



**THE DATASHEET OF  
CTA12-1000TW**





### CTA/CTB12

12Amp - 400/600/800/1000V - TRIAC

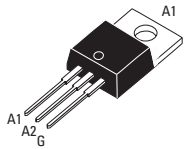
#### Applications

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

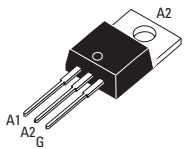
- > **Suitable for General Purpose AC Switching**
- > **Alternistor/No Snubber Versions for Inductive Loads**
- > **Logic Level Available for use with Microcontrollers and Low Level Devices**
- > **IGT Range 5-50 mA (Q1)**
- > **V<sub>DRM</sub>/V<sub>RMM</sub> 400, 600, 800, 1000V**

#### Absolute Maximum Ratings

|  | CONDITIONS                                      | SYMBOL                   | RATING                     |
|--|---|--------------------------|----------------------------|
| RMS On-State Current (full sine wave)  | T <sub>c</sub> = 105°C<br>T <sub>c</sub> = 90°C | T0-220AB<br>T0-220AB Iso | I <sub>T(RMS)</sub><br>12A |
| Non Repetitive Surge Peak On-State Current (Full Cycle, T <sub>j</sub> Initial = 25°C)                                 | F = 50 Hz<br>F = 60 Hz                          | I <sub>TSM</sub>         | 120A<br>126A               |
| I <sup>2</sup> t Value for fusing  | tp = 10 ms                                      | I <sup>2</sup> t         | 78A <sup>2</sup> s         |
| Critical rate of rise of on-state current<br>I <sub>G</sub> = 2 x I <sub>GT</sub> , tr < 100ns, T <sub>j</sub> = 125°C | F = 120 Hz                                      | di/dt                    | 50A/μs                     |
| Peak Gate Current @ T <sub>j</sub> = 125°C   | tp = 20 μs                                      | I <sub>GM</sub>          | 4A                         |
| Average Gate Power Dissipation @ T <sub>j</sub> = 125°C  |   | P <sub>G(AV)</sub>       | 1W                         |
| Storage Temperature Range  |   | T <sub>stg</sub>         | -40 to +150°C              |
| Operating Junction Temperature Range   |   | T <sub>j</sub>           | -40 to +125°C              |
| Isolation Voltage (CTA Series only)  |   | V <sub>ISO</sub>         | 2500 V <sub>RMS</sub>      |



TO-220AB Isolated (CTA12)



TO-220AB Non-Isolated (CTB12)



#### Electrical Characteristics

| ALTERNISTOR/NO SNUBBER AND LOGIC LEVEL (3 Quadrants)                             | TW                     | SW        | CW      | BW      |         |          |
|--|------------------------|-----------|---------|---------|---------|----------|
| I <sub>GT</sub> MAX @ V <sub>D</sub> = 12 V, R <sub>L</sub> = 30Ω NOTE 1         | QI-II-III              | 5mA       | 10mA    | 35mA    | 50mA    |          |
| V <sub>GT</sub> MAX @ V <sub>D</sub> = 12 V, R <sub>L</sub> = 30Ω                | QI-II-III              | 1.3V      | 1.3V    | 1.3V    | 1.3V    |          |
| V <sub>GD</sub> MIN @ V <sub>D</sub> = V <sub>DRM</sub> , R <sub>L</sub> = 3.3kΩ | T <sub>j</sub> = 125°C | QI-II-III | 0.2V    | 0.2V    | 0.2V    |          |
| I <sub>H</sub> MAX @ I <sub>T</sub> = 500 mA NOTE 2                              |                        |           | 10mA    | 15mA    | 35mA    | 50mA     |
| I <sub>L</sub> MAX @ I <sub>G</sub> = 1.2 I <sub>GT</sub>                        | QI-III                 | 10mA      | 25mA    | 50mA    | 70mA    |          |
| I <sub>L</sub> MAX @ I <sub>G</sub> = 1.2 I <sub>GT</sub>                        | Q-II                   | 15mA      | 30mA    | 60mA    | 80mA    |          |
| dv/dt MIN @ V <sub>D</sub> = 67%V <sub>DRM</sub> (gate open) NOTE 2              | T <sub>j</sub> = 125°C |           | 20V/μs  | 40V/μs  | 400V/μs | 1000V/μs |
| (di/dt) <sub>c</sub> MIN @ (dv/dt) <sub>c</sub> = 0.1 V/ms NOTE 2                | T <sub>j</sub> = 125°C |           | 3.5A/ms | 5.4A/ms |         |          |
| (di/dt) <sub>c</sub> MIN @ (dv/dt) <sub>c</sub> = 10 V/ms NOTE 2                 | T <sub>j</sub> = 125°C |           | 1A/ms   | 2.9A/ms |         |          |
| (di/dt) <sub>c</sub> MIN without Snubber NOTE 2                                  | T <sub>j</sub> = 125°C |           |         |         | 6.5A/ms | 12A/ms   |

| STANDARD (4 Quadrants)   | C                      | B     |         |         |
|--|------------------------|-------|---------|---------|
| I <sub>GT</sub> MAX @ V <sub>D</sub> = 12 V, R <sub>L</sub> = 30Ω NOTE 1         | QI-II-III              | 25mA  | 50mA    |         |
| I <sub>GT</sub> MAX @ V <sub>D</sub> = 12 V, R <sub>L</sub> = 30Ω NOTE 1         | QIV                    | 50mA  | 100mA   |         |
| V <sub>GT</sub> MAX @ V <sub>D</sub> = 12 V, R <sub>L</sub> = 30Ω                | Q-All                  |       | 1.3V    |         |
| V <sub>GD</sub> MIN @ V <sub>D</sub> = V <sub>DRM</sub> , R <sub>L</sub> = 3.3kΩ | T <sub>j</sub> = 125°C | Q-All | 0.2V    |         |
| I <sub>H</sub> MAX @ I <sub>T</sub> = 500 mA NOTE 2                              |                        |       | 25mA    | 50mA    |
| I <sub>L</sub> MAX @ I <sub>G</sub> = 1.2 I <sub>GT</sub>                        | QI-III-IV              |       | 40mA    | 50mA    |
| I <sub>L</sub> MAX @ I <sub>G</sub> = 1.2 I <sub>GT</sub>                        | Q-II                   |       | 80mA    | 100mA   |
| dv/dt MIN @ V <sub>D</sub> = 67%V <sub>DRM</sub> (gate open) NOTE 2              | T <sub>j</sub> = 125°C |       | 200V/μs | 400V/μs |
| (dv/dt) <sub>c</sub> MIN @ (di/dt) <sub>c</sub> = 2.7 A/ms NOTE 2                | T <sub>j</sub> = 125°C |       | 5V/μs   | 10V/μs  |

#### GENERAL NOTES

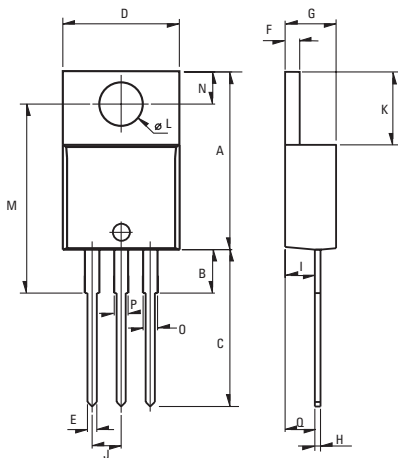
1. Minimum IGT is guaranteed at 5% of IGT max.
2. For both polarities of A2 referenced to A1
3. All parameters at 25 degrees C unless otherwise specified.

## Static Characteristics

|  |                     |              |
|--|---------------------|--------------|
| $V_T$ MAX @ $I_{TM} = 17$ 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                | $T_j = 125^\circ C$ | 35m $\Omega$ |
| $I_{ORM}$ MAX @ $V_{DRM} = V_{RRM}$                  | $T_j = 25^\circ C$  | 5 $\mu A$    |
| $I_{RRM}$ MAX @ $V_{DRM} = V_{RRM}$                  | $T_j = 125^\circ C$ | 1mA          |

## Thermal Resistances

|                       | SYMBOL            | RATING                |
|-----------------------|-------------------|-----------------------|
| Junction to Case (AC) | TO-220AB          | $R_{th(j-c)}$ 1.4°C/W |
| Junction to Case (AC) | TO-220AB Isolated | $R_{th(j-c)}$ 2.3°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/CTB12-xxxB  | 400, 600, 800, 1000 | 50mA          | Standard               | TO-220AB |
| CTA/CTB12-xxxBW | 400, 600, 800, 1000 | 50mA          | Alternistor/No Snubber | TO-220AB |
| CTA/CTB12-xxxC  | 400, 600, 800, 1000 | 25mA          | Standard               | TO-220AB |
| CTA/CTB12-xxxCW | 400, 600, 800, 1000 | 35mA          | Alternistor/No Snubber | TO-220AB |
| CTA/CTB12-xxxSW | 400, 600, 800, 1000 | 10mA          | Logic Level            | TO-220AB |
| CTA/CTB12-xxxTW | 400, 600, 800, 1000 | 5mA           | Logic Level            | TO-220AB |

## Part Number Designation

**CT** SERIES  
**B** Isolation Type  
**12** Rated Current 12: 12 Amp  
**800** Maximum Blocking Voltage  
**CW** Type  
**PT** Packaging

**A:** Isolated  
**B:** Non-Isolated

**400:** 400Vpk  
**600:** 600Vpk  
**800:** 800Vpk  
**1000:** 1000Vpk

**B:** Standard ( $I_{GT}=50$ mA)  
**BW:** Alternistor/No Snubber ( $I_{GT}=50$ mA)  
**C:** Standard ( $I_{GT}=25$ mA)  
**CW:** Alternistor/No Snubber ( $I_{GT}=35$ mA)  
**SW:** Logic Level ( $I_{GT}=10$ mA)  
**TW:** Logic Level ( $I_{GT}=5$ mA)

**Blank:** Bulk  
**PT:** Plastic Tube

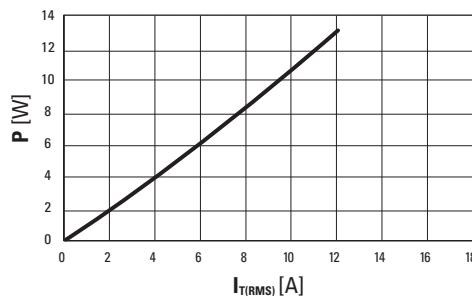


Fig. 1: Power dissipation versus RMS on-state current (full cycle).

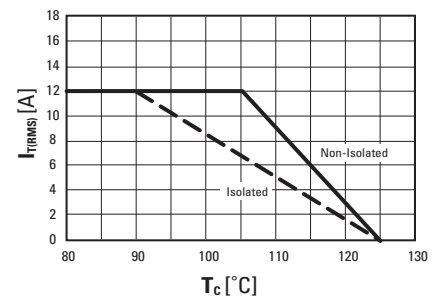


Fig. 2: RMS on-state current versus case temperature (full cycle)

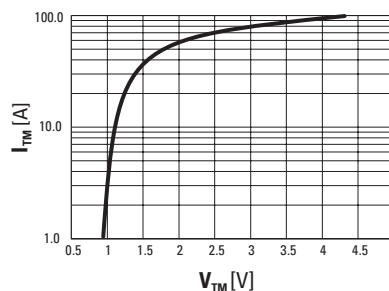


Fig. 3: On-state current versus on-state voltage (instantaneous values)

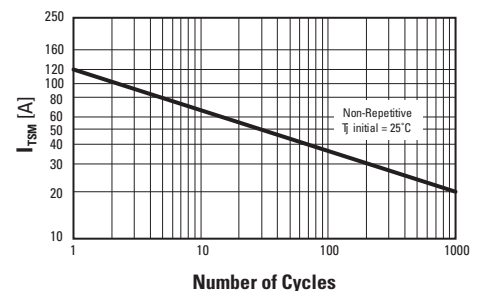


Fig. 4: Non-repetitive surge peak on-state current versus number of cycles.

## ISO9001 Certified

## Approvals

UL - E72445

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