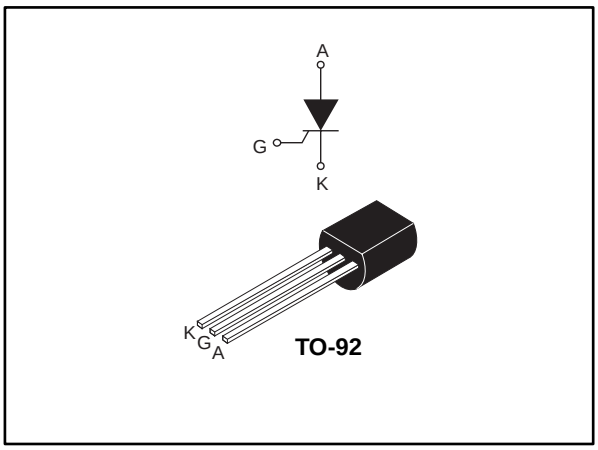
# XL0840

## 0.8 A asymmetric sensitive gate SCR

Datasheet - production data




## Description

Thanks to highly sensitive triggering levels, the XL0840 is suitable for all applications where the available gate current is limited, such as Christmas lights control.

**Table 1: Device summary**

| Symbol | Value | Unit |
|---|---|---|
| $I_{T(RMS)}$ | 0.8 | A |
| $V_{DRM}$ | 400 | V |
| $I_{GT}$ | 200 | µA |

## Features

- High immunity: 75 V/µs at 125 °C
- Sensitive gate: 200 µA at 25 °C
- Low leakage current: $I_{DRM}$ max. 100 µA at 125 °C
- ECOPACK®2 ROHS - No exemption

## Application

- Christmas lights control

# 1 Characteristics

**Table 2: Absolute ratings (limiting values), limiting values**

| Symbol | Parameter | | | Value | Unit |
|---|---|---|---|---|---|
| $I_{T(RMS)}$ | RMS on-state current (180 ° conduction angle) | | $T_C$ = 55 °C | 0.8 | A |
| $I_{T(AV)}$ | Average on-state current (180 ° conduction angle) | | | 0.5 | |
| $I_{TSM}$ | Non repetitive surge peak on-state current | $t_p$ = 8.3 ms | $T_j$ = 25 °C | 8 | A |
| | | $t_p$ = 10 ms | | 7 | |
| $I^2t$ | $I^2t$ value for fusing | | | 0.24 | $A^2s$ |
| dI/dt | Critical rate of rise of on-state current $I_G$ = 2 x $I_{GT}$ , tr ≤ 100 ns | f = 60 Hz | $T_j$ = 125 °C | 30 | A/µs |
| $I_{GM}$ | Peak forward gate current | $t_p$ = 20 µs | $T_j$ = 125 °C | 1 | A |
| $V_{DRM}$ | Repetitive peak off-state voltage | | Max. | 400 | V |
| $P_{G(AV)}$ | Average gate power dissipation | | $T_j$ = 125 °C | 0.1 | W |
| $T_{stg}$ | Storage junction temperature range | | | -40 to +150 | °C |
| $T_j$ | Operating junction temperature range | | | -40 to +125 | |

**Table 3: Electrical characteristics ($T_j$ = 25 °C unless otherwise specified)**

| Symbol | Test conditions | | | Value | Unit |
|---|---|---|---|---|---|
| $I_{GT}$ | $V_D$ = 12 V, $R_L$ = 140 Ω | | Max. | 200 | µA |
| $V_{GT}$ | | | Max. | 0.8 | V |
| $V_{GD}$ | $V_D$ = $V_{DRM}$, $R_L$ = 3.3 kΩ, $R_{GK}$ = 1 kΩ | $T_j$ = 125 °C | Min. | 0.1 | V |
| $V_{RG}$ | $I_{RG}$ = 10 µA | | Min. | 8 | V |
| $I_H$ | $I_T$ = 50 mA, $R_{GK}$ = 1 kΩ | | Max. | 5 | mA |
| $I_L$ | $I_G$ = 1 mA, $R_{GK}$ = 1 kΩ | $T_j$ = 125 °C | Max. | 6 | mA |
| dV/dt[(1)] | $V_D$ = 67 % $V_{DRM}$, $R_{GK}$ = 1 kΩ | $T_j$ = 125 °C | Min. | 75 | V/µs |
| $V_{TM}$ | $I_{TM}$ = 1.6 A, $t_p$ = 380 µs | $T_j$ = 25 °C | Max. | 1.95 | V |
| $V_{to}$ | Threshold voltage | $T_j$ = 125 °C | Max. | 1.0 | V |
| Rd | Dynamic resistance | $T_j$ = 125 °C | Max. | 600 | mΩ |
| $I_{DRM}$ | $V_{DRM}$ $R_{GK}$ = 1 kΩ | $T_j$ = 25 °C | Max. | 1 | µA |
| | | $T_j$ = 125 °C | Max. | 100 | |

**Notes:**

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

**Table 4: Thermal parameters**

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $R_{th(j-a)}$ | Junction to ambient (DC) | 150 | °C/W |
| $R_{th(j-l)}$ | Junction to lead (DC) | 80 | |

## 1.1 Characteristics (curves)

**Figure 1: Maximum average power dissipation versus average on-state current**

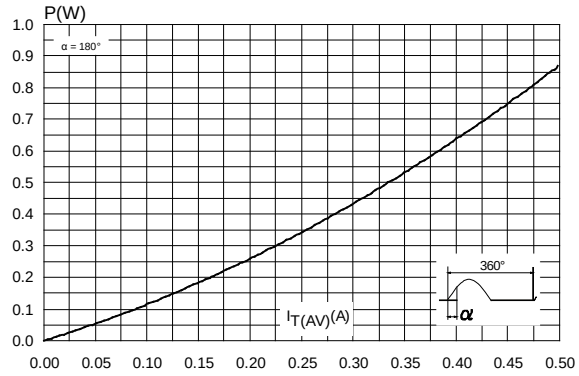



**Figure 2: Average and D.C. on-state current versus lead temperature**

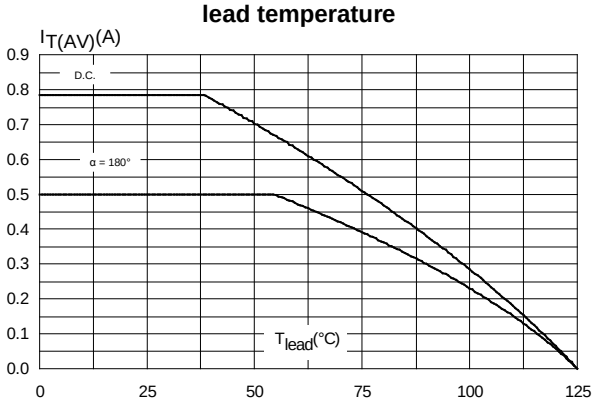



**Figure 3: Average and D.C. on-state current versus ambient temperature (device mounted on FR4 with recommended pad layout)**

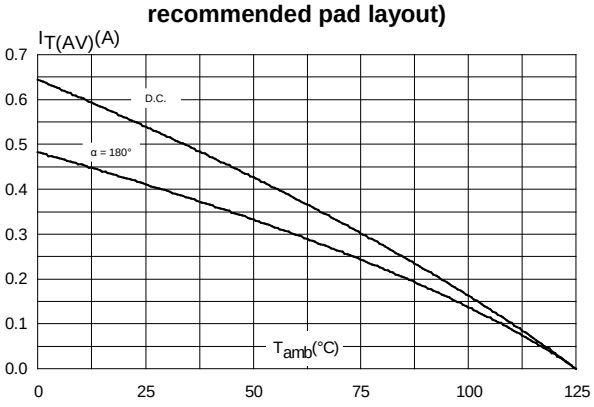



**Figure 4: Relative variation of thermal impedance junction to ambient versus pulse duration**

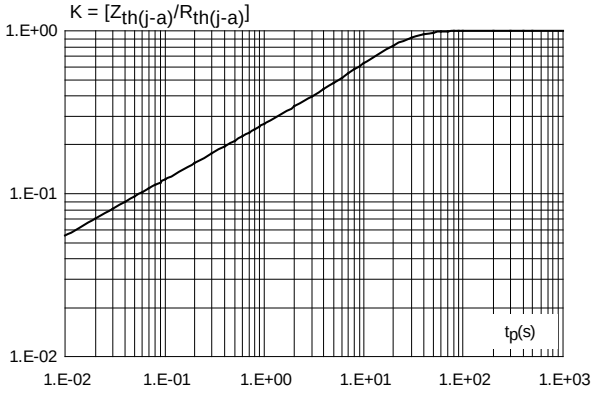



**Figure 5: Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values)**

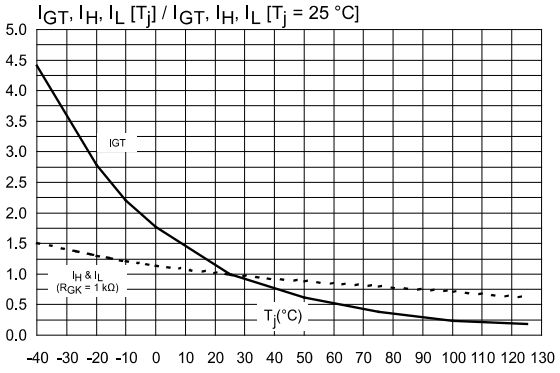



**Figure 6: Relative variation of holding current versus gate-cathode resistance (typical values)**

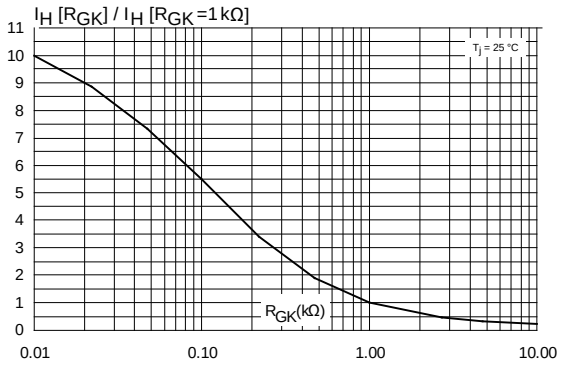


**Figure 7: Relative variation of dV/dt immunity versus gate-cathode resistance (typical values)**

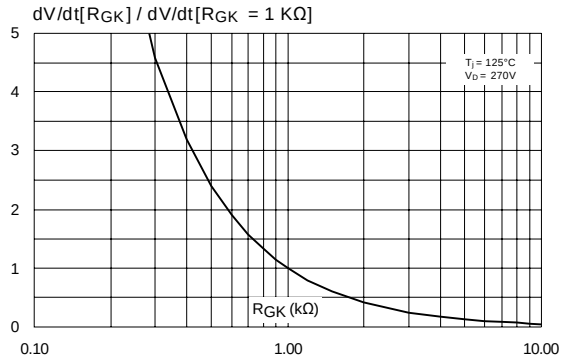



**Figure 8: Relative variation of dV/dt immunity versus gate-cathode capacitance (typical values)**

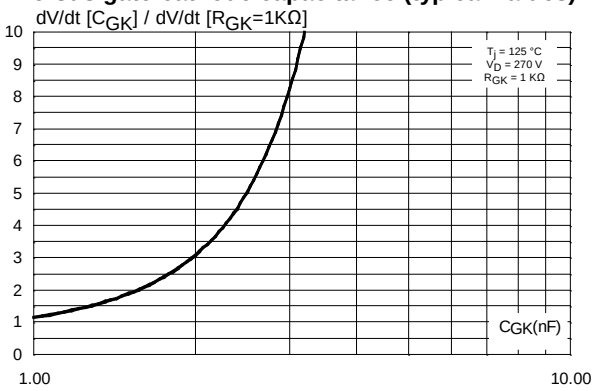



**Figure 9: Surge peak on-state current versus number of cycles**

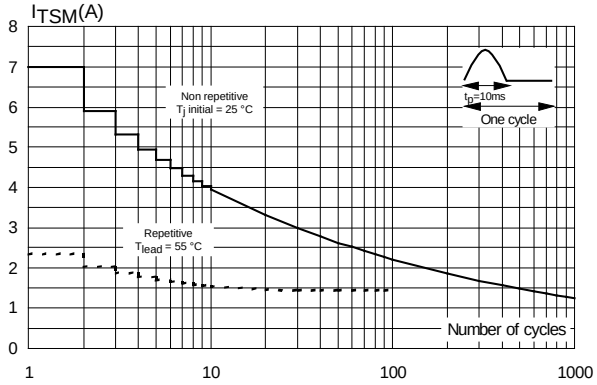



**Figure 10: Non repetitive surge peak on-state current for a sinusoidal pulse with width $t_p$<10ms**

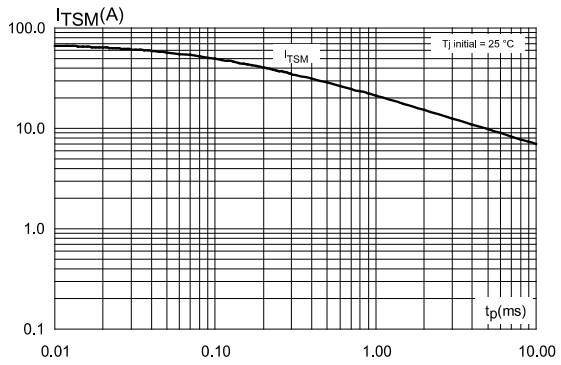
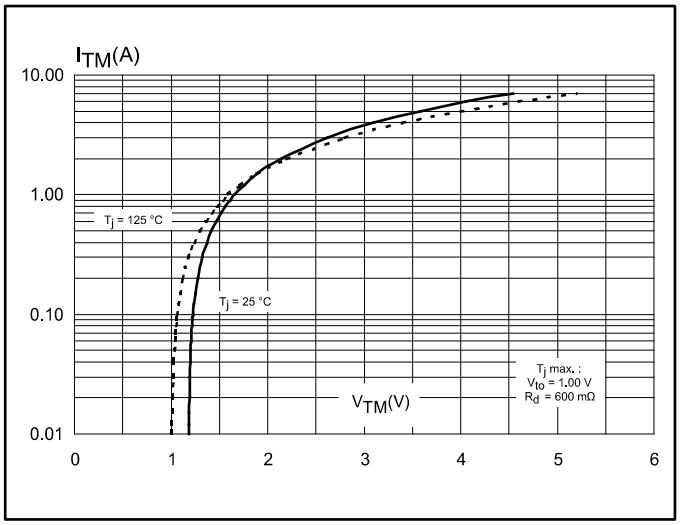



**Figure 11: On-state characteristics (maximum values)**



# 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 TO-92 package information (for bag version)

**Figure 12: TO-92 package outline (for bag version)**

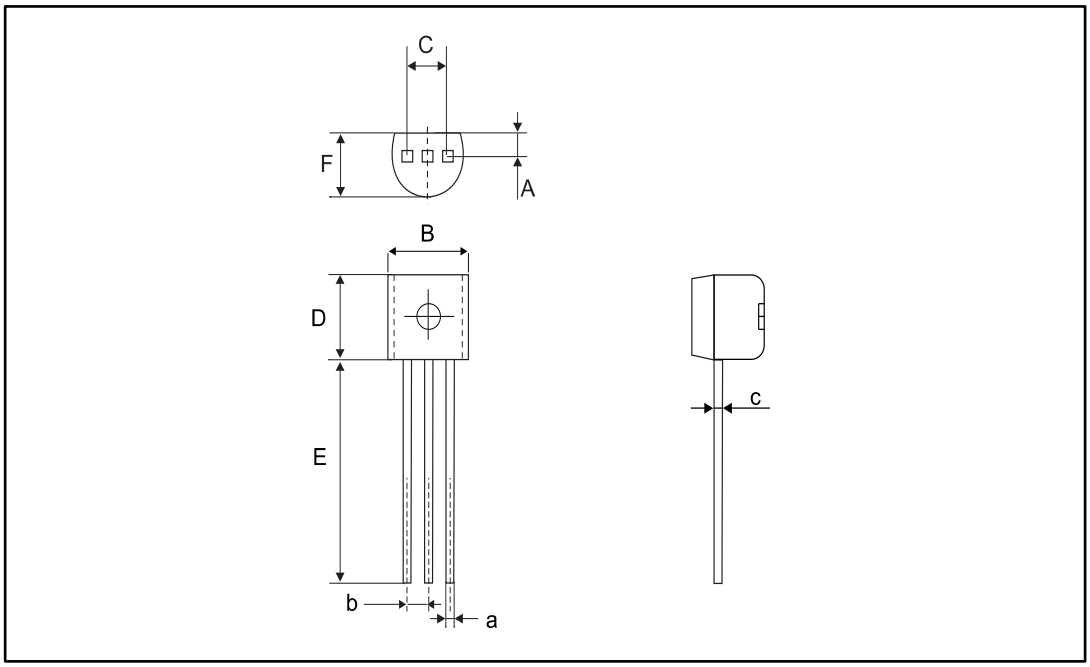



**Table 5: TO-92 package mechanical data (for bag version)**

| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches[(1)] | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | | 1.35 | | | 0.0531 | |
| B | | | 4.70 | | | 0.1850 |
| C | | 2.54 | | | 0.1000 | |
| D | 4.40 | | | 0.1732 | | |
| E | 12.70 | | | 0.5000 | | |
| F | | | 3.70 | | | 0.1457 |
| a | | | 0.50 | | | 0.0197 |
| b | | 1.27 | | | 0.0500 | |
| c | | | 0.48 | | | 0.0189 |

**Notes:**

(1)Inches given for reference only

## 2.2 TO-92 package information (for ammopack and tape and reel versions)

**Figure 13: TO-92 package outline (for ammopack and tape and reel versions)**

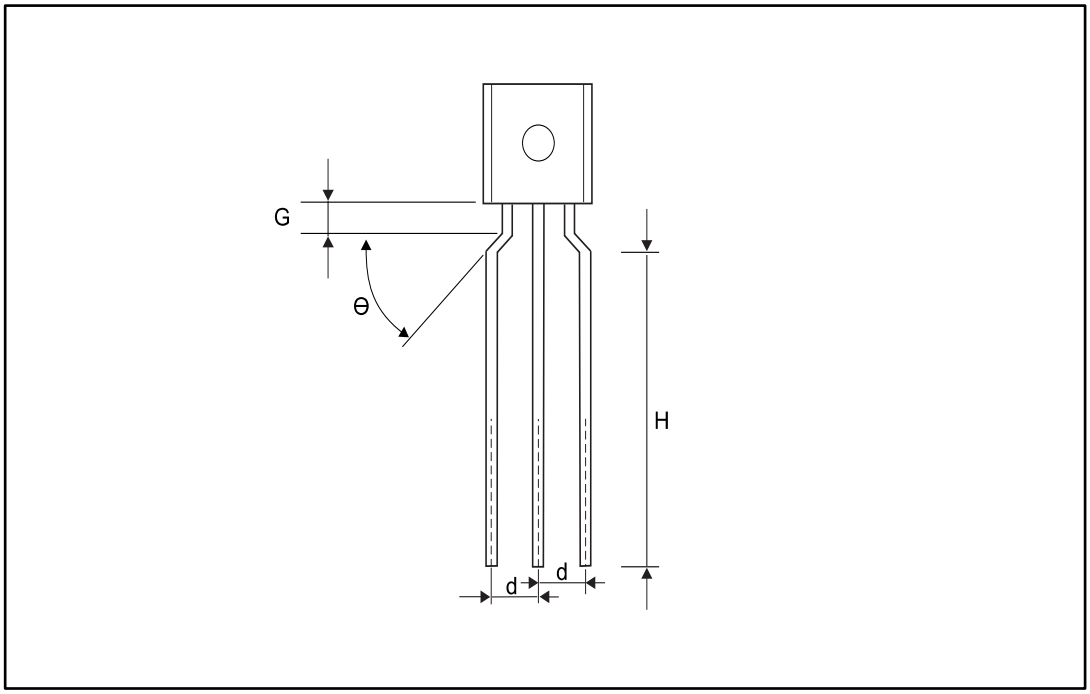



**Table 6: TO-92 package mechanical data (for ammopack and tape and reel versions)**

| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches[(1)] | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| G | 1.30 | 1.70 | 2.00 | 0.0511 | 0.0669 | 0.0787 |
| H | 7.69 | | 9.69 | 0.3028 | | 0.3815 |
| d | 2.40 | | 2.90 | 0.0945 | | 0.1142 |
| Θ | 30° | 40° | 50° | 30° | 40° | 50° |

**Notes:**

(1)Inches given for reference only

# 3 Ordering information

**Figure 14: Ordering information scheme**

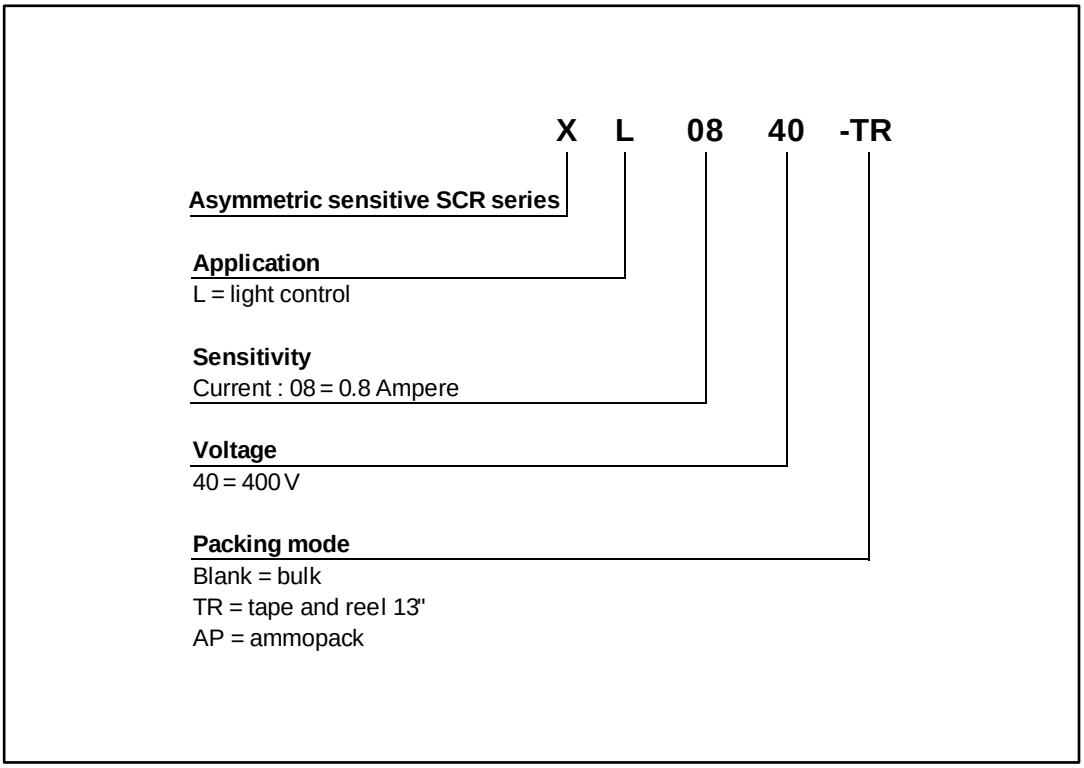



**Table 7: Ordering information**

| Order code | Marking | Package | Weight | Base qty. | Delivery mode |
|---|---|---|---|---|---|
| XL0840 | XL0840 | TO-92 | 0.2 g | 2500 | Bag |
| XL0840-AP | XL0840 | | | 2000 | Ammopack not in dry bag |
| XL0840-TR | XL0840 | | | 2000 | Tape and Reel 13 inches |

# 4 Revision history

**Table 8: Document revision history**

| Date | Revision | Changes |
|---|---|---|
| Jan-2002 | 1 | Initial release |
| 07-Sep-2017 | 2 | Updated package information section. |

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