

# DIGITRON SEMICONDUCTORS

## BTC05-( )A SERIES BTC05-( )B SERIES

## SILICON BIDIRECTIONAL THYRISTORS

Available Non-RoHS (standard) or RoHS compliant (add PBF suffix).

Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.

### MAXIMUM RATINGS

| Rating  | Symbol              | Value                          | Unit                 |
|---|---------------------|--------------------------------|----------------------|
| <b>Peak repetitive off-state voltage</b> <sup>(1)</sup><br>( $T_J = 110^\circ\text{C}$ )<br>BTC05-50A,B<br>BTC05-100A,B<br>BTC05-200A,B<br>BTC05-400A,B<br>BTC05-600A,B | $V_{\text{DRM}}$    | 50<br>100<br>200<br>400<br>600 | Volts                |
| <b>RMS on-state current</b> ( $T_C = 80^\circ\text{C}$ )  | $I_{\text{T(RMS)}}$ | 5                              | Amps                 |
| <b>Peak non-repetitive surge current</b><br>(1 cycle, 60 Hz, $T_J = -40$ to $110^\circ\text{C}$ )   | $I_{\text{TSM}}$    | 30                             | Amps                 |
| <b>Circuit fusing considerations</b> ( $T_J = -40$ to $110^\circ\text{C}$ , $t = 10\text{ms}$ )   | $I^2t$              | 4.5                            | $\text{A}^2\text{s}$ |
| <b>Peak gate power</b>  | $P_{\text{GM}}$     | 10                             | Watts                |
| <b>Average gate power</b>   | $P_{\text{G(AV)}}$  | 0.5                            | Watts                |
| <b>Peak gate voltage</b>  | $V_{\text{GM}}$     | 5.0                            | Volts                |
| <b>Operating junction temperature range</b>   | $T_J$               | -40 to +110                    | $^\circ\text{C}$     |
| <b>Storage temperature range</b>  | $T_{\text{stg}}$    | -40 to +150                    | $^\circ\text{C}$     |

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.

Note 2: Soldering temperatures shall not exceed  $+200^\circ\text{C}$  for 10 seconds.

### THERMAL CHARACTERISTICS

| Characteristic                                 | Symbol                | Maximum | Unit                      |
|--|-----------------------|---------|---------------------------|
| <b>Thermal resistance, junction to case</b>    | $R_{\theta\text{JC}}$ | 3       | $^\circ\text{C}/\text{W}$ |
| <b>Thermal resistance, junction to ambient</b> | $R_{\theta\text{JA}}$ | 60      | $^\circ\text{C}/\text{W}$ |

### ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic   | Symbol           | Min           | Typ.        | Max             | Unit                   |
|--|------------------|---------------|-------------|-----------------|------------------------|
| <b>Peak blocking current</b> (either direction)<br>(Rated $V_{\text{DRM}}$ @ $T_J = 110^\circ\text{C}$ , gate open)  | $I_{\text{DRM}}$ | -             | -           | 2.0             | mA                     |
| <b>Peak on-state voltage</b> (either direction)<br>( $I_{\text{TM}} = 5.0\text{A}$ peak)   | $V_{\text{TM}}$  | -             | -           | 1.8             | Volts                  |
| <b>Peak gate trigger voltage</b><br>(main terminal voltage = 12V, $R_L = 100\Omega$ )<br>MT2(+), G(+); MT2(+), G(-); MT2(-), G(-)<br>MT2(-), G(+)<br>(main terminal voltage = rated $V_{\text{DRM}}$ , $R_L = 10\text{k}\Omega$ , $T_J = 110^\circ\text{C}$ )<br>All quadrants | $V_{\text{GTM}}$ | -<br>-<br>0.2 | -<br>-<br>- | 2.2<br>2.5<br>- | Volts                  |
| <b>Holding current</b> (either direction)<br>(main terminal voltage = 12V, gate open, initiating current = 1.0A, $T_J = 25^\circ\text{C}$ )<br>BTC05-( )A SERIES<br>BTC05-( )B SERIES  | $I_{\text{H}}$   | -<br>-        | -<br>-      | 10<br>5.0       | mA                     |
| <b>Turn on time</b> (either direction)<br>( $I_{\text{TM}} = 14\text{A}$ , $I_{\text{GT}} = 100\text{mA}$ )  | $t_{\text{on}}$  | -             | 1.5         | -               | $\mu\text{s}$          |
| <b>Blocking voltage application rate at commutation</b><br>(@ $V_{\text{DRM}}$ , gate open)  | $dv/dt$          | -             | 50          | -               | $\text{V}/\mu\text{s}$ |

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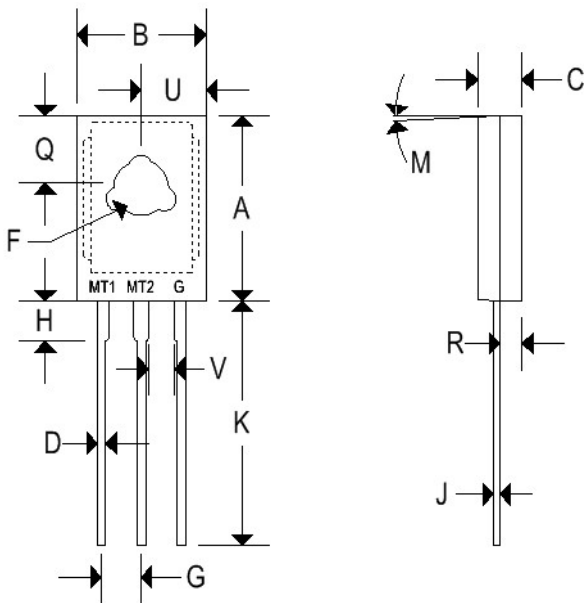
BTC05-( )A SERIES  
BTC05-( )B SERIES

SILICON BIDIRECTIONAL THYRISTORS

| 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>BTC05-( )A, $T_J = 25^\circ\text{C}$<br>BTC05-( )A, $T_J = -40^\circ\text{C}$<br>BTC05-( )B, $T_J = 25^\circ\text{C}$<br>BTC05-( )B, $T_J = -40^\circ\text{C}$ | $I_{GTm}$ | 10<br>25<br>5.0<br>15 | 10<br>25<br>5.0<br>15 | 10<br>25<br>5.0<br>15 | 15<br>40<br>10<br>25 |

## MECHANICAL CHARACTERISTIC

|         |                             |
|---------|-----------------------------|
| Case    | TO-220AB                    |
| Marking | Body painted, alpha-numeric |
| Pin out | See below                   |



|   | TO-220AB |       |             |        |
|---|----------|-------|-------------|--------|
|   | Inches   |       | Millimeters |        |
|   | Min      | Max   | Min         | Max    |
| A | 0.575    | 0.620 | 14.600      | 15.750 |
| B | 0.380    | 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 | 0.080    | 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 | -        | 0.080 | -           | 2.030  |

# DIGITRON SEMICONDUCTORS

BTC05-()A SERIES  
BTC05-()B SERIES

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FIGURE 1 – RMS CURRENT DERATING (f = 50 Hz)

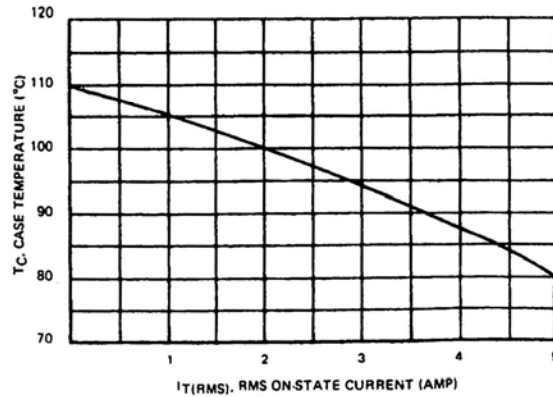


FIGURE 2 – MAXIMUM ON-STATE CHARACTERISTICS

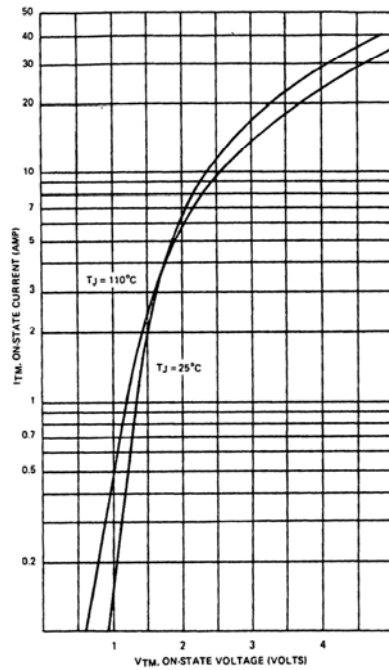
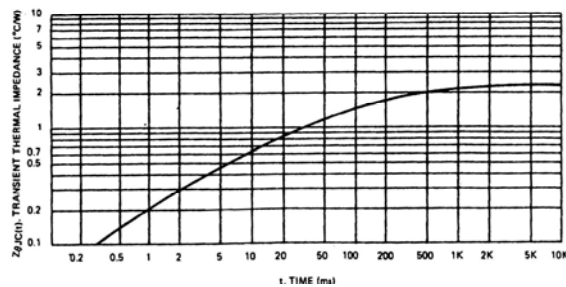


FIGURE 3 – THERMAL RESPONSE



# DIGITRON SEMICONDUCTORS

BTC05-(Q)A SERIES  
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FIGURE 4 – TYPICAL HOLDING CURRENT

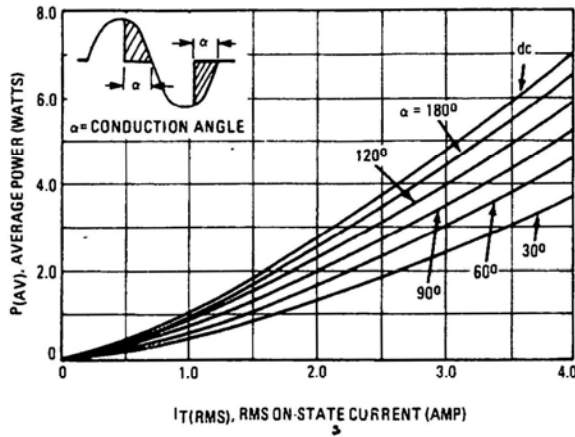


FIGURE 5 – TYPICAL GATE-TRIGGER CURRENT

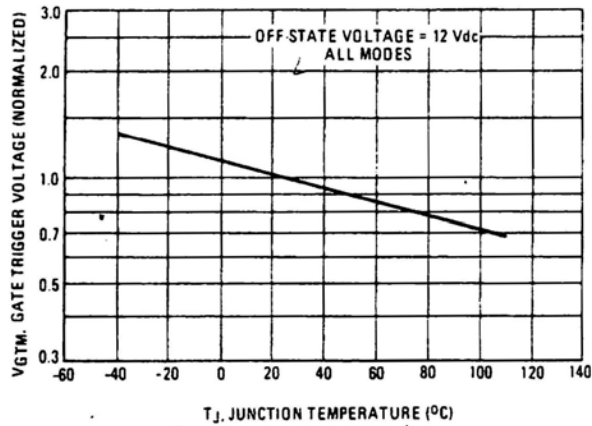


FIGURE 6 – TYPICAL GATE-TRIGGER VOLTAGE

