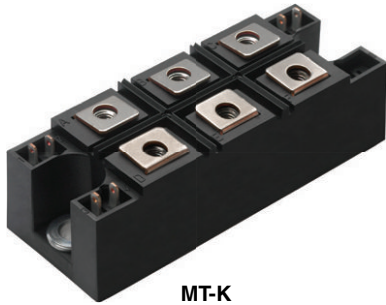




**THE DATASHEET OF  
VS-70MT160KPBF**



## Three Phase Bridge (Power Modules), 60/70 A



MT-K

PRODUCT SUMMARY	
$I_O$	60 A to 70 A
$V_{RRM}$	800 V to 1600 V
Package	MT-K
Circuit	Three phase bridge

### 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](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### 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 60MT.K	VALUES 70MT.K	UNITS
$I_O$		60 (75)	70 (90)	A
	$T_C$	85 (61)	85 (57)	°C
$I_{FSM}$	50 Hz	420	480	A
	60 Hz	440	500	
$I^2t$	50 Hz	870	1150	kA <sup>2</sup> s
	60 Hz	790	1050	
$I^2\sqrt{t}$		8700	11 500	kA <sup>2</sup> √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-60-70MT..K	80	800	900	10
	100	1000	1100	
	120	1200	1300	
	140	1400	1500	
	160	1600	1700	



FORWARD CONDUCTION							
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES 60MT.K	VALUES 70MT.K	UNITS	
Maximum DC output current at case temperature	I <sub>O</sub>	120° rect. conduction angle		60 (75)	70 (90)	A	
				85 (61)	85 (57)	°C	
Maximum peak, one-cycle forward, non-repetitive surge current	I <sub>FSM</sub>	t = 10 ms	No voltage reapplied	Initial T <sub>J</sub> = T <sub>J</sub> maximum	420	480	A
		t = 8.3 ms			440	500	
		t = 10 ms	100 % V <sub>RRM</sub> reapplied		350	400	
		t = 8.3 ms			370	420	
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	870	1150	kA <sup>2</sup> s
		t = 8.3 ms			790	1050	
		t = 10 ms	100 % V <sub>RRM</sub> reapplied		610	800	
		t = 8.3 ms			560	730	
Maximum I <sup>2</sup> √t for fusing	I <sup>2</sup> √t	t = 0.1 ms to 10 ms, no voltage reapplied		8700	11 300	A <sup>2</sup> √s	
Low level value of threshold voltage	V <sub>F(TO)1</sub>	(16.7 % × π × I <sub>F(AV)</sub> < I < π · I <sub>F(AV)</sub> ), T <sub>J</sub> maximum		0.85	0.86	V	
High level value of threshold voltage	V <sub>F(TO)2</sub>	(I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> maximum		1.07	1.08		
Low level value of forward slope resistance	r <sub>f1</sub>	(16.7 % × π × I <sub>F(AV)</sub> < I < π · I <sub>F(AV)</sub> ), T <sub>J</sub> maximum		8.04	7.35	mΩ	
High level value of forward slope resistance	r <sub>f2</sub>	(I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> maximum		7.08	6.53		
Maximum forward voltage drop	V <sub>FM</sub>	I <sub>pk</sub> = 100 A, T <sub>J</sub> = 25 °C, t <sub>p</sub> = 400 μs single junction		1.75	1.55	V	
RMS isolation voltage	V <sub>ISOL</sub>	T <sub>J</sub> = 25 °C, all terminal shorted f = 50 Hz, t = 1 s		4000			

THERMAL AND MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES 60MT.K	VALUES 70MT.K	UNITS
Maximum junction operating and storage temperature range	T <sub>J</sub> , T <sub>Stg</sub>			-40 to 150		°C
Maximum thermal resistance, junction to case	R <sub>thJC</sub>	DC operation per module		0.37	0.29	K/W
		DC operation per junction		2.22	1.75	
		120° rect. conduction angle per module		0.40	0.34	
		120° rect. conduction angle per junction		2.42	2.01	
Maximum thermal resistance, case to heatsink per module	R <sub>thCS</sub>	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 hours to allow for the spread of the compound. Lubricated threads.		4 to 6		Nm
	to terminal			3 to 4		
Approximate weight				176		g

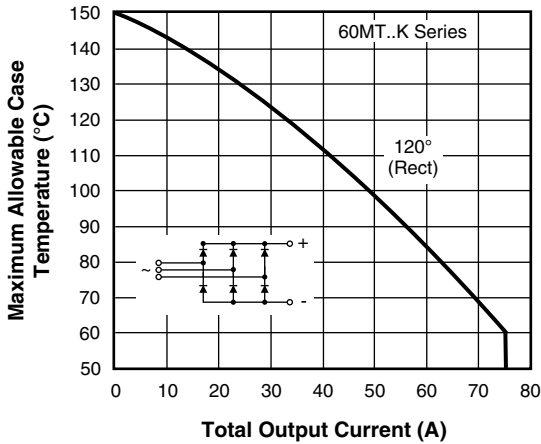


Fig. 1 - Current Ratings Characteristics

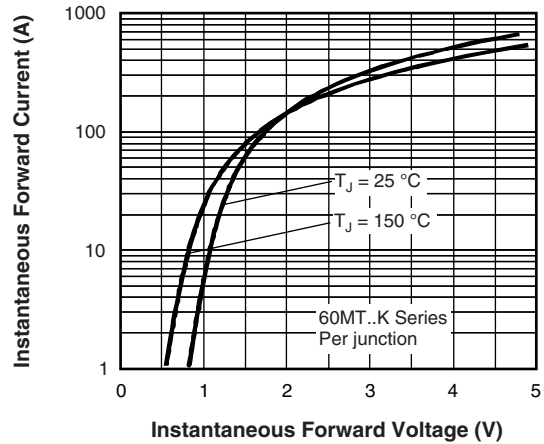


Fig. 2 - Forward Voltage Drop Characteristics

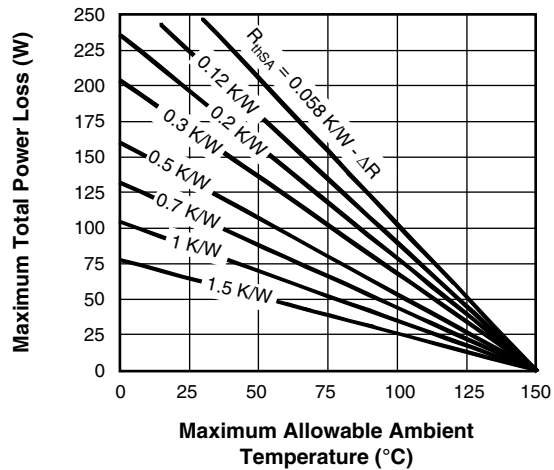
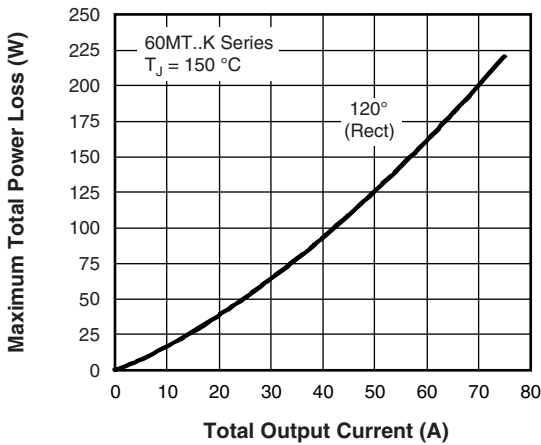


Fig. 3 - Total Power Loss Characteristics

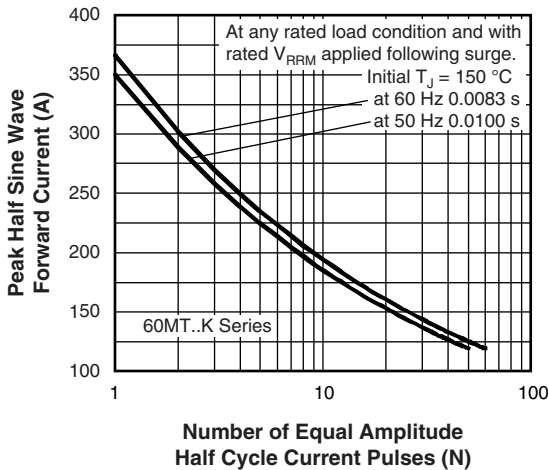


Fig. 4 - Maximum Non-Repetitive Surge Current

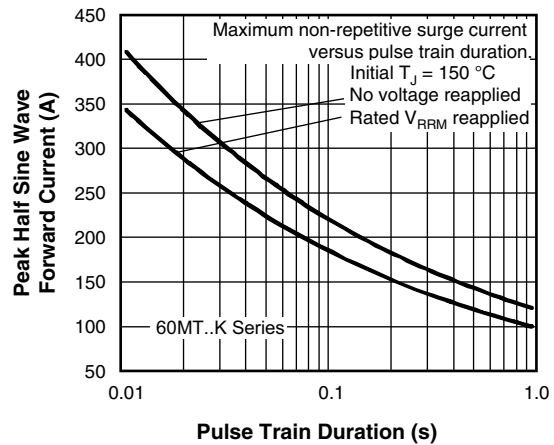


Fig. 5 - Maximum Non-Repetitive Surge Current

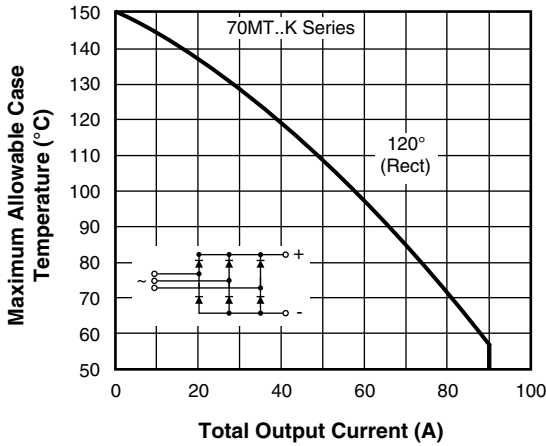


Fig. 6 - Current Ratings Characteristics

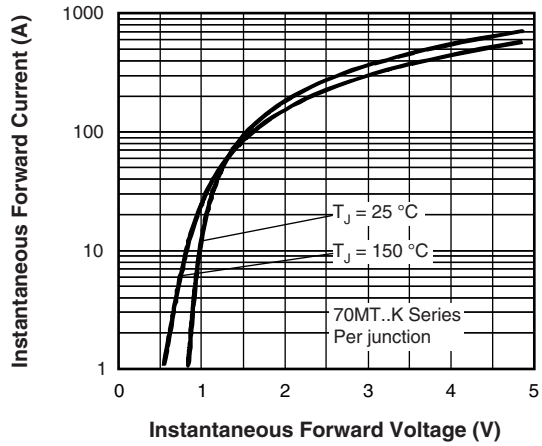


Fig. 7 - Forward Voltage Drop Characteristics

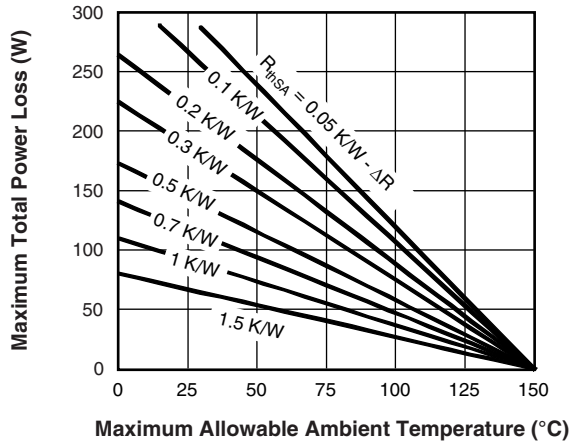
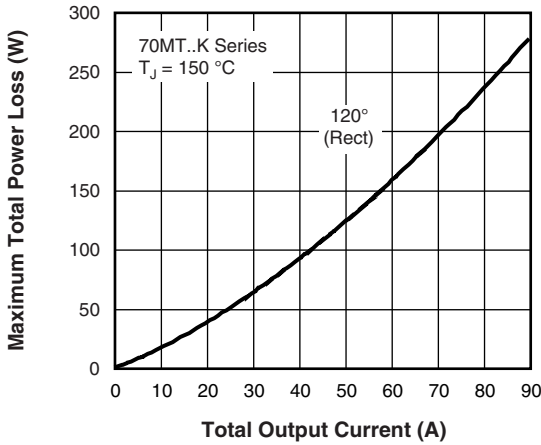


Fig. 8 - Total Power Loss Characteristics

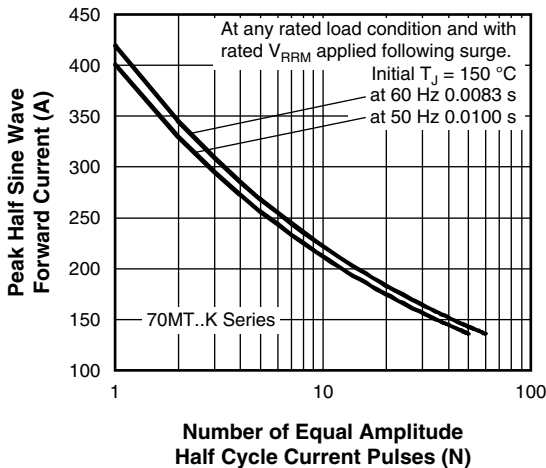


Fig. 9 - Maximum Non-Repetitive Surge Current

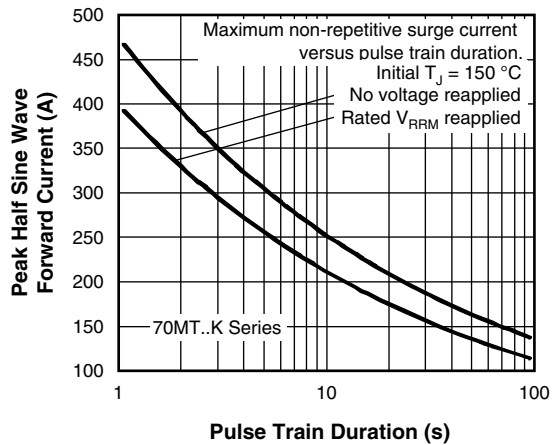
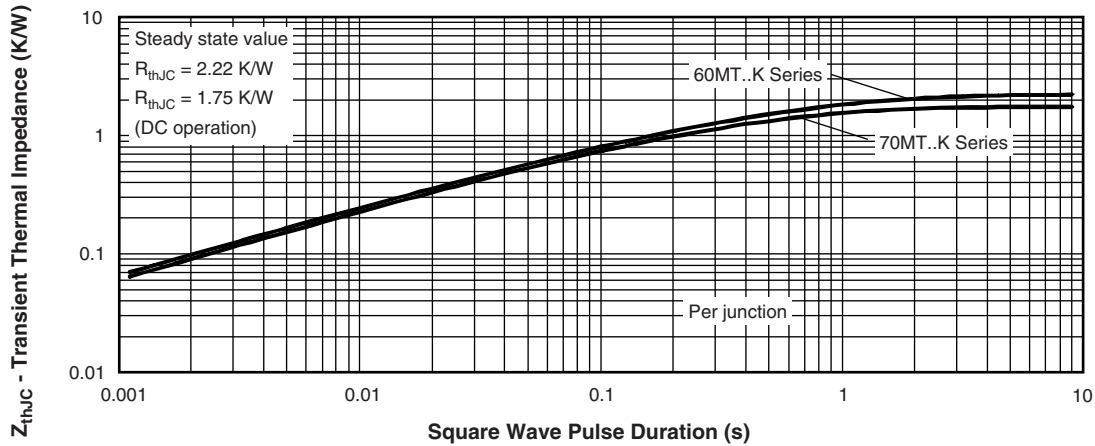


Fig. 10 - Maximum Non-Repetitive Surge Current

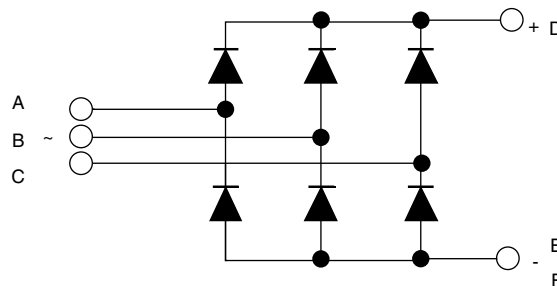

 Fig. 11 - Thermal Impedance  $Z_{thJC}$  Characteristics

**ORDERING INFORMATION TABLE**

Device code	<b>VS-</b>	<b>7</b>	<b>0</b>	<b>MT</b>	<b>160</b>	<b>K</b>	<b>PbF</b>
	①	②	③	④	⑤		⑥
	<b>1</b>	-	Vishay Semiconductors product				
	<b>2</b>	-	Current rating code: 6 = 60 A (average) 7 = 70 A (average)				
	<b>3</b>	-	Three phase diodes bridge				
	<b>4</b>	-	Essential part number				
	<b>5</b>	-	Voltage code x 10 = $V_{RRM}$ (see Voltage Ratings table)				
	<b>6</b>	-	PbF = Lead (Pb)-free				

**Note**

- To order the optional hardware go to [www.vishay.com/doc?95172](http://www.vishay.com/doc?95172)

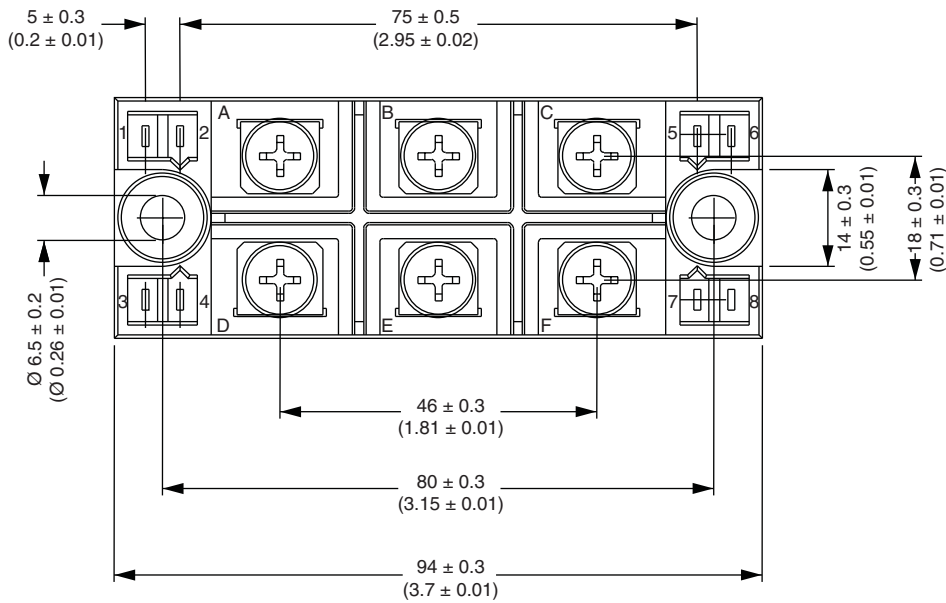
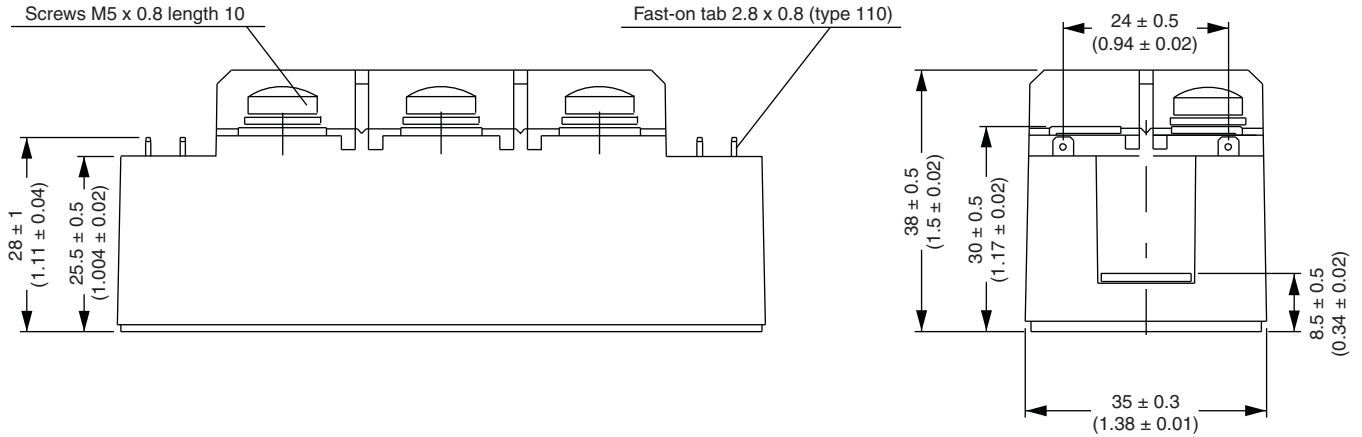
**CIRCUIT CONFIGURATION**

**LINKS TO RELATED DOCUMENTS**

Dimensions

[www.vishay.com/doc?95004](http://www.vishay.com/doc?95004)

## MTK (with and without optional barrier)

### DIMENSIONS WITH OPTIONAL BARRIERS in millimeters (inches)

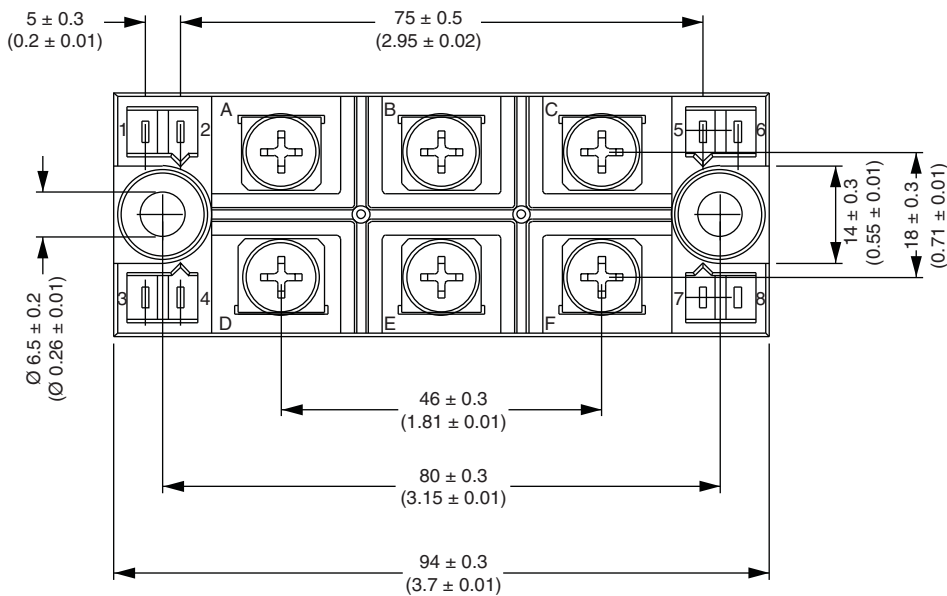
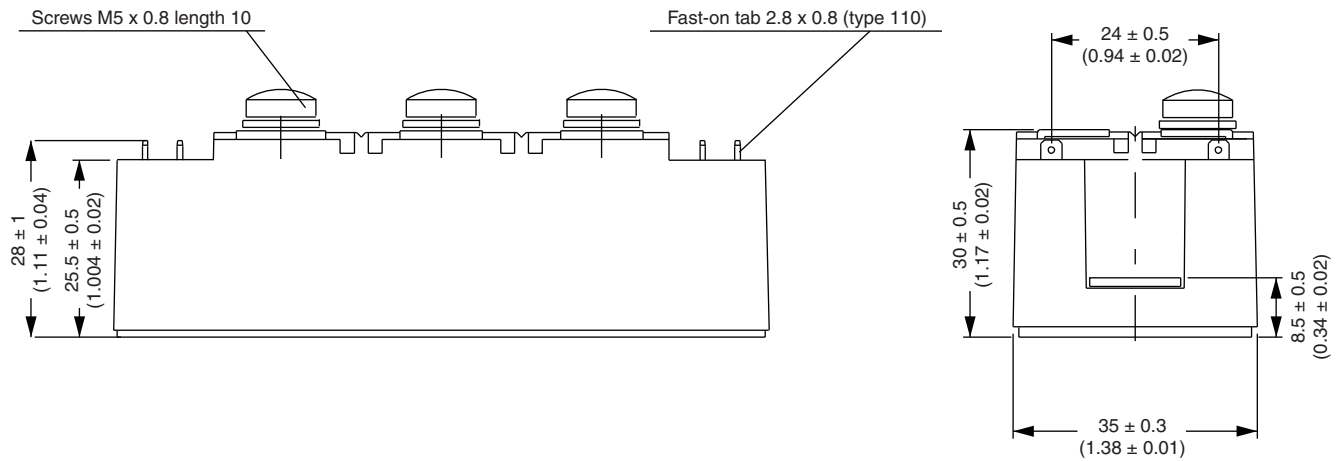


# Outline Dimensions

Vishay Semiconductors MTK (with and without optional barrier)



## DIMENSIONS WITHOUT OPTIONAL BARRIERS in millimeters (inches)





## Disclaimer

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**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

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