

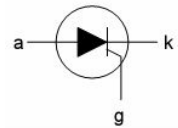
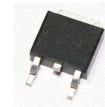
# BT151

## Thyristors

### General Description

- ◆ Package: TO-252
- ◆ Glass passivated thyristors in a plastic envelope, Intended for use in applications requiring high bidirectional blocking voltage capability and high thermal cycling performance. Typical applications include motor control, industrial and domestic lighting, heating and static switching.

### DRAWING



K A G

### Limiting Values

#### Limiting values in accordance with the absolute Maximum System(IEC134)

| SYMBOL             | PARAMETER                                                    | CONDITIONS                                                                  | MIN | MAX | UNIT                   |
|--------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------|-----|-----|------------------------|
| $V_{DRM}, V_{RRM}$ | Repetitive peak off-state Voltages                           |                                                                             |     | 600 | V                      |
| $I_{T(AV)}$        | Average on-state current                                     | half sine wave; $T_{mb} \leq 109^{\circ}\text{C}$                           |     | 7.5 | A                      |
| $I_{T(RMS)}$       | RMS on-state current                                         | all conduction angles                                                       |     | 12  | A                      |
| $I_{TSM}$          | Non-repetitive peak on-state current                         | half sine wave; $T_j = 25^{\circ}\text{C}$ prior to surge                   |     |     |                        |
|                    |                                                              | $t = 10\text{ms}$                                                           |     | 100 | A                      |
|                    |                                                              | $t = 8.3\text{ms}$                                                          |     | 110 | A                      |
| $I^2T$             | $I^2T$ for fusing                                            | $t = 10\text{ms}$                                                           |     | 50  | $\text{A}^2\text{S}$   |
| $dI/dt$            | Repetitive rate of rise of on-state current after triggering | $I_{TM} = 20\text{A}; I_G = 50\text{mA}; dI_G/dt = 50\text{mA}/\mu\text{s}$ |     | 50  | $\text{A}/\mu\text{s}$ |
| $I_{GM}$           | Peak gate current                                            |                                                                             |     | 2   | A                      |
| $V_{GM}$           | Peak gate voltage                                            |                                                                             |     | 5   | V                      |
| $V_{RGM}$          | Peak reverse gate voltage                                    |                                                                             |     | 5   | V                      |
| $P_{GM}$           | Peak gate power                                              |                                                                             |     | 5   | W                      |
| $P_{G(AV)}$        | Average gate power                                           | over any 20 ms period                                                       |     | 0.5 | W                      |
| $T_{STG}$          | Storage temperature                                          |                                                                             | -40 | 150 | $^{\circ}\text{C}$     |
| $T_j$              | Operating junction temperature                               |                                                                             |     | 125 | $^{\circ}\text{C}$     |

### Thermal Resistances

| SYMBOL       | PARAMETER                                    | CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------|----------------------------------------------|------------|-----|-----|-----|------|
| $R_{thj-mb}$ | Thermal resistance junction to mounting base |            |     |     | 1.8 | K/W  |
| $R_{thj-a}$  | Thermal resistance junction to ambient       |            |     | 75  |     | K/W  |

## Static Characteristics

$T_J=25^{\circ}\text{C}$  unless otherwise stated

| SYMBOL     | PARAMETER                 | CONDITIONS                                                    | MIN  | TYP | MAX  | UNIT |
|------------|---------------------------|---------------------------------------------------------------|------|-----|------|------|
| $I_{GT}$   | Gate trigger current      | $V_D=12\text{V}; I_T=0.1\text{A}$                             |      | 2   | 15   | mA   |
| $I_L$      | Latching current          | $V_D=12\text{V}; I_{GT}=0.1\text{A}$                          |      | 10  | 40   | mA   |
| $I_H$      | Holding current           | $V_D=12\text{V}; I_{GT}=0.1\text{A}$                          |      | 7   | 20   | mA   |
| $V_T$      | On-state voltage          | $I_T=23\text{A}$                                              |      | 1.4 | 1.75 | V    |
| $V_{GT}$   | Gate trigger voltage      | $V_D=12\text{V}; I_T=0.1\text{A}$                             |      | 0.6 | 1.5  | V    |
|            |                           | $V_D=V_{DRM(MAX)}; I_T=0.1\text{A}; T_J=125^{\circ}\text{C}$  | 0.25 | 0.4 |      | V    |
| $I_D, I_R$ | Off-state leakage current | $V_D=V_{DRM(MAX)}; V_R=V_{RRM(MAX)}; T_J=125^{\circ}\text{C}$ |      | 0.1 | 0.5  | mA   |

## Dynamic Characteristics

$T_J=25^{\circ}\text{C}$  unless otherwise stated

| SYMBOL | PARAMETER                                  | CONDITIONS                                                                   | MIN | TYP  | MAX | UNIT |
|--------|--------------------------------------------|------------------------------------------------------------------------------|-----|------|-----|------|
| DVD/dt | Critical rate of rise or off-state voltage | $V_{DM}=67\%V_{DRM(MAX)}; T_J=125^{\circ}\text{C};$<br>exponential waveform; |     |      |     |      |
|        |                                            | Gate open circuit                                                            | 50  | 130  |     | V/us |
|        |                                            | $R_{GK}=100\Omega$                                                           | 200 | 1000 |     | V/us |
| tgt    | Gate controlled turn-on time               | $I_{TM}=40\text{A}; V_D=V_{DRM(MAX)}; I_G=0.1\text{A}$                       |     | 2    |     | us   |
|        |                                            | $dI/dt=5\text{A/us}$                                                         |     |      |     |      |
| tq     | Circuit commutated turn-off time           | $V_D=67\%V_{DRM(MAX)}; T_J=125^{\circ}\text{C}$                              |     | 70   |     | us   |
|        |                                            | $I_{TM}=20\text{A}; V_R=25\text{V}; dI/dt=30\text{A/us}$                     |     |      |     |      |
|        |                                            | $dV/dt=50\text{V/us}; R_{GK}=100\Omega$                                      |     |      |     |      |

## Typical Characteristics

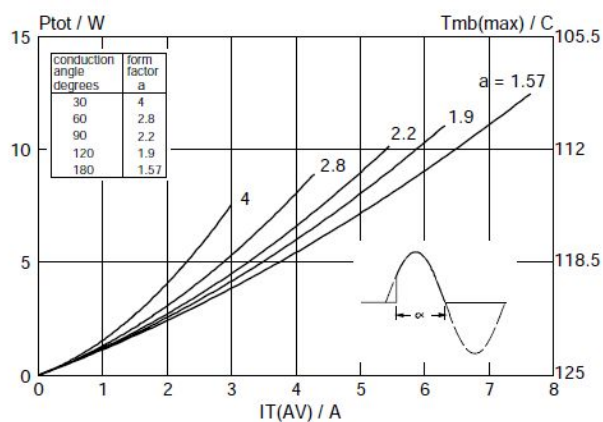


Fig.1. Maximum on-state dissipation,  $P_{tot}$ , versus average on-state current,  $I_{T(AV)}$ , where  $a = \text{form factor} = I_{T(RMS)} / I_{T(AV)}$ .

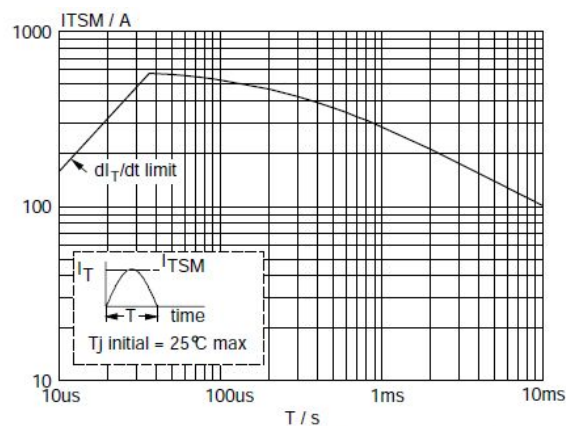


Fig.2. Maximum permissible non-repetitive peak on-state current  $I_{TSM}$  versus pulse width  $t_p$  for sinusoidal currents,  $t_p \leq 10\text{ms}$ .

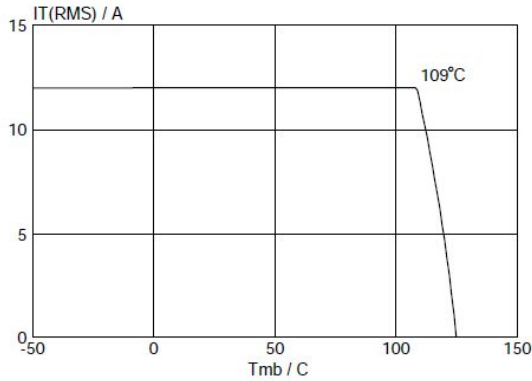


Fig.3. Maximum permissible rms current  $I_{T(RMS)}$ , versus mounting base temperature  $T_{mb}$ .

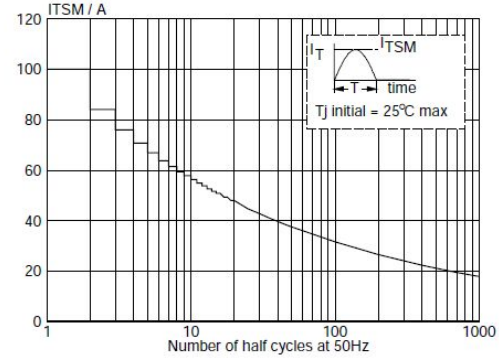


Fig.4. Maximum permissible non-repetitive peak on-state current  $I_{TSM}$ , versus number of cycles, for sinusoidal currents,  $f = 50 \text{ Hz}$ .

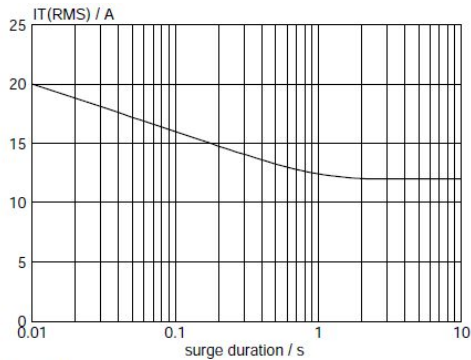


Fig.5. Maximum permissible repetitive rms on-state current  $I_{T(RMS)}$ , versus surge duration, for sinusoidal currents,  $f = 50 \text{ Hz}$ ;  $T_{mb} \leq 109^\circ\text{C}$ .

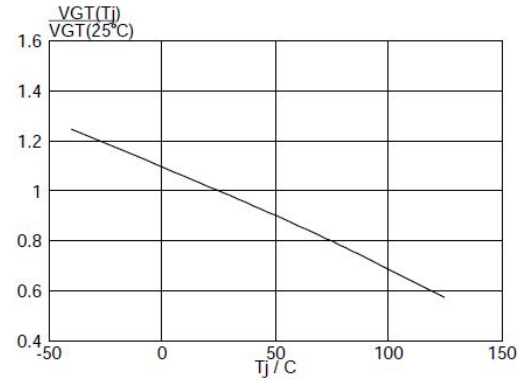


Fig.6. Normalised gate trigger voltage  $V_{GT}(T_J) / V_{GT}(25^\circ\text{C})$ , versus junction temperature  $T_J$ .

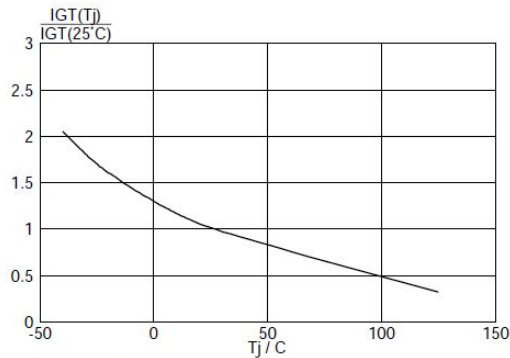


Fig.7. Normalised gate trigger current  $I_{GT}(T_J) / I_{GT}(25^\circ\text{C})$ , versus junction temperature  $T_J$ .

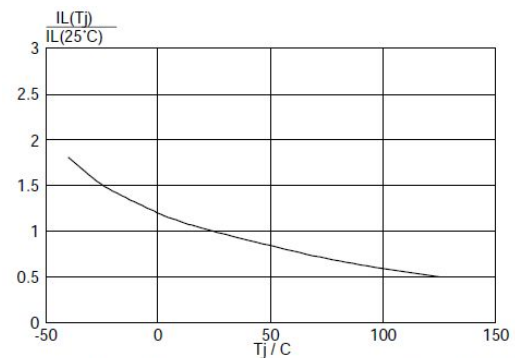


Fig.8. Normalised latching current  $I_L(T_J) / I_L(25^\circ\text{C})$ , versus junction temperature  $T_J$ .

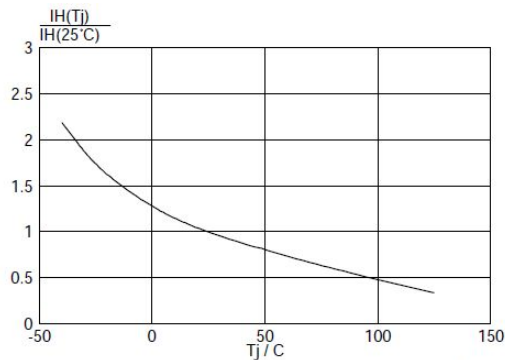


Fig.9. Normalised holding current  $I_H(T_J) / I_H(25^\circ\text{C})$ , versus junction temperature  $T_J$ .

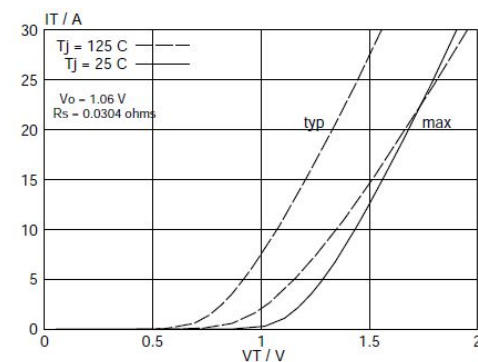
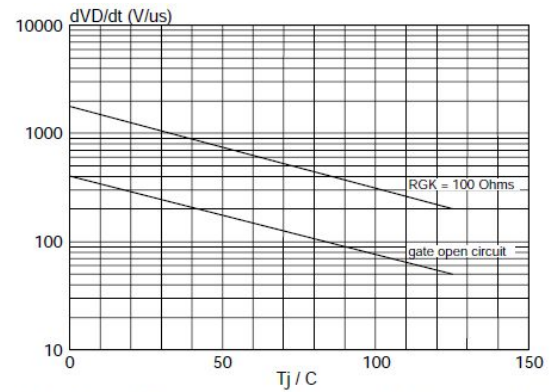
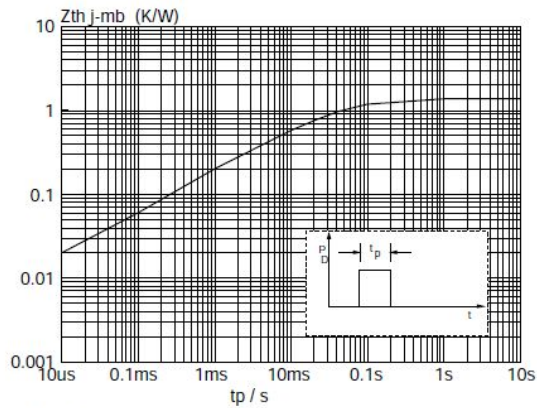


Fig.10. Typical and maximum on-state characteristic.



## Mechanical Dimensions

