


## Three Phase Bridge, 160 A (Power Modules)



MTC

### FEATURES

- Blocking voltage up to 1800 V
- High surge capability
- High thermal conductivity package, electrically insulated case
- Excellent power volume ratio
- 3600 V<sub>RMS</sub> isolating voltage
- UL approved file E78996 
- Designed for industrial level
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### PRIMARY CHARACTERISTICS

$I_O$	160 A at 118 °C
$V_{RRM}$	1600 V to 1800 V
Package	MTC
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	UNITS
$I_O^{(1)}$		257	A
	$T_C$	85	°C
$I_{FSM}$	50 Hz	1540	A
	60 Hz	1610	
$I^2t$	50 Hz	11 860	A <sup>2</sup> s
	60 Hz	10 825	
$I^2\sqrt{t}$		118 580	A <sup>2</sup> √s
$V_{RRM}$	Range	1600 to 1800	V
$T_{Stg}$	Range	-40 to +125	°C
$T_J$	Range	-40 to +150	°C

#### Note

<sup>(1)</sup> Maximum output current must be limited to 220 A to do not exceed the maximum temperature of terminals

### 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-161MT...C	160	1600	1700	12
	180	1800	1900	

**FORWARD CONDUCTION**

PARAMETER	SYMBOL	TEST CONDITIONS			VALUES	UNITS
Maximum DC output current at case temperature	I <sub>O</sub>	120° rect. conduction angle			160	A
					118	°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	1540	A
		t = 8.3 ms			1610	
		t = 10 ms	100 % V <sub>RRM</sub> reapplied		1295	
		t = 8.3 ms			1355	
Maximum I <sup>2</sup> t for fusing	I <sup>2</sup> t	t = 10 ms	No voltage reapplied		11 860	A <sup>2</sup> s
		t = 8.3 ms			10 825	
		t = 10 ms	100 % V <sub>RRM</sub> reapplied		8385	
		t = 8.3 ms			7620	
Maximum I <sup>2</sup> √t for fusing	I <sup>2</sup> √t	t = 0.1 ms to 10 ms, no voltage reapplied			118 580	A <sup>2</sup> √s
Low level value of threshold voltage	V <sub>FT(TO)1</sub>	(16.7 % × π × I <sub>F(AV)</sub> < I < π × I <sub>F(AV)</sub> ), T <sub>J</sub> maximum			0.81	V
High level value of threshold voltage	V <sub>FT(TO)2</sub>	(I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> maximum			0.98	
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			3.89	mΩ
High level of forward slope resistance	r <sub>f2</sub>	(I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> maximum			3.68	
Maximum forward voltage drop	V <sub>FM</sub>	I <sub>pk</sub> = 300 A, T <sub>J</sub> = 25 °C, per junction			1.85	V
RMS isolation voltage	V <sub>ISOL</sub>	T <sub>J</sub> = 25 °C, all terminal shorted f = 50 Hz, t = 1 s			3600	

**THERMAL AND MECHANICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction operating	$T_J$		-40 to +150	°C
Maximum storage temperature	$T_{Stg}$		-40 to +125	
Maximum thermal resistance, junction to case	$R_{thJC}$	DC operation per module	0.058	°C/W
		DC operation per junction	0.35	
Typical thermal resistance, case to heatsink	$R_{thCS}$	Per module Mounting surface smooth, flat, and greased	0.03	
Mounting torque ± 15 %	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.	5	Nm
	to terminal		5	
Approximate weight			235	g

**ΔR CONDUCTION PER JUNCTION**

DEVICES	SINE HALF WAVE CONDUCTION					RECTANGULAR WAVE CONDUCTION					UNITS
	180°	120°	90°	60°	30°	180°	120°	90°	60°	30°	
VS-161MT...C Series	0.054	0.061	0.076	0.107	0.165	0.039	0.064	0.083	0.111	0.167	°C/W

**Note**

- Table shows the increment of thermal resistance  $R_{thJC}$  when devices operate at different conduction angles than DC

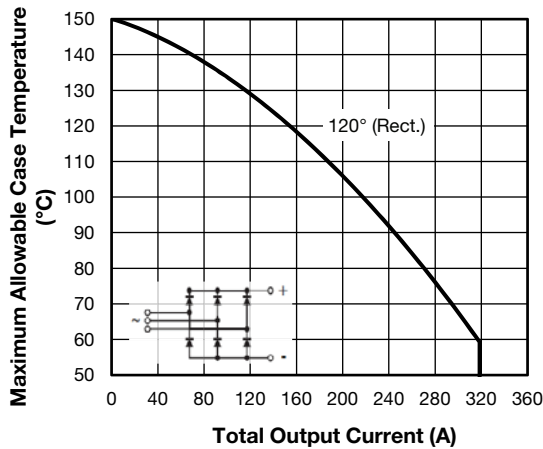


Fig. 1 - Current Ratings Characteristics

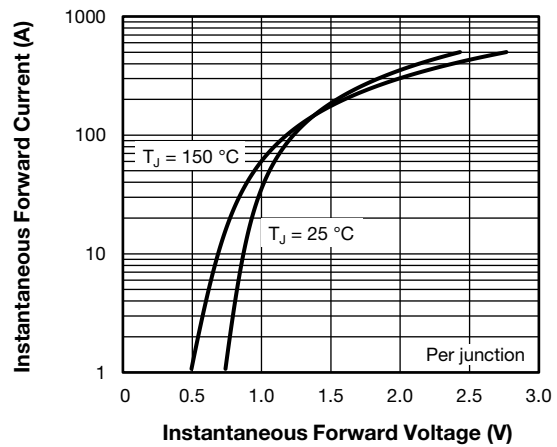


Fig. 2 - Forward Voltage Drop Characteristics

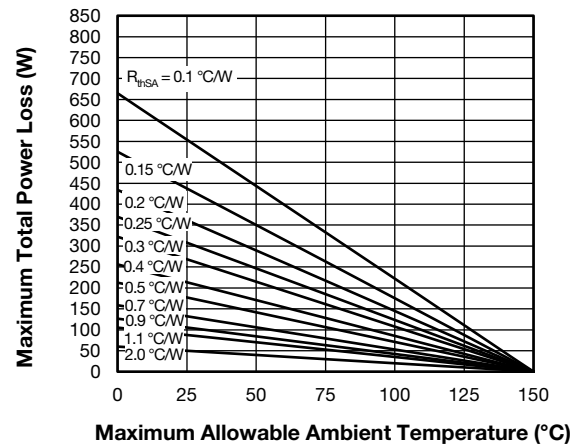
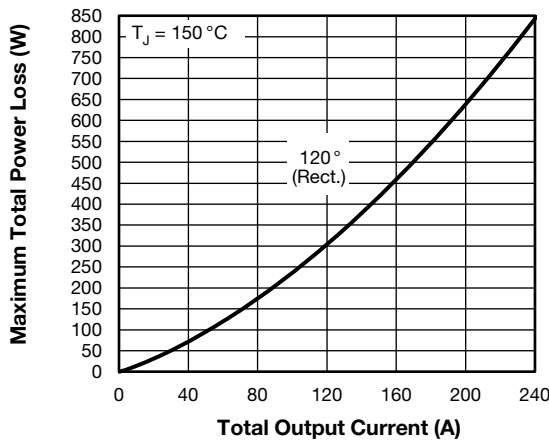


Fig. 3 - Total Power Loss Characteristics

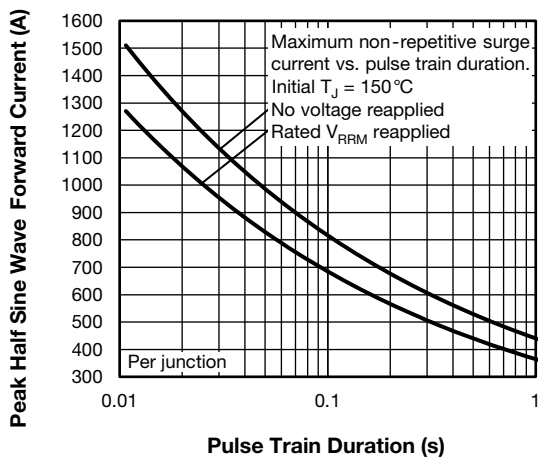


Fig. 4 - Maximum Non-Repetitive Surge Current

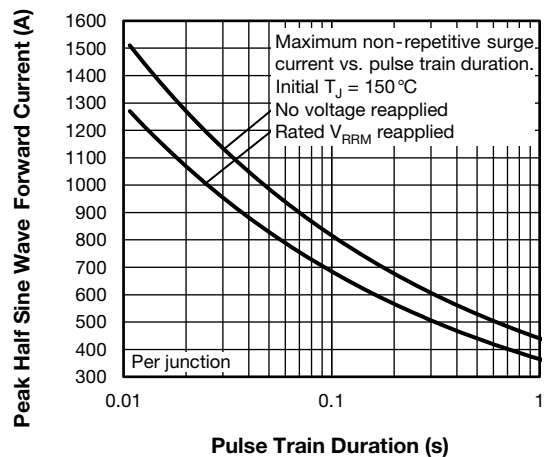
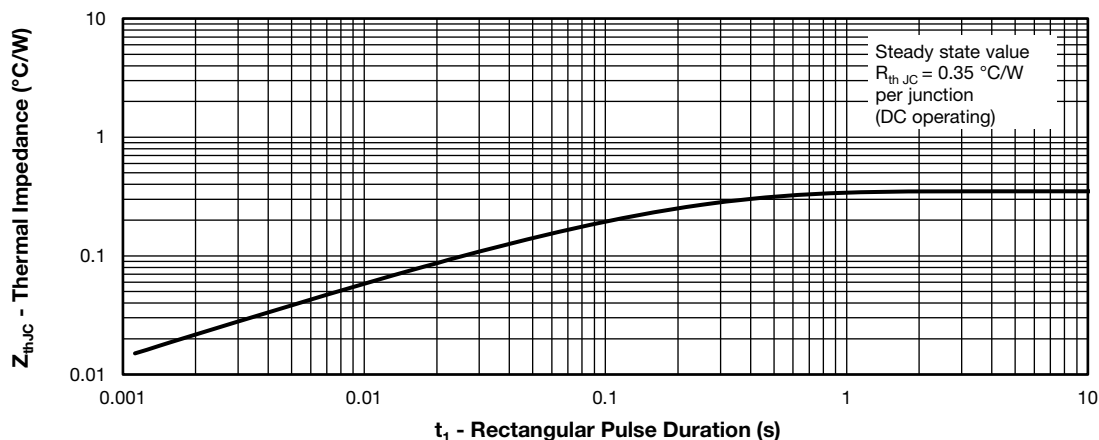


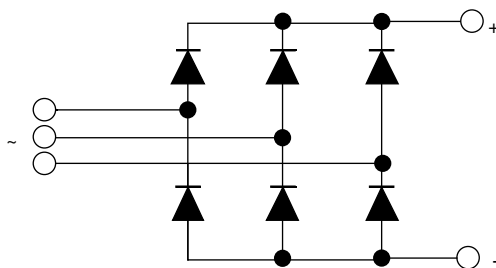
Fig. 5 - Maximum Non-Repetitive Surge Current


Fig. 6 - Thermal Impedance  $Z_{thJC}$  Characteristic

## ORDERING INFORMATION TABLE

Device code	VS-	16	1	MT	160	C
	①	②	③	④	⑤	
①	- Vishay Semiconductors product					
②	- Current rating code: 16 = 160 A (average)					
③	- Circuit configuration (three phase diodes bridge)					
④	- Package indicator					
⑤	- Voltage code x 10 = $V_{RRM}$ (see Voltage Ratings table)					

## CIRCUIT CONFIGURATION



## LINKS TO RELATED DOCUMENTS

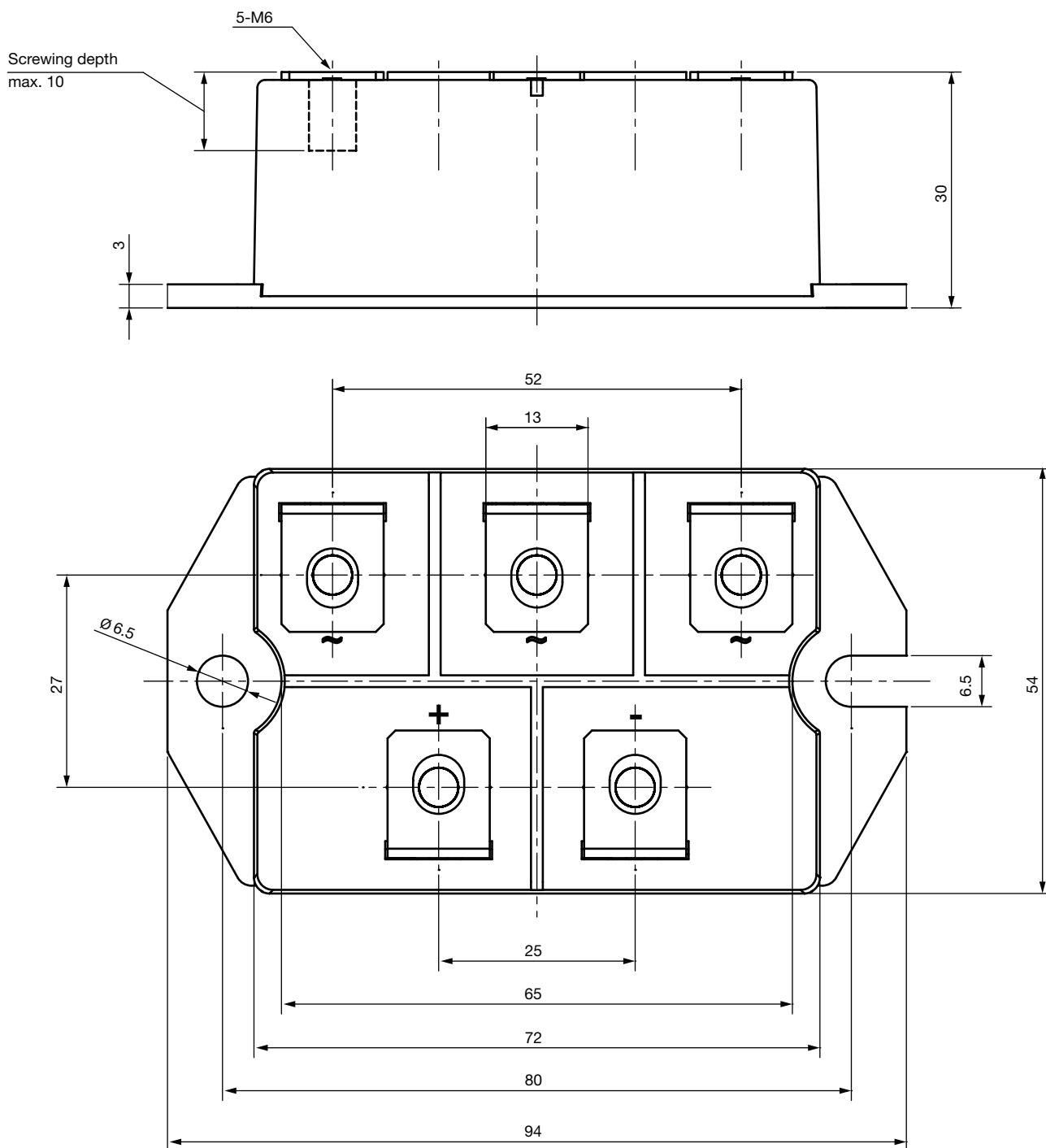
Dimensions

[www.vishay.com/doc?96003](http://www.vishay.com/doc?96003)



## MTC

**DIMENSIONS** in millimeters





## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.