



### THYRISTOR

#### DESCRIPTION

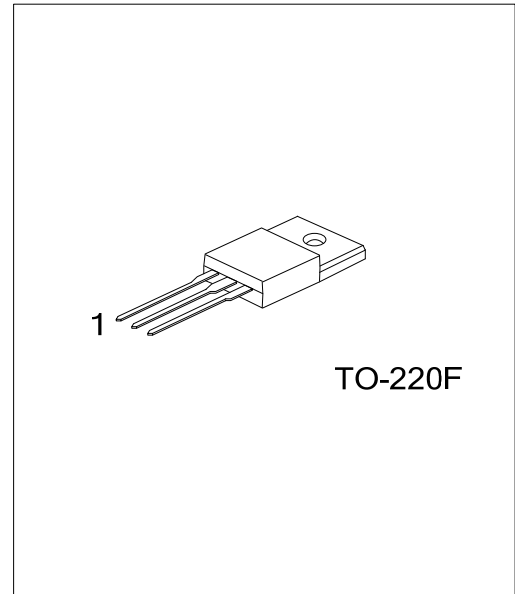
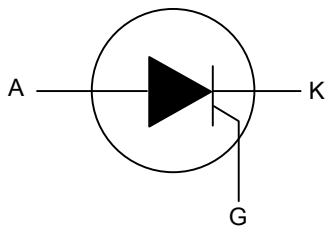
The UTC **BT152** is a thyristor, it uses UTC's advanced technology to provide customers with high bidirectional blocking voltage capability and high thermal cycling performance, etc.

The UTC **BT152** is suitable for motor control, industrial, static switching, heating and domestic lighting, etc.

#### FEATURES

- \* High bidirectional blocking voltage capability
- \* High thermal cycling performance

#### SYMBOL



#### ORDERING INFORMATION

| Ordering Number |                | Package | Pin Assignment |   |   | Packing |
|-----------------|----------------|---------|----------------|---|---|---------|
| Lead Free       | Halogen Free   |         | 1              | 2 | 3 |         |
| BT152L-x-TF3-T  | BT152G-x-TF3-T | TO-220F | K              | A | G | Tube    |

Note: Pin Assignment: K: Cathode A: Anode G: Gate

|   |   |
|---|---|
| <p>BT152L-x-TF3-T</p> <p>(1)Packing Type<br/>(2)Package Type<br/>(3)Peak Voltage<br/>(4)Lead Free</p> | <p>(1) T: Tube<br/>(2) TF3: TO-220F<br/>(3) 4: 450V, 6: 650V, 8: 800V<br/>(3) L: Lead Free, G: Halogen Free</p> |
|---|---|

### ■ ABSOLUTE MAXIMUM RATINGS

| PARAMETER  |  | SYMBOL             | RATINGS  | UNIT                   |
|--|--|--------------------|----------|------------------------|
| Repetitive Peak Off-State Voltages   | BT152-4  | $V_{DRM}, V_{RRM}$ | 450      | V                      |
|  | BT152-6  |                    | 650      | V                      |
|  | BT152-8  |                    | 800      | V                      |
| Average On-State Current   | Half Sine Wave, $T_{MB} \leq 103^\circ\text{C}$                            | $I_{T(AV)}$        | 13       | A                      |
| RMS On-State Current   | All Conduction Angles  | $I_{T(RMS)}$       | 20       | A                      |
| Non Repetitive Surge Peak On-State Current (Half Sine Wave; $T_J=25^\circ\text{C}$ Prior to Surge) | $t=10\text{ms}$  | $I_{TSM}$          | 200      | A                      |
|  | $t=8.3\text{ms}$   |                    | 220      | A                      |
| $I^2t$ Value for Fusing  | $t=10\text{ms}$  | $I^2t$             | 200      | $\text{A}^2\text{s}$   |
| Repetitive Rate of Rise of On-State Current After Triggering                                       | $I_{TM}=50\text{A}, I_G=0.2\text{A},$<br>$dI_G/dt=0.2\text{A}/\mu\text{s}$ | $dI_T/dt$          | 200      | $\text{A}/\mu\text{s}$ |
| Peak Gate Current  |  | $I_{GM}$           | 5        | A                      |
| Peak Gate Voltage  |  | $V_{GM}$           | 5        | V                      |
| Peak Reverse Gate Voltage  |  | $V_{RGM}$          | 5        | V                      |
| Peak Gate Power  |  | $P_{GM}$           | 20       | W                      |
| Average Gate Power Dissipation   | Over Any 20ms Period   | $P_{G(AV)}$        | 0.5      | W                      |
| Storage Junction Temperature   |  | $T_{STG}$          | -40~+150 | $^\circ\text{C}$       |
| Operating Junction Temperature   |  | $T_J$              | 125      | $^\circ\text{C}$       |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

### ■ THERMAL RESISTANCES

| PARAMETER                                    |             | SYMBOL         | MIN | TYP | MAX | UNIT |
|--|-------------|----------------|-----|-----|-----|------|
| Junction to Ambient                          | In Free Air | $\theta_{JA}$  |     | 60  |     | K/W  |
| Thermal Resistance Junction to Mounting Base |             | $\theta_{JMB}$ |     |     | 1.1 | K/W  |

### ■ STATIC CHARACTERISTICS ( $T_J=25^\circ\text{C}$ unless otherwise stated)

| PARAMETER                 | SYMBOL   | TEST CONDITIONS  | MIN  | TYP | MAX  | UNIT |
|---------------------------|----------|--|------|-----|------|------|
| Gate Trigger Current      | $I_{GT}$ | $V_D=12\text{V}, I_T=0.1\text{A}$                                |      | 3   | 32   | mA   |
| Latching Current          | $I_L$    | $V_D=12\text{V}, I_{GT}=0.1\text{A}$                             |      | 25  | 80   | mA   |
| Holding Current           | $I_H$    | $V_D=12\text{V}, I_{GT}=0.1\text{A}$                             |      | 15  | 60   | mA   |
| On-State Voltage          | $V_T$    | $I_T=40\text{A}$   |      | 1.4 | 1.75 | V    |
| Gate Trigger Voltage      | $V_{GT}$ | $V_D=12\text{V}, I_T=0.1\text{A}$                                |      | 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    |
| Off-State Leakage Current | $I_D$    | $V_D=V_{DRM(max)}, V_R=V_{RRM(max)},$<br>$T_J=125^\circ\text{C}$ |      | 0.2 | 1.0  | mA   |
|                           | $I_R$    | $T_J=125^\circ\text{C}$  |      | 0.2 | 1.0  | mA   |

### ■ DYNAMIC CHARACTERISTICS ( $T_J=25^\circ\text{C}$ unless otherwise stated)

| PARAMETER                                  | SYMBOL    | TEST CONDITIONS   | MIN | TYP | MAX | UNIT                   |
|--|-----------|---|-----|-----|-----|------------------------|
| Critical Rate of Rise of Off-State Voltage | $dV_D/dt$ | $V_{DM}=67\%V_{DRM(max)}, T_J=125^\circ\text{C},$<br>Exponential Waveform Gate Open Circuit                                   | 200 | 300 |     | $\text{V}/\mu\text{s}$ |
| Gate Controlled Turn-On Time               | $t_{GT}$  | $V_D=V_{DRM(max)}, I_G=0.1\text{A},$<br>$dI_G/dt=5\text{A}/\mu\text{s}, I_5$<br>$T_M=40\text{A}$                              |     | 2   |     | $\mu\text{s}$          |
| Circuit Commutated Turn-Off Time           | $t_Q$     | $I_{TM}=50\text{A}, V_R=25\text{V}, dI_{TM}/dt=30\text{A}/\mu\text{s},$<br>$dV_D/dt=50\text{V}/\mu\text{s}, R_{GK}=100\Omega$ |     | 70  |     | $\mu\text{s}$          |

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