



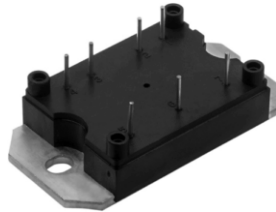
# THE DATASHEET OF VS-40MT160PBPBF



## Three Phase Bridge (Power Module), 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
- Compliant to RoHS directive 2002/95/EC
- Designed and qualified for industrial level



**RoHS**  
COMPLIANT

### APPLICATIONS

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

### PRODUCT SUMMARY

$I_o$	45 A to 100 A
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### 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.

### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	40MT	70MT	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	$A^2\sqrt{s}$
$V_{RRM}$		1400 to 1600			V
$T_{Stg}$	Range	- 40 to 125			$^{\circ}C$
$T_J$		- 40 to 150			

# 40MT1.0P.PbF, 70MT1.0P.PbF, 100MT1.0P.PbF Series



Vishay High Power Products Three Phase Bridge  
(Power Module), 45 A to 100 A

## ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS				
TYPE NUMBER	VOLTAGE CODE REVERSE VOLTAGE V	V <sub>RRM</sub> , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V	V <sub>RSM</sub> , MAXIMUM NON-REPETITIVE PEAK V	I <sub>RRM</sub> MAXIMUM AT T <sub>J</sub> = 150 °C mA
40MT140P, 70MT140P, 100MT140P	140	1400	1500	5
40MT160P, 70MT160P, 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 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 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 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



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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				

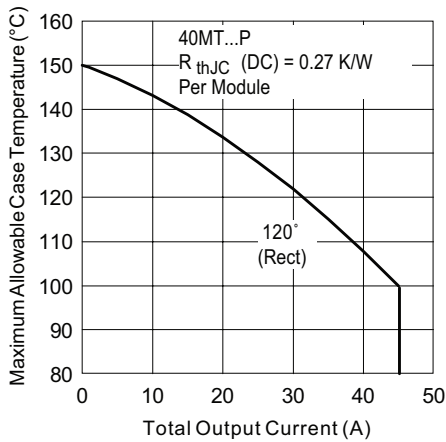


Fig. 1 - Current Rating Characteristics

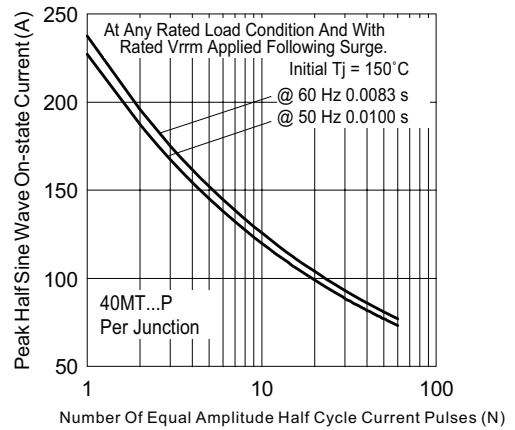


Fig. 3 - Maximum Non-Repetitive Surge Current

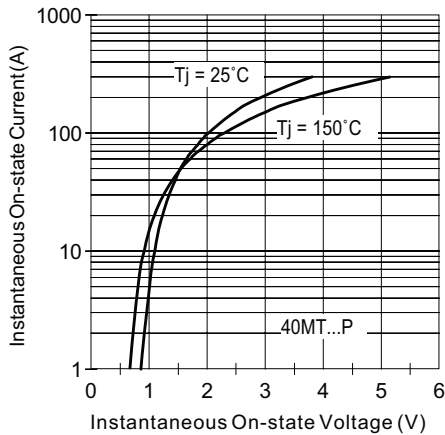


Fig. 2 - On-State Voltage Drop Characteristics

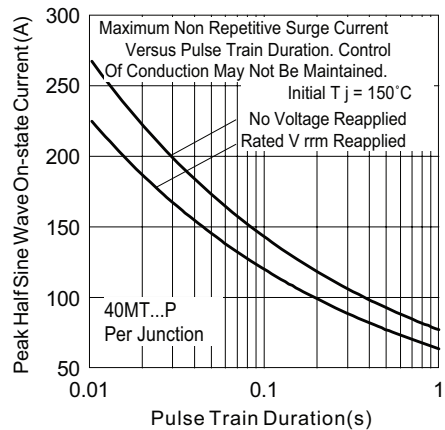


Fig. 4 - Maximum Non-Repetitive Surge Current

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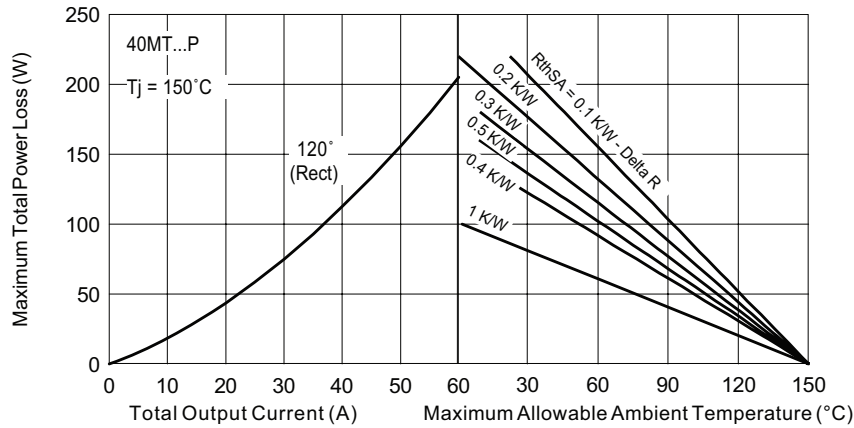


Fig. 5 - Current Rating Nomogram (1 Module Per Heatsink)

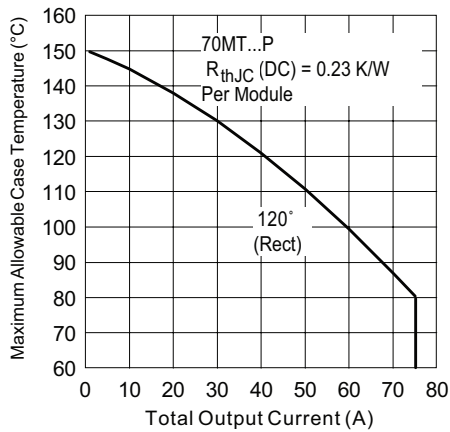


Fig. 6 - Current Rating Characteristics

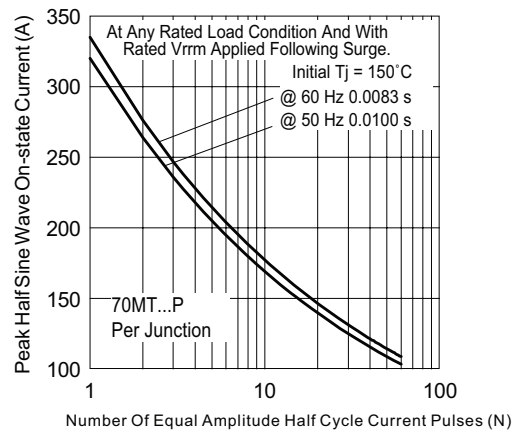


Fig. 8 - Maximum Non-Repetitive Surge Current

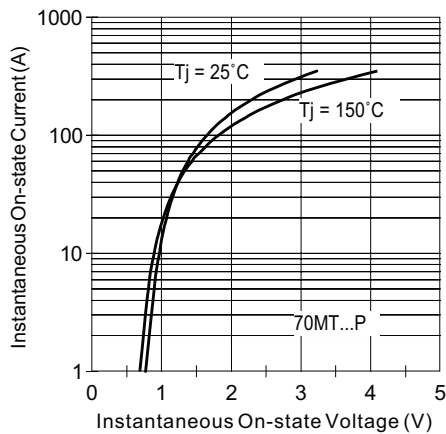


Fig. 7 - On-State Voltage Drop Characteristics

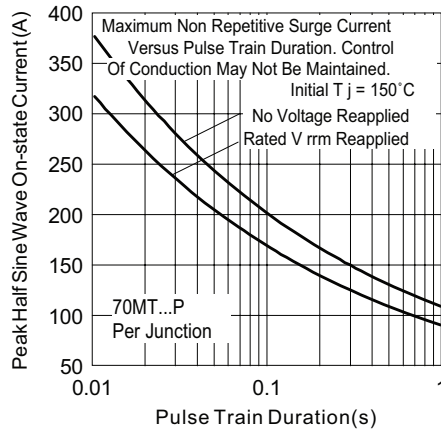


Fig. 9 - Maximum Non-Repetitive Surge Current



# 40MT1.0P.PbF, 70MT1.0P.PbF, 100MT1.0P.PbF Series

Three Phase Bridge Vishay High Power Products  
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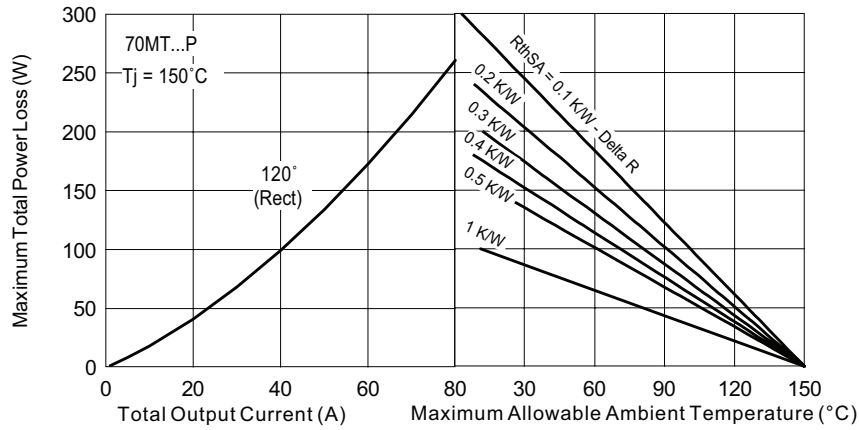


Fig. 10 - Current Rating Nomogram (1 Module Per Heatsink)

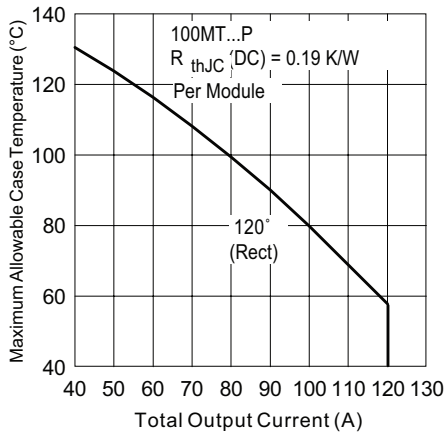


Fig. 11 - Current Rating Characteristics

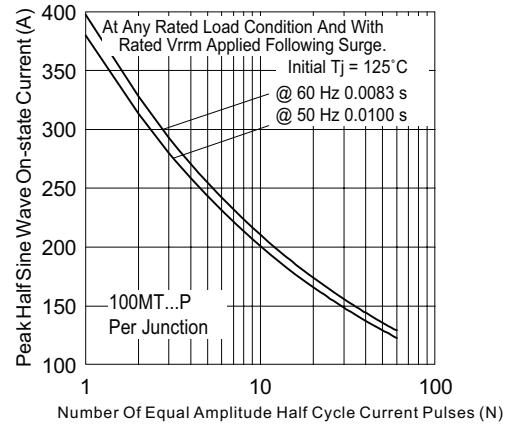


Fig. 13 - Maximum Non-Repetitive Surge Current

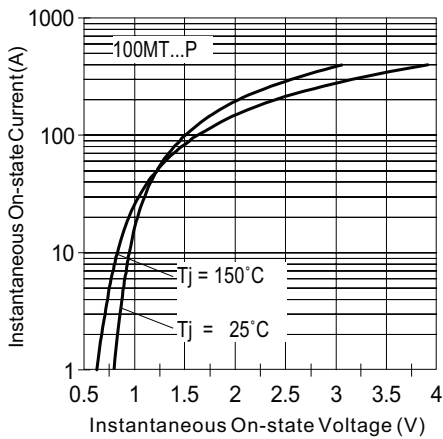


Fig. 12 - On-State Voltage Drop Characteristics

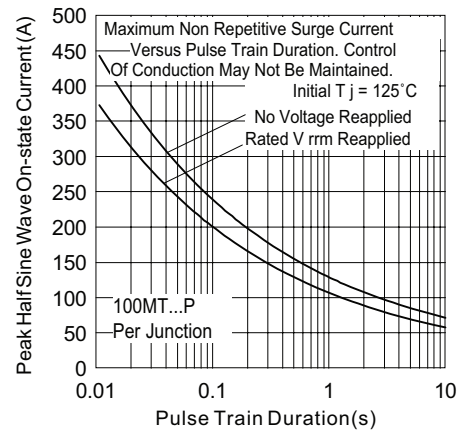


Fig. 14 - Maximum Non-Repetitive Surge Current

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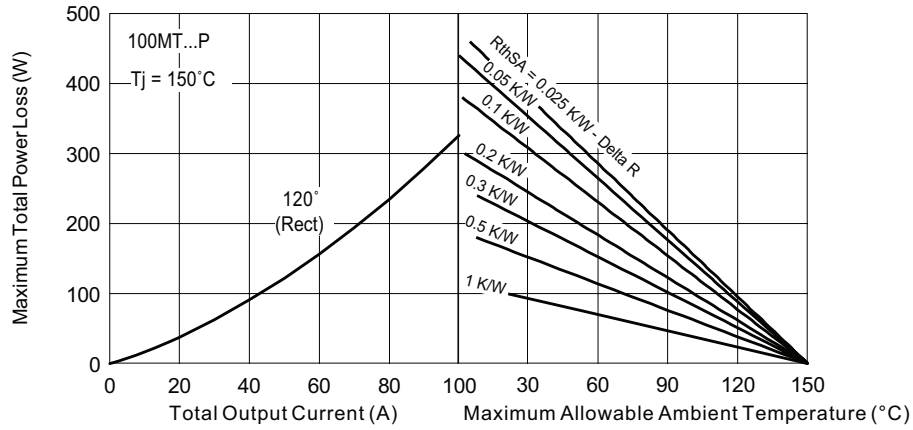


Fig. 15 - Current Rating Nomogram (1 Module Per Heatsink)

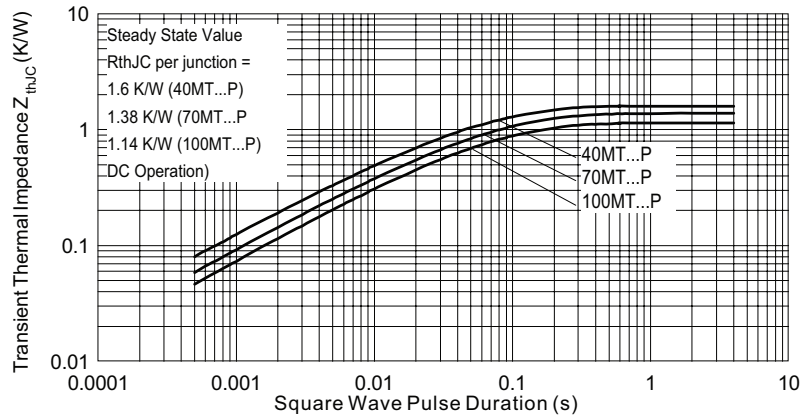


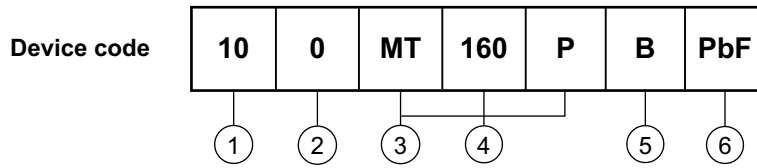
Fig. 16 - Thermal Impedance  $Z_{thJC}$  Characteristics



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## ORDERING INFORMATION TABLE



1

- Current rating code

4 = 45 A
7 = 75 A
10 = 100 A

2

- Circuit configuration code: 0 = 3-Phase rectifier bridge

3

- Essential part number

4

- Voltage code x 10 =  $V_{RRM}$  (see Voltage Ratings table)

5

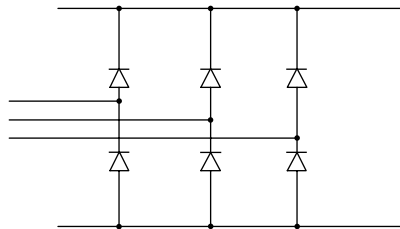
- Pinout code

A = Flat pins
B = Round pins

6

- Lead (Pb)-free

## CIRCUIT CONFIGURATION



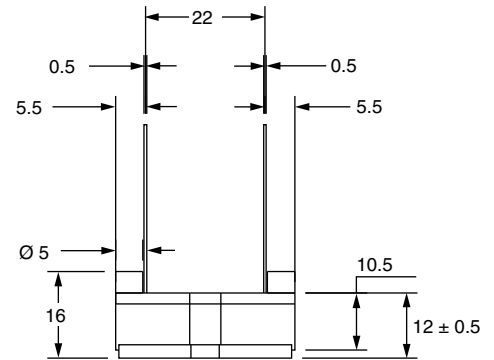
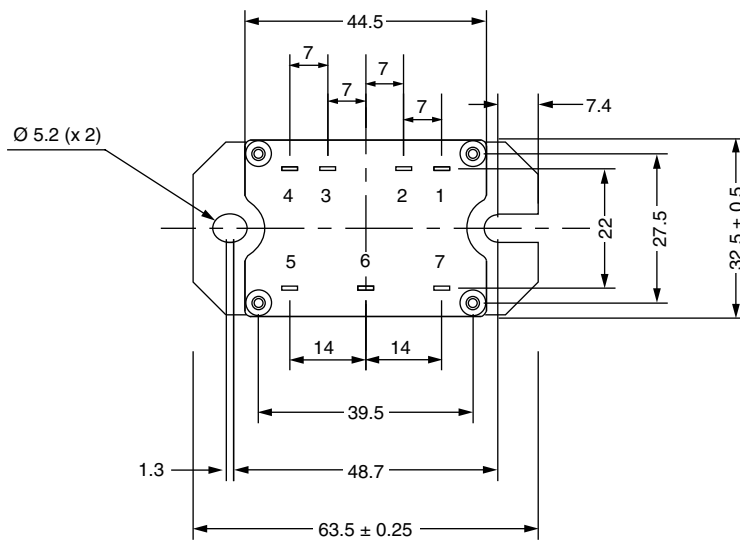
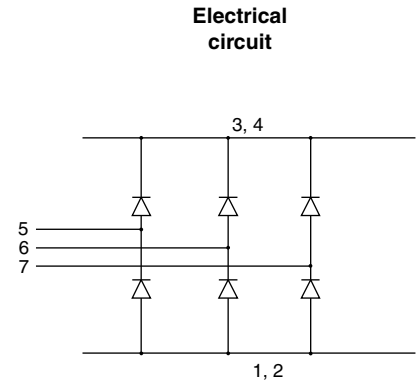
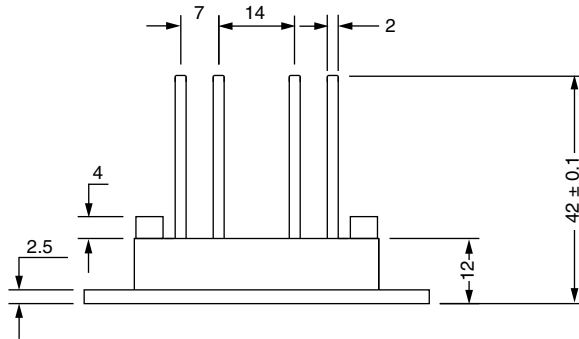
## LINKS TO RELATED DOCUMENTS

Dimensions

[www.vishay.com/doc?95244](http://www.vishay.com/doc?95244)

## MTP Flat and Round Pin

### DIMENSIONS FOR MTP WITH FLAT PIN in millimeters



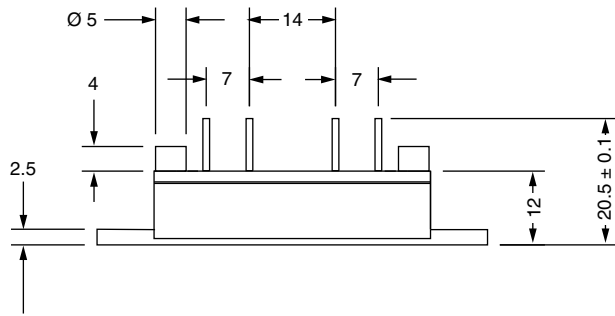
# Outline Dimensions

Vishay Semiconductors

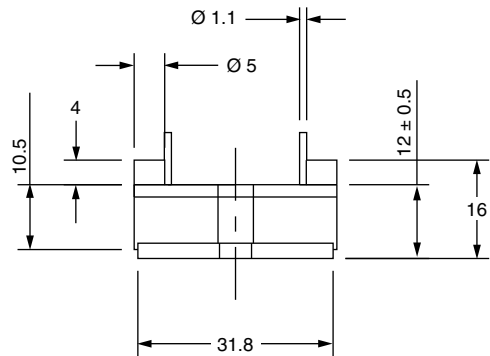
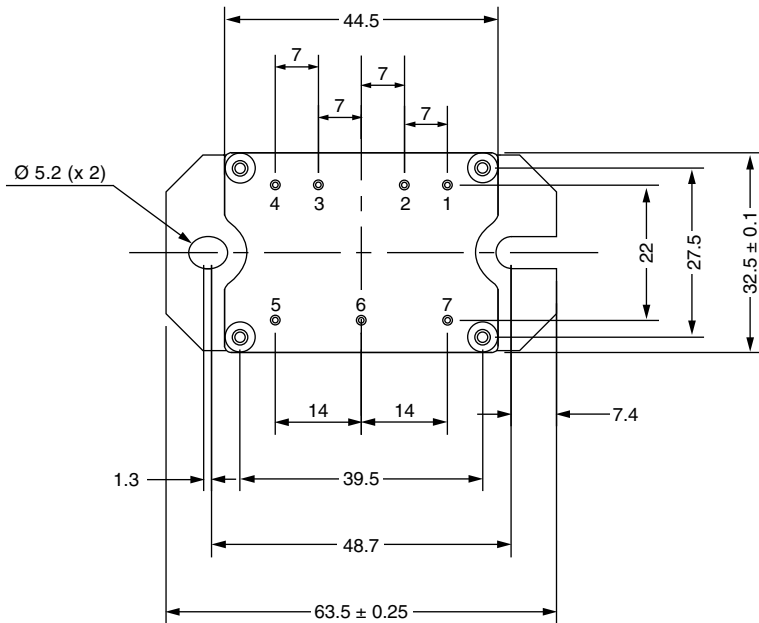
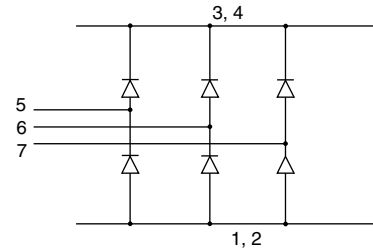
MTP Flat and Round Pin



## DIMENSIONS FOR MTP WITH ROUND PIN in millimeters



Electrical circuit





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