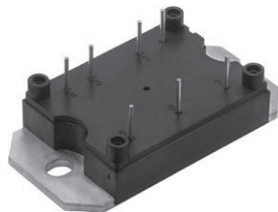




## Three Phase Bridge (Power Modules), 45 A to 100 A




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 <sub>O</sub>		45	75	100	A
	T <sub>C</sub>	100	80	80	°C
I <sub>FSM</sub>	50 Hz	270	380	450	A
	60 Hz	280	398	470	
I <sup>2</sup> t	50 Hz	365	724	1013	A <sup>2</sup> s
	60 Hz	325	660	920	
I <sup>2</sup> √t		3650	7240	10 130	A <sup>2</sup> √s
V <sub>RRM</sub>		1600			V
T <sub>Stg</sub>	Range	- 40 to + 150			°C
T <sub>J</sub>		- 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-40MT160P, VS-70MT160P, 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	$I_O$	120° rect. to conduction angle	45	75	100	A
			100	80	80	°C
Maximum peak, one cycle forward, non-repetitive on state surge current	$I_{FSM}$	<div> <div> <math>t = 10\text{ ms}</math>  <math>t = 8.3\text{ ms}</math> </div> <div> No voltage reappplied  100 % <math>V_{RRM}</math> reappplied </div> </div>	270	380	450	A
		Initial $T_J = T_J$ maximum	280	398	470	
			225	320	380	
			240	335	400	
Maximum $I^2t$ for fusing	$I^2t$	<div> <div> <math>t = 10\text{ ms}</math>  <math>t = 8.3\text{ ms}</math> </div> <div> No voltage reappplied  100 % <math>V_{RRM}</math> reappplied </div> </div>	365	724	1013	A <sup>2</sup> s
			325	660	920	
			253	512	600	
			240	467	665	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1\text{ ms to }10\text{ ms}$ , no voltage reappplied	3650	7240	10 130	A <sup>2</sup> √s
Value of threshold voltage	$V_{F(TO)}$	$T_J$ maximum	0.78	0.82	0.75	V
Slope resistance	$r_t$		14.8	9.5	8.1	mΩ
Maximum forward voltage drop	$V_{FM}$	$T_J = 25\text{ °C}$ ; $t_p = 400\text{ μs}$ single junction (40MT, $I_{pk} = 40\text{ A}$ ) (70MT, $I_{pk} = 70\text{ A}$ ) (100MT, $I_{pk} = 100\text{ A}$ )	1.45	1.45	1.51	V

**INSULATION TABLE**

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES 40MT	VALUES 70MT	VALUES 100MT	UNITS
RMS insulation voltage	$V_{INS}$	$T_J = 25\text{ °C}$ , all terminal shorted, $f = 50\text{ Hz}$ , $t = 1\text{ s}$	3500			V

**THERMAL AND MECHANICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES 40MT	VALUES 70MT	VALUES 100MT	UNITS
Maximum junction operating temperature range	$T_J$		- 40 to + 150			°C
Maximum storage temperature range	$T_{Stg}$		- 40 to + 150			
Maximum thermal resistance, junction to case	$R_{thJC}$	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	$R_{thCS}$	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			

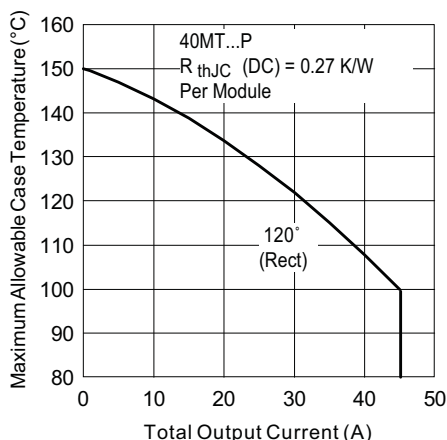


Fig. 1 - Current Rating Characteristics

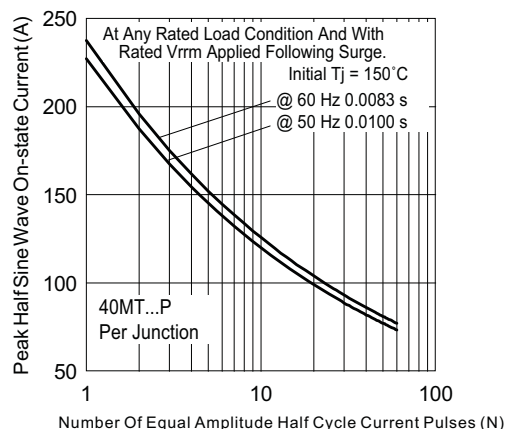


Fig. 3 - Maximum Non-Repetitive Surge Current

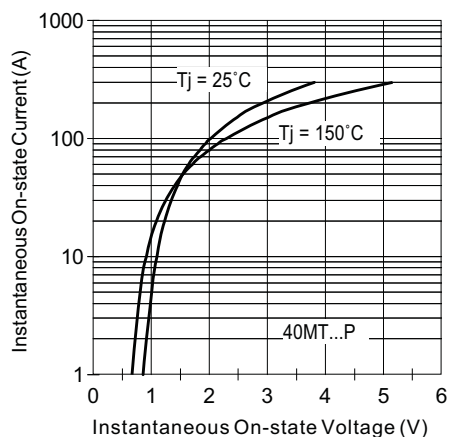


Fig. 2 - On-State Voltage Drop Characteristics

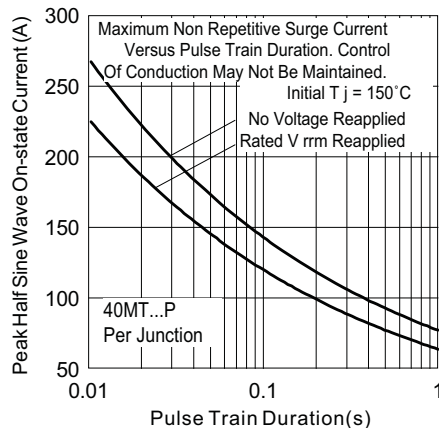


Fig. 4 - Maximum Non-Repetitive Surge Current

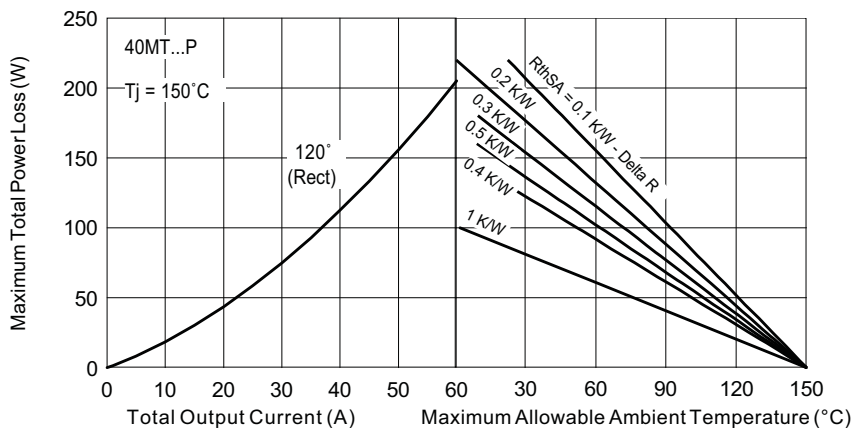


Fig. 5 - Current Rating Nomogram (1 Module Per Heatsink)

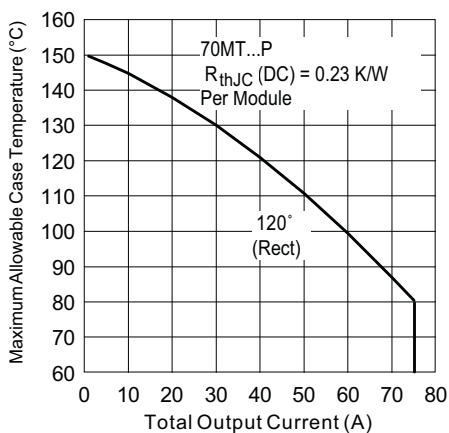


Fig. 6 - Current Rating Characteristics

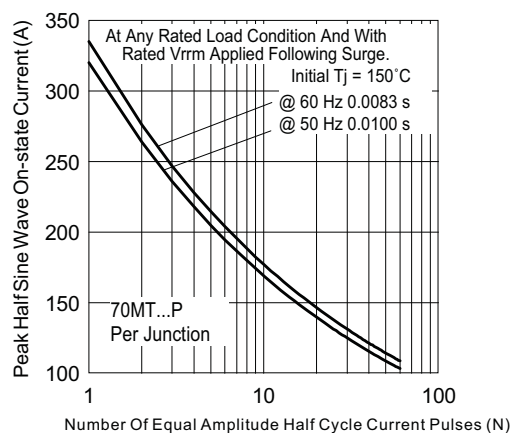


Fig. 8 - Maximum Non-Repetitive Surge Current

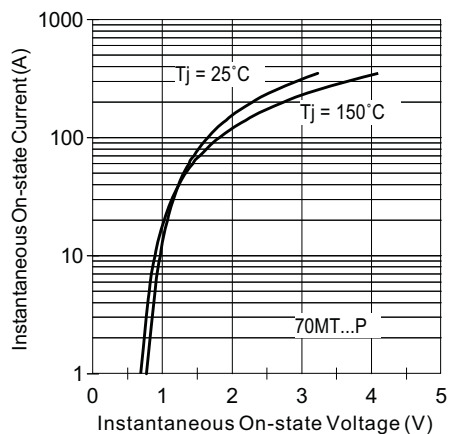


Fig. 7 - On-State Voltage Drop Characteristics

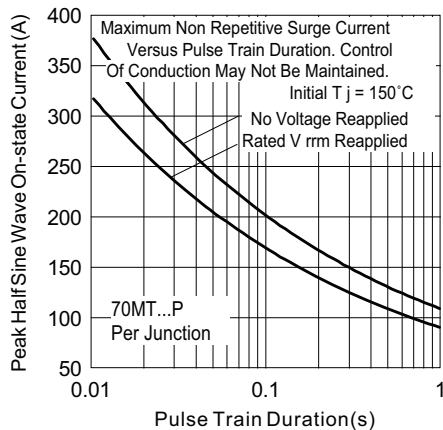


Fig. 9 - Maximum Non-Repetitive Surge Current

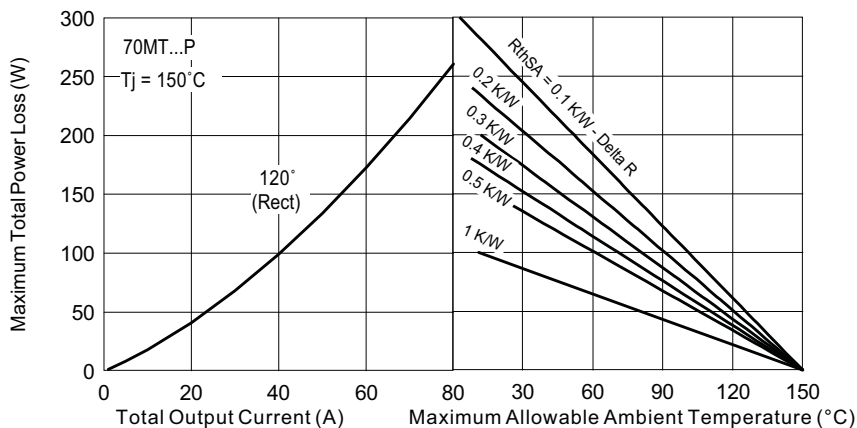


Fig. 10 - Current Rating Nomogram (1 Module Per Heatsink)

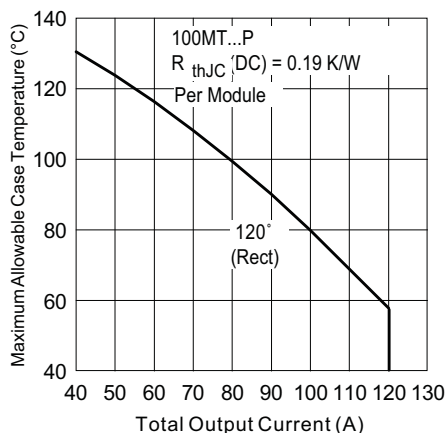


Fig. 11 - Current Rating Characteristics

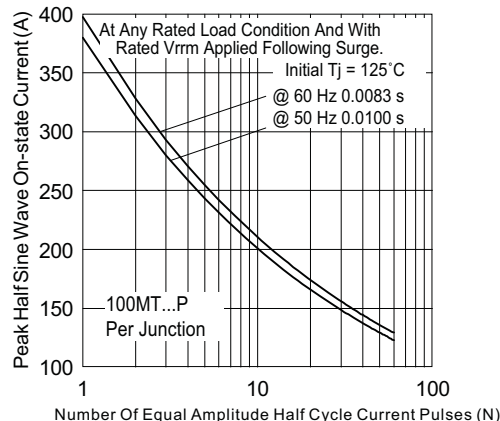


Fig. 13 - Maximum Non-Repetitive Surge Current

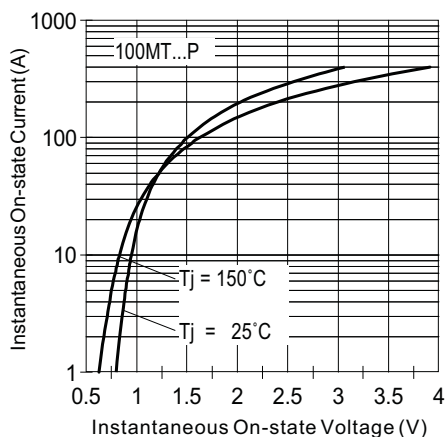


Fig. 12 - On-State Voltage Drop Characteristics

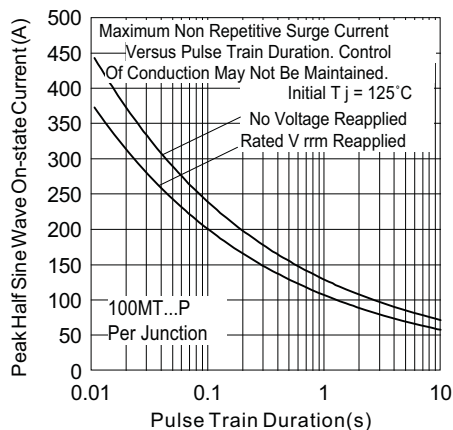


Fig. 14 - Maximum Non-Repetitive Surge Current

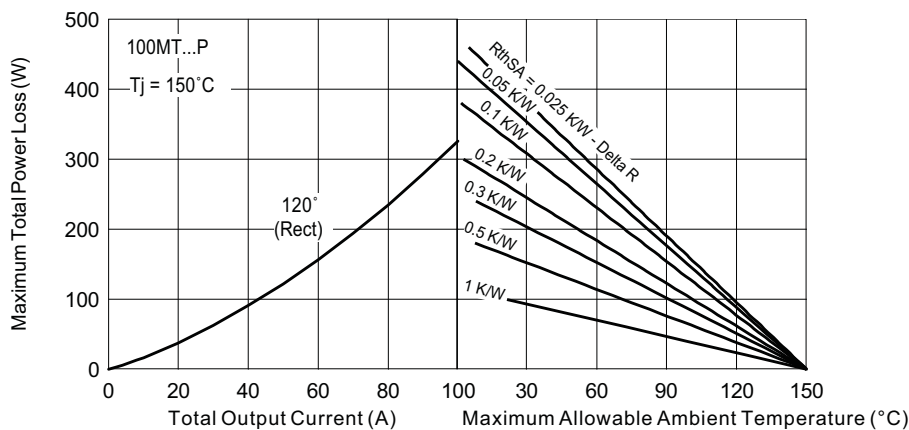


Fig. 15 - Current Rating Nomogram (1 Module Per Heatsink)

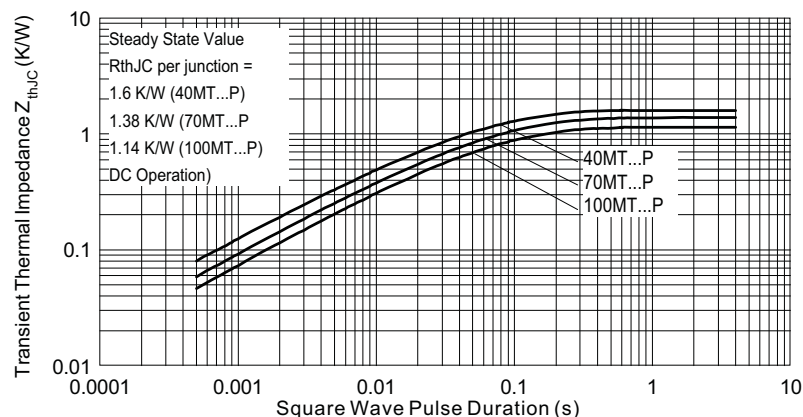


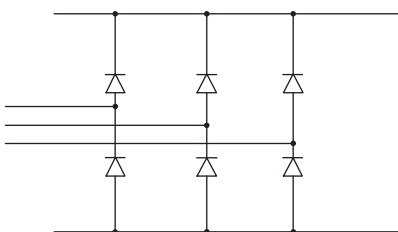
Fig. 16 - Thermal Impedance  $Z_{thJC}$  Characteristics

## ORDERING INFORMATION TABLE

Device code	VS-	10	0	MT	160	P	B	PbF
	1	2	3	4	5		6	7

- 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

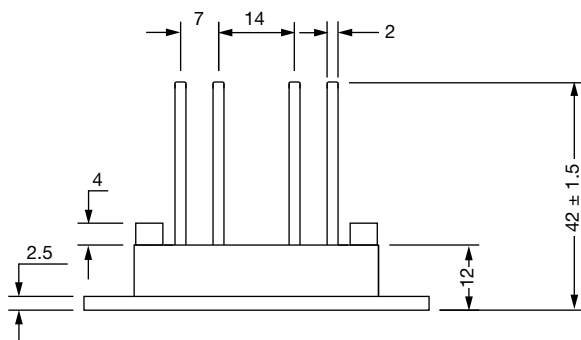


LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95244">www.vishay.com/doc?95244</a>

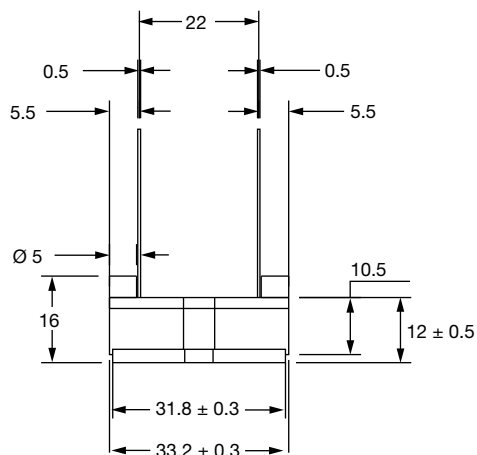
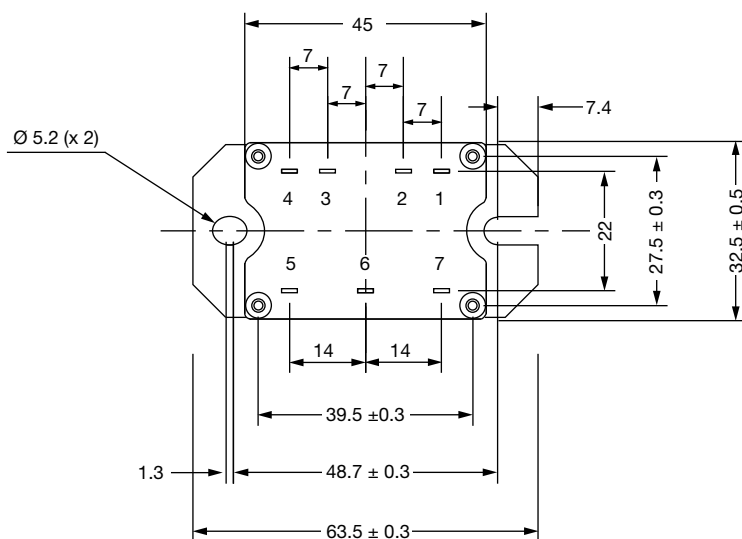
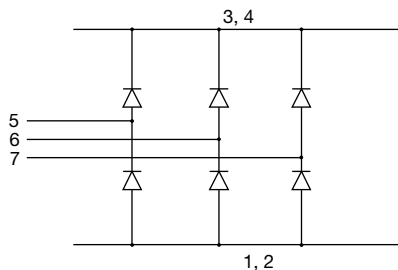


## MTP Flat and Round Pin

### DIMENSIONS FOR MTP WITH FLAT PIN in millimeters



Electrical circuit



Tolerance (unless other stated):

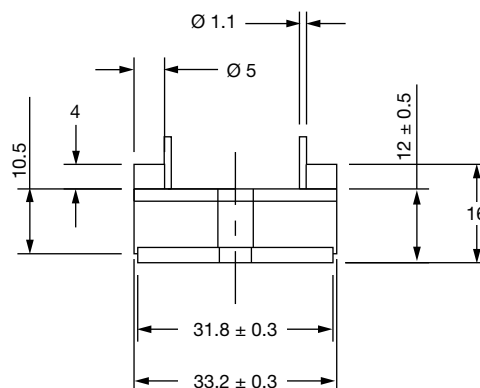
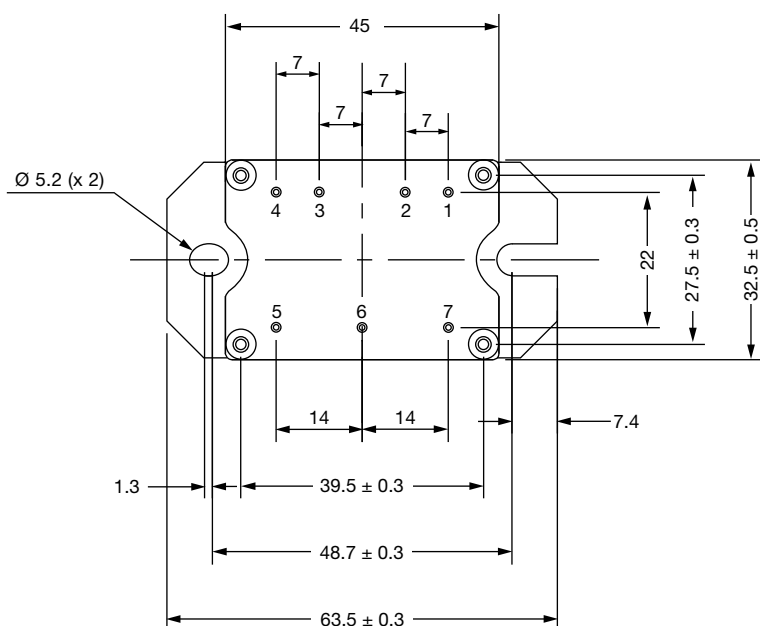
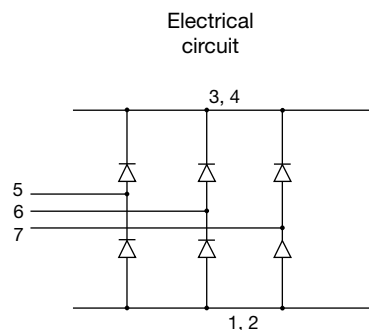
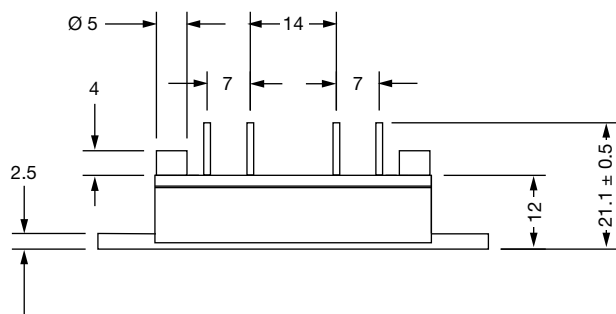
X =  $\pm 0.3$

X.X =  $\pm 0.1$

X.XX =  $\pm 0.03$



## DIMENSIONS FOR MTP WITH ROUND PIN in millimeters



Tolerance (unless other stated):

X = ± 0.3

X.X = ± 0.1

X.XX = ± 0.03





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