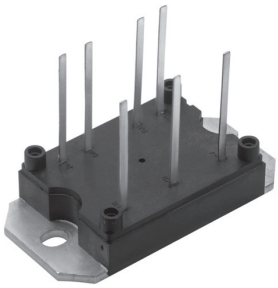
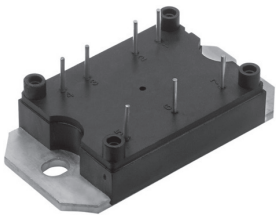
Three Phase Bridge (Power Modules), 45 A to 100 A



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

Pb-free
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^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			°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 °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_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}	t = 10 ms	No voltage reapplied	Initial $T_J = T_J$ maximum	270	380	450	A
		t = 8.3 ms			280	398	470	
		t = 10 ms	100 % V_{RRM} reapplied		225	320	380	
		t = 8.3 ms			240	335	400	
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reapplied		365	724	1013	A^2s
		t = 8.3 ms			325	660	920	
		t = 10 ms	100 % V_{RRM} reapplied		253	512	600	
		t = 8.3 ms			240	467	665	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied			3650	7240	10 130	$A^2\sqrt{s}$
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 °C; t_p = 400 µs single junction (40MT, I_{pk} = 40 A) (70MT, I_{pk} = 70 A) (100MT, I_{pk} = 100 A)			1.45	1.45	1.51	V

INSULATION TABLE

PARAMETER	SYMBOL	TEST CONDITIONS	40MT	70MT	100MT	UNITS
RMS insulation voltage	V_{INS}	T_J = 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_J		- 40 to 150			°C
Maximum storage temperature range	T_{Stg}		- 40 to 125			
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 = 0.42 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. 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			

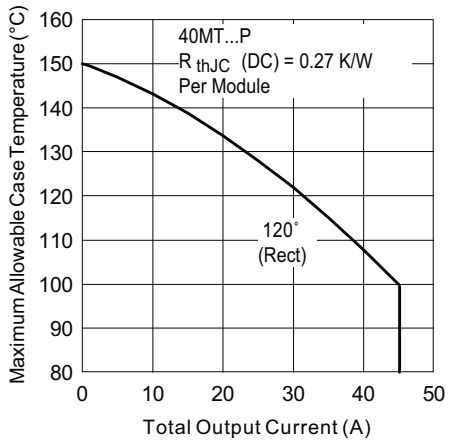


Fig. 1 - Current Rating Characteristics

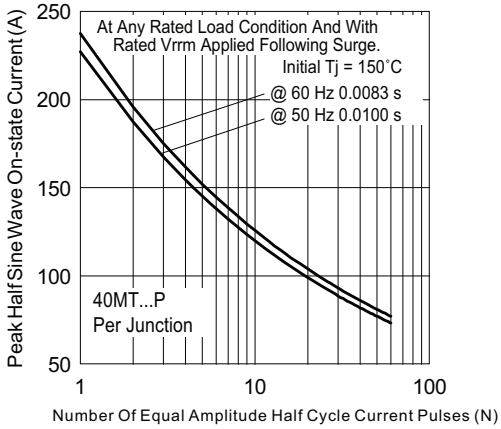


Fig. 3 - Maximum Non-Repetitive Surge Current

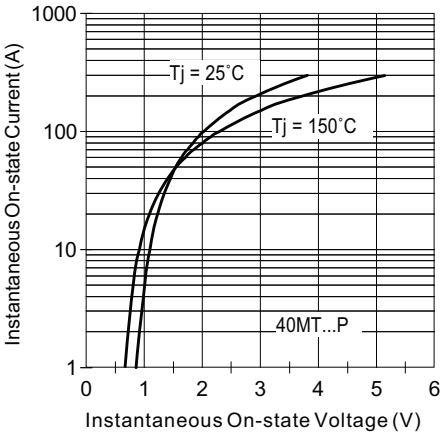


Fig. 2 - On-State Voltage Drop Chracteristics

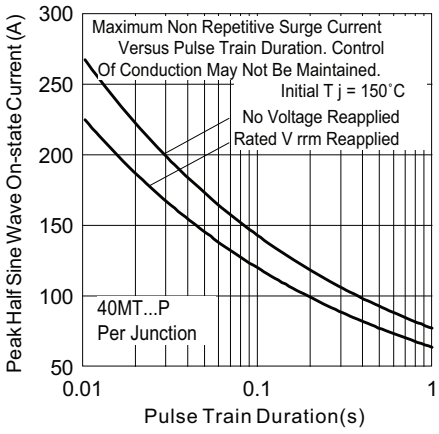


Fig. 4 - Maximum Non-Repetitive Surge Current

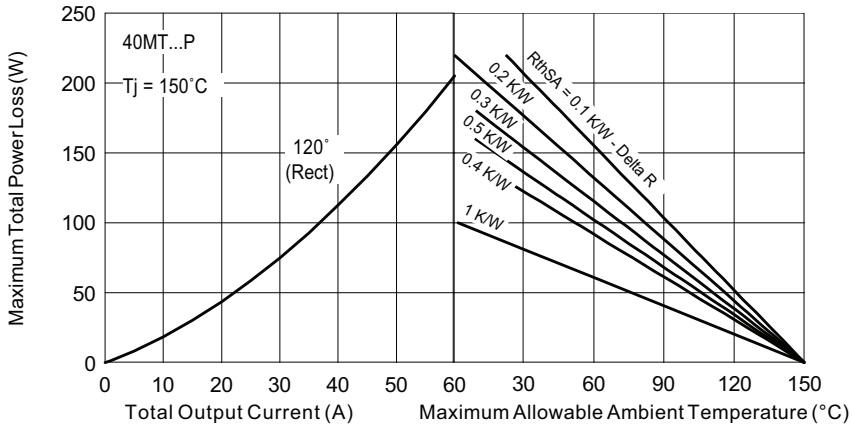


Fig. 5 - Current Rating Nomogram (1 Module Per Heatsink)

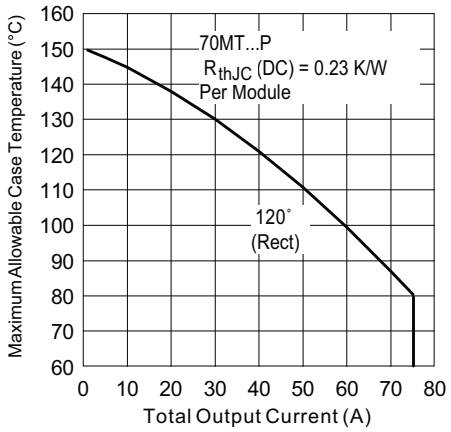


Fig. 6 - Current Rating Characteristics

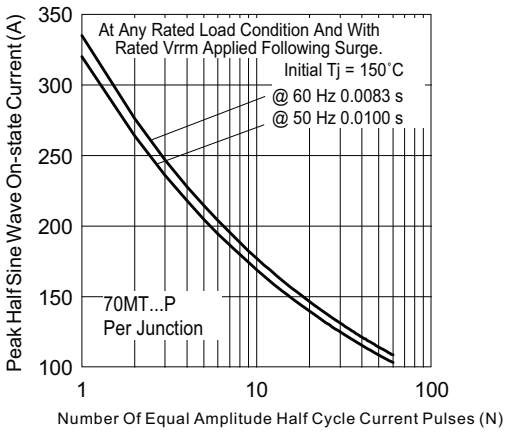


Fig. 8 - Maximum Non-Repetitive Surge Current

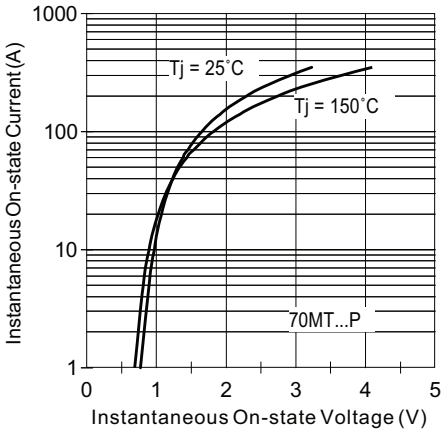


Fig. 7 - On-State Voltage Drop Characteristics

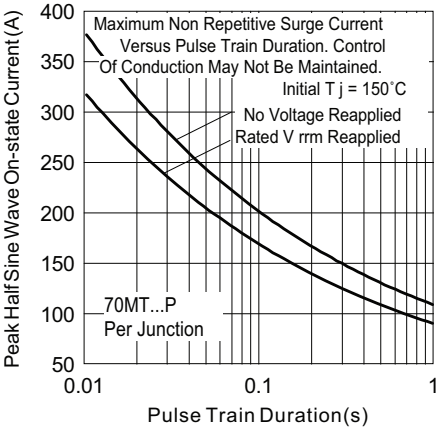


Fig. 9 - Maximum Non-Repetitive Surge Current

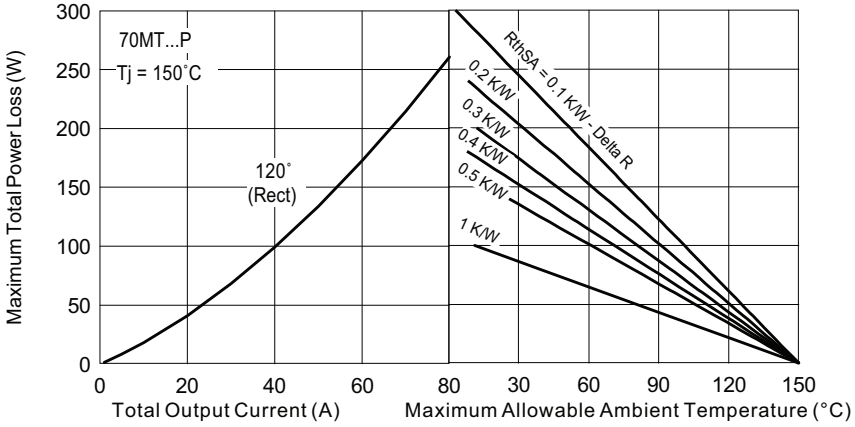


Fig. 10 - Current Rating Nomogram (1 Module Per Heatsink)

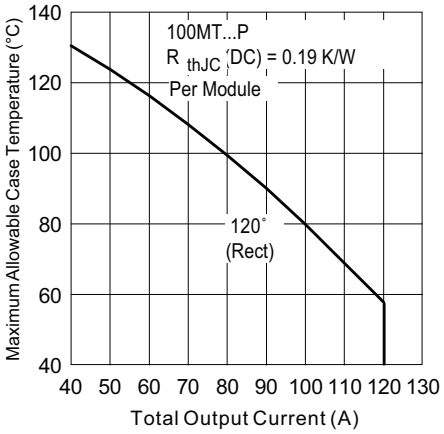


Fig. 11 - Current Rating Characteristics

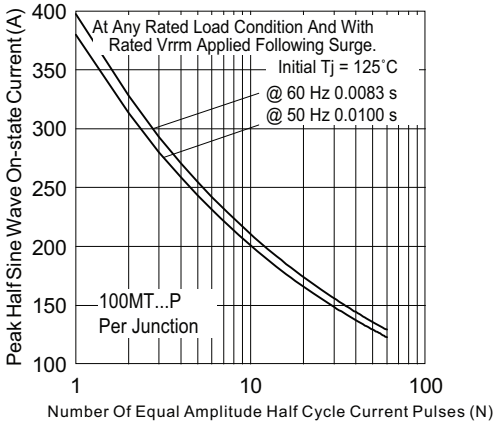


Fig. 13 - Maximum Non-Repetitive Surge Current

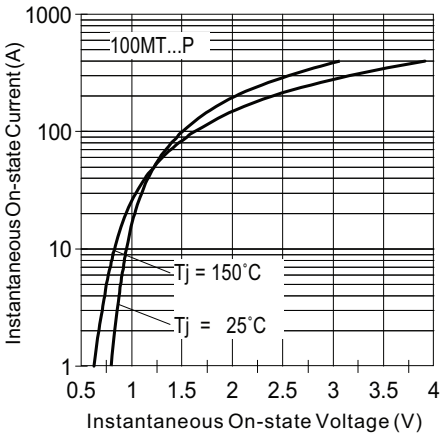


Fig. 12 - On-State Voltage Drop Characteristics

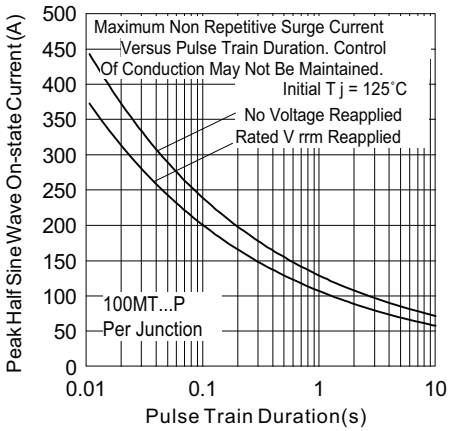


Fig. 14 - Maximum Non-Repetitive Surge Current

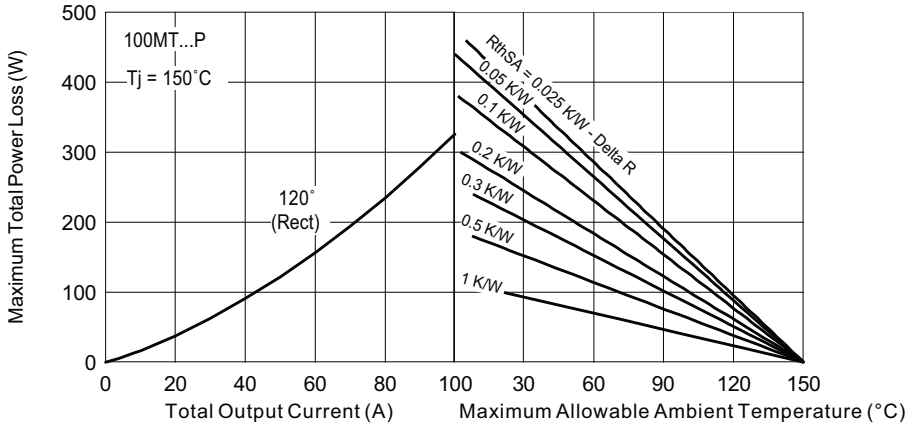


Fig. 15 - Current Rating Nomogram (1 Module Per Heatsink)

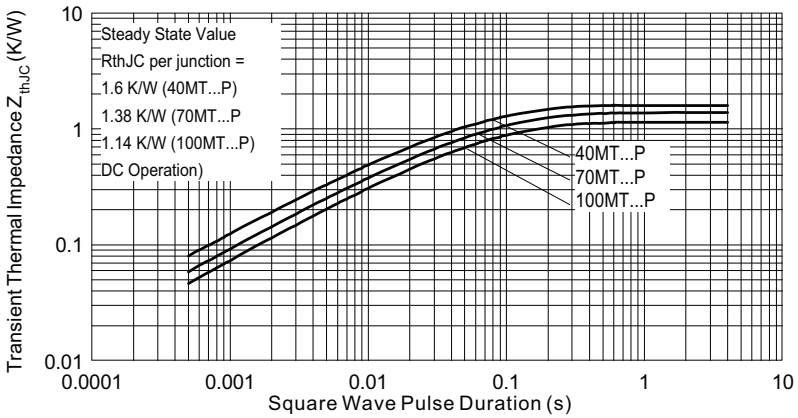


Fig. 16 - Thermal Impedance Z_{thJC} Characteristics

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 = 3-Phase rectifier bridge

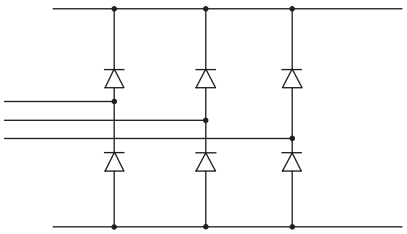
4 - Essential part number

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

6 - Pinout code — A = Flat pins, B = Round pins

7 - Lead (Pb)-free

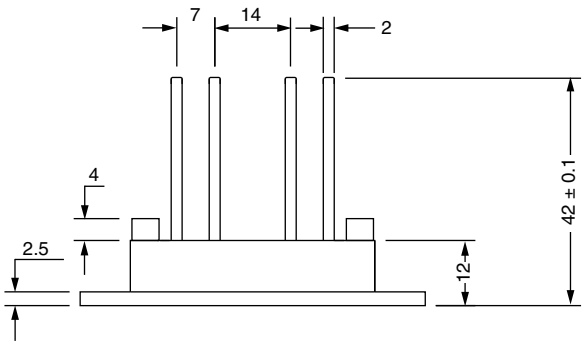
CIRCUIT CONFIGURATION



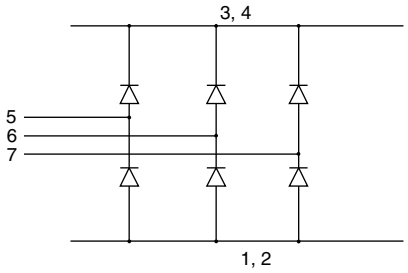
LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95244

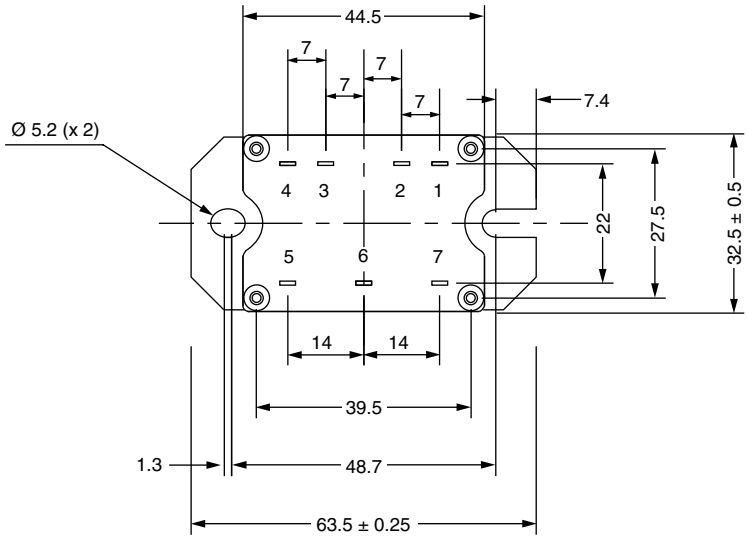
MTP Flat and Round Pin

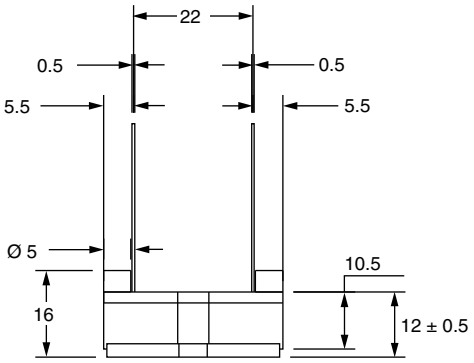
DIMENSIONS FOR MTP WITH FLAT PIN in millimeters



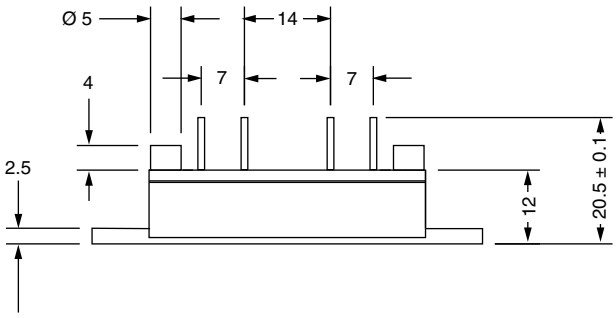
Electrical circuit



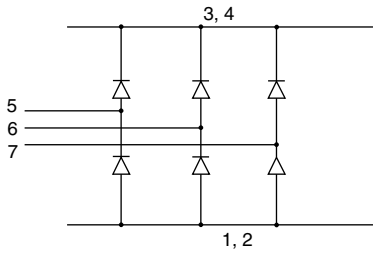


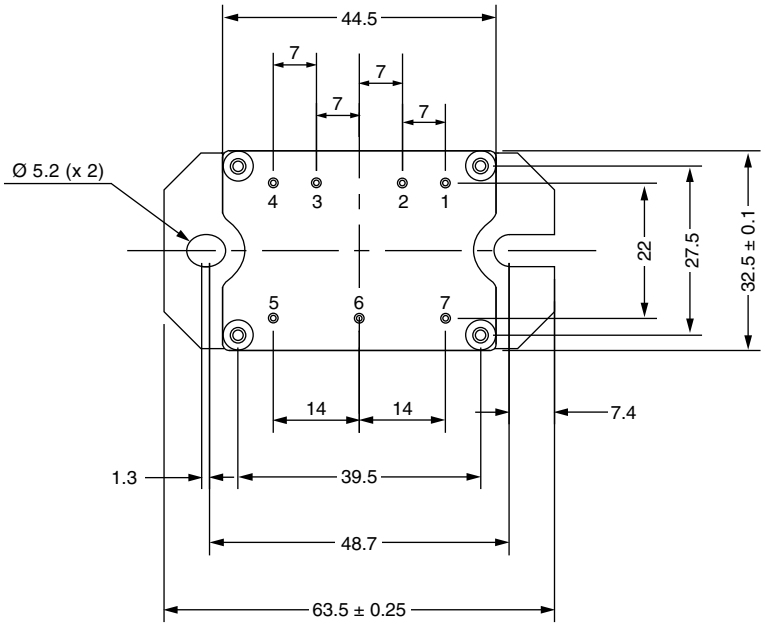


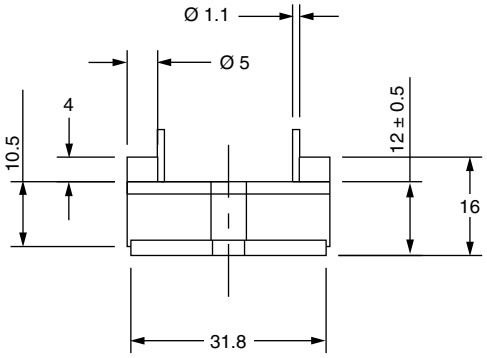
DIMENSIONS FOR MTP WITH ROUND PIN in millimeters



Electrical circuit







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