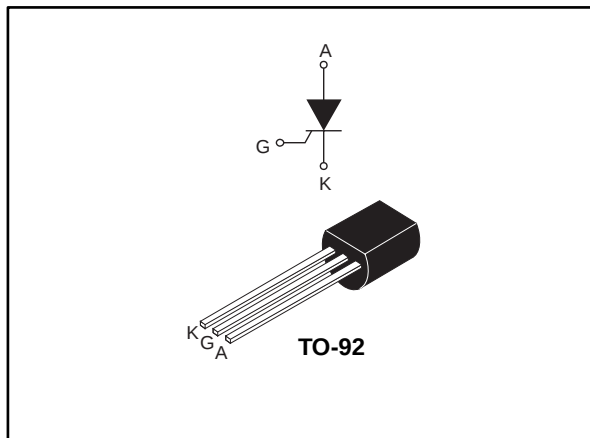


## 0.8 A asymmetric sensitive gate SCR

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   | $\mu A$ |

### Features

- High immunity: 75 V/ $\mu s$  at 125 °C
- Sensitive gate: 200  $\mu A$  at 25 °C
- Low leakage current:  $I_{DRM}$  max. 100  $\mu A$  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 <sub>T(RMS)</sub> | RMS on-state current (180 ° conduction angle)                                                   |                         | T <sub>C</sub> = 55 °C  | 0.8         | A    |
| I <sub>T(AV)</sub>  | Average on-state current (180 ° conduction angle)                                               |                         |                         | 0.5         |      |
| I <sub>TSM</sub>    | Non repetitive surge peak on-state current                                                      | t <sub>p</sub> = 8.3 ms | T <sub>j</sub> = 25 °C  | 8           | A    |
|                     |                                                                                                 | t <sub>p</sub> = 10 ms  |                         | 7           |      |
| I <sup>2</sup> t    | I <sup>2</sup> t value for fusing                                                               |                         |                         |             |      |
| di/dt               | Critical rate of rise of on-state current<br>I <sub>G</sub> = 2 X I <sub>GT</sub> , tr ≤ 100 ns | f = 60 Hz               | T <sub>j</sub> = 125 °C | 30          | A/μs |
| I <sub>GM</sub>     | Peak forward gate current                                                                       | t <sub>p</sub> = 20 μs  | T <sub>j</sub> = 125 °C | 1           | A    |
| V <sub>DRM</sub>    | Repetitive peak off-state voltage                                                               |                         | Max.                    | 400         | V    |
| P <sub>G(AV)</sub>  | Average gate power dissipation                                                                  |                         | T <sub>j</sub> = 125 °C | 0.1         | W    |
| T <sub>stg</sub>    | Storage junction temperature range                                                              |                         |                         | -40 to +150 | °C   |
| T <sub>j</sub>      | Operating junction temperature range                                                            |                         |                         | -40 to +125 |      |

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

| Symbol               | Test conditions                                                                     |                         |      | Value | Unit |
|----------------------|-------------------------------------------------------------------------------------|-------------------------|------|-------|------|
| I <sub>GT</sub>      | V <sub>D</sub> = 12 V, R <sub>L</sub> = 140 Ω                                       |                         | Max. | 200   | μA   |
| V <sub>GT</sub>      |                                                                                     |                         | Max. | 0.8   | V    |
| V <sub>GD</sub>      | V <sub>D</sub> = V <sub>DRM</sub> , R <sub>L</sub> = 3.3 kΩ, R <sub>GK</sub> = 1 kΩ | T <sub>j</sub> = 125 °C | Min. | 0.1   | V    |
| V <sub>RG</sub>      | I <sub>RG</sub> = 10 μA                                                             |                         | Min. | 8     | V    |
| I <sub>H</sub>       | I <sub>T</sub> = 50 mA, R <sub>GK</sub> = 1 kΩ                                      |                         | Max. | 5     | mA   |
| I <sub>L</sub>       | I <sub>G</sub> = 1 mA, R <sub>GK</sub> = 1 kΩ                                       | T <sub>j</sub> = 125 °C | Max. | 6     | mA   |
| dV/dt <sup>(1)</sup> | V <sub>D</sub> = 67 % V <sub>DRM</sub> , R <sub>GK</sub> = 1 kΩ                     | T <sub>j</sub> = 125 °C | Min. | 75    | V/μs |
| V <sub>TM</sub>      | I <sub>TM</sub> = 1.6 A, t <sub>p</sub> = 380 μs                                    | T <sub>j</sub> = 25 °C  | Max. | 1.95  | V    |
| V <sub>to</sub>      | Threshold voltage                                                                   | T <sub>j</sub> = 125 °C | Max. | 1.0   | V    |
| R <sub>d</sub>       | Dynamic resistance                                                                  | T <sub>j</sub> = 125 °C | Max. | 600   | mΩ   |
| I <sub>DRM</sub>     | V <sub>DRM</sub> R <sub>GK</sub> = 1 kΩ                                             | T <sub>j</sub> = 25 °C  | Max. | 1     | μA   |
|                      |                                                                                     | T <sub>j</sub> = 125 °C | Max. | 100   |      |

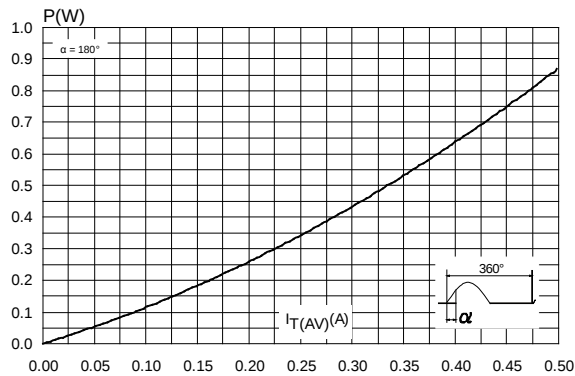
**Notes:**
<sup>(1)</sup>for both polarities of A2 referenced to A1.

**Table 4: Thermal parameters**

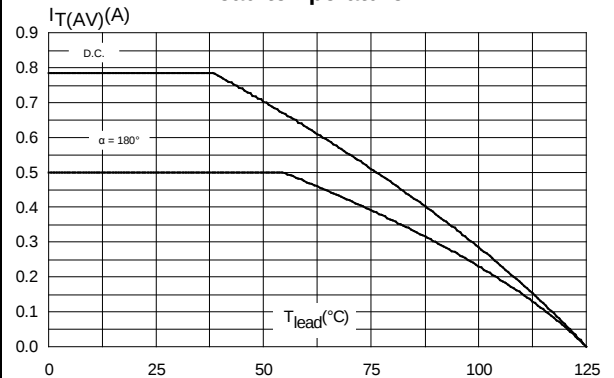
| Symbol        | Parameter                | Value | Unit |
|---------------|--------------------------|-------|------|
| $R_{th(j-a)}$ | Junction to ambient (DC) | 150   | °C/W |
| $R_{th(j-l)}$ | Junction to lead (DC)    | 80    |      |

## 1.1 Characteristics (curves)

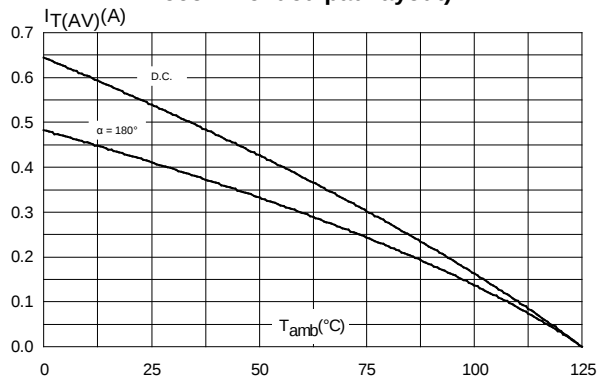
**Figure 1: Maximum average power dissipation versus average on-state current**



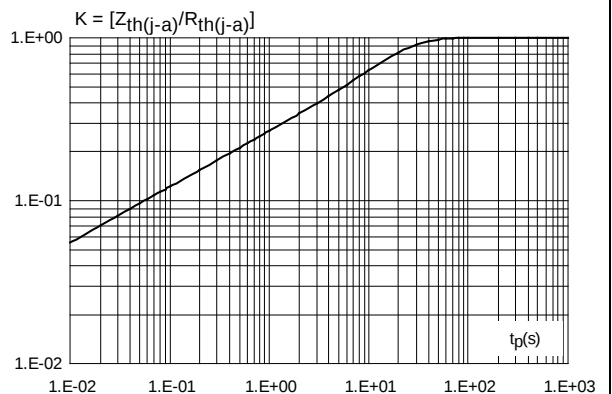
**Figure 2: Average and D.C. on-state current versus lead temperature**



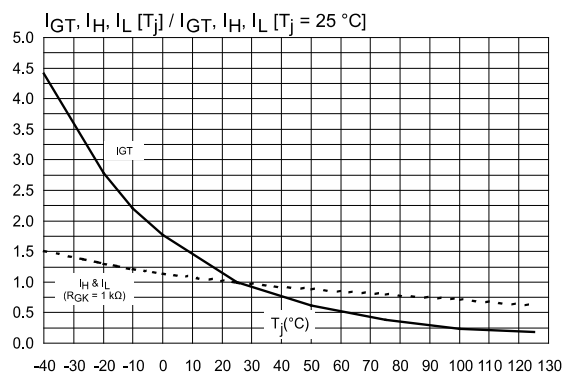
**Figure 3: Average and D.C. on-state current versus ambient temperature (device mounted on FR4 with recommended pad layout)**



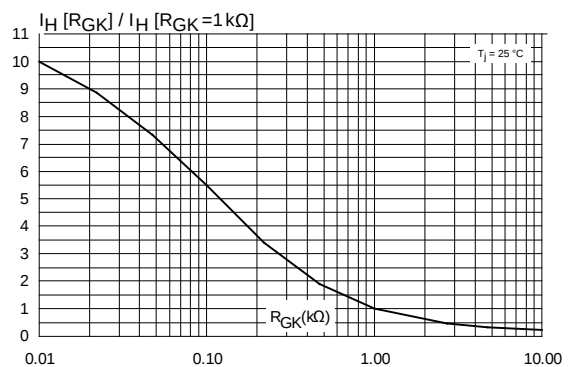
**Figure 4: Relative variation of thermal impedance junction to ambient versus pulse duration**



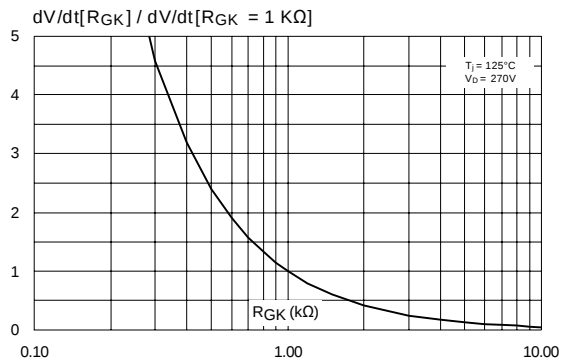
**Figure 5: Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values)**



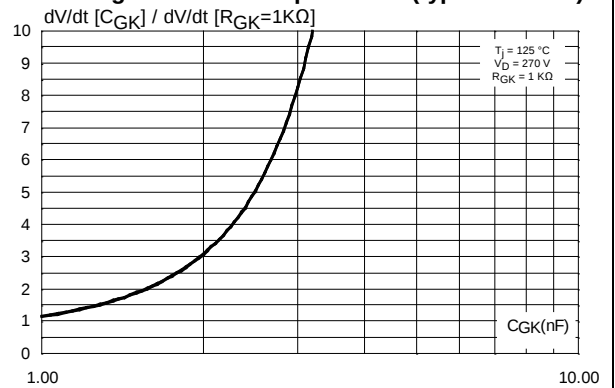
**Figure 6: Relative variation of holding current versus gate-cathode resistance (typical values)**



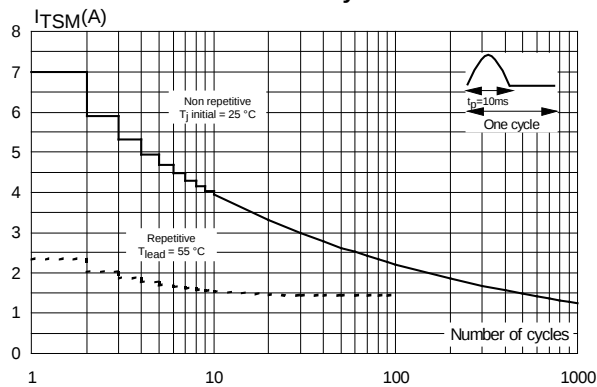
**Figure 7: Relative variation of dV/dt immunity versus gate-cathode resistance (typical values)**



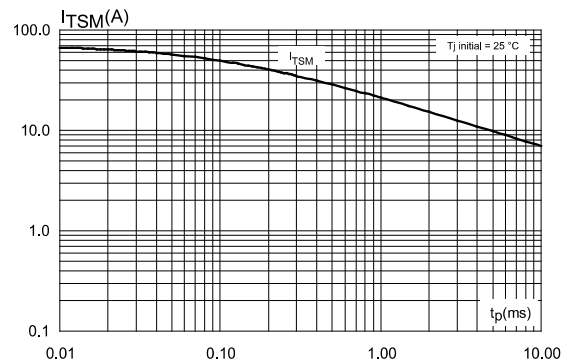
**Figure 8: Relative variation of dV/dt immunity versus gate-cathode capacitance (typical values)**



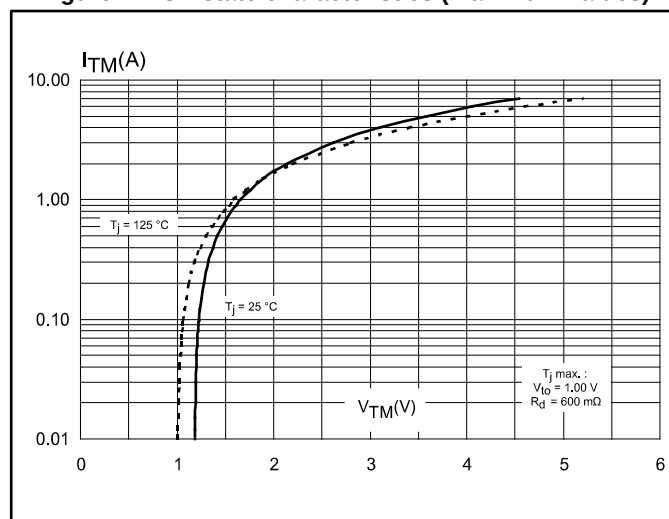
**Figure 9: Surge peak on-state current versus number of cycles**



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



**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](http://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)

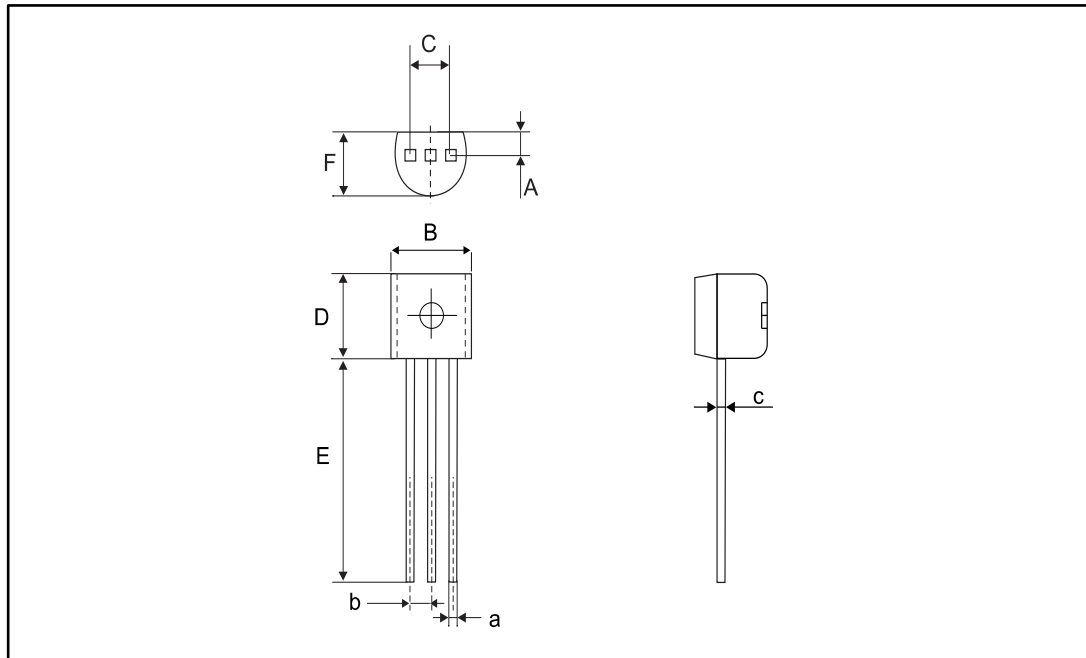


Table 5: TO-92 package mechanical data (for bag version)

| Ref. | Dimensions  |      |      |                       |        |        |
|------|-------------|------|------|-----------------------|--------|--------|
|      | Millimeters |      |      | Inches <sup>(1)</sup> |        |        |
|      | 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:**

<sup>(1)</sup>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)

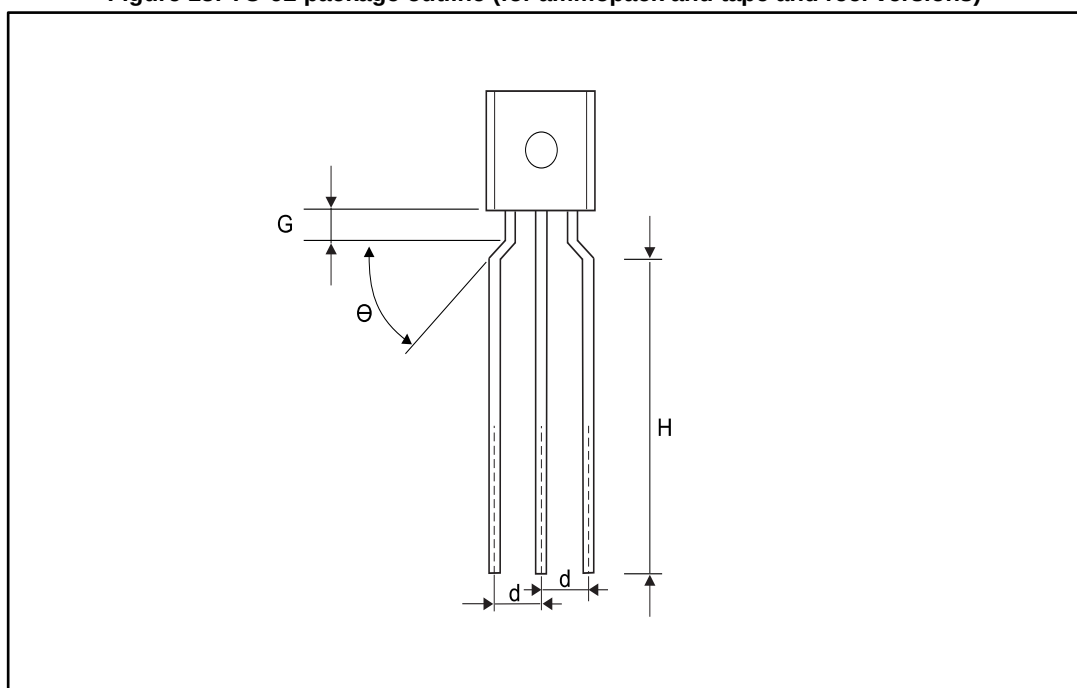


Table 6: TO-92 package mechanical data (for ammopack and tape and reel versions)

| Ref. | Dimensions  |      |      |                       |        |        |
|------|-------------|------|------|-----------------------|--------|--------|
|      | Millimeters |      |      | Inches <sup>(1)</sup> |        |        |
|      | 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:**

<sup>(1)</sup>Inches given for reference only

### 3 Ordering information

Figure 14: Ordering information scheme

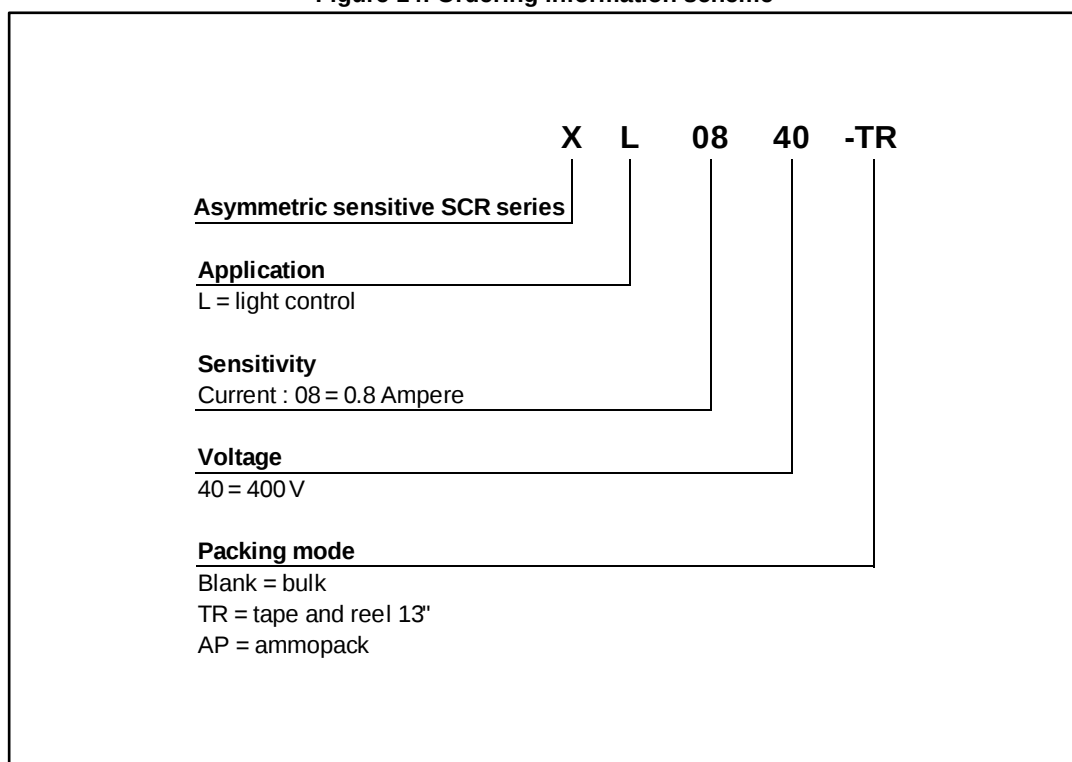


Table 7: Ordering information

| 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. |

**IMPORTANT NOTICE – PLEASE READ CAREFULLY**

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2017 STMicroelectronics – All rights reserved