



Micro Commercial Components



Micro Commercial Components  
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**MT110CB08T1**  
**MT110CB12T1**  
**MT110CB16T1**  
**MT110CB18T1**

## Features

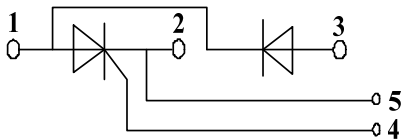
- Lead Free Finish/RoHS Compliant (NOTE 1) ("P" Suffix designates RoHS Compliant. See ordering information)
- International standard package
- Heat transfer through aluminum oxide DBC ceramic isolated metal baseplate
- Glass passivated chip
- Simple Mounting

## Applications

- Power Converters
- Lighting Control
- DC Motor Control and Drives
- Heat and temperature control

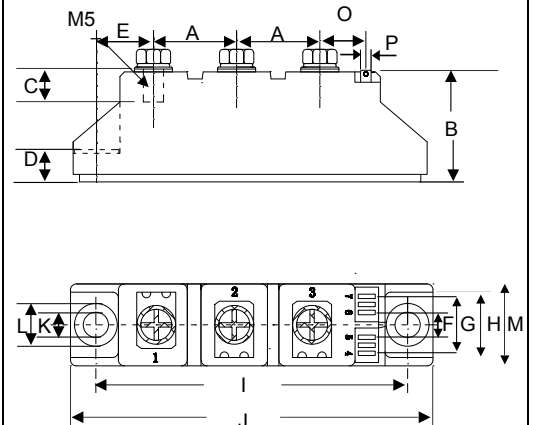


**Circuit**



**110 Amp**  
**THYRISTOR/DIODE**  
**MODULE**  
**800~1800 Volts**

T1



**DIMENSIONS**

| DIM | INCHES     |       | MM      |       | NOTE |
|-----|------------|-------|---------|-------|------|
|     | MIN        | MAX   | MIN     | MAX   |      |
| A   | .776       | .799  | 19.70   | 20.30 |      |
| B   | 1.169      | 1.193 | 29.70   | 30.30 |      |
| C   | .343       | .366  | 8.70    | 9.30  |      |
| D   | .323       | .346  | 8.20    | 8.80  |      |
| E   | .602       | .622  | 15.30   | 15.80 |      |
| F   | .224       | .248  | 5.70    | 6.30  |      |
| G   | .539       | .563  | 13.70   | 14.30 |      |
| H   | .657       | .681  | 16.70   | 17.30 |      |
| I   | 3.138      | 3.161 | 79.70   | 80.30 |      |
| J   | 3.650      | 3.673 | 92.70   | 93.30 |      |
| K   | .256       |       | 6.50    |       | Ø    |
| L   | .421       | .445  | 10.70   | 11.30 |      |
| M   | .815       | .839  | 20.70   | 21.30 |      |
| O   | .579       | .602  | 14.70   | 15.30 |      |
| P   | 0.11X0.032 |       | 2.8X0.8 |       |      |

## Module Type

| TYPE        | VRRM  | VRS   |
|-------------|-------|-------|
| MT110CB08T1 | 800V  | 900V  |
| MT110CB12T1 | 1200V | 1300V |
| MT110CB16T1 | 1600V | 1700V |
| MT110CB18T1 | 1800V | 1900V |

## ◆Diode

### Maximum Ratings

| Symbol           | Item                               | Conditions           | Values      | Units            |
|------------------|------------------------------------|----------------------|-------------|------------------|
| ID               | Output Current(D.C.)               | Tc=85℃               | 110         | A                |
| IFSM             | Surge forward current              | t=10mS Tvj =45℃      | 2250        | A                |
| i <sup>2</sup> t | Circuit Fusing Consideration       |                      | 25000       | A <sup>2</sup> s |
| Visol            | Isolation Breakdown Voltage(R.M.S) | a.c.50HZ;r.m.s.;1min | 3000        | V                |
| Tvj              | Operating Junction Temperature     |                      | -40 to +125 | ℃                |
| Tstg             | Storage Temperature                |                      | -40 to +125 | ℃                |
| Mt               | Mounting Torque                    | To terminals(M5)     | 3±15%       | Nm               |
| Ms               |                                    | To heatsink(M6)      | 5±15%       | Nm               |
| Weight           | Module (Approximately)             |                      | 100         | g                |

### Thermal Characteristics

| Symbol   | Item                    | Conditions       | Values | Units |
|----------|-------------------------|------------------|--------|-------|
| Rth(j-c) | Thermal Impedance, max. | Junction to Case | 0.14   | ℃/W   |
| Rth(c-s) | Thermal Impedance, max. | Case to Heatsink | 0.10   | ℃/W   |

### Electrical Characteristics

| Symbol | Item                                  | Conditions                              | Values |            |      | Units    |
|--------|---------------------------------------|-----------------------------------------|--------|------------|------|----------|
|        |                                       |                                         | Min.   | Typ.       | Max. |          |
| VFM    | Forward Voltage Drop, max.            | T=25℃ IF =300A                          |        |            | 1.65 | V        |
| IRRM   | Repetitive Peak Reverse Current, max. | Tvj =25℃ VRD=VRRM<br>Tvj =125℃ VRD=VRRM |        | ≤0.5<br>≤6 |      | mA<br>mA |

◆ **Thyristor**

**Maximum Ratings**

| Symbol    | Item                                             | Conditions                                                                                                | Values         | Units            |
|-----------|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------|----------------|------------------|
| $I_{TAV}$ | Average On-State Current                         | Sine 180°; $T_c=85^{\circ}\text{C}$                                                                       | 110            | A                |
| $I_{TSM}$ | Surge On-State Current                           | $T_{VJ}=45^{\circ}\text{C}$ $t=10\text{ms}$ , sine<br>$T_{VJ}=125^{\circ}\text{C}$ $t=10\text{ms}$ , sine | 2250<br>1900   | A                |
| $i^2t$    | Circuit Fusing Consideration                     | $T_{VJ}=45^{\circ}\text{C}$ $t=10\text{ms}$ , sine<br>$T_{VJ}=125^{\circ}\text{C}$ $t=10\text{ms}$ , sine | 25000<br>18000 | A <sup>2</sup> s |
| Visol     | Isolation Breakdown Voltage(R.M.S)               | a.c.50HZ;r.m.s.;1min                                                                                      | 3000           | V                |
| $T_{vj}$  | Operating Junction Temperature                   |                                                                                                           | -40 to +130    | °C               |
| $T_{stg}$ | Storage Temperature                              |                                                                                                           | -40 to +125    | °C               |
| $M_t$     | Mounting Torque                                  | To terminals(M5)                                                                                          | $3 \pm 15\%$   | Nm               |
| $M_s$     |                                                  | To heatsink(M6)                                                                                           | $5 \pm 15\%$   | Nm               |
| $di/dt$   | Critical Rate of Rise of On-State Current        | $T_{VJ}=T_{VJM}$ , $2/3V_{DRM}$ , $I_G=500\text{mA}$<br>$T_r<0.5\mu\text{s}$ , $t_p>6\mu\text{s}$         | 150            | A/ $\mu\text{s}$ |
| $dv/dt$   | Critical Rate of Rise of Off-State Voltage, min. | $T_J=T_{VJM}$ , $2/3V_{DRM}$ linear voltage rise                                                          | 1000           | V/ $\mu\text{s}$ |
| a         | Maximum allowable acceleration                   |                                                                                                           | 50             | $\text{m/s}^2$   |

**Thermal Characteristics**

| Symbol        | Item                    | Conditions       | Values | Units |
|---------------|-------------------------|------------------|--------|-------|
| $R_{th(j-c)}$ | Thermal Impedance, max. | Junction to Case | 0.28   | °C/W  |
| $R_{th(c-s)}$ | Thermal Impedance, max. | Case to Heatsink | 0.20   | °C/W  |

**Electrical Characteristics**

| Symbol            | Item                                                                            | Conditions                                                                        | Values |     |      | Units         |
|-------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------|-----|------|---------------|
|                   |                                                                                 |                                                                                   |        |     |      |               |
| $V_{TM}$          | Peak On-State Voltage, max.                                                     | $T=25^{\circ}\text{C}$ $I_T=300\text{A}$                                          |        |     | 1.65 | V             |
| $I_{RRM}/I_{DRM}$ | Repetitive Peak Reverse Current, max. / Repetitive Peak Off-State Current, max. | $T_{VJ}=T_{VJM}$ , $V_R=V_{RRM}$ , $V_D=V_{DRM}$                                  |        |     | 20   | mA            |
| $V_{TO}$          | On state threshold voltage                                                      | For power-loss calculations only<br>( $T_{VJ}=125^{\circ}\text{C}$ )              |        |     | 0.9  | V             |
| $r_T$             | Value of on-state slope resistance. max                                         | $T_{VJ}=T_{VJM}$                                                                  |        |     | 2    | m $\Omega$    |
| $V_{GT}$          | Gate Trigger Voltage, max.                                                      | $T_{VJ}=25^{\circ}\text{C}$ , $V_D=6\text{V}$                                     |        |     | 3    | V             |
| $I_{GT}$          | Gate Trigger Current, max.                                                      | $T_{VJ}=25^{\circ}\text{C}$ , $V_D=6\text{V}$                                     |        |     | 150  | mA            |
| $V_{GD}$          | Non-triggering gate voltage, max.                                               | $T_{VJ}=125^{\circ}\text{C}$ , $V_D=2/3V_{DRM}$                                   |        |     | 0.25 | V             |
| $I_{GD}$          | Non-triggering gate current, max.                                               | $T_{VJ}=125^{\circ}\text{C}$ , $V_D=2/3V_{DRM}$                                   |        |     | 6    | mA            |
| $I_L$             | Latching current, max.                                                          | $T_{VJ}=25^{\circ}\text{C}$ , $R_G=33\Omega$                                      |        | 300 | 600  | mA            |
| $I_H$             | Holding current, max.                                                           | $T_{VJ}=25^{\circ}\text{C}$ , $V_D=6\text{V}$                                     |        | 150 | 250  | mA            |
| tg <sub>d</sub>   | Gate controlled delay time                                                      | $T_{VJ}=25^{\circ}\text{C}$ ,<br>$I_G=1\text{A}$ , $diG/dt=1\text{A}/\mu\text{s}$ | 1      |     |      | $\mu\text{s}$ |
| tq                | Circuit commutated turn-off time                                                | $T_{VJ}=T_{VJM}$                                                                  | 100    |     |      | $\mu\text{s}$ |

## Performance Curves

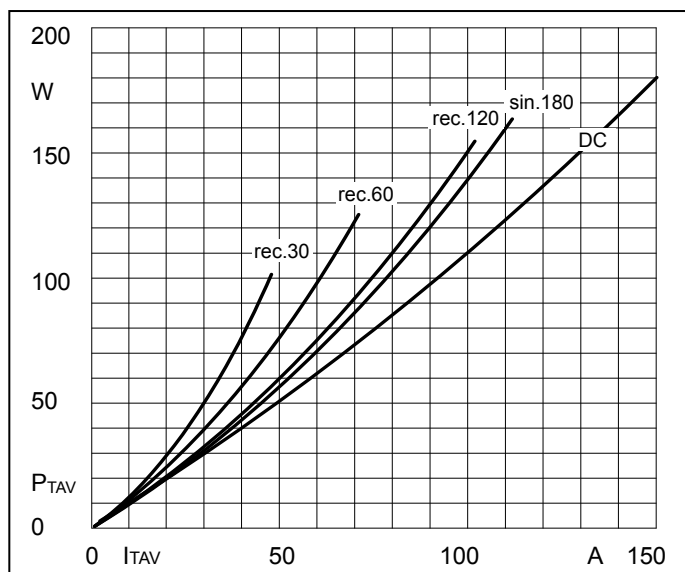


Fig1. Power dissipation

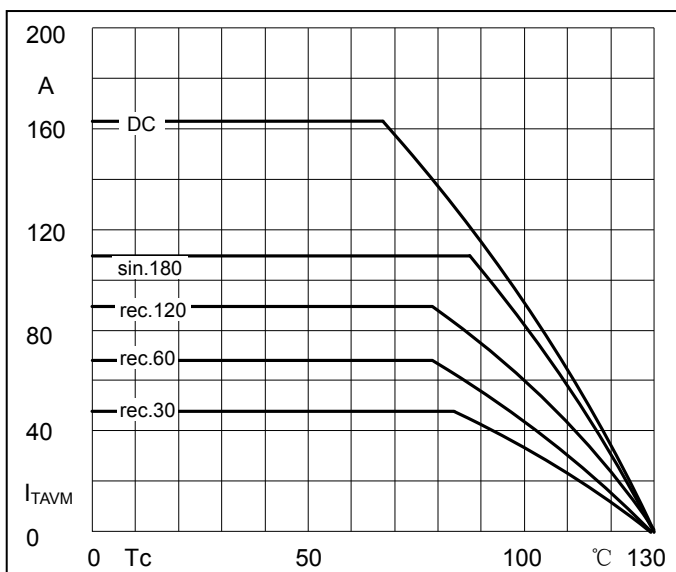


Fig2. Forward Current Derating Curve

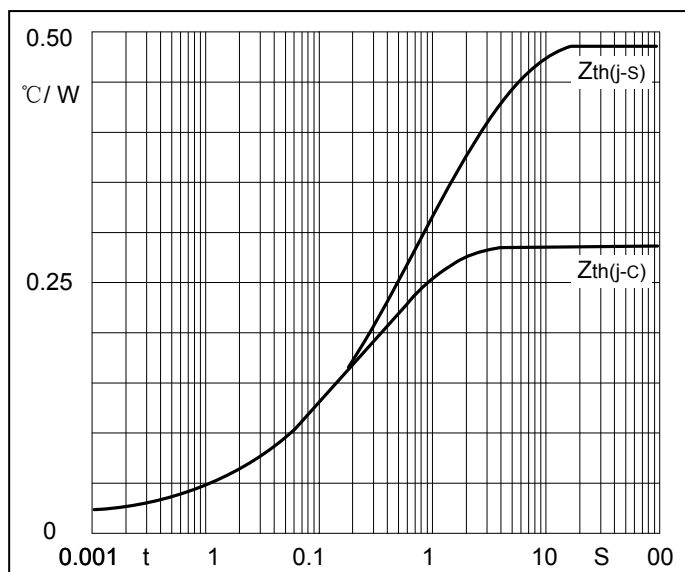


Fig3. Transient thermal impedance

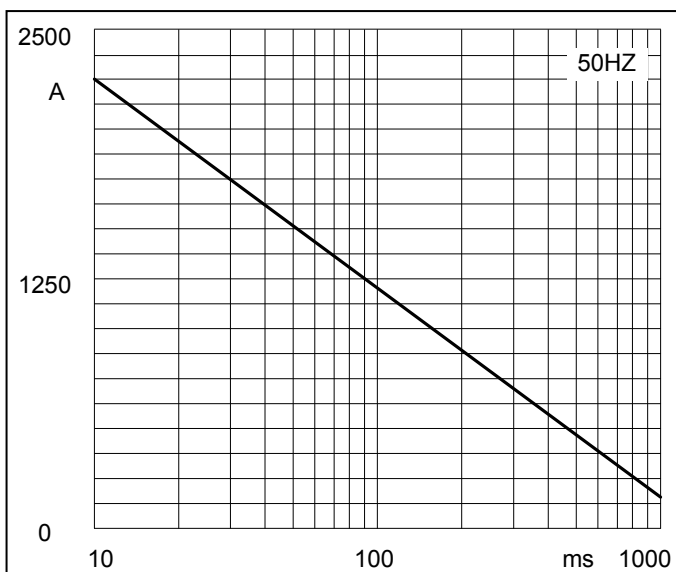


Fig4. Max Non-Repetitive Forward Surge Current

## Performance Curves

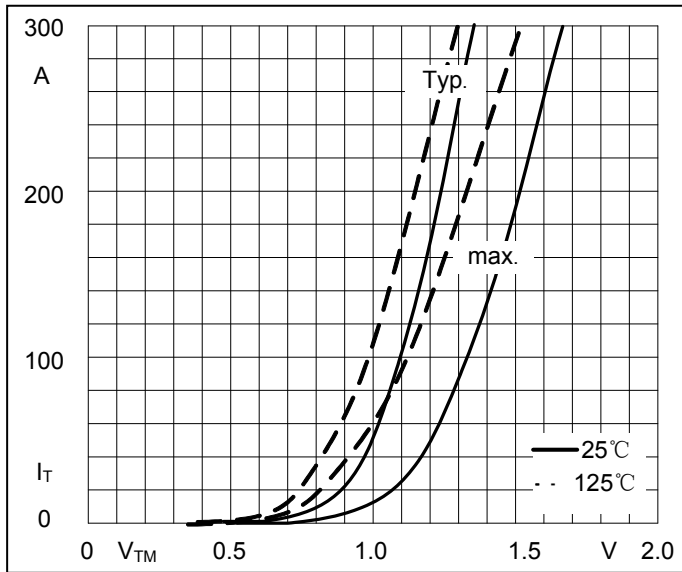


**Fig5. Forward Characteristics**

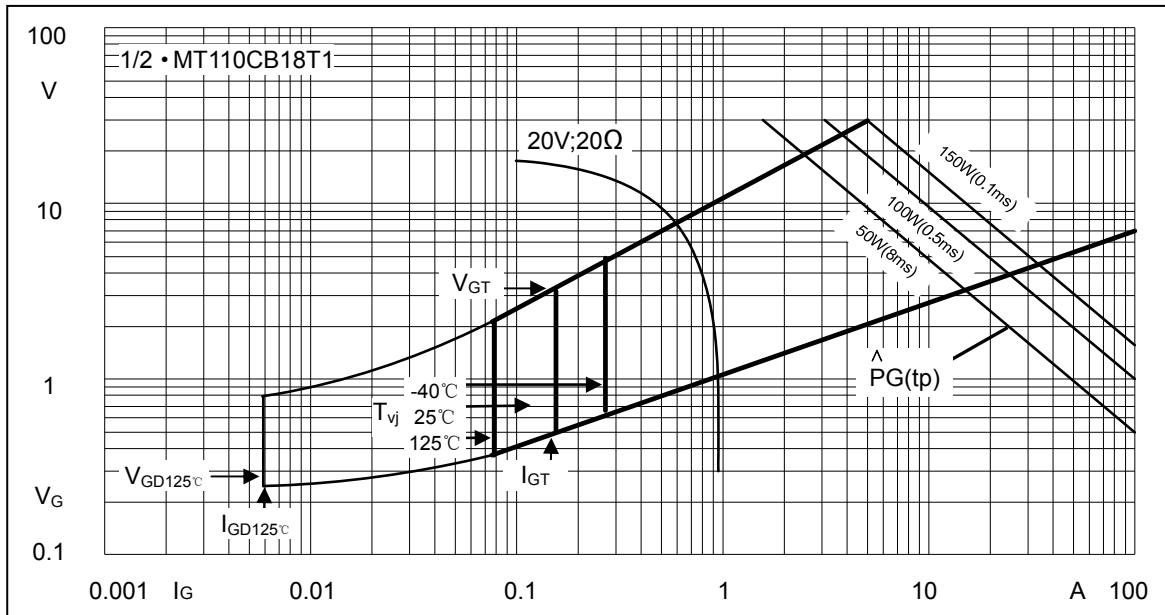


**Fig6. Gate trigger Characteristics**

## Ordering Information :

| Device         | Packing                     |
|----------------|-----------------------------|
| Part Number-BP | Bulk: 10PCS/BOX ;100PCS/CTN |

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