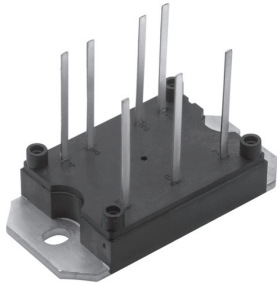
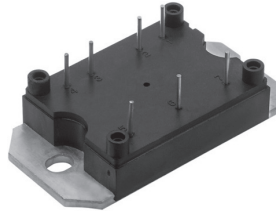




## Three Phase Bridge (Power Modules), 45 A to 100 A




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.

| PRODUCT SUMMARY |                    |
|-----------------|--------------------|
| $I_o$           | 45 A to 100 A      |
| $V_{RRM}$       | 1400 V to 1600 V   |
| Package         | MT...PA, MT...PB   |
| Circuit         | 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           | °C                |
| $I_{FSM}$                         | 50 Hz           | 270          | 380         | 450          | A                 |
|                                   | 60 Hz           | 280          | 398         | 470          |                   |
| $I^2t$                            | 50 Hz           | 365          | 724         | 1013         | A <sup>2</sup> s  |
|                                   | 60 Hz           | 325          | 660         | 920          |                   |
| $I^2\sqrt{t}$                     |                 | 3650         | 7240        | 10 130       | A <sup>2</sup> √s |
| $V_{RRM}$                         |                 | 1400 to 1600 |             |              | V                 |
| $T_{Stg}$                         | Range           | - 40 to 125  |             |              | °C                |
| $T_J$                             |                 | - 40 to 150  |             |              |                   |

### ELECTRICAL SPECIFICATIONS

| VOLTAGE RATINGS                        |                                |   |   |   |
|--|--------------------------------|---|---|---|
| TYPE NUMBER                            | VOLTAGE CODE REVERSE VOLTAGE V | $V_{RRM}$ , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V | $V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK V | $I_{RRM}$ MAXIMUM AT $T_J = 150\text{ °C}$ mA |
| VS-40MT140P, VS-70MT140P, VS-100MT140P | 140                            | 1400  | 1500                                      | 5   |
| VS-40MT160P, VS-70MT160P, VS-100MT160P | 160                            | 1600  | 1700                                      |   |



| FORWARD CONDUCTION   |                    |  |                                  |  |      |      |        |                   |
|--|--------------------|--|----------------------------------|--|------|------|--------|-------------------|
| PARAMETER  | SYMBOL             | TEST CONDITIONS  |                                  |  | 40MT | 70MT | 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 reapplied             | 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> reapplied |  | 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 reapplied             | 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> reapplied |  | 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 reapplied  |                                  |  | 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  |  |  | 40MT | 70MT | 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  |  |  | 40MT        | 70MT | 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 125 |      |       |       |
| 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<br>Heatsink compound thermal conductivity = 0.42 W/mK  |  |  | 0.1         |      |       |       |
| Mounting torque to heatsink ± 10 %                      |                   | A mounting compound is recommended and the torque should be rechecked after a period of 3 hours to allow for the spread of the compound. |  |  | 4           |      |       | Nm    |
| Approximate weight                                      |                   | Lubricated threads   |  |  | 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 |  |  |         |         |       |

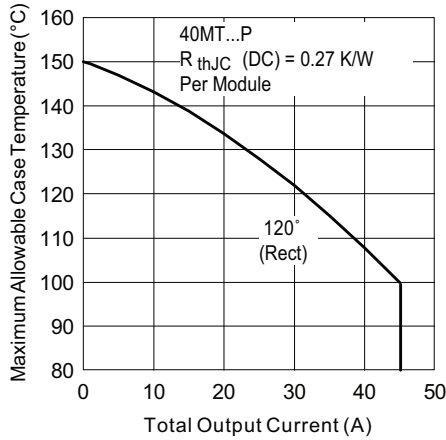


Fig. 1 - Current Rating Characteristics

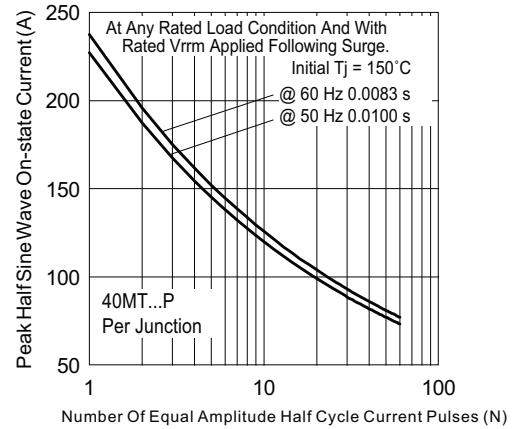


Fig. 3 - Maximum Non-Repetitive Surge Current

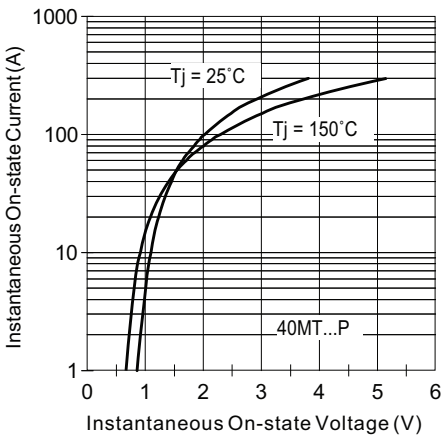


Fig. 2 - On-State Voltage Drop Characteristics

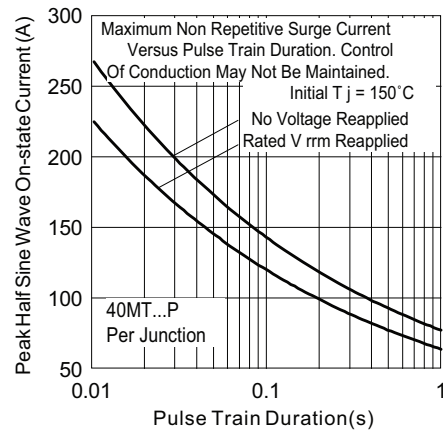


Fig. 4 - Maximum Non-Repetitive Surge Current

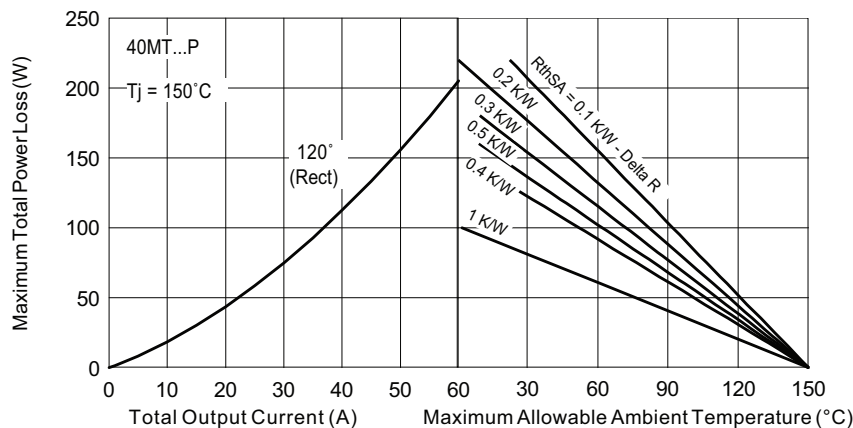


Fig. 5 - Current Rating Nomogram (1 Module Per Heatsink)

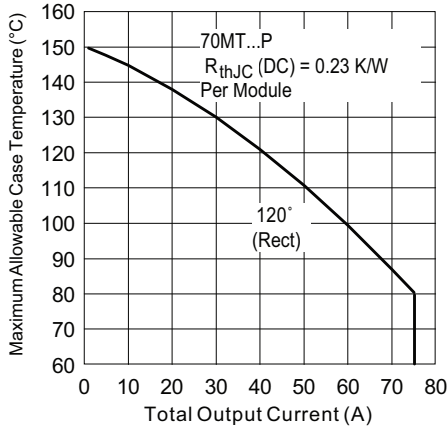


Fig. 6 - Current Rating Characteristics

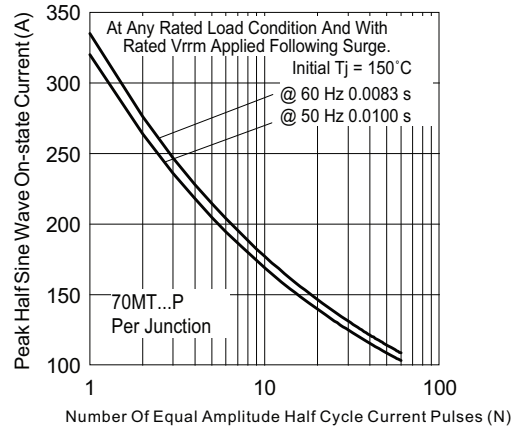


Fig. 8 - Maximum Non-Repetitive Surge Current

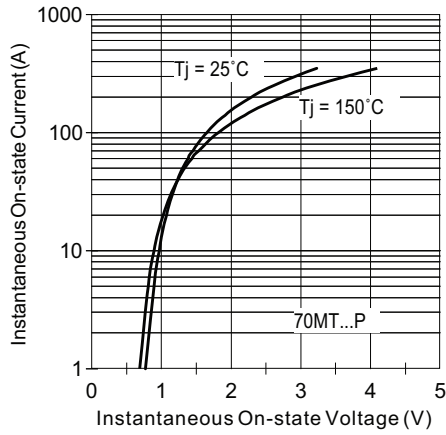


Fig. 7 - On-State Voltage Drop Characteristics

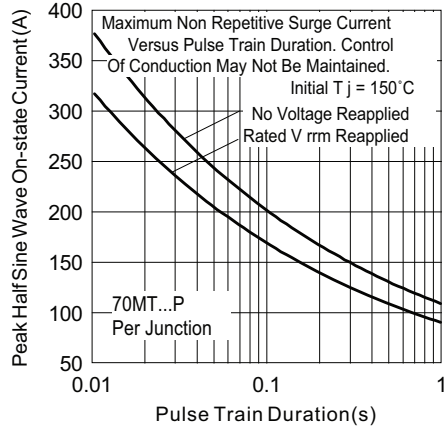


Fig. 9 - Maximum Non-Repetitive Surge Current

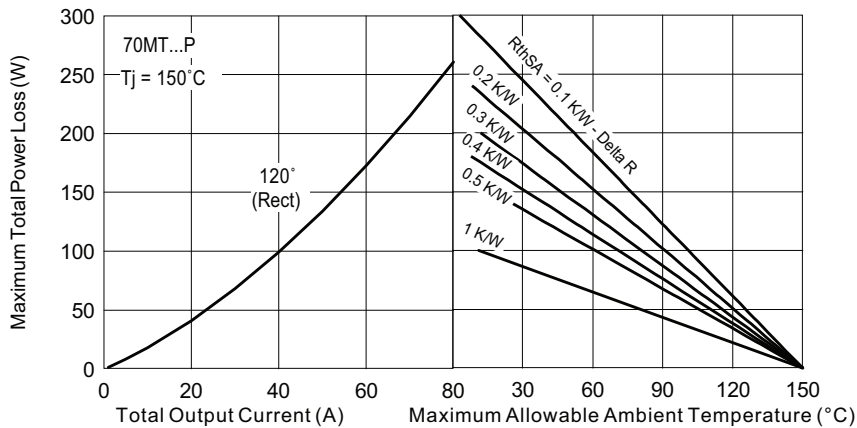


Fig. 10 - Current Rating Nomogram (1 Module Per Heatsink)

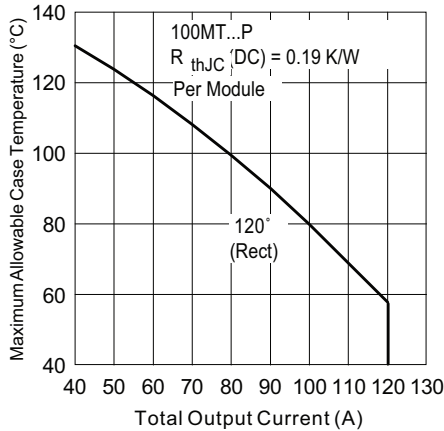


Fig. 11 - Current Rating Characteristics

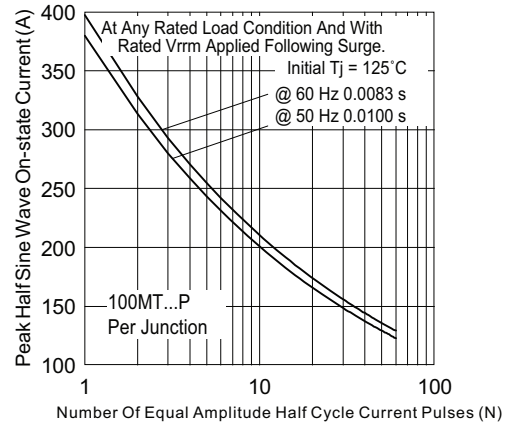


Fig. 13 - Maximum Non-Repetitive Surge Current

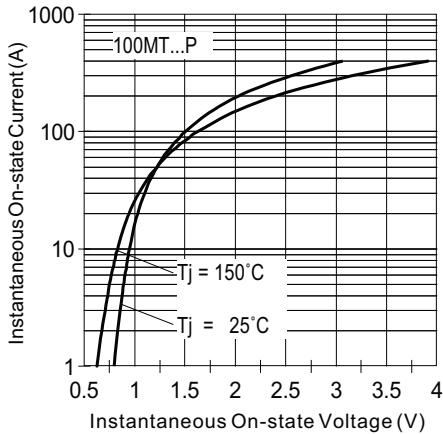


Fig. 12 - On-State Voltage Drop Characteristics

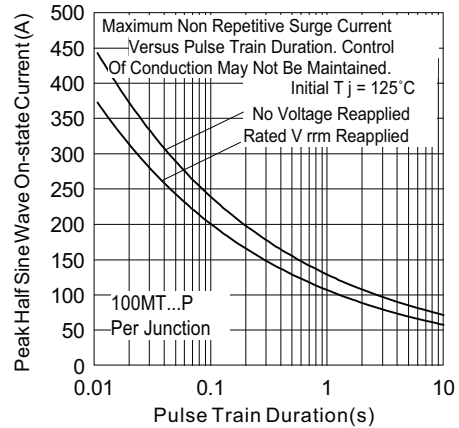


Fig. 14 - Maximum Non-Repetitive Surge Current

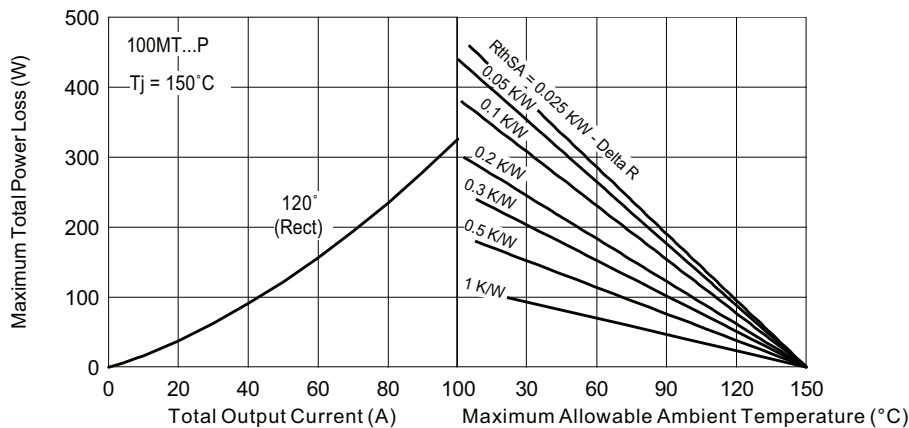


Fig. 15 - Current Rating Nomogram (1 Module Per Heatsink)

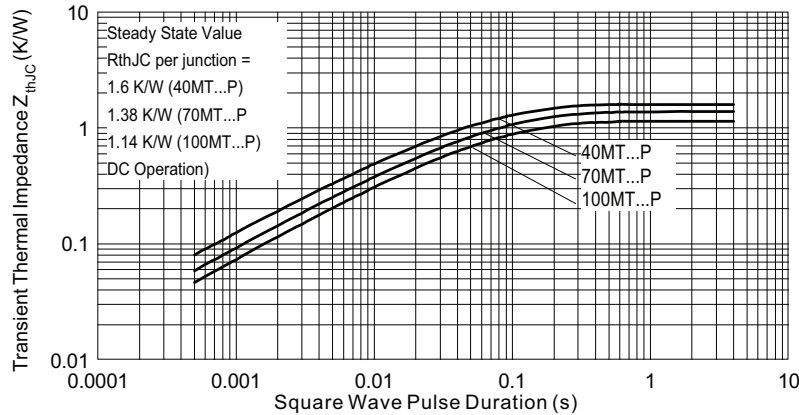
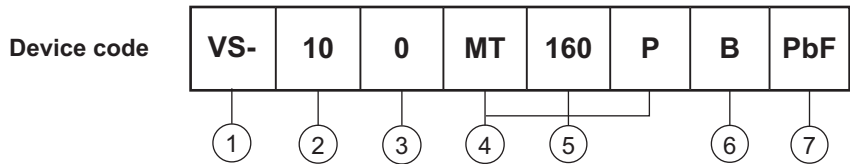


Fig. 16 - Thermal Impedance  $Z_{thJC}$  Characteristics

**ORDERING INFORMATION TABLE**

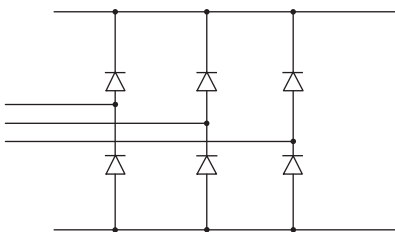


- 1** - Vishay Semiconductors product
- 2** - Current rating code
 

|            |
|------------|
| 4 = 45 A   |
| 7 = 75 A   |
| 10 = 100 A |
- 3** - Circuit configuration code: 0 = 3-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

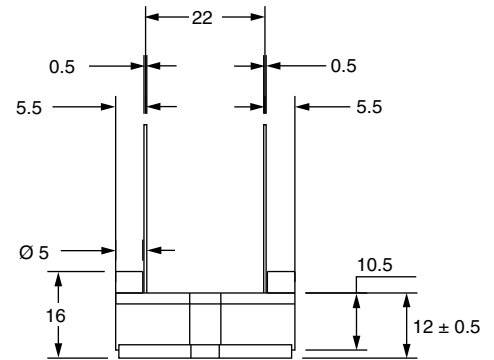
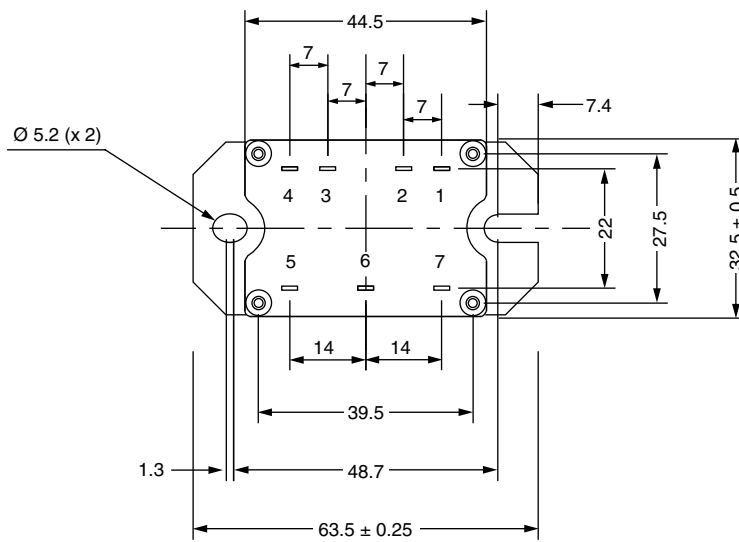
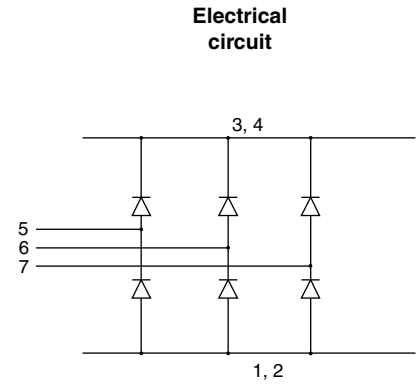
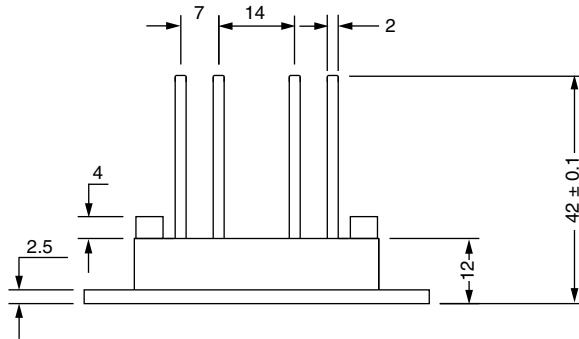
**CIRCUIT CONFIGURATION**



| 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



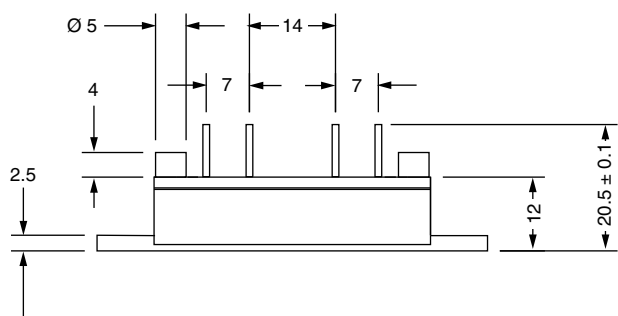
# Outline Dimensions

Vishay Semiconductors

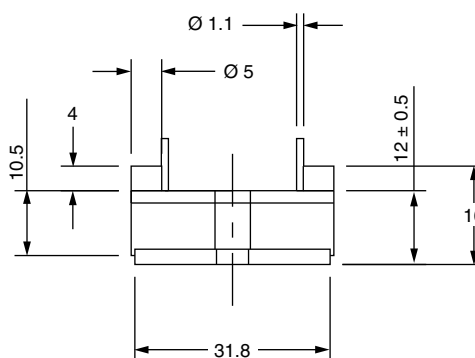
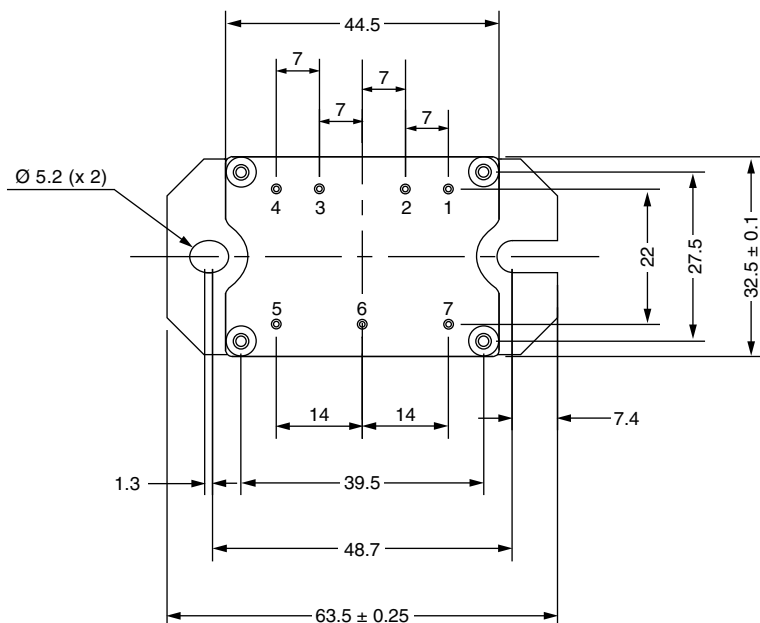
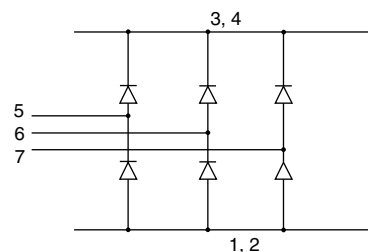
MTP Flat and Round Pin



## DIMENSIONS FOR MTP WITH ROUND PIN in millimeters



Electrical circuit







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