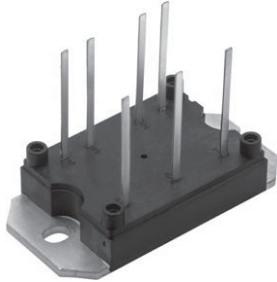
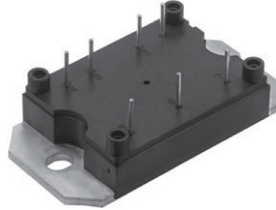




## Three Phase Bridge (Power Modules), 45 A to 100 A




MT...PA



MT...PB

### FEATURES

- Low  $V_F$
- Low profile package
- Direct mounting to heatsink
- Flat pin/round pin versions with PCB solderable terminals
- Low junction to case thermal resistance
- 3500  $V_{RMS}$  insulation voltage
- UL approved file E78996 
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



RoHS COMPLIANT

### APPLICATIONS

- Power conversion machines
- Welding
- UPS
- SMPS
- Motor drives
- General purpose and heavy duty application

### DESCRIPTION

A range of extremely compact three phase rectifier bridges offering efficient and reliable operation. The low profile package has been specifically conceived to maximize space saving and optimize the electrical layout of the application specific power supplies.

| PRIMARY CHARACTERISTICS |                    |
|-------------------------|--------------------|
| $I_o$                   | 45 A to 100 A      |
| $V_{RRM}$               | 1600 V             |
| Package                 | MTP                |
| Circuit configuration   | Three phase bridge |

| MAJOR RATINGS AND CHARACTERISTICS |                 |               |             |              |               |
|-----------------------------------|-----------------|---------------|-------------|--------------|---------------|
| SYMBOL                            | CHARACTERISTICS | VALUES 40MT   | VALUES 70MT | VALUES 100MT | UNITS         |
| $I_o$                             |                 | 45            | 75          | 100          | A             |
|                                   | $T_C$           | 100           | 80          | 80           | $^{\circ}C$   |
| $I_{FSM}$                         | 50 Hz           | 270           | 380         | 450          | A             |
|                                   | 60 Hz           | 280           | 398         | 470          |               |
| $I^2t$                            | 50 Hz           | 365           | 724         | 1013         | $A^2s$        |
|                                   | 60 Hz           | 325           | 660         | 920          |               |
| $I^2\sqrt{t}$                     |                 | 3650          | 7240        | 10 130       | $A^2\sqrt{s}$ |
| $V_{RRM}$                         |                 | 1600          |             |              | V             |
| $T_{Stg}$                         | Range           | - 40 to + 150 |             |              | $^{\circ}C$   |
| $T_J$                             |                 | - 40 to + 150 |             |              |               |

### ELECTRICAL SPECIFICATIONS

| VOLTAGE RATINGS                           |                                      |  |   |  |
|---|--------------------------------------|--|---|--|
| TYPE NUMBER                               | VOLTAGE CODE<br>REVERSE VOLTAGE<br>V | $V_{RRM}$ , MAXIMUM<br>REPETITIVE PEAK<br>REVERSE VOLTAGE<br>V | $V_{RSM}$ , MAXIMUM<br>NON-REPETITIVE PEAK<br>V | $I_{RRM}$ MAXIMUM<br>AT $T_J = 150^{\circ}C$<br>mA |
| VS-40MT160P, VS-70MT160P,<br>VS-100MT160P | 160                                  | 1600   | 1700  | 5  |



| FORWARD CONDUCTION   |                    |  |                                   |  |             |              |                   |                  |
|--|--------------------|--|-----------------------------------|--|-------------|--------------|-------------------|------------------|
| PARAMETER  | SYMBOL             | TEST CONDITIONS  |                                   | VALUES 40MT  | VALUES 70MT | VALUES 100MT | UNITS             |                  |
| Maximum DC output current at case temperature                          | I <sub>O</sub>     | 120° rect. to conduction angle   |                                   | 45   | 75          | 100          | A                 |                  |
|  |                    |  |                                   | 100  | 80          | 80           | °C                |                  |
| Maximum peak, one cycle forward, non-repetitive on state surge current | I <sub>FSM</sub>   | t = 10 ms  | No voltage reappplied             | Initial<br>T <sub>J</sub> = T <sub>J</sub> maximum | 270         | 380          | 450               | A                |
|  |                    | t = 8.3 ms   |                                   |  | 280         | 398          | 470               |                  |
|  |                    | t = 10 ms  | 100 % V <sub>RRM</sub> reappplied |  | 225         | 320          | 380               |                  |
|  |                    | t = 8.3 ms   |                                   |  | 240         | 335          | 400               |                  |
| Maximum I <sup>2</sup> t for fusing                                    | I <sup>2</sup> t   | t = 10 ms  | No voltage reappplied             | Initial<br>T <sub>J</sub> = T <sub>J</sub> maximum | 365         | 724          | 1013              | A <sup>2</sup> s |
|  |                    | t = 8.3 ms   |                                   |  | 325         | 660          | 920               |                  |
|  |                    | t = 10 ms  | 100 % V <sub>RRM</sub> reappplied |  | 253         | 512          | 600               |                  |
|  |                    | t = 8.3 ms   |                                   |  | 240         | 467          | 665               |                  |
| Maximum I <sup>2</sup> √t for fusing                                   | I <sup>2</sup> √t  | t = 0.1 ms to 10 ms, no voltage reappplied   |                                   | 3650   | 7240        | 10 130       | A <sup>2</sup> √s |                  |
| Value of threshold voltage   | V <sub>F(TO)</sub> | T <sub>J</sub> maximum   |                                   | 0.78   | 0.82        | 0.75         | V                 |                  |
| Slope resistance   | r <sub>t</sub>     |  |                                   | 14.8   | 9.5         | 8.1          | mΩ                |                  |
| Maximum forward voltage drop   | V <sub>FM</sub>    | T <sub>J</sub> = 25 °C; t <sub>p</sub> = 400 μs single junction (40MT, I <sub>pk</sub> = 40 A) (70MT, I <sub>pk</sub> = 70 A) (100MT, I <sub>pk</sub> = 100 A) |                                   | 1.45   | 1.45        | 1.51         | V                 |                  |

| INSULATION TABLE       |                  |  |  |             |             |              |       |
|------------------------|------------------|--|--|-------------|-------------|--------------|-------|
| PARAMETER              | SYMBOL           | TEST CONDITIONS  |  | VALUES 40MT | VALUES 70MT | VALUES 100MT | UNITS |
| RMS insulation voltage | V <sub>INS</sub> | T <sub>J</sub> = 25 °C, all terminal shorted, f = 50 Hz, t = 1 s |  | 3500        |             |              | V     |

| THERMAL AND MECHANICAL SPECIFICATIONS                   |                   |   |  |               |             |              |       |
|---|-------------------|---|--|---------------|-------------|--------------|-------|
| PARAMETER   | SYMBOL            | TEST CONDITIONS   |  | VALUES 40MT   | VALUES 70MT | VALUES 100MT | UNITS |
| Maximum junction operating temperature range            | T <sub>J</sub>    |   |  | - 40 to + 150 |             |              | °C    |
| Maximum storage temperature range                       | T <sub>Stg</sub>  |   |  | - 40 to + 150 |             |              |       |
| Maximum thermal resistance, junction to case            | R <sub>thJC</sub> | DC operation per module   |  | 0.27          | 0.23        | 0.19         | K/W   |
|   |                   | DC operation per junction   |  | 1.6           | 1.38        | 1.14         |       |
|   |                   | 120° rect. conduction angle per module  |  | 0.38          | 0.29        | 0.22         |       |
|   |                   | 120° rect. conduction angle per junction  |  | 2.25          | 1.76        | 1.29         |       |
| Maximum thermal resistance, case to heatsink per module | R <sub>thCS</sub> | Mounting surface smooth, flat and greased Heatsink compound thermal conductivity = 0.42W/mK   |  | 0.1           |             |              |       |
| Mounting torque to heatsink ± 10 %                      |                   | A mounting compound is recommended and the torque should be rechecked after a period of 3 h to allow for the spread of the compound. Lubricated threads |  | 4             |             |              | Nm    |
| Approximate weight                                      |                   |   |  | 65            |             |              | g     |

| CLEARANCE AND CREEPAGE DISTANCES |   |  |         |         |       |
|----------------------------------|---|--|---------|---------|-------|
| PARAMETER                        | TEST CONDITIONS   |  | MT...PA | MT...PB | UNITS |
| Clearance                        | External shortest distances in air between terminals which are not internally short circuited together                                  |  | 10.9    | 12.3    | mm    |
| Creepage distance                | Shortest distance along external surface of the insulating material between terminals which are not internally short circuited together |  |         |         |       |

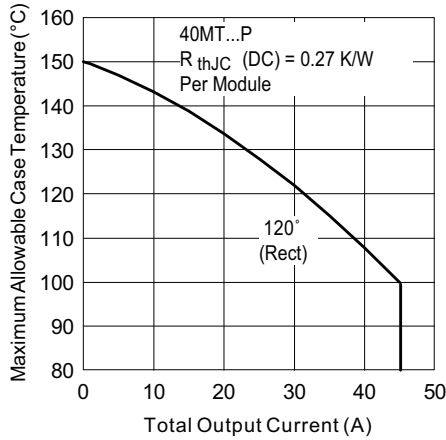


Fig. 1 - Current Rating Characteristics

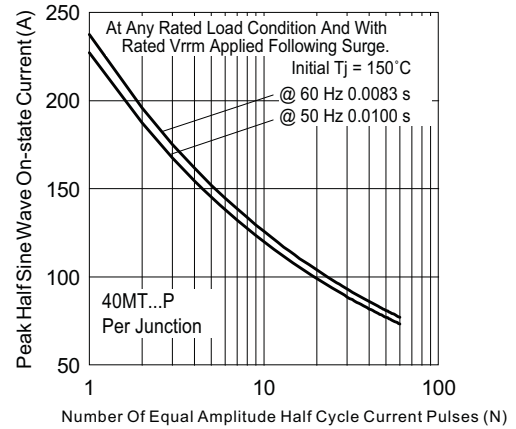


Fig. 3 - Maximum Non-Repetitive Surge Current

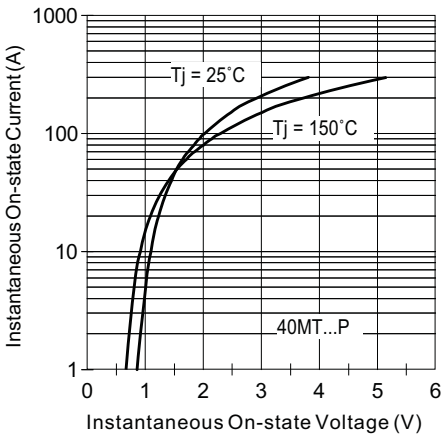


Fig. 2 - On-State Voltage Drop Characteristics

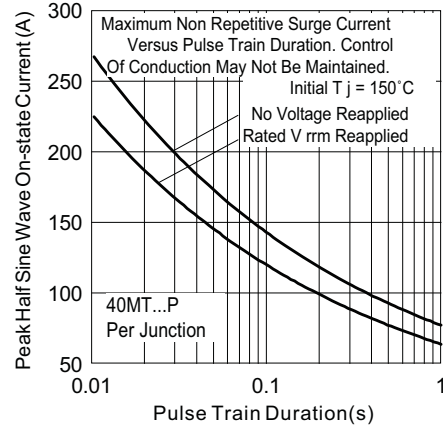


Fig. 4 - Maximum Non-Repetitive Surge Current

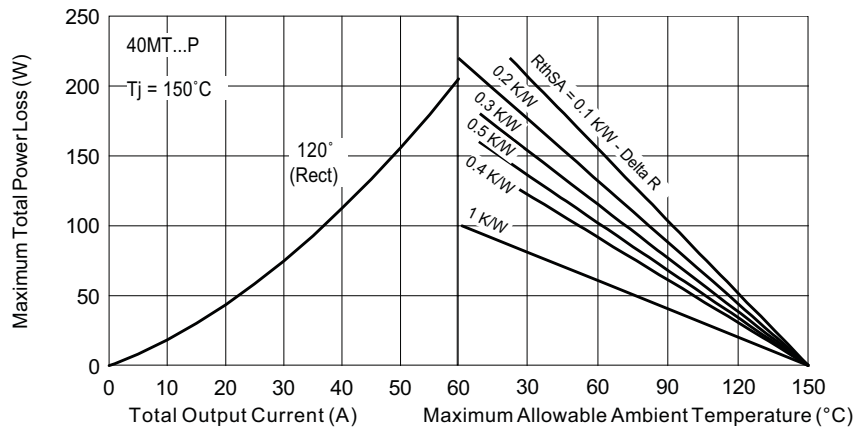


Fig. 5 - Current Rating Nomogram (1 Module Per Heatsink)

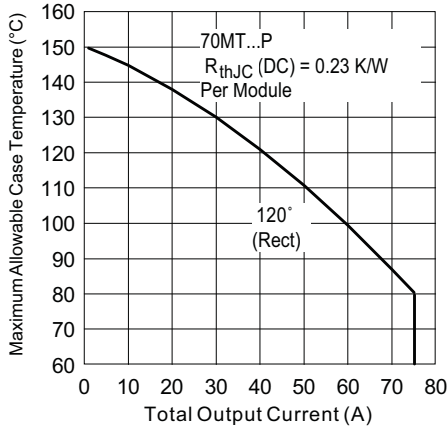


Fig. 6 - Current Rating Characteristics

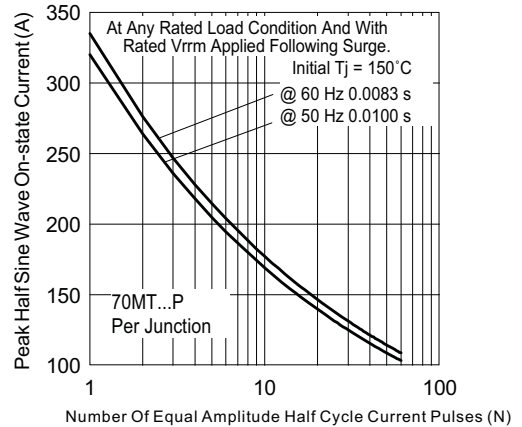


Fig. 8 - Maximum Non-Repetitive Surge Current

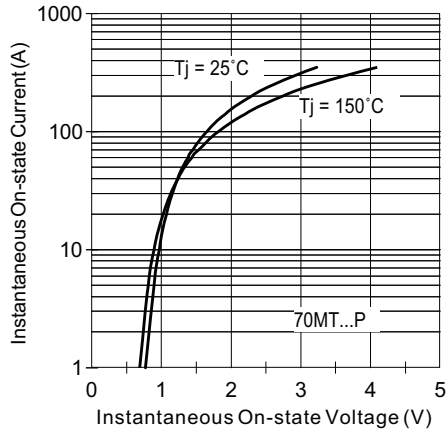


Fig. 7 - On-State Voltage Drop Characteristics

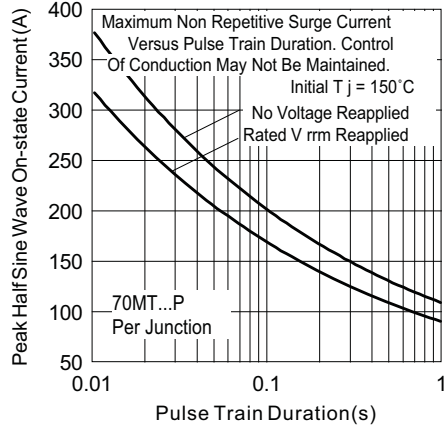


Fig. 9 - Maximum Non-Repetitive Surge Current

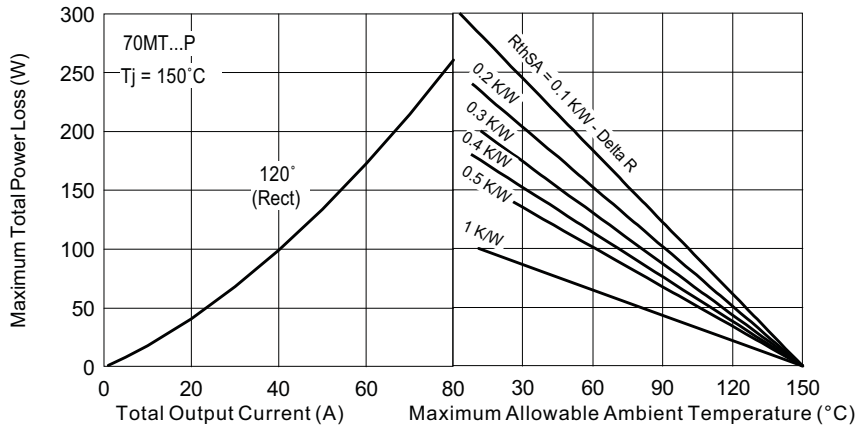


Fig. 10 - Current Rating Nomogram (1 Module Per Heatsink)

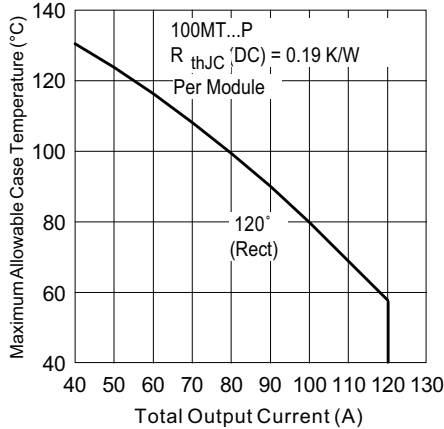


Fig. 11 - Current Rating Characteristics

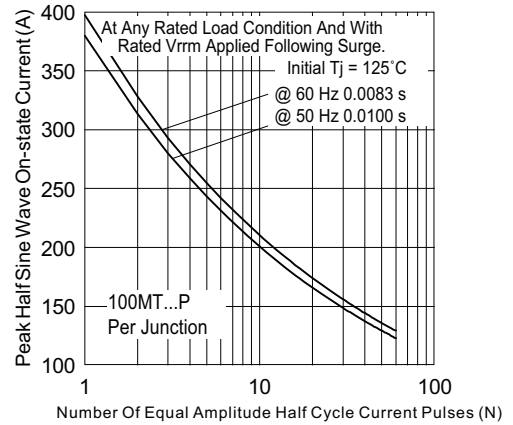


Fig. 13 - Maximum Non-Repetitive Surge Current

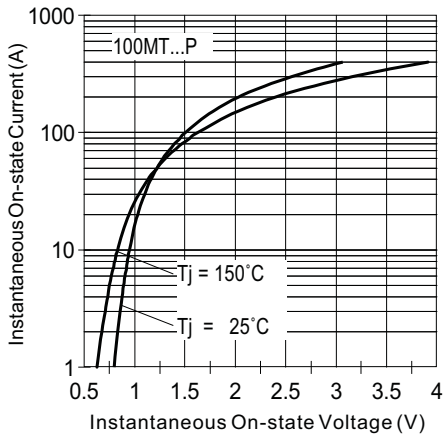


Fig. 12 - On-State Voltage Drop Characteristics

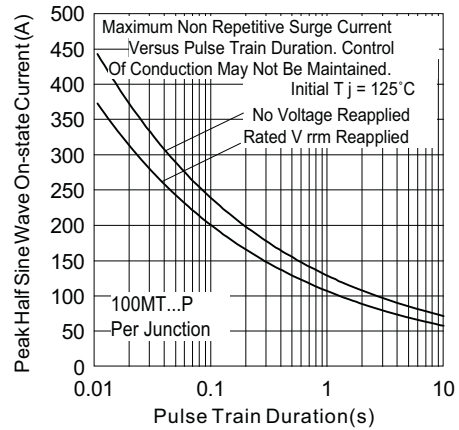


Fig. 14 - Maximum Non-Repetitive Surge Current

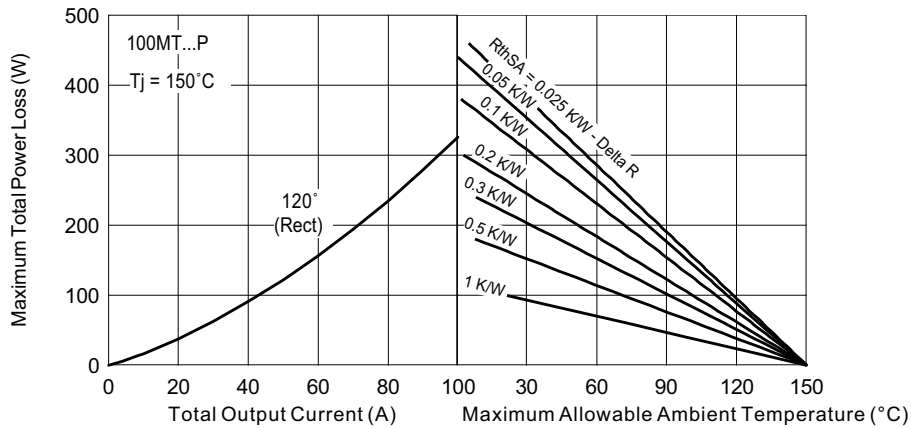


Fig. 15 - Current Rating Nomogram (1 Module Per Heatsink)

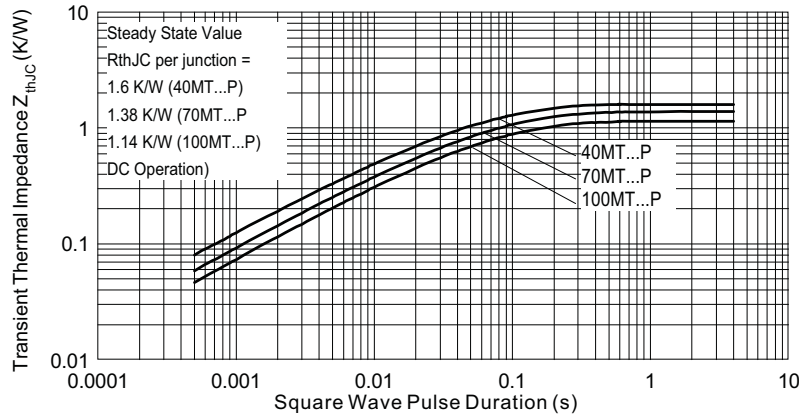
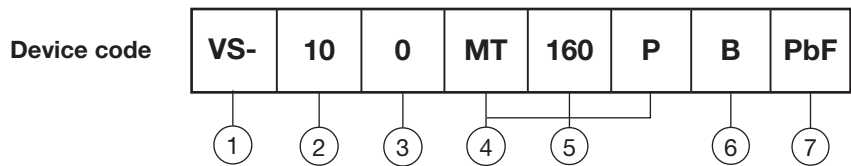


Fig. 16 - Thermal Impedance  $Z_{thJC}$  Characteristics

**ORDERING INFORMATION TABLE**

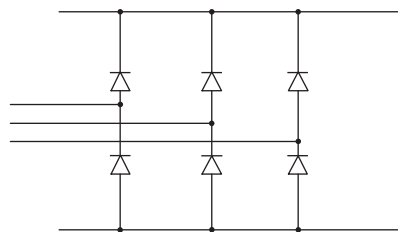


- 1** - Vishay Semiconductors product
- 2** - Current rating code
 

|            |
|------------|
| 4 = 45 A   |
| 7 = 75 A   |
| 10 = 100 A |
- 3** - Circuit configuration code: 0 = three phase rectifier bridge
- 4** - Essential part number
- 5** - Voltage code x 10 =  $V_{RRM}$  (see Voltage Ratings table)
- 6** - Pinout code
 

|                |
|----------------|
| A = flat pins  |
| B = round pins |
- 7** - Lead (Pb)-free

**CIRCUIT CONFIGURATION**

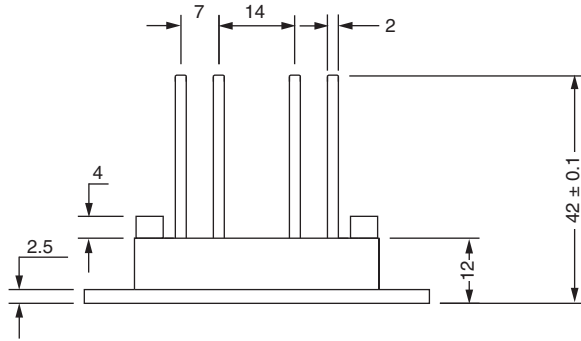


| LINKS TO RELATED DOCUMENTS |  |
|----------------------------|--|
| Dimensions                 | <a href="http://www.vishay.com/doc?95244">www.vishay.com/doc?95244</a> |

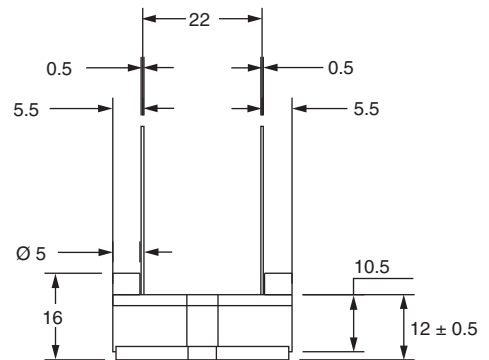
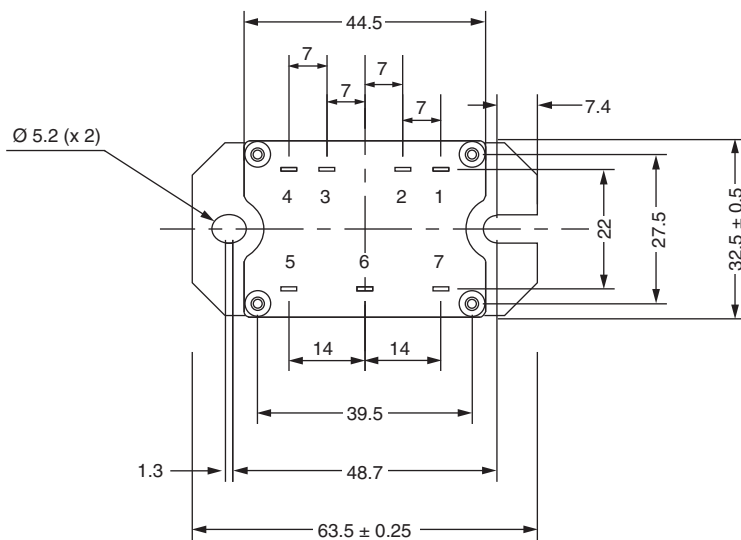
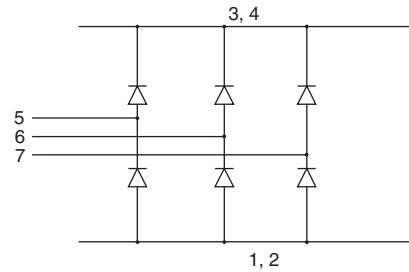


## MTP Flat and Round Pin

**DIMENSIONS FOR MTP WITH FLAT PIN** in millimeters

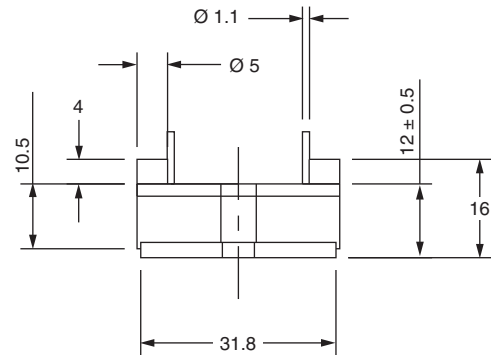
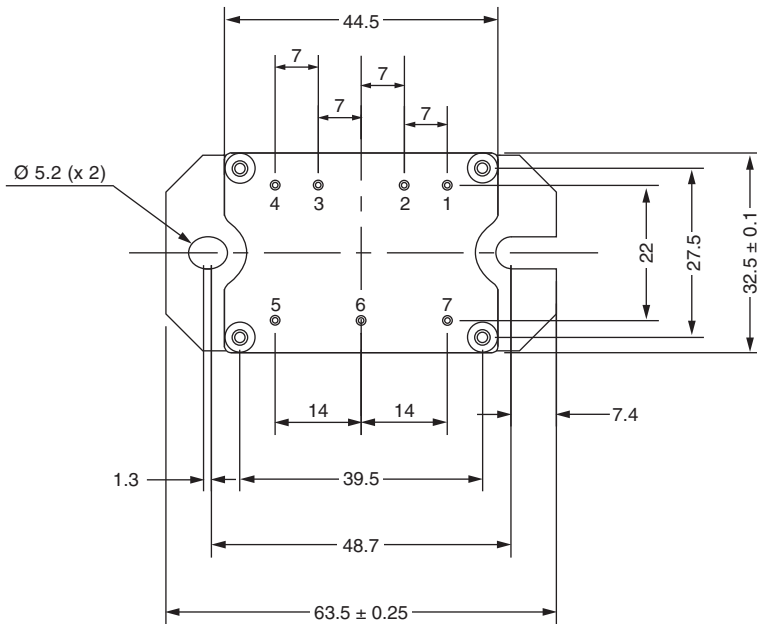
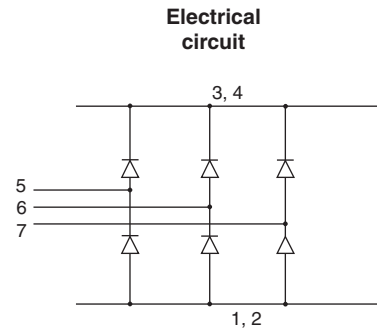
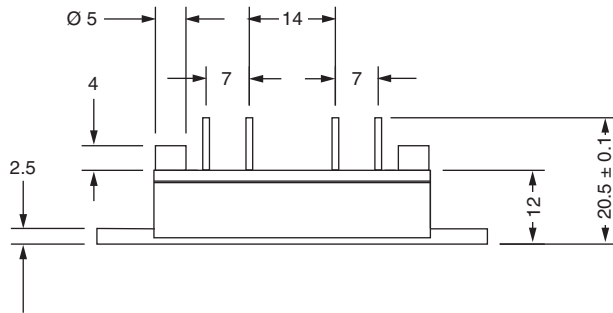


Electrical circuit





### DIMENSIONS FOR MTP WITH ROUND PIN in millimeters







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