# BT151 Series

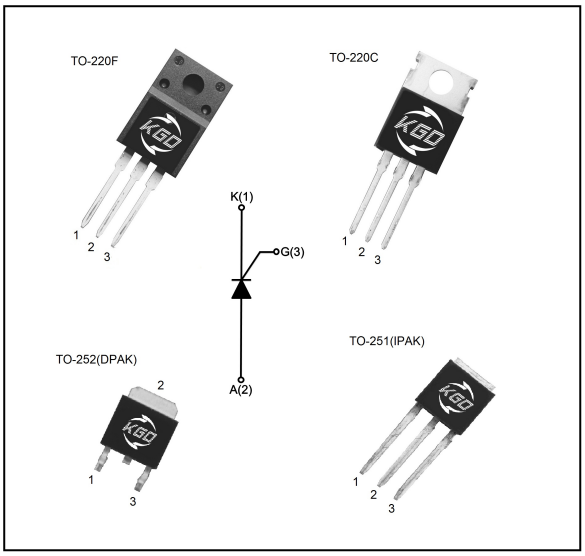
- **Description:**

High current density due to singel mesa technology.

BT151 series of silicon controlled rectifiers are specifically designed for medium power switching and phase control applications.

BT151 series are suitable for general purpose applications,a high gate sensitivity is required.

BT151F are full pack plastic package,they provides a 2000V RMS isolation voltage from allthree terminals to extemal heetsink.




- **Features:**

Blocking voltage to 500/650/800V
On-state RMS current to 12A
Non-repetitive peak on-state current to 120A

- **Absolute Maximum Ratings**

| Symbol | Parameter | | Conditions | Value | Unit |
|---|---|---|---|---|---|
| $V_{DRM}$ $V_{RRM}$ | Repetitive peak off-state voltage Repetitive peak Reverse voltage | BT151-500R | $T_J$=25℃ | 500 | V |
| | | BT151-650R | | 650 | |
| | | BT151-800R | | 800 | |
| $I_{T(RMS)}$ | RMS on-state current (all conduction angels) | IPAK/DPAK | $T_c$=100℃ | 12 | A |
| | | TO-220C | $T_c$=109℃ | | |
| | | TO-220F | $T_c$=69℃ | | |
| $I_{T(av)}$ | Average on-state current (half sine wave) | IPAK/DPAK | $T_c$=100℃ | 7.5 | A |
| | | TO-220C | $T_c$=109℃ | | |
| | | TO-220F | $T_c$=69℃ | | |
| $I_{TSM}$ | Non-repetitive surge peak On-state current (half sine cycle$T_J$=25℃) | f= 50Hz | tp=10ms | 120 | A |
| | | f= 60Hz | tp=8.3ms | 132 | |
| $I^2t$ | $I^2t$ Value for fusing | | tp=10ms | 72 | $A^2S$ |
| $di_T/dt$ | Repetitive rate of rise of on-state current after triggering $I_{TM}$=20A $I_G$=50mA $dI_G/dt$ 50Ma/ms | | | 50 | A/μs |

| | | | | | |
|---|---|---|---|---|---|
| $I_{GM}$ | Peak gate current | tp=20μs, $T_J$=125℃ | | 2 | A |
| $P_{GM}$ | Peak gate power | | | 5 | W |
| $P_{G(AV)}$ | Average gate power dissipation | | | 0.5 | W |
| $T_{STG}$ | Storage temperature | | -40 | 150 | ℃ |
| $T_J$ | Junction temperature | | -40 | 110 | ℃ |

- **Electrical Characteristics**

| Symbol | Conditions | Value | | | Unit |
|---|---|---|---|---|---|
| | | MIN | TYP | MAX | |
| $I_{GT}$ | $V_D$=12V,$R_L$=33Ω | / | 3 | 15 | mA |
| $V_{GT}$ | | / | 0.6 | 1.5 | V |
| $V_{GD}$ | $V_D$=$V_{DRM}$,$R_L$=3.3KΩ,$T_J$=110℃ | / | / | 0.2 | V |
| $I_L$ | $I_G$=1.2$I_{GT}$ | / | 10 | 40 | mA |
| $I_H$ | $I_T$=500mA | / | 8 | 30 | mA |
| dv/dt | $V_{DM}$=67%$V_{DRM}$,gate open,$T_J$=125℃ | 200 | 400 | / | V/μs |

- **Electrical Characteristics**

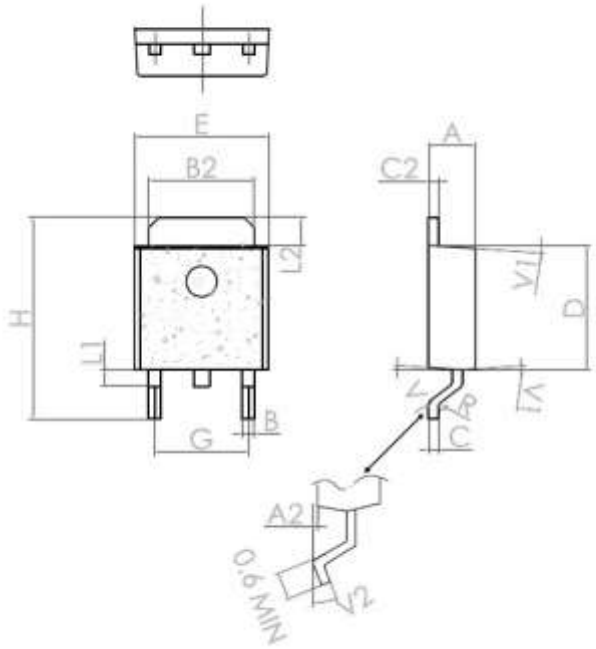
| Symbol | Parameter | | Numerical | Unit |
|---|---|---|---|---|
| $V_{TM}$ | $I_T$=23A,tp=380μs | $T_j$=25℃ | 1.7 | V |
| $I_{DRM}$ $I_{RRM}$ | $V_D$=$V_{DRM}$,$V_R$=$V_{RRM}$ | $T_j$=25℃ | 10 | μA |
| | | $T_j$=125℃ | 0.5 | mA |

- **Thermal Characteristics**

| Symbol | Parameter | | Numerical(MAX) | Unit |
|---|---|---|---|---|
| $R_{th(j-mb)}$ | Thermal resistance from junction to mounting base | TO-220C | 1.3 | ℃/W |
| | | IPAK/DPAK | 2.0 | |
| $R_{th(j-hs)}$ | Thermal resistance from junction to heatsink compound | TO-220F | 4.5 | |

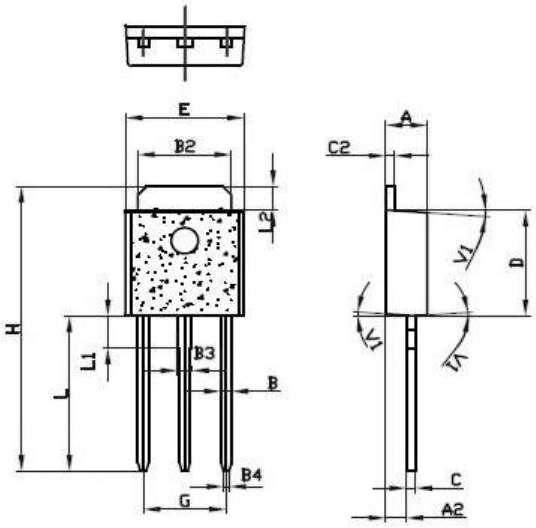
- **Package Outline Dimensions**

## TO-252 / DPAK




| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 2.2 | | 2.4 | 0.086 | | 0.095 |
| A2 | 0.03 | | 0.23 | 0.001 | | 0.009 |
| B | 0.55 | | 0.65 | 0.021 | | 0.026 |
| B2 | 5.2 | | 5.4 | 0.204 | | 0.212 |
| C | 0.45 | | 0.62 | 0.017 | | 0.024 |
| C2 | 0.48 | | 0.62 | 0.019 | | 0.024 |
| D | 6 | | 6.2 | 0.236 | | 0.244 |
| E | 6.4 | | 6.6 | 0.251 | | 0.259 |
| G | 4.40 | | 4.60 | 0.173 | | 0.181 |
| H | 9.35 | | 10.1 | 0.368 | | 0.397 |
| L1 | | 0.8 | | | 0.031 | |
| L2 | 1.37 | | 1.5 | 0.054 | | 0.059 |
| V1 | | 4° | | | 4° | |
| V2 | 0° | | 8° | 0° | | 8° |

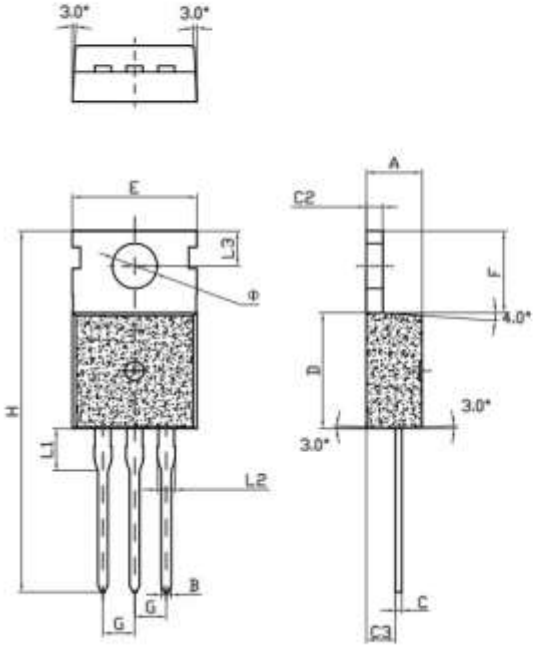
## TO-251(iPAK)




| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 2.2 | | 2.4 | 0.086 | | 0.095 |
| A2 | 0.9 | | 1.1 | 0.035 | | 0.043 |
| B | 0.55 | | 0.65 | 0.021 | | 0.026 |
| B2 | 5.1 | | 5.4 | 0.200 | | 0.212 |
| B3 | 0.76 | | 0.85 | 0.030 | | 0.033 |
| B4 | | 0.32 | | | 0.013 | |
| C | 0.45 | | 0.62 | 0.017 | | 0.024 |
| C2 | 0.48 | | 0.62 | 0.019 | | 0.024 |
| D | 6 | | 6.2 | 0.236 | | 0.244 |
| E | 6.4 | | 6.7 | 0.252 | | 0.264 |
| G | 4.4 | | 4.7 | 0.173 | | 0.185 |
| H | 16.0 | | 16.7 | 0.630 | | 0.658 |
| L | 8.9 | | 9.4 | 0.350 | | 0.370 |
| L1 | 1.8 | | 1.9 | 0.071 | | 0.075 |
| L2 | 1.37 | | 1.5 | 0.054 | | 0.059 |
| V1 | | 4° | | | 4° | |

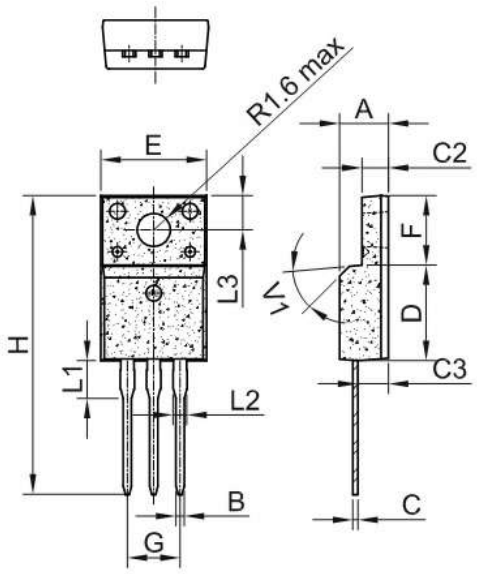
# BT151 Series

## TO-220C




| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 4.4 | | 4.6 | 0.173 | | 1.181 |
| B | 0.7 | | 0.9 | 0.027 | | 0.035 |
| C | 0.45 | | 0.6 | 0.018 | | 0.024 |
| C2 | 1.23 | | 1.32 | 0.048 | | 0.052 |
| C3 | 2.2 | | 2.6 | 0.086 | | 0.102 |
| D | 8.9 | | 9.9 | 0.350 | | 0.390 |
| E | 9.9 | | 10.3 | 0.390 | | 0.406 |
| F | 6.3 | | 6.9 | 0.248 | | 0.272 |
| G | | 2.54 | | | 0.1 | |
| H | 28.0 | | 29.8 | 11.0 | | 11.7 |
| L1 | | 3.2 | | | 0.126 | |
| L2 | 1.14 | | 1.7 | 0.045 | | 0.067 |
| L3 | 2.65 | | 2.95 | 0.104 | | 0.116 |
| Φ | | 3.6 | | | 0.142 | |

## TO-220F




| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 4.4 | | 4.8 | 0.173 | | 0.189 |
| B | 0.74 | 0.8 | 0.83 | 0.029 | 0.031 | 0.033 |
| C | 0.5 | | 0.75 | 0.020 | | 0.030 |
| C2 | 2.4 | | 2.7 | 0.094 | | 0.106 |
| C3 | 2.6 | | 3.0 | 0.102 | | 0.118 |
| D | 8.8 | | 9.3 | 0.346 | | 0.367 |
| E | 9.7 | | 10.3 | 0.382 | | 0.406 |
| F | 6.4 | | 6.8 | 0.252 | | 0.268 |
| G | 5.0 | | 5.2 | 0.197 | | 0.205 |
| H | 28.0 | | 29.8 | 11.0 | | 11.7 |
| L1 | | 3.63 | | | 0.143 | |
| L2 | 1.14 | | 1.7 | 0.044 | | 0.067 |
| L3 | | 3.3 | | | 0.130 | |
| V1 | | 40° | | | 40° | |

FIG.1: Maximum power dissipation versus average on-state current(half cycle)

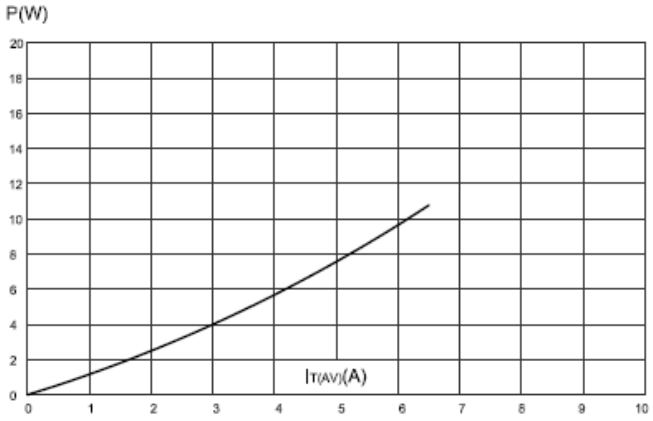



FIG.2: RMS on-state current versus case temperature(full cycle)

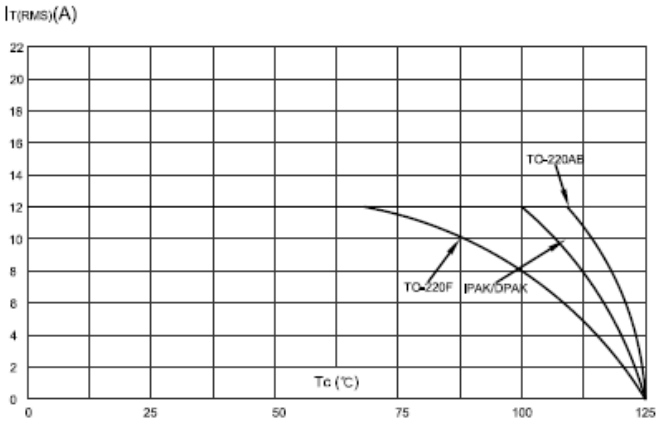



FIG.3:On-state characteristics (maximum values).

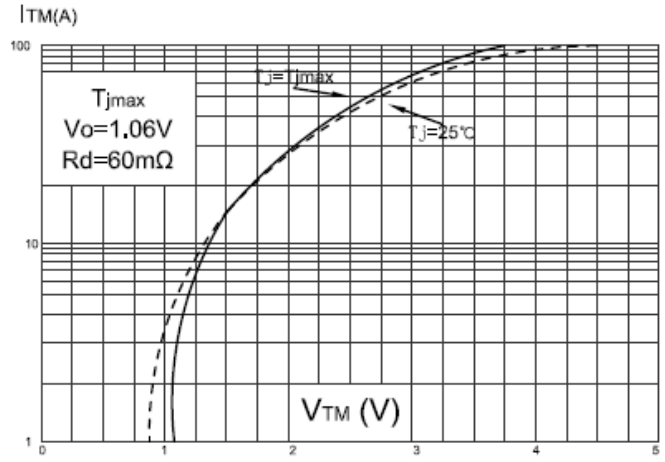



FIG.4:Surge peak on-state current versus number of cycles.

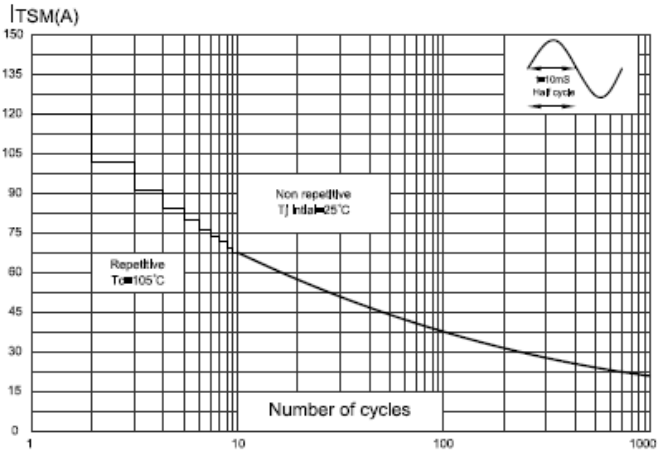



FIG.5:Non-repetitive surge peak on-state current for a sinusoidal pulse with width tp<10ms,and corresponding value of I²t.

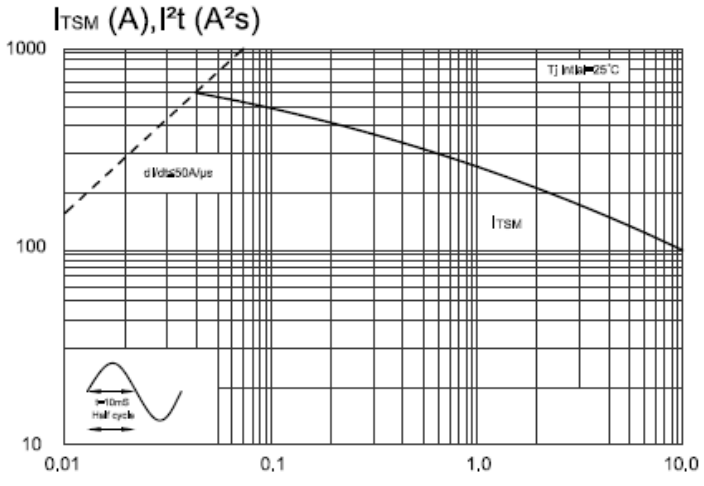



FIG.6:Relative variations of gate trigger current,holding current and latching current versus junction temperature(typical values)