

**BTA08-600XW**

THREE-QUADRANT TRIAC



**VOLTAGE:** 600 Volts

**CURRENT:** 8 Ampers

**Package:** TO-220A

**Marking and Polarity**

**FEATURES**

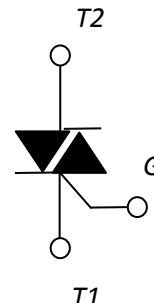
- Highly di/dt For High Reliability
- Low On-State Voltage For Low Power Consumption
- Ceramic Pad For Internal Insulation
- RoHS Compliant

**TYPICAL APPLICATIONS**

- Phase Control Operation Of Light Dimmers And Motor Speed Controllers
- ON/OFF Control Operation Of Heating Regulation And Induction Motor
- Weight: App. 2.057 Grams (0.07255 Ounce)

**PRODUCT SUMMARY**

| Item                    | TW  | SW | CW | BW | Unit |
|-------------------------|-----|----|----|----|------|
| $I_{T(RMS)}$            | 8   |    |    |    | A    |
| $V_{DRM}/V_{RRM}$ Min.  | 600 |    |    |    | V    |
| $I_{GT(I-II-III)}$ Max. | 5   | 10 | 35 | 50 | mA   |



Remark:

- ①. NH=Nihang Trademark
- ②. FF=Product Line Code, According To Actual Changes  
YWW=Date Code, According To Actual Changes  
LLWWF=Internal Code, According To Actual Changes
- ③. BTA08-600XW=Model, XW=TW, SW, CW, BW

**Absolute Maximum Ratings (Ta=25°C Unless otherwise specified)**

| Parameter                                  | Test Conditions                                                                          | Symbol       | BTA08-600XW | Unit       |
|--------------------------------------------|------------------------------------------------------------------------------------------|--------------|-------------|------------|
| Repetitive Peak Off-State Voltage          |                                                                                          | $V_{DRM}$    | 600         | V          |
| Repetitive Peak Reverse Voltage            |                                                                                          | $V_{RRM}$    | 600         | V          |
| RMS On-State Current                       | $T_c \leq 80^\circ C$                                                                    | $I_{T(RMS)}$ | 8           | A          |
| Non Repetitive Surge Peak On-State Current | $F = 50 \text{ Hz}, T_p = 20 \text{ ms}$                                                 | $I_{TSM}$    | 80          | A          |
| $I^2T$ Value For Fusing                    | $T_p = 10 \text{ ms}$                                                                    | $I^2t$       | 32          | A          |
| Critical Rate Of Rise Of On-State Current  | $I_G = 2 \cdot I_{GT}, tr \leq 10 \text{ ns}$<br>$F = 100 \text{ Hz}, T_j = 150^\circ C$ | $di/dt$      | 50          | A/ $\mu s$ |
| Peak Gate Current                          | $T_p = 20 \mu s, T_j = 150^\circ C$                                                      | $I_{GM}$     | 4.0         | A          |
| Average Gate Power Dissipation             | $T_j = 150^\circ C$                                                                      | $P_{G(AV)}$  | 1.0         | W          |
| Maximum Mounting Torque                    | M3 screw                                                                                 | $T_{MM}$     | 1.1         | N.m        |

**Thermal Characteristics (Ta=25°C Unless otherwise specified)**

| Parameter                            | Symbol          | BTA08-600XW | Unit         |
|--------------------------------------|-----------------|-------------|--------------|
| Operating Junction Temperature Range | $T_J$           | -40 to 150  | $^\circ C$   |
| Storage Temperature Range            | $T_{STD}$       | -40 to 150  |              |
| Typical Thermal Resistance           | $R_{\theta JA}$ | 60.0        | $^\circ C/W$ |
|                                      | $R_{\theta JC}$ | 1.7         |              |

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**Electrical Characteristics (Ta=25°C Unless otherwise specified )**

| Parameter                                | Test Conditions                   | Symbol    | Quadrants    | Value  |      |       |       | Unit |
|------------------------------------------|-----------------------------------|-----------|--------------|--------|------|-------|-------|------|
|                                          |                                   |           |              | TW     | SW   | CW    | BW    |      |
| Gate Trigger Current                     | VD=12V, IT=0.1A                   | $I_{GT}$  | I - II - III | ≤5     | ≤10  | ≤35   | ≤50   | mA   |
| Gate Trigger Voltage                     | VD=12V, IT=0.1A                   | $V_{GT}$  | I - II - III | ≤ 1.5  |      |       |       | V    |
| Holding Current                          | IT=100mA                          | $I_H$     |              | ≤10    | ≤15  | ≤35   | ≤50   | mA   |
| Latching Current                         | IG=1.2*IGT                        | $I_L$     | I - III      | ≤10    | ≤25  | ≤50   | ≤60   | mA   |
|                                          |                                   |           | II           | ≤15    | ≤30  | ≤60   | ≤80   |      |
| Rise Of Off- State Voltage               | VD=2/3*VDRM, Gate open, Tj =150°C | $dv/dt$   |              | ≥150   | ≥500 | ≥1000 | ≥2000 | V/us |
| Peak On-State Voltage                    | IT= 8 A, Tj =25°C                 | $V_{TM}$  |              | ≤ 1.70 |      |       |       | V    |
| Peak Repetitive Forward Blocking Current | $V_D=V_{DRM}$ , Tj =25°C          | $I_{DRM}$ |              | ≤ 5.0  |      |       |       | uA   |
|                                          | $V_D=V_{DRM}$ , Tj =125°C         |           |              | ≤ 3.1  |      |       |       | mA   |
| Peak Repetitive Reverse Blocking Current | $V_R=V_{RRM}$ , Tj =25°C          | $I_{RRM}$ |              | ≤ 5.0  |      |       |       | uA   |
|                                          | $V_R=V_{RRM}$ , Tj =125°C         |           |              | ≤ 3.1  |      |       |       | mA   |

**Model and identification instructions**

|                                                                                                  |   |   |   |   |     |    |
|--------------------------------------------------------------------------------------------------|---|---|---|---|-----|----|
| BT                                                                                               | 0 | 8 | A | - | 600 | xW |
| Product Type<br>BT=TRIAC                                                                         |   |   |   |   |     |    |
| Insulation Spec.:<br>A=Insulation<br>B=No insulation                                             |   |   |   |   |     |    |
| IT(RMS) Spec.:<br>8 = 8A                                                                         |   |   |   |   |     |    |
| Package Spec.:<br>A= TO-220A                                                                     |   |   |   |   |     |    |
| "-"=Connector<br>constant                                                                        |   |   |   |   |     |    |
| VDRM/VRRM Spec.<br>600 = 600V                                                                    |   |   |   |   |     |    |
| IGT Spec.<br>TW:IGT I -III≤5mA<br>SW:IGT I -III≤10mA<br>CW:IGT I -III≤35mA<br>BW:IGT I -III≤50mA |   |   |   |   |     |    |

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Typical Characteristics Curves

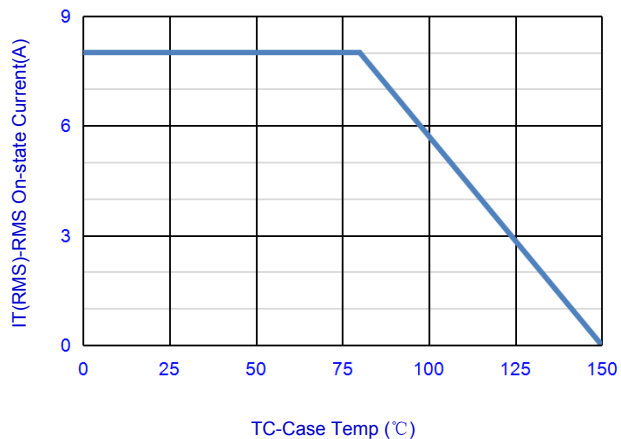


Fig.1-RMS on-state current vs. case temperature

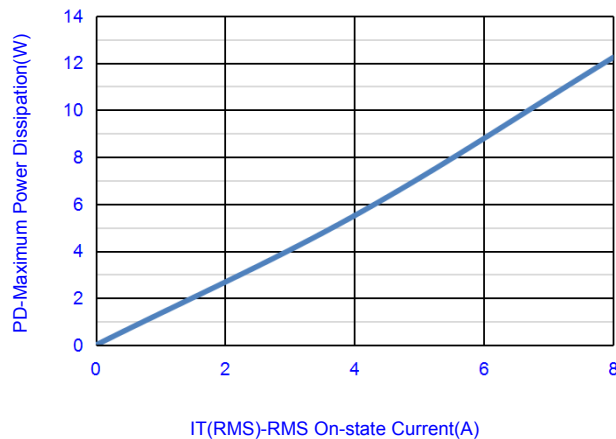


Fig.2- Maximum Power Dissipation Vs. on-state current

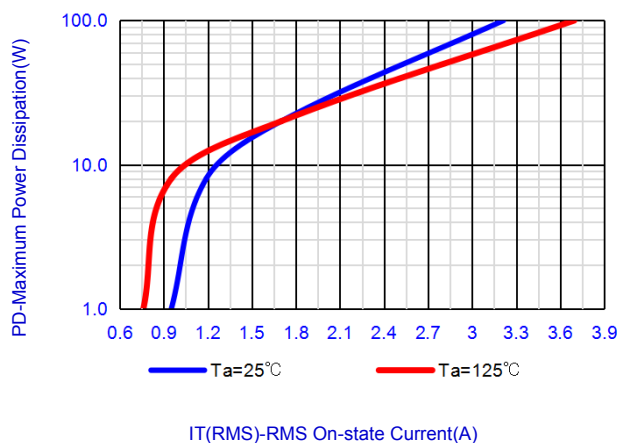


Fig.3- Maximum Power Dissipation Vs. on-state current

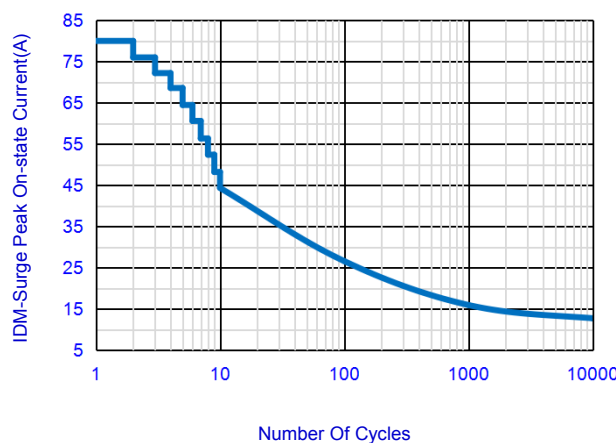


Fig.4- Surge Peak On-state Current Vs. Number Cycles

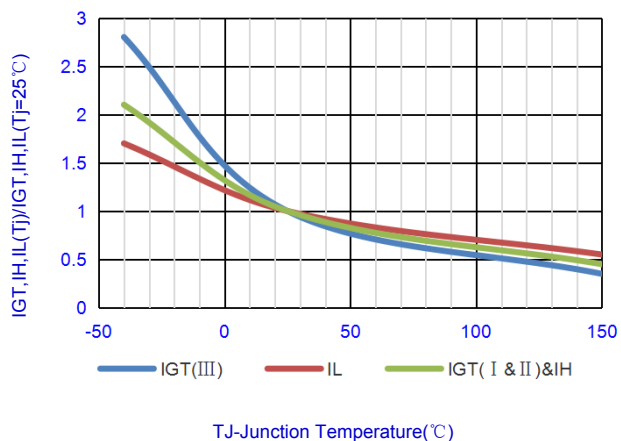


Fig.5- Relative Variation Of Gate Trigger Current , Holding Current And Latching Current Versus Junction Temperature (Typical Value)

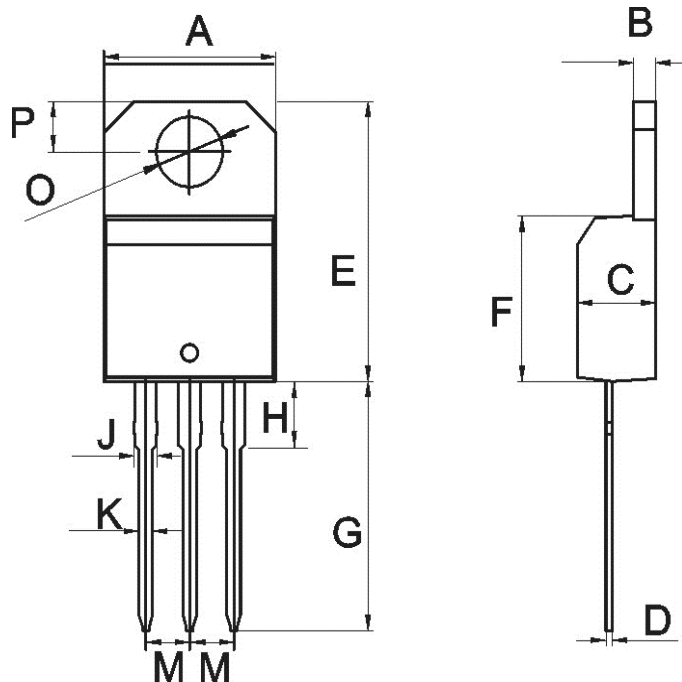
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**OUTLINE DRAWINGS**

**TO-220A**



**OUTLINE DIMENSIONS**

| Dim. | Millimeters |      |       | Inches |      |        |
|------|-------------|------|-------|--------|------|--------|
|      | Min.        | Typ. | Max.  | Min.   | Typ. | Max.   |
| A    | 9.25        | --   | 10.75 | 0.3642 | --   | 0.4232 |
| B    | 1.15        | --   | 1.45  | 0.0453 | --   | 0.0571 |
| C    | 4.20        | --   | 4.70  | 0.1654 | --   | 0.1850 |
| D    | 0.45        | --   | 0.65  | 0.0177 | --   | 0.0256 |
| E    | 14.70       | --   | 16.70 | 0.5787 | --   | 0.6575 |
| F    | 8.55        | --   | 10.05 | 0.3366 | --   | 0.3957 |
| G    | 12.50       | --   | 14.50 | 0.4921 | --   | 0.5709 |
| H    | 3.00        | --   | 4.00  | 0.118  | --   | 0.157  |
| J    | 1.20        | --   | 1.40  | 0.0472 | --   | 0.0551 |
| K    | 0.70        | --   | 1.00  | 0.0276 | --   | 0.0394 |
| M    | 2.20        | --   | 3.00  | 0.0866 | --   | 0.1181 |
| O    | 3.45        | --   | 4.15  | 0.1358 | --   | 0.1634 |
| P    | 2.40        | --   | 3.40  | 0.0945 | --   | 0.1339 |

**PACKING INFORMATION**

| Package Code | Package Method | Box Size L×W×H (mm) | Quantity (pcs/box) | Carton Size L×W×H (mm) | Quantity (pcs/carton) |
|--------------|----------------|---------------------|--------------------|------------------------|-----------------------|
| TO-220A      | Tube Packaging | 570*153*47          | 1000               | 580*250*180            | 5000                  |

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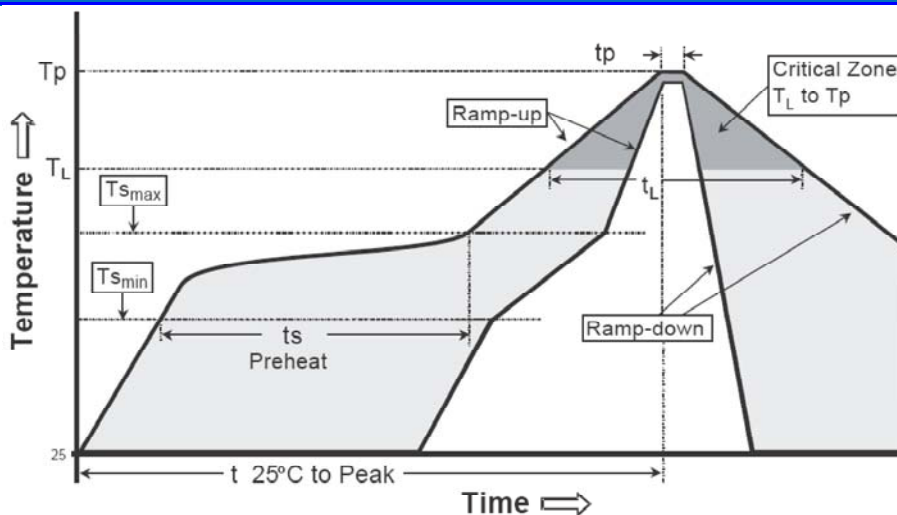
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**Recommended wave soldering condition**

| Product         | Peak Temperature | Soldering Time  |
|-----------------|------------------|-----------------|
| Pb-free devices | 260 +0/-5 °C     | 5 +1/-1 seconds |

**Recommended temperature profile for IR reflow**



| Profile feature                                                                                                                            | Sn-Pb eutectic Assembly          | Pb-free Assembly                 |
|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------|
| Average ramp-up rate<br>(T <sub>smax</sub> to T <sub>p</sub> )                                                                             | 3°C/second max.                  | 3°C/second max.                  |
| Preheat<br>-Temperature Min(T <sub>s</sub> min)<br>-Temperature Max(T <sub>s</sub> max)<br>-Time(t <sub>s</sub> min to t <sub>s</sub> max) | 100°C<br>150°C<br>60-120 seconds | 150°C<br>200°C<br>60-180 seconds |
| Time maintained above:<br>-Temperature (T <sub>L</sub> )<br>- Time (t <sub>L</sub> )                                                       | 183°C<br>60-150 seconds          | 217°C<br>60-150 seconds          |
| Peak Temperature(T <sub>P</sub> )                                                                                                          | 240 +0/-5 °C                     | 260 +0/-5 °C                     |
| Time within 5°C of actual peak<br>temperature(tp)                                                                                          | 10-30 seconds                    | 20-40 seconds                    |
| Ramp down rate                                                                                                                             | 6°C/second max.                  | 6°C/second max.                  |
| Time 25 °C to peak temperature                                                                                                             | 6 minutes max.                   | 8 minutes max.                   |

Note : All temperatures refer to topside of the package, measured on the package body surface.

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