



# KK500-FAST SWITCHING THYRISTOR

1800-2000 V<sub>DRM</sub>

\*\*\*\*\*

## 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

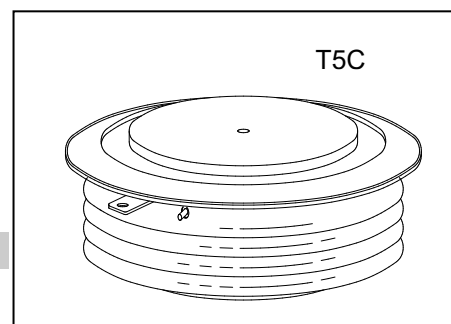
| Device Type | V <sub>RRM</sub> (1) | V <sub>DRM</sub> (1) | V <sub>RSM</sub> (1) |
|-------------|----------------------|----------------------|----------------------|
| KK500/18    | 1800                 | 1800                 | 2000                 |
| KK500/20    | 2000                 | 2000                 | 2100                 |

V<sub>RRM</sub> = Repetitive peak reverse voltage

V<sub>DRM</sub> = Repetitive peak off state voltage

V<sub>RSM</sub> = Non repetitive peak reverse voltage (2)

|                                                       |                                    |                   |
|-------------------------------------------------------|------------------------------------|-------------------|
| Repetitive peak reverse leakage and off state leakage | I <sub>RRM</sub> /I <sub>DRM</sub> | 2 mA<br>50 mA (3) |
| Critical rate of voltage rise                         | dv/dt (4)                          | 1000 V/μs         |



### Notes:

All ratings are specified for T<sub>j</sub>=25 °C unless otherwise stated.

(1) All voltage ratings are specified for an applied 50Hz/60Hz sinusoidal waveform over the temperature range 0 to +125 °C

(2) 10 msec. Max. Pulse width

(3) Maximum value for T<sub>j</sub>=125 °C.

(4) Minimum value for linear and exponential waveshape to 67% rated V<sub>DRM</sub>. Gate open, T<sub>j</sub>=125 °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 <sub>T(AV)</sub> |      | 500               |      | A                | Sinewave, 180° conduction, T <sub>c</sub> =55°C                                                |
| RMS value of on-state current                 | I <sub>TRMS</sub>  |      | 785               |      | A                | Nominal value                                                                                  |
| Peak one cycle surge (non repetitive) current | I <sub>TSM</sub>   |      | 10000             |      | A                | 10 msec (50Hz), sinusoidal wave-shape, 180° conduction, T <sub>j</sub> = 125 °C                |
| I square t                                    | I <sup>2</sup> t   |      | 5x10 <sup>5</sup> |      | A <sup>2</sup> s | 10 msec                                                                                        |
| Latching current                              | I <sub>L</sub>     |      | 1000              |      | mA               | V <sub>D</sub> =12V; R <sub>L</sub> =12ohms                                                    |
| Holding current                               | I <sub>H</sub>     |      | 200               |      | mA               | V <sub>D</sub> =12V; I=2.5A                                                                    |
| Peak on-state voltage                         | V <sub>TM</sub>    |      | 2.50              |      | V                | I <sub>TM</sub> = 1570A; T <sub>j</sub> =25°C                                                  |
| Threshold voltage, low-level                  | V <sub>TO</sub>    |      | 1.35              |      | V                | T <sub>j</sub> =125°C                                                                          |
| Slope resistance, low-level                   | r <sub>T</sub>     |      | 0.9               |      | mΩ               | 500A to 2000A                                                                                  |
| Critical rate of rise of on-state current(5)  | di/dt              |      | 200               |      | A/μs             | T <sub>j</sub> =125°C; V <sub>D</sub> = 0.67 V <sub>DRM</sub> ; f=50Hz; I <sub>TM</sub> =1000A |

**ELECTRICAL CHARACTERISTICS AND RATINGS KK500-FAST SWITCHING THYRISTOR****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           | $I_{GT}$    |      | 150  |      | mA    | $V_D=12V; R_L=3ohms; T_j=+25^{\circ}C$ |
| Gate- trigger voltage          | $V_{GT}$    | 0.70 | 2.5  |      | V     | $V_D=12V; R_L=3ohms; T_j=+25^{\circ}C$ |
| Peak negative voltage          | $V_{GRM}$   |      | 5    |      | V     |                                        |

**Dynamic**

| Parameter                          | Symbol   | Min. | Max. | Typ. | Units   | Conditions                                                                                                     |
|------------------------------------|----------|------|------|------|---------|----------------------------------------------------------------------------------------------------------------|
| Delay time                         | $t_d$    |      | 3.0  | 2.5  | $\mu s$ | $I_{TM}=500A; V_D=67\%V_{DRM}$<br>Gate pulse: $V_G=30V; R_G=10ohms;$<br>$t_r=0.1\mu s; t_p=20\mu s$            |
| Turn-off time (with $V_R = -5 V$ ) | $t_q$    |      | 40   |      | $\mu s$ | $I_{TM}=500 A; di/dt = -10 A/\mu s;$<br>$V_R = 50 V; dv/dt=30V/\mu s;$<br>$V_D= 67\%V_{DRM}; T_j=125^{\circ}C$ |
| Reverse recovery charge            | $Q_{rr}$ |      |      |      | $\mu C$ | $I_{TM}=500 A; di/dt=-10A/\mu s;$<br>$V_R=50 V; T_j=125^{\circ}C$                                              |

**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 | $R_{\Theta(j-c)}$ |      | 0.039 |      | $^{\circ}C/W$ | Double sided cooled |
| Thermal resistance - case to heatsink | $R_{\Theta(c-s)}$ |      | 0.008 |      | $^{\circ}C/W$ | Double sided cooled |
| Mounting force                        | F                 | 13   | 17    | 15   | kN            |                     |
| Weight                                | m                 |      |       | 0.26 | kg            |                     |

\* Mounting surfaces smooth, flat and greased

