

## Silicon Controlled Rectifiers

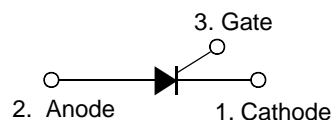
### Features

- ◆ Repetitive Peak Off-State Voltage : 600V
- ◆ R.M.S On-State Current (  $I_{T(RMS)} = 12\text{ A}$  )
- ◆ Low On-State Voltage (1.3V(Typ.)@  $I_{TM}$ )
- ◆ Non-isolated Type

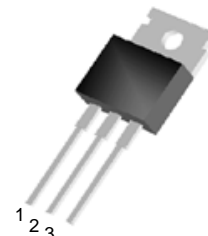
### General Description

Standard gate triggering SCR is suitable for the application where requiring high bidirectional blocking voltage capability and also suitable for over voltage protection ,motor control circuit in power tool, inrush current limit circuit and heating control system.

#### Symbol



#### TO-220



### Absolute Maximum Ratings ( $T_J = 25^\circ\text{C}$ unless otherwise specified )

| Symbol       | Parameter                                 | Condition                                  | Ratings    | Units                  |
|--------------|---|--|------------|------------------------|
| $V_{DRM}$    | Repetitive Peak Off-State Voltage         |  | 600        | V                      |
| $I_{T(AV)}$  | Average On-State Current                  | Half Sine Wave : $T_C = 109^\circ\text{C}$ | 7.6        | A                      |
| $I_{T(RMS)}$ | R.M.S On-State Current                    | 180° Conduction Angle                      | 12         | A                      |
| $I_{TSM}$    | Surge On-State Current                    | 1/2 Cycle, 60Hz, Sine Wave Non-Repetitive  | 132        | A                      |
| $I^2t$       | $I^2t$ for Fusing                         | $t = 8.3\text{ms}$                         | 87         | $\text{A}^2\text{s}$   |
| di/dt        | Critical rate of rise of on-state current |  | 50         | $\text{A}/\mu\text{s}$ |
| $P_{GM}$     | Forward Peak Gate Power Dissipation       |  | 5          | W                      |
| $P_{G(AV)}$  | Forward Average Gate Power Dissipation    |  | 0.5        | W                      |
| $I_{FGM}$    | Forward Peak Gate Current                 |  | 2          | A                      |
| $V_{RGM}$    | Reverse Peak Gate Voltage                 |  | 5.0        | V                      |
| $T_J$        | Operating Junction Temperature            |  | - 40 ~ 125 | $^\circ\text{C}$       |
| $T_{STG}$    | Storage Temperature                       |  | - 40 ~ 150 | $^\circ\text{C}$       |

# SCP12C60

## Electrical Characteristics ( $T_C = 25\text{ }^\circ\text{C}$ unless otherwise noted )

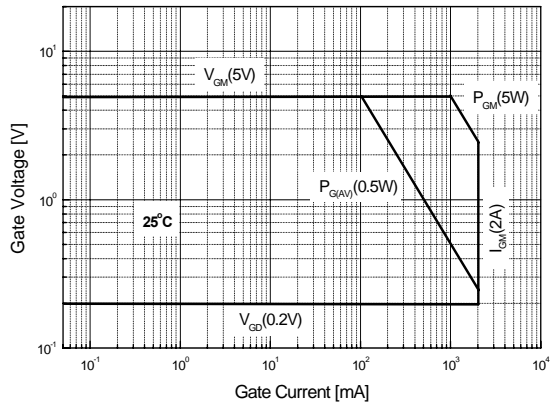
| Symbol               | Items                                   | Conditions  | Ratings |        |           | Unit                   |
|----------------------|---|---|---------|--------|-----------|------------------------|
|                      |   |   | Min.    | Typ.   | Max.      |                        |
| $I_{\text{DRM}}$     | Repetitive Peak Off-State Current       | $V_{\text{AK}} = V_{\text{DRM}}$<br>$T_C = 25\text{ }^\circ\text{C}$<br>$T_C = 125\text{ }^\circ\text{C}$ | —<br>—  | —<br>— | 10<br>200 | $\mu\text{A}$          |
| $V_{\text{TM}}$      | Peak On-State Voltage (1)               | $I_{\text{TM}} = 24\text{ A}$ $t_p = 380\mu\text{s}$  | —       | —      | 1.6       | V                      |
| $I_{\text{GT}}$      | Gate Trigger Current (2)                | $V_{\text{AK}} = 6\text{ V(DC)}$ , $R_L = 10\ \Omega$<br>$T_C = 25\text{ }^\circ\text{C}$                 | —       | —      | 15        | mA                     |
| $V_{\text{GT}}$      | Gate Trigger Voltage (2)                | $V_D = 6\text{ V(DC)}$ , $R_L = 10\ \Omega$<br>$T_C = 25\text{ }^\circ\text{C}$                           | —       | —      | 1.5       | V                      |
| $V_{\text{GD}}$      | Non-Trigger Gate Voltage (1)            | $V_{\text{AK}} = 12\text{ V}$ , $R_L = 100\ \Omega$ $T_C = 125\text{ }^\circ\text{C}$                     | 0.2     | —      | —         | V                      |
| dv/dt                | Critical Rate of Rise Off-State Voltage | Linear slope up to $V_D = V_{\text{DRM}} 67\%$ ,<br>Gate open<br>$T_J = 125\text{ }^\circ\text{C}$        | 200     | —      | —         | $\text{V}/\mu\text{s}$ |
| $I_{\text{H}}$       | Holding Current                         | $I_T = 100\text{ mA}$ , Gate Open<br>$T_C = 25\text{ }^\circ\text{C}$                                     | —       | —      | 20        | mA                     |
| $R_{\text{th(j-c)}}$ | Thermal Impedance                       | Junction to case  | —       | —      | 1.3       | $^\circ\text{C/W}$     |
| $R_{\text{th(j-a)}}$ | Thermal Impedance                       | Junction to Ambient   | —       | —      | 60        | $^\circ\text{C/W}$     |

### ※ Notes :

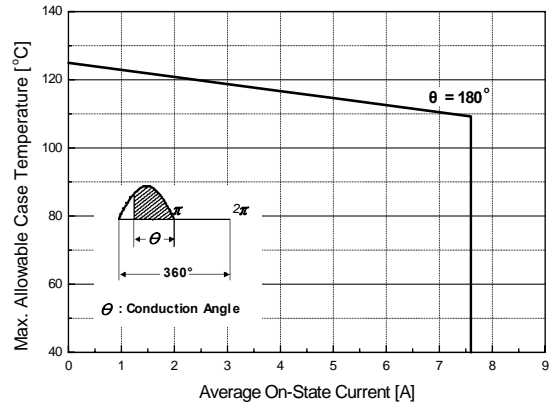
1. Pulse Width  $\leq 1.0\text{ ms}$  , Duty cycle  $\leq 1\%$
2.  $R_{\text{GK}}$  Current not Included in measurement.



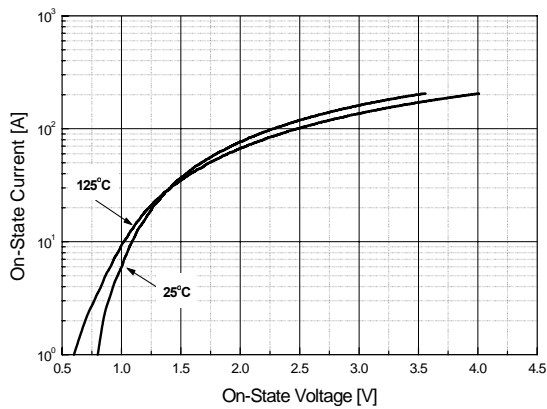
**Fig 1. Gate Characteristics**



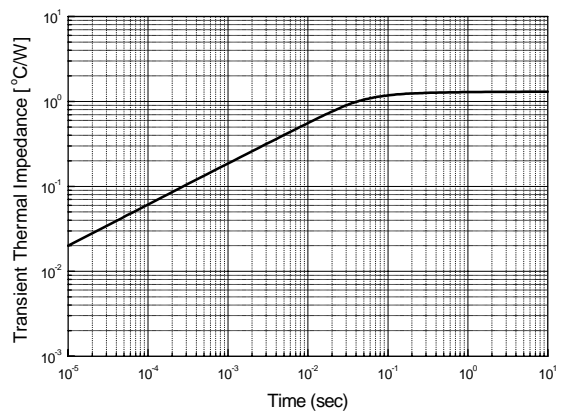
**Fig 2. Maximum Case Temperature**



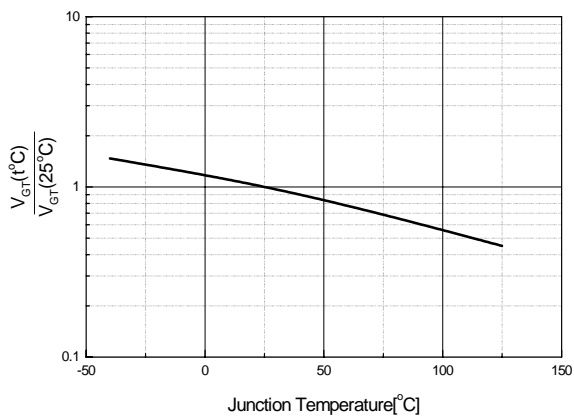
**Fig 3. Typical Forward Voltage**



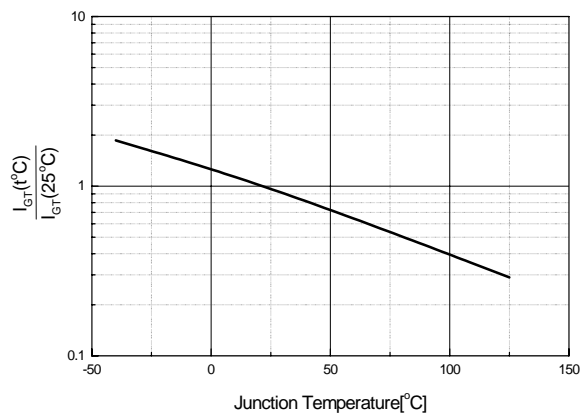
**Fig 4. Thermal Response**



**Fig 5. Typical Gate Trigger Voltage vs. Junction Temperature**



**Fig 6. Typical Gate Trigger Current vs. Junction Temperature**



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Fig 7. Typical Holding Current

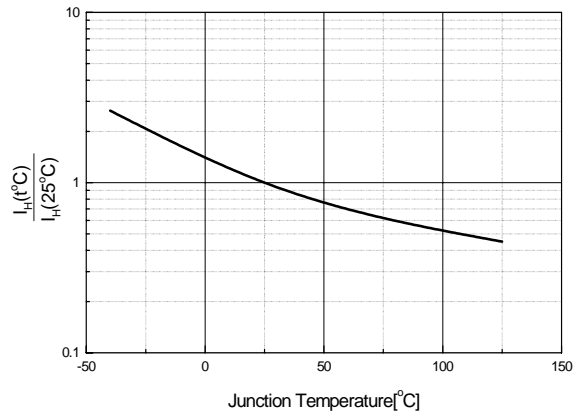
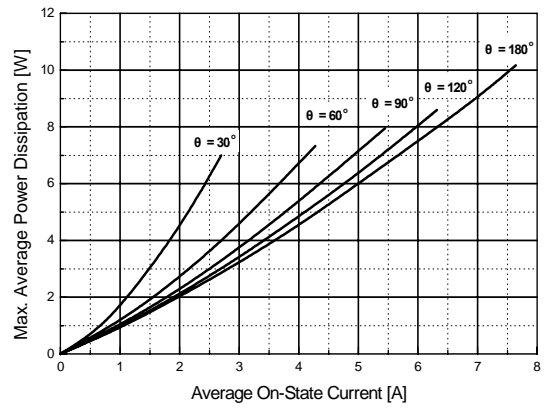


Fig 8. Power Dissipation



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## TO-220 Package Dimension

| Dim.   | mm   |      |      | Inch  |       |       |
|--------|------|------|------|-------|-------|-------|
|        | Min. | Typ. | Max. | Min.  | Typ.  | Max.  |
| A      | 9.7  |      | 10.1 | 0.382 |       | 0.398 |
| B      | 6.3  |      | 6.7  | 0.248 |       | 0.264 |
| C      | 9.0  |      | 9.47 | 0.354 |       | 0.373 |
| D      | 12.8 |      | 13.3 | 0.504 |       | 0.524 |
| E      | 1.2  |      | 1.4  | 0.047 |       | 0.055 |
| F      |      | 1.7  |      |       | 0.067 |       |
| G      |      | 2.5  |      |       | 0.098 |       |
| H      | 3.0  |      | 3.4  | 0.118 |       | 0.134 |
| I      | 1.25 |      | 1.4  | 0.049 |       | 0.055 |
| J      | 2.4  |      | 2.7  | 0.094 |       | 0.106 |
| K      | 5.0  |      | 5.15 | 0.197 |       | 0.203 |
| L      | 2.2  |      | 2.6  | 0.087 |       | 0.102 |
| M      | 1.25 |      | 1.55 | 0.049 |       | 0.061 |
| N      | 0.45 |      | 0.6  | 0.018 |       | 0.024 |
| O      | 0.6  |      | 1.0  | 0.024 |       | 0.039 |
| $\phi$ |      | 3.6  |      |       | 0.142 |       |

