

## DESCRIPTION:

High current density due to double mesa technology; SIPOS and Glass Passivation.

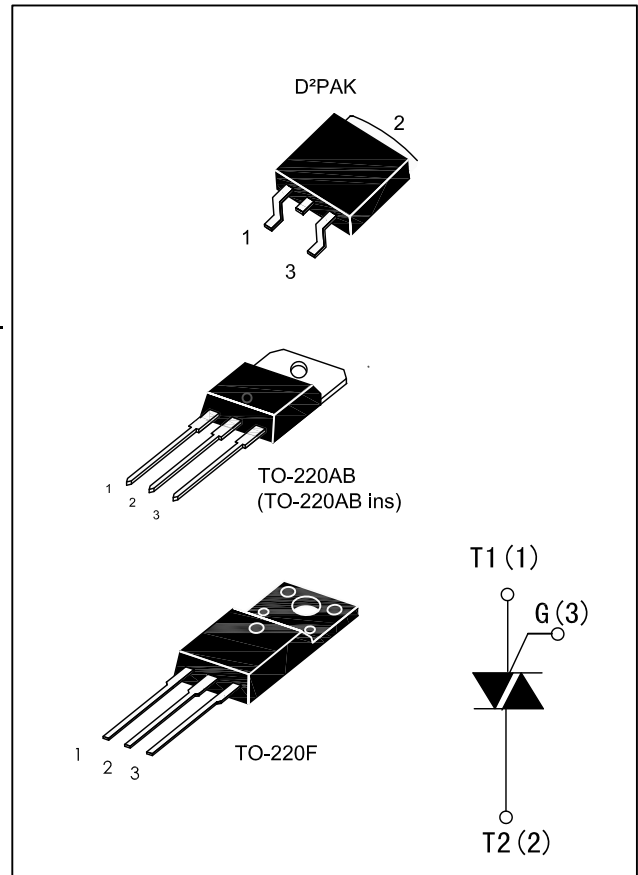
BTB16/BTB16 series triacs is suitable for general purpose AC switching. They can be used as an ON/OFF Function in applications such as static relays, heating regulation, induction motor starting circuits... or for phase control operation light dimmers, motor speed controllers.

BTB16/BTB16- $\times \times \times$ SW, - $\times \times \times$ CW, - $\times \times \times$ BW are 3 Quadrants triacs, They are specially recommended for use on inductive loads.

TO-220ABins and TO-220F are isolated internally, they provide a 2500V RMS isolation voltage from all three terminals to external heatsink.

## MAIN FEATURES

| Symbol            | Value       | Unit |
|-------------------|-------------|------|
| $I_T(RMS)$        | 16          | A    |
| $V_{DRM}/V_{RRM}$ | 600 and 800 | V    |
| $V_{TM}$          | $\leq 1.55$ | V    |



## ABSOLUTE MAXIMUM RATINGS

| Parameter                                                                                                                               |                                                   | Symbol              | Value       | Unit             |
|-----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|---------------------|-------------|------------------|
| Storage junction temperature range                                                                                                      |                                                   | T <sub>stg</sub>    | -40 to +150 | °C               |
| Operating junction temperature range                                                                                                    |                                                   | T <sub>j</sub>      | -40 to +125 | °C               |
| Repetitive Peak Off-state Voltage                                                                                                       | T <sub>j</sub> =25°C                              | V <sub>DRM</sub>    | 600 and 800 | V                |
| Repetitive Peak Reverse Voltage                                                                                                         | T <sub>j</sub> =25°C                              | V <sub>RRM</sub>    | 600 and 800 |                  |
| Non repetitive Surge Peak Off-state Voltage                                                                                             | t <sub>p</sub> =10ms, T <sub>j</sub> =25°C        | V <sub>DSM</sub>    | 700 and 900 | V                |
| Non repetitive Peak Reverse Voltage                                                                                                     |                                                   | V <sub>RSM</sub>    | 700 and 900 |                  |
| RMS on-state current (full sine wave)                                                                                                   | D <sup>2</sup> PAK/TO-220AB T <sub>c</sub> =100°C | I <sub>T(RMS)</sub> | 16          | A                |
|                                                                                                                                         | TO-220F T <sub>c</sub> =78°C                      |                     |             |                  |
|                                                                                                                                         | TO-220AB Ins T <sub>c</sub> =85°C                 |                     |             |                  |
| Non repetitive surge peak on-state current (full cycle, T <sub>j</sub> =25°C)                                                           | f = 60 Hz    t=16.7ms                             | I <sub>TSM</sub>    | 168         | A                |
|                                                                                                                                         | f = 50 Hz    t=20ms                               |                     | 160         |                  |
| I <sup>2</sup> t Value for fusing                                                                                                       | t <sub>p</sub> =10ms                              | I <sup>2</sup> t    | 144         | A <sup>2</sup> s |
| Critical rate of rise of on-state current<br>I <sub>G</sub> =2×I <sub>GT</sub> , t <sub>r</sub> ≤100 ns, f=120Hz, T <sub>j</sub> =125°C |                                                   | di/dt               | 50          | A/μs             |
| Peak gate current                                                                                                                       | t <sub>p</sub> =20μs, T <sub>j</sub> =125°C       | I <sub>GM</sub>     | 4           | A                |
| Average gate power dissipation                                                                                                          | T <sub>j</sub> =125°C                             | P <sub>G(AV)</sub>  | 1           | W                |

ELECTRICAL CHARACTERISTICS(T<sub>j</sub>=25°C unless otherwise specified)

● 3 Quadrants

| Symbol               | Test Condition                                                                | Quadrant |      | BTA16/BTB16 |     |      | Unit |
|----------------------|-------------------------------------------------------------------------------|----------|------|-------------|-----|------|------|
|                      |                                                                               |          |      | SW          | CW  | BW   |      |
| I <sub>GT</sub>      | V <sub>D</sub> =12V   R <sub>L</sub> =33Ω                                     | I-II-III | MAX. | 10          | 35  | 50   | mA   |
| V <sub>GT</sub>      |                                                                               | I-II-III | MAX. | 1.3         |     |      | V    |
| V <sub>GD</sub>      | V <sub>D</sub> =V <sub>DRM</sub> R <sub>L</sub> =3.3KΩ   T <sub>j</sub> =125℃ | I-II-III | MIN. | 0.2         |     |      | V    |
| I <sub>L</sub>       | I <sub>G</sub> =1.2I <sub>GT</sub>                                            | I-III    | MAX. | 25          | 50  | 70   | mA   |
|                      |                                                                               | II       | MAX. | 30          | 60  | 80   | mA   |
| I <sub>H</sub>       | I <sub>T</sub> =500mA                                                         |          | MAX. | 15          | 35  | 50   | mA   |
| dV/dt                | V <sub>D</sub> =67%V <sub>DRM</sub> gate open   T <sub>j</sub> =125℃          |          | MIN. | 40          | 500 | 1000 | V/μs |
| (dI/dt) <sub>c</sub> | (dV/dt) <sub>c</sub> =0.1V/μs   T <sub>j</sub> =125℃                          |          | MIN. | 8.5         | --- | ---  | A/mS |
|                      | (dV/dt) <sub>c</sub> =10V/μs   T <sub>j</sub> =125℃                           |          |      | 3.0         | --- | ---  |      |
|                      | Without snubber   T <sub>j</sub> =125℃                                        |          |      | ----        | 8.5 | 14   |      |

● 4 Quadrants

| Symbol               | Test Condition                                                               | Quadrant       |      | BTA16/BTB16 |           | Unit |
|----------------------|------------------------------------------------------------------------------|----------------|------|-------------|-----------|------|
|                      |                                                                              |                |      | C           | B         |      |
| I <sub>GT</sub>      | V <sub>D</sub> =12V R <sub>L</sub> =33Ω                                      | I-II-III<br>IV | MAX. | 25<br>50    | 50<br>100 | mA   |
| V <sub>GT</sub>      |                                                                              | ALL            | MAX. | 1.3         |           | V    |
| V <sub>GD</sub>      | V <sub>D</sub> =V <sub>DRM</sub> R <sub>L</sub> =3.3KΩ T <sub>j</sub> =125°C | ALL            | MIN. | 0.2         |           | V    |
| I <sub>L</sub>       | I <sub>G</sub> =1.2I <sub>GT</sub>                                           | I-III-IV       | MAX. | 40          | 60        | mA   |
|                      |                                                                              | II             | MAX. | 80          | 120       | mA   |
| I <sub>H</sub>       | I <sub>T</sub> =500mA                                                        |                | MAX. | 25          | 50        | mA   |
| dV/dt                | V <sub>D</sub> =67%V <sub>DRM</sub> gate open T <sub>j</sub> =125°C          |                | MIN. | 200         | 400       | V/μs |
| (dV/dt) <sub>c</sub> | (dI/dt) <sub>c</sub> =7A/ms T <sub>j</sub> =125°C                            |                | MIN. | 5           | 10        | V/μs |

## STATIC CHARACTERISTICS

| Symbol                 | Parameter                    |                    | Value(MAX.) | Unit    |
|------------------------|------------------------------|--------------------|-------------|---------|
| $V_{TM}$               | $I_{TM}=22.5A, t_p=380\mu s$ | $T_j=25^{\circ}C$  | 1.55        | V       |
| $I_{DRM}$<br>$I_{RRM}$ | $V_D=V_{DRM} \ V_R=V_{RRM}$  | $T_j=25^{\circ}C$  | 5           | $\mu A$ |
|                        |                              | $T_j=125^{\circ}C$ | 2           | mA      |

## THERMAL RESISTANCES

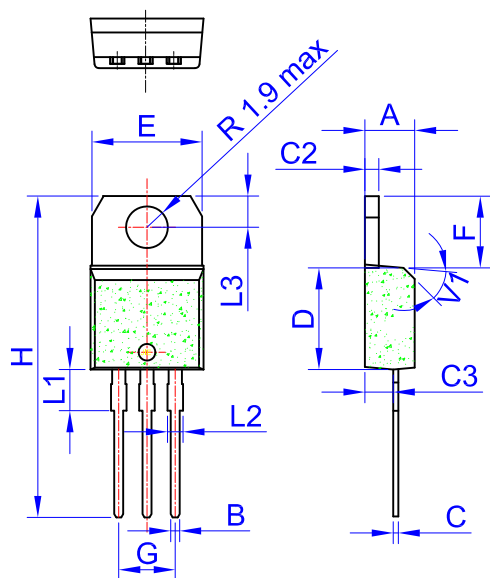
| Symbol        | Parameter            |                             | Value | Unit          |
|---------------|----------------------|-----------------------------|-------|---------------|
| $R_{th(J-C)}$ | Junction to Case(AC) | D <sup>2</sup> PAK/TO-220AB | 1.2   | $^{\circ}C/W$ |
|               |                      | TO-220AB INS /TO-220F       | 2.1   |               |

## ORDERING INFORMATION

|                           |  |                                   |    |                                                                                                |     |                                              |   |
|---------------------------|--|-----------------------------------|----|------------------------------------------------------------------------------------------------|-----|----------------------------------------------|---|
| BT                        |  | A                                 | 16 | –                                                                                              | 800 | B                                            | G |
| TRIAC SERIES              |  | A:TO-220AB ins<br>B: no insulated |    | IGT Class                                                                                      |     | Package: G:TO-220AB<br>X:TO-263<br>F:TO-220F |   |
| I <sub>T(RMS)</sub> : 16A |  |                                   |    | 600:V <sub>DRM</sub> /V <sub>RRM</sub> ≥ 600V<br>800:V <sub>DRM</sub> /V <sub>RRM</sub> ≥ 800V |     |                                              |   |

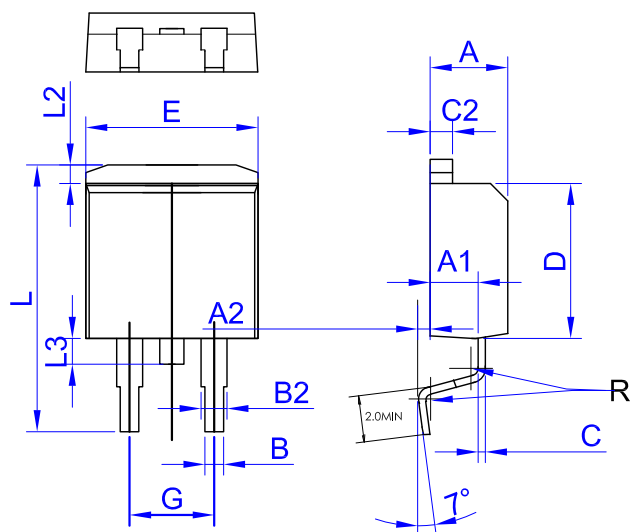
## PACKAGE MECHANICAL DATA

### TO-220AB



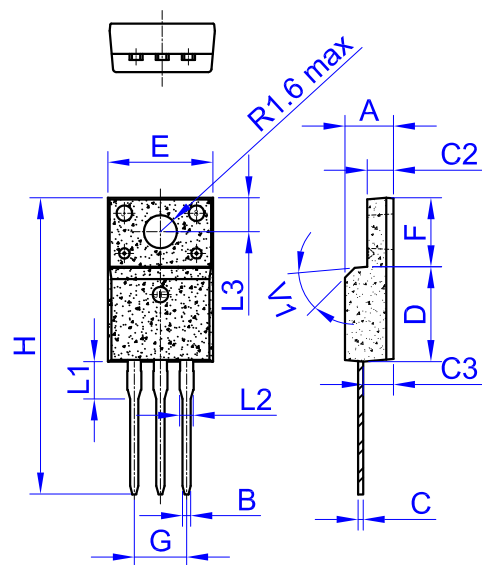
| Ref. | Dimensions  |      |      |        |      |       |
|------|-------------|------|------|--------|------|-------|
|      | Millimeters |      |      | Inches |      |       |
|      | Min.        | Typ. | Max. | Min.   | Typ. | Max.  |
| A    | 4.4         |      | 4.6  | 0.173  |      | 1.181 |
| B    | 0.61        |      | 0.88 | 0.024  |      | 0.034 |
| C    | 0.46        |      | 0.70 | 0.018  |      | 0.027 |
| C2   | 1.23        |      | 1.32 | 0.048  |      | 0.051 |
| C3   | 2.4         |      | 2.72 | 0.094  |      | 0.107 |
| D    | 8.6         |      | 9.7  | 0.338  |      | 0.382 |
| E    | 9.8         |      | 10.4 | 0.386  |      | 0.409 |
| F    | 6.2         |      | 6.6  | 0.244  |      | 0.259 |
| G    | 4.8         |      | 5.4  | 0.189  |      | 0.213 |
| H    | 28.0        |      | 29.8 | 11.0   |      | 11.7  |
| L1   |             | 3.75 |      | 0.147  |      |       |
| L2   | 1.14        |      | 1.7  | 0.044  |      | 0.066 |
| L3   | 2.65        |      | 2.95 | 0.104  |      | 0.116 |
| V1   |             | 40°  |      |        | 40°  |       |

### D<sup>2</sup>PAK



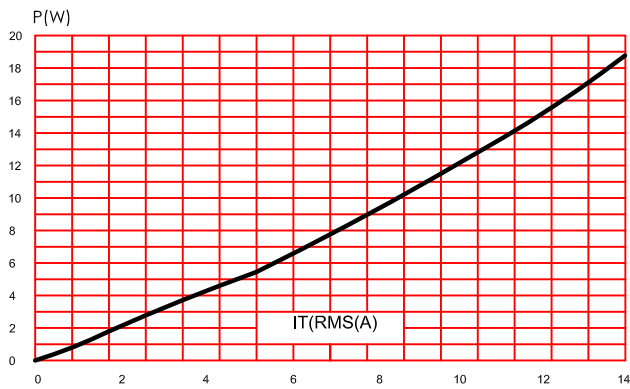
| Ref. | Dimensions  |      |       |        |       |       |
|------|-------------|------|-------|--------|-------|-------|
|      | Millimeters |      |       | Inches |       |       |
|      | Min.        | Typ. | Max.  | Min.   | Typ.  | Max.  |
| A    | 4.30        |      | 4.60  | 0.169  |       | 0.181 |
| A1   | 2.49        |      | 2.69  | 0.098  |       | 0.106 |
| A2   | 0.03        |      | 0.23  | 0.001  |       | 0.009 |
| B    | 0.70        |      | 0.93  | 0.027  |       | 0.037 |
| B2   | 1.25        | 1.40 |       | 0.048  | 0.055 |       |
| C    | 0.45        |      | 0.60  | 0.017  |       | 0.024 |
| C2   | 1.21        |      | 1.36  | 0.047  |       | 0.054 |
| D    | 8.95        |      | 9.35  | 0.352  |       | 0.368 |
| E    | 10.0        |      | 10.28 | 0.393  |       | 0.405 |
| G    | 4.88        |      | 5.28  | 0.192  |       | 0.208 |
| L    | 15.0        |      | 15.85 | 0.590  |       | 0.624 |
| L2   | 1.27        |      | 1.40  | 0.050  |       | 0.055 |
| L3   | 1.40        |      | 1.75  | 0.055  |       | 0.069 |
| R    |             | 0.40 |       |        | 0.016 |       |

TO-220F

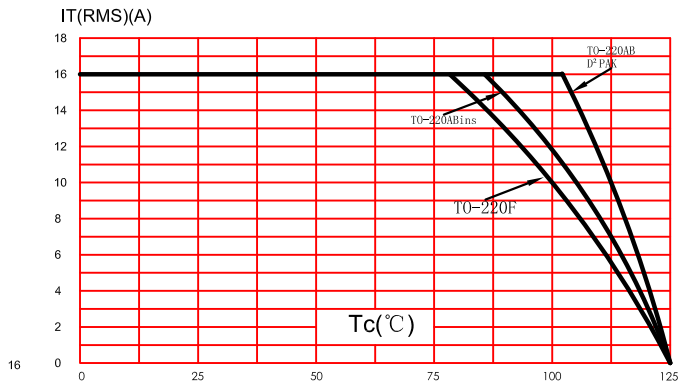


| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 4.4         |      | 4.8  | 0.173  |       | 0.189 |
| B    | 0.74        | 0.8  | 0.83 | 0.029  | 0.031 | 0.033 |
| C    | 0.5         |      | 0.75 | 0.020  |       | 0.030 |
| C2   | 2.4         |      | 2.7  | 0.094  |       | 0.106 |
| C3   | 2.6         |      | 3.0  | 0.102  |       | 0.118 |
| D    | 8.8         |      | 9.3  | 0.346  |       | 0.367 |
| E    | 9.7         |      | 10.3 | 0.382  |       | 0.406 |
| F    | 6.4         |      | 6.8  | 0.252  |       | 0.268 |
| G    | 5.0         |      | 5.2  | 0.197  |       | 0.205 |
| H    | 28.0        |      | 29.8 | 11.0   |       | 11.7  |
| L1   |             | 3.63 |      |        | 0.143 |       |
| L2   | 1.14        |      | 1.7  | 0.044  |       | 0.067 |
| L3   |             | 3.3  |      |        | 0.130 |       |
| V1   |             | 40°  |      |        | 40°   |       |

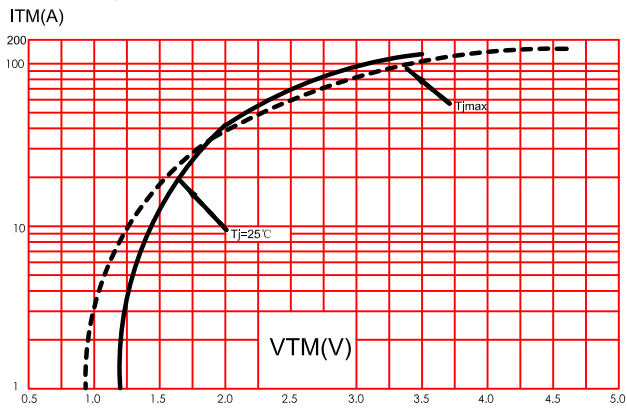
**FIG.1:** Maximum power dissipation versus RMS on-state current(full cycle)



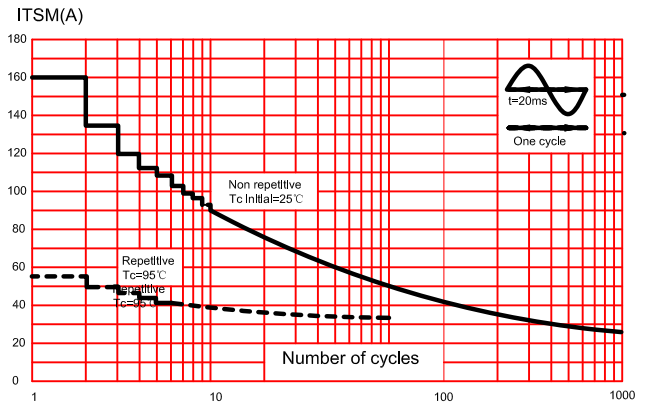
**FIG.2:** RMS on-state current versus case temperature(full cycle)



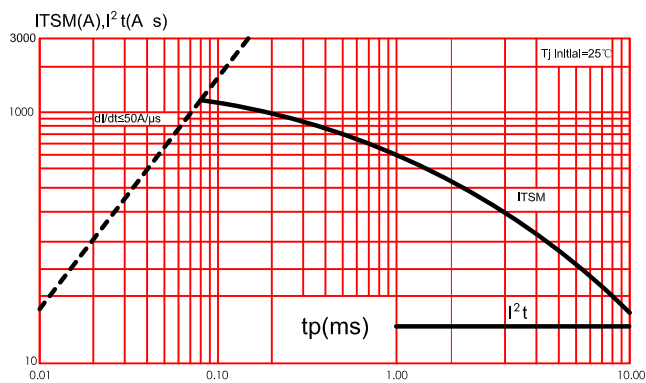
**FIG.3:** On-state characteristics (maximum values)



**FIG.4:** Surge peak on-state current versus number of cycles.



**FIG.5:** Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10ms$ , and corresponding value of  $I^2t$



**FIG.6:** Relative variation of gate trigger current, holding current and latching current versus junction temperature(typical values).

