



## Applications

- Phase Control
- Static Switching
- Light Dimming
- Motor Speed Control
- Kitchen Equipment
- Power Tools
- Solenoid Valve Controls:
  - Dishwashers
  - Washing Machines

- Suitable for General Purpose AC Switching
- Alternistor/No Snubber Versions for Inductive Loads
- Logic Level Available for Use with Microcontrollers and Low Level Devices
- IGT Range 10-50 mA (Q1)
- $V_{DRM}/V_{RMM}$  400, 600, 800, 1000V

## Absolute Maximum Ratings

|                                                                                                                          | CONDITIONS                                            | SYMBOL       | RATING                       |
|--------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|--------------|------------------------------|
| RMS On-State Current (full sine wave)                                                                                    | $T_c = 100^\circ\text{C}$<br>$T_c = 85^\circ\text{C}$ | $I_{T(RMS)}$ | 16A                          |
| Non Repetitive Surge Peak On-State Current (Full Cycle, $T_j$ Initial = $25^\circ\text{C}$ )                             | $F = 50\text{ Hz}$<br>$F = 60\text{ Hz}$              | $I_{TSM}$    | 160A<br>168A                 |
| $I^2t$ Value for fusing                                                                                                  | $t_p = 10\text{ ms}$                                  | $I^2t$       | 144A <sup>2</sup> s          |
| Critical rate of rise of on-state current<br>$I_G = 2 \times I_{GT}$ , $t_r < 100\text{ ns}$ , $T_j = 125^\circ\text{C}$ | $F = 120\text{ Hz}$                                   | $di/dt$      | 100A/ $\mu\text{s}$          |
| Peak Gate Current @ $T_j = 125^\circ\text{C}$                                                                            | $t_p = 20\text{ }\mu\text{s}$                         | $I_{GM}$     | 4A                           |
| Average Gate Power Dissipation @ $T_j = 125^\circ\text{C}$                                                               |                                                       | $P_{G(AV)}$  | 1W                           |
| Storage Temperature Range                                                                                                |                                                       | $T_{stg}$    | -40 to +150 $^\circ\text{C}$ |
| Operating Junction Temperature Range                                                                                     |                                                       | $T_j$        | -40 to +125 $^\circ\text{C}$ |
| Isolation Voltage (CTA Series only)                                                                                      |                                                       | $V_{ISO}$    | 2500 $V_{RMS}$               |

## Electrical Characteristics

### ALTERNISTOR/NO SNUBBER AND LOGIC LEVEL (3 Quadrants)

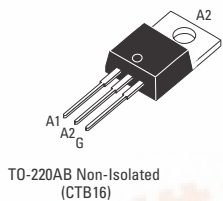
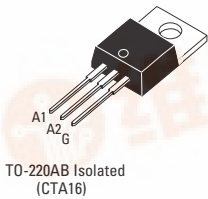
|                                                                   |                                     | SW                 | CW                  | BW                   |
|-------------------------------------------------------------------|-------------------------------------|--------------------|---------------------|----------------------|
| $I_{GT}\text{ MAX @ }V_D = 12\text{ V}$ , $R_L = 30\Omega$ NOTE 1 | QI-II-III                           | 10mA               | 35mA                | 50mA                 |
| $V_{GT}\text{ MAX @ }V_D = 12\text{ V}$ , $R_L = 30\Omega$        | QI-II-III                           | 1.3V               | 1.3V                | 1.3V                 |
| $V_{GD}\text{ MIN @ }V_D = V_{DRM}$ , $R_L = 3.3k\Omega$          | $T_j = 125^\circ\text{C}$ QI-II-III | 0.2V               | 0.2V                | 0.2V                 |
| $I_H\text{ MAX @ }I_T = 500\text{ mA}$ NOTE 2                     |                                     | 15mA               | 35mA                | 50mA                 |
| $I_L\text{ MAX @ }I_G = 1.2 I_{GT}$                               | QI-III                              | 25mA               | 50mA                | 70mA                 |
| $I_L\text{ MAX @ }I_G = 1.2 I_{GT}$                               | Q-II                                | 30mA               | 60mA                | 80mA                 |
| $dv/dt\text{ MIN @ }V_D = 67\%V_{DRM}$ (gate open) NOTE 2         | $T_j = 125^\circ\text{C}$           | 40V/ $\mu\text{s}$ | 500V/ $\mu\text{s}$ | 1000V/ $\mu\text{s}$ |
| $(di/dt)_c\text{ MIN @ } (dv/dt)_c = 0.1\text{ V/ms}$ NOTE 2      | $T_j = 125^\circ\text{C}$           | 8.5A/ms            |                     |                      |
| $(di/dt)_c\text{ MIN @ } (dv/dt)_c = 10\text{ V/ms}$ NOTE 2       | $T_j = 125^\circ\text{C}$           | 3.0A/ms            |                     |                      |
| $(di/dt)_c\text{ MIN without Snubber}$ NOTE 2 & 4                 | $T_j = 125^\circ\text{C}$           |                    | 8.5A/ms             | 14A/ms               |

### STANDARD (4 Quadrants)

|                                                                   |                                 | C                   | B                   |
|-------------------------------------------------------------------|---------------------------------|---------------------|---------------------|
| $I_{GT}\text{ MAX @ }V_D = 12\text{ V}$ , $R_L = 30\Omega$ NOTE 1 | QI-II-III                       | 25mA                | 50mA                |
| $I_{GT}\text{ MAX @ }V_D = 12\text{ V}$ , $R_L = 30\Omega$ NOTE 1 | QIV                             | 50mA                | 100mA               |
| $V_{GT}\text{ MAX @ }V_D = 12\text{ V}$ , $R_L = 30\Omega$        | Q-AII                           | 1.3V                |                     |
| $V_{GD}\text{ MIN @ }V_D = V_{DRM}$ , $R_L = 3.3k\Omega$          | $T_j = 125^\circ\text{C}$ Q-AII | 0.2V                |                     |
| $I_H\text{ MAX @ }I_T = 500\text{ mA}$ NOTE 2                     |                                 | 25mA                | 50mA                |
| $I_L\text{ MAX @ }I_G = 1.2 I_{GT}$                               | QI-III-IV                       | 40mA                | 50mA                |
| $I_L\text{ MAX @ }I_G = 1.2 I_{GT}$                               | Q-II                            | 80mA                | 100mA               |
| $dv/dt\text{ MIN @ }V_D = 67\%V_{DRM}$ (gate open) NOTE 2         | $T_j = 125^\circ\text{C}$       | 200V/ $\mu\text{s}$ | 400V/ $\mu\text{s}$ |
| $(dv/dt)_c\text{ MIN @ } (di/dt)_c = 7.0\text{ A/ms}$ NOTE 2      | $T_j = 125^\circ\text{C}$       | 5V/ $\mu\text{s}$   | 10V/ $\mu\text{s}$  |

### GENERAL NOTES

1. Minimum IGT is guaranteed at 5% of IGT max.
2. For both polarities of A2 referenced to A1
3. All parameters at 25 degrees C unless otherwise specified.
4. Commutating  $dv/dt = 50\text{ V}/\mu\text{sec}$  (exponential to 200Vpk)

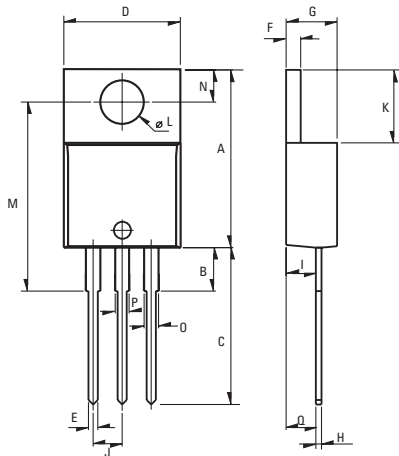


## Static Characteristics

|                                                        |                     |              |
|--------------------------------------------------------|---------------------|--------------|
| $V_T$ MAX @ $I_{TM} = 22.5$ A, $t_p = 380\mu s$ NOTE 2 | $T_J = 25^\circ C$  | 1.55V        |
| $V_{TO}$ MAX @ Threshold Voltage NOTE 2                | $T_J = 125^\circ C$ | 0.85V        |
| $R_d$ MAX @ Dynamic Resistance NOTE 2                  | $T_J = 125^\circ C$ | 25m $\Omega$ |
| $I_{DRM}$ MAX @ $V_{DRM} = V_{RRM}$                    | $T_J = 25^\circ C$  | 5 $\mu$ A    |
| $I_{RRM}$ MAX @ $V_{DRM} = V_{RRM}$                    | $T_J = 125^\circ C$ | 2mA          |

## Thermal Resistances

|                       | SYMBOL            | RATING                |
|-----------------------|-------------------|-----------------------|
| Junction to Case (AC) | TO-220AB          | $R_{th(j-c)}$ 1.2°C/W |
| Junction to Case (AC) | TO-220AB Isolated | $R_{th(j-c)}$ 2.1°C/W |
| Junction to Ambient   | TO-220AB          | $R_{th(j-a)}$ 60°C/W  |
| Junction to Ambient   | TO-220AB Isolated | $R_{th(j-a)}$ 60°C/W  |



Weight: 2.3g (0.08 oz)

## Dimensions

| REF. | Millimeters |      |       | Inches |       |       |
|------|-------------|------|-------|--------|-------|-------|
|      | Min.        | Typ. | Max.  | Min.   | Typ.  | Max.  |
| A    | 15.24       |      | 15.75 | 0.6    |       | 0.62  |
| B    |             | 3.23 |       |        | 0.127 |       |
| C    | 12.78       |      | 13.79 | 0.503  |       | 0.543 |
| D    | 9.96        |      | 10.36 | 0.392  |       | 0.408 |
| E    | 0.69        |      | 0.94  | 0.027  |       | 0.037 |
| F    | 1.22        |      | 1.32  | 0.048  |       | 0.052 |
| G    | 4.62        |      | 4.83  | 0.182  |       | 0.19  |
| H    | 0.46        |      | 0.61  | 0.018  |       | 0.024 |
| I    | 2.49        |      | 2.84  | 0.098  |       | 0.112 |
| J    | 2.39        |      | 2.69  | 0.094  |       | 0.106 |
| K    | 6.48        |      | 6.88  | 0.255  |       | 0.271 |
| L    | 3.78        |      | 3.89  | 0.149  |       | 0.153 |
| M    | 15.49       | 16   | 16.51 | 0.61   | 0.63  | 0.65  |
| N    | 2.59        |      | 2.9   | 0.102  |       | 0.114 |
| O    | 0.99        |      | 1.55  | 0.039  |       | 0.061 |
| P    | 0.99        |      | 1.55  | 0.039  |       | 0.061 |
| Q    |             | 2.67 |       |        | 0.105 |       |

## Part Number Selection

| Part Number     | Voltage [Vpk]       | $I_{GT}$ [mA] | Type                   | Package  |
|-----------------|---------------------|---------------|------------------------|----------|
| CTA/CTB16-xxxB  | 400, 600, 800, 1000 | 50mA          | Standard               | TO-220AB |
| CTA/CTB16-xxxBW | 400, 600, 800, 1000 | 50mA          | Alternistor/No Snubber | TO-220AB |
| CTA/CTB16-xxxC  | 400, 600, 800, 1000 | 25mA          | Standard               | TO-220AB |
| CTA/CTB16-xxxCW | 400, 600, 800, 1000 | 35mA          | Alternistor/No Snubber | TO-220AB |
| CTA/CTB16-xxxSW | 400, 600, 800, 1000 | 10mA          | Logic Level            | TO-220AB |

## Part Number Designation

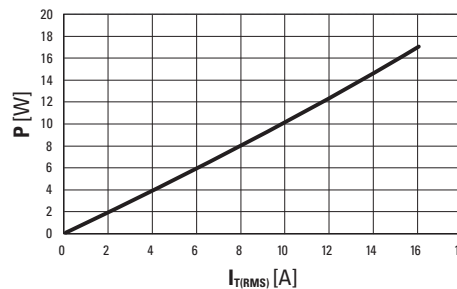
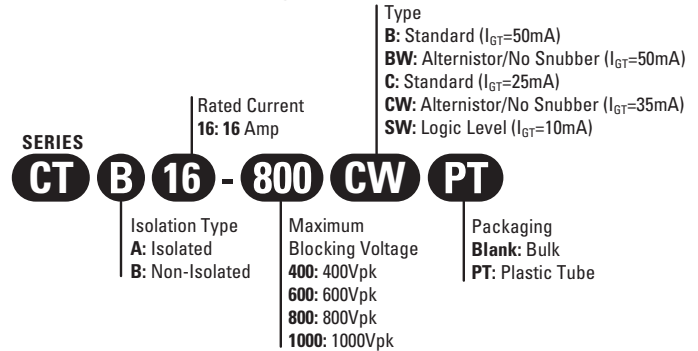


Fig. 1: Power dissipation versus RMS on-state current (full cycle).

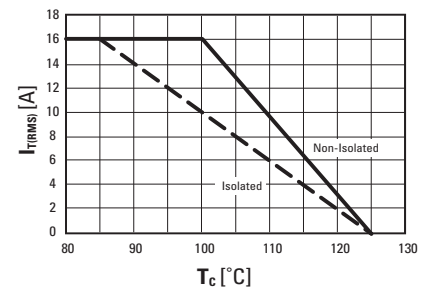


Fig. 2: RMS on-state current versus case temperature (full cycle)

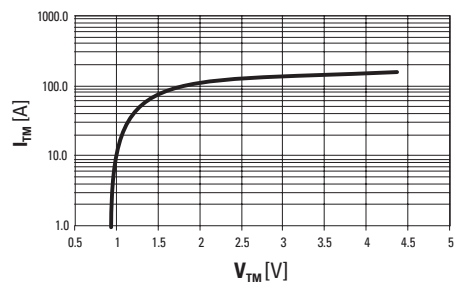


Fig. 3: On-state current versus on-state voltage (instantaneous values)

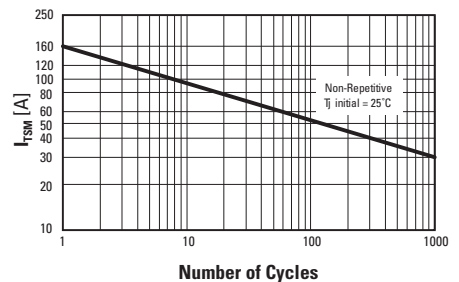


Fig. 4: Non-repetitive surge peak on-state current versus number of cycles.

ISO9001 CERTIFIED

## Approvals

UL Recognized Component - E72445 (CTA Series)

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