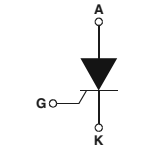
# P01xxxL

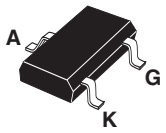
**SENSITIVE**

## 0.25A SCRs

**Table 1: Main Features**

| Symbol | Value | Unit |
|---|---|---|
| $I_{T(RMS)}$ | 0.25 | A |
| $V_{DRM}/V_{RRM}$ | 100 and 200 | V |
| $I_{GT}$ | 1 and 200 | µA |




**SOT23-3L**

### DESCRIPTION

Thanks to highly sensitive triggering levels, the **P01xxxL** SCR series is suitable for all applications where the available gate current is limited such as stand-by mode power supplies, smoke and alarm detectors...

Available in SOT23-3L, it provides optimized space saving on high density printed circuit boards.

**Table 2: Order Codes**

| Part Numbers | Marking |
|---|---|
| P0102AL 5AA4 | P2A |
| P0102BL 5AA4 | P2B |
| P0109AL 5AA4 | P9A |

**Table 3: Absolute Ratings** (limiting values)

| Symbol | Parameter | | | Value | Unit |
|---|---|---|---|---|---|
| $I_{T(RMS)}$ | RMS on-state current (180° conduction angle) | | $T_{amb}$ = 36°C | 0.25 | A |
| $IT_{(AV)}$ | Average on-state current (180° conduction angle) | | $T_{amb}$ = 36°C | 0.16 | A |
| $I_{TSM}$ | Non repetitive surge peak on-state current | $t_p$ = 8.3 ms | $T_j$ = 25°C | 7 | A |
| | | $t_p$ = 10 ms | | 6 | |
| $I^2t$ | $I^2t$ Value for fusing | $t_p$ = 10 ms | $T_j$ = 25°C | 0.18 | $A^2S$ |
| dI/dt | Critical rate of rise of on-state current $I_G$ = 2 x $I_{GT}$ , $t_r \leq$ 100 ns | F = 60 Hz | $T_j$ = 125°C | 50 | A/µs |
| $I_{GM}$ | Peak gate current | $t_p$ = 20 µs | $T_j$ = 125°C | 0.5 | A |
| $P_{G(AV)}$ | Average gate power dissipation | | $T_j$ = 125°C | 0.02 | W |
| $T_{stg}$<br>$T_j$ | Storage junction temperature range<br>Operating junction temperature range | | | - 40 to + 150<br>- 40 to + 125 | °C |

**Tables 4: Electrical Characteristics** ($T_j$ = 25°C, unless otherwise specified)

| Symbol | Test Conditions | | | P0102xL | P0109AL | Unit |
|---|---|---|---|---|---|---|
| $I_{GT}$ | $V_D$ = 12 V $R_L$ = 140 Ω | | MAX. | 200 | 1 | 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. | 6 | | mA |
| $I_L$ | $I_G$ = 1 mA $R_{GK}$ = 1 kΩ | | MAX. | 7 | | mA |
| dV/dt | $V_D$ = 67 % $V_{DRM}$ $R_{GK}$ = 1 kΩ | $T_j$ = 125°C | MIN. | 200 | 100 | V/µs |
| $V_{TM}$ | $I_{TM}$ = 0.4 A tp = 380 µs | $T_j$ = 25°C | MAX. | 1.7 | | V |
| $V_{t0}$ | Threshold voltage | $T_j$ = 125°C | MAX. | 1.0 | | V |
| $R_d$ | Dynamic resistance | $T_j$ = 125°C | MAX. | 1000 | | mΩ |
| $I_{DRM}$ $I_{RRM}$ | $V_{DRM} = V_{RRM}$ | $T_j$ = 25°C | MAX. | 1 | | µA |
| | | $T_j$ = 125°C | | 100 | | |

**Table 5: Thermal resistance**

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $R_{th(j-a)}$ | Junction to ambient (mounted on FR4 with recommended pad layout) | 400 | °C/W |



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

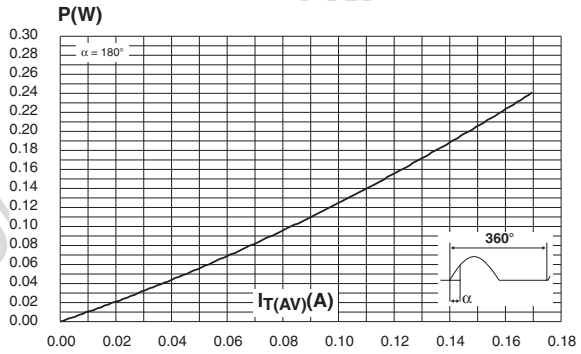



**Figure 2: Average and D.C. on-state current versus case temperature**

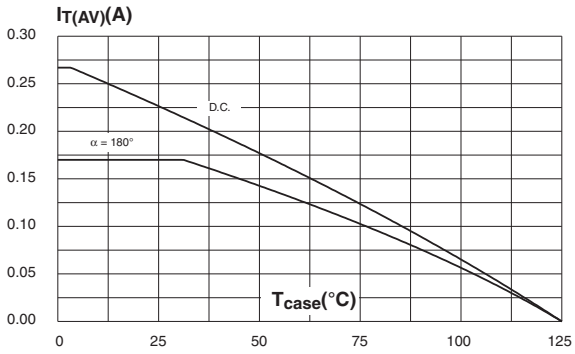


**Figure 3: Relative variation of thermal impedance junction to ambient versus pulse duration**

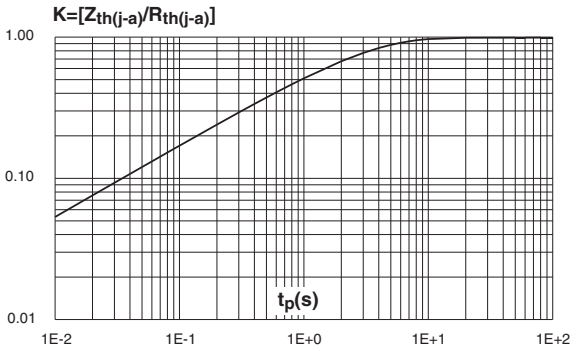



**Figure 4: Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values)**

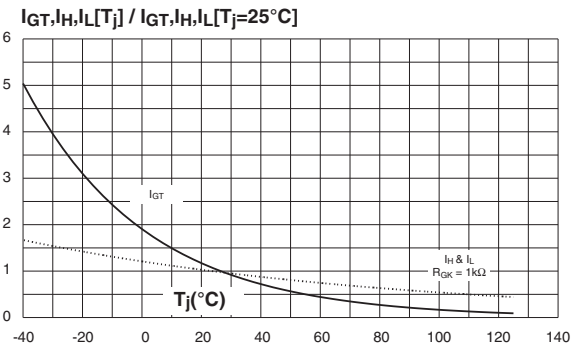



**Figure 5: Relative variation of holding current versus gate-cathode resistance (typical values)**

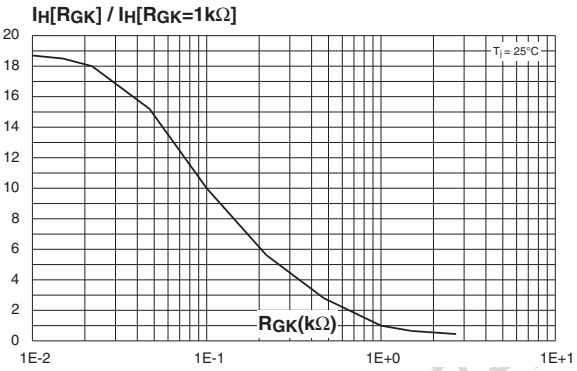



**Figure 6: Relative variation of dV/dt immunity versus gate-cathode resistance (typical values)**

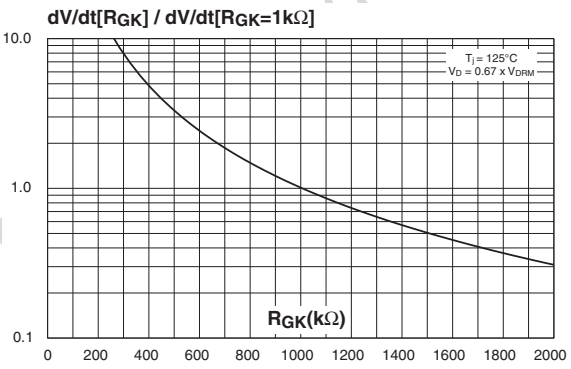



**Figure 7: Relative variation of dV/dt immunity versus gate-cathode capacitance (typical values)**

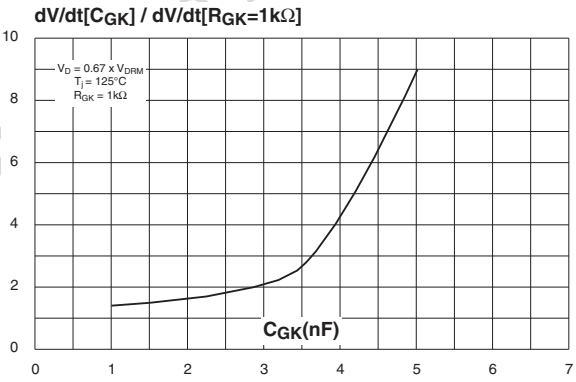



**Figure 8: Surge peak on-state current versus number of cycles**

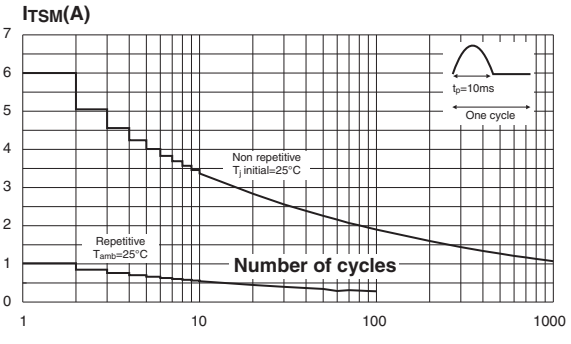


**Figure 9: Non-repetitive surge peak on-state current for a sinusoidal pulse with width $t_p$ < 10ms, and corresponding value of $I^2t$**

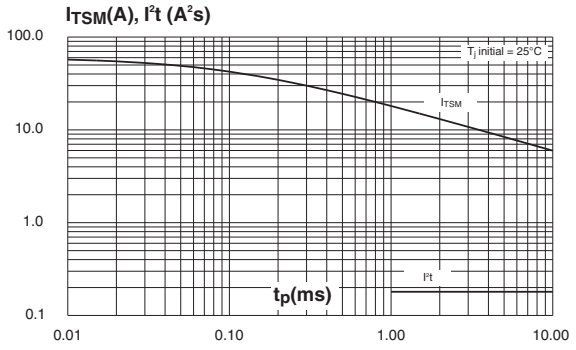



**Figure 10: On-state characteristics (maximum values)**

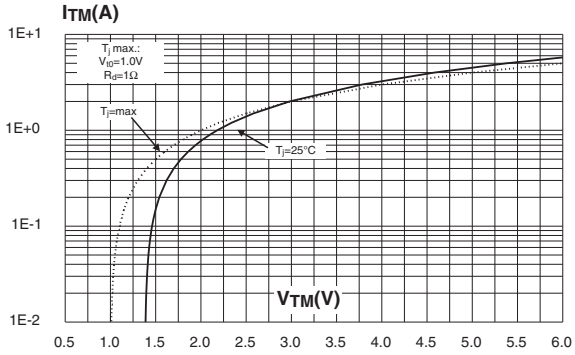



**Figure 11: Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness: 35 mm)**

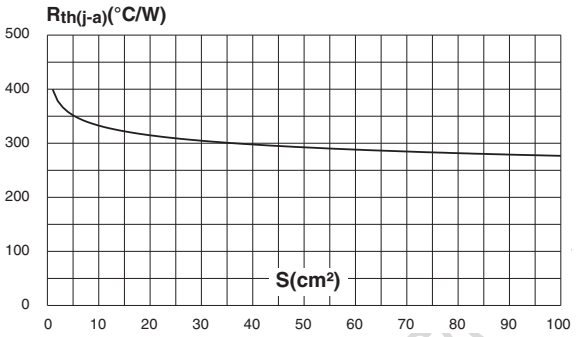





**Figure 12: Ordering Information Scheme**

P 01 02 A L Blank 5AA4

**Sensitive SCR series**

**Current**
01 = 0.25A

**Sensitivity**
02 = 200µA
09 = 1µA

**Voltage**
A = 100V
B = 200V

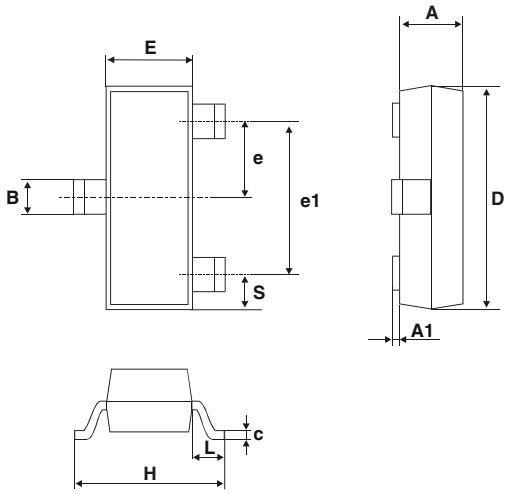
**Package**
L = SOT23-3L

**Packing mode**
5AA4 = Tape & Reel

**Table 6: Product Selector**

| Part Number | Voltage | Sensitivity | Package |
|---|---|---|---|
| P0102AL 5AA4 | 100 V | 200 µA | SOT23-3L |
| P0102BL 5AA4 | 200 V | 200 µA | |
| P0109AL 5AA4 | 100 V | 1 µA | |

**Figure 13: SOT23-3L Package Mechanical Data**




| REF. | DIMENSIONS | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 0.89 | 1.4 | 0.035 | 0.055 |
| A1 | 0 | 0.1 | 0 | 0.004 |
| B | 0.3 | 0.51 | 0.012 | 0.02 |
| c | 0.085 | 0.18 | 0.003 | 0.007 |
| D | 2.75 | 3.04 | 0.108 | 0.12 |
| e | 0.85 | 1.05 | 0.033 | 0.041 |
| e1 | 1.7 | 2.1 | 0.067 | 0.083 |
| E | 1.2 | 1.6 | 0.047 | 0.063 |
| H | 2.1 | 2.75 | 0.083 | 0.108 |
| L | 0.6 typ. | | 0.024 typ. | |
| S | 0.35 | 0.65 | 0.014 | 0.026 |

**Figure 14: Foot Print Dimensions** (in millimeters)

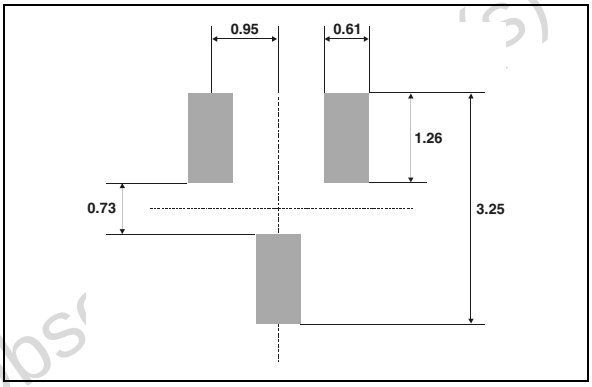


**Table 7: Ordering Information**

| Ordering type | Marking | Package | Weight | Base qty | Delivery mode |
|---|---|---|---|---|---|
| P0102AL 5AA4 | P2A | SOT23-3L | 0.01 g | 3000 | Tape & reel |
| P0102BL 5AA4 | P2B | | | | |
| P0109AL 5AA4 | P9A | | | | |

**Table 8: Revision History**

| Date | Revision | Description of Changes |
|---|---|---|
| Sep-2000 | 3 | Last update. |
| 11-Apr-2005 | 4 | P0102AL and P0109AL added. |