# Phase Control Thyristor
# Type SA22SR7905A0

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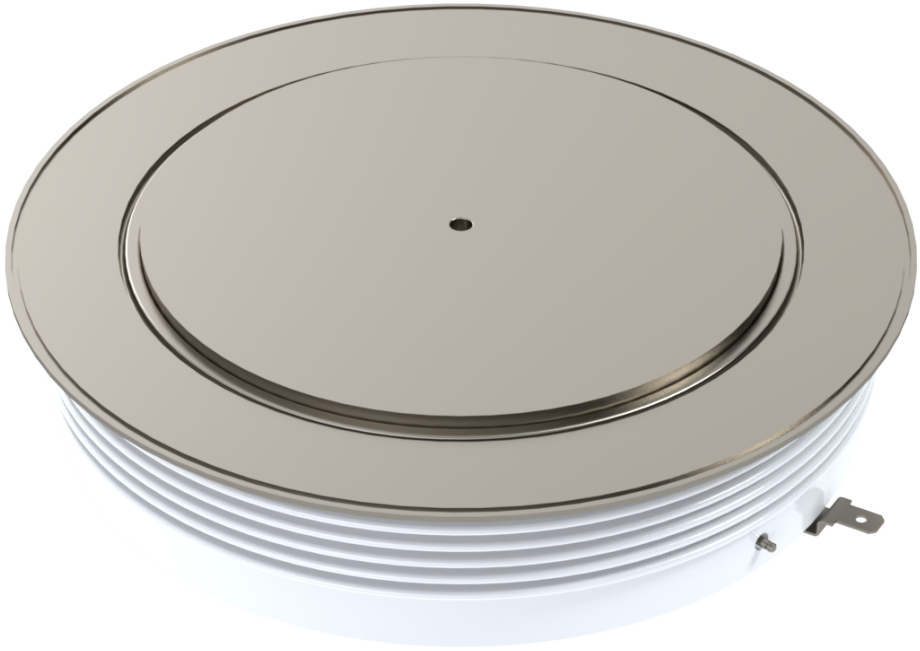
Data Sheet Issue: 1



| ORDERING INFORMATION | | | | | (Please quote 12 to 15 digit code as below) | |
|---|---|---|---|---|---|---|
| SA | 22 | SR | 7905 | A | 0 | |
| - | Voltage Code | Outline Code | Current code | Type code | Special code | Optional code |

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**Absolute Maximum Ratings**

| | VOLTAGE RATINGS | MAXIMUM LIMITS | UNITS |
|---|---|---|---|
| $V_{DRM}$ | Repetitive peak off-state voltage, (note 1) | 2200 | V |
| $V_{DSM}$ | Non-repetitive peak off-state voltage, (note 1) | 2200 | V |
| $V_{DDC}$ | Maximum DC of-state voltage, (note 1) | 1350 | V |
| $V_{RRM}$ | Repetitive peak reverse voltage, (note 1) | 2200 | V |
| $V_{RSM}$ | Non-repetitive peak reverse voltage, (note 1) | 2300 | V |
| $V_{RDC}$ | Maximum DC revrese voltage, (note 1) | 1350 | V |
| note 1) | De-rating factor of 0.13%/°C is applicable for $T_j$ below 25°C | | |

| | OTHER RATINGS | MAXIMUM LIMITS | UNITS |
|---|---|---|---|
| $I_{T(AV)M}$ | Maximum average on-state current, $T_{sink}$ = 55°C, (note 1) | 7850 | A |
| $I_{T(AV)M}$ | Maximum average on-state current, $T_{sink}$ = 85°C, (note 1) | 5459 | A |
| $I_{T(AV)M}$ | Maximum average on-state current, $T_{sink}$ = 85°C, (note 2) | 3089 | A |
| $I_{T(RMS)M}$ | Nominal RMS on-state current, $T_{sink}$ = 25°C (note 1) | 15390 | A |
| $I_{T(d.c.)}$ | D.C. on-state current, $T_{sink}$ = 25°C, (note 3) | 13602 | A |
| $I_{TSM}$ | Peak non-repetitive surge current $t_p$ = 10ms, $V_{RM}$ = 60%$V_{RRM}$, (note 4) | 117 | kA |
| $I_{TSM2}$ | Peak non-repetitive surge current $t_p$ = 10ms, $V_{RM} \leq$ 10V, (note 4) | 128 | kA |
| $I^2t$ | $I^2t$ capacity for fusing $t_p$ = 10ms, $V_{RM}$ = 60%$V_{RRM}$, (note 4) | $68.45 \cdot 10^6$ | $A^2s$ |
| $I^2t$ | $I^2t$ capacity for fusing $t_p$ = 10ms, $V_{RM} \leq$ 10V, (note 4) | $81.92 \cdot 10^6$ | $A^2s$ |
| $(di/dt)_{cr}$ | Critical rate of rise of on-state current (continuous, 50Hz), (note 5) | 75 | A/µs |
| | Critical rate of rise of on-state current (repetitive, 50Hz, 60s), (note 5) | 150 | A/µs |
| | Critical rate of rise of on-state current (non repetitive), (note 5) | 300 | A/µs |
| $V_{RGM}$ | Peak reverse gate voltage | 5 | V |
| $P_{G(AV)}$ | Mean forward gate power | 5 | W |
| $P_{GM}$ | Peak forward gate power | 30 | W |
| $T_{jop}$ | Operating temperature range | -40 to +125 | °C |
| $T_{stg}$ | Storage temperature range | -40 to +150 | °C |
| note 1) | Double-side cooled, single phase, 50Hz, 180° half-sinewave. | | |
| note 2) | Single-side cooled, single phase, 50Hz, 180° half-sinewave. | | |
| note 3) | Double-side cooled | | |
| note 4) | Half-sinewave, 125°C $T_j$ initial | | |
| note 5) | $V_D$ = 67%$V_{DRM}$, $I_{TM}$ = 4000A, $I_{FG}$ = 2A, $t_R \leq$ 0.5µs, $T_{case}$ = 125°C | | |

## Characteristics

| | PARAMETER | TEST CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|
| $V_{TM}$ | Maximum peak on-state voltage | $I_{TM}$ = 6000A | - | - | 1.10 | V |
| | | $I_{TM}$ = 8000A | - | - | 1.19 | V |
| $V_{T0}$ | Threshold voltage | | - | - | 0.77 | V |
| $r_T$ | Slope resistance | | - | - | 0.056 | mΩ |
| $(dv/dt)_{CR}$ | Critical rate of rise of off-state voltage | $V_D$ = 80%$V_{DRM}$, Linear ramp, gate o/c | 1000 | - | - | V/µs |
| $I_{DRM}$ | Peak off-state current | Rated $V_{DRM}$ | - | - | 200 | mA |
| $I_{RRM}$ | Peak reverse current | Rated $V_{RRM}$ | - | - | 200 | mA |
| $V_{GT}$ | Gate trigger voltage | $T_j$ = 25°C, $V_D$ = 10V, $I_T$ = 3A | - | - | 3.0 | V |
| $I_{GT}$ | Gate trigger current | | - | - | 300 | mA |
| $V_{GD}$ | Gate non-trigger voltage | Rated $V_{DRM}$ | - | - | 0.25 | V |
| $I_H$ | Holding current | $T_j$ = 25°C | - | - | 1000 | mA |
| $t_{GD}$ | Gate controlled turn-on delay time | $V_D$ = 67%$V_{DRM}$, $I_{TM}$ = 3000A, di/dt = 10A/µs, $I_{FG}$ = 2A, $t_r$ = 0.5µs, $T_j$ = 25°C | - | 0.7 | 2.0 | µs |
| $t_{GT}$ | Turn-on time | | - | 1.1 | 3.0 | µs |
| $Q_{RR}$ | Recovered charge | $I_{TM}$ = 4000A, $t_p$ = 2000µs,di/dt = 10A/µs, $V_R$ = 50V | - | 9900 | 11000 | µC |
| $Q_{RA}$ | Recovered charge, 50% Chord | | - | 7350 | - | µC |
| $I_{RR}$ | Reverse recovery current | | - | 300 | - | A |
| $t_{RR}$ | Reverse recovery time, 50% Chord | | - | 49 | - | µs |
| $t_{GQ}$ | Turn-off time | $I_{TM}$ = 4000A, $t_p$ = 2000µs, di/dt = 10A/µs, $V_R$ = 50V, $V_{DR}$ = 80%$V_{DRM}$, $dV_{DR}/dt$ = 20V/µs | - | 400 | - | µs |
| | | $I_{TM}$ = 4000A, $t_p$ = 2000µs, di/dt = 10A/µs, $V_R$ = 50V, $V_{DR}$ = 80%$V_{DRM}$, $dV_{DR}/dt$ = 200V/µs | - | 675 | - | µs |
| $R_{thJK}$ | Thermal resistance, junction to sink | Double-side cooled | - | - | 4.8 | K/kW |
| | | Anode-side cooled | | | 8.6 | K/kW |
| | | Cathode-side cooled | - | - | 10.8 | K/kW |
| F | Mounting force | (note 2) | 80 | - | 100 | kN |
| $W_t$ | Weight | | - | 2900 | - | g |
| note 1) | Unless otherwise indicated $T_j$ = 125°C | | | | | |
| note 2) | For other clamp forces, please consult factory | | | | | |

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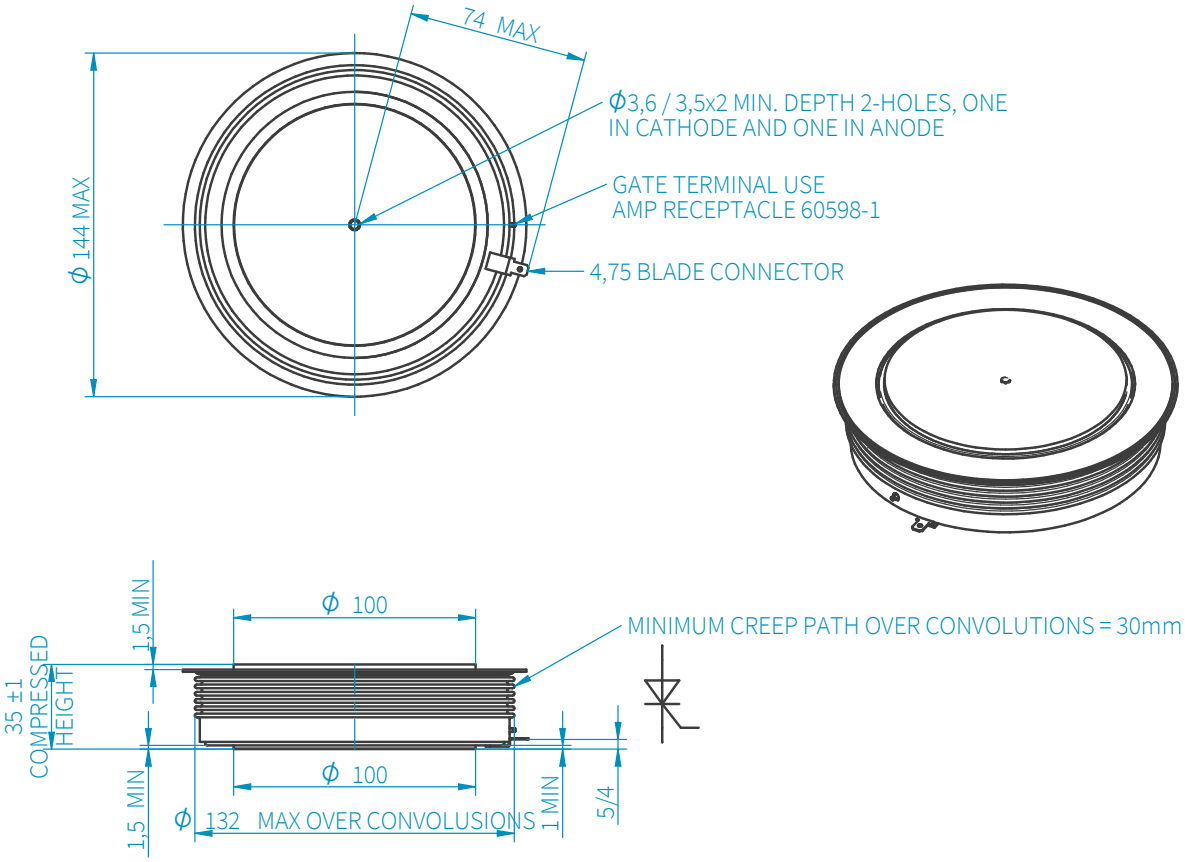
**Outline Drawing**

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