

Provisional Data

## Symmetrical Gate Turn-Off Thyristor Types S0300SR12#

### Absolute Maximum Ratings

|               | VOLTAGE RATINGS                                 | MAXIMUM LIMITS | UNITS |
|---------------|-------------------------------------------------|----------------|-------|
| $V_{DRM}$     | Repetitive peak off-state voltage, (note 1)     | 1200           | V     |
| $V_{DSM}$     | Non-repetitive peak off-state voltage, (note 1) | 1300           | V     |
| $V_{DC-link}$ | Maximum continuous DC-link voltage              | 600            | V     |
| $V_{RRM}$     | Repetitive peak reverse voltage                 | 960            | V     |
| $V_{RSM}$     | Non-repetitive peak reverse voltage             | 960            | V     |

|              | RATINGS                                                 | MAXIMUM LIMITS      | UNITS       |
|--------------|---------------------------------------------------------|---------------------|-------------|
| $I_{TGQ}$    | Peak turn-off current, (note 2)                         | 480                 | A           |
| $L_s$        | Snubber loop inductance, $I_{TM}=I_{TGQ}$ , (note 2)    | 300                 | nH          |
| $I_{T(AV)M}$ | Mean on-state current, $T_{sink}=55^{\circ}C$ (note 3)  | 215                 | A           |
| $I_{T(RMS)}$ | Nominal RMS on-state current, $25^{\circ}C$ (note 3)    | 445                 | A           |
| $I_{TSM}$    | Peak non-repetitive surge current $t_p=10ms$ , (Note 4) | 3.5                 | kA          |
| $I_{TSM2}$   | Peak non-repetitive surge current $t_p=2ms$ , (Note 4)  | 6.1                 | kA          |
| $I^2t$       | $I^2t$ capacity for fusing $t_p=10ms$                   | $61.25 \times 10^3$ | $A^2s$      |
| $di/dt_{cr}$ | Critical rate of rise of on-state current, (note 5)     | 400                 | A/ $\mu s$  |
| $P_{FGM}$    | Peak forward gate power                                 | 140                 | W           |
| $P_{RGM}$    | Peak reverse gate power                                 | 2                   | kW          |
| $I_{FGM}$    | Peak forward gate current                               | 100                 | A           |
| $V_{RGM}$    | Peak reverse gate voltage (note 6).                     | 18                  | V           |
| $t_{off}$    | Minimum permissible off-time (note 2)                   | 40                  | $\mu s$     |
| $t_{on}$     | Minimum permissible on-time                             | 10                  | $\mu s$     |
| $T_{j op}$   | Operating temperature range                             | -40 to +125         | $^{\circ}C$ |
| $T_{stg}$    | Storage temperature range                               | -40 to +125         | $^{\circ}C$ |

Notes:-

- 1)  $V_{GK}=-2Volts$ .
- 2)  $T_j=125^{\circ}C$ ,  $V_D=600V$ ,  $V_{DM} \leq 1200V$   $di_{GQ}/dt=15A/\mu s$ ,  $I_{TGQ}=480A$  and  $C_s=1\mu F$ .
- 3) Double-side cooled, single phase; 50Hz,  $180^{\circ}$  half-sinewave.
- 4)  $T_{j(initial)}=125^{\circ}C$ , single phase,  $180^{\circ}$  sinewave, re-applied voltage  $V_D=V_R \leq 720V$ .
- 5) For  $di/dt > 400A/\mu s$  please consult the factory.
- 6) May exceed this value during turn-off avalanche period.

**Characteristics**

|              | Parameter                                  | MIN  | TYP  | MAX  | TEST CONDITIONS (note 1)                                                                                                | UNITS      |
|--------------|--------------------------------------------|------|------|------|-------------------------------------------------------------------------------------------------------------------------|------------|
| $V_{TM}$     | Maximum peak on-state voltage              | -    | 2.1  | 2.4  | $I_G=0.8A$ , $I_T=480A$                                                                                                 | V          |
| $I_L$        | Latching current                           | -    | 5    | -    | $T_j=25^\circ C$                                                                                                        | A          |
| $I_H$        | Holding current.                           | -    | 5    | -    | $T_j=25^\circ C$                                                                                                        | A          |
| $dv/dt_{cr}$ | Critical rate of rise of off-state voltage | 1000 | -    | -    | $V_D=1250V$ , $V_{GR}=-2V$                                                                                              | V/ $\mu s$ |
| $I_{DRM}$    | Peak off state current                     | -    | -    | 30   | Rated $V_{DRM}$ , $V_{GR}=-2V$                                                                                          | mA         |
| $I_{RRM}$    | Peak reverse current                       | -    | -    | 30   | $V_{RR}=16V$                                                                                                            | mA         |
| $I_{GKM}$    | Peak negative gate leakage current         | -    | -    | 50   | $V_{GR}=-16V$                                                                                                           | mA         |
| $V_{GT}$     | Gate trigger voltage                       | -    | 0.9  | -    | $T_j=-40^\circ C$                                                                                                       | V          |
|              |                                            | -    | 0.8  | -    | $T_j=25^\circ C$ $V_D=25V$ , $R_L=25m\Omega$                                                                            | V          |
|              |                                            | -    | 0.6  | -    | $T_j=125^\circ C$                                                                                                       | V          |
| $I_{GT}$     | Gate trigger current                       | -    | 0.75 | 2.0  | $T_j=-40^\circ C$                                                                                                       | A          |
|              |                                            | -    | 0.25 | 0.5  | $T_j=25^\circ C$ $V_D=25V$ , $R_L=25m\Omega$                                                                            | A          |
|              |                                            | -    | 0.05 | 0.1  | $T_j=125^\circ C$                                                                                                       | A          |
| $t_d$        | Delay time                                 | -    | 1.1  | -    | $V_D=600V$ , $I_{TGQ}=480A$ , $di_T/dt=150A/\mu s$ , $I_{GM}=6A$ ,<br>$di_G/dt=5A/\mu s$ , $C_S=1\mu F$ , $R_s=5\Omega$ | $\mu s$    |
| $t_{gt}$     | Turn-on time                               | -    | 3.5  | 5.0  |                                                                                                                         | $\mu s$    |
| $E_{on}$     | Turn-on Energy                             | -    | -    | 150  |                                                                                                                         | mJ         |
| $t_f$        | Fall time                                  | -    | 1.0  | -    | $V_D=600V$ , $I_{TGQ}=480A$ , $di_{GQ}/dt=15A/\mu s$ , $V_{GR}=-16V$ ,<br>$C_S=1\mu F$                                  | $\mu s$    |
| $t_s$        | Storage time                               | -    | 8.0  | -    |                                                                                                                         | $\mu s$    |
| $t_{gq}$     | Turn-off time                              | -    | -    | 10   |                                                                                                                         | $\mu s$    |
| $I_{GQ}$     | Peak turn-off gate current                 | -    | 125  | -    |                                                                                                                         | A          |
| $Q_{GQ}$     | Turn-off gate charge                       | -    | 900  | -    |                                                                                                                         | $\mu C$    |
| $t_{tail}$   | Tail time                                  | -    | 10   | -    |                                                                                                                         | $\mu s$    |
| $E_{off}$    | Turn-off energy                            | -    | -    | 400  |                                                                                                                         | mJ         |
| $R_{thJC}$   | Thermal resistance junction to case        | -    | -    | 0.13 |                                                                                                                         | K/W        |
| F            | Mounting torque                            | 24.5 | -    | 27.0 |                                                                                                                         | Nm         |
| $W_t$        | Weight                                     | -    | 250  | -    |                                                                                                                         | g          |

Notes:-

1) Unless otherwise indicated  $T_j=125^\circ C$ .

## Curves

Figure 1 - On-state characteristics of Limit device

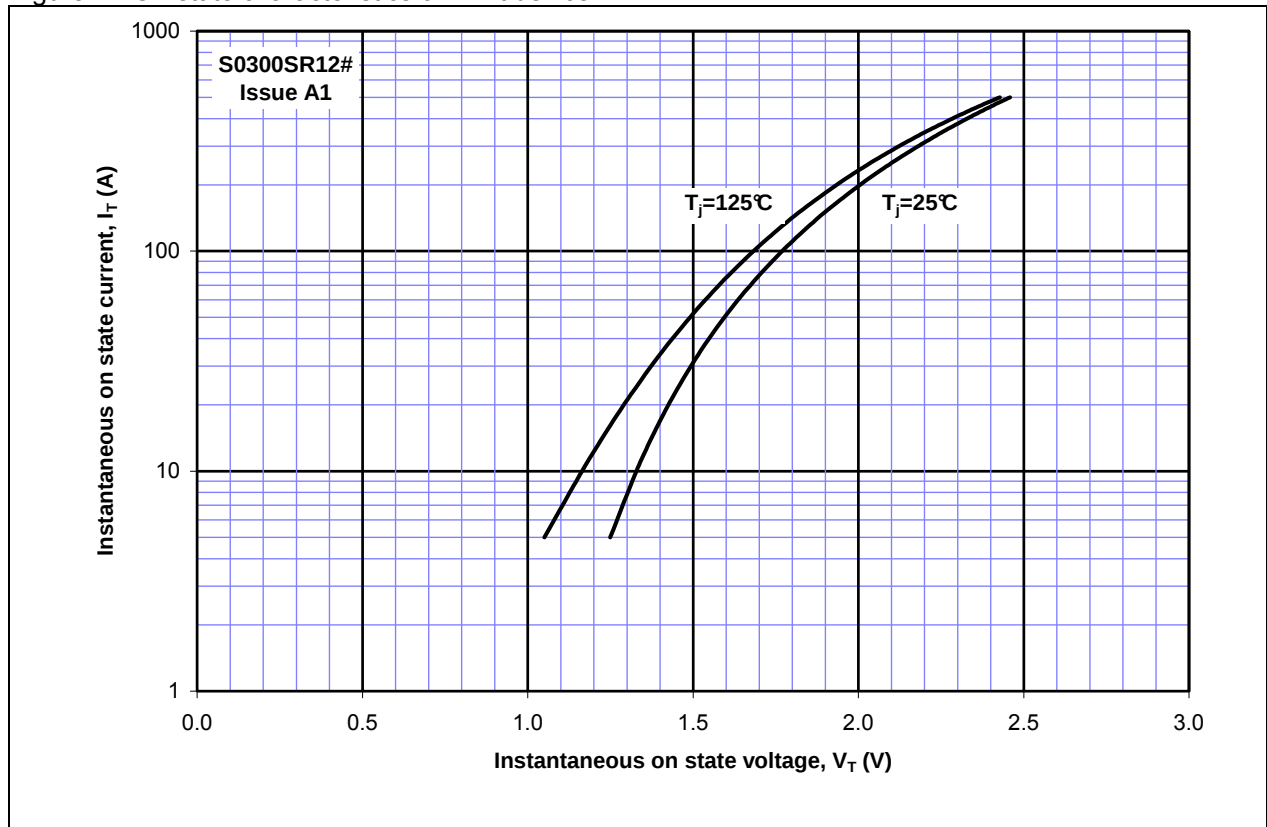


Figure 2 – Transient thermal impedance

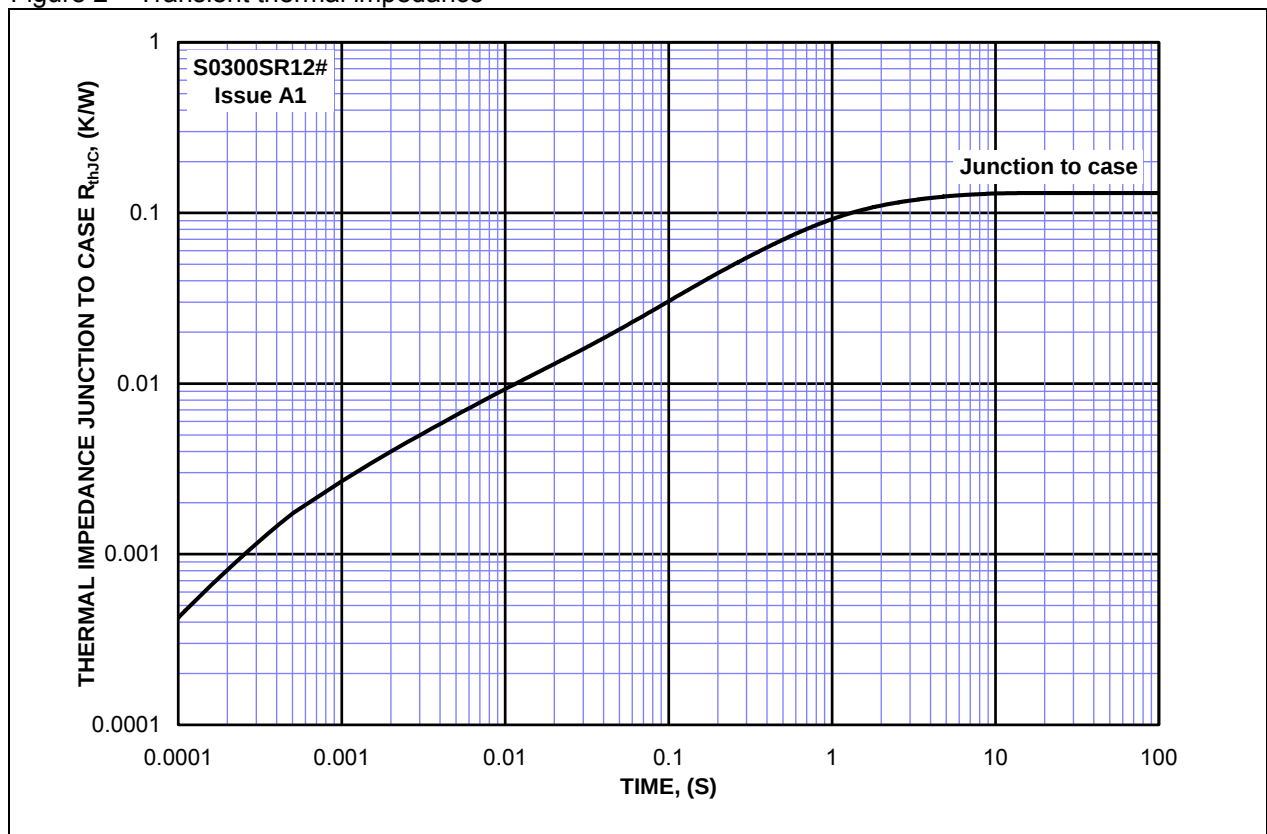
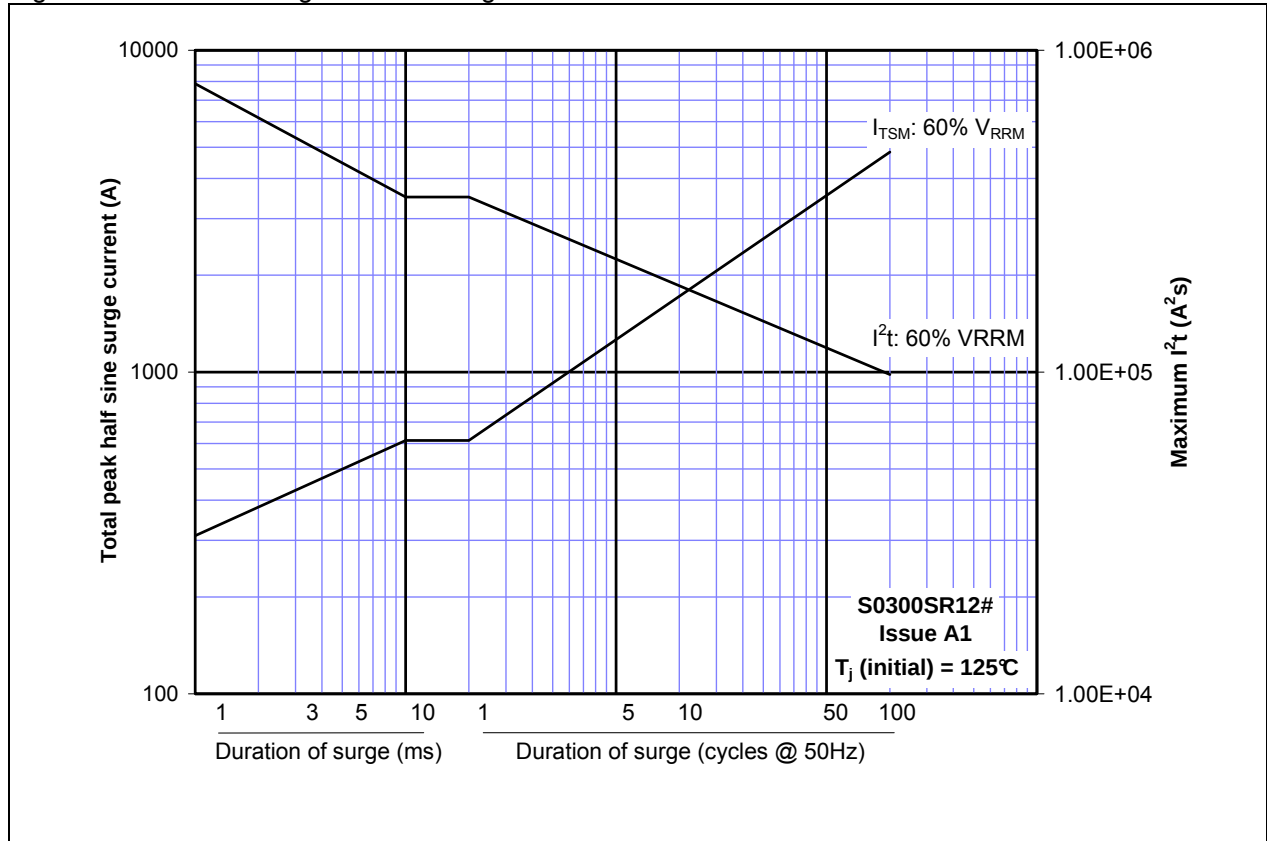
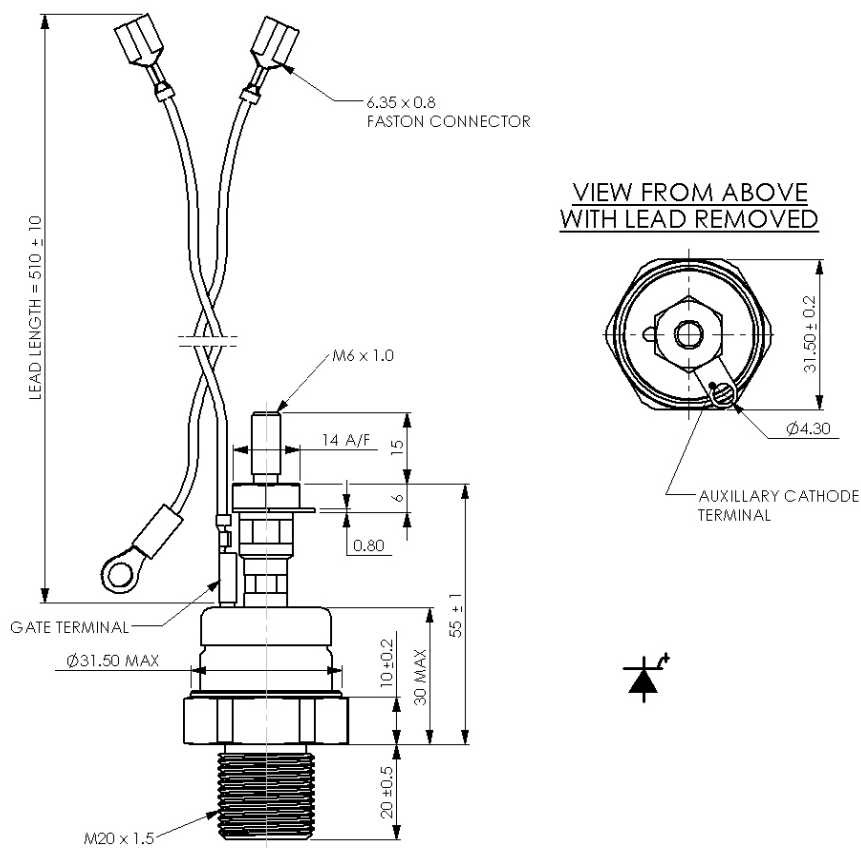


Figure 3 – Maximum surge and  $I^2t$  Ratings

**Outline Drawing & Ordering Information****ORDERING INFORMATION**

(Please quote 10 digit code as below)

| S0300              | SR                    | 12                                        | #                                |
|--------------------|-----------------------|-------------------------------------------|----------------------------------|
| Fixed<br>Type Code | Fixed<br>Outline Code | Fixed Voltage Code<br>$V_{DRM}/100$<br>25 | $V_{RRM}$ Code<br>D=960V, Y=100V |

Typical order code: S0300SR12Y –  $V_{DRM} = 1200V$  &  $V_{RRM} = 960V$ .

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