



High-end Power Semiconductor Manufacturer

# KK1000A 800V-1800V

## Fast Switching Thyristor

- Low switching losses
- Low reverse recovery charge
- Distributed amplified gate for high  $di_T/dt$



|                                   |           |                   |
|-----------------------------------|-----------|-------------------|
| Mean on-state current             | $I_{TAV}$ | 1000 A            |
| Repetitive peak off-state voltage | $V_{DRM}$ | 800-1800 V        |
| Repetitive peak reverse voltage   | $V_{RRM}$ |                   |
| Turn-off time                     | $t_q$     | 18.0-50.0 $\mu s$ |
| $T_j, ^\circ C$                   | - 60-125  |                   |

### MAXIMUM ALLOWABLE RATINGS

| Symbols and parameters |                                                                   | Units           | Values       | Test conditions                                                                                                                |                                         |
|------------------------|-------------------------------------------------------------------|-----------------|--------------|--------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| ON-STATE               |                                                                   |                 |              |                                                                                                                                |                                         |
| $I_{TAV}$              | Mean on-state current                                             | A               | 1000<br>1500 | $T_c=85^{\circ}\text{C}$ ; Double side cooled;<br>$T_c=55^{\circ}\text{C}$ ; Double side cooled;<br>180° half-sine wave; 50 Hz |                                         |
| $I_{TSM}$              | Surge on-state current                                            | kA              | 14.0         | $T_j=125^{\circ}\text{C}$                                                                                                      | 10ms half sine wave<br>$V_R=0.6V_{RRM}$ |
| $I^2t$                 | Safety factor                                                     | $A^2s\cdot10^3$ | 980.0        | $T_j=125^{\circ}\text{C}$                                                                                                      | 10ms half sine wave<br>$V_R=0.6V_{RRM}$ |
| BLOCKING               |                                                                   |                 |              |                                                                                                                                |                                         |
| $V_{DRM}, V_{RRM}$     | Repetitive peak off-state and<br>Repetitive peak reverse voltages | V               | 800–1800     | $T_j=125^{\circ}\text{C}$ , $t_q=10\text{ms}$                                                                                  |                                         |

| SWITCHING          |                                           |             |           |                                                                             |
|--------------------|-------------------------------------------|-------------|-----------|-----------------------------------------------------------------------------|
| $(di_T/dt)_{crit}$ | Critical rate of rise of on-state current | A/ $\mu$ s  | 1200      | $V_{DM}=67\%V_{DRM}$ to 1600A, Gate pulse $t_f \leq 0.5\mu$ s $I_{GM}=1.5A$ |
| THERMAL            |                                           |             |           |                                                                             |
| $T_{stg}$          | Storage temperature                       | $^{\circ}C$ | - 40-130  |                                                                             |
| $T_j$              | Operating junction temperature            | $^{\circ}C$ | - 60-125  |                                                                             |
| MECHANICAL         |                                           |             |           |                                                                             |
| F                  | Mounting force                            | kN          | 19.0-26.0 |                                                                             |

## CHARACTERISTICS

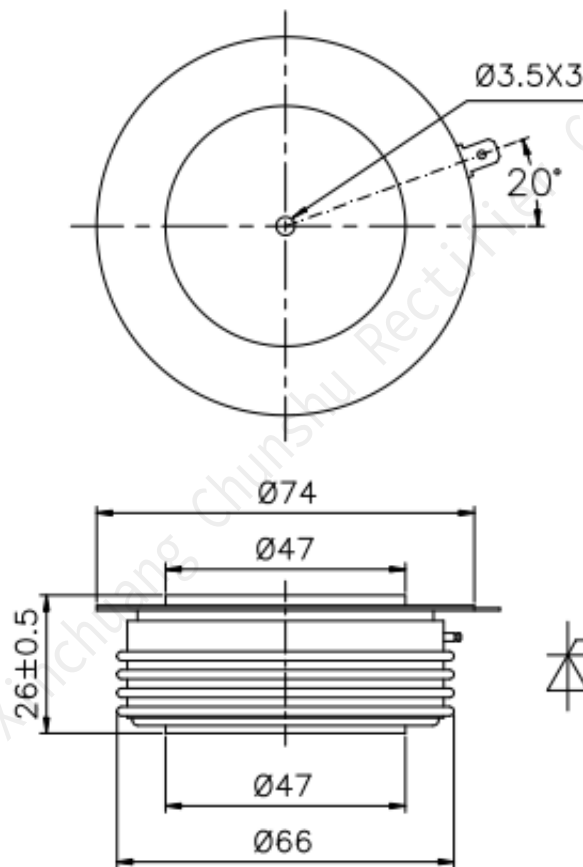
| Symbols and parameters |                                                                     | Units                  | Values             | Conditions                                                                                                                                |                                        |
|------------------------|---------------------------------------------------------------------|------------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| ON-STATE               |                                                                     |                        |                    |                                                                                                                                           |                                        |
| $V_{TM}$               | Peak on-state voltage, max                                          | V                      | 3.15               | $T_j=25\text{ }^{\circ}\text{C}$ ; $I_{TM}=3000\text{A}$ , $F=24.0\text{kN}$                                                              |                                        |
| $V_{T(TO)}$            | On-state threshold voltage, max                                     | V                      | 1.56               | $T_j=125\text{ }^{\circ}\text{C}$                                                                                                         |                                        |
| $r_T$                  | On-state slope resistance, max                                      | $\text{m}\Omega$       | 0.33               |                                                                                                                                           |                                        |
| $I_H$                  | Holding current, max                                                | mA                     | 500                | $V_A=12\text{V}$ , $I_A=1\text{A}$                                                                                                        |                                        |
| BLOCKING               |                                                                     |                        |                    |                                                                                                                                           |                                        |
| $I_{DRM}$ , $I_{RRM}$  | Repetitive peak off-state and Repetitive peak reverse currents, max | mA                     | 80                 | $T_j=125\text{ }^{\circ}\text{C}$<br>$V_D=V_{DRM}$ ; $V_R=V_{RRM}$                                                                        |                                        |
| $(dv_D/dt)_{crit}$     | Critical rate of rise of off-state voltage <sup>1)</sup> , min      | $\text{V}/\mu\text{s}$ | 1000               | $T_j=125\text{ }^{\circ}\text{C}$<br>$V_D=0.67\cdot V_{DRM}$ ; Gate open                                                                  |                                        |
| TRIGGERING             |                                                                     |                        |                    |                                                                                                                                           |                                        |
| $V_{GT}$               | Gate trigger direct voltage,                                        | V                      | 0.90Min<br>3.00Max | $T_j=25\text{ }^{\circ}\text{C}$                                                                                                          | $V_A=12\text{ V}$ ; $I_A=1\text{ A}$ ; |
| $I_{GT}$               | Gate trigger direct current,                                        | mA                     | 40Min<br>300Max    | $T_j=25\text{ }^{\circ}\text{C}$                                                                                                          |                                        |
| $V_{GD}$               | Gate non-trigger direct voltage, min                                | V                      | 0.30               | $T_j=125\text{ }^{\circ}\text{C}$ ; $V_D=0.67\cdot V_{DRM}$ ;                                                                             |                                        |
| SWITCHING              |                                                                     |                        |                    |                                                                                                                                           |                                        |
| $t_q$                  | Turn-off time <sup>2)</sup> ,                                       | $\mu\text{s}$          | 18.0Min            | $I_{TM}=1000\text{A}$ , $t_p=1000\mu\text{s}$ , $V_R=50\text{V}$                                                                          |                                        |
|                        |                                                                     |                        | 50.0Max            | $dv/dt=30\text{V}/\mu\text{s}$ , $di/dt=-20\text{A}/\mu\text{s}$                                                                          |                                        |
| $Q_{rr}$               | Total recovered charge, max                                         | $\mu\text{C}$          | 750                | $T_j=125\text{ }^{\circ}\text{C}$ ; $I_{TM}=1500\text{A}$ , $t_p=2000\mu\text{s}$ ,<br>$di/dt=-60\text{A}/\mu\text{s}$ , $V_R=50\text{V}$ |                                        |

**THERMAL**

|            |                                              |                             |       |                                                         |
|------------|----------------------------------------------|-----------------------------|-------|---------------------------------------------------------|
| $R_{thjc}$ | Thermal resistance, junction to case,<br>max | $^{\circ}\text{C}/\text{W}$ | 0.020 | At 180°sine, double side cooled<br>Clamping force 7.0kN |
| $R_{thch}$ | Thermal resistance, case to heatsink,<br>max | $^{\circ}\text{C}/\text{W}$ | 0.005 |                                                         |

**MECHANICAL**

|   |             |   |     |  |
|---|-------------|---|-----|--|
| w | Weight, typ | g | 440 |  |
|---|-------------|---|-----|--|

**OVERALL DIMENSIONS**

KT55

All dimensions in millimeters

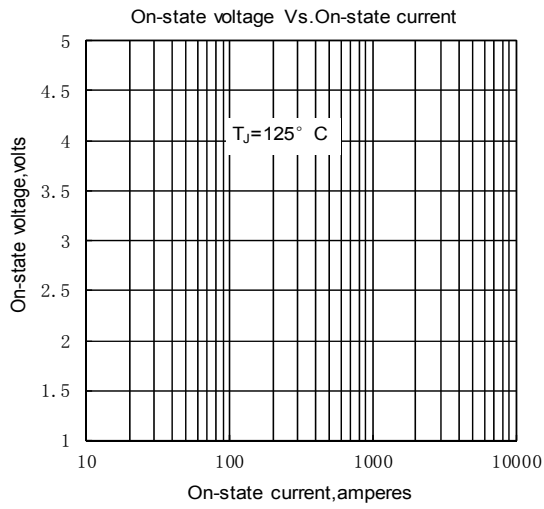


Fig. 1

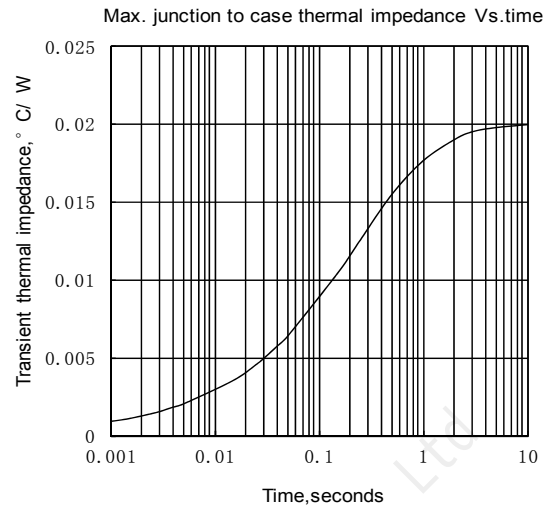


Fig. 2

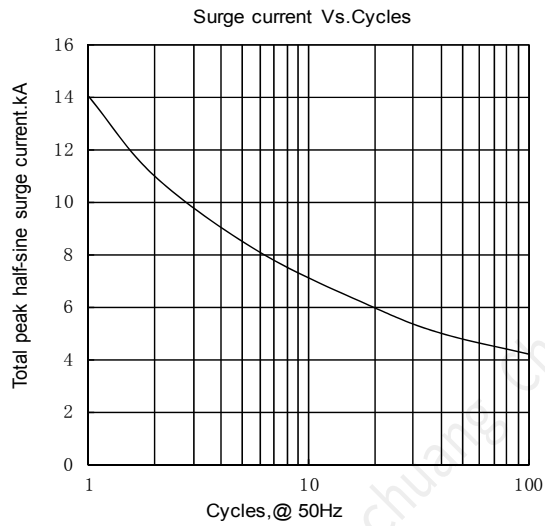


Fig. 3

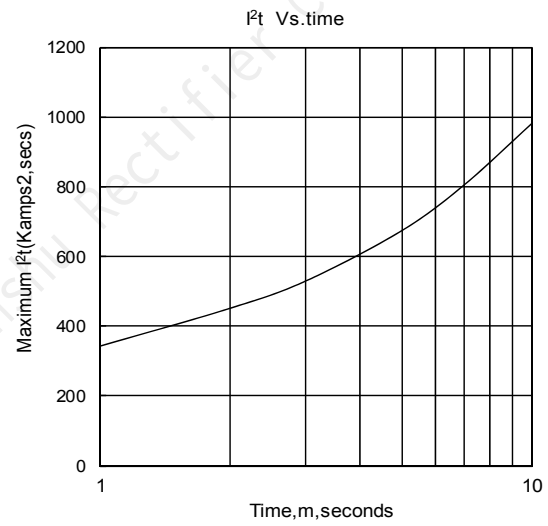


Fig. 4

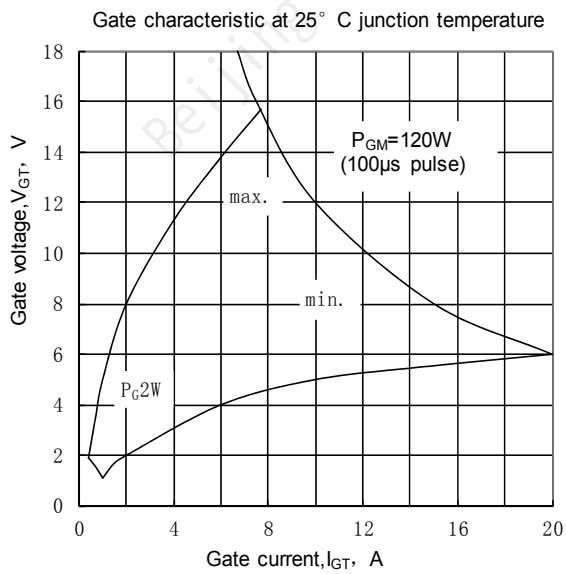


Fig. 5

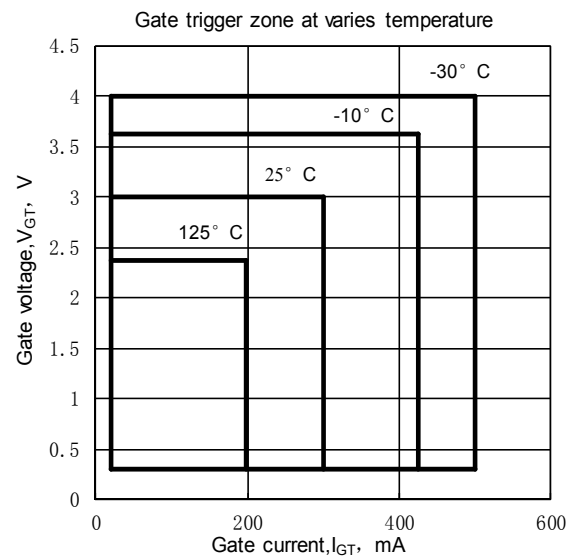


Fig. 6