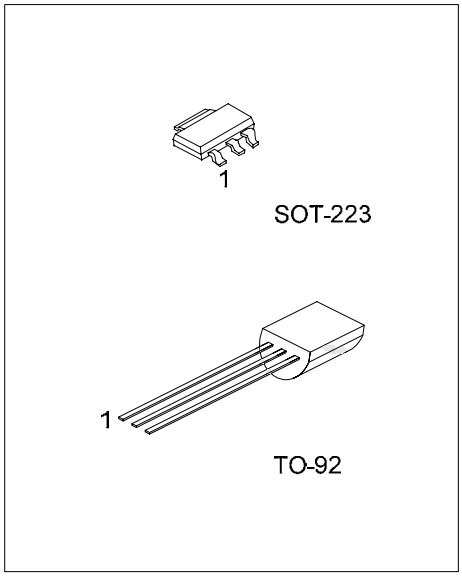
# SENSITIVE SCRS




*Pb-free plating product number:
X0202L/X0202AL

## ■ DESCRIPTION

The UTC **X0202/A** SCR series is suitable for all applications where the available gate current is limited, such as ground fault circuit interruptors, overvoltage crowbar protection in low power supplies, capacitive ignition circuit, …….

## ■ FEATURES

* $I_{T(RMS)}$ : 1.25A
* $V_{DRM}/V_{RRM}$ :600/800V

## ■ ORDERING INFORMATION

| Ordering Number | | Package | Pin Assignment | | | Packing |
|---|---|---|---|---|---|---|
| Normal | Lead Free Plating | | 1 | 2 | 3 | |
| X0202-AA3-R | X0202L-AA3-R | SOT-223 | K | A | G | Tape Reel |
| X0202-T92-B | X0202L-T92-B | TO-92 | K | G | A | Tape Box |
| X0202-T92-K | X0202L-T92-K | TO-92 | K | G | A | Bulk |
| X0202-T92-R | X0202L-T92-R | TO-92 | K | G | A | Tape Reel |
| X0202A-AA3-R | X0202AL-AA3-R | SOT-223 | K | A | G | Tape Reel |
| X0202A-T92-B | X0202AL-T92-B | TO-92 | K | G | A | Tape Box |
| X0202A-T92-K | X0202AL-T92-K | TO-92 | K | G | A | Bulk |
| X0202A-T92-R | X0202AL-T92-R | TO-92 | K | G | A | Tape Reel |

Note: Pin Assignment: G: Gate A: Anode K: Cathode

| | |
|---|---|
| X0202L-AA3-R<br>(1)Packing Type<br>(2)Package Type<br>(3)Lead Plating | (1) B: Tape Box, K: Bulk, R: Tape Reel<br>(2) AA3: SOT-223, T92: TO-92<br>(3) L: Lead Free Plating, Blank: Pb/Sn |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## ■ ABSOLUTE MAXIMUM RATINGS (unless otherwise specified)

| PARAMETERS | | SYMBOL | RATINGS | UNIT |
|---|---|---|---|---|
| Peak Repetitive Forward and Reverse Blocking Voltage ($T_J$=110°C, $R_{GK}$=1kΩ) | X0202 | $V_{DRM}$, $V_{RRM}$ | 600 | V |
| | X0202A | | 800 | V |
| RMS On-State Current (Ttab=95°C) 180°C Conduction Angle | | $I_{T(RMS)}$ | 1.25 | A |
| Average On-State Current (Ttab=95°C) 180°C Conduction Angle | | $I_{T(AV)}$ | 0.8 | A |
| Non Repetitive Surge Peak on-State Current (tp=8.3ms $T_J$=25°C) | | $I_{TSM}$ | 25 | A |
| Non Repetitive Surge Peak on-State Current (tp=10ms $T_J$=25°C) | | $I_{TSM}$ | 22.5 | A |
| $I^2t$ Value for Fusing (tp=10ms $T_J$=25°C) | | $I^2t$ | 2.5 | $A^2S$ |
| Critical Rate Of Rise Of On-state Current $I_G$=2*$I_{GT}$,tr≤100ns, f=60Hz, $T_J$=125°C | | dI/dt | 50 | A/μs |
| Peak Gate Current (p=20μs $T_J$=125°C) | | $I_{GM}$ | 1.2 | A |
| Average Gate Power Dissipation ($T_J$=125°C) | | $P_{G(AV)}$ | 0.2 | W |
| Operating Junction Temperature Range | | $T_J$ | -40 ~ +125 | °C |
| Storage Junction Temperature Range | | $T_{STG}$ | -40 ~ +150 | °C |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

## ■ THERMAL DATA

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---|---|---|---|---|
| Junction to Tab | SOT-223 | $θ_{JT}$ | 25 | °C/W |
| | TO-92 | | 60 | °C/W |
| Junction to Ambient (S=5cm) | SOT-223 | $θ_{JA}$ | 60 | °C/W |
| | TO-92 | | 150 | °C/W |

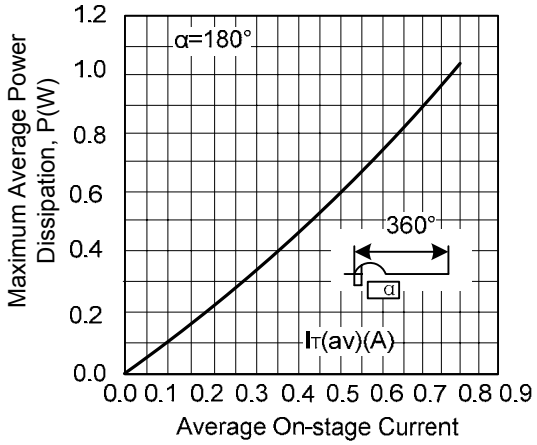
S=Copper surface under tab

## ■ ELECTRICAL CHARACTERISTICS ($T_J$=25°C, unless otherwise specified)

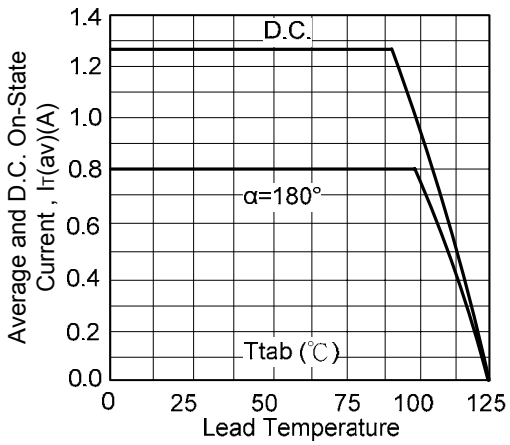
| PARAMETER | | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| Peak Forward or Reverse Blocking Current | $T_J$=25°C | $I_{DRM}$, $I_{RRM}$ | $V_{DRM}$=$V_{RRM}$, $R_{GK}$=1kΩ | | | 5 | μA |
| | $T_J$=125°C | | | | | 500 | μA |
| Peak Forward On-State Voltage | | $V_{TM}$ | $I_{TM}$= 2.5A, tp=380μs | | | 1.45 | V |
| Gate Trigger Current | | $I_{GT}$ | $V_D$=12V, $R_L$=140Ω | | | 200 | μA |
| Gate Trigger Voltage | | $V_{GT}$ | $V_D$=12V, $R_L$=140Ω | | | 0.8 | V |
| Gate Non-Trigger Voltage | | $V_{GD}$ | $V_D$=$V_{DRM}$, $R_L$=3.3kΩ, $R_{GK}$=1kΩ, ($T_J$=125°C) | 0.1 | | | V |
| Holding Current | | $I_H$ | $I_T$=50mA, $R_{GK}$=1kΩ | | | 5 | mA |
| Latch Current | | $I_L$ | $I_G$=1mA, $R_{GK}$=1kΩ | | | 6 | mA |
| Critical Rate of Rise of Off-State Voltage | | dv/dt | $V_D$=67%$V_{DRM}$, $R_{GK}$=1kΩ, ($T_J$=110°C) | 10 | | | V/μs |
| Peak Reversed Gate Voltage | | $V_{RG}$ | $I_{RG}$=10μA | 8 | | | V |
| Threshold Voltage | | $V_{TO}$ | ($T_J$=125°C) | | | 0.9 | V |
| Dynamic Resistance | | Rd | ($T_J$=125°C) | | | 200 | mΩ |

## ■ TYPICAL CHARACTERISTICS

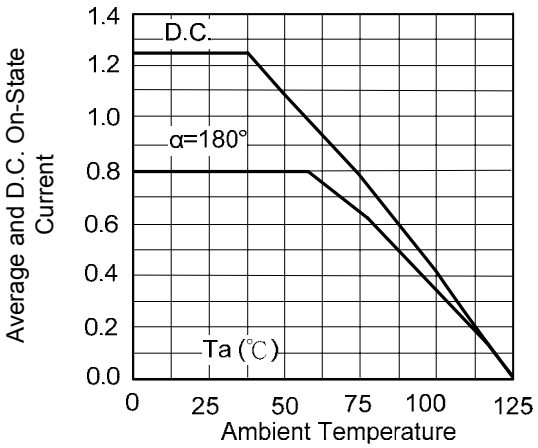
Maximum Average Power Dissipation vs. Average On-stage Current



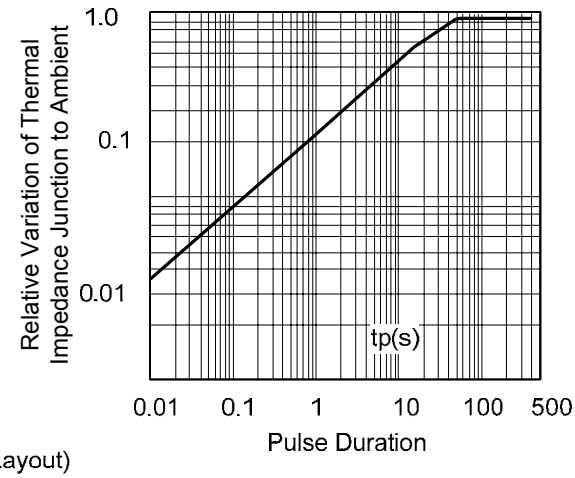

Average and D.C. On-state Current vs. Lead Temperature



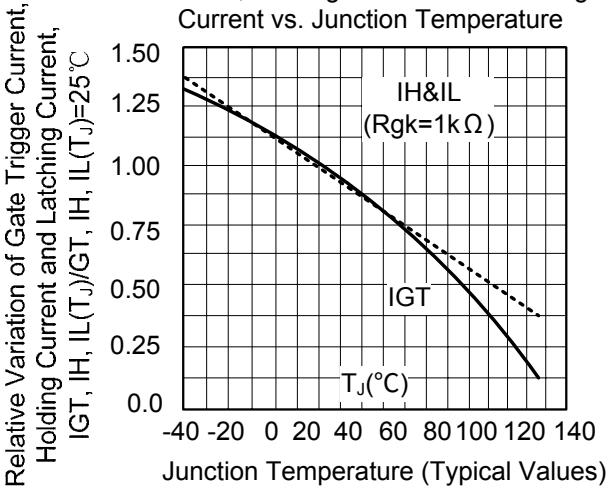

Average and D.C. On-State Current vs. Ambient Temperature (Device Mounted On FR4 with Recomended Pad Layout)



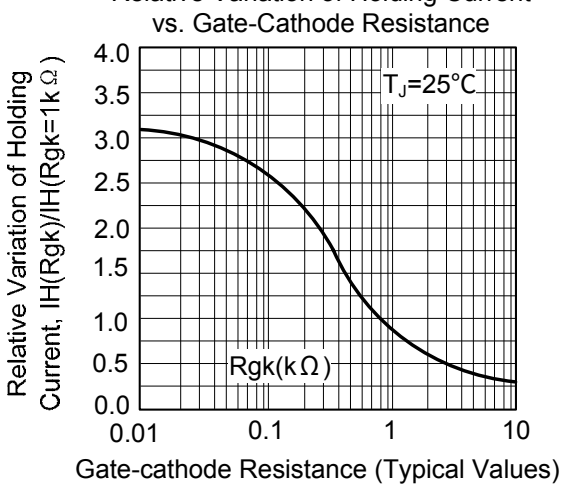

Relative Variation of Thermal Impedance Junction to Ambient vs. Pulse Duration




Relative Variation of Gate Trigger Current, Holding Current and Latching Current vs. Junction Temperature

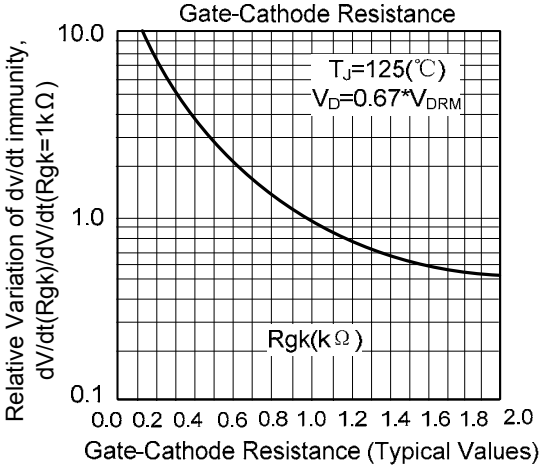



Relative Variation of Holding Current vs. Gate-Cathode Resistance

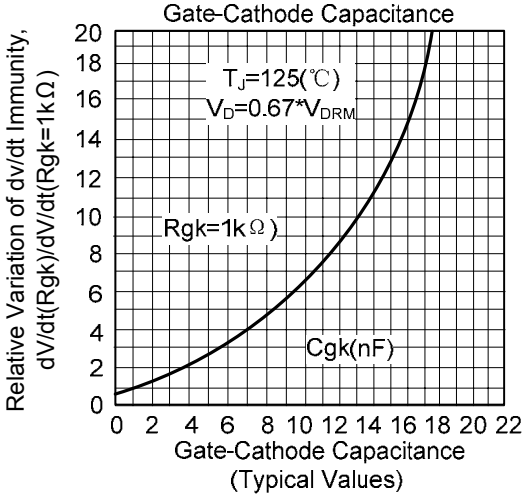


## ■ TYPICAL CHARACTERISTICS(Cont.)

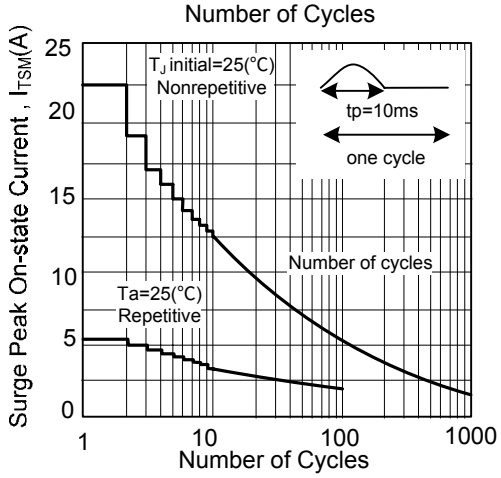
Relative Variation of dv/dt immunity vs. Gate-Cathode Resistance



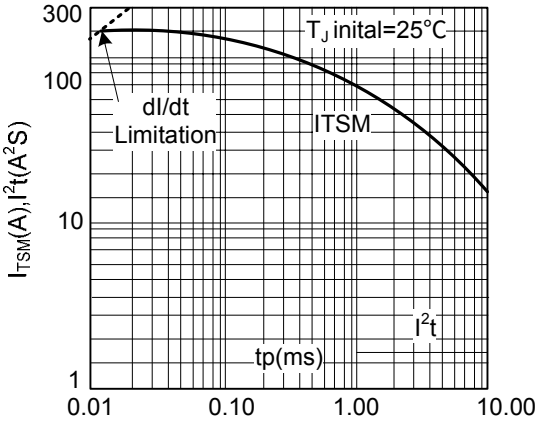

Relative Variation of dv/dt Immunity vs. Gate-Cathode Capacitance



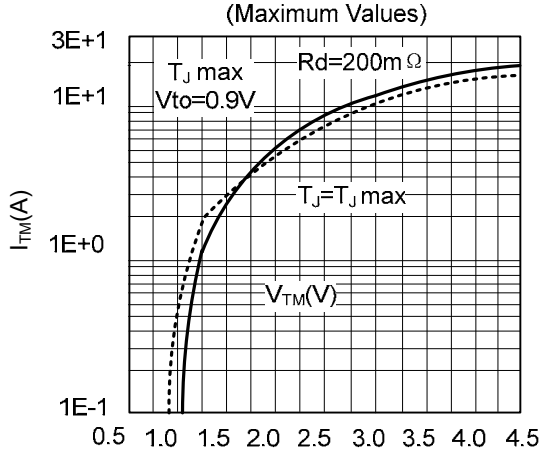

Surge Peak On-state Current vs. Number of Cycles



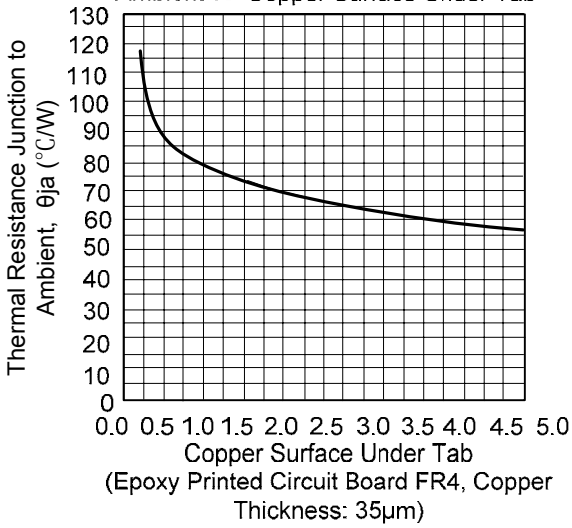

Non-Repetitive Surge Peak On-State Current for a Sinusoidal Pulse with Width tp<10ms, and Corresponding Value of $I^2t$




On-state Characteristics (Maximum Values)




Thermal Resistance Junction to Ambient vs. Copper Surface Under Tab



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