



# KK1100-FAST SWITCHING THYRISTOR

2500-2800  $V_{DRM}$

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## HIGH POWER THYRISTOR FOR INVERTER APPLICATION

### Features:

- . All Diffused Structure
- . Amplifying Gate Configuration
- . Blocking capability up to 2800 volts
- . High  $dv/dt$  Capability
- . Pressure Assembled Device

## ELECTRICAL CHARACTERISTICS AND RATINGS

### Blocking - Off State

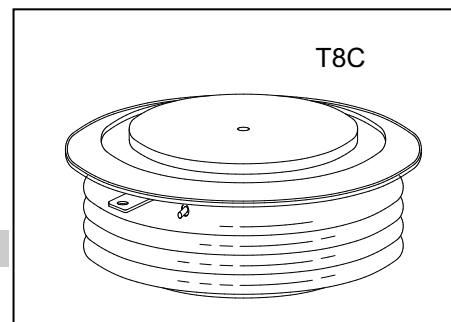
| Device Type | $V_{RRM}$ (1) | $V_{DRM}$ (1) | $V_{RSM}$ (1) |
|-------------|---------------|---------------|---------------|
| KK1100/25   | 2500          | 2500          | 2700          |
| KK1100/28   | 2800          | 2800          | 3000          |

$V_{RRM}$  = 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>100 mA (3) |
| Critical rate of voltage rise                         | $dv/dt$ (4)       | 1000 V/ $\mu$ s    |



### 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             | $I_{T(AV)}$  |      | 1100               |      | A                    | Sinewave, 180° conduction, $T_c=55^\circ\text{C}$                                        |
| RMS value of on-state current                 | $I_{T(RMS)}$ |      | 1727               |      | A                    | Nominal value                                                                            |
| Peak one cycle surge (non repetitive) current | $I_{TSM}$    |      | 14400              |      | A                    | 10 msec (50Hz), sinusoidal waveshape, 180° conduction, $T_j = 125^\circ\text{C}$         |
| I square t                                    | $I^2t$       |      | $1.04 \times 10^6$ |      | $\text{A}^2\text{s}$ | 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                         | $V_{TM}$     |      | 2.8                |      | V                    | $I_{TM}=3000\text{A}$ ; $T_j=25^\circ\text{C}$                                           |
| Threshold voltage, low-level                  | $V_{TO}$     |      | 1.51               |      | V                    | $T_j=125^\circ\text{C}$                                                                  |
| Slope resistance, low-level                   | $r_T$        |      | 0.43               |      | $\text{m}\Omega$     | 1000A to 2500A                                                                           |
| Critical rate of rise of on-state current(5)  | $di/dt$      |      | 200                |      | A/ $\mu$ s           | $T_j=125^\circ\text{C}$ ; $V_D = 0.67 V_{DRM}$ ; $f=50\text{Hz}$ ; $I_{TM}=2000\text{A}$ |

## ELECTRICAL CHARACTERISTICS AND RATINGS KK1100-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     |                                        |

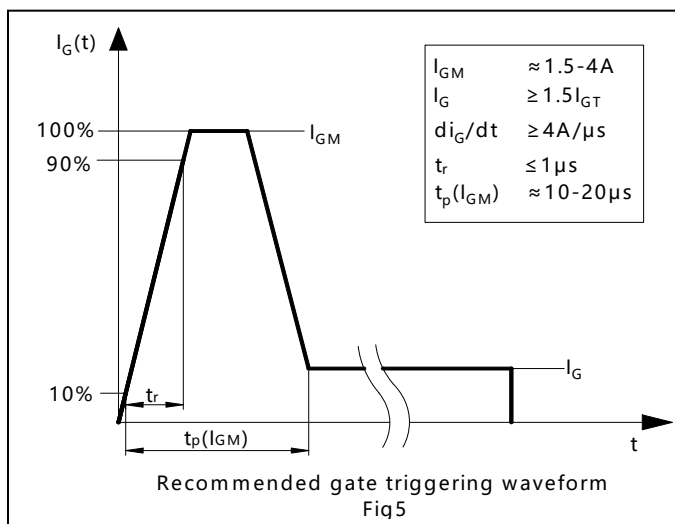
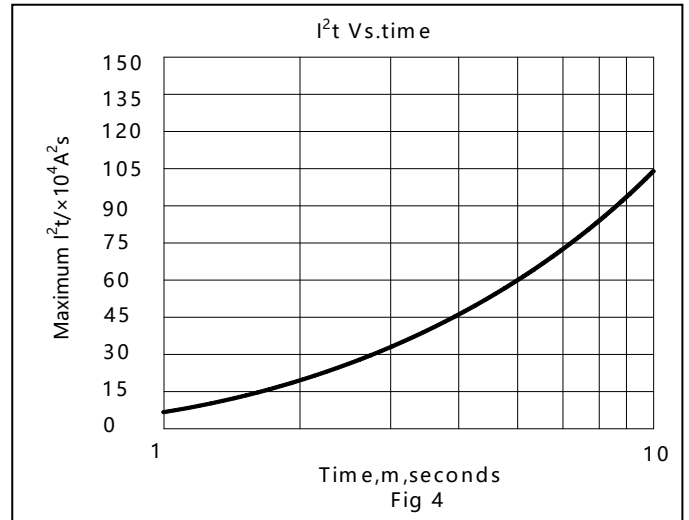
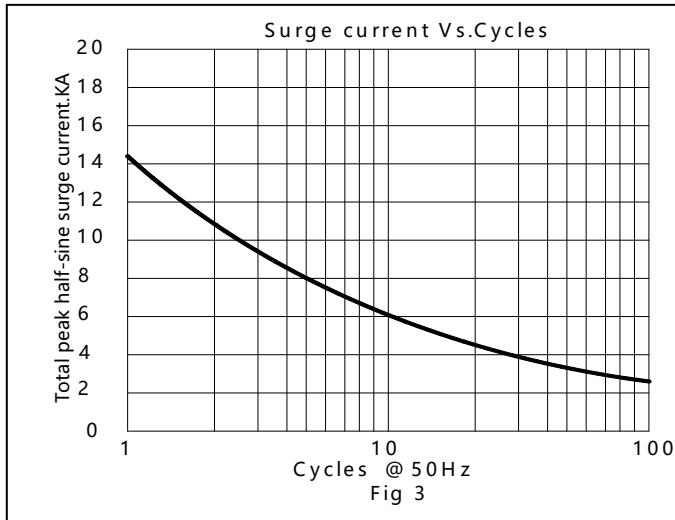
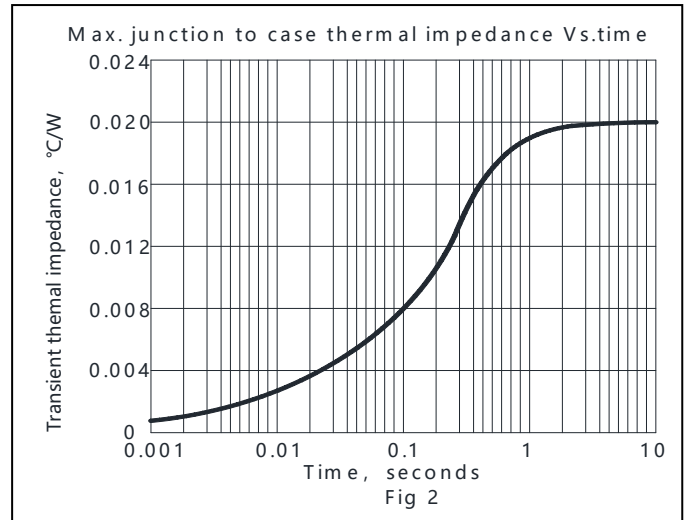
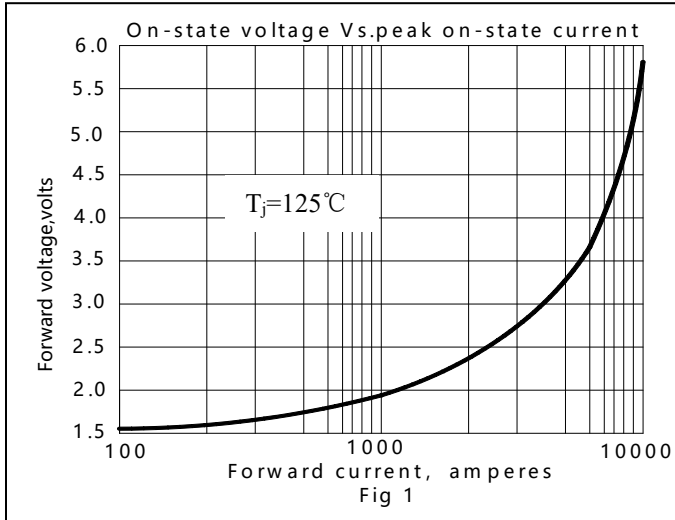
### Dynamic

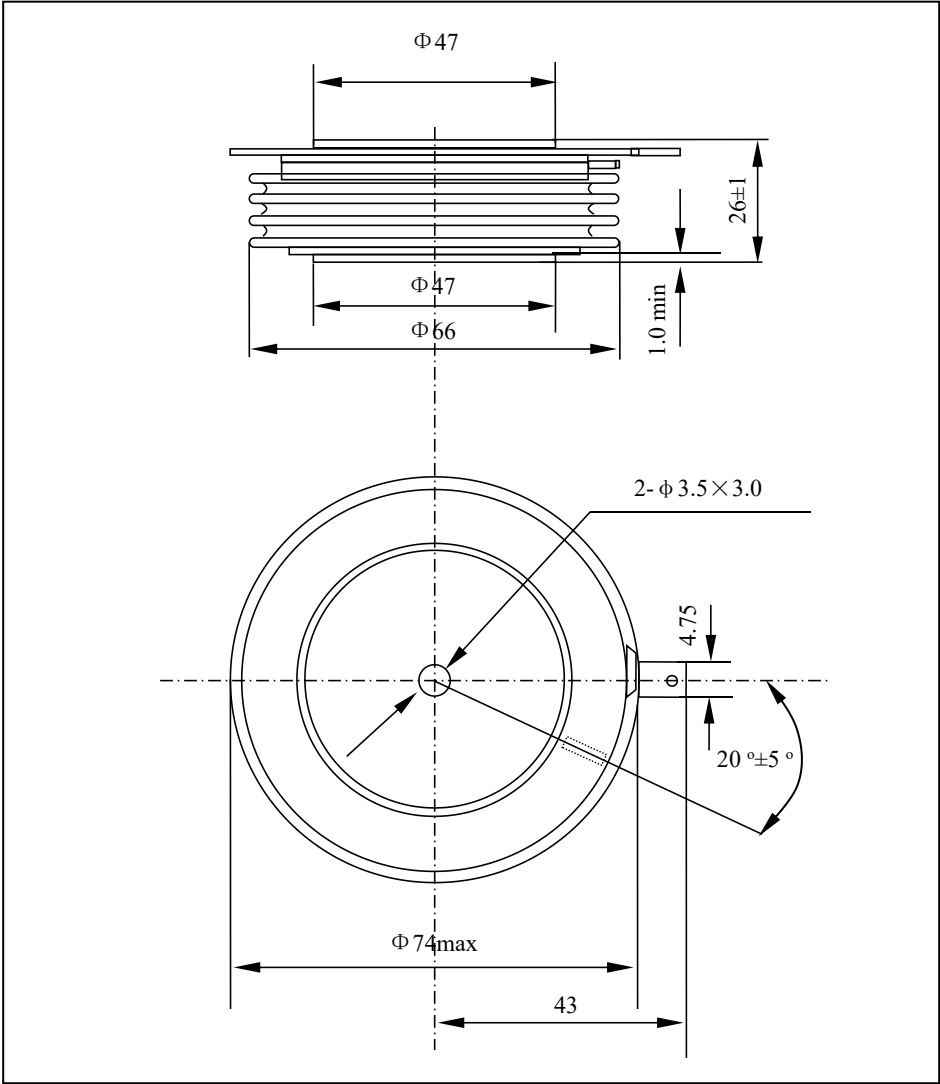
| Parameter                          | Symbol   | Min. | Max. | Typ. | Units   | Conditions                                                                                                       |
|------------------------------------|----------|------|------|------|---------|------------------------------------------------------------------------------------------------------------------|
| Delay time                         | $t_d$    |      | 3.0  | 2.5  | $\mu s$ | $I_{TM}=1000A; V_D=67\%V_{DRM}$<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 $V_R = -5 V$ ) | $t_q$    |      | 70   |      | $\mu s$ | $I_{TM}=1100 A; di/dt = -25 A/\mu s;$<br>$V_R = 50 V; dv/dt=30V/\mu s ;$<br>$V_D= 67\%V_{DRM}; T_j=125^{\circ}C$ |
| Reverse recovery charge            | $Q_{rr}$ |      |      |      | $\mu C$ | $I_{TM}=1100 A; di/dt=-10A/\mu s;$<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 | $R_{\Theta(j-c)}$ |      | 0.02  |      | $^{\circ}C/W$ | Double sided cooled |
| Thermal resistance - case to heatsink | $R_{\Theta(c-s)}$ |      | 0.005 |      | $^{\circ}C/W$ | Double sided cooled |
| Mounting force                        | F                 | 24   | 30    | 27   | kN            |                     |
| Weight                                | m                 |      |       | 0.59 | kg            |                     |

\* Mounting surfaces smooth, flat and greased





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