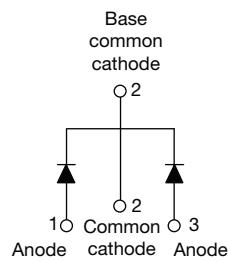




# VS-MRB15..CTPbF, VS-MBR15..CT-1PbF Series

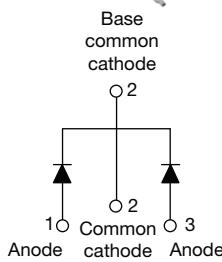
**KERSEMI**

VS-MRB15..CTPbF



D<sup>2</sup>PAK

VS-MBR15..CT-1PbF



TO-262

## FEATURES

- 150 °C T<sub>J</sub> operation
- Center tap TO-220 package
- Low forward voltage drop
- High frequency operation
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Halogen-free according to IEC 61249-2-21 definition
- Compliant to RoHS directive 2002/95/EC
- AEC-Q101 qualified



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

## DESCRIPTION

The VS-MBR(B)15... center tap Schottky rectifier has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 150 °C junction temperature. Typical applications are in switching power supplies, converters, freewheeling diodes, and reverse battery protection.

## PRODUCT SUMMARY

I <sub>F(AV)</sub>	2 x 7.5 A
V <sub>R</sub>	35 V/45 V
I <sub>RM</sub>	15 mA at 125 °C

## MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
I <sub>F(AV)</sub>	Rectangular waveform	15	A
V <sub>RRM</sub>		35/45	V
I <sub>FSM</sub>	t <sub>p</sub> = 5 µs sine	690	A
V <sub>F</sub>	7.5 Apk, T <sub>J</sub> = 125 °C	0.57	V
T <sub>J</sub>		- 65 to 150	°C

## VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-MRB1535CTPbF VS-MBR1535CT-1PbF	VS-MRB1545CTPbF VS-MBR1545CT-1PbF	UNITS
Maximum DC reverse voltage	V <sub>R</sub>			
Maximum working peak reverse voltage	V <sub>RWM</sub>	35	45	V

## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current per leg	I <sub>F(AV)</sub>	T <sub>C</sub> = 131 °C, rated V <sub>R</sub>		7.5	A
per device				15	
Maximum peak one cycle non-repetitive surge	I <sub>FSM</sub>	5 µs sine or 3 µs rect. pulse	Following any rated load condition and with rated V <sub>RRM</sub> applied	690	
		Surge applied at rated load conditions halfwave, single phase, 60 Hz		150	
Non-repetitive avalanche energy per leg	E <sub>AS</sub>	T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 2 A, L = 3.5 mH		7	mJ
Repetitive avalanche current per leg	I <sub>AR</sub>	Current decaying linearly to zero in 1 µs Frequency limited by T <sub>J</sub> maximum V <sub>A</sub> = 1.5 x V <sub>R</sub> typical		2	A

<b>ELECTRICAL SPECIFICATIONS</b>						
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum forward voltage drop	V <sub>FM</sub> <sup>(1)</sup>	15 A	T <sub>J</sub> = 25 °C	0.84	V	
		7.5 A	T <sub>J</sub> = 125 °C	0.57		
		15 A		0.72		
Maximum instantaneous reverse current	I <sub>RM</sub> <sup>(1)</sup>	T <sub>J</sub> = 25 °C	Rated DC voltage	0.1	mA	
		T <sub>J</sub> = 125 °C		15		
Maximum junction capacitance	C <sub>T</sub>	V <sub>R</sub> = 5 V <sub>DC</sub> (test signal range 100 kHz to 1 MHz), 25 °C		400	pF	
Typical series inductance	L <sub>S</sub>	Measured from top of terminal to mounting plane		8.0	nH	
Maximum voltage rate of change	dV/dt	Rated V <sub>R</sub>		10 000	V/μs	

**Note**

(1) Pulse width &lt; 300 μs, duty cycle &lt; 2 %

<b>THERMAL - MECHANICAL SPECIFICATIONS</b>							
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS		
Maximum junction temperature range	T <sub>J</sub>			- 65 to 150	°C		
Maximum storage temperature range	T <sub>Stg</sub>			- 65 to 175			
Maximum thermal resistance, junction to case per leg	R <sub>thJC</sub>	DC operation		3.0	°C/W		
Typical thermal resistance, case to heatsink	R <sub>thCS</sub>	Mounting surface, smooth and greased		0.50			
Maximum thermal resistance, junction to ambient	R <sub>thJA</sub>	DC operation		60			
Approximate weight				2	g		
				0.07	oz.		
Mounting torque	minimum			6 (5)	kgf · cm (lbf · in)		
	maximum			12 (10)			
Marking device		Case style D <sup>2</sup> PAK		MBRB1545CT			
		Case style TO-262		MBR1545CT-1			



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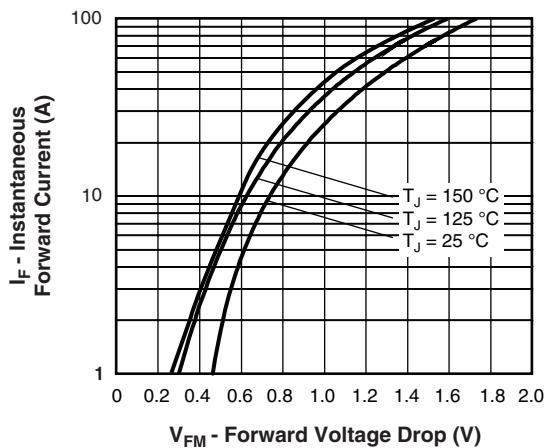


Fig. 1 - Maximum Forward Voltage Drop Characteristics  
(Per Leg)

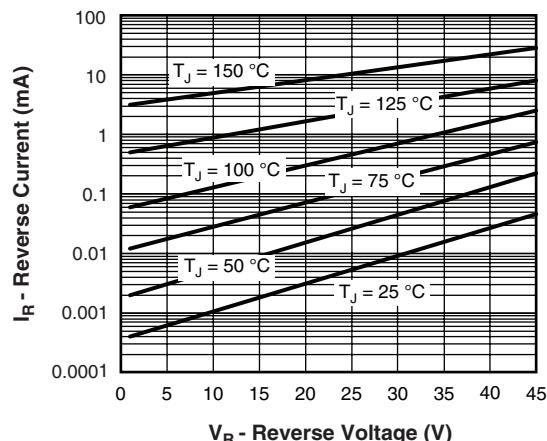


Fig. 2 - Typical Values of Reverse Current vs.  
Reverse Voltage (Per Leg)

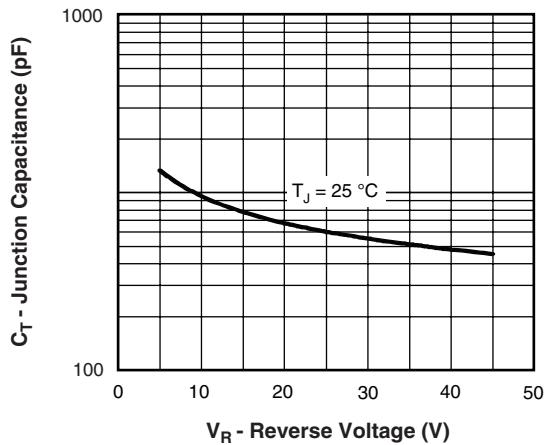


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

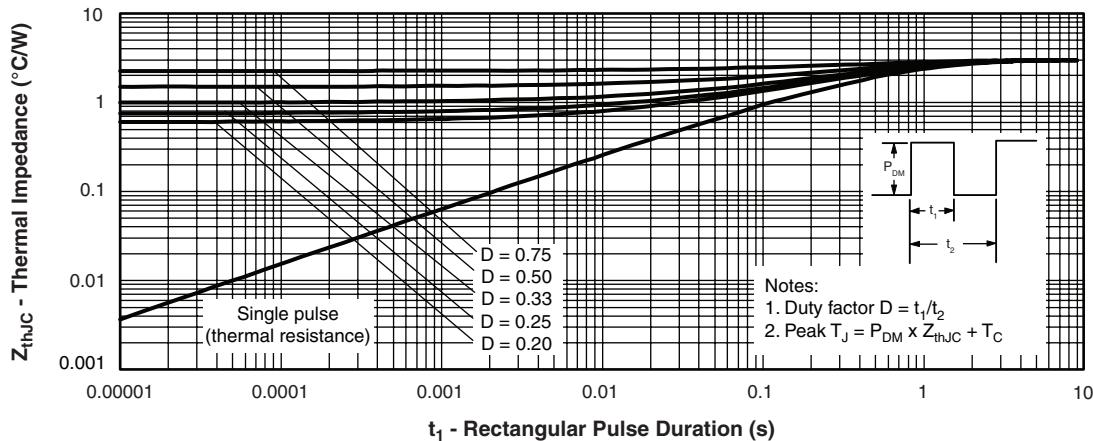


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

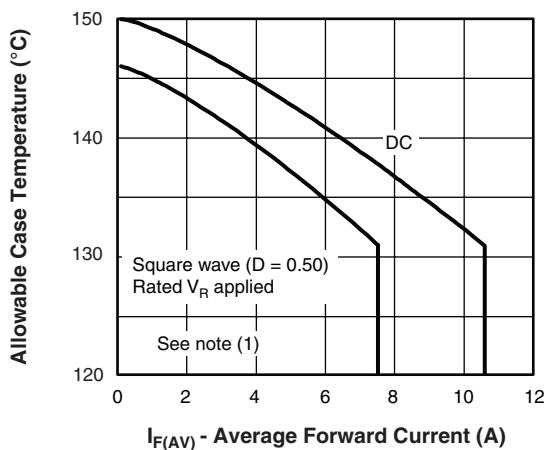


Fig. 5 - Maximum Allowable Case Temperature vs.  
Average Forward Current

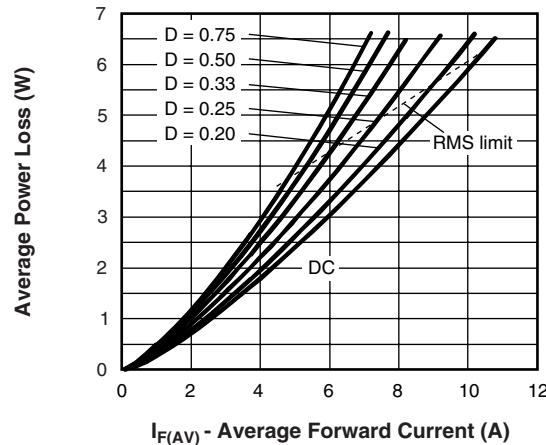


Fig. 6 - Forward Power Loss Characteristics

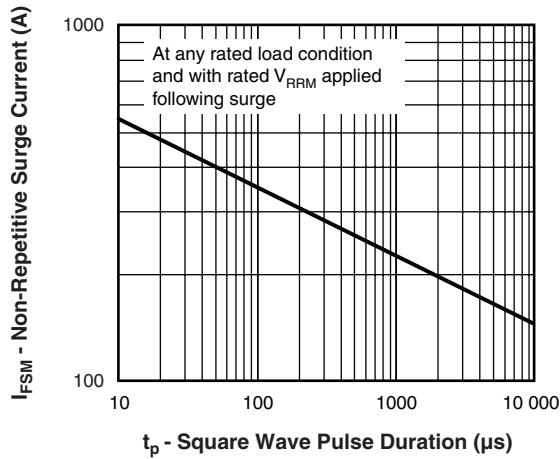


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

## Note

- (1) Formula used:  $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$ ;
- $Pd$  = Forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 6);
- $Pd_{REV}$  = Inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1}$  = Rated  $V_R$



# VS-MRB15..CTPbF, VS-MBR15..CT-1PbF Series

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Device code	VS-	MBR	B	15	45	CT	-1	TRL	PbF
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>1</b>	- HPP product suffix								
<b>2</b>	- Essential part number								
<b>3</b>	- • B = D <sup>2</sup> PAK <b>7</b> None • None = TO-262 <b>7</b> = -1								
<b>4</b>	- Current rating (15 = 15 A)								
<b>5</b>	- Voltage ratings				35 = 35 V 45 = 45 V				
<b>6</b>	- CT = Essential part number								
<b>7</b>	- • None = D <sup>2</sup> PAK <b>3</b> = B • -1 = TO-262 <b>3</b> None								
<b>8</b>	- • None = Tube (50 pieces) • TRL = Tape and reel (left oriented - for D <sup>2</sup> PAK only) • TRR = Tape and reel (right oriented - for D <sup>2</sup> PAK only)								
<b>9</b>	- • PbF = Lead (Pb)-free (for TO-262 and D <sup>2</sup> PAK tube) • P = Lead (Pb)-free (for D <sup>2</sup> PAK TRR and TRL)								

## LINKS TO RELATED DOCUMENTS

Dimensions	<a href="http://www.vishay.com/doc?95014">www.vishay.com/doc?95014</a>
Part marking information	<a href="http://www.vishay.com/doc?95008">www.vishay.com/doc?95008</a>
Packaging information	<a href="http://www.vishay.com/doc?95032">www.vishay.com/doc?95032</a>
SPICE model	<a href="http://www.vishay.com/doc?95294">www.vishay.com/doc?95294</a>