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Vishay Semiconductor/Diodes Division
VS-MBR20100CTKPBF

For any questions, you can email us directly:
sales@integrated-circuit.com
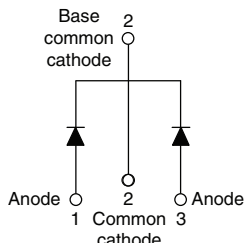
VS-MBR20...CTKPbF Series, VS-MBR20...CTK-N3 Series

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Vishay Semiconductors

Schottky Rectifier, 2 x 10 A

TO-220AB

Base common cathode 2

Anode 1 — Common cathode 2 — Anode 3

FEATURES

- 150 °C T_J operation
- 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
- Compliant to RoHS Directive 2002/95/EC
- Designed and qualified according to JEDEC-JESD47
- Halogen-free according to IEC 61249-2-21 definition (-N3 only)

Pb-free

e3

RoHS COMPLIANT

HALOGEN FREE Available

DESCRIPTION

This center tap Schottky rectifier series 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

Package	TO-220AB
$I_{F(AV)}$	2 x 10 A
V_R	80 V, 90 V, 100 V
V_F at I_F	0.65 V
I_{RM} max.	6 mA at 125 °C
T_J max.	150 °C
Diode variation	Common cathode
E_{AS}	24 mJ

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform (per device)	20	A
V_{RRM}		80 to 100	V
I_{FRM}	T_C = 133 °C (per leg)	20	A
I_{FSM}	t_p = 5 µs sine	850	
V_F	10 A_{pk}, T_J = 125 °C	0.65	V
T_J	Range	- 65 to 150	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-MBR2080CTKPbF	VS-MBR2080CTK-N3	VS-MBR2090CTKPbF	VS-MBR2090CTK-N3	VS-MBR20100CTKPbF	VS-MBR20100CTK-N3	UNITS
Maximum DC reverse voltage	V_R	80	80	90	90	100	100	V
Maximum working peak reverse voltage	V_{RWM}							

ABSOLUTE MAXIMUM RATINGS

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

VS-MBR20...CTKPbF Series, VS-MBR20...CTK-N3 Series

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ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	V_{FM} [1]	10 A	T_J = 25 °C	0.80	V
		20 A		0.95	
		10 A	T_J = 125 °C	0.65	
		20 A		0.80	
Maximum instantaneous reverse current	I_{RM} [1]	T_J = 25 °C	Rated DC voltage	0.10	mA
		T_J = 125 °C		6	
Threshold voltage	$V_{F(TO)}$	T_J = T_J maximum		0.433	V
Forward slope resistance	r_t			15.8	mΩ
Maximum junction capacitance	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz) 25 °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/µs

Note

[1] Pulse width < 300 µs, duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS

PARAMETER		SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction temperature range		T_J		- 65 to 150	°C
Maximum storage temperature range		T_{Stg}		- 65 to 175	
Maximum thermal resistance, junction to case per leg		R_{thJC}	DC operation	2.0	°C/W
Typical thermal resistance, case to heatsink		R_{thCS}	Mounting surface, smooth and greased	0.50	
Approximate weight				2	g
				0.07	oz.
Mounting torque	minimum		Non-lubricated threads	6 (5)	kgf · cm (lbf · in)
	maximum			12 (10)	
Marking device			Case style TO-220AB	MBR2080CTK	
				MBR2090CTK	
				MBR20100CTK	

VS-MBR20...CTKPbF Series, VS-MBR20...CTK-N3 Series

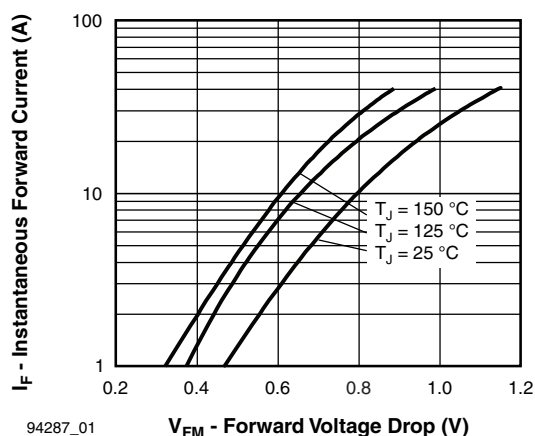www.vishay.com

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94287_01

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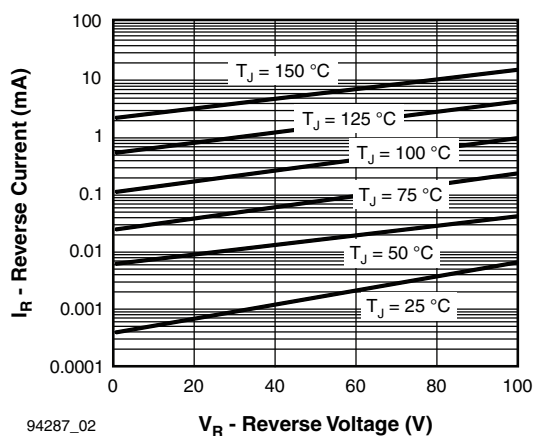(Per Leg)

94287_02

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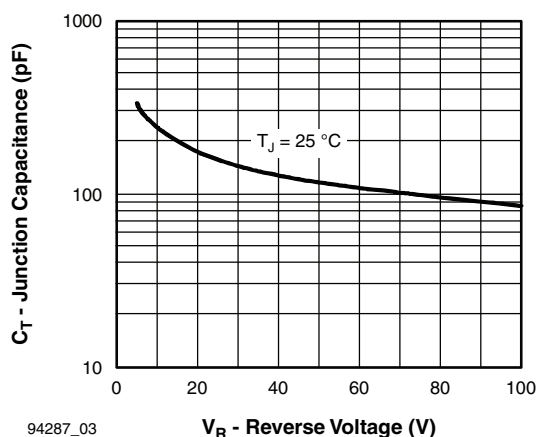Reverse Voltage (Per Leg)

94287_03

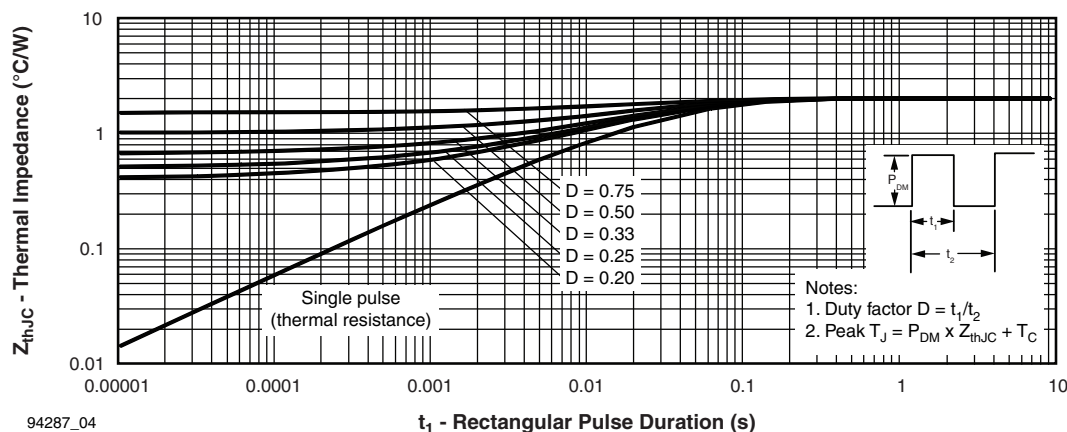Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

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

VS-MBR20...CTKPbF Series, VS-MBR20...CTK-N3 Series
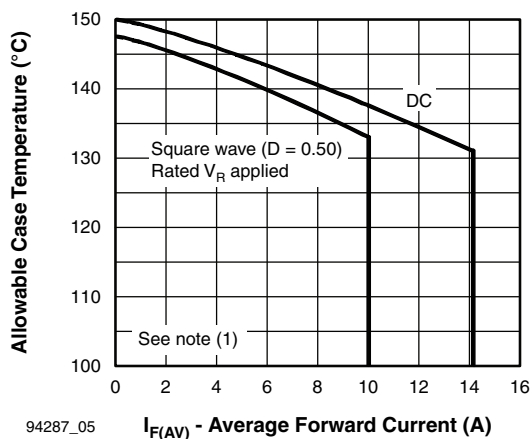
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Fig. 5 - Maximum Allowable Case Temperature vs.
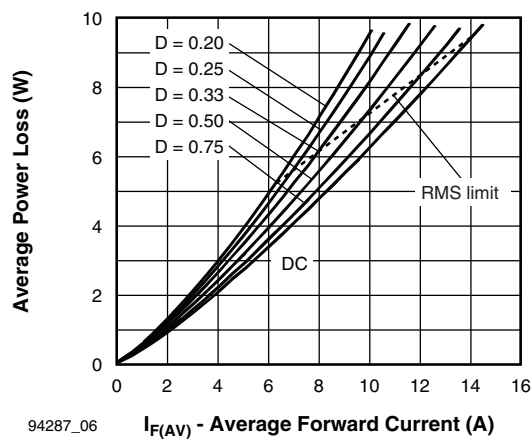Average Forward Current (Per Leg)

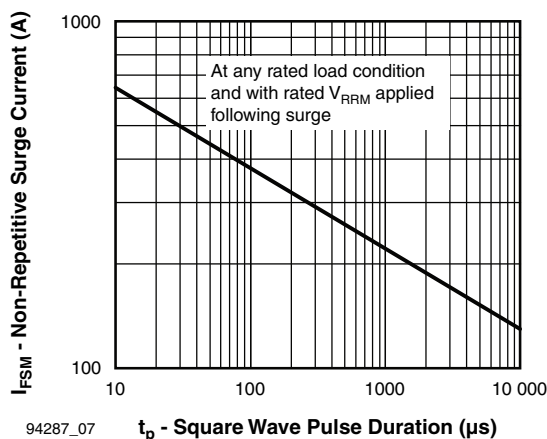

Fig. 6 - Forward Power Loss Characteristics (Per Leg)

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-MBR20...CTKPbF Series, VS-MBR20...CTK-N3 Series

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ORDERING INFORMATION TABLE

Device code	VS-	MBR	20	100	CT	K	PbF
	①	②	③	④	⑤	⑥	⑦

1	-	Vishay Semiconductors product
2	-	MBR series
3	-	Current rating (20 = 20 A)
4	-	Voltage rating
5	-	CT = Center tap (dual)
6	-	K = Schottky generation
7	-	Environmental digit

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

- PbF = Lead (Pb)-free and RoHS compliant
- -N3 = Halogen-free, RoHS compliant, and totally lead (Pb)-free

ORDERING INFORMATION (Example)

PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-MBR2080CTKPbF	50	1000	Antistatic plastic tube
VS-MBR2080CTK-N3	50	1000	Antistatic plastic tube
VS-MBR2090CTKPbF	50	1000	Antistatic plastic tube
VS-MBR2090CTK-N3	50	1000	Antistatic plastic tube
VS-MBR20100CTKPbF	50	1000	Antistatic plastic tube
VS-MBR20100CTK-N3	50	1000	Antistatic plastic tube

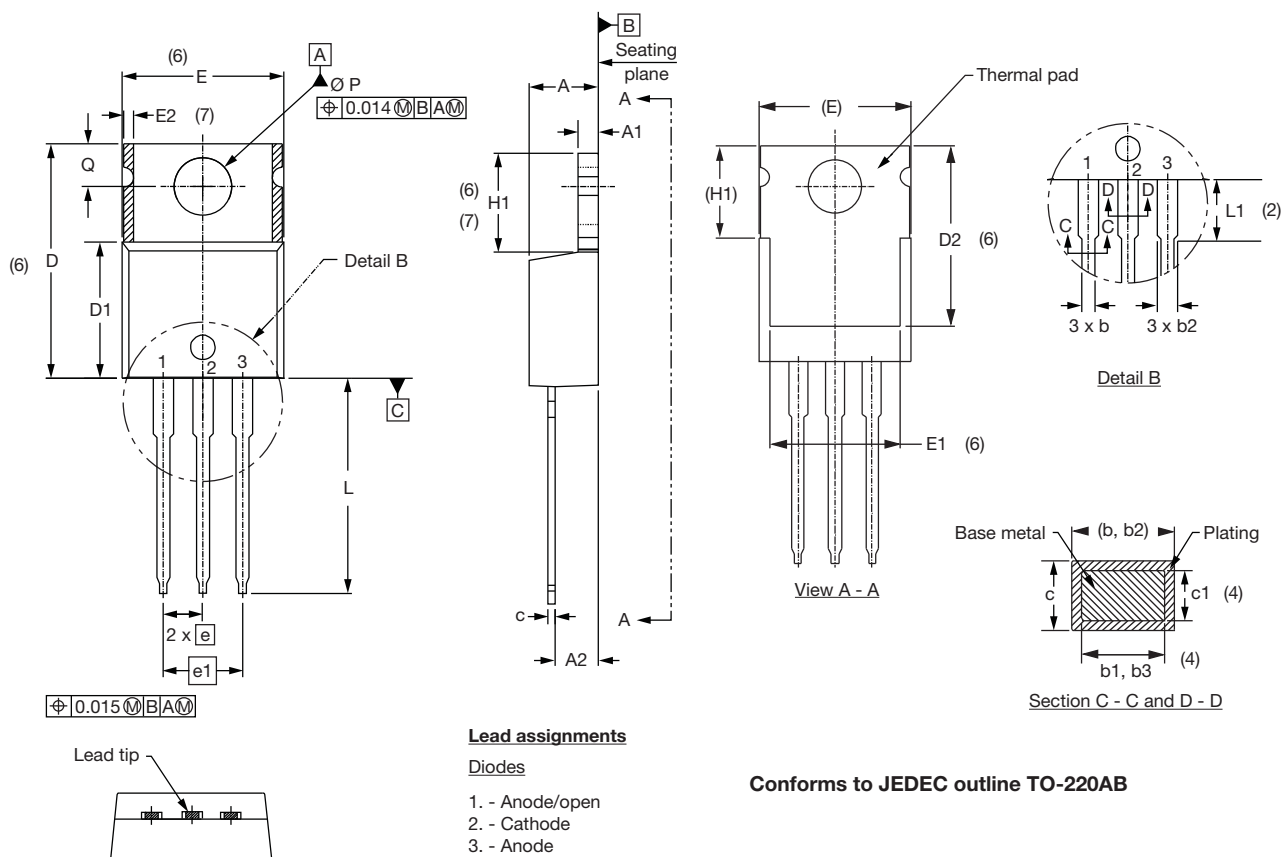| LINKS TO RELATED DOCUMENTS		
Dimensions		www.vishay.com/doc?95222
Part marking information	TO-220AB PbF	www.vishay.com/doc?95225
	TO-220AB -N3	www.vishay.com/doc?95028

Outline Dimensions

Vishay Semiconductors

TO-220AB

DIMENSIONS in millimeters and inches

Lead assignments

Diodes

1. - Anode/open
2. - Cathode
3. - Anode

Conforms to JEDEC outline TO-220AB

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.25	4.65	0.167	0.183	
A1	1.14	1.40	0.045	0.055	
A2	2.56	2.92	0.101	0.115	
b	0.69	1.01	0.027	0.040	
b1	0.38	0.97	0.015	0.038	4
b2	1.20	1.73	0.047	0.068	
b3	1.14	1.73	0.045	0.068	4
c	0.36	0.61	0.014	0.024	
c1	0.36	0.56	0.014	0.022	4
D	14.85	15.25	0.585	0.600	3
D1	8.38	9.02	0.330	0.355	
D2	11.68	12.88	0.460	0.507	6

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
E	10.11	10.51	0.398	0.414	3, 6
E1	6.86	8.89	0.270	0.350	6
E2	-	0.76	-	0.030	7
e	2.41	2.67	0.095	0.105	
e1	4.88	5.28	0.192	0.208	
H1	6.09	6.48	0.240	0.255	6, 7
L	13.52	14.02	0.532	0.552	
L1	3.32	3.82	0.131	0.150	2
Ø P	3.54	3.73	0.139	0.147	
Q	2.60	3.00	0.102	0.118	
θ	90° to 93°		90° to 93°		

Notes

[1] Dimensioning and tolerancing as per ASME Y14.5M-1994
[2] Lead dimension and finish uncontrolled in L1
[3] Dimension D, D1 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 outermost extremes of the plastic body
[4] Dimension b1, b3 and c1 apply to base metal only
[5] Controlling dimensions: inches
[6] Thermal pad contour optional within dimensions E, H1, D2 and E1

[7] Dimensions E2 x H1 define a zone where stamping and singulation irregularities are allowed
[8] Outline conforms to JEDEC TO-220, except A2 (maximum) and D2 (minimum) where dimensions are derived from the actual package outline

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For technical questions within your region, please contact one of the following:
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