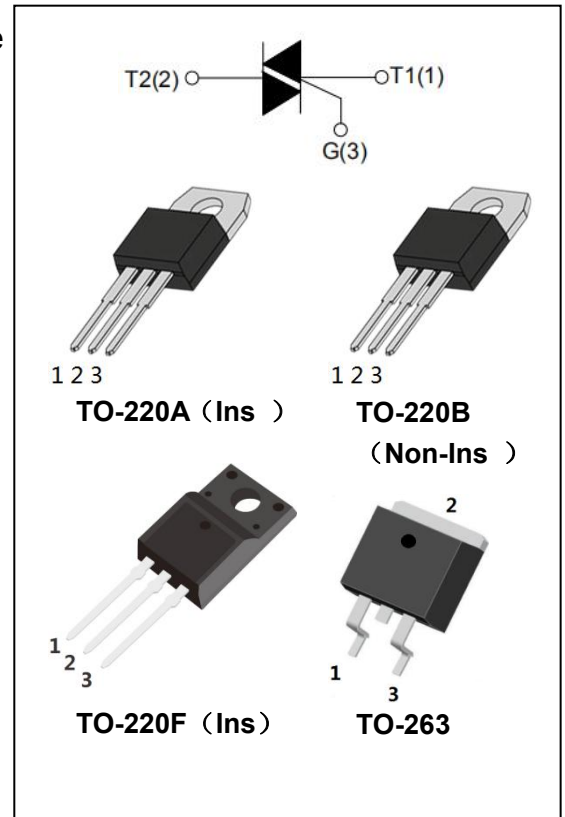


DESCRIPTION:

With high ability to withstand the shock loading of Large current, BTA12/BTB12 series triacs provide high dv/dt rate with strong resistance to electromagnetic interference. With high commutation performances, 3 quadrants products especially recommended for use on inductive load. From all three terminals to external heatsink, BTA12 provides a rated insulation voltage of 2500 V_{RMS} complying with UL standards

MAIN FEATURES:

| symbol | value | unit |
|-------------------|--------------|------|
| $I_{T(RMS)}$ | 12 | A |
| V_{DRM}/V_{RRM} | 600/800/1200 | V |
| V_{TM} | ≤1.5 | V |



ABSOLUTE MAXIMUM RATINGS:

| Parameter | Symbol | Value | Unit |
|--|--------------|--------------|------------------|
| Storage junction temperature range | T_{stg} | -40~150 | °C |
| Operating junction temperature range | T_j | -40~125 | °C |
| Repetitive peak off-state voltage ($T_j=25^\circ\text{C}$) | V_{DRM} | 600/800/1200 | V |
| Repetitive peak reverse voltage ($T_j=25^\circ\text{C}$) | V_{RRM} | 600/800/1200 | V |
| RMS on-state current | $I_{T(RMS)}$ | 12 | A |
| Non repetitive surge peak on-state current (full cycle, F=50Hz) | I_{TSM} | 120 | A |
| I^2t value for fusing ($t_p=10\text{ms}$) | I^2t | 78 | A ² s |
| Critical rate of rise of on-state current($I_G=2 \times I_{GT}$) | di/dt | 50 | A/ μs |
| Peak gate current | I_{GM} | 4 | A |
| Average gate power dissipation | $P_{G(AV)}$ | 1 | W |
| Peak gate power | P_{GM} | 5 | W |

ELECTRICAL CHARACTERISTICS ($T_j=25^\circ\text{C}$ unless otherwise specified)

3 Quadrants:

| Parameter | Test Condition | Quadrant | | Value | | | | Unit |
|-----------|---|--------------|-----|-------|-----|-----|------|------------------|
| | | | | TW | SW | CW | BW | |
| I_{GT} | $V_D=12\text{V}$, $R_L=33\Omega$ | I - II - III | MAX | 5 | 10 | 35 | 50 | mA |
| V_{GT} | | | | 1.5 | | | | V |
| V_{GD} | $V_D=V_{DRM}$ | I - II - III | MIN | 0.2 | | | | V |
| I_H | $I_T=100\text{mA}$ | | MAX | 5 | 10 | 40 | 60 | mA |
| I_L | $I_G=1.2I_{GT}$ | I - III | MAX | 20 | 30 | 50 | 70 | mA |
| | | II | | 25 | 40 | 60 | 80 | |
| dV/dt | $V_D=2/3V_{DRM}$ $T_j=125^\circ\text{C}$ Gate open | | MIN | 100 | 200 | 500 | 1000 | V/ μs |

4 Quadrants:

| Parameter | Test Condition | Quadrant | | Value | | Unit |
|-----------|---|--------------|-----|-------|-----|------------------|
| | | | | C | B | |
| I_{GT} | $V_D=12\text{V}$, $R_L=33\Omega$ | I - II - III | MAX | 25 | 50 | mA |
| | | IV | | 50 | 70 | mA |
| V_{GT} | | ALL | | 1.5 | | V |
| V_{GD} | $V_D=V_{DRM}$ | ALL | MIN | 0.2 | | V |
| I_H | $I_T=100\text{mA}$ | | MAX | 40 | 60 | mA |
| I_L | $I_G=1.2I_{GT}$ | I - III - IV | MAX | 50 | 70 | mA |
| | | II | | 70 | 90 | |
| dV/dt | $V_D=2/3V_{DRM}$ $T_j=125^\circ\text{C}$ Gate open | | MIN | 200 | 500 | V/ μs |

STATIC CHARACTERISTICS

| Symbol | Test Condition | | | Value | Unit |
|------------------------|-----------------------------|-------------------|-----|-------|---------|
| V_{TM} | $I_{TM}=17A$ $t_p=380\mu s$ | $T_j=25^\circ C$ | MAX | 1.5 | V |
| I_{DRM} I_{RRM} | $V_{DRM}=V_{RRM}$ | $T_j=25^\circ C$ | MAX | 5 | μA |
| | | $T_j=125^\circ C$ | | 1 | mA |

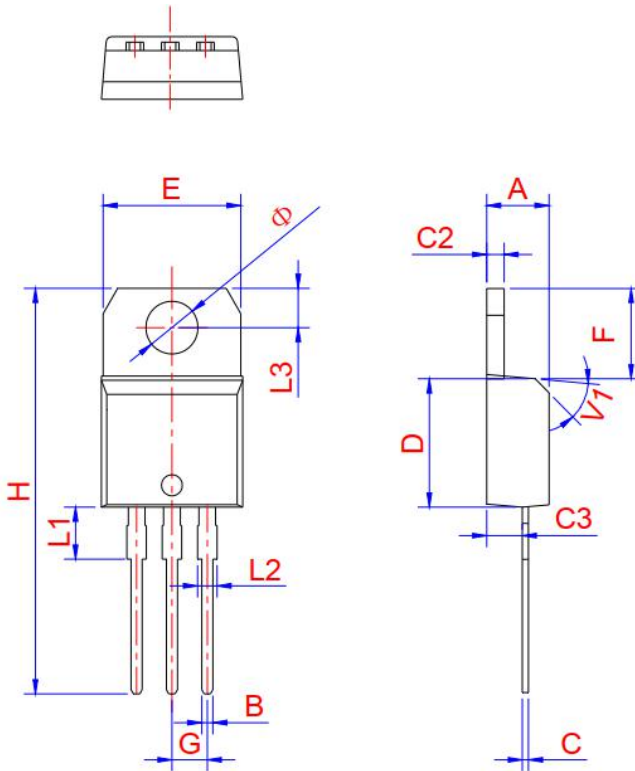
THERMAL RESISTANCES

| Symbol | Test Condition | | Value | Unit |
|---------------|----------------------|------------------|-------|--------------|
| $R_{th(j-c)}$ | junction to case(AC) | TO-220A(Ins) | 2.3 | $^\circ C/W$ |
| | | TO-220B(Non-Ins) | 1.5 | |
| | | TO-220F(Ins) | 2.5 | |
| | | TO-263 | 1.5 | |

ORDERING INFORMATION

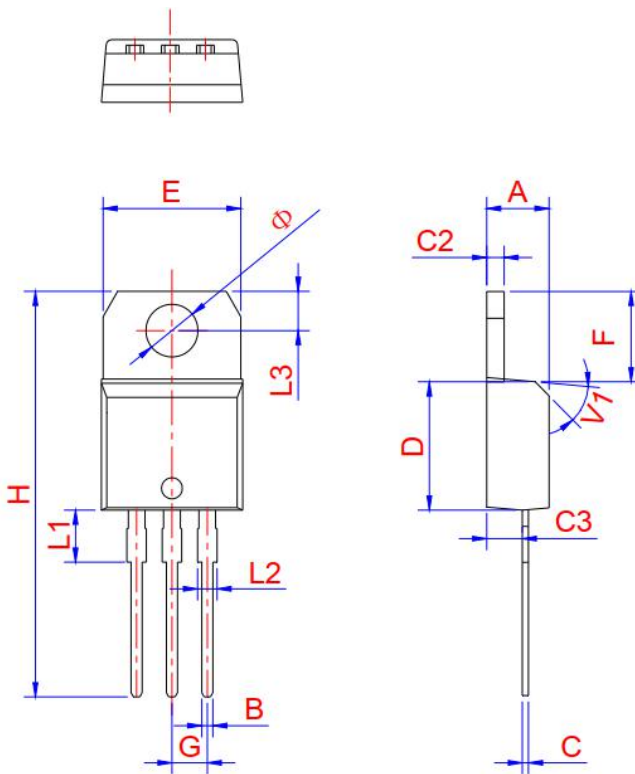
| | | | |
|---|--|--|---|
| <p>B T A</p> <p>Triacs</p> <p>A: Insulated</p> <p>B: Non-Insulated</p> | <p>12 - 600</p> <p>$I_{T(RMS)}: 12A$</p> | <p>C W</p> <p>V_{DRM}, V_{RRM}:</p> <p>600: 600V</p> <p>800: 800V</p> <p>1200: 1200V</p> | <p>B: $I_{GT1-3} \leq 50mA, I_{GT4} \leq 100mA$</p> <p>C: $I_{GT1-3} \leq 25mA, I_{GT4} \leq 50mA$</p> <p>TW: $I_{GT1-3} \leq 5mA$</p> <p>SW: $I_{GT1-3} \leq 10mA$</p> <p>CW: $I_{GT1-3} \leq 35mA$</p> <p>BW: $I_{GT1-3} \leq 50mA$</p> |
|---|--|--|---|

PACKAGE MECHANICAL DATA



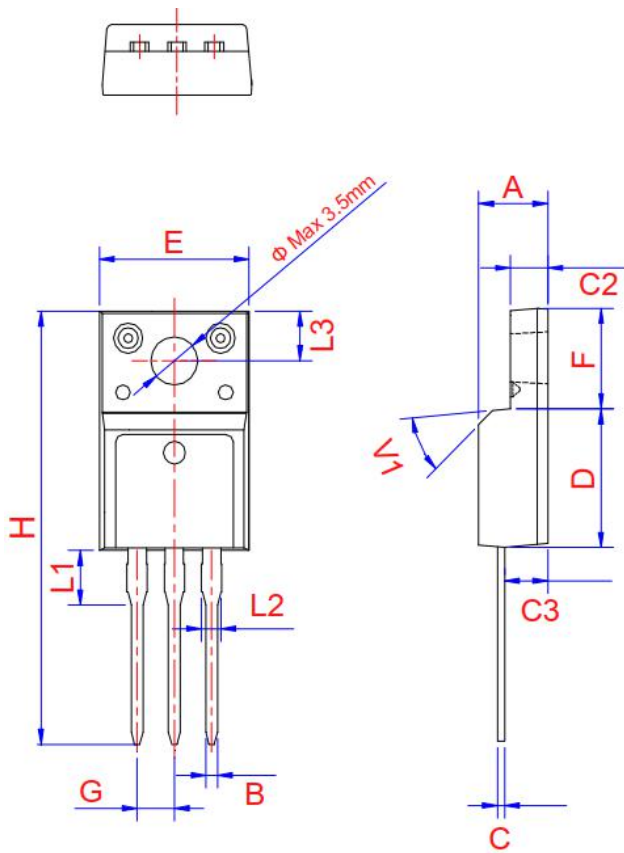
TO-220A Ins

| Ref. | Dimensions | | | | | |
|--------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 4.4 | 4.47 | 4.6 | 0.173 | 0.176 | 0.181 |
| B | 0.61 | | 0.88 | 0.024 | | 0.035 |
| C | 0.46 | 0.50 | 0.7 | 0.018 | 0.02 | 0.028 |
| C2 | 1.21 | 1.27 | 1.32 | 0.048 | 0.050 | 0.052 |
| C3 | 2.4 | | 2.72 | 0.094 | | 0.107 |
| D | 8.6 | | 9.7 | 0.339 | | 0.382 |
| E | 9.8 | | 10.4 | 0.386 | | 0.409 |
| F | 6.55 | | 6.95 | 0.258 | | 0.274 |
| G | | 2.54 | | | 0.1 | |
| H | 28 | | 29.8 | 1.102 | | 1.173 |
| L1 | | 3.75 | | | 0.148 | |
| L2 | 1.14 | | 1.7 | 0.045 | | 0.067 |
| L3 | 2.65 | | 2.95 | 0.104 | | 0.116 |
| V1 | | 45° | | | 45° | |
| Φ | 3.7 | 3.75 | 3.8 | 0.145 | 0.147 | 0.149 |



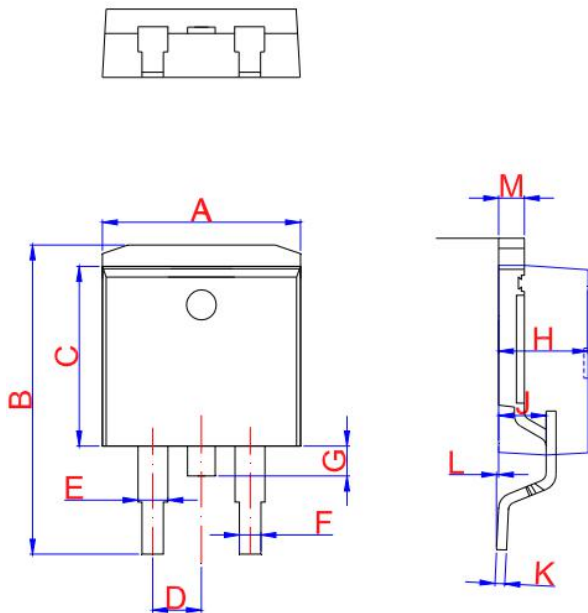
TO-220B Non-Ins

| Ref. | Dimensions | | | | | |
|--------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 4.4 | 4.47 | 4.6 | 0.173 | 0.176 | 0.181 |
| B | 0.61 | | 0.88 | 0.024 | | 0.035 |
| C | 0.46 | 0.50 | 0.7 | 0.018 | 0.02 | 0.028 |
| C2 | 1.21 | 1.27 | 1.32 | 0.048 | 0.050 | 0.052 |
| C3 | 2.4 | | 2.72 | 0.094 | | 0.107 |
| D | 8.6 | | 9.7 | 0.339 | | 0.382 |
| E | 9.8 | | 10.4 | 0.386 | | 0.409 |
| F | 6.55 | | 6.95 | 0.258 | | 0.274 |
| G | | 2.54 | | | 0.1 | |
| H | 28 | | 29.8 | 1.102 | | 1.173 |
| L1 | | 3.75 | | | 0.148 | |
| L2 | 1.14 | | 1.7 | 0.045 | | 0.067 |
| L3 | 2.65 | | 2.95 | 0.104 | | 0.116 |
| V1 | | 45° | | | 45° | |
| Φ | 3.7 | 3.75 | 3.8 | 0.145 | 0.147 | 0.149 |



TO-220F Ins

| Ref. | Dimensions | | | | | |
|------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 4.5 | | 4.9 | 0.177 | | 0.193 |
| B | 0.74 | 0.8 | 0.83 | 0.029 | 0.031 | 0.033 |
| C | 0.47 | | 0.65 | 0.019 | | 0.026 |
| C2 | 2.45 | | 2.75 | 0.096 | | 0.108 |
| C3 | 2.6 | | 3 | 0.102 | | 0.118 |
| D | 8.8 | | 9.3 | 0.346 | | 0.366 |
| E | 9.8 | | 10.4 | 0.386 | | 0.41 |
| F | 6.4 | | 6.8 | 0.252 | | 0.268 |
| G | | 2.54 | | | 0.1 | |
| H | 28 | | 29.8 | 1.102 | | 1.173 |
| L1 | | 3.63 | | | 0.148 | |
| L2 | 1.14 | | 1.7 | 0.045 | | 0.067 |
| L3 | 2.65 | 3.3 | 0 | | 0.13 | 0.116 |
| V1 | | 45° | | | 45° | |



TO-263

| Ref. | Dimensions | | | | | |
|------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 9.9 | | 10.3 | 0.390 | | 0.406 |
| B | 14.7 | | 15.8 | 0.579 | | 0.622 |
| C | 8.5 | | 8.9 | 0.370 | | 0.378 |
| D | | 2.54 | | | 0.100 | |
| E | 1.20 | | 1.40 | 0.047 | | 0.055 |
| F | 0.75 | | 0.85 | 0.029 | | 0.033 |
| G | | | 1.75 | | | 0.069 |
| H | 4.40 | 4.60 | 4.80 | 0.173 | 0.181 | 0.189 |
| J | 2.40 | 2.60 | 2.80 | 0.094 | 0.102 | 0.110 |
| L | 0 | 0.1 | 0.25 | 0 | 0.004 | 0.010 |
| M | 1.17 | 1.27 | 1.37 | 0.046 | 0.05 | 0.054 |

FIG.1: Maximum power dissipation versus RMS on-state current

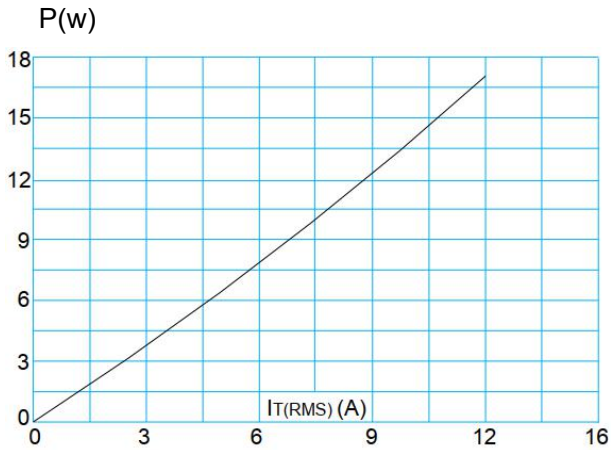


FIG.2: RMS on-state current versus case temperature

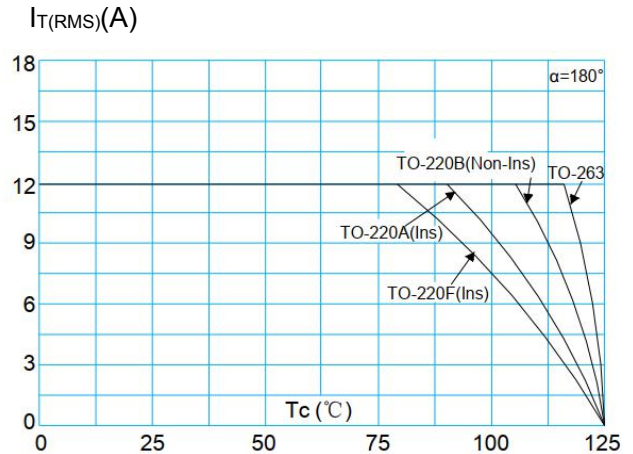


FIG.3: Surge peak on-state current versus number of cycles

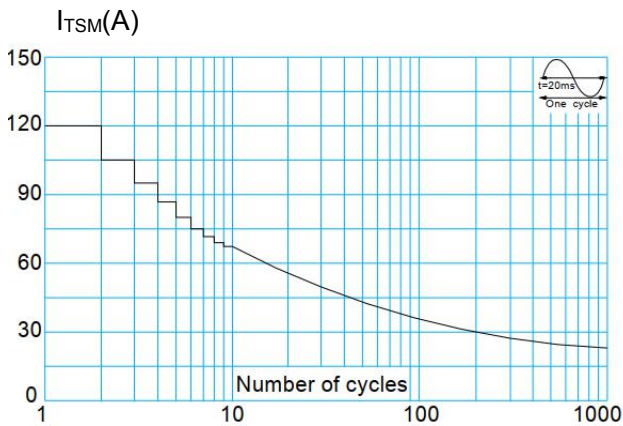


FIG.4: On-state characteristics (maximum values)

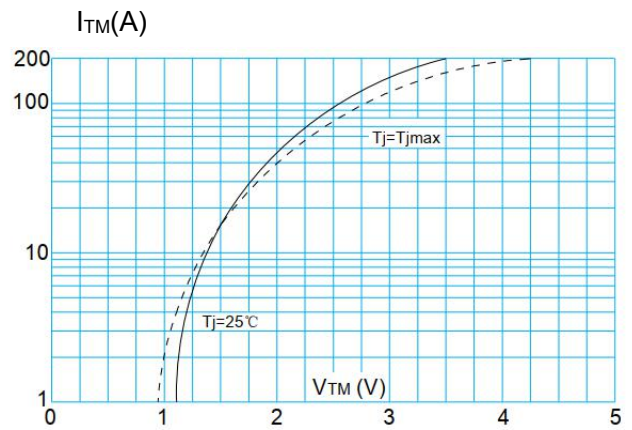


FIG.5: Non-repetitive surge peak on-state current for a sinusoidal pulse with width $t_p < 20\text{ms}$, and corresponding value of I^2t (I - II - III: $dI/dt < 50\text{A}/\mu\text{s}$; IV: $dI/dt < 10\text{A}/\mu\text{s}$)

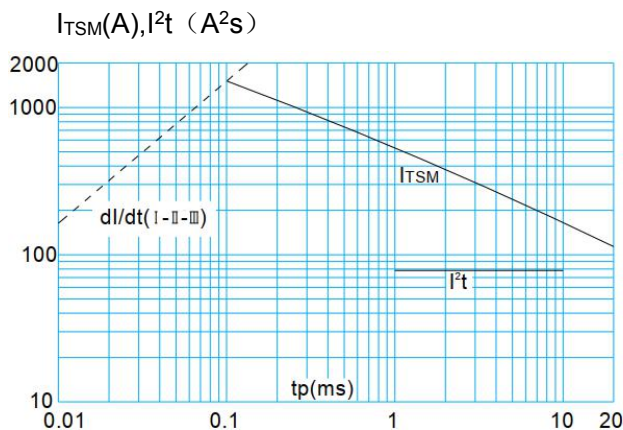


FIG.6: Relative variations of gate trigger current, holding current and latching current versus junction temperature

