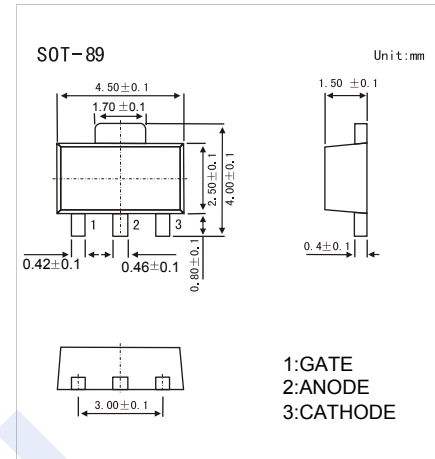


## SCR Thyristor

### BT169 (KT169)

#### ■ Features

- Repetitive peak off-state voltages :400V
- Average on-state current :0.5A
- RMS on-state current :0.8A
- Non-repetitive peak on-state current :8A



#### ■ Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

| Parameter  | Symbol                         | Rating     | Unit             |
|--|--------------------------------|------------|------------------|
| Peak Repetitive Forward and Reverse Blocking Voltages        | BT169-400<br>$V_{DRM} V_{RRM}$ | 400        | V                |
| Average on-state Current                                     | $I_T(AV)$                      | 0.5        | A                |
| Forward Current RMS  | $I_T(RMS)$                     | 0.8        |                  |
| Non-Repetitive Peak on-state Current (t=10ms)                | $I_{TSM}$                      | 8          |                  |
| Non-Repetitive Peak on-state Current (t=8.3ms)               |                                | 9          |                  |
| Circuit Fusing Considerations (t = 10ms)                     | $I^2t$                         | 0.32       | $A^2s$           |
| Repetitive Rate of rise of on-state Current after Triggering | $di_T/dt$                      | 50         | A/us             |
| Peak Gate Current  | $I_{GM}$                       | 1          | A                |
| Peak Gate Voltage  | $V_{GM}$                       | 5          | V                |
| Peak Gate Voltage — Reverse                                  | $V_{GRM}$                      | 5          | V                |
| Peak Gate Power — Forward                                    | $P_{GM}$                       | 2          | W                |
| Average Gate Power — Forward                                 | $P_{GF(AV)}$                   | 0.1        |                  |
| Thermal Resistance Junction to Ambient                       | $R_{thJA}$                     | 150        | K/W              |
| Thermal Resistance Junction to Case                          | $R_{thJC}$                     | 60         |                  |
| Junction Temperature   | $T_J$                          | 125        | $^\circ\text{C}$ |
| Storage Temperature Range                                    | $T_{stg}$                      | -40 to 150 |                  |

## SCR Thyristor

### BT169 (KT169)

■ Electrical Characteristics (Ta = 25°C, unless otherwise noted.)

| Parameter   | Symbol                            | Test Conditions  | Min | Typ. | Max | Unit |
|---|-----------------------------------|--|-----|------|-----|------|
| Peak Repetitive Forward and Reverse Blocking Voltages | V <sub>DRM</sub> V <sub>RRM</sub> | I <sub>DRM</sub> =I <sub>RRM</sub> 50μA  | 400 |      |     | V    |
| Off-state Leakage Current                             | I <sub>D,IR</sub>                 | V <sub>DRM</sub> =V <sub>RRM</sub> (max); T <sub>j</sub> =125°C; R <sub>GK</sub> =1kΩ  |     |      | 0.1 | mA   |
| On-state Voltage                                      | V <sub>TM</sub>                   | I <sub>T</sub> =1A   |     |      | 1.5 | V    |
| Gate Trigger Voltage                                  | V <sub>GT</sub>                   | V <sub>D</sub> =12V, I <sub>T</sub> =10mA  |     |      | 0.8 |      |
|   |                                   | V <sub>D</sub> =V <sub>DRM</sub> (max), I <sub>T</sub> =10mA; T <sub>j</sub> =125°C  | 0.2 |      |     |      |
| Gate Trigger Current (Continuous dc)                  | I <sub>GT</sub>                   | V <sub>D</sub> =12V, I <sub>T</sub> =10mA  |     |      | 200 | μA   |
| Latching Current                                      | I <sub>L</sub>                    | V <sub>D</sub> =12V, I <sub>GT</sub> =0.5mA; R <sub>GK</sub> =1kΩ  |     |      | 6   | mA   |
| Holding Current                                       | I <sub>H</sub>                    | V <sub>D</sub> =12V, I <sub>GT</sub> =0.5mA; R <sub>GK</sub> =1kΩ  |     |      | 5   |      |
| Critical Rate of rise of off-state Voltage            | dV <sub>D</sub> /dt               | V <sub>DM</sub> =67% V <sub>DRM</sub> (max); T <sub>j</sub> =125°C exponential waveform; R <sub>GK</sub> =1kΩ  |     | 25   |     | V/μs |
| Gate Controlled turn-on time                          | t <sub>gt</sub>                   | I <sub>TM</sub> =2A; V <sub>D</sub> =V <sub>DRM</sub> (max), G=10mA; di <sub>G</sub> /dt=0.1A/μs   |     | 2    |     | μs   |
| Circuit Commutated turn-off time                      | t <sub>q</sub>                    | V <sub>D</sub> =67% V <sub>DRM</sub> (max); T <sub>j</sub> =125°C, T <sub>M</sub> =1.6A; V <sub>R</sub> =35V; di <sub>TM</sub> /dt=30A/μs, dV <sub>D</sub> /dt=2V/μs; R <sub>GK</sub> =1kΩ |     | 100  |     |      |

■ Classification of I<sub>GT</sub> (μA)

| Type    | BT169-400 | BT169-400A | BT169-400B |
|---------|-----------|------------|------------|
| Range   | 0-200     | 10-30      | 30-60      |
| Marking | BT/C39    | BT/C35     | BT/C36     |

### SCR Thyristor BT169 (KT169)

■ Typical Characteristics

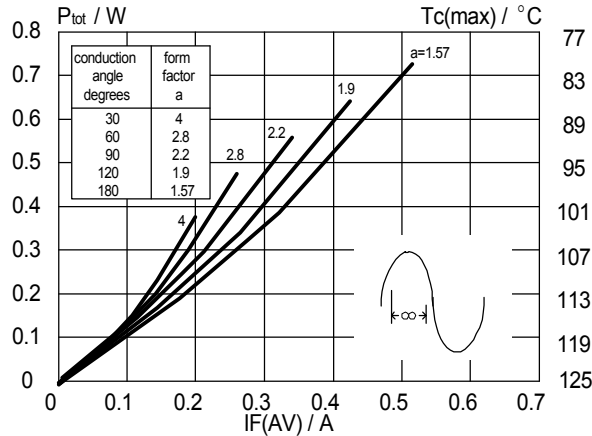


FIG.1 Maximum on-state dissipation,  $P_{tot}$ , versus average on-state current,  $I_{T(AV)}$ , where  $a = \text{form factor} = I_{T(RMS)} / I_{T(AV)}$

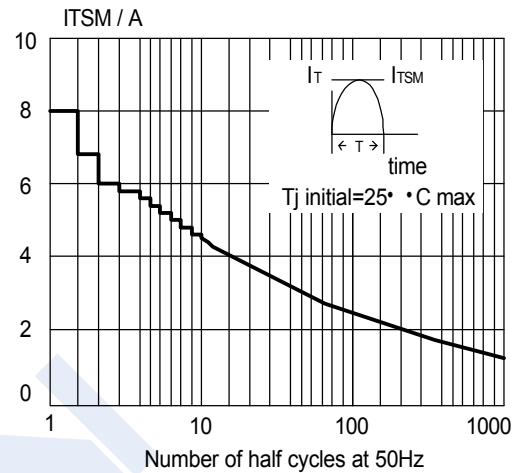


FIG.4 Maximum permissible non-repetitive peak on-state current  $I_{TSM}$ , versus number of cycles, for sinusoidal currents,  $f = 50\text{Hz}$ .

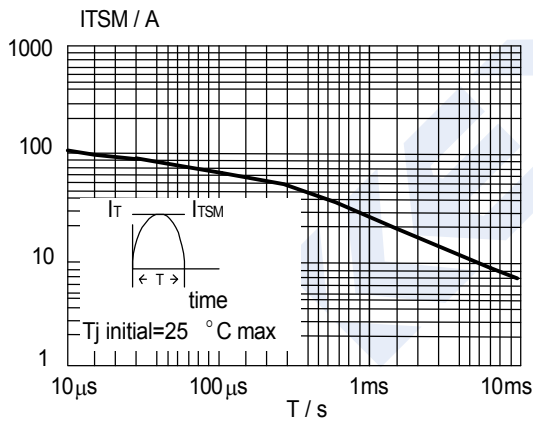


FIG.2 Maximum permissible non-repetitive peak on-state current  $I_{TSM}$ , versus pulse width  $t_p$ , for sinusoidal currents,  $t_p \leq 10\text{ms}$ .

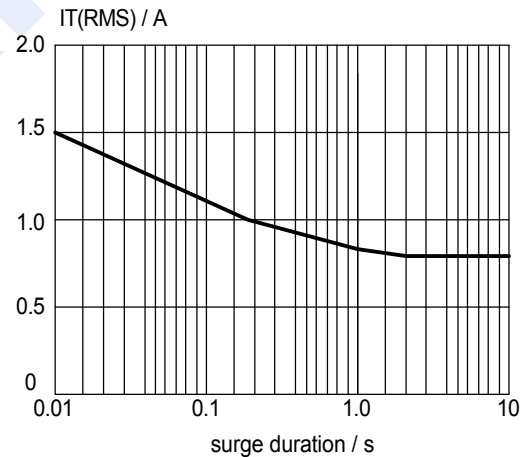


FIG.5 Maximum permissible repetitive rms on-state current  $I_{T(RMS)}$ , versus surge duration, for sinusoidal currents,  $f = 50\text{Hz}$ ;  $T_{lead} \leq 83^\circ\text{C}$

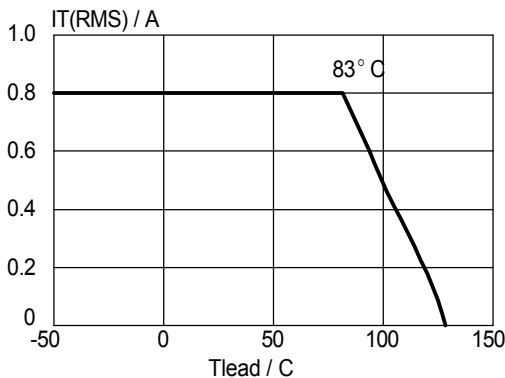


FIG.3 Maximum permissible rms current  $I_{T(RMS)}$ , versus lead temperature,  $T_{lead}$

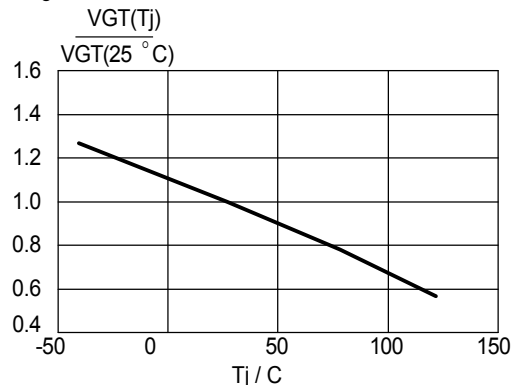


FIG.6 Normalised gate trigger voltage  $V_{GT}(T_j) / V_{GT}(25^\circ\text{C})$ , versus junction temperature  $T_j$

## SCR Thyristor BT169 (KT169)

■ Typical Characteristics

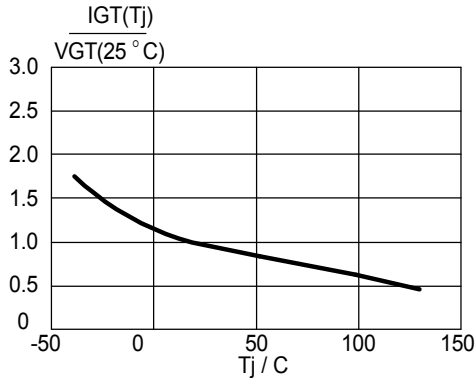


FIG.7 Normalised gate trigger current  $I_{GT}(T_j)/I_{GT}(25^\circ\text{C})$ , versus junction temperature  $T_j$

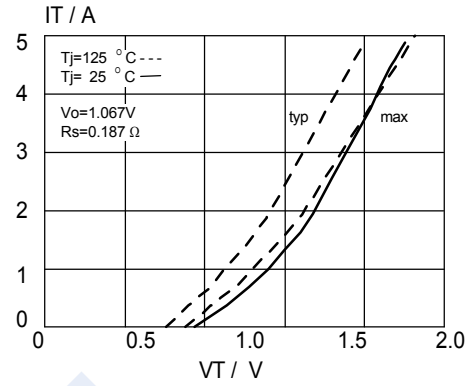


FIG.10 Typical and maximum on-state characteristic.

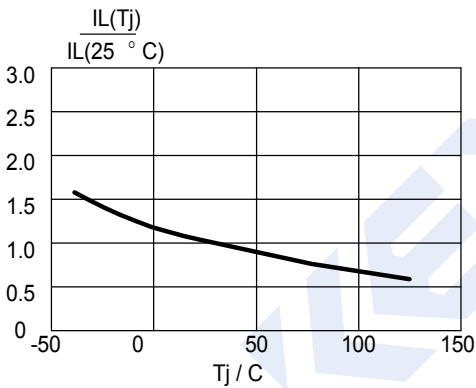


FIG.8 Normalised latching current  $I_L(T_j) / I_L(25^\circ\text{C})$ , versus junction temperature  $T_j$ ,  $R_{GK} = 1\text{K}\Omega$

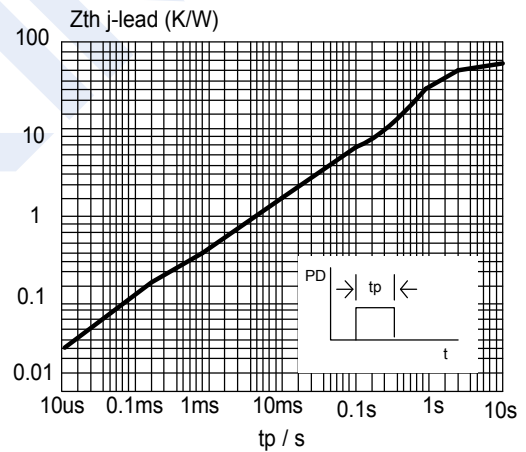


FIG.11 Transient thermal impedance  $Z_{th\ j\text{-lead}}$ , versus pulse width  $t_p$ .

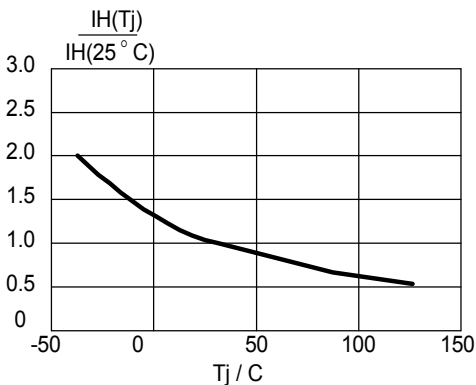


FIG.9 Normalised holding current  $I_H(T_j)/I_H(25^\circ\text{C})$ , versus junction temperature  $T_j$ ,  $R_{GK} = 1\text{K}\Omega$

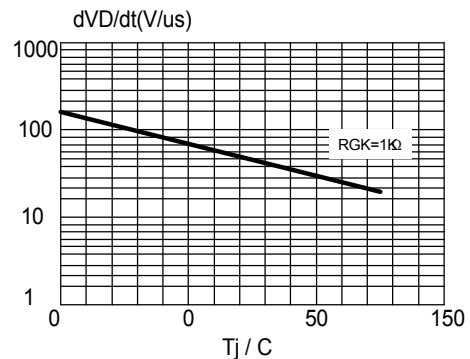


FIG.12 Typical, critical rate of rise of off-state voltage,  $dV_D/dt$  versus junction temperature  $T_j$ .