



**TO-220BK Plastic-Encapsulate Thyristors**

**CT316B** 3Q TRIACs

**MAIN CHARACTERISTICS**

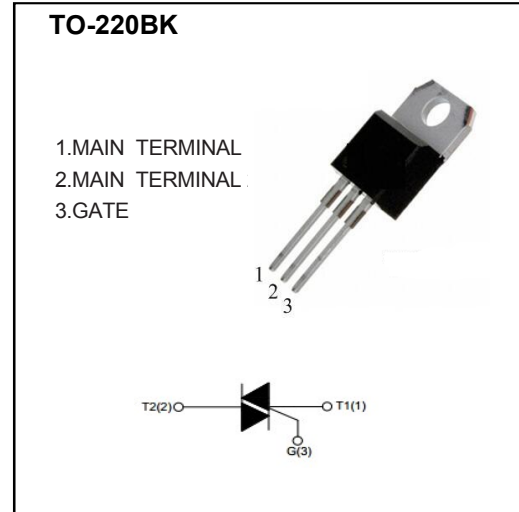
|                   |                 |              |
|-------------------|-----------------|--------------|
| $I_{T(RMS)}$      |                 | <b>16A</b>   |
| $V_{DRM}/V_{RRM}$ | CT316B-600S/C/B | <b>600V</b>  |
|                   | CT316B-800S/C/B | <b>800V</b>  |
| $V_{TM}$          |                 | <b>1.55V</b> |

**FEATURES**

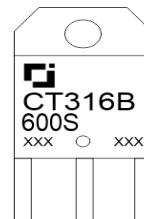
- NPNPN 5-layer Structure TRIACs
- Mesa Glass Passivated Technology
- Multi Layers Metal Electrodes
- High Junction Temperature
- Good Commutation Performance
- High  $dV/dt$  and  $dI/dt$

**APPLICATIONS**

- Heater Control
- Motor Speed Controller
- Mixer



**MARKING**



CT316B:Series Code  
 600S:Depends on  $V_{DRM}$   
 and  $I_{GT}$   
 XXX:Internal Code

**ABSOLUTE RATINGS (  $T_a=25^\circ\text{C}$  unless otherwise noted )**

| Symbol            | Parameter                                  | Test condition   | Value           | Unit                 |                        |
|-------------------|--|--|-----------------|----------------------|------------------------|
| $V_{DRM}/V_{RRM}$ | Repetitive peak off-state voltage          | $T_j=25^\circ\text{C}$   | CT316B-600S/C/B | 600                  | V                      |
|                   |  |  | CT316B-800S/C/B | 800                  | V                      |
| $I_{T(RMS)}$      | RMS on-state current                       | TO-220BK( $T_c \leq 110^\circ\text{C}$ ), Fig. 1,2   | 16              | A                    |                        |
| $I_{TSM}$         | Non repetitive surge peak on-state current | Full sine wave , $T_j(\text{init})=25^\circ\text{C}$ , $t_p=20\text{ms}$ ; Fig. 3,5        | 160             | A                    |                        |
| $I^2t$            | $I^2t$ value                               | $t_p=10\text{ms}$  | 140             | $\text{A}^2\text{s}$ |                        |
| $dI_T/dt$         | Critical rate of rise of on-state current  | $I_G=2 \cdot I_{GT}$ , $t_r \leq 10\text{ns}$ , $F=120\text{Hz}$ , $T_j=125^\circ\text{C}$ | I - II - III    | 50                   | $\text{A}/\mu\text{s}$ |
|                   |  |  | IV              | n/a                  |                        |
| $I_{GM}$          | Peak gate current                          | $t_p=20\mu\text{s}$ , $T_j=125^\circ\text{C}$  | 4               | A                    |                        |
| $P_{G(AV)}$       | Average gate power                         | $T_j=125^\circ\text{C}$  | 1               | W                    |                        |
| $T_{STG}$         | Storage temperature                        |  | -40~+150        | $^\circ\text{C}$     |                        |
| $T_j$             | Operating junction temperature             |  | -40~+125        |                      |                        |

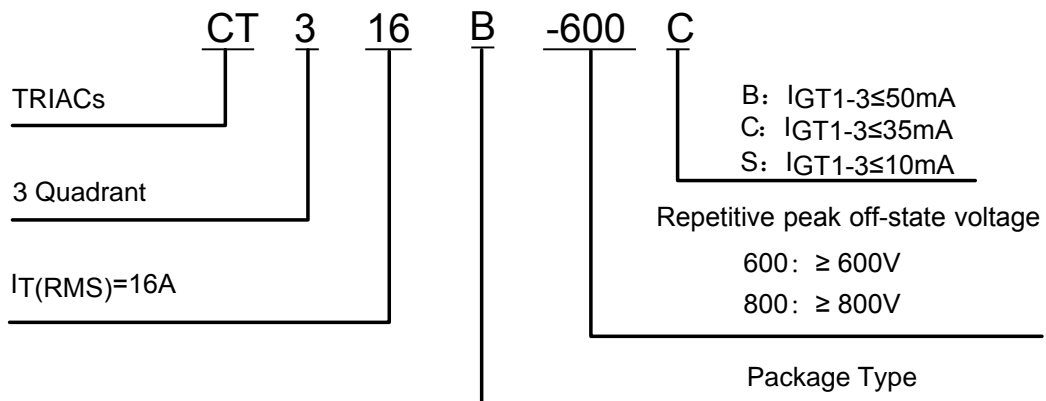
## ELECTRICAL CHARACTERISTICS (T<sub>a</sub>=25°C unless otherwise specified)

| Symbol                              | Parameter                          | Test condition  | Value       |      |       | Unit |    |
|-------------------------------------|------------------------------------|---|-------------|------|-------|------|----|
|                                     |                                    |   | S           | C    | B     |      |    |
| I <sub>GT</sub>                     | Gate trigger current               | V <sub>D</sub> =12V,<br>R <sub>L</sub> =33Ω,<br>T <sub>j</sub> =25°C,<br>Fig. 6 | I - II -III | ≤10  | ≤35   | ≤50  | mA |
|                                     |                                    |   | IV          | n/a  | n/a   | n/a  |    |
| V <sub>GT</sub>                     | Gate trigger voltage               | T <sub>j</sub> =25°C,<br>Fig. 6   | I - II -III | ≤1.3 |       | V    |    |
| V <sub>GD</sub>                     | Non-triggering gate voltage        | V <sub>D</sub> =V <sub>DRM</sub> , T <sub>j</sub> =125°C                        | ≥0.2        |      |       | V    |    |
| I <sub>H</sub>                      | Holding current                    | I <sub>T</sub> =500mA, Fig. 6   | ≤15         | ≤30  | ≤50   | mA   |    |
| I <sub>L</sub>                      | Latching current                   | I <sub>G</sub> =1.2I <sub>GT</sub><br>Fig. 6                                    | I - III     | ≤25  | ≤50   | ≤70  | mA |
|                                     |                                    |   | II          | ≤30  | ≤60   | ≤80  | mA |
| dV <sub>D</sub> /dt                 | Critical rate of rise of off-state | V <sub>D</sub> =67%V <sub>DRM</sub> , Gate Open<br>T <sub>j</sub> =125°C        | ≥40         | ≥500 | ≥1000 | V/μs |    |
| V <sub>TM</sub>                     | On-state Voltage                   | I <sub>TM</sub> =23A, tp=380μs,<br>Fig. 4                                       | ≤1.55       |      |       | V    |    |
| I <sub>DRM</sub> / I <sub>RPM</sub> | Repetitive peak off-state current  | V <sub>D</sub> =V <sub>DRM</sub> /V <sub>RPM</sub> , T <sub>j</sub> =25°C       | ≤5          | ≤5   | ≤5    | μA   |    |
|                                     |                                    | V <sub>D</sub> =V <sub>DRM</sub> /V <sub>RPM</sub> , T <sub>j</sub> =125°C      | ≤1          | ≤1   | ≤1    | mA   |    |

## THERMAL RESISTANCES

| Symbol                | Parameter             | Value    | Unit     |
|-----------------------|-----------------------|----------|----------|
| R <sub>th</sub> (j-c) | Junction to case (AC) | TO-220BK | 1.2 °C/W |
| R <sub>th</sub> (j-a) | Junction to ambient   | TO-220BK | 60 °C/W  |

## PART NUMBER



# CHARACTERISTICS CURVES

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

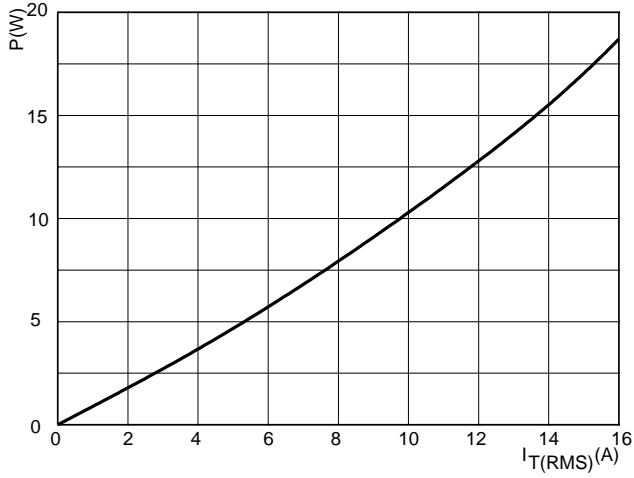


FIG.2: RMS on-state current versus case temperature (full cycle)

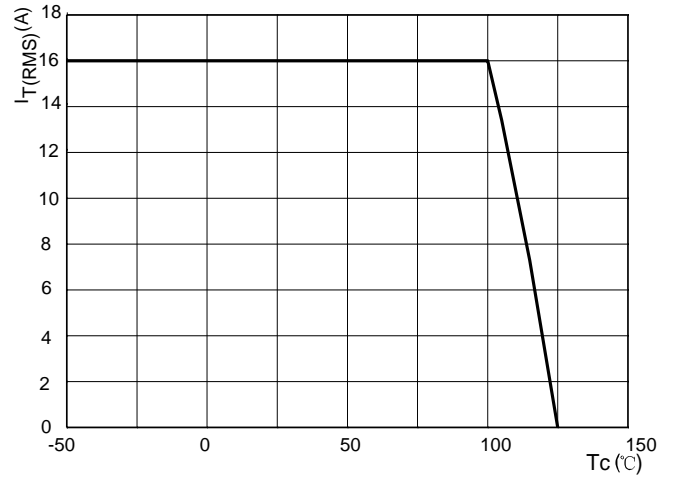


FIG.3: Surge peak on-state current versus number of cycles

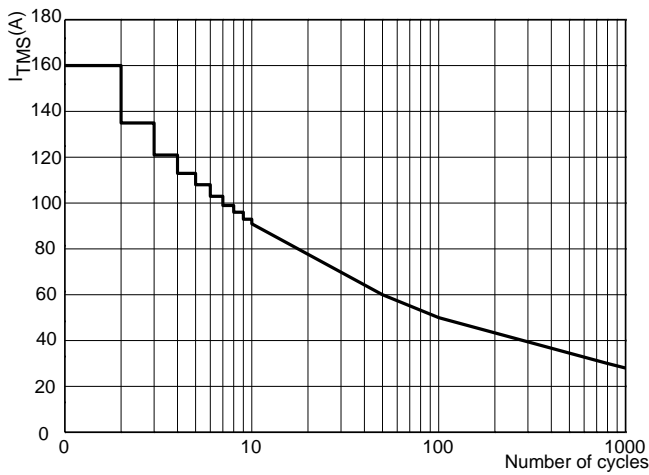


FIG.4: On-state characteristics (maximum values)

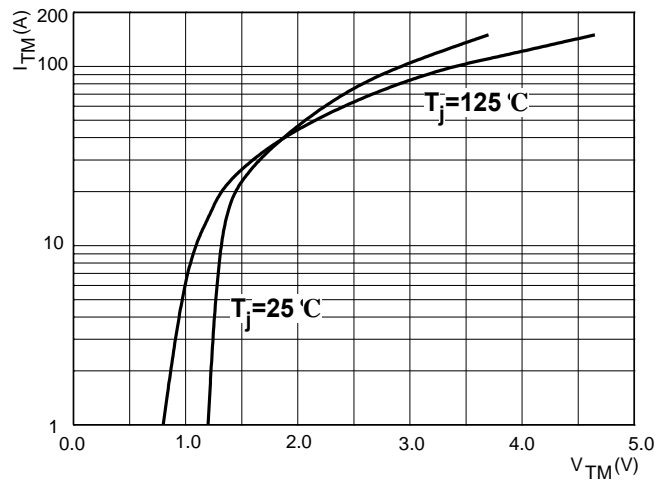


FIG.5: Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10\text{ms}$

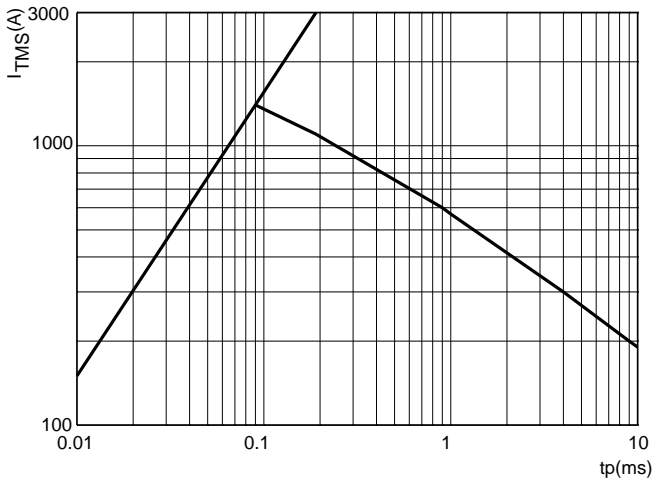
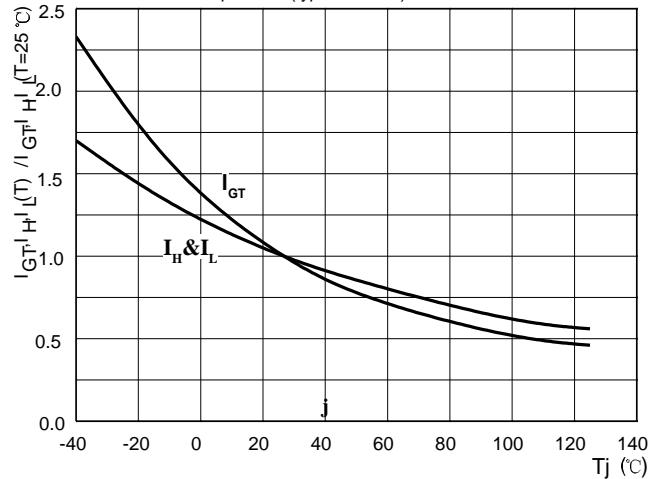
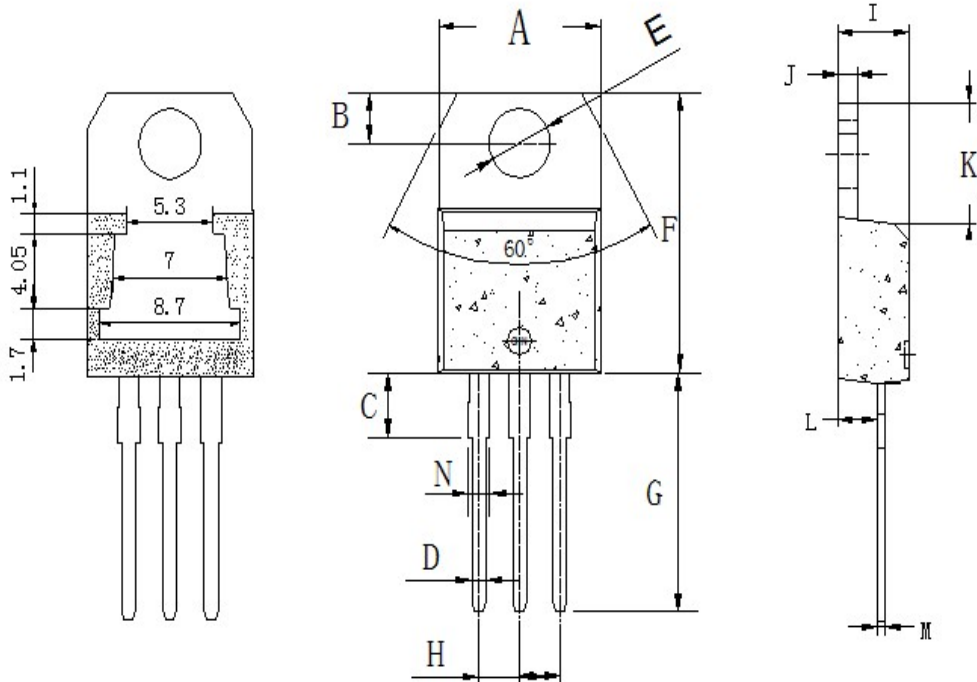


FIG.6: Relative variations of gate trigger current, holding current and latching current versus junction temperature (typical values)



# TO-220BK PACKAGE OUTLINE DIMENSIONS



| Symbol | Dimensions In Millimeters |      | Dimensions In Inches |       |
|--------|---------------------------|------|----------------------|-------|
|        | Min                       | Max  | Min                  | Max   |
| A      | 9.8                       | 10.4 | 0.385                | 0.409 |
| B      | 2.65                      | 3.1  | 0.104                | 0.122 |
| C      | 2.8                       | 4.2  | 0.110                | 0.165 |
| D      | 0.7                       | 0.92 | 0.027                | 0.036 |
| E      | 3.75                      | 3.95 | 0.147                | 0.155 |
| F      | 14.8                      | 16.1 | 0.582                | 0.633 |
| G      | 13.05                     | 13.6 | 0.513                | 0.535 |
| H      | 2.4                       | 2.7  | 0.094                | 0.106 |
| I      | 4.38                      | 4.61 | 0.172                | 0.181 |
| J      | 1.15                      | 1.36 | 0.045                | 0.053 |
| K      | 5.85                      | 6.82 | 0.230                | 0.268 |
| L      | 2.35                      | 2.75 | 0.092                | 0.108 |
| M      | 0.35                      | 0.65 | 0.013                | 0.025 |
| N      | 1.18                      | 1.42 | 0.046                | 0.055 |

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