

# KK2700-Fast Switching Thyristor

Shanghai Sunco Electronics Co., Ltd.

1600-2000  $V_{DRM}$

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## HIGH POWER THYRISTOR FOR INVERTER APPLICATION

### Features:

- . All Diffused Structure
- . Amplifying Gate Configuration
- . Blocking capability up to 2000 volts
- . High  $dV/dt$  Capability
- . Pressure Assembled Device

## ELECTRICAL CHARACTERISTICS AND RATINGS

### Blocking-Off State

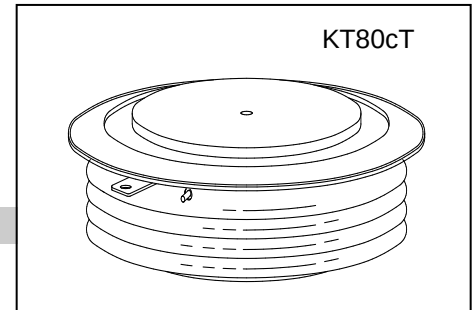
| Device Type | $V_{RRM}$ (1) | $V_{DRM}$ (1) | $V_{RSM}$ (1) |
|-------------|---------------|---------------|---------------|
| KK2700/16   | 1600          | 1600          | 1800          |
| KK2700/18   | 1800          | 1800          | 2000          |
| KK2700/20   | 2000          | 2000          | 2100          |

$V_{RRM}$  = Repetitive peak reverse voltage

$V_{DRM}$  = Repetitive peak off state voltage

$V_{RSM}$  = Non Repetitive peak reverse voltage(2)

|                                                       |                   |                   |
|-------------------------------------------------------|-------------------|-------------------|
| Repetitive peak reverse leakage and off state leakage | $I_{RRM}/I_{DRM}$ | 5 mA<br>80 mA (3) |
| Critical rate of voltage rise                         | $dV/dt$ (4)       | 1000 V/sec (min)  |



### Notes:

All ratings are specified for  $T_j=25^\circ\text{C}$  unless otherwise stated.

(1) All voltage ratings are specified for an applied 50Hz/60Hz sinusoidal waveform over the temperature range 0 to  $+125^\circ\text{C}$

(2) 10 msec. Max. Pulse width

(3) Maximum value for  $T_j=125^\circ\text{C}$ .

(4) Minimum value for linear and exponential waveshape to 67% rated  $V_{DRM}$ . Gate open,  $T_j=125^\circ\text{C}$

(5) The value of  $di/dt$  is established in accordance with JB/T4193-2013.

### Conducting-On State

| Parameter                                     | Symbol      | Min. | Max.              | Typ. | Units                | Conditions                                                                               |
|-----------------------------------------------|-------------|------|-------------------|------|----------------------|------------------------------------------------------------------------------------------|
| Average value of on-state current             | $I_{T(AV)}$ |      | 2700              |      | A                    | Sinewave, $180^\circ$ conduction, $T_c=55^\circ\text{C}$                                 |
| RMS value of on-state current                 | $I_{TRMS}$  |      | 4239              |      | A                    | Nominal value                                                                            |
| Peak one cycle surge (non repetitive) current | $I_{TSM}$   |      | 37800             |      | A                    | 10 msec (50Hz), sinusoidal wave-shape, $180^\circ$ conduction, $T_j = 125^\circ\text{C}$ |
| I square t                                    | $I^2t$      |      | $7.1 \times 10^6$ |      | $\text{A}^2\text{s}$ | 10 msec                                                                                  |
| Latching current                              | $I_L$       |      | 1000              |      | mA                   | $V_D=12\text{V}$ ; $R_L=12\text{ohms}$                                                   |
| Holding current                               | $I_H$       |      | 200               |      | mA                   | $V_D=12\text{V}$ ; $I=2.5\text{A}$                                                       |
| Peak on-state voltage                         | $V_{TM}$    |      | 1.90              |      | V                    | $I_{TM}= 3000\text{A}$ ; $T_j = 25^\circ\text{C}$                                        |
| Threshold voltage, low level                  | $V_{TO}$    |      | 1.31              |      | V                    | $T_j=125^\circ\text{C}$                                                                  |
| Slope resistance, low-level                   | $r_T$       |      | 0.19              |      | m $\Omega$           | 3000A to 5000A                                                                           |
| Critical rate of rise of on-state current(5)  | $di/dt$     |      | 200               |      | A/ $\mu\text{s}$     | Repetition                                                                               |

## ELECTRICAL CHARACTERISTICS AND RATINGS

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### Gating

| Parameter                      | Symbol      | Min. | Max. | Typ. | Units | Conditions                               |
|--------------------------------|-------------|------|------|------|-------|------------------------------------------|
| Peak gate power dissipation    | $P_{GM}$    |      | 20   |      | W     |                                          |
| Average gate power dissipation | $P_{G(AV)}$ |      | 4    |      | W     |                                          |
| Gate trigger current           | $I_{GT}$    |      | 200  | 150  | mA    | $V_D=12V; R_L=30\Omega; T_j=+25^\circ C$ |
| Gate trigger voltage           | $V_{GT}$    | 0.70 | 3.0  | 2.5  | V     | $V_D=12V; R_L=30\Omega; T_j=+25^\circ C$ |
| Peak negative voltage          | $V_{GRM}$   |      | 5    |      | V     |                                          |

### Dynamic

| Parameter                   | Symbol   | Min. | Max. | Typ. | Units   | Conditions                                                                                               |
|-----------------------------|----------|------|------|------|---------|----------------------------------------------------------------------------------------------------------|
| Delay time                  | $t_d$    |      | 3.0  | 2.5  | $\mu s$ | $I_{TM}=50A; V_D=67\%V_{DRM}$<br>Gate pulse: $V_G=30V; R_G=10\Omega$ ; $t_r=0.1\mu s; t_p=20\mu s$       |
| Turn-off time ( $V_R=-5V$ ) | $t_q$    |      | 40   |      | $\mu s$ | $I_{TM}=2000A; di/dt=-10A/\mu s$ ;<br>$V_R=50V; dV/dt=30V/\mu s$ ;<br>$V_D=67\%V_{DRM}; T_j=125^\circ C$ |
| Reverse recovery current    | $Q_{rr}$ |      |      |      | $\mu C$ | $I_{TM}=2000A; di/dt=-10A/\mu s$ ;<br>$V_R=50V; T_j=125^\circ C$                                         |

## THERMAL AND MECHANICAL CHARACTERISTICS AND RATINGS

| Parameter                             | Symbol            | Min. | Max.  | Typ. | Units        | Conditions          |
|---------------------------------------|-------------------|------|-------|------|--------------|---------------------|
| Operating temperature                 | $T_j$             | -40  | +125  |      | $^\circ C$   |                     |
| Storage temperature                   | $T_{stg}$         | -40  | +140  |      | $^\circ C$   |                     |
| Thermal resistance-junction to case   | $R_{\theta(j-c)}$ |      | 0.01  |      | $^\circ C/W$ | Double sided cooled |
| Thermal resistance - case to heatsink | $R_{\theta(c-s)}$ |      | 0.003 |      | $^\circ C/W$ | Double sided cooled |
| Mounting force                        | P                 |      |       | 35   | kN           |                     |
| Weight                                | W                 |      |       | 1.10 | kg.          |                     |

\* Mounting surfaces smooth, flat and greased

