

# DIGITRON SEMICONDUCTORS

MAC6068C-MAC6075C

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>MAC6068C<br>MAC6069C<br>MAC6070C<br>MAC6071C<br>MAC6073C<br>MAC6074C<br>MAC6075C | $V_{\text{DRM}}$    | 25<br>50<br>100<br>200<br>400<br>500<br>600 | Volts                |
| <b>RMS on-state current</b> ( $T_C = 85^\circ\text{C}$ )   | $I_{\text{T(RMS)}}$ | 4.0   | 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 $+110^\circ\text{C}$ , $t = 1.0$ to $8.3\text{ms}$ )   | $I^2t$              | 3.6   | $\text{A}^2\text{s}$ |
| <b>Peak gate power</b>   | $P_{\text{GM}}$     | 10  | Watts                |
| <b>Average gate power</b>  | $P_{\text{G(AV)}}$  | 0.5   | Watts                |
| <b>Operating junction temperature range</b>  | $T_J$               | -40 to +110                                 | $^\circ\text{C}$     |
| <b>Storage temperature range</b>   | $T_{\text{stg}}$    | -40 to +150                                 | $^\circ\text{C}$     |
| <b>Mounting torque</b> (6-32 screw) <sup>(2)</sup>   |                     | 8.0   | In. lb.              |

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: Torque rating applies with use of torque washer. Mounting torque in excess of 6 in. lb. does not appreciably lower case to sink thermal resistance. Main terminal 2 and heatsink contact pad are common.

\* Soldering temperatures shall not exceed  $200^\circ\text{C}$  for 10 seconds.

## THERMAL CHARACTERISTICS

| Characteristic                          | Symbol                | Maximum | Unit                      |
|---|-----------------------|---------|---------------------------|
| Thermal resistance, junction to case    | $R_{\theta\text{JC}}$ | 3.5     | $^\circ\text{C}/\text{W}$ |
| Thermal resistance, junction to ambient | $R_{\theta\text{JA}}$ | 60      | $^\circ\text{C}/\text{W}$ |

## ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ and either polarity of MT2 to MT1 voltage, unless otherwise noted)

| Characteristic   | Symbol           | Min                  | Typ.                 | Max                  | Unit  |
|--|------------------|----------------------|----------------------|----------------------|-------|
| <b>Peak blocking current</b> (either direction)<br>(Rated $V_{\text{DRM}}$ @ $T_J = 125^\circ\text{C}$ , gate open)  | $I_{\text{DRM}}$ | -                    | -                    | 2.0                  | mA    |
| <b>Peak on-state voltage</b> (either direction)<br>( $I_{\text{TM}} = 6.0\text{A}$ peak)   | $V_{\text{TM}}$  | -                    | -                    | 2.0                  | Volts |
| <b>Gate trigger voltage</b><br>( $V_D = 12\text{V}$ , $R_L = 100\Omega$ , $T_J = -40^\circ\text{C}$ )<br>MT2(+),G(+); MT2(-),G(-), all types<br>MT2(+),G(-); MT2(-),G(+), all types<br>( $V_D = \text{Rated } V_{\text{DRM}}$ , $R_L = 10\text{k}\Omega$ , $T_J = 110^\circ\text{C}$ )<br>MT2(+),G(+); MT2(-),G(-), all types<br>MT2(+),G(-); MT2(-),G(+), all types | $V_{\text{GT}}$  | -<br>-<br>0.2<br>0.2 | 1.4<br>1.4<br>-<br>- | 2.5<br>2.5<br>-<br>- | Volts |
| <b>Holding current</b> (either direction)<br>( $V_D = 12\text{V}$ , gate open, $T_J = -40^\circ\text{C}$ , initiating current = 1A)<br>MAC6068C-MAC6075C<br>$T_J = 25^\circ\text{C}$<br>MAC6068C-MAC6075C  | $I_{\text{H}}$   | -<br>-               | -<br>-               | 30<br>15             | mA    |

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MAC6068C-MAC6075C

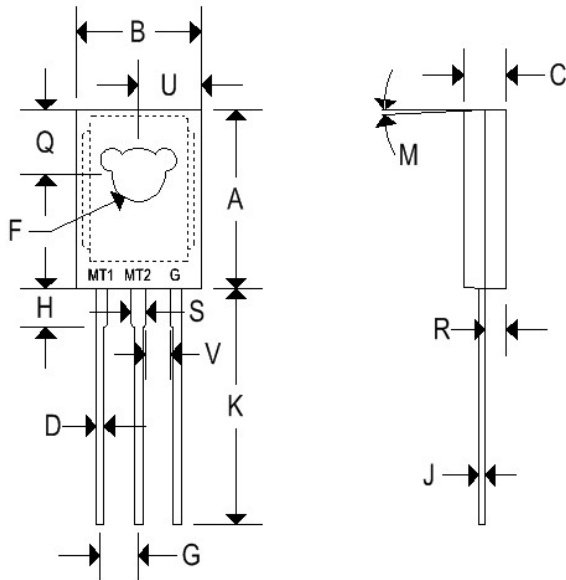
SILICON BIDIRECTIONAL THYRISTORS

| Characteristic  | Symbol   | Min | Typ. | Max | Unit      |
|---|----------|-----|------|-----|-----------|
| Turn on time (either direction)<br>( $I_{TM} = 14A$ peak, $I_{GT} = 100mA$ )                      | $t_{on}$ | -   | 1.5  | -   | $\mu s$   |
| Blocking voltage application rate at commutation @ $V_{DRM}$<br>( $T_J = 85^\circ C$ , gate open) | $dv/dt$  | -   | 5.0  | -   | $V/\mu s$ |

| Characteristic   | Symbol    | Quadrant |          |           |          |
|--|-----------|----------|----------|-----------|----------|
|  |           | I<br>mA  | II<br>mA | III<br>mA | IV<br>mA |
| Peak gate trigger current<br>(Main terminal voltage = 12V, $R_L = 100\Omega$ , $T_J = 25^\circ C$ )<br>(Main terminal voltage = 12V, $R_L = 100\Omega$ , $T_J = -40^\circ C$ ) | $I_{GTM}$ | 10<br>20 | 10<br>20 | 10<br>20  | 20<br>40 |

## MECHANICAL CHARACTERISTIC

|         |                             |
|---------|-----------------------------|
| Case    | TO-126                      |
| Marking | Body painted, alpha-numeric |
| Pin out | See below                   |



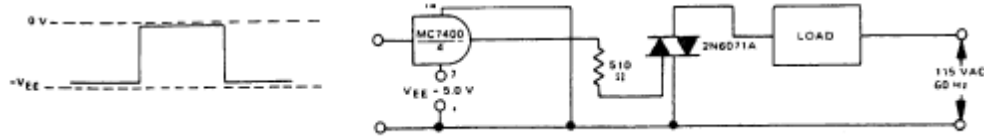
|   | TO-126 |       |             |        |
|---|--------|-------|-------------|--------|
|   | Inches |       | Millimeters |        |
|   | Min    | Max   | Min         | Max    |
| A | 0.425  | 0.435 | 10.80       | 11.050 |
| B | 0.295  | 0.305 | 7.490       | 7.750  |
| C | 0.095  | 0.105 | 2.410       | 2.670  |
| D | 0.020  | 0.026 | 0.510       | 0.660  |
| F | 0.115  | 0.125 | 2.920       | 3.180  |
| G | 0.091  | 0.097 | 2.310       | 2.460  |
| H | 0.050  | 0.095 | 1.270       | 2.410  |
| J | 0.015  | 0.025 | 0.380       | 0.640  |
| K | 0.595  | 0.655 | 15.110      | 16.640 |
| M | 3° TYP |       | 3° TYP      |        |
| Q | 0.148  | 0.158 | 3.760       | 4.010  |
| R | 0.045  | 0.055 | 1.140       | 1.400  |
| S | 0.025  | 0.035 | 0.640       | 0.890  |
| U | 0.145  | 0.155 | 3.680       | 3.940  |
| V | 0.040  | -     | 1.020       | -      |

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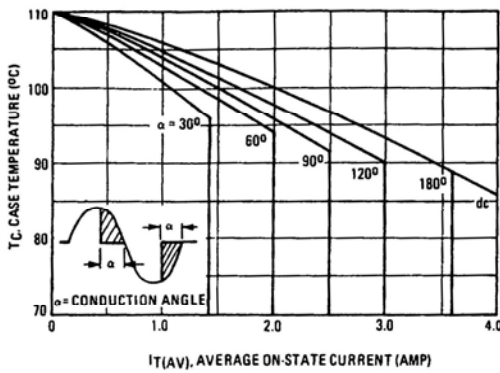
## MAC6068C-MAC6075C

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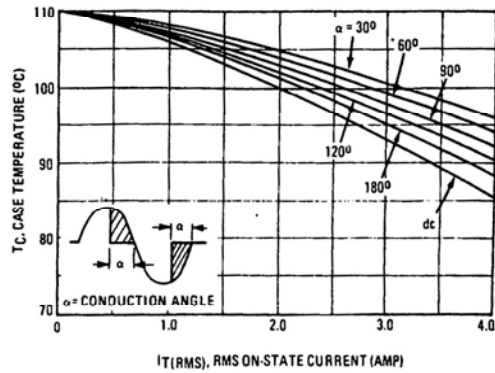
**SAMPLE APPLICATION:  
TTL SENSITIVE GATE 4 AMPERE TRIAC  
TRIGGERS IN MODES II AND III**



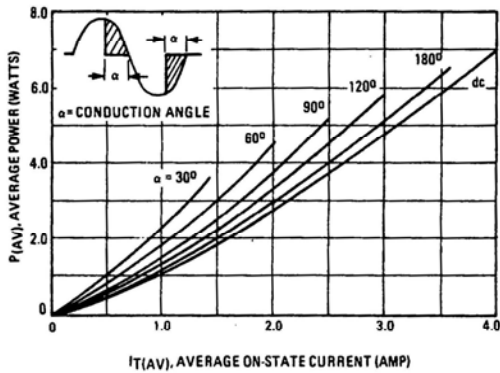
**FIGURE 1 - AVERAGE CURRENT DERATING**



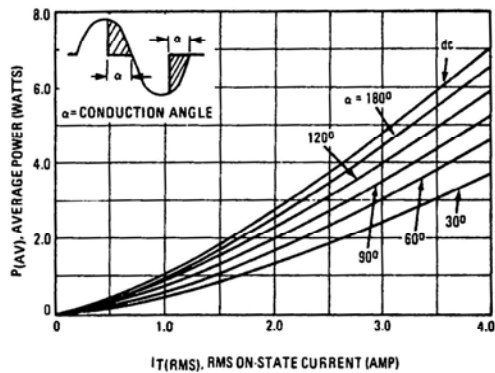
**FIGURE 2 - RMS CURRENT DERATING**



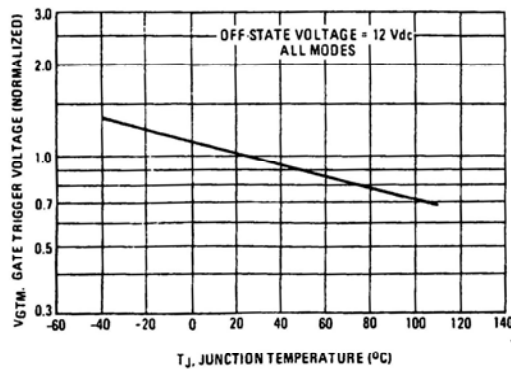
**FIGURE 3 - POWER DISSIPATION**



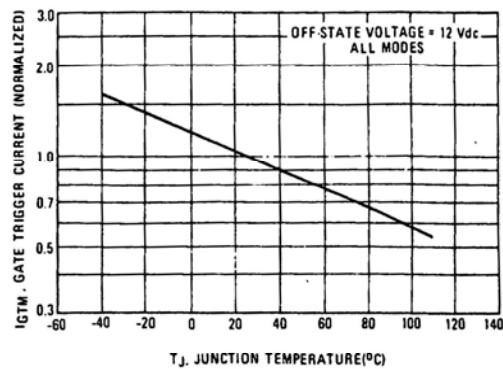
**FIGURE 4 - POW.H DISSIPATION**



**FIGURE 5 - TYPICAL GATE TRIGGER VOLTAGE**



**FIGURE 6 - TYPICAL GATE TRIGGER CURRENT**



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### SILICON BIDIRECTIONAL THYRISTORS

FIGURE 7 – MAXIMUM ON-STATE CHARACTERISTICS

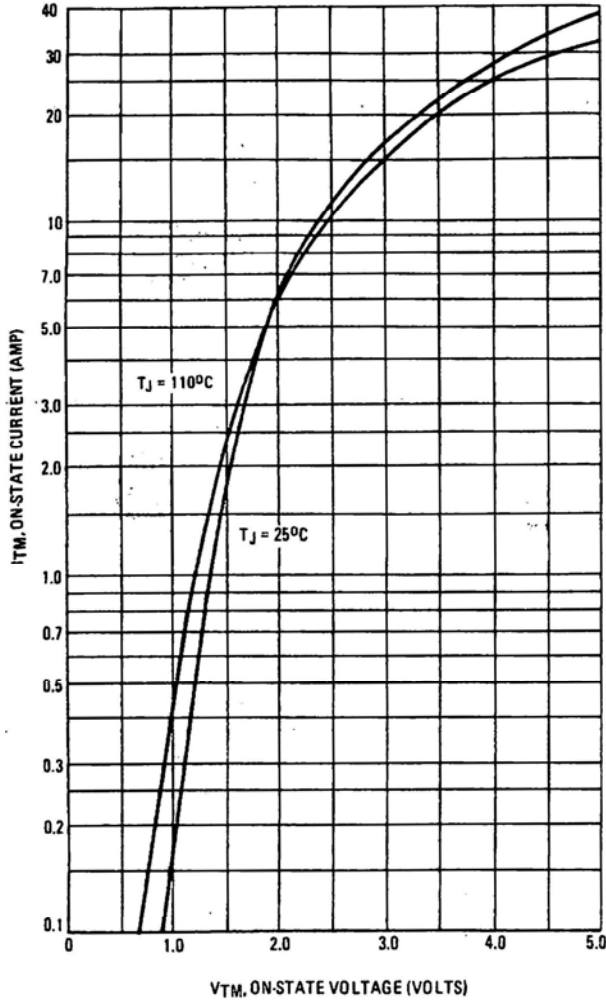


FIGURE 8 – TYPICAL HOLDING CURRENT

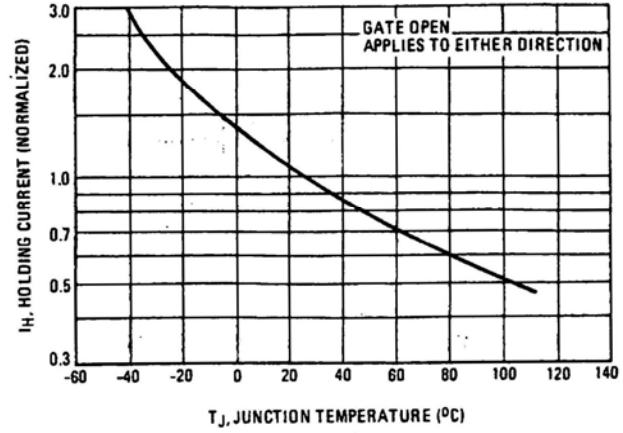


FIGURE 9 – MAXIMUM ALLOWABLE SURGE CURRENT

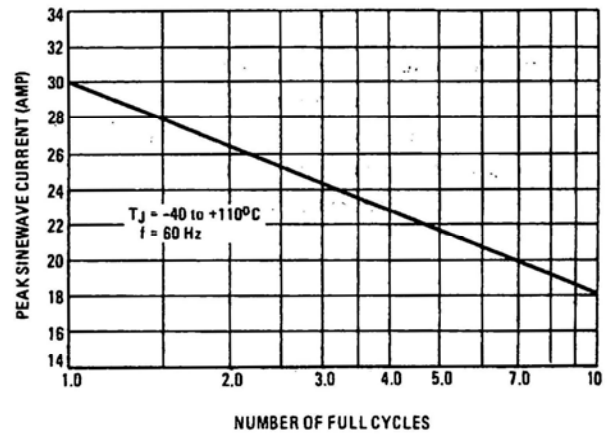


FIGURE 10 – THERMAL RESPONSE

