

### FEATURES

- Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.
- Available as non-RoHS (Sn/Pb plating), standard, and as RoHS by adding "-PBF" suffix.

### MAXIMUM RATINGS

| Rating  | Symbol              | Value             | Unit             |
|---|---------------------|-------------------|------------------|
| <b>Peak repetitive off-state voltage<sup>(1)</sup></b><br>(T <sub>J</sub> = 125°C)<br>BTC12-200<br>BTC12-400<br>BTC12-600 | V <sub>DRM</sub>    | 200<br>400<br>600 | Volts            |
| <b>RMS on-state current</b> (T <sub>C</sub> = 70°C)   | I <sub>T(RMS)</sub> | 12                | Amps             |
| <b>Peak non-repetitive surge current</b><br>(1 cycle, 50 Hz, t = 20ms)<br>(1/2 cycle, 50Hz, t = 10ms)                     | I <sub>TSM</sub>    | 90<br>100         | Amps             |
| <b>Circuit fusing considerations</b> (T <sub>J</sub> = -40 to 125°C, t = 10ms)  | I <sup>2</sup> t    | 40                | A <sup>2</sup> s |
| <b>Peak gate power</b> (pulse width = 2.0μs)  | P <sub>GM</sub>     | 16                | Watts            |
| <b>Average gate power</b> (t = 10ms)  | P <sub>G(AV)</sub>  | 0.35              | Watts            |
| <b>Peak gate current</b> (pulse width = 1.0μs)  | I <sub>GM</sub>     | 4.0               | Amps             |
| <b>Operating junction temperature range</b>   | T <sub>J</sub>      | -40 to +125       | °C               |
| <b>Storage temperature range</b>  | T <sub>stg</sub>    | -40 to +150       | °C               |
| <b>Maximum rate of change of on-state current</b><br>(I <sub>TM</sub> = 12A, I <sub>G</sub> = 200mA)                      | di/dt               | 10                | A/μs             |

Note 1: Ratings apply for open gate conditions. Thyristor devices shall not be tested with a constant current source for blocking capability such that the voltage applied exceeds the rated blocking voltage.

### THERMAL CHARACTERISTICS

| Characteristic                              | Symbol           | Maximum | Unit |
|---|------------------|---------|------|
| <b>Thermal resistance, junction to case</b> | R <sub>θJC</sub> | 2.2     | °C/W |

### ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted)

| Characteristic  | Symbol           | Min         | Typ.        | Max               | Unit  |
|---|------------------|-------------|-------------|-------------------|-------|
| <b>Peak blocking current</b> (either direction)<br>(Rated V <sub>DRM</sub> @ T <sub>J</sub> = 125°C, gate open)   | I <sub>DRM</sub> | -           | -           | 2.0               | mA    |
| <b>Peak on-state voltage</b> (either direction)<br>(I <sub>TM</sub> = 17A peak)   | V <sub>TM</sub>  | -           | 1.4         | 1.65              | Volts |
| <b>Peak gate trigger voltage</b><br>(main terminal voltage = 12V, R <sub>L</sub> = 100Ω)<br>All quadrants<br>(main terminal voltage = rated V <sub>DRM</sub> , R <sub>L</sub> = 1kΩ, T <sub>J</sub> = 125°C)<br>All quadrants | V <sub>GTM</sub> | -<br>0.2    | -           | 2.5               | Volts |
| <b>Holding current</b> (either direction)<br>(main terminal voltage = 12V, gate open, initiating current = 1.0A, T <sub>C</sub> = 25°C)   | I <sub>H</sub>   | -           | -           | 50                | mA    |
| <b>Latching current</b><br>(main terminal voltage = 24V, gate trigger source = 15V, 100Ω)<br>MT2(+), G(+)<br>MT2(-), G(-)<br>MT2(+), G(-)   | I <sub>L</sub>   | -<br>-<br>- | -<br>-<br>- | 100<br>100<br>200 | mA    |

# BTC12 SERIES

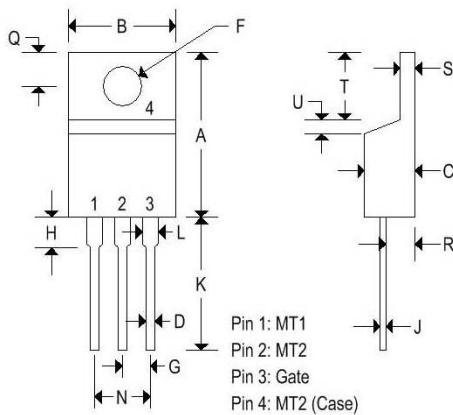
## SILICON BIDIRECTIONAL THYRISTORS

|   |          |     |   |   |                  |
|---|----------|-----|---|---|------------------|
| <b>Critical rate of rise of off state voltage</b><br>(Rated $V_{DRM}$ , exponential voltage rise, gate open, $T_J = 125^\circ\text{C}$ )          | dv/dt    | 100 | - | - | V/ $\mu\text{s}$ |
| <b>Blocking voltage application rate</b><br>(@ $T_C = 80^\circ\text{C}$ @ $V_{DRM}$ , $I_T = 6\text{A}$ , gate open, commutation di/dt = 4.3A/ms) | dv/dt(c) | 5   | - | - | V/ $\mu\text{s}$ |

| Characteristic  | Symbol    | QUADRANT  |           |           |           |
|---|-----------|-----------|-----------|-----------|-----------|
|   |           | I<br>mA   | II<br>mA  | III<br>mA | IV<br>mA  |
| <b>Peak trigger current</b><br>(main terminal voltage = 12V, $R_L = 100\Omega$ )<br>BTC12(-), $T_J = 25^\circ\text{C}$<br>BTC12(-), $T_J = -40^\circ\text{C}$ | $I_{GTM}$ | 50<br>100 | 50<br>100 | 50<br>100 | 80<br>200 |

### MECHANICAL CHARACTERISTICS

|         |               |
|---------|---------------|
| Case    | TO-220AB      |
| Marking | Alpha-numeric |
| Pin out | See below     |



|   | TO-220AB |       |             |        |
|---|----------|-------|-------------|--------|
|   | Inches   |       | Millimeters |        |
|   | Min      | Max   | Min         | Max    |
| A | 0.575    | 0.620 | 14.600      | 15.750 |
| B | 0.360    | 0.405 | 9.650       | 10.290 |
| C | 0.160    | 0.190 | 4.060       | 4.820  |
| D | 0.025    | 0.035 | 0.640       | 0.890  |
| F | 0.142    | 0.147 | 3.610       | 3.730  |
| G | 0.095    | 0.105 | 2.410       | 2.670  |
| H | 0.110    | 0.155 | 2.790       | 3.930  |
| J | 0.014    | 0.022 | 0.360       | 0.560  |
| K | 0.500    | 0.562 | 12.700      | 14.270 |
| L | 0.045    | 0.055 | 1.140       | 1.390  |
| N | 0.190    | 0.210 | 4.830       | 5.330  |
| Q | 0.100    | 0.120 | 2.540       | 3.040  |
| R | 0.060    | 0.110 | 2.040       | 2.790  |
| S | 0.045    | 0.055 | 1.140       | 1.390  |
| T | 0.235    | 0.255 | 5.970       | 6.480  |
| U | -        | 0.050 | -           | 1.270  |
| V | 0.045    | -     | 1.140       | -      |
| Z | -        | 0.060 | -           | 2.030  |

FIGURE 1 – RMS CURRENT DERATING

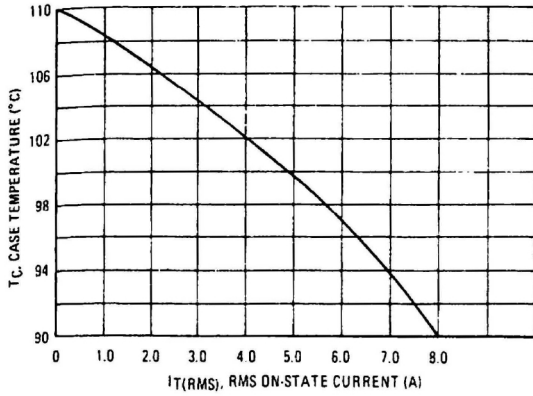


FIGURE 2 – ON-STATE POWER DISSIPATION

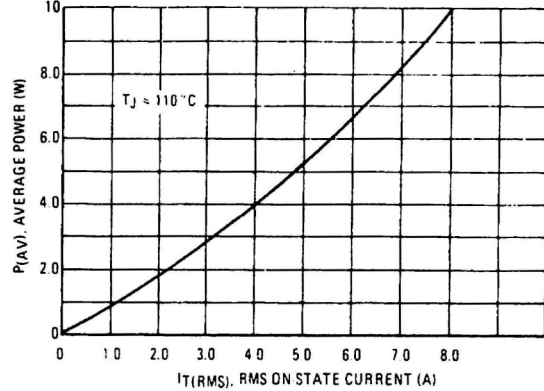


FIGURE 3 – TYPICAL GATE TRIGGER VOLTAGE

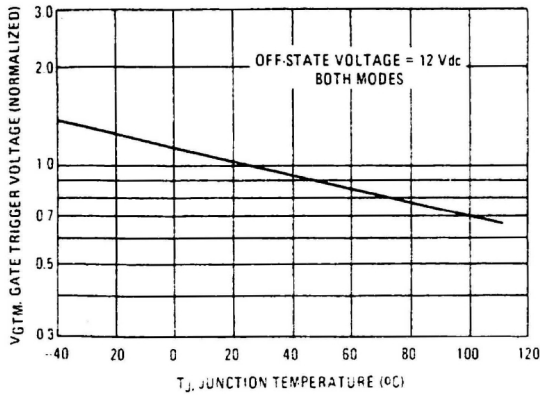


FIGURE 4 – TYPICAL GATE TRIGGER CURRENT

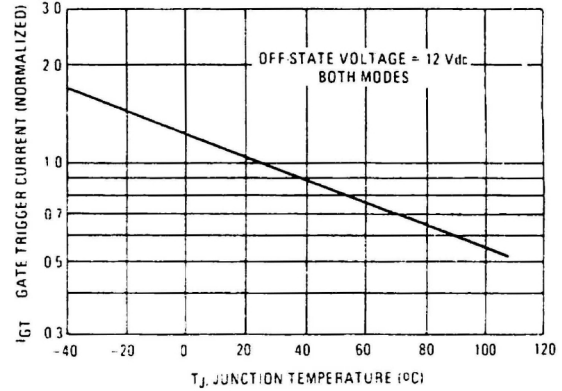


FIGURE 5 – TYPICAL HOLDING CURRENT

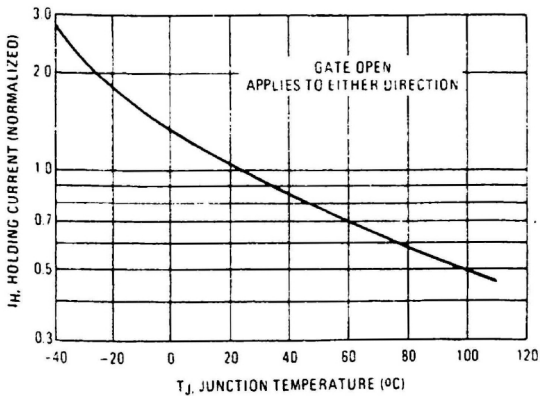


FIGURE 6 – TYPICAL LATCHING CURRENT

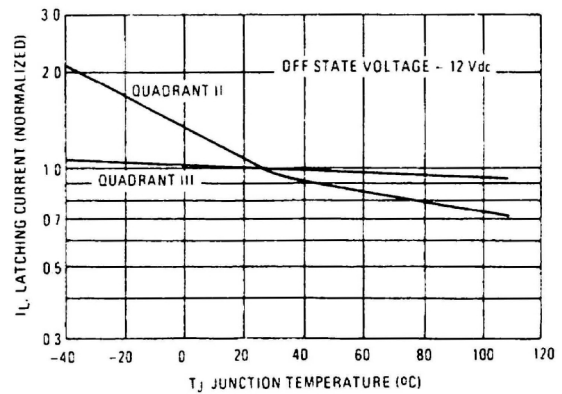


FIGURE 7 – MAXIMUM ON-STATE CHARACTERISTICS

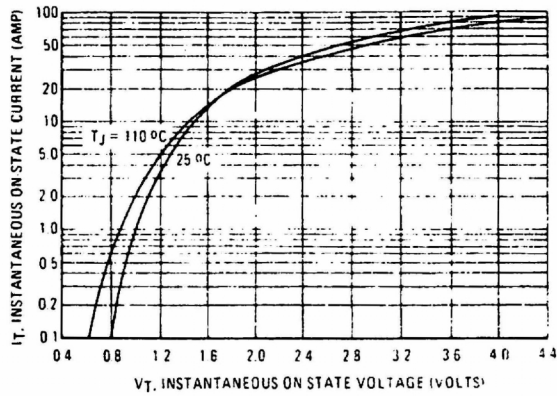


FIGURE 8 – MAXIMUM NON-REPETITIVE SURGE CURRENT

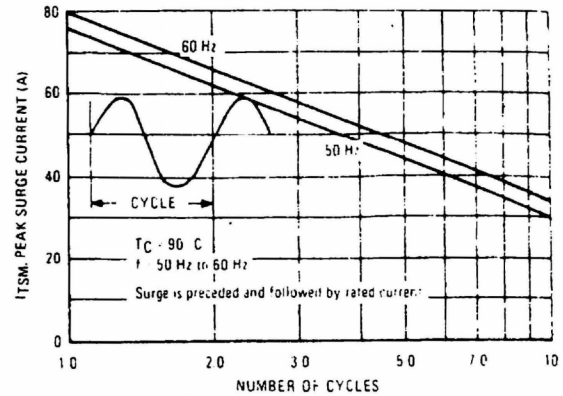


FIGURE 9 – TYPICAL THERMAL RESISTANCE FROM MOUNTING BASE TO HEATSINK

|                 |       |                 |
|-----------------|-------|-----------------|
| Metal to Metal: | Dry   | 0,9 °C/W        |
| Metal to Metal: | Lubed | 0,3 °C/W        |
| With Insulator: | Dry   | Not recommended |
| With Insulator: | Lubed | 1,3 °C/W        |

These values are available when using the rectangular washer and mica insulator furnished for TO-220 Package. The recommended mounting torque is 0.68 Nm.

FIGURE 10 – THERMAL RESPONSE

