

### Description

8 Amp bi-directional solid state switch series is designed for AC switching and phase control applications such as motor speed and temperature modulation controls, lighting controls, and static switching relays.

**Sensitive** type devices guarantee gate control in Quadrants I & IV needed for digital control circuitry.

**Standard** type devices normally operate in Quadrants I & III triggered from AC line.

**Alternistor** type devices only operate in quadrants I, II, & III and are used in circuits requiring high dv/dt capability.

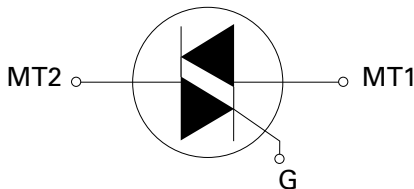
### Main Features

| Symbol            | Value       | Unit |
|-------------------|-------------|------|
| $I_{T(RMS)}$      | 8           | A    |
| $V_{DRM}/V_{RRM}$ | 400 to 1000 | V    |
| $I_{GT(Q1)}$      | 5 to 50     | mA   |

### Features & Benefits

- RoHS compliant
- Glass – passivated junctions
- Voltage capability up to 1000 V
- Surge capability up to 100 A
- Electrically isolated “L-Package” is UL recognized for 2500Vrms
- Solid-state switching eliminates arcing or contact bounce that create voltage transients
- No contacts to wear out from reaction of switching events
- Restricted (or limited) RFI generation, depending on activation point of sine wave
- Requires only a small gate activation pulse in each half-cycle

### Schematic Symbol



### Applications

Excellent for AC switching and phase control applications such as heating, lighting, and motor speed controls.

Typical applications are AC solid-state switches, light dimmers, power tools, home/brown goods and white goods appliances.

Alternistor Triacs (no snubber required) are used in applications with extremely inductive loads requiring highest commutation performance.

Internally constructed isolated packages are offered for ease of heat sinking with highest isolation voltage.

### Absolute Maximum Ratings — Sensitive Triac (4 Quadrants)

| Symbol       | Parameter   | Value   | Unit                        |
|--------------|---|---|-----------------------------|
| $I_{T(RMS)}$ | RMS on-state current (full sine wave)   | CIQ08X0 $T_c = 80^\circ\text{C}$                    | 8 A                         |
|              |   | CIQ08X0R CIQ08X0D $T_c = 85^\circ\text{C}$          |                             |
| $I_{TSM}$    | Non repetitive surge peak on-state current (full cycle, $T_J$ initial = $25^\circ\text{C}$ )  | f = 50 Hz t = 20 ms                                 | 65 A                        |
|              |   | f = 60 Hz t = 16.7 ms                               | 85 A                        |
| $I^2t$       | $I^2t$ Value for fusing   | $t_p = 8.3$ ms                                      | 26.5 $\text{A}^2\text{s}$   |
| di/dt        | Critical rate of rise of on-state current $I_G = 50\text{mA}$ with $0.1\mu\text{s}$ rise time | f = 120 Hz $T_J = 110^\circ\text{C}$                | 70 $\text{A}/\mu\text{s}$   |
| $I_{GTM}$    | Peak gate trigger current   | $t_p \leq 10 \mu\text{s}$ $T_J = 110^\circ\text{C}$ | 1.6 A                       |
| $P_{G(AV)}$  | Average gate power dissipation  | $T_J = 110^\circ\text{C}$                           | 0.4 W                       |
| $T_{stg}$    | Storage temperature range   |   | -40 to 150 $^\circ\text{C}$ |
| $T_J$        | Operating junction temperature range  |   | -40 to 110 $^\circ\text{C}$ |

### Absolute Maximum Ratings — Standard Triac

| Symbol       | Parameter   | Value   | Unit                        |
|--------------|---|---|-----------------------------|
| $I_{T(RMS)}$ | RMS on-state current (full sine wave)   | CIQ08X0R CIQ08X0D $T_c = 95^\circ\text{C}$                                    | 8 A                         |
|              |   | CIQ08X0 $T_c = 90^\circ\text{C}$  |                             |
| $I_{TSM}$    | Non repetitive surge peak on-state current (full cycle, $T_J$ initial = $25^\circ\text{C}$ )        | f = 50 Hz t = 20 ms   | 83 A                        |
|              |   | f = 60 Hz t = 16.7 ms   | 100 A                       |
| $I^2t$       | $I^2t$ Value for fusing   | $t_p = 8.3$ ms  | 41 $\text{A}^2\text{s}$     |
| di/dt        | Critical rate of rise of on-state current $I_G = 200\text{mA}$ with $\leq 0.1\mu\text{s}$ rise time | f = 120 Hz $T_J = 125^\circ\text{C}$  | 70 $\text{A}/\mu\text{s}$   |
| $I_{GTM}$    | Peak gate trigger current   | $t_p \leq 10 \mu\text{s};$<br>$I_{GT} \leq T_{GTM}$ $T_J = 125^\circ\text{C}$ | 1.8 A                       |
| $P_{G(AV)}$  | Average gate power dissipation  | $T_J = 125^\circ\text{C}$   | 0.5 W                       |
| $T_{stg}$    | Storage temperature range   |   | -40 to 150 $^\circ\text{C}$ |
| $T_J$        | Operating junction temperature range  |   | -40 to 125 $^\circ\text{C}$ |

### Absolute Maximum Ratings — Alternistor (3 Quadrants)

| Symbol       | Parameter  |   |                           | Value                           | Unit       |                  |
|--------------|--|---|---------------------------|---------------------------------|------------|------------------|
| $I_{T(RMS)}$ | RMS on-state current (full sine wave)  | CIQ08X0   |                           | $T_C = 90^\circ\text{C}$        | 8          | A                |
|              |  |   |                           | $T_C = 95^\circ\text{C}$        |            |                  |
| $I_{TSM}$    | Non repetitive surge peak on-state current (full cycle, $T_J$ initial = $25^\circ\text{C}$ ) | f = 50 Hz   | t = 20 ms                 | CIQ08X0V<br>CIQ08X0D            | 80         | A                |
|              |  |   |                           | CIQ08X0<br>CIQ08X0R<br>CIQ08X0N |            |                  |
|              |  | f = 60 Hz   | t = 16.7 ms               | CIQ08X0V<br>CIQ08X0D            | 85         |                  |
|              |  |   |                           | CIQ08X0<br>CIQ08X0R<br>CIQ08X0N |            |                  |
| $I^2t$       | $I^2t$ Value for fusing  | $t_p = 8.3$ ms                                      |                           | CIQ08X0V<br>CIQ08X0D            | 30         | A <sup>2</sup> s |
|              |  |   |                           | CIQ08X0<br>CIQ08X0R<br>CIQ08X0N | 41         |                  |
| di/dt        | Critical rate of rise of on-state current  | f = 120 Hz  |                           | $T_J = 125^\circ\text{C}$       | 70         | A/ $\mu\text{s}$ |
| $I_{GTM}$    | Peak gate trigger current  | $t_p \leq 10 \mu\text{s};$<br>$I_{GT} \leq I_{GTM}$ | $T_J = 125^\circ\text{C}$ | CIQ08X0V<br>CIQ08X0D            | 1.6        | A                |
|              |  |   |                           | CIQ08X0<br>CIQ08X0R<br>CIQ08X0N | 2.0        |                  |
| $P_{G(AV)}$  | Average gate power dissipation   | $T_J = 125^\circ\text{C}$                           | $I_{GT} = 10\text{mA}$    | CIQ08X0V<br>CIQ08X0D            | 0.4        | W                |
|              |  |   | $I_{GT} = 35\text{mA}$    | CIQ08X0<br>CIQ08X0R<br>CIQ08X0N | 0.5        |                  |
| $T_{stg}$    | Storage temperature range  |   |                           |                                 | -40 to 150 | $^\circ\text{C}$ |
| $T_J$        | Operating junction temperature range   |   |                           |                                 | -40 to 125 | $^\circ\text{C}$ |

### Electrical Characteristics ( $T_J = 25^\circ\text{C}$ , unless otherwise specified) — Sensitive Triac (4 Quadrants)

| Symbol   | Test Conditions  | Quadrant           |      | CI08X0S2 | CI08X0   | Unit             |
|----------|--|--------------------|------|----------|----------|------------------|
| $I_{GT}$ | $V_D = 12\text{V}$ $R_L = 60 \Omega$                                 | I – II – III<br>IV | MAX. | 5<br>10  | 10<br>20 | mA               |
| $V_{GT}$ | $V_D = 12\text{V}$ $R_L = 60 \Omega$                                 | ALL                | MAX. | 1.3      |          | V                |
| $V_{GD}$ | $V_D = V_{DRM}$ $R_L = 3.3 \text{k}\Omega$ $T_J = 110^\circ\text{C}$ | ALL                | MIN. | 0.2      |          | V                |
| $I_H$    | $I_T = 100\text{mA}$   |                    | MAX. | 10       | 20       | mA               |
| dv/dt    | $V_D = V_{DRM}$ Gate Open $T_J = 100^\circ\text{C}$                  | 400V               | TYP. | 30       | 40       | V/ $\mu\text{s}$ |
|          |  | 600V               |      | 20       | 30       |                  |
| (dv/dt)c | (di/dt)c = 4.3 A/ms $T_J = 110^\circ\text{C}$                        |                    | TYP. | 2        | 2        | V/ $\mu\text{s}$ |
| $t_{gt}$ | $I_G = 100\text{mA}$ $PW = 15\mu\text{s}$ $I_T = 11.3 \text{A(pk)}$  |                    | TYP. | 3.0      | 3.2      | $\mu\text{s}$    |



# 8A TRIACS

CIQ0880

## Electrical Characteristics ( $T_J = 25^\circ\text{C}$ , unless otherwise specified) — Standard Triac

| Symbol      | Test Conditions  | Quadrant           |              | CIQ08X0H4 | CIQ08X0H5 | Unit             |
|-------------|--|--------------------|--------------|-----------|-----------|------------------|
| $I_{GT}$    | $V_D = 12V$ $R_L = 60\ \Omega$   | I – II – III<br>IV | MAX.<br>TYP. | 25<br>50  | 50<br>75  | mA               |
| $V_{GT}$    | $V_D = 12V$ $R_L = 60\ \Omega$   | I – II – III       | MAX.         | 1.3       |           | V                |
| $V_{GD}$    | $V_D = V_{DRM}$ $R_L = 3.3\ \text{k}\Omega$ $T_J = 125^\circ\text{C}$  | ALL                | MIN.         | 0.2       |           | V                |
| $I_H$       | $I_T = 200\text{mA}$   |                    | MAX.         | 50        | 50        | mA               |
| $dv/dt$     | $V_D = V_{DRM}$ Gate Open $T_J = 125^\circ\text{C}$                    | 400V               | MIN.         | 150       |           | V/ $\mu\text{s}$ |
|             |  | 600V               |              |           | 125       |                  |
|             |  | 800V               |              |           | 100       |                  |
|             |  | 1000V              |              |           | 80        |                  |
| $(dv/dt)_c$ | $(di/dt)_c = 4.3\ \text{A/ms}$ $T_J = 125^\circ\text{C}$               |                    | TYP.         | 4         | 4         | V/ $\mu\text{s}$ |
| $t_{gt}$    | $I_G = 100\text{mA}$ $PW = 15\ \mu\text{s}$ $I_T = 11.3\ \text{A(pk)}$ |                    | TYP.         | 3.0       | 3.0       | $\mu\text{s}$    |

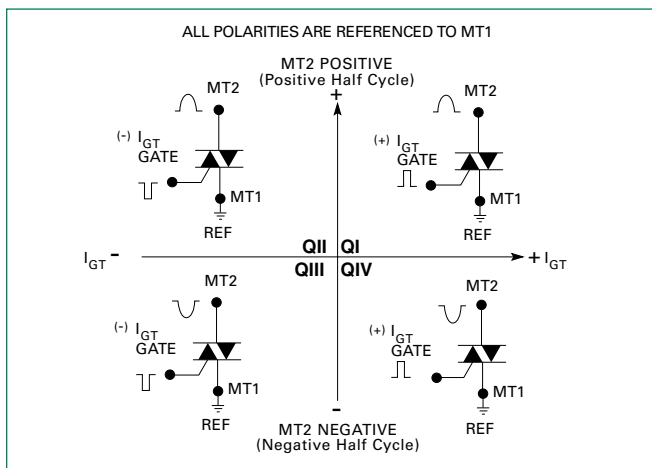
## Electrical Characteristics ( $T_J = 25^\circ\text{C}$ , unless otherwise specified) — Alternistor Triac (3 Quadrants)

| Symbol      | Test Conditions  | Quadrant                        |      | CIQ08X0L3 |     | Unit             |                  |
|-------------|--|---------------------------------|------|-----------|-----|------------------|------------------|
| $I_{GT}$    | $V_D = 12V$ $R_L = 60\ \Omega$   | I – II – III                    | MAX. | 10        | 35  | mA               |                  |
| $V_{GT}$    | $V_D = 12V$ $R_L = 60\ \Omega$   | I – II – III                    | MAX. | 1.3       |     | V                |                  |
| $V_{GD}$    | $V_D = V_{DRM}$ $R_L = 3.3\ \text{k}\Omega$ $T_J = 125^\circ\text{C}$  | I – II – III                    | MIN. | 0.2       |     | V                |                  |
| $I_H$       | $I_T = 100\text{mA}$   |                                 | MAX. | 15        | 35  | mA               |                  |
| $dv/dt$     | $V_D = V_{DRM}$ Gate Open $T_J = 125^\circ\text{C}$                    | CIQ08X0<br>CIQ08X0R<br>CIQ08X0N | MIN. | 400V      | 75  | 400              | V/ $\mu\text{s}$ |
|             |  |                                 |      | 600V      | 50  | 300              |                  |
|             |  |                                 |      | 800V      |     | 200              |                  |
|             |  |                                 |      | 1000V     |     | 100              |                  |
|             |  | CIQ08X0V<br>CIQ08X0D            |      | 400V      | 75  | 450              |                  |
|             |  |                                 |      | 600V      | 50  | 350              |                  |
|             |  |                                 |      | 800V      |     | 250              |                  |
|             |  |                                 |      | 1000V     |     | 150              |                  |
| $(dv/dt)_c$ | $(di/dt)_c = 4.3\ \text{A/ms}$ $T_J = 125^\circ\text{C}$               |                                 | MIN. | 20        | 25  | V/ $\mu\text{s}$ |                  |
| $t_{gt}$    | $I_G = 100\text{mA}$ $PW = 15\ \mu\text{s}$ $I_T = 11.3\ \text{A(pk)}$ |                                 | TYP. | 4.0       | 4.0 | $\mu\text{s}$    |                  |

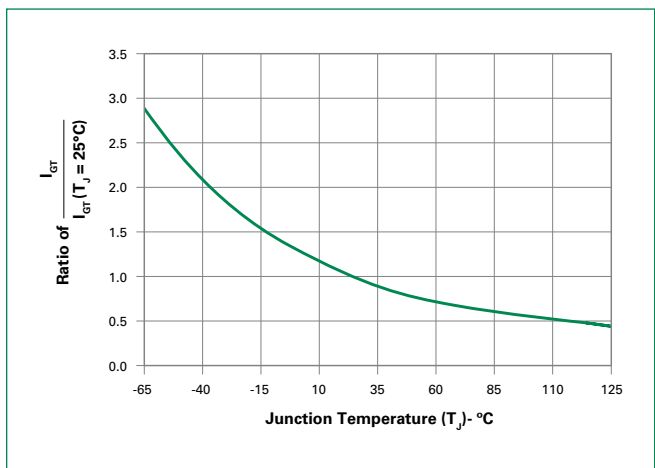
| Static Characteristics |                                    |          |                     |             |       |      |         |
|------------------------|------------------------------------|----------|---------------------|-------------|-------|------|---------|
| Symbol                 | Test Conditions                    |          |                     |             | Value | Unit |         |
| $V_{TM}$               | $I_{TM} = 11.3A$ $t_p = 380 \mu s$ |          |                     |             | MAX.  | 1.60 | V       |
| $I_{DRM}$<br>$I_{RRM}$ | $V_{DRM} = V_{RRM}$                | CIQ08X0  | $T_J = 25^\circ C$  | 400 - 600V  | MAX.  | 10   | $\mu A$ |
|                        |                                    |          | $T_J = 110^\circ C$ | 400 - 600V  |       | 0.5  | mA      |
|                        |                                    | CIQ08X0  | $T_J = 25^\circ C$  | 400 - 1000V |       | 20   | $\mu A$ |
|                        |                                    |          | $T_J = 125^\circ C$ | 400 - 800V  |       | 2    | mA      |
|                        |                                    |          | $T_J = 100^\circ C$ | 1000V       |       |      |         |
|                        |                                    | CIQ08X0X | $T_J = 25^\circ C$  | 400 - 800V  |       | 10   | $\mu A$ |
|                        |                                    |          |                     | 1000V       |       |      |         |
|                        |                                    |          | $T_J = 125^\circ C$ | 400 - 800V  |       | 2    | mA      |
|                        |                                    |          | $T_J = 100^\circ C$ | 1000V       |       |      |         |

| Thermal Resistances |                       |                      |       |              |
|---------------------|-----------------------|----------------------|-------|--------------|
| Symbol              | Parameter             |                      | Value | Unit         |
| $R_{\theta(J-C)}$   | Junction to case (AC) | CIQ08X0R<br>CIQ08X0N | 1.5   | $^\circ C/W$ |
|                     |                       | CIQ08X0              | 2.8   |              |
|                     |                       | CIQ08X0V             | 2.1   |              |
| $R_{\theta(J-A)}$   | Junction to ambient   | CIQ08X0R             | 45    | $^\circ C/W$ |
|                     |                       | CIQ08X0              | 50    |              |
|                     |                       | CIQ08X0V             | 64    |              |

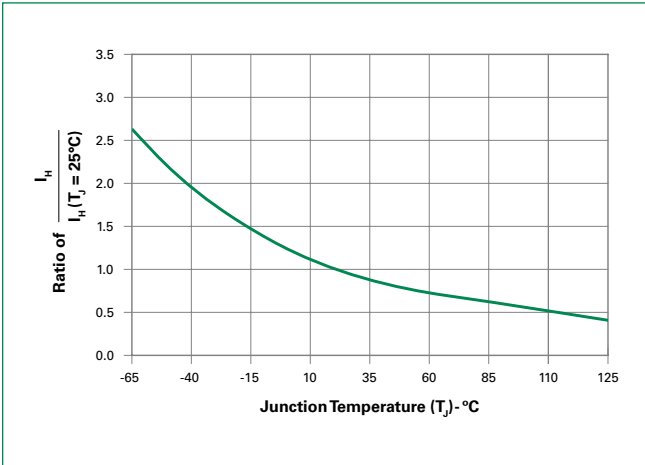
**Figure 1: Definition of Quadrants**



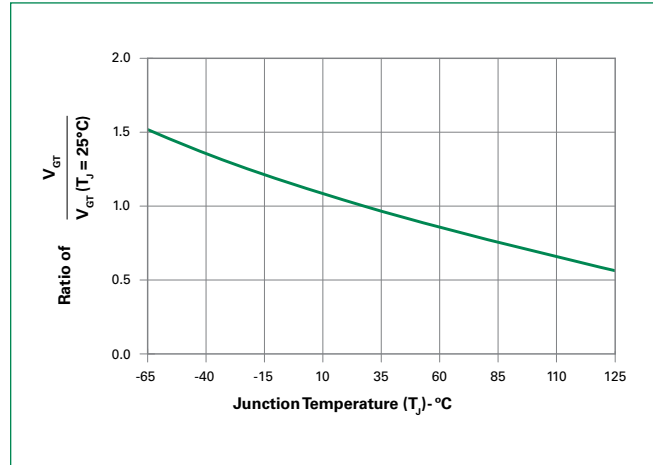
**Figure 2: Normalized DC Gate Trigger Current for All Quadrants vs. Junction Temperature**



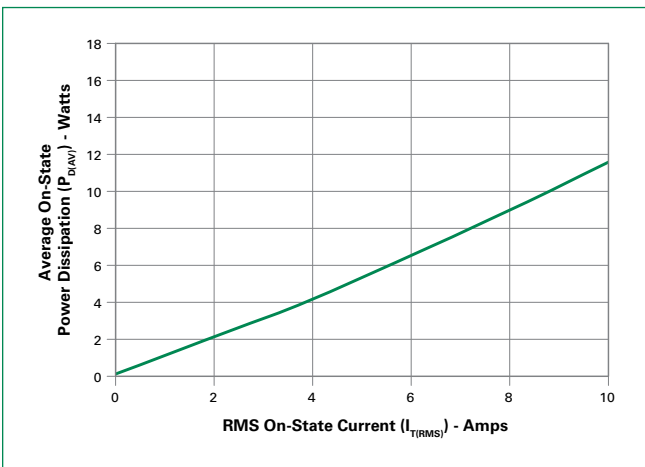
**Figure 3: Normalized DC Holding Current vs. Junction Temperature**



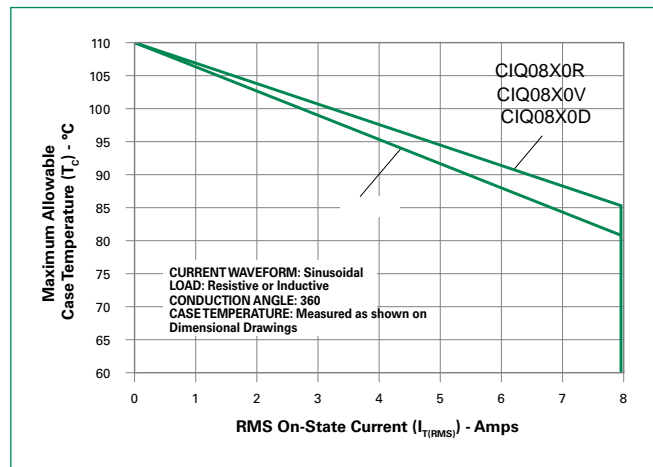
**Figure 4: Normalized DC Gate Trigger Voltage for All Quadrants vs. Junction Temperature**



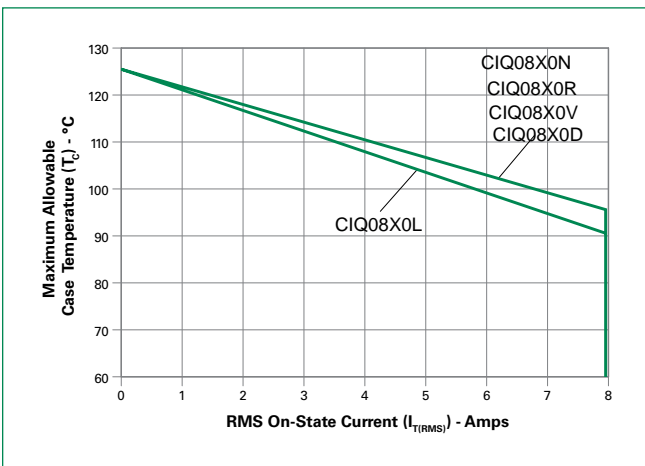
**Figure 5: Power Dissipation (Typical) vs. RMS On-State Current**



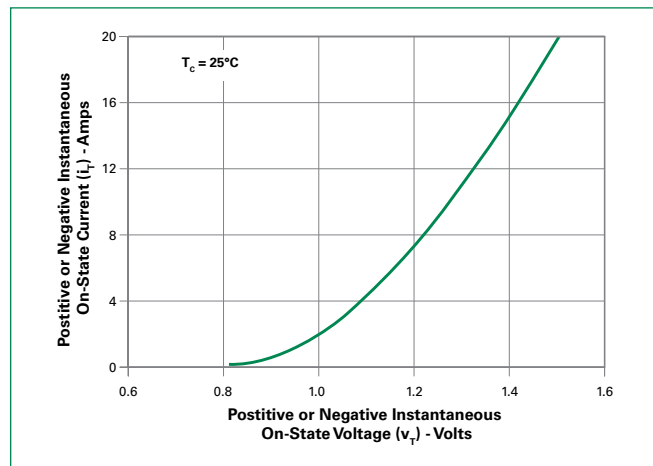
**Figure 6: Maximum Allowable Case Temperature vs. On-State Current (Sensitive Triac)**



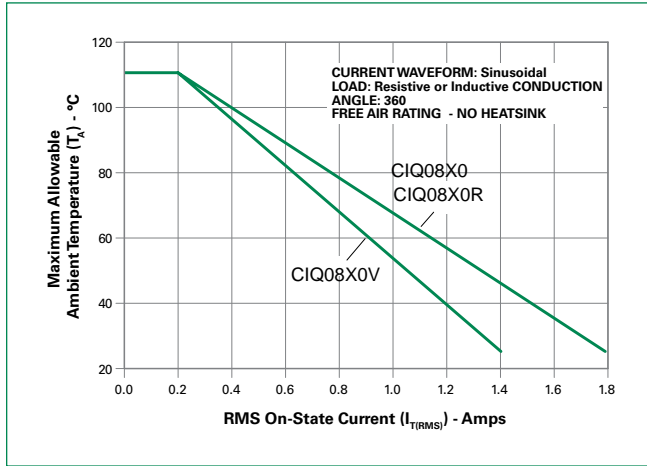
**Figure 7: Maximum Allowable Case Temperature vs. On-State Current (Standard / Alternistor Triac)**



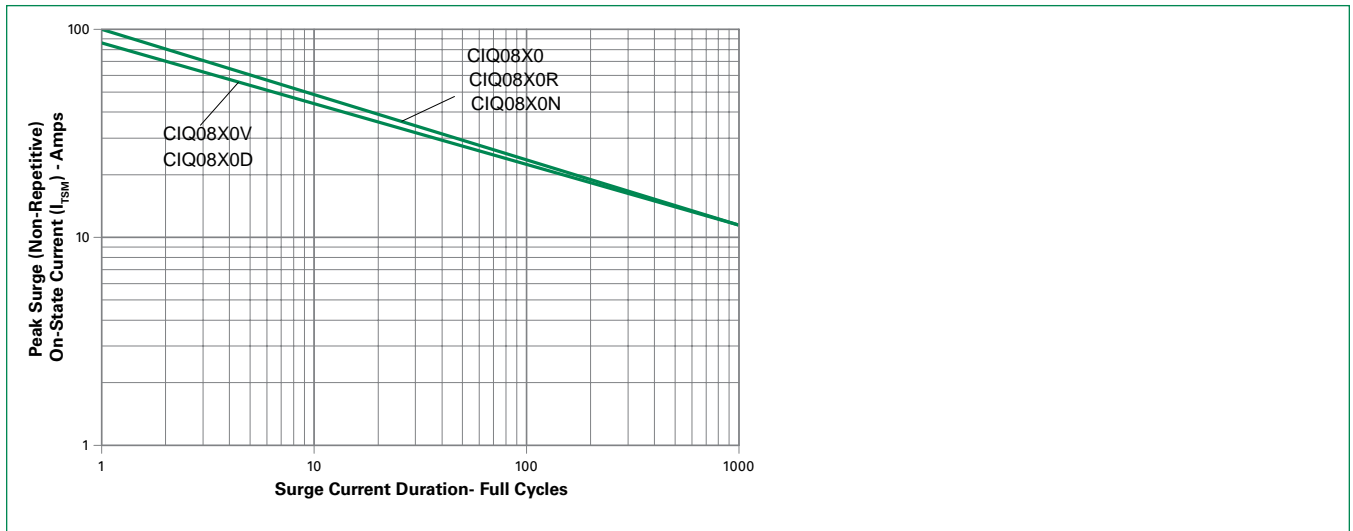
**Figure 8: On-State Current vs. On-State Voltage (Typical)**



**Figure 9: Maximum Allowable Ambient Temperature vs. On-State Current**

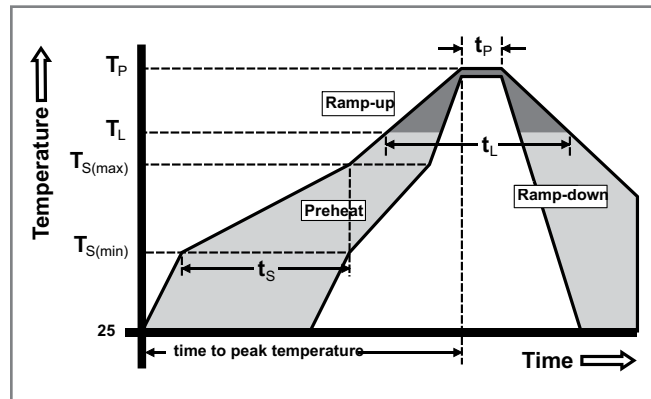


**Figure 10: Surge Peak On-State Current vs. Number of Cycles**



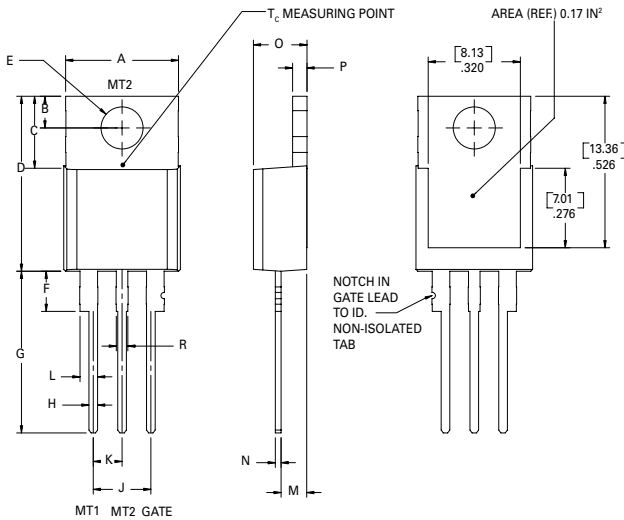
## Soldering Parameters

|  |                                    |                         |
|--|------------------------------------|-------------------------|
| Reflow Condition                                       |                                    | Pb – Free assembly      |
| Pre Heat   | - Temperature Min ( $T_{s(min)}$ ) | 150°C                   |
|  | - Temperature Max ( $T_{s(max)}$ ) | 200°C                   |
|  | - Time (min to max) ( $t_s$ )      | 60 – 180 secs           |
| Average ramp up rate (Liquidus Temp) ( $T_L$ ) to peak |                                    | 5°C/second max          |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                   |                                    | 5°C/second max          |
| Reflow   | - Temperature ( $T_L$ ) (Liquidus) | 217°C                   |
|  | - Temperature ( $t_l$ )            | 60 – 150 seconds        |
| Peak Temperature ( $T_p$ )                             |                                    | 260 <sup>+0/-5</sup> °C |
| Time within 5°C of actual peak Temperature ( $t_p$ )   |                                    | 20 – 40 seconds         |
| Ramp-down Rate   |                                    | 5°C/second max          |
| Time 25°C to peak Temperature ( $T_p$ )                |                                    | 8 minutes Max.          |
| Do not exceed  |                                    | 280°C                   |



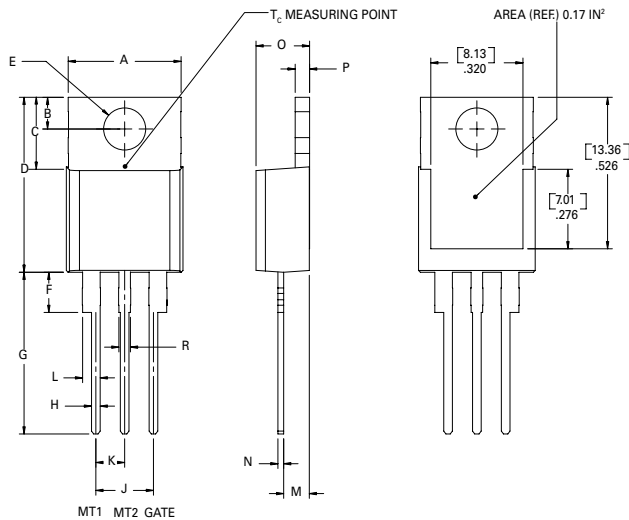


### Dimensions — TO-220AB (R-Package) — Non-Isolated Mounting Tab Common with Center Lead



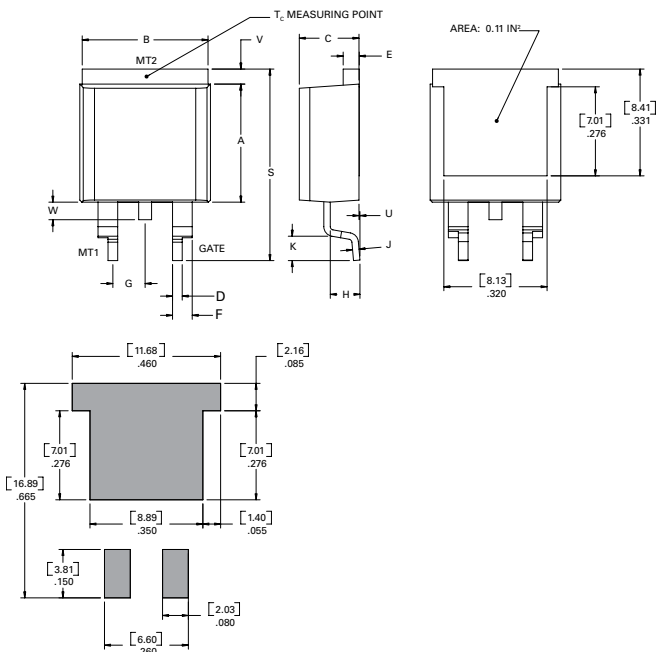
| Dimension | Inches |       | Millimeters |       |
|-----------|--------|-------|-------------|-------|
|           | Min    | Max   | Min         | Max   |
| A         | 0.380  | 0.420 | 9.65        | 10.67 |
| B         | 0.105  | 0.115 | 2.67        | 2.92  |
| C         | 0.230  | 0.250 | 5.84        | 6.35  |
| D         | 0.590  | 0.620 | 14.99       | 15.75 |
| E         | 0.142  | 0.147 | 3.61        | 3.73  |
| F         | 0.110  | 0.130 | 2.79        | 3.30  |
| G         | 0.540  | 0.575 | 13.72       | 14.61 |
| H         | 0.025  | 0.035 | 0.64        | 0.89  |
| J         | 0.195  | 0.205 | 4.95        | 5.21  |
| K         | 0.095  | 0.105 | 2.41        | 2.67  |
| L         | 0.060  | 0.075 | 1.52        | 1.91  |
| M         | 0.085  | 0.095 | 2.16        | 2.41  |
| N         | 0.018  | 0.024 | 0.46        | 0.61  |
| O         | 0.178  | 0.188 | 4.52        | 4.78  |
| P         | 0.045  | 0.060 | 1.14        | 1.52  |
| R         | 0.038  | 0.048 | 0.97        | 1.22  |

### Dimensions — TO-220AB (L-Package) — Isolated Mounting Tab



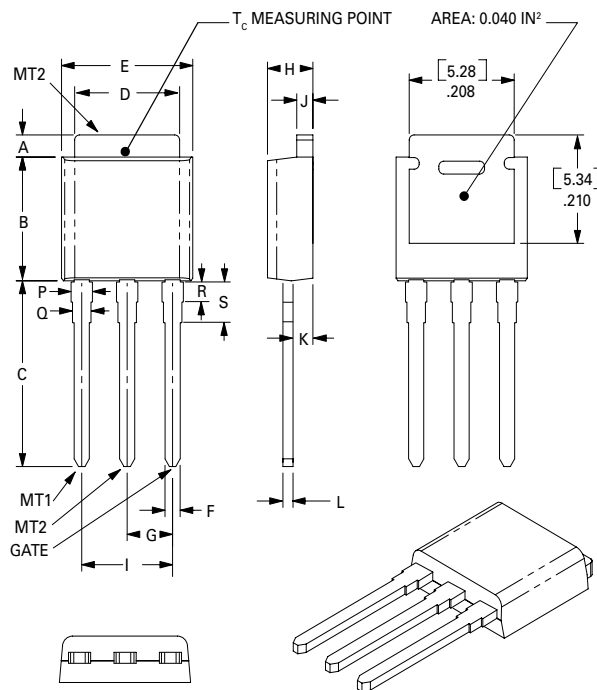
| Dimension | Inches |       | Millimeters |       |
|-----------|--------|-------|-------------|-------|
|           | Min    | Max   | Min         | Max   |
| A         | 0.380  | 0.420 | 9.65        | 10.67 |
| B         | 0.105  | 0.115 | 2.67        | 2.92  |
| C         | 0.230  | 0.250 | 5.84        | 6.35  |
| D         | 0.590  | 0.620 | 14.99       | 15.75 |
| E         | 0.142  | 0.147 | 3.61        | 3.73  |
| F         | 0.110  | 0.130 | 2.79        | 3.30  |
| G         | 0.540  | 0.575 | 13.72       | 14.61 |
| H         | 0.025  | 0.035 | 0.64        | 0.89  |
| J         | 0.195  | 0.205 | 4.95        | 5.21  |
| K         | 0.095  | 0.105 | 2.41        | 2.67  |
| L         | 0.060  | 0.075 | 1.52        | 1.91  |
| M         | 0.085  | 0.095 | 2.16        | 2.41  |
| N         | 0.018  | 0.024 | 0.46        | 0.61  |
| O         | 0.178  | 0.188 | 4.52        | 4.78  |
| P         | 0.045  | 0.060 | 1.14        | 1.52  |
| R         | 0.038  | 0.048 | 0.97        | 1.22  |

### Dimensions — TO-263AB (N-Package) — D<sup>2</sup>-PAK Surface Mount



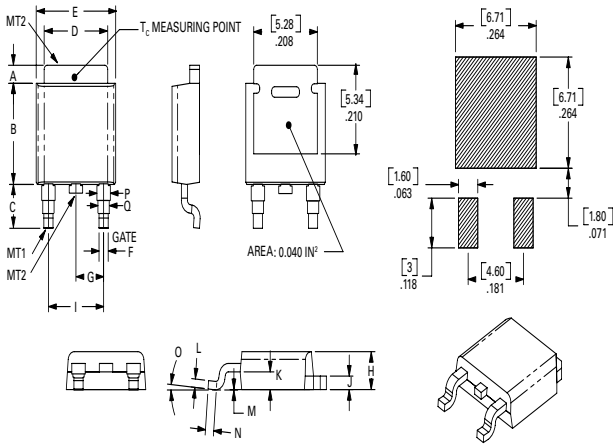
| Dimension | Inches |       | Millimeters |       |
|-----------|--------|-------|-------------|-------|
|           | Min    | Max   | Min         | Max   |
| A         | 0.360  | 0.370 | 9.14        | 9.40  |
| B         | 0.380  | 0.420 | 9.65        | 10.67 |
| C         | 0.178  | 0.188 | 4.52        | 4.78  |
| D         | 0.025  | 0.035 | 0.64        | 0.89  |
| E         | 0.045  | 0.060 | 1.14        | 1.52  |
| F         | 0.060  | 0.075 | 1.52        | 1.91  |
| G         | 0.095  | 0.105 | 2.41        | 2.67  |
| H         | 0.092  | 0.102 | 2.34        | 2.59  |
| J         | 0.018  | 0.024 | 0.46        | 0.61  |
| K         | 0.090  | 0.110 | 2.29        | 2.79  |
| S         | 0.590  | 0.625 | 14.99       | 15.88 |
| V         | 0.035  | 0.045 | 0.89        | 1.14  |
| U         | 0.002  | 0.010 | 0.05        | 0.25  |
| W         | 0.040  | 0.070 | 1.02        | 1.78  |

### Dimensions — TO-251AA (V-Package) — V-PAK Through Hole



| Dimension | Inches |       |       | Millimeters |      |      |
|-----------|--------|-------|-------|-------------|------|------|
|           | Min    | Typ   | Max   | Min         | Typ  | Max  |
| A         | 0.037  | 0.040 | 0.043 | 0.94        | 1.01 | 1.09 |
| B         | 0.235  | 0.242 | 0.245 | 5.97        | 6.15 | 6.22 |
| C         | 0.350  | 0.361 | 0.375 | 8.89        | 9.18 | 9.53 |
| D         | 0.205  | 0.208 | 0.213 | 5.21        | 5.29 | 5.41 |
| E         | 0.255  | 0.262 | 0.265 | 6.48        | 6.66 | 6.73 |
| F         | 0.027  | 0.031 | 0.033 | 0.69        | 0.80 | 0.84 |
| G         | 0.087  | 0.090 | 0.093 | 2.21        | 2.28 | 2.36 |
| H         | 0.085  | 0.092 | 0.095 | 2.16        | 2.34 | 2.41 |
| I         | 0.176  | 0.180 | 0.184 | 4.47        | 4.57 | 4.67 |
| J         | 0.018  | 0.020 | 0.023 | 0.46        | 0.51 | 0.58 |
| K         | 0.035  | 0.037 | 0.039 | 0.90        | 0.95 | 1.00 |
| L         | 0.018  | 0.020 | 0.023 | 0.46        | 0.52 | 0.58 |
| P         | 0.042  | 0.047 | 0.052 | 1.06        | 1.20 | 1.32 |
| Q         | 0.034  | 0.039 | 0.044 | 0.86        | 1.00 | 1.11 |
| R         | 0.034  | 0.039 | 0.044 | 0.86        | 1.00 | 1.11 |
| S         | 0.074  | 0.079 | 0.084 | 1.86        | 2.00 | 2.11 |

## Dimensions — TO-252AA (D-Package) — D-PAK Surface Mount



| Dimension | Inches |       |       | Millimeters |      |      |
|-----------|--------|-------|-------|-------------|------|------|
|           | Min    | Typ   | Max   | Min         | Typ  | Max  |
| A         | 0.037  | 0.040 | 0.043 | 0.94        | 1.01 | 1.09 |
| B         | 0.235  | 0.243 | 0.245 | 5.97        | 6.16 | 6.22 |
| C         | 0.106  | 0.108 | 0.113 | 2.69        | 2.74 | 2.87 |
| D         | 0.205  | 0.208 | 0.213 | 5.21        | 5.29 | 5.41 |
| E         | 0.255  | 0.262 | 0.265 | 6.48        | 6.65 | 6.73 |
| F         | 0.027  | 0.031 | 0.033 | 0.69        | 0.80 | 0.84 |
| G         | 0.087  | 0.090 | 0.093 | 2.21        | 2.28 | 2.36 |
| H         | 0.085  | 0.092 | 0.095 | 2.16        | 2.33 | 2.41 |
| I         | 0.176  | 0.179 | 0.184 | 4.47        | 4.55 | 4.67 |
| J         | 0.018  | 0.020 | 0.023 | 0.46        | 0.51 | 0.58 |
| K         | 0.035  | 0.037 | 0.039 | 0.90        | 0.95 | 1.00 |
| L         | 0.018  | 0.020 | 0.023 | 0.46        | 0.51 | 0.58 |
| M         | 0.000  | 0.000 | 0.004 | 0.00        | 0.00 | 0.10 |
| N         | 0.021  | 0.026 | 0.027 | 0.53        | 0.67 | 0.69 |
| O         | 0°     | 0°    | 5°    | 0°          | 0°   | 5°   |
| P         | 0.042  | 0.047 | 0.052 | 1.06        | 1.20 | 1.32 |
| Q         | 0.034  | 0.039 | 0.044 | 0.86        | 1.00 | 1.11 |