# X0405M

4.0A Sensitive Gate SCRs

## Product Summary

| Symbol | Value | Unit |
|---|---|---|
| $I_{T(RMS)}$ | 4.0 | A |
| $V_{DRM}$ $V_{RRM}$ | 600 | V |
| $I_{GT}$ | 10-200 | μA |

## Feature

With high ability to withstand the shock loading of large current, Provide high dv/dt rate with strong resistance to electromagnetic interference.

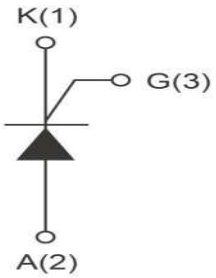
## Application

Power charger, T-tools, massager, solid state relay, AC Motor speed regulation and so on.

## Package


**TO-252**

## Circuit diagram



## Absolute maximum ratings (Ta=25℃ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Repetitive peak off-state voltage | $V_{DRM}$ | 600 | V |
| Repetitive peak reverse voltage | $V_{RRM}$ | 600 | V |
| RMS on-state current | $I_{T(RMS)}$ | 4 | A |
| Non repetitive surge peak on-state current (full cycle, F=50Hz) | $I_{TSM}$ | 30 | A |
| $I^2t$ value for fusing (tp=10ms) | $I^2t$ | 4.5 | $A^2s$ |
| Critical rate of rise of on-state current ($I_G$ =2×$I_{GT}$) | $dI_T/dt$ | 50 | A/μs |
| Peak gate current | $I_{GM}$ | 1.2 | A |
| Average gate power dissipation | $P_{G(AV)}$ | 0.2 | W |
| Junction Temperature | $T_J$ | -40 ~ +110 | ℃ |
| Storage Temperature | $T_{STG}$ | -40 ~ +150 | ℃ |

## Electrical characteristics ($T_A$=25 °C, unless otherwise noted)

| Parameter | Symbol | Test Condition | | Value | | Unit |
|---|---|---|---|---|---|---|
| | | | | Min | Max | |
| Gate trigger current | $I_{GT}$ | $V_D$ =12V $R_L$=140Ω $T_j$ =25℃ | | 10 | 200 | μA |
| Gate trigger voltage | $V_{GT}$ | | | - | 0.8 | V |
| Gate non-trigger voltage | $V_{GD}$ | $V_D$ =$V_{DRM}$ $R_{GK}$=1kΩ $T_j$ =110℃ | | 0.2 | - | V |
| latching current | $I_L$ | $I_G$=1mA $R_{GK}$=1kΩ $T_j$ =25℃ | | - | 6 | mA |
| Holding current | $I_H$ | $I_T$=50mA $R_{GK}$=1kΩ $T_j$ =25℃ | | - | 5 | mA |
| Critical-rate of rise of commutation voltage | $dV_D/dt$ | $V_D$=2/3$V_{DRM}$ $R_{GK}$=1kΩ $T_j$ =110℃ | | 10 | - | V/μs |
| **STATIC CHARACTERISTICS** | | | | | | |
| Forward "on" voltage | $V_{TM}$ | $I_{TM}$ =8A tp=380μs | | - | 1.55 | V |
| Repetitive Peak Off-State Current | $I_{DRM}$ | $V_D$ =$V_{DRM}$ $V_R$ =$V_{RRM}$ | $T_j$=25℃ | - | 5 | μA |
| Repetitive Peak Reverse Current | $I_{RRM}$ | | $T_j$=110℃ | - | 0.15 | mA |
| **THERMAL RESISTANCES** | | | | | | |
| Thermal resistance | Rth(j-c) | Junction to case (AC) | | TYP. | 7.2 | ℃/W |
| | Rth(j-a) | Junction to ambient | | TYP. | 100 | ℃/W |

## Typical Characteristics

FIG.1: Maximum power dissipation versus RMS on-state current (full cycle)

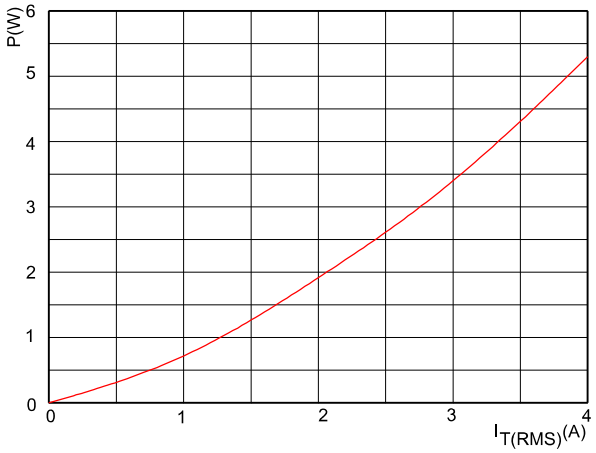



FIG.2: RMS on-state current versus case temperature (full cycle)

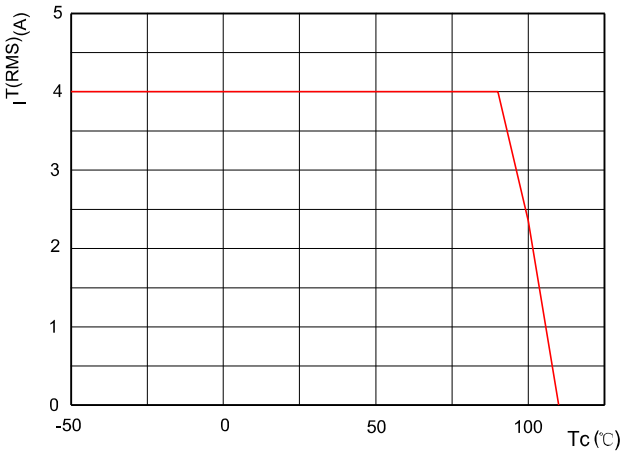



FIG.3: Surge peak on-state current versus number of cycles

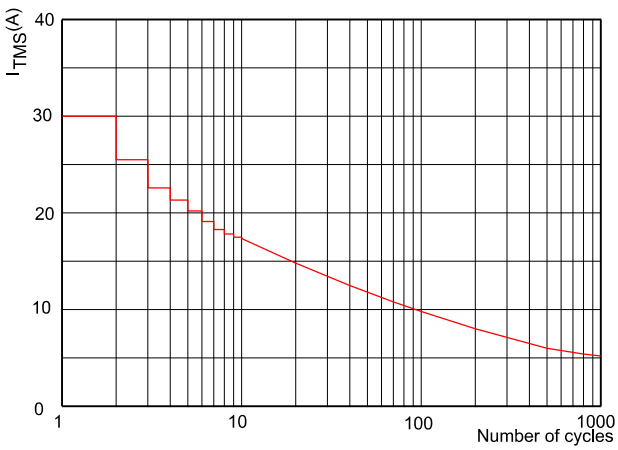



FIG.4: On-state characteristics (maximum values)

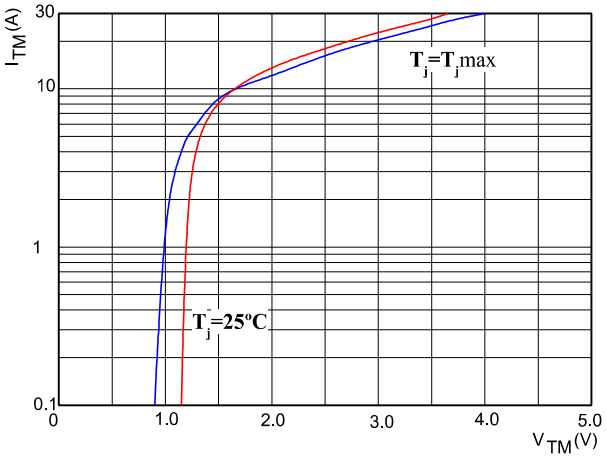



FIG.5: Non-repetitive surge peak on-state current for a sinusoidal pulse with width tp < 10ms

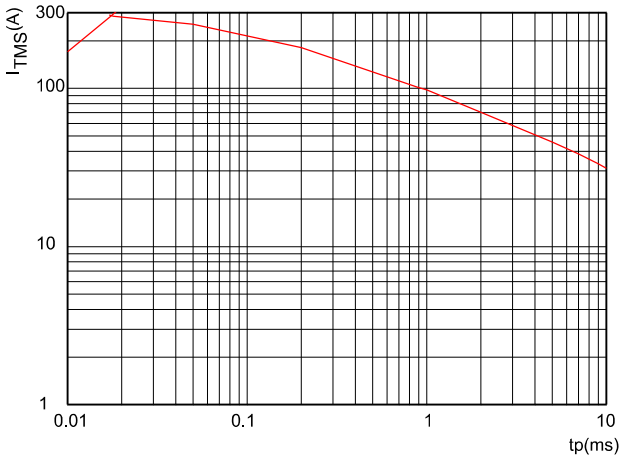
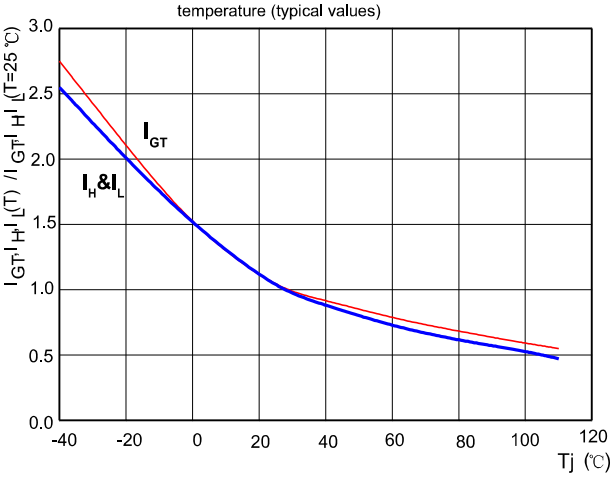
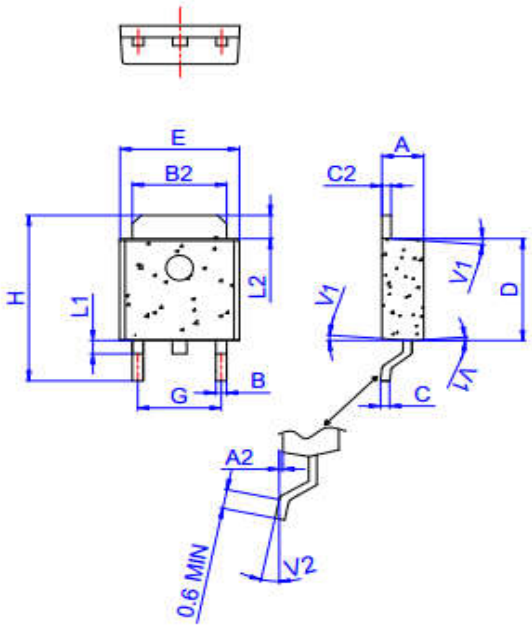



FIG.6: Relative variations of gate trigger current, holding current and latching current versus junction temperature (typical values)



## TO-252 Package Information




| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 2.20 | | 2.40 | 0.086 | | 0.095 |
| A2 | 0.03 | | 0.23 | 0.001 | | 0.009 |
| B | 0.55 | | 0.65 | 0.022 | | 0.026 |
| B2 | 5.10 | | 5.40 | 0.200 | | 0.213 |
| C | 0.45 | | 0.62 | 0.018 | | 0.024 |
| C2 | 0.48 | | 0.85 | 0.019 | | 0.034 |
| D | 5.30 | | 6.20 | 0.208 | | 0.244 |
| E | 6.40 | | 6.70 | 0.252 | | 0.264 |
| G | 4.40 | | 4.70 | 0.173 | | 0.185 |
| H | 9.35 | | 10.6 | 0.368 | | 0.417 |
| L1 | 1.30 | | 1.70 | 0.051 | | 0.067 |
| L2 | 1.37 | | 1.50 | 0.054 | | 0.059 |
| V1 | | 4° | | | 4° | |
| V2 | 0° | | 8° | 0° | | 8° |