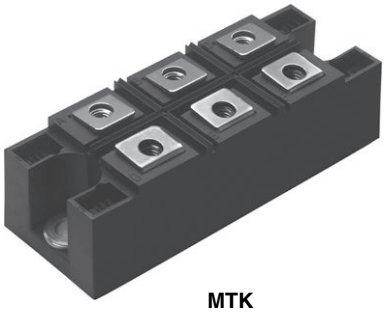
Three Phase Bridge (Power Modules), 90 A/110 A



MTK

FEATURES

- Package fully compatible with the industry standard INT-A-PAK power modules series
- High thermal conductivity package, electrically insulated case
- Excellent power volume ratio, outline for easy connections to power transistor and IGBT modules
- 4000 V_{RMS} isolating voltage
- UL E78996 approved
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT

PRIMARY CHARACTERISTICS	
I_O	90 A to 110 A
V_{RRM}	800 V to 1600 V
Package	MTK
Circuit configuration	Three phase bridge

DESCRIPTION

A range of extremely compact, encapsulated three phase bridge rectifiers offering efficient and reliable operation. They are intended for use in general purpose and heavy duty applications.

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES 90MT.K	VALUES 110MT.K	UNITS
I_O		90 (120)	110 (150)	A
	T_C	90 (61)	90 (57)	°C
I_{FSM}	50 Hz	770	950	A
	60 Hz	810	1000	
I^2t	50 Hz	3000	4500	A^2s
	60 Hz	2700	4100	
$I^2\sqrt{t}$		30 000	45 000	$A^2\sqrt{s}$
V_{RRM}	Range	800 to 1600		V
T_{Stg}	Range	-40 to 150		°C
T_J		-40 to 150		

ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS

TYPE NUMBER	VOLTAGE CODE	V_{RRM}, MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V	V_{RSM}, MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I_{RRM} MAXIMUM AT T_J = MAXIMUM mA
VS-90MT..K VS-110MT..K	80	800	900	10
	100	1000	1100	
	120	1200	1300	
	140	1400	1500	
	160	1600	1700	

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FORWARD CONDUCTION							
PARAMETER	SYMBOL	TEST CONDITIONS			VALUES 90MT.K	VALUES 110MT.K	UNITS
Maximum DC output current at case temperature	I_O	120° rect. conduction angle			90 (120)	110 (150)	A
					90 (61)	90 (57)	°C
Maximum peak, one-cycle forward, non-repetitive surge current	I_{FSM}	t = 10 ms	No voltage reapplied	Initial $T_J = T_J$ maximum	770	950	A
		t = 8.3 ms			810	1000	
		t = 10 ms	100 % V_{RRM} reapplied		650	800	
		t = 8.3 ms			680	840	
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reapplied		3000	4500	A^2s
		t = 8.3 ms			2700	4100	
		t = 10 ms	100 % V_{RRM} reapplied		2100	3200	
		t = 8.3 ms			1900	2900	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied			30 000	45 000	$A^2\sqrt{s}$
Low level value of threshold voltage	$V_{F(TO)1}$	(16.7 % x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), T_J maximum			0.89	0.81	V
High level value of threshold voltage	$V_{F(TO)2}$	(I > π x $I_{F(AV)}$), T_J maximum			1.05	0.99	
Low level value of forward slope resistance	r_{f1}	(16.7 % x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), T_J maximum			5.11	4.37	mΩ
High level value of forward slope resistance	r_{f2}	(I > π x $I_{F(AV)}$), T_J maximum			4.64		
Maximum forward voltage drop	V_{FM}	I_{pk} = 150 A, T_J = 25 °C t_p = 400 µs single junction			1.6	1.4	V
RMS isolation voltage	V_{ISOL}	T_J = 25 °C, all terminal shorted f = 50 Hz, t = 1 s			4000		

THERMAL AND MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES 90MT.K	VALUES 110MT.K	UNITS
Maximum junction operating and storage temperature range	T_J, T_{Stg}		-40 to 150		°C
Maximum thermal resistance, junction to case	R_{thJC}	DC operation per module	0.21	0.18	°C/W
		DC operation per junction	1.26	1.07	
		120° rect. conduction angle per module	0.25	0.21	
		120° rect. conduction angle per junction	1.47	1.25	
Maximum thermal resistance, case to heatsink per module	R_{thCS}	Mounting surface smooth, flat and greased	0.03		
Mounting torque ± 10 % — to heatsink		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 to 6		Nm
Mounting torque ± 10 % — to terminal			3 to 4		
Approximate weight			176		g

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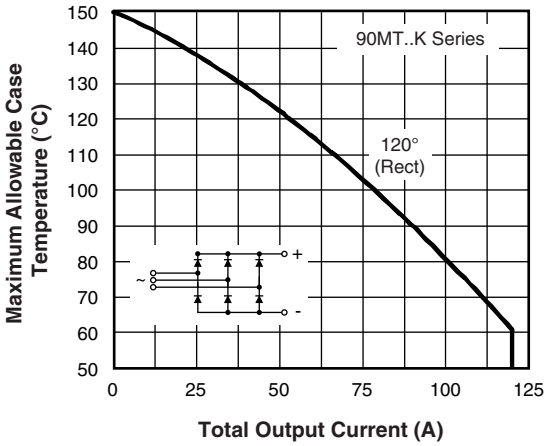


Fig. 1 - Current Ratings Characteristics

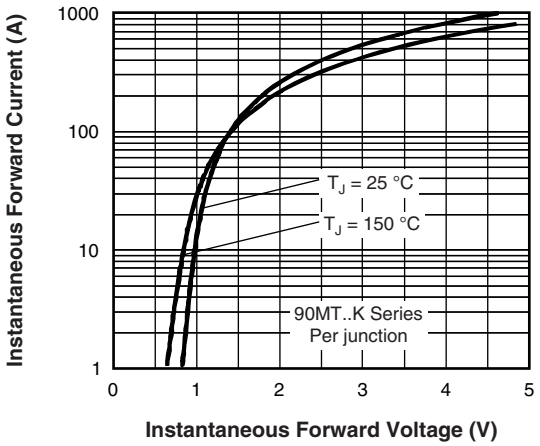
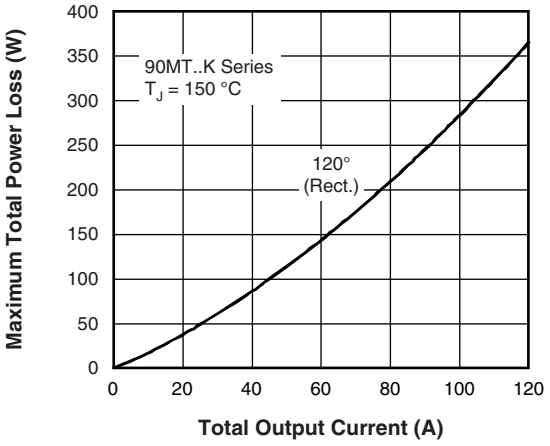


Fig. 2 - Forward Voltage Drop Characteristics



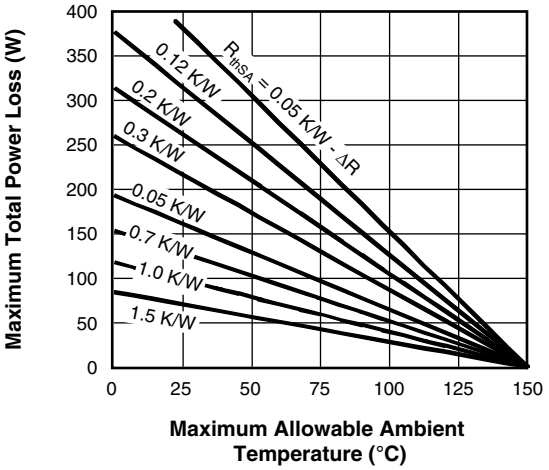


Fig. 3 - Total Power Loss Characteristics

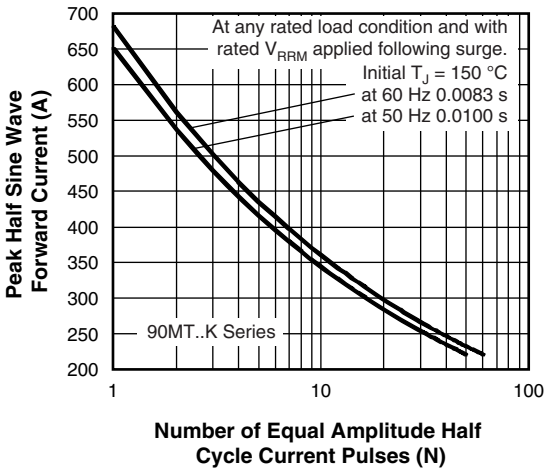


Fig. 4 - Maximum Non-Repetitive Surge Current

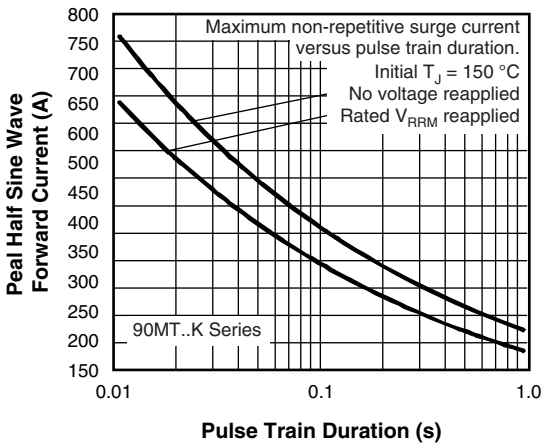


Fig. 5 - Maximum Non-Repetitive Surge Current

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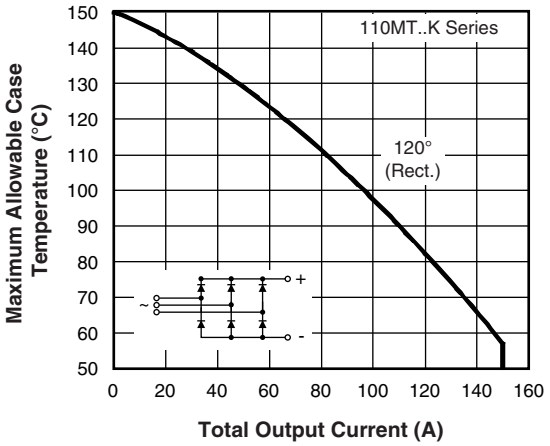


Fig. 6 - Current Ratings Characteristics

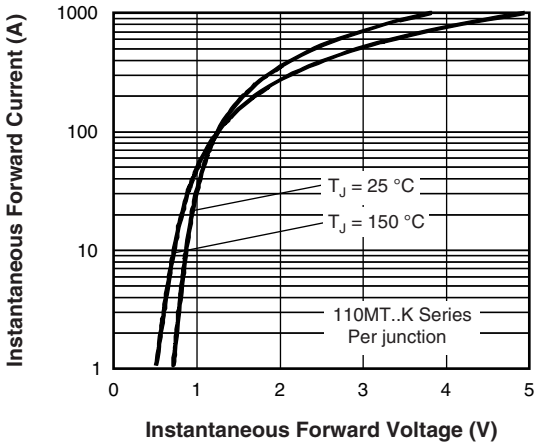
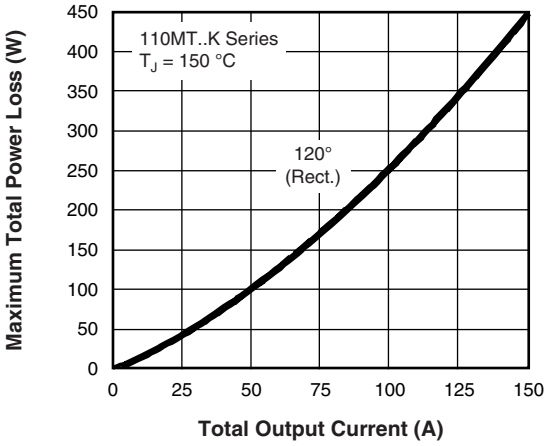


Fig. 7 - Forward Voltage Drop Characteristics



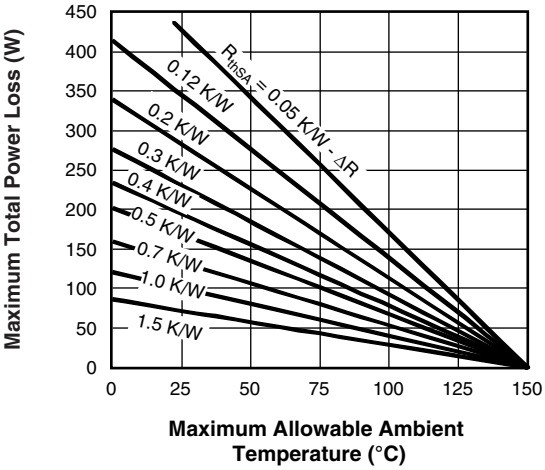


Fig. 8 - Total Power Loss Characteristics

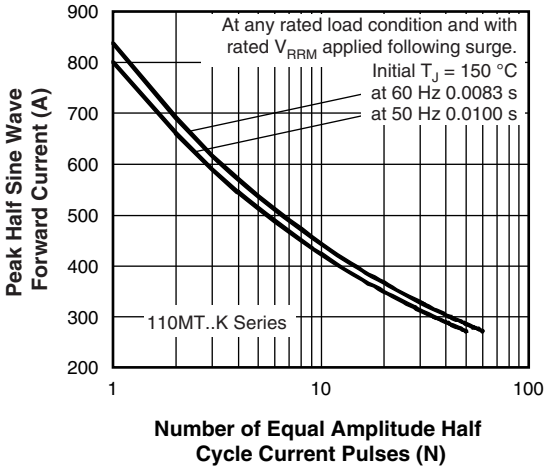


Fig. 9 - Maximum Non-Repetitive Surge Current

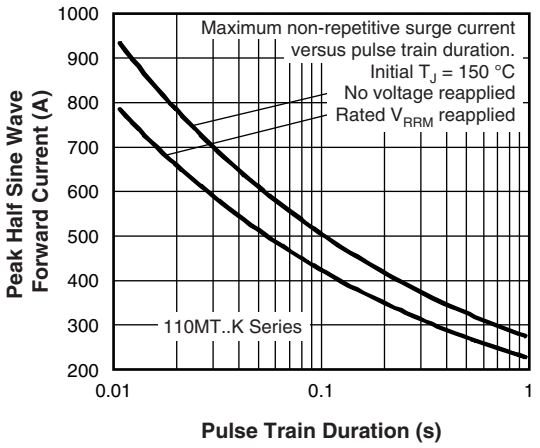


Fig. 10 - Maximum Non-Repetitive Surge Current

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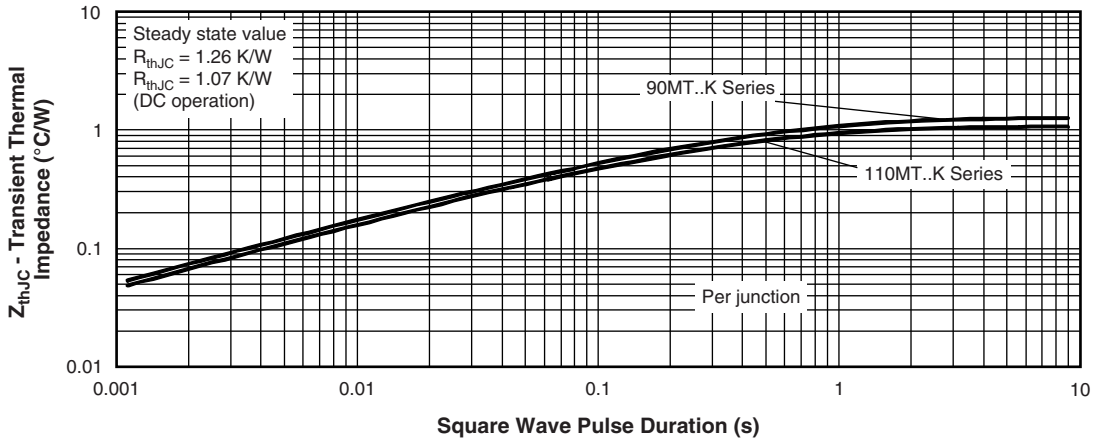


Fig. 11 - Thermal Impedance Z_{thJC} Characteristic

ORDERING INFORMATION TABLE

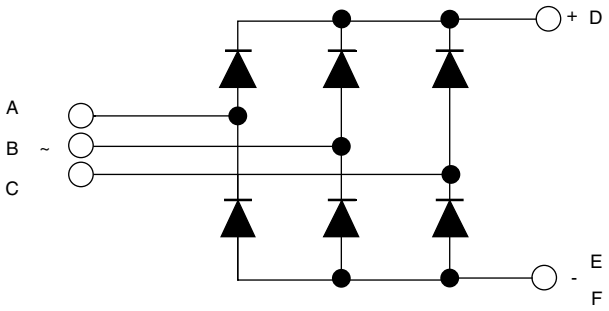
Device code	VS-	11	0	MT	160	K	PbF
	1	2	3	4	5		6

1 - Vishay Semiconductors product
2 - Current rating code: 9 = 90 A (average)
11 = 110 A (average)
3 - Three phase diodes bridge
4 - Essential part number
5 - Voltage code x 10 = V_{RRM} (see Voltage Ratings table)
6 - PbF = Lead (Pb)-free

Note

- To order the optional hardware go to www.vishay.com/doc?95172

CIRCUIT CONFIGURATION



LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95004

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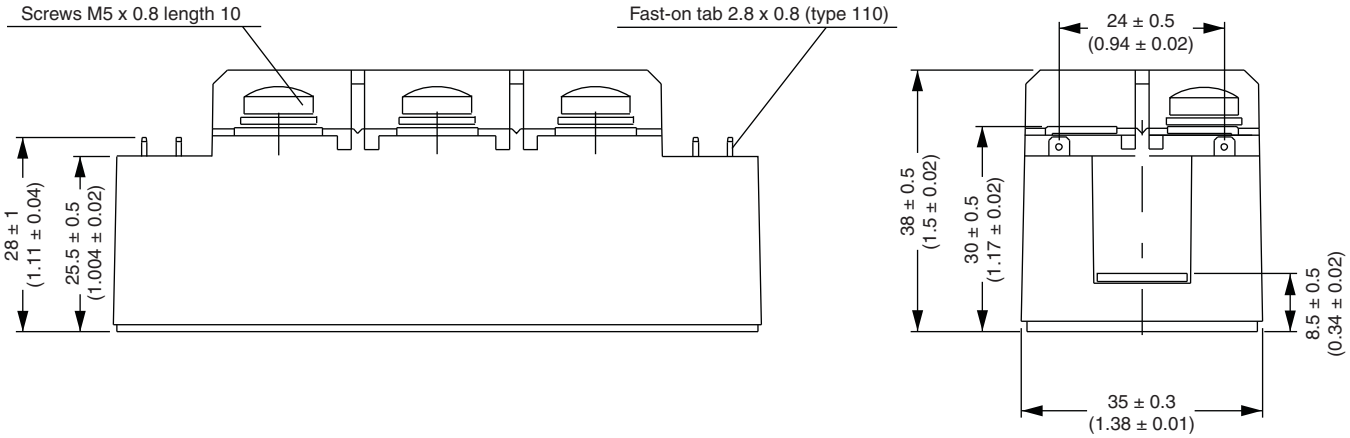
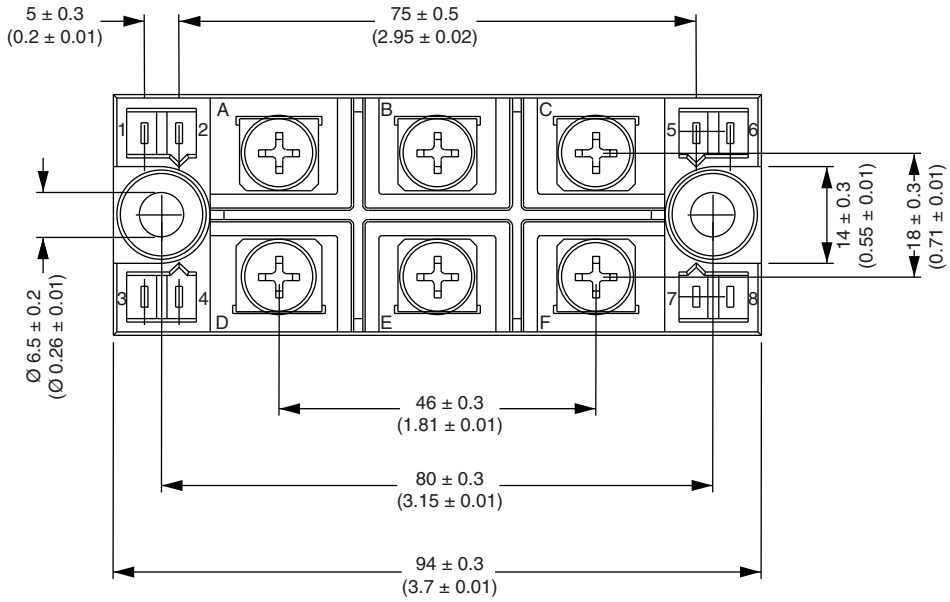
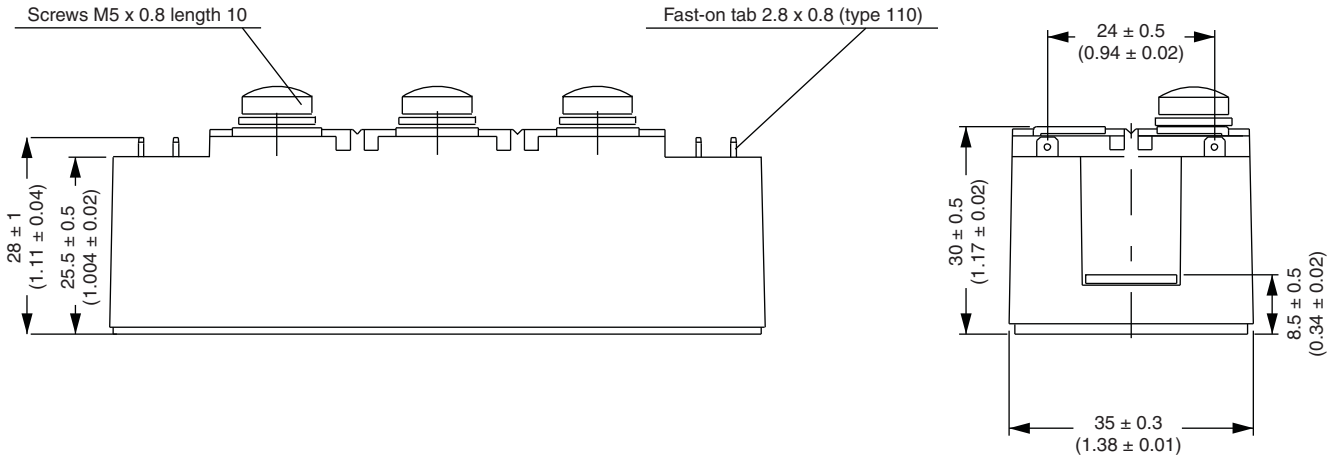
MTK (with and without optional barrier)

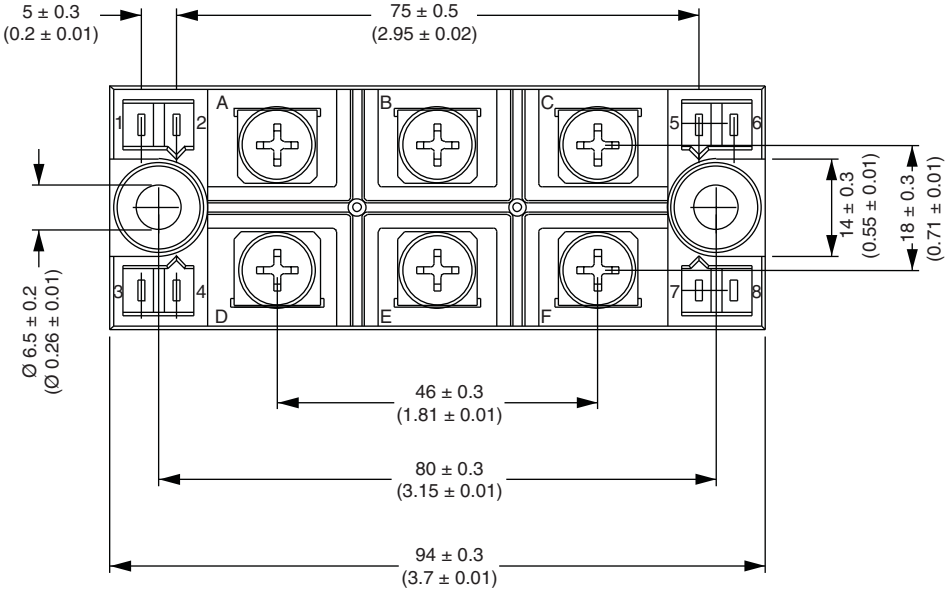
DIMENSIONS WITH OPTIONAL BARRIERS in millimeters (inches)





DIMENSIONS WITHOUT OPTIONAL BARRIERS in millimeters (inches)





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