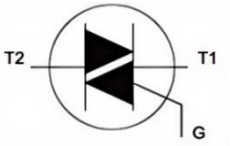
# BT139

*TRIAC*

## ■ GENERAL DESCRIPTION

*Glass passivated triacs in a plastic envelope, intended for use in applications requiring high bidirectional transient and blocking voltage capability and high thermal cycling performance.

*Typical applications include motor control, industrial and domestic lighting , heating and static switching.


Pin1: T1
Pin2: T2
Pin3: G

## ■ MARKING


BT139=Device Code
800E:$V_{DRM}/V_{RRM}$=800V
XXXX=Date Code
Solid Dot=Green molding compound

## ■ ABSOLUTE MAXIMUM RATINGS (TC=25°C, unless otherwise specified)

| SYMBOL | PARAMETER | | TEST CONDITION | RATINGS | UNIT |
|---|---|---|---|---|---|
| $V_{DRM}/V_{RRM}$ | Repetitive Peak Off State/reverse Voltage | BT139-600 | Tj=25℃ | 600 | V |
| | | BT139-800 | | 800 | |
| $I_{T(RMS)}$ | RMS On-State Current | | Tc=25℃ | 16 | A |
| $I_{TSM}$ | Non Repetitive Peak. On-State Current | | t=20ms | 155 | A |
| | | | t=16.7ms | 160 | |
| $I_{GM}$ | Peak Gate Current | | | 2 | A |
| $I^2t$ | $I^2t$ for fusing | | t=10ms | 120 | $A^2S$ |
| dI /dt | Repetitive Rate of Rise of On-state Current after Triggering ($I_{TM}$=12A;$I_G$=0.2A,$dI_G/dt$=0.2A/μs) | | T2+ G- | 50 | A/μs |
| | | | T2+ G- | 50 | |
| | | | T2- G- | 50 | |
| | | | T2- G+ | 10 | |
| $P_{G(AV)}$ | Average Gate Power (Over any 20ms period) | | | 0.5 | W |
| $P_{GM}$ | Peak Gate Power | | | 5 | W |
| $V_{GM}$ | Peak Gate Voltage | | | 5 | V |
| Tstg | Storage Temperature | | | -40 to +150 | ℃ |
| Tj | Operating junction temperature | | | 150 | ℃ |

Notes:*Although not recommended, off-state voltages up to 800V may be applied without damage, but the triac may switch to the on-state. The rate of rise of current should not exceed 6A/μs.

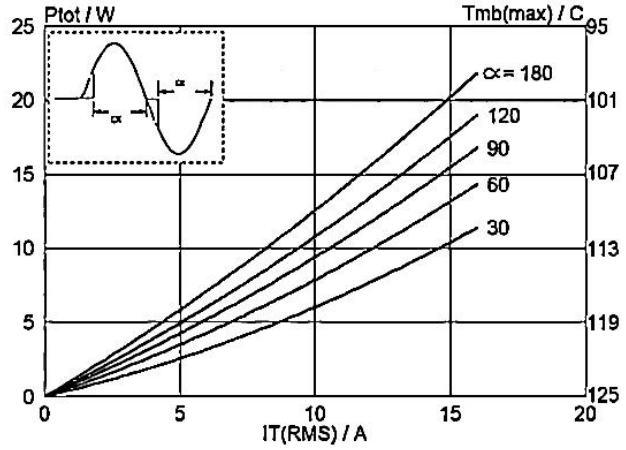
## THERMAL RESISTANCES

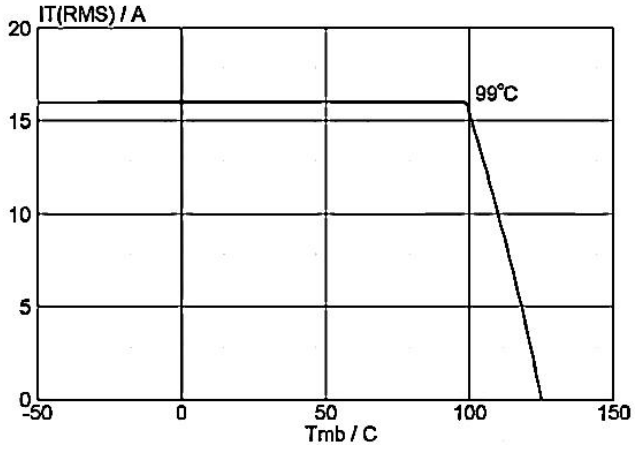
| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---|---|---|---|---|
| Junction to Ambient | TO-220F | RθJA | 62.5 | ℃/W |
| Junction to Case | | RθJC | 3.31 | ℃/W |

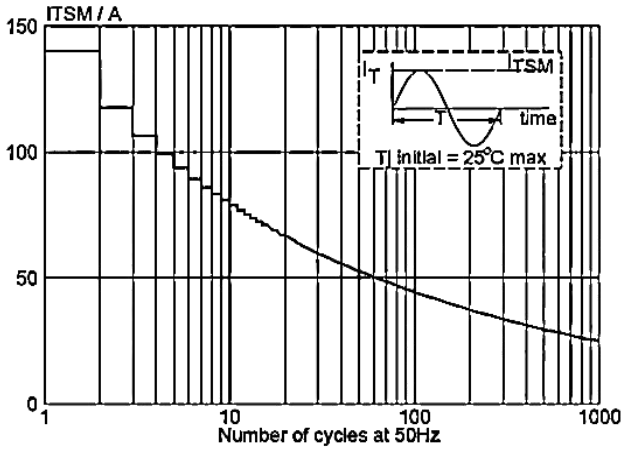
## ELECTRICAL CHARACTERISTICS (TJ=25°C, unless otherwise specified)

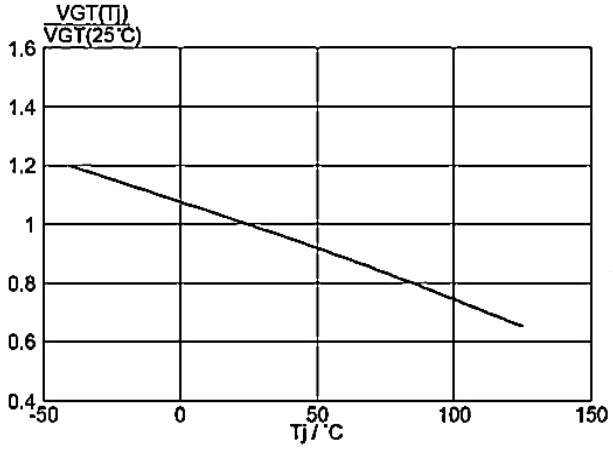
| PARAMETER | SYMBOL | TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| **STATIC CHARACTERISTICS** | | | | | | | |
| Rated repetitive peak off-state/reverse current | $I_{DRM}$, $I_{RRM}$ | Tj=25°C | | | | 5 | uA |
| | | Tj=125°C | | | | 1 | mA |
| Gate trigger current | $I_{GT}$ | T2+ G+ | $V_D$=12V, $R_L$=100Ω | | 10 | 20 | mA |
| | | T2+ G- | | | 13 | 20 | mA |
| | | T2- G- | | | 13 | 20 | mA |
| | | T2- G+ | | | 55 | 70 | mA |
| Latching Voltage | $V_{GT}$ | T2+ G+ | $V_D$=12V, $R_L$=100Ω | | | 0.9 | V |
| | | T2+ G- | | | | 0.9 | V |
| | | T2- G- | | | | 0.9 | V |
| | | T2- G+ | | | | 1.5 | V |
| Latching current | IL | T2+ G+ | $I_G$=50mA | | 24 | 40 | mA |
| | | T2+ G- | | | 70 | 80 | mA |
| | | T2- G- | | | 22 | 40 | mA |
| | | T2- G+ | | | 20 | 60 | mA |
| Holding current | $I_H$ | $I_G$=0.5A | | | 20 | 60 | mA |
| On-State Voltage | $V_{TM}$ | $I_T$=20A | | | 1.2 | 1.6 | V |
| Slope resistance | $R_d$ | $T_j$=125° | | | | 14.6 | mΩ |
| **DYNAMIC CHARACTERISTICS** | | | | | | | |
| Critical Rate of Rise of off-state Voltage | dVD/dt | VDM=67%VDRM(max),Tj=125° Exponential waveform, Gate open circuit | | | 50 | | V/μs |
| Critical Rate of Change of commutating Voltage | dVcom/dt | VDM=400V , Tj=95°C, IT(RMS)=8A dIcom/dt =3.6A/ms Gate open circuit | | | 20 | | V/μs |
| Gate Controlled Turn-on Time | tgt | ITM=6A,VD=VDRM,IG=0.1A dIG/dt=5A/μs | | | 2 | | μs |

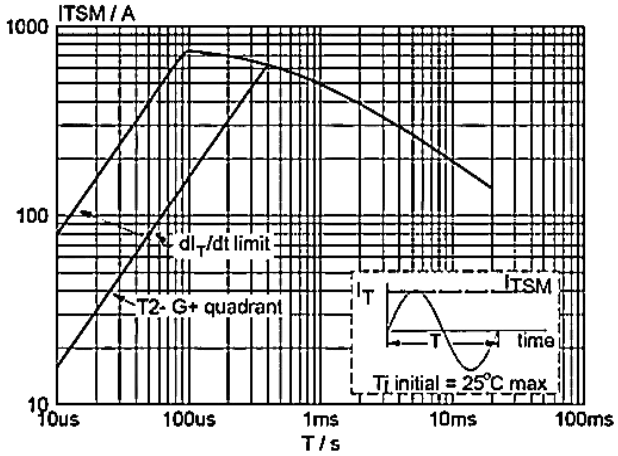
## ■ TYPICAL CHARACTERISTICS(1)

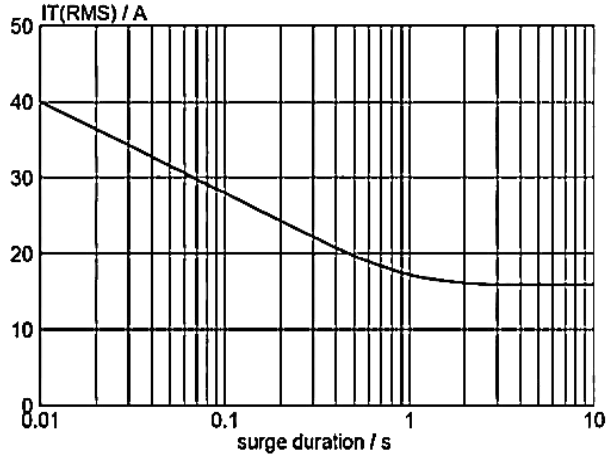


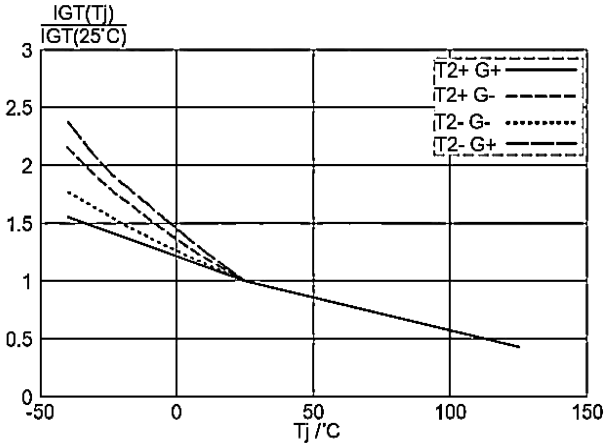



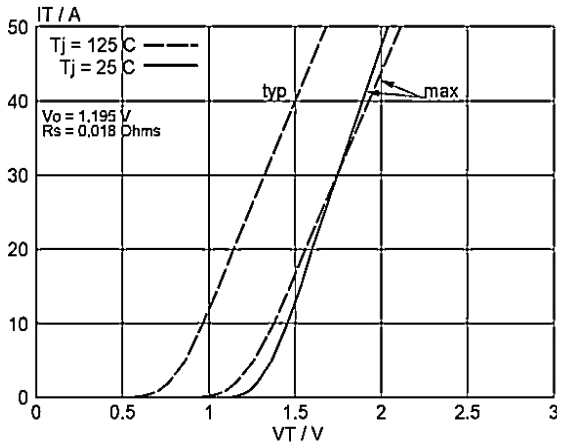



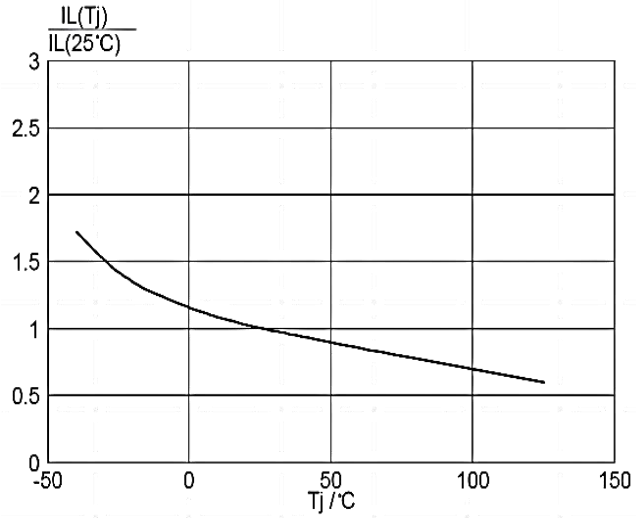



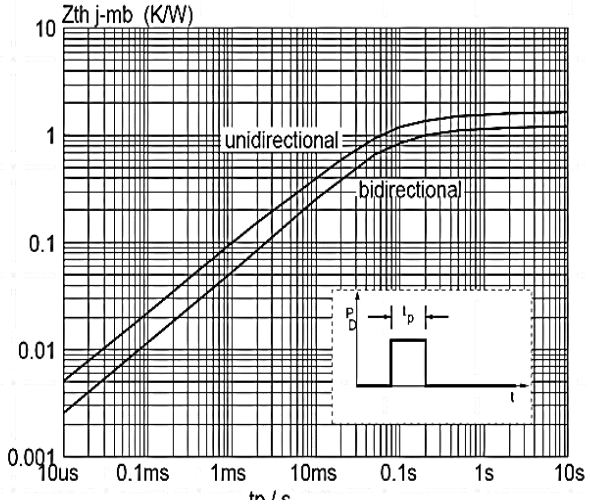



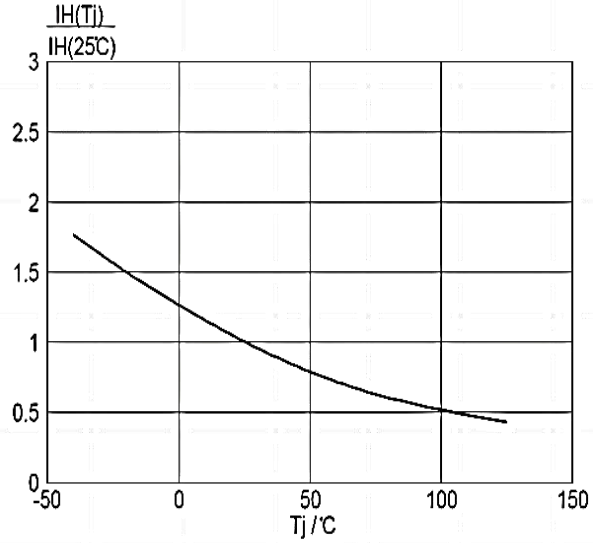
## ■ TYPICAL CHARACTERISTICS(2)

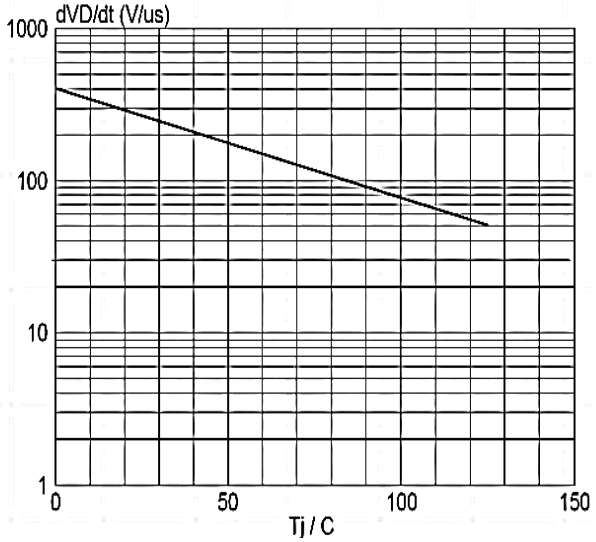


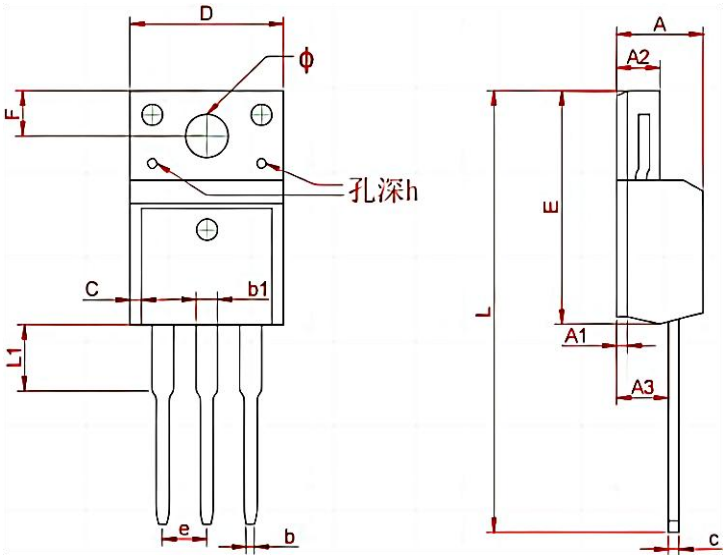



## ■ TO - 220F Package Outline Dimensions




| Symbol | Dimensions In Millimeters | |
|---|---|---|
| | Min | Max |
| A | 4.300 | 4.750 |
| A1 | 0.7 REF | |
| A2 | 2.300 | 2.850 |
| A3 | 2.500 | 2.900 |
| b | 0.380 | 0.420 |
| b1 | 1.220 | 1.280 |
| C | 1.08 | 1.200 |
| c | 0.480 | 0.520 |
| D | 10.15 | 10.450 |
| E | 15.700 | 15.950 |
| e | 2.574 TYP | |
| F | 3.470 REF | |
| y | 3.200 REF | |
| h | 0.000 | 0.800 |
| L | 28.780 | 28.900 |
| L1 | 2.990 | 3.100 |

## ■ TO - 220F Packing Information

| Package version | Tube dimensions LxW×H (mm) | Per Tube (pcs) | Tube per box | Inner box dimensions LxW×H (mm) | PCS/ Inner box | Outer box dimensions L×W×H(mm) | PCS/ Outer box |
|---|---|---|---|---|---|---|---|
| TO-220F | 530*32*7 | 50 | 20 | 580*155*50 | 1000 | 602*277*188 | 5000 |