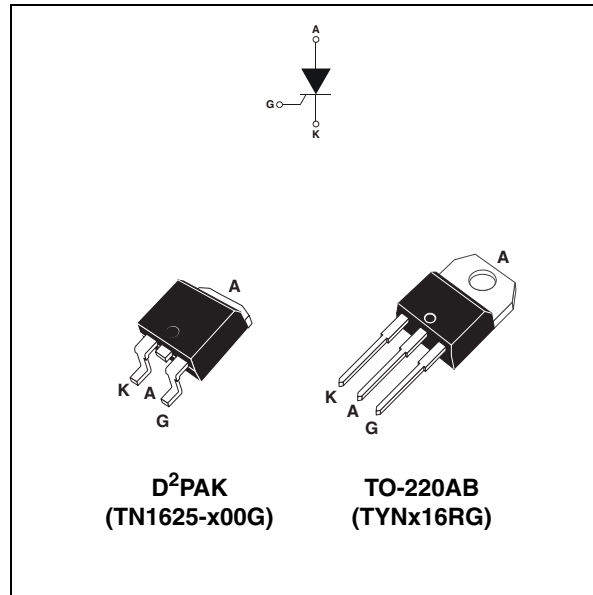


Table 1. Device summary

| Parameter | TN1625-600G TYN616RG | TYN816RG | TN1625-1000G | Unit |
|-------------------|-------------------------|----------|--------------|------|
| V_{DRM}/V_{RRM} | 600 | 800 | 1000 | V |
| Sensitivity | 25 | 25 | 25 | mA |

1 Characteristics

Table 2. Absolute ratings (limiting values)

| Symbol | Parameter | | Value | Unit | |
|--------------------|--|-------------------------|-----------------------|--------------------------------|------------|
| $I_{T(RMS)}$ | RMS on-state current (180 °Conduction angle) | | $T_c = 110\text{ °C}$ | 16 | A |
| $I_{T(AV)}$ | Average on-state current (180 °Conduction angle) | | $T_c = 110\text{ °C}$ | 10 | A |
| I_{TSM} | Non repetitive surge peak on-state current | $t_p = 8.3\text{ ms}$ | $T_j = 25\text{ °C}$ | 200 | A |
| | | $t_p = 10\text{ ms}$ | | 190 | |
| I^2t | I^2t Value for fusing | $t_p = 10\text{ ms}$ | $T_j = 25\text{ °C}$ | 180 | A^2s |
| dI/dt | Critical rate of rise of on-state current $I_G = 2 \times I_{GT}, t_r \leq 100\text{ ns}$ | F = 60 Hz | $T_j = 125\text{ °C}$ | 50 | A/ μs |
| I_{GM} | Peak gate current | $t_p = 20\text{ }\mu s$ | $T_j = 125\text{ °C}$ | 4 | A |
| $P_{G(AV)}$ | Average gate power dissipation | | $T_j = 125\text{ °C}$ | 1 | W |
| T_{stg} T_j | Storage junction temperature range Operating junction temperature range | | | - 40 to + 150 - 40 to + 125 | °C |
| V_{RGM} | Maximum peak reverse gate voltage | | | 5 | V |

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

| Symbol | Test Conditions | | Value | Unit | | |
|------------------------|---|-----------------------|-----------------------|------|------------|------------|
| I_{GT} | $V_D = 12\text{ V}$ $R_L = 33\text{ }\Omega$ | MIN. | 2 | mA | | |
| | | MAX. | 25 | | | |
| V_{GT} | | MAX. | 1.3 | V | | |
| V_{GD} | $V_D = V_{DRM}$ $R_L = 3.3\text{ k}\Omega$ | $T_j = 125\text{ °C}$ | MIN. | 0.2 | V | |
| I_H | $I_T = 500\text{ mA}$ Gate open | | MAX. | 40 | mA | |
| I_L | $I_G = 1.2 \times I_{GT}$ | | MAX. | 60 | mA | |
| dV/dt | $V_D = 67\% V_{DRM}$ Gate open | $T_j = 125\text{ °C}$ | MIN. | 500 | V/ μs | |
| V_{TM} | $I_{TM} = 32\text{ A}$ $t_p = 380\text{ }\mu s$ | $T_j = 25\text{ °C}$ | MAX. | 1.6 | V | |
| V_{t0} | Threshold voltage | | $T_j = 125\text{ °C}$ | MAX. | 0.77 | V |
| R_d | Dynamic resistance | | $T_j = 125\text{ °C}$ | MAX. | 23 | m Ω |
| I_{DRM} I_{RRM} | $V_{DRM} = V_{RRM}$ | $T_j = 25\text{ °C}$ | MAX. | 5 | μA | |
| | | $T_j = 125\text{ °C}$ | | 2 | mA | |

Table 4. Thermal resistance

| Symbol | Parameter | | Value | Unit |
|---------------|--------------------------|---|-------|------|
| $R_{th(j-c)}$ | Junction to case (DC) | | 1.1 | °C/W |
| $R_{th(j-a)}$ | Junction to ambient (DC) | S = 01 cm ² D ² PAK | 45 | °C/W |
| | | TO-220AB | 60 | |

S = copper surface under tab

Figure 1. Maximum average power dissipation versus average on-state current

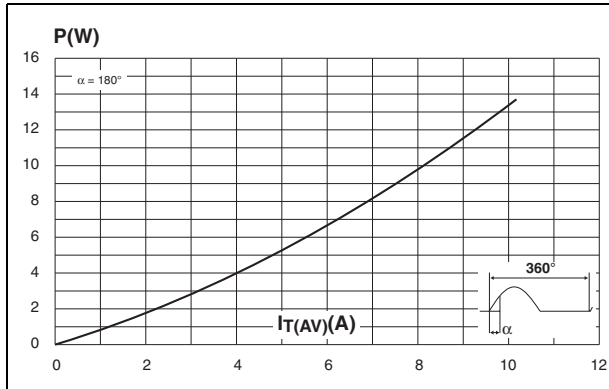


Figure 2. Average and D.C. on-state current versus case temperature

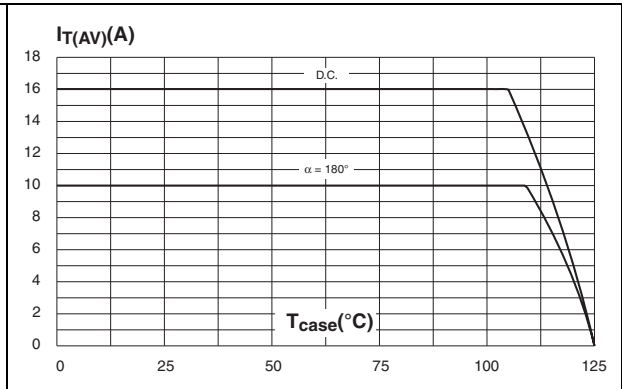


Figure 3. Average and D.C. on-state current versus ambient temperature (copper surface under tab: S=1cm²) (D²PAK)

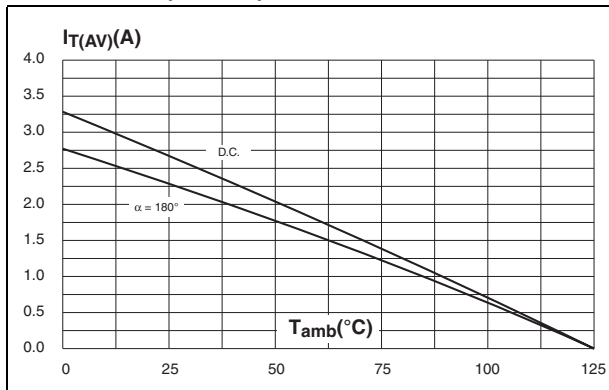


Figure 4. Relative variation of thermal impedance versus pulse duration

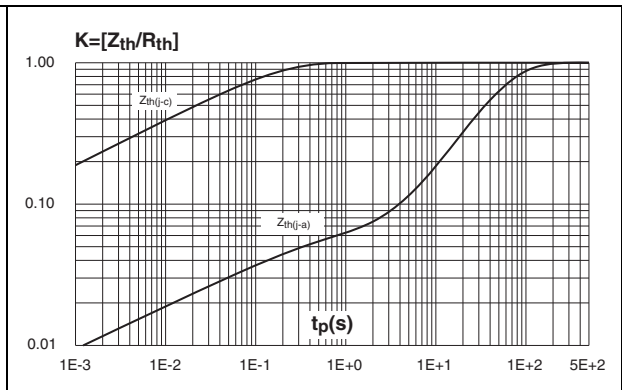


Figure 5. Relative variation of gate trigger current, holding current and latching current versus junction temperature

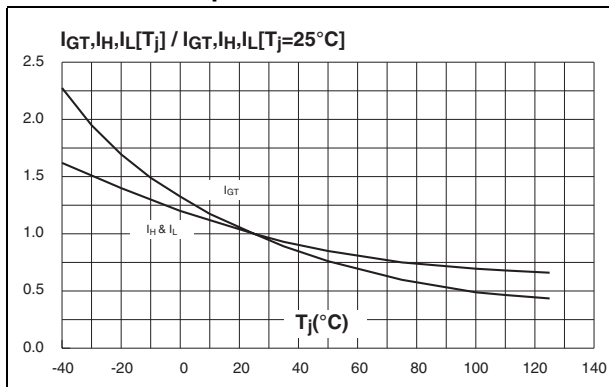


Figure 6. Surge peak on-state current versus number of cycles

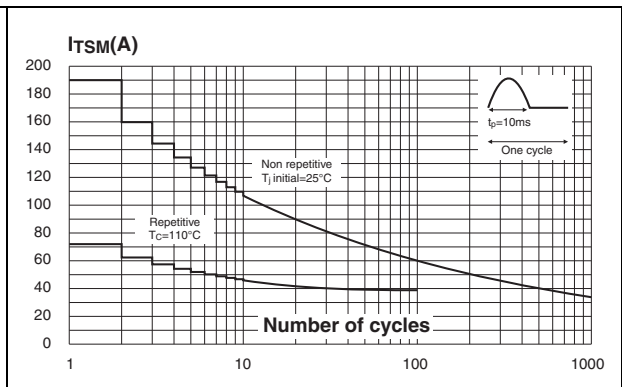


Figure 7. Non-repetitive surge peak on-state current for a sinusoidal pulse with width $t_p < 10$ ms, and corresponding values of I^2t

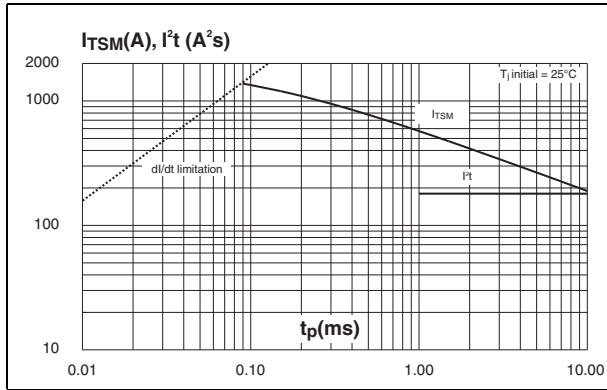


Figure 8. On-state characteristics (maximum values)

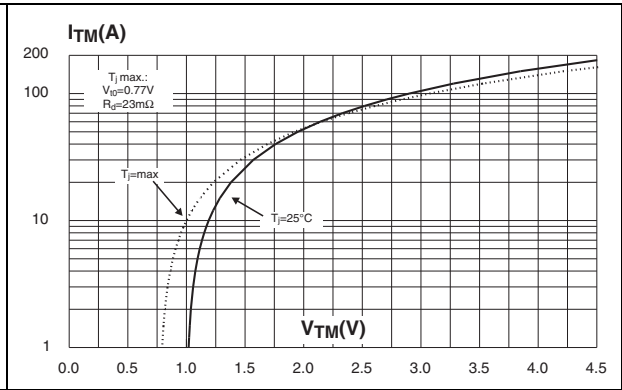
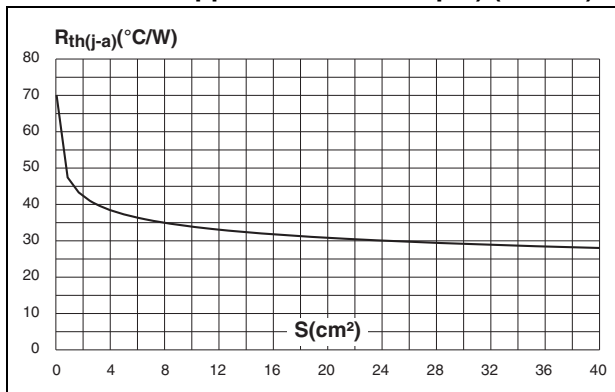


Figure 9. Thermal resistance junction to ambient versus copper surface under tab (epoxy printed circuit board FR4, copper thickness: 35 μm) (D²PAK)



2 Ordering information scheme

Figure 10. TN1625

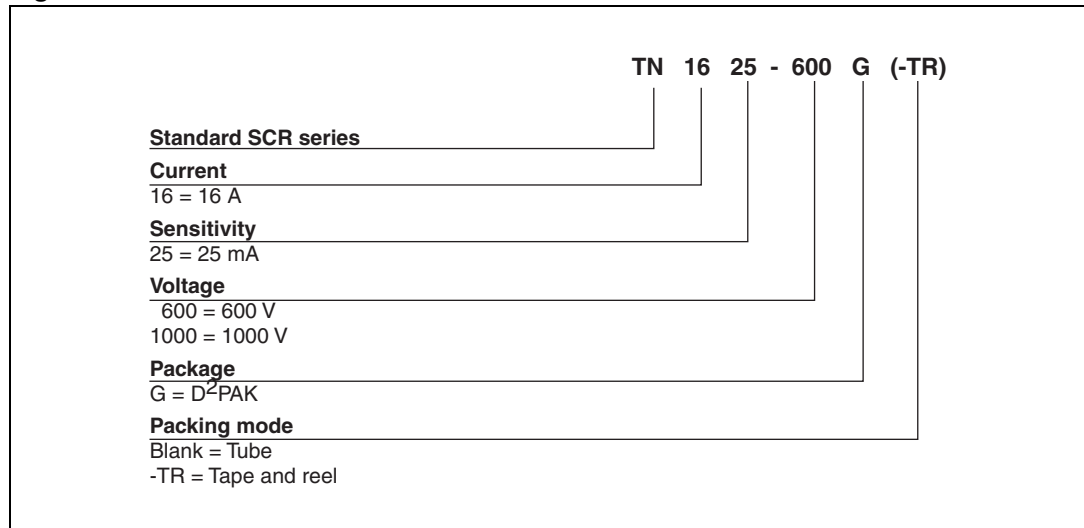
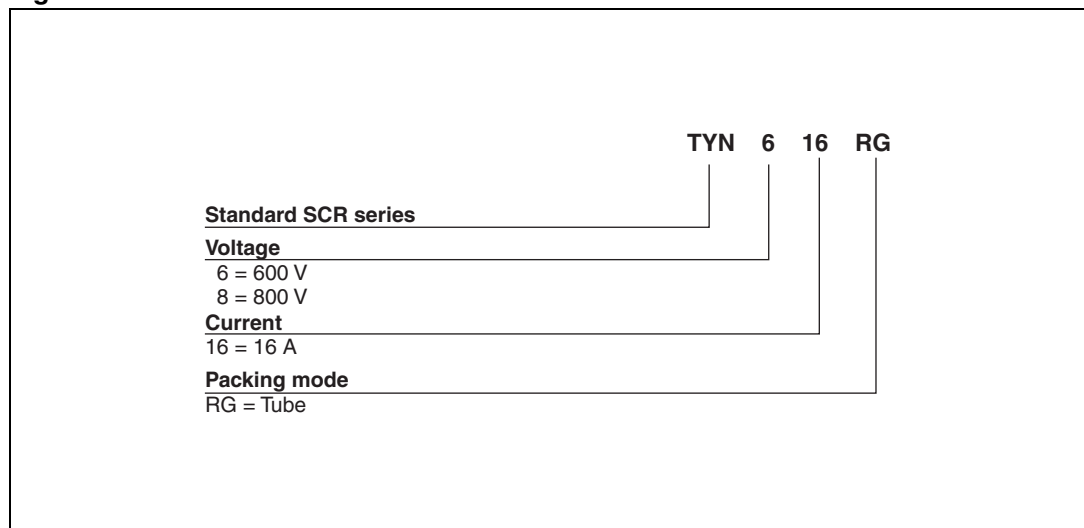


Figure 11. TYNx16



3 Package information

- Epoxy meets UL94,V0
- Cooling method: C
- Recommended torque value: 0.4 - 0.6 N·m

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

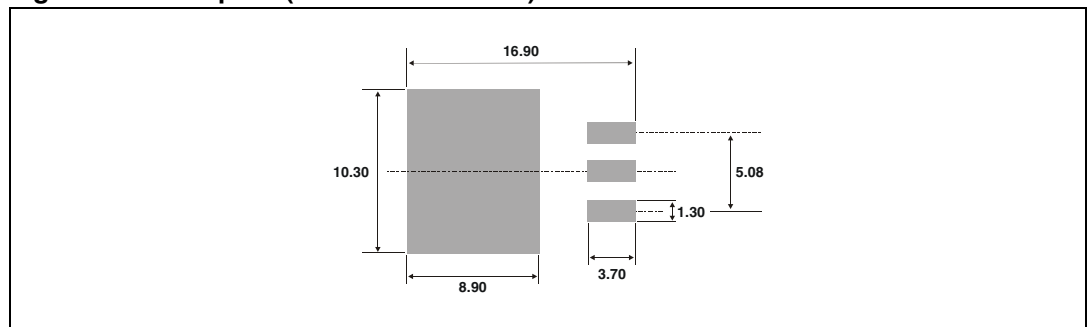
Table 5. TO-220AB dimensions

| 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 | |

Table 6. D²PAK dimensions

| Ref. | Dimensions | | | | | |
|------|-------------|------|-------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 4.30 | | 4.60 | 0.169 | | 0.181 |
| A1 | 2.49 | | 2.69 | 0.098 | | 0.106 |
| A2 | 0.03 | | 0.23 | 0.001 | | 0.009 |
| B | 0.70 | | 0.93 | 0.027 | | 0.037 |
| B2 | 1.25 | 1.40 | | 0.048 | 0.055 | |
| C | 0.45 | | 0.60 | 0.017 | | 0.024 |
| C2 | 1.21 | | 1.36 | 0.047 | | 0.054 |
| D | 8.95 | | 9.35 | 0.352 | | 0.368 |
| E | 10.00 | | 10.28 | 0.393 | | 0.405 |
| G | 4.88 | | 5.28 | 0.192 | | 0.208 |
| L | 15.00 | | 15.85 | 0.590 | | 0.624 |
| L2 | 1.27 | | 1.40 | 0.050 | | 0.055 |
| L3 | 1.40 | | 1.75 | 0.055 | | 0.069 |
| R | 0.40 | | | 0.016 | | |
| V2 | 0° | | 8° | 0° | | 8° |

Figure 12. Footprint (dimensions in mm)



4 Ordering information

Table 7. Ordering information

| Order code ⁽¹⁾ | Marking ⁽¹⁾ | Package | Weight | Base qty | Delivery mode |
|---------------------------|------------------------|--------------------|--------|----------|---------------|
| TN1625-x00G | TN1625x00G | D ² PAK | 1.5 g | 50 | Tube |
| TN1625-x00G-TR | TN1625x00G | D ² PAK | 1.5 g | 1000 | Tape and reel |
| TYNx16RG | TYNx16 | TO-220AB | 2.3 g | 50 | Tube |

1. x indicates voltage, 6, 8 or 10 for 600, 800 and 1000 V respectively

5 Revision history

Table 8. Document revision history

| Date | Revision | Changes |
|-------------|----------|--|
| Apr-2002 | 4A | Last update. |
| 13-Feb-2006 | 5 | TO-220AB delivery mode changed from bulk to tube. ECOPACK statement added. |
| 07-Nov-2007 | 6 | Reformatted to current standards. Table 2 : $I_{T(RMS)}$ value corrected from 12 A to 16 A |

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