Three Phase Bridge, 300 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_{RMS} isolating voltage
- UL approved file E78996
- Designed for industrial level
- Material categorization: for definitions of compliance please see 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.

PRIMARY CHARACTERISTICS	
I_O	300 A at 100 °C
V_{RRM}	1600 V to 1800 V
Package	MTC
Circuit configuration	Three phase bridge

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
I_O (1)		258	A
	T_C	110	°C
I_{FSM}	50 Hz	2400	A
	60 Hz	2512	
I^2t	50 Hz	28 795	A^2s
	60 Hz	26 285	
$I^2\sqrt{t}$		287 955	$A^2\sqrt{s}$
V_{RRM}	Range	1600 to 1800	V
T_{Stg}	Range	-40 to +125	°C
T_J	Range	-40 to +150	°C

Note

(1) Maximum output current must be limited to 250 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-300MT...C	160	1600	1700	12
	180	1800	1900	

FORWARD CONDUCTION						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**			**VALUES**	**UNITS**
Maximum DC output current at case temperature	I_O	120° rect. conduction angle			300	A
					100	°C
Maximum peak, one-cycle forward, non-repetitive surge current	I_{FSM}	t = 10 ms	No voltage reapplied	Initial $T_J = T_J$ maximum	2400	A
		t = 8.3 ms			2512	
		t = 10 ms	100 % V_{RRM} reapplied		2018	
		t = 8.3 ms			2113	
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reapplied		28 795	A^2s
		t = 8.3 ms			26 285	
		t = 10 ms	100 % V_{RRM} reapplied		20 360	
		t = 8.3 ms			18 590	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied			287 955	$A^2\sqrt{s}$
Low level value of threshold voltage	$V_{FT(TO)1}$	(16.7 % x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), T_J maximum			0.79	V
High level value of threshold voltage	$V_{FT(TO)2}$	(I > π x $I_{F(AV)}$), T_J maximum			0.96	
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			3.36	mΩ
High level of forward slope resistance	r_{f2}	(I > π x $I_{F(AV)}$), T_J maximum			3.22	
Maximum forward voltage drop	V_{FM}	I_{pk} = 240 A, T_J = 25 °C, per junction			1.54	V
		I_{pk} = 300 A, T_J = 25 °C, per junction			1.7	
RMS isolation voltage	V_{ISOL}	T_J = 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	0.038	°C/W
		DC operation per junction	0.23	
Typical thermal resistance, case to heat sink	R_{thCS}	Per module Mounting surface smooth, flat, and greased	0.03	
Mounting torque ± 15 % — to heat sink		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.	5	Nm
Mounting torque ± 15 % — 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-300MT...C Series	0.044	0.050	0.061	0.087	0.143	0.029	0.050	0.066	0.091	0.145	°C/W

Note

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

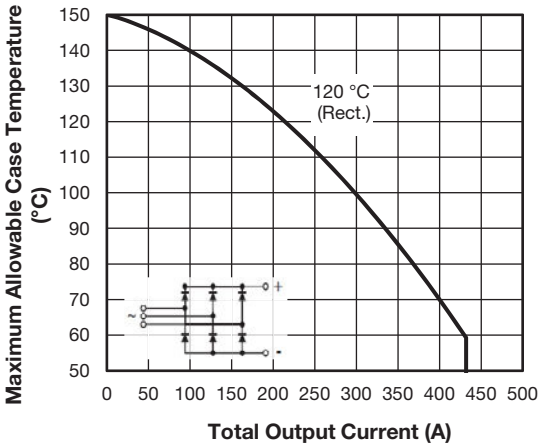


Fig. 1 - Current Rating Characteristics

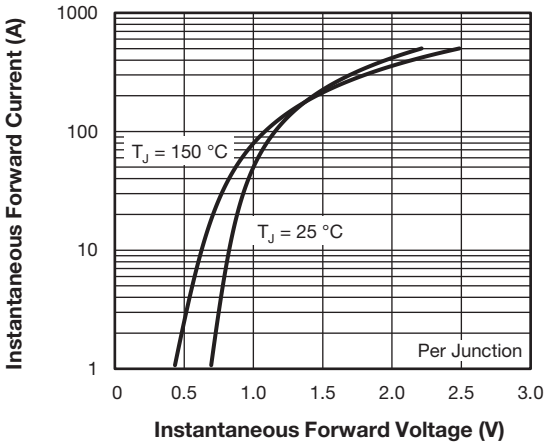
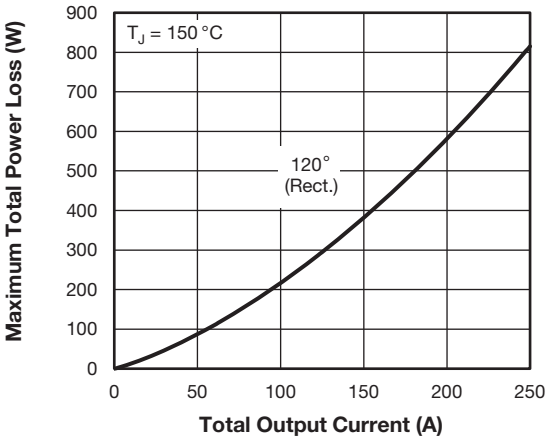


Fig. 2 - Forward Voltage Drop Characteristics



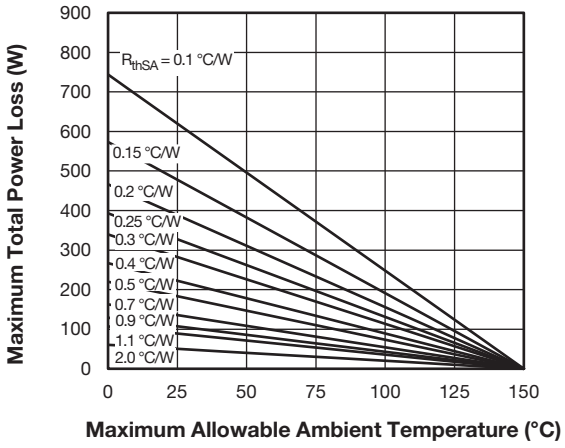


Fig. 3 - Total Power Loss Characteristics

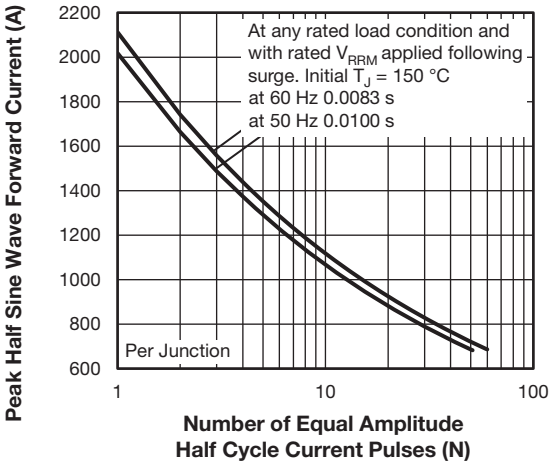


Fig. 4 - Maximum Non-Repetitive Surge Current

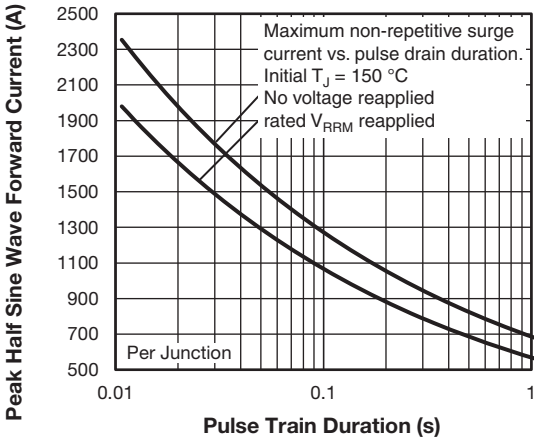


Fig. 5 - Maximum Non-Repetitive Surge Current

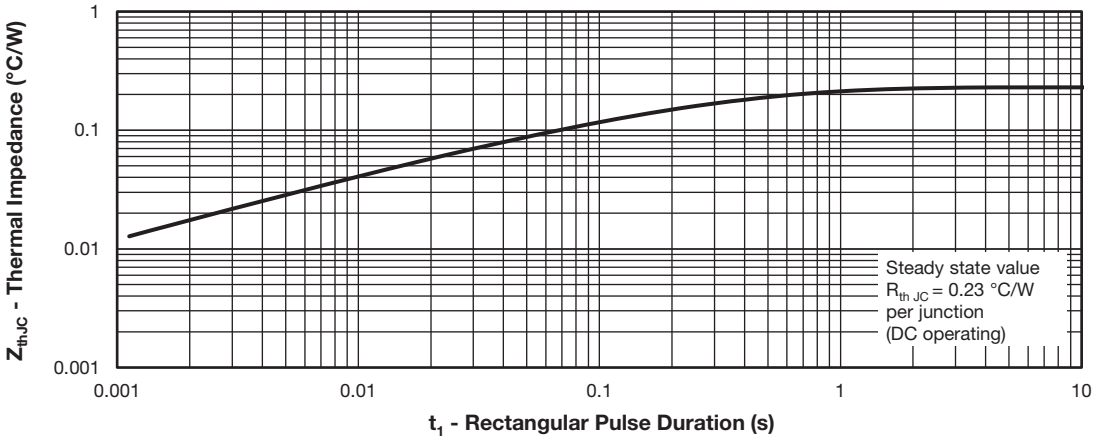


Fig. 6 - Thermal Impedance Z_{thJC} Characteristics

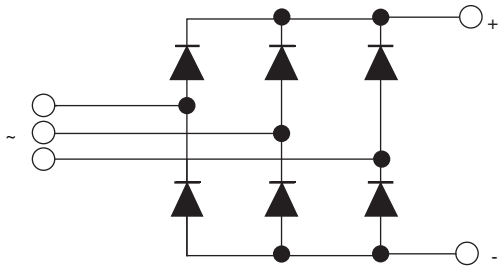
ORDERING INFORMATION TABLE

Device code

VS-	30	0	MT	160	C
1	2	3	4	5	

- 1 - Vishay Semiconductors product
- 2 - Current rating code: 30 = 300 A (average)
- 3 - Circuit configuration (three phase diodes bridge)
- 4 - Package indicator
- 5 - Voltage code x 10 = V_{RRM} (see Voltage Ratings table)

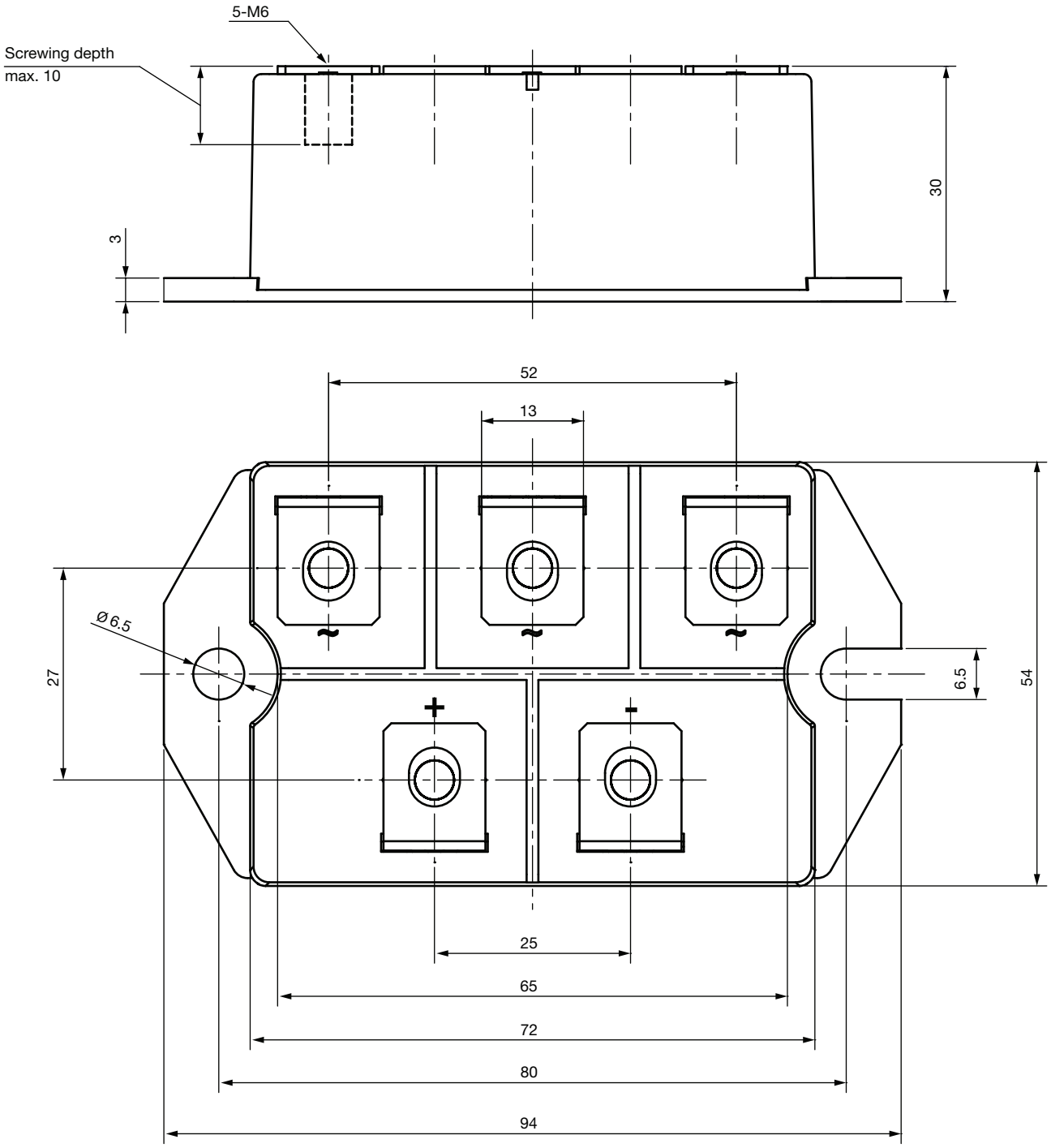
CIRCUIT CONFIGURATION



LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?96003

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.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. 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.