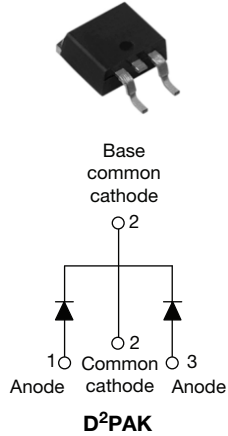
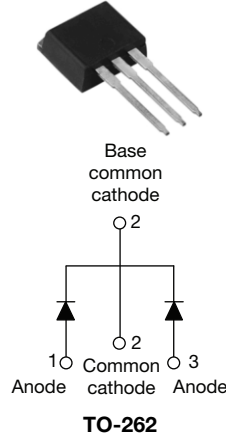


## Schottky Rectifier, 2 x 10 A

VS-MBRB20...CTGPbF



VS-MBR20...CTG-1PbF



### FEATURES

- 150 °C T<sub>J</sub> operation
- Center tap D<sup>2</sup>PAK and TO-262 packages
- Low forward voltage drop
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- High frequency operation
- Guard ring 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**

### PRODUCT SUMMARY

I <sub>F(AV)</sub>	2 x 10 A
V <sub>R</sub>	80 V to 100 V

### DESCRIPTION

This 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.

### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
I <sub>FRM</sub>	T <sub>C</sub> = 133 °C (per leg)	20	A
V <sub>RRM</sub>		80 to 100	V
I <sub>FSM</sub>	t <sub>p</sub> = 5 μs sine	850	A
V <sub>F</sub>	10 Apk, T <sub>J</sub> = 125 °C	0.70	V
T <sub>J</sub>	Range	- 65 to 150	°C

### VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-MBRB2080CTGPbF VS-MBR2080CTG-1PbF	VS-MBRB2090CTGPbF VS-MBR2090CTG-1PbF	VS-MBRB20100CTGPbF VS-MBR20100CTG-1PbF	UNITS
Maximum DC reverse voltage	V <sub>R</sub>	80	90	100	V
Maximum working peak reverse voltage	V <sub>RWM</sub>				

# VS-MBRB20...CTGPbF, VS-MBR20...CTG-1PbF Series



Vishay High Power Products Schottky Rectifier, 2 x 10 A

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	$T_C = 133\text{ }^\circ\text{C}$ , rated $V_R$		10	A
				per leg	
	per device			20	
Peak repetitive forward current per leg	$I_{FRM}$	Rated $V_R$ , square wave, 20 kHz $T_C = 133\text{ }^\circ\text{C}$		20	
Non-repetitive peak surge current	$I_{FSM}$	5 $\mu\text{s}$ sine or 3 $\mu\text{s}$ rect. pulse	Following any rated load condition and with rated $V_{RRM}$ applied	850	
		Surge applied at rated load conditions half wave, single phase, 60 Hz		150	
Peak repetitive reverse surge current	$I_{RRM}$	2.0 $\mu\text{s}$ , 1.0 kHz		0.5	
Non-repetitive avalanche energy per leg	$E_{AS}$	$T_J = 25\text{ }^\circ\text{C}$ , $I_{AS} = 2\text{ A}$ , $L = 12\text{ mH}$		24	mJ

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	$V_{FM}^{(1)}$	10 A	$T_J = 25\text{ }^\circ\text{C}$	0.80	V
		20 A		0.95	
		10 A	$T_J = 125\text{ }^\circ\text{C}$	0.70	
		20 A		0.85	
Maximum instantaneous reverse current	$I_{RM}^{(1)}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	0.10	mA
		$T_J = 125\text{ }^\circ\text{C}$		6	
Threshold voltage	$V_{F(TO)}$	$T_J = T_J \text{ maximum}$		0.433	V
Forward slope resistance	$r_f$			15.8	m $\Omega$
Maximum junction capacitance	$C_T$	$V_R = 5\text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz), $25\text{ }^\circ\text{C}$		400	pF
Typical series inductance	$L_S$	Measured from top of terminal to mounting plane		8.0	nH
Maximum voltage rate of change	dV/dt	Rated $V_R$		10 000	V/ $\mu\text{s}$

### Note

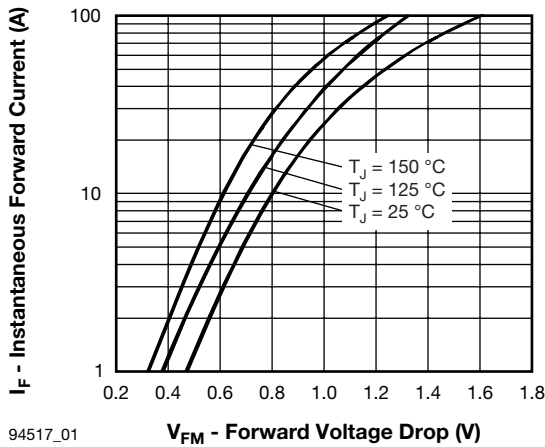
(1) Pulse width < 300  $\mu\text{s}$ , duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum junction temperature range	$T_J$			- 65 to 150	$^\circ\text{C}$
Maximum storage temperature range	$T_{Stg}$			- 65 to 175	
Maximum thermal resistance, junction to case per leg	$R_{thJC}$	DC operation		2.0	$^\circ\text{C/W}$
Maximum thermal resistance, junction to ambient	$R_{thJA}$			50	
Approximate weight				2	g
Mounting torque	minimum	Non-lubricated threads		6 (5)	kgf · cm (lbf · in)
	maximum			12 (10)	
Marking device		Case style D <sup>2</sup> PAK		MBRB2080CTG	
				MBRB2090CTG	
				MBRB20100CTG	
		Case style TO-262		MBR2080CTG-1	
		MBR2090CTG-1			
MBR20100CTG-1					



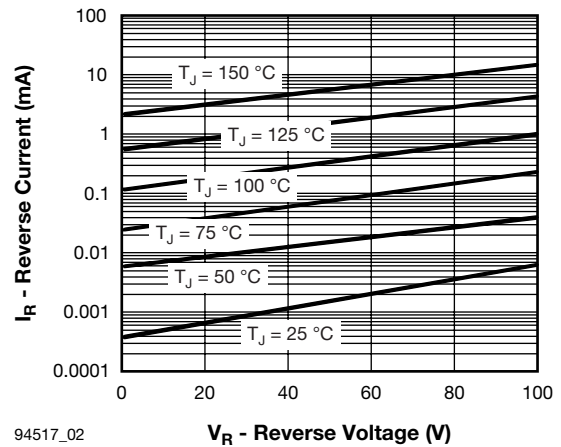
# VS-MBRB20...CTGPbF, VS-MBR20...CTG-1PbF Series

Schottky Rectifier, 2 x 10 A Vishay High Power Products



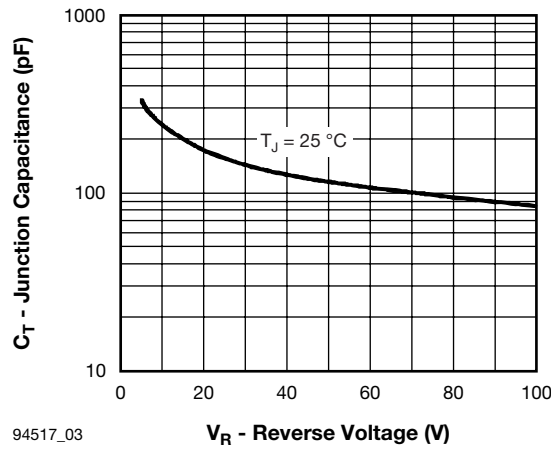
94517\_01

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



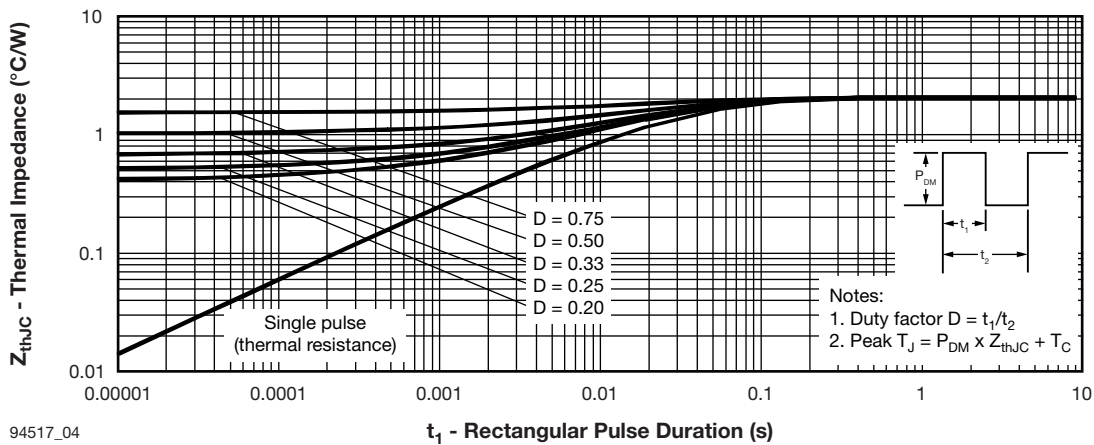
94517\_02

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



94517\_03

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



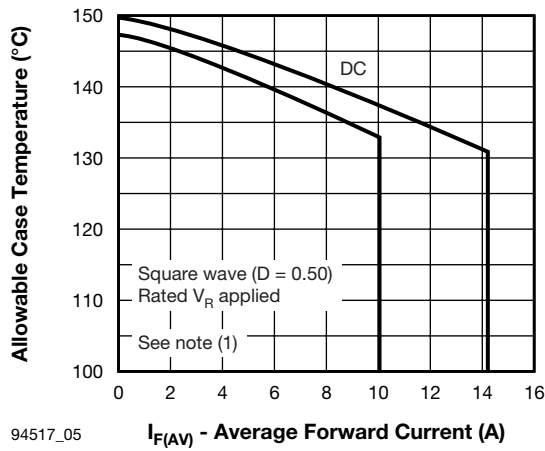
94517\_04

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

# VS-MBRB20...CTGPbF, VS-MBR20...CTG-1PbF Series



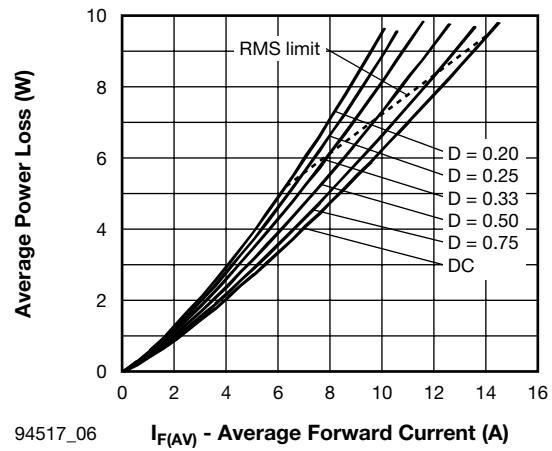
Vishay High Power Products Schottky Rectifier, 2 x 10 A



94517\_05

$I_{F(AV)}$  - Average Forward Current (A)

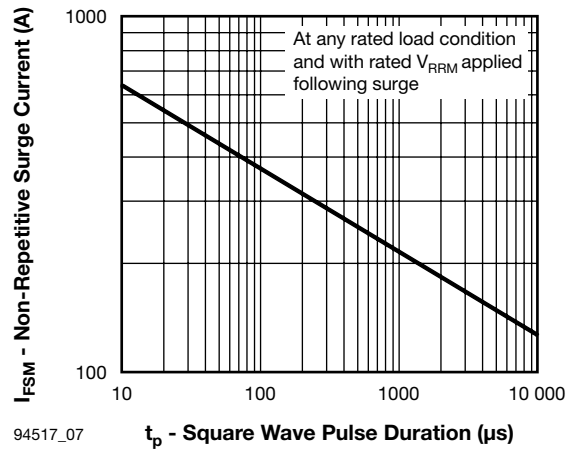
Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)



94517\_06

$I_{F(AV)}$  - Average Forward Current (A)

Fig. 6 - Forward Power Loss Characteristics (Per Leg)



94517\_07

$t_p$  - Square Wave Pulse Duration ( $\mu$ s)

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-MBRB20...CTGPbF, VS-MBR20...CTG-1PbF Series

Schottky Rectifier, 2 x 10 A Vishay High Power Products

## ORDERING INFORMATION TABLE

Device code	<b>VS-</b>	<b>MBR</b>	<b>B</b>	<b>20</b>	<b>100</b>	<b>CT</b>	<b>G</b>	<b>-1</b>	<b>TL</b>	<b>PbF</b>
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩

- 1** - HPP product suffix
- 2** - Essential part number
- 3** -
  - B = D<sup>2</sup>PAK
  - None = TO-262
- 4** - Current rating (20 = 20 A)
- 5** - Voltage ratings
- 6** - CT = Essential part number
- 7** - G = Schottky generation
- 8** -
  - None = D<sup>2</sup>PAK
  - -1 = TO-262
- 9** -
  - None = Tube (50 pieces)
  - TL = Tape and reel (left oriented - for D<sup>2</sup>PAK only)
  - TR = Tape and reel (right oriented - for D<sup>2</sup>PAK only)
- 10** -
  - PbF = Lead (Pb)-free (for D<sup>2</sup>PAK tube)
  - P = Lead (Pb)-free (for D<sup>2</sup>PAK TL/TR, and TO-262)

80 = 80 V
90 = 90 V
100 = 100 V

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>

## D<sup>2</sup>PAK, TO-262

### DIMENSIONS FOR D<sup>2</sup>PAK in millimeters and inches

Conforms to JEDEC outline D<sup>2</sup>PAK (SMD-220)



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	0.160	0.190	
A1	0.00	0.254	0.000	0.010	
b	0.51	0.99	0.020	0.039	
b1	0.51	0.89	0.020	0.035	4
b2	1.14	1.78	0.045	0.070	
b3	1.14	1.73	0.045	0.068	4
c	0.38	0.74	0.015	0.029	
c1	0.38	0.58	0.015	0.023	4
c2	1.14	1.65	0.045	0.065	
D	8.51	9.65	0.335	0.380	2

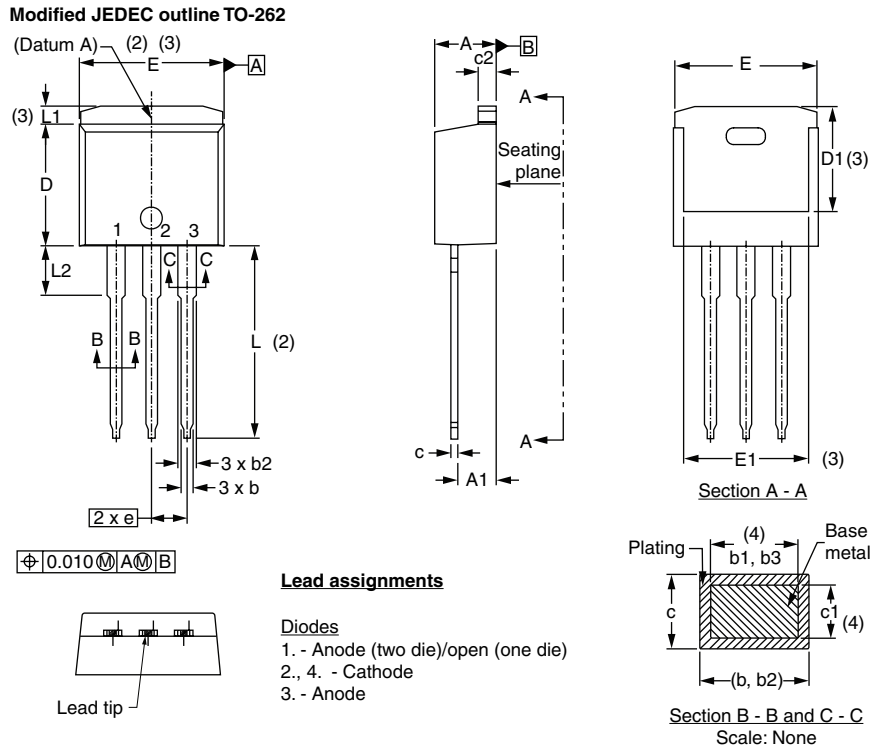
SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
D1	6.86	8.00	0.270	0.315	3
E	9.65	10.67	0.380	0.420	2, 3
E1	7.90	8.80	0.311	0.346	3
e	2.54 BSC		0.100 BSC		
H	14.61	15.88	0.575	0.625	
L	1.78	2.79	0.070	0.110	
L1	-	1.65	-	0.066	3
L2	1.27	1.78	0.050	0.070	
L3	0.25 BSC		0.010 BSC		
L4	4.78	5.28	0.188	0.208	

#### Notes

- (1) Dimensioning and tolerancing per ASME Y14.5 M-1994
- (2) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body
- (3) Thermal pad contour optional within dimension E, L1, D1 and E1
- (4) Dimension b1 and c1 apply to base metal only
- (5) Datum A and B to be determined at datum plane H
- (6) Controlling dimension: inch

- (7) Outline conforms to JEDEC outline TO-263AB

## DIMENSIONS FOR TO-262 in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	0.160	0.190	
A1	2.03	3.02	0.080	0.119	
b	0.51	0.99	0.020	0.039	
b1	0.51	0.89	0.020	0.035	4
b2	1.14	1.78	0.045	0.070	
b3	1.14	1.73	0.045	0.068	4
c	0.38	0.74	0.015	0.029	
c1	0.38	0.58	0.015	0.023	4
c2	1.14	1.65	0.045	0.065	
D	8.51	9.65	0.335	0.380	2
D1	6.86	8.00	0.270	0.315	3
E	9.65	10.67	0.380	0.420	2, 3
E1	7.90	8.80	0.311	0.346	3
e	2.54 BSC		0.100 BSC		
L	13.46	14.10	0.530	0.555	
L1	-	1.65	-	0.065	3
L2	3.56	3.71	0.140	0.146	

### Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body
- (3) Thermal pad contour optional within dimension E, L1, D1 and E1
- (4) Dimension b1 and c1 apply to base metal only
- (5) Controlling dimension: inches
- (6) Outline conform to JEDEC TO-262 except A1 (maximum), b (minimum) and D1 (minimum) where dimensions derived the actual package outline



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### Наши контакты:

**Телефон:** +7 812 627 14 35

**Электронная почта:** [sales@st-electron.ru](mailto:sales@st-electron.ru)

**Адрес:** 198099, Санкт-Петербург,  
Промышленная ул, дом № 19, литера Н,  
помещение 100-Н Офис 331