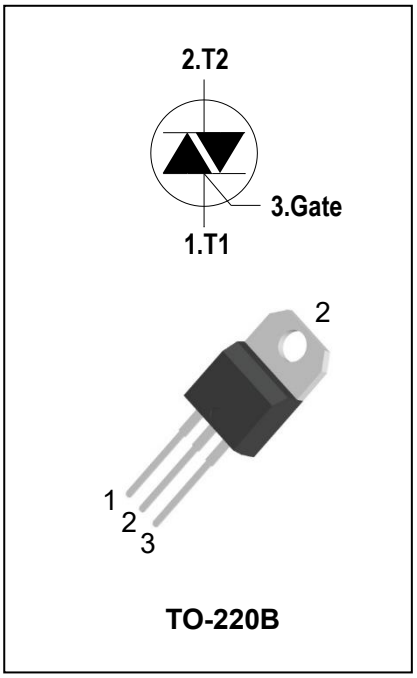
# *4Quadrants Triacs*

## General Description

High current density due to mesa technology .the BT139 triac series is suitable for general purpose AC switching. They can be used as an ON/OFF function in applications such as static relays, heating regulation, Rectifier-fed DC inductive loads e.g.DC motors and solenoids , motor speed controllers.




## Features

- Repetitive Peak Off-State Voltage: 600Vand800V
- R.M.S On-State Current ( $I_{T(RMS)}$= 16A )
- These Devices are Pb-Free and are RoHS Compliant

## Absolute Maximum Ratings

| Symbol | Items | Conditions | | Ratings | Unit |
|---|---|---|---|---|---|
| $V_{DRM}$ | Repetitive Peak Off-State Voltage | Tj = 25°C | BT139-600 | 600 | V |
| $V_{RRM}$ | | | BT139-800 | 800 | V |
| $I_{T(RMS)}$ | R.M.S On-State Current | $T_C$ = 105°C | | 16 | A |
| $I_{TSM}$ | Surge On-State Current | tp=20ms(50Hz)/tp=16.7ms(60Hz) | | 160/168 | A |
| $I^2t$ | $I^2t$ for fusing | tp=10ms | | 144 | $A^2s$ |
| dI/dt | Critical rate of rise of on-state current | F = 120 Hz Tj = 125°C | Q1-Q2-Q3 | 50 | A/μs |
| | | $I_G$ = 2 x $I_{GT}$ , tr ≤ 100 ns | Q4 | 10 | |
| $I_{GM}$ | Peak Gate Current | tp = 20 μs Tj = 125°C | | 2 | A |
| $P_{G(AV)}$ | Average Gate Power Dissipation(Tj=125°C) | | | 0.5 | W |
| $P_{GM}$ | Peak Gate Power Dissipation(tp=20us,Tj=125°C) | | | 5 | W |
| $T_j$ | Operating Junction Temperature | | | - 40 ~ 125 | °C |
| $T_{STG}$ | Storage Temperature | | | - 40 ~ 150 | °C |

ADV
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## Electrical Characteristics ( $T_j$ = 25°C unless otherwise specified )

| Symbol | Items | | Conditions | | BT139-600/800 | | | | Unit |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | E | F | Blank | G | |
| $I_{DRM}$ | Peak Forward Reverse Blocking Current | | $V_{DRM}$ = $V_{RRM}$, Tj = 25°C | Max. | 5 | | | | uA |
| $I_{RRM}$ | | | $V_{DRM}$ = $V_{RRM}$, Tj = 125°C | | 1 | | | | mA |
| $V_{TM}$ | Peak On-State Voltage | | $I_{TM}$ = 17A, $t_p$ = 380 μs | Max. | 1.55 | | | | V |
| $V_{GD}$ | Q1-Q2-Q3-Q4 | Non – Trigger Gate Voltage | $V_D$ = $V_{DRM}$ $R_L$ = 3.3 kΩ Tj = 125°C | Min. | 0.2 | | | | V |
| $V_{GT}$ | Q1-Q2-Q3-Q4 | GateTrigger Voltage | $V_D$ = 12V ， $R_L$ = 33Ω | Max. | 1.3 | | | | V |
| $I_{GT}$ | Q1-Q2-Q3 | GateTrigger Current | | Max. | 10 | 25 | 35 | 50 | mA |
| | Q4 | | | | 25 | 70 | 70 | 100 | |
| $I_H$ | Q1-Q2-Q3-Q4 | Holding Current | $I_T$ = 0.1A | Max. | 25 | 45 | 45 | 60 | mA |
| $I_L$ | Q1-Q3-Q4 | Latching Current | $I_G$ = 1.2 $I_{GT}$ | Max. | 30 | 40 | 40 | 60 | mA |
| | Q2 | | | | 40 | 60 | 60 | 90 | |
| dV/dt | Critical Rate of Rise of Off-State Voltage | | $V_D$ = 2/3$V_{DRM}$ gate open Tj = 125°C | Min. | 20 | 200 | 200 | 400 | V/μs |
| (dV/dt)c | Rate of Change of Commutating Current, | | (dI/dt)c=-5.3A/ms Tj = 125°C | Min. | 2 | 5 | 5 | 10 | V/μs |
| $R_{th(j-c)}$ | Junction to case (AC) | | | Max. | 1.4 | | | | °C/W |
| $R_{th(j-a)}$ | Junction to ambient | | | Max. | 60 | | | | °C/W |

**FIG.1:Triac quadrant are defined and the gate trigger test circuit**

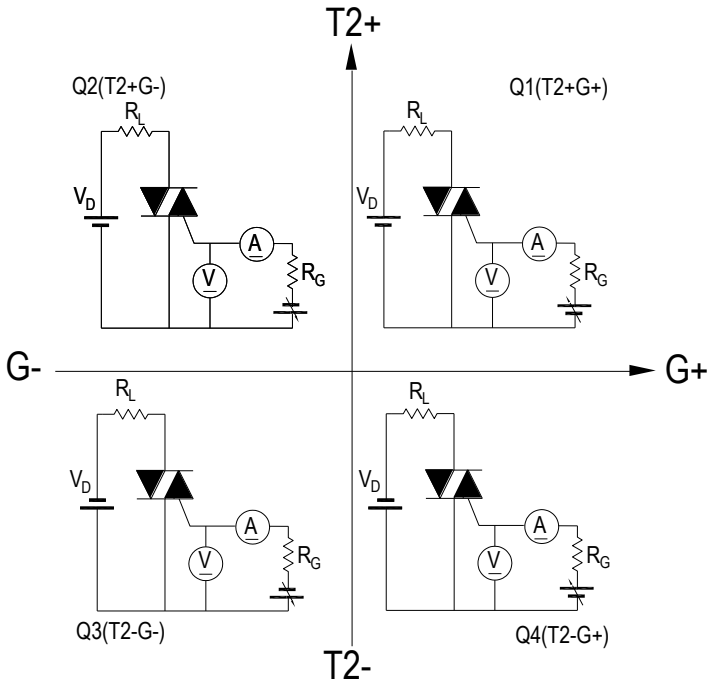


**FIG.2: Maximum on-state power dissipation**

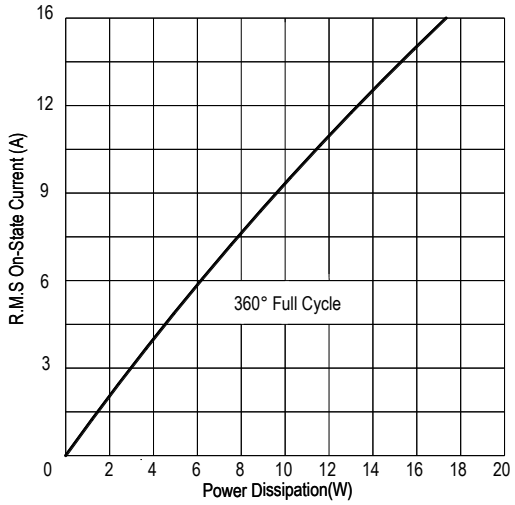



**FIG.3: Typical RMS on-state current VS Allowable case Temperature**

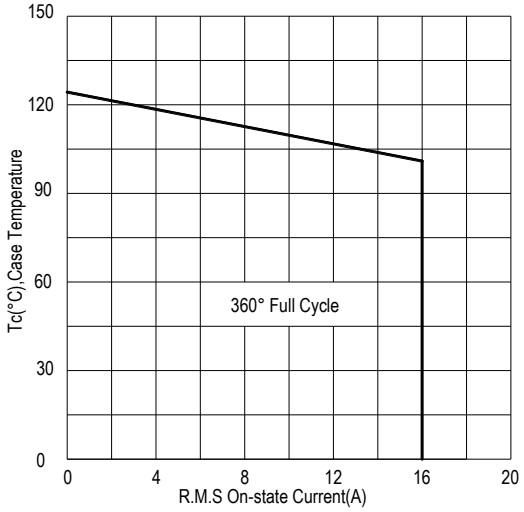



**FIG.4: Maximum transient thermal impedance**

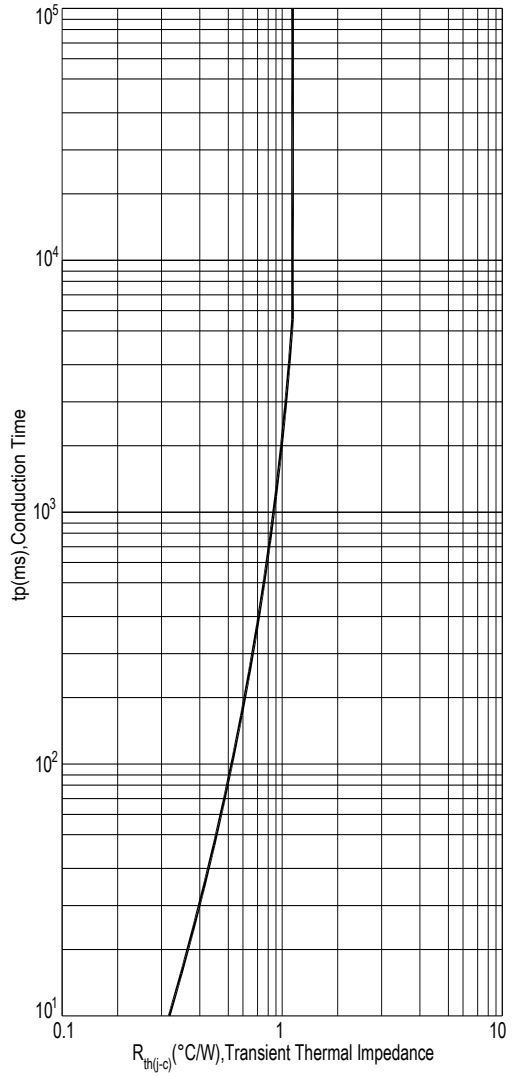



**FIG.5: Rated surge on-state current ( Non-Repetitive)**

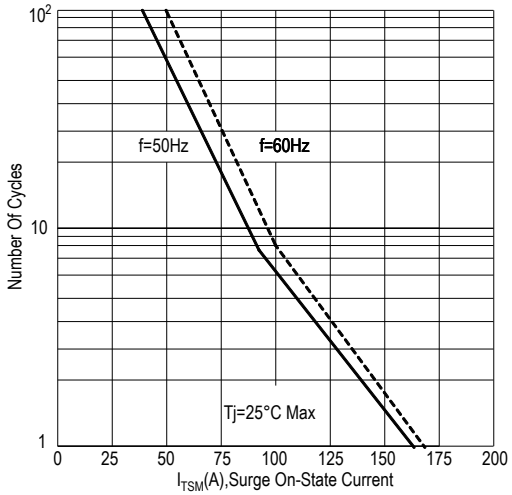



**FIG.6: Gate trigger current VS Junction temperature**

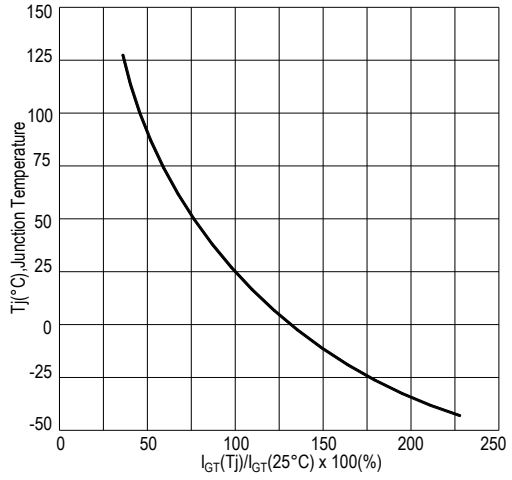


**FIG.7:Holding current and Latching current VS Junction temperature**

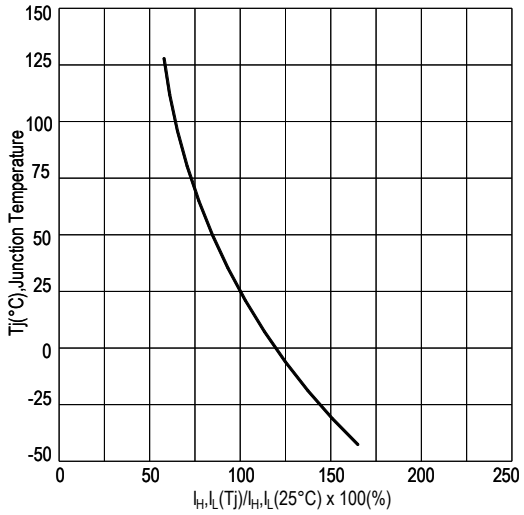



**FIG.8: Gate trigger voltage VS Junction temperature**

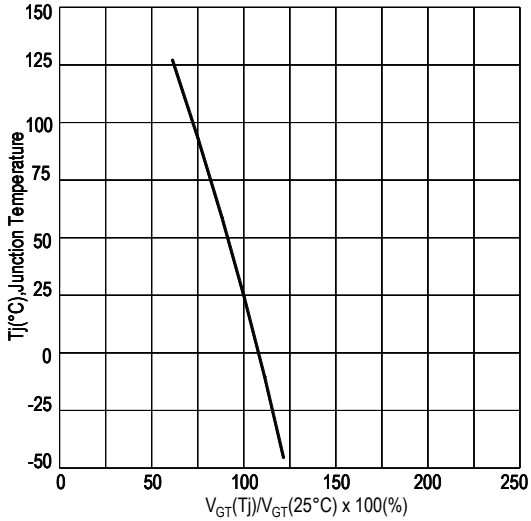
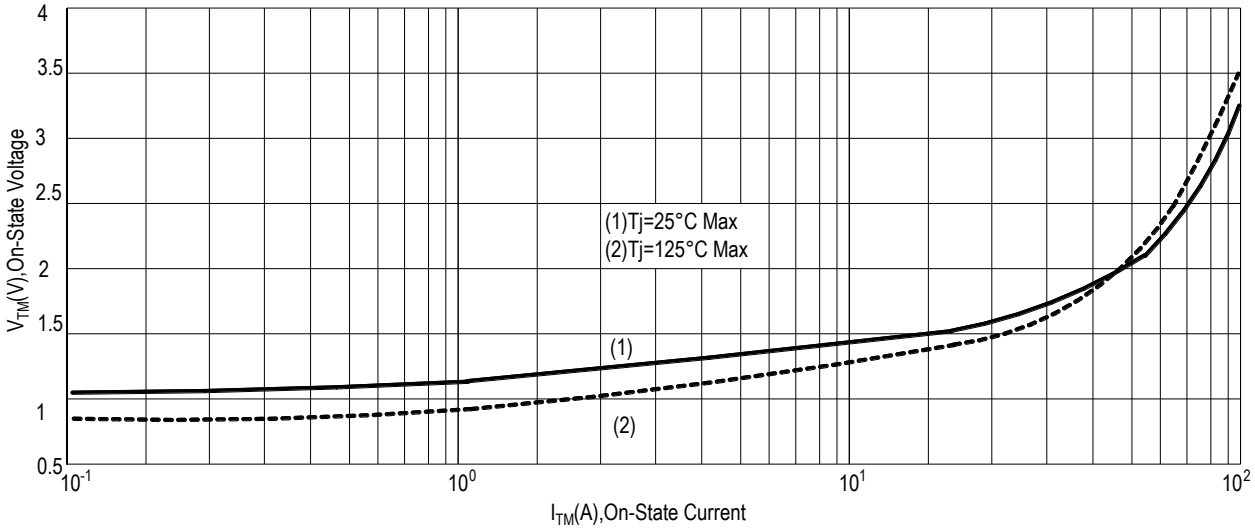
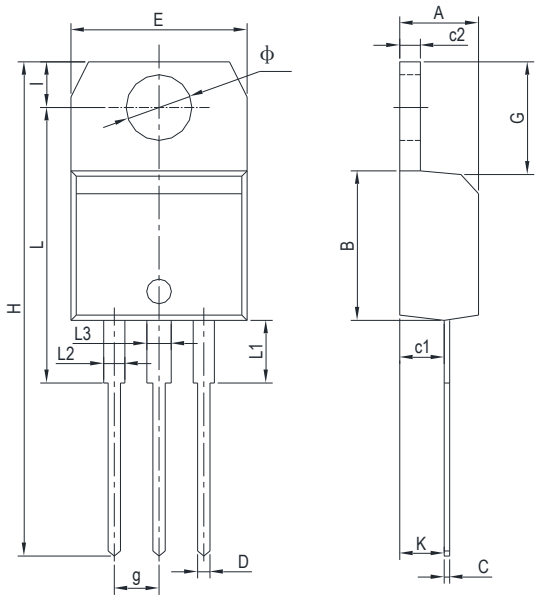



**FIG.9: On-state characteristics(Max)**



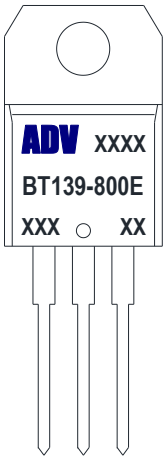
**PACKAGE MECHANICAL DATA**

**TO-220B Package Dimension**




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 4.40 | 4.60 | 0.173 | 0.181 |
| B | 9.00 | 9.30 | 0.354 | 0.366 |
| C | 0.40 | 0.60 | 0.015 | 0.023 |
| c1 | 2.00 | 2.60 | 0.078 | 0.102 |
| c2 | 1.23 | 1.32 | 0.048 | 0.051 |
| D | 0.70 | 1.00 | 0.027 | 0.039 |
| E | 10.00 | 10.40 | 0.393 | 0.409 |
| g | 2.40 | 2.70 | 0.094 | 0.106 |
| G | 6.20 | 6.80 | 0.244 | 0.267 |
| H | 28.00 | 29.85 | 1.102 | 1.175 |
| I | 2.65 | 2.95 | 0.104 | 0.116 |
| L | 15.80 | 16.80 | 0.622 | 0.661 |
| L1 | 3.75 | | 0.147 | |
| L2 | 1.14 | 1.70 | 0.044 | 0.066 |
| L3 | 1.14 | 1.70 | 0.044 | 0.066 |
| Φ | 3.60 | 3.90 | 0.141 | 0.153 |
| K | 2.60TYP | | 0.102TYP | |

**Making Diagram**




ADV:Logo
BT139-800E:Part number
X:Internal control code

**Ordering information**

| Part number | Package | Marking | Packing | Quantity |
|---|---|---|---|---|
| BT139-600# | TO-220B | BT139-600# | Tube | 50pcs |
| BT139-800# | TO-220B | BT139-800# | Tube | 50pcs |
| Note:# = Gate Trigger Current Sensitivity and type | | | | |

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