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Stocking Distributor

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[Vishay Semiconductor/Diodes Division](#)
[MBR2045CT](#)

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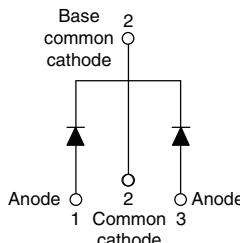
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VS-MBR20...CTPbF Series, VS-MBR20...CT-N3 Series

Vishay Semiconductors



TO-220AB



Schottky Rectifier, 2 x 10 A

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)



RoHS
COMPLIANT
HALOGEN
FREE
Available

PRODUCT SUMMARY	
Package	TO-220AB
$I_{F(AV)}$	2 x 10 A
V_R	35 V, 45 V
V_F at I_F	0.57 V
I_{RM} max.	15 mA at 125 °C
T_J max.	150 °C
Diode variation	Common cathode
E_{AS}	8 mJ

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
$I_{F(AV)}$	Rectangular waveform (per device)	20	A
V_{RRM}		35/45	V
I_{FRM}	$T_C = 135$ °C (per leg)	20	A
I_{FSM}	$t_p = 5$ µs sine	1060	
V_F	10 A _{pk} , $T_J = 125$ °C	0.57	V
T_J	Range	- 65 to 150	°C

VOLTAGE RATINGS						
PARAMETER	SYMBOL	VS-MBR2035CTPbF	VS-MBR2035CT-N3	VS-MBR2045CTPbF	VS-MBR2045CT-N3	UNITS
Maximum DC reverse voltage	V_R	35	35	45	45	V
Maximum working peak reverse voltage	V_{RWM}					

ABSOLUTE MAXIMUM RATINGS						
PARAMETER	SYMBOL	TEST CONDITIONS			VALUES	UNITS
Maximum average forward current per leg per device	$I_{F(AV)}$	$T_C = 135$ °C, rated V_R			10	A
					20	
Peak repetitive forward current per leg	I_{FRM}	Rated V_R , square wave, 20 kHz, $T_C = 135$ °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	1060	A
		Surge applied at rated load condition half wave, single phase, 60 Hz			150	
Repetitive avalanche current per leg	I_{AR}	Current decaying linearly to zero in 1 µs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical			2	
Non-repetitive avalanche energy per leg	E_{AS}	$T_J = 25$ °C, $I_{AS} = 2$ A, $L = 4$ mH			8	mJ



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ELECTRICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum forward voltage drop	$V_{FM}^{(1)}$	20 A	$T_J = 25^\circ C$	0.84	V	
		10 A	$T_J = 125^\circ C$	0.57		
		20 A		0.72		
Maximum instantaneous reverse current	$I_{RM}^{(1)}$	$T_J = 25^\circ C$	Rated DC voltage	0.1	mA	
		$T_J = 125^\circ C$		15		
Threshold voltage	$V_{F(TO)}$	$T_J = T_J$ maximum		0.354	V	
Forward slope resistance	r_t			17.6	$m\Omega$	
Maximum junction capacitance	C_T	$V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) $25^\circ C$		600	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	$V/\mu s$	

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	$^\circ C$	
Maximum storage temperature range	T_{Stg}			- 65 to 175		
Maximum thermal resistance, junction to case per leg	R_{thJC}	DC operation		2.0	$^\circ C/W$	
Typical thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth and greased (only for TO-220)		0.50		
Approximate weight				2	g	
				0.07	oz.	
Mounting torque	minimum maximum	Non-lubricated threads		6 (5)	$kgf \cdot cm$ (lbf · in)	
				12 (10)		
Marking device		Case style TO-220AB		MBR2035CT		
				MBR2045CT		



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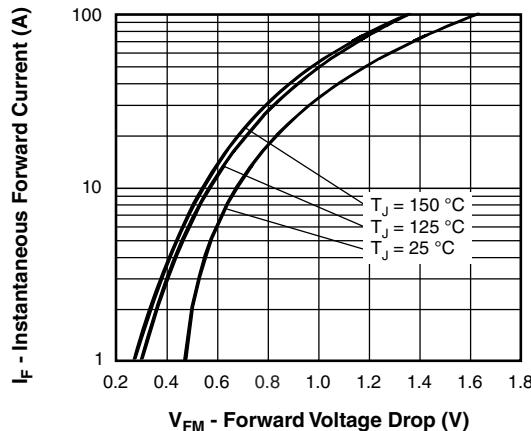


Fig. 1 - Maximum Forward Voltage Drop Characteristics
(Per Leg)

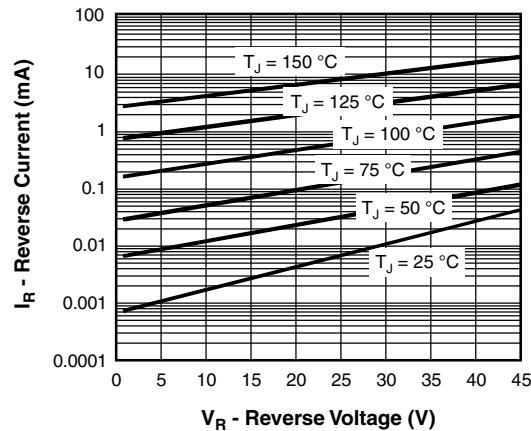


Fig. 2 - Typical Values of Reverse Current vs.
Reverse Voltage (Per Leg)

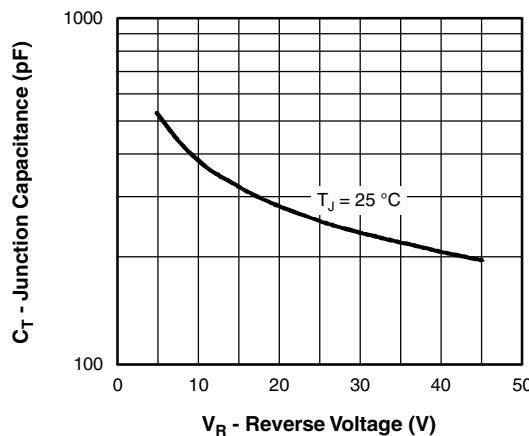


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

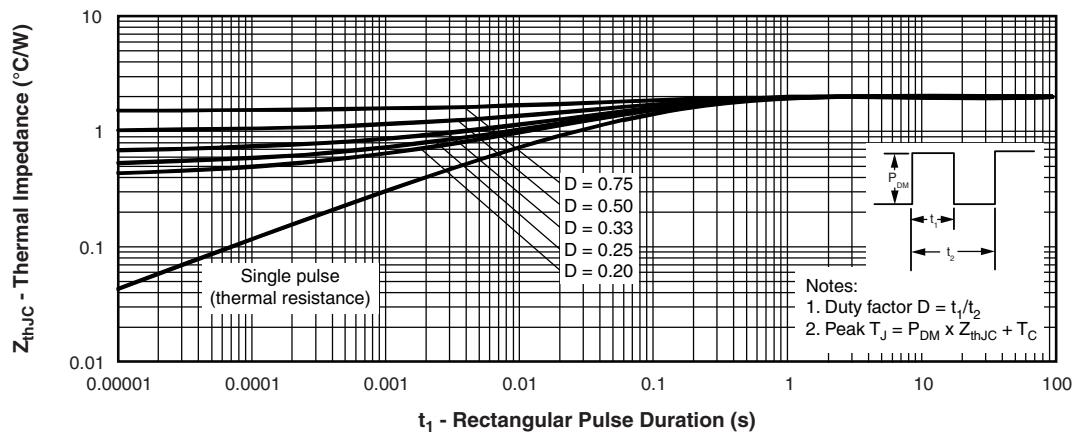


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)



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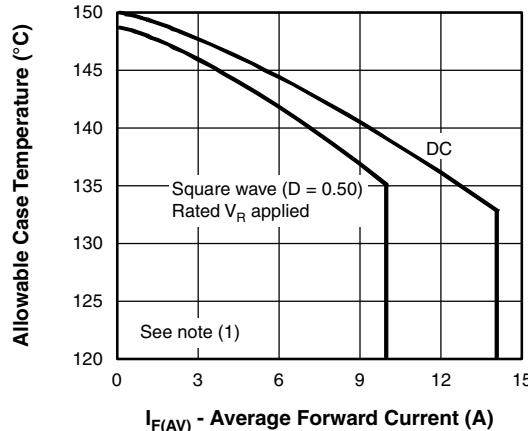


Fig. 5 - Maximum Allowable Case Temperature vs.
Average Forward Current (Per Leg)

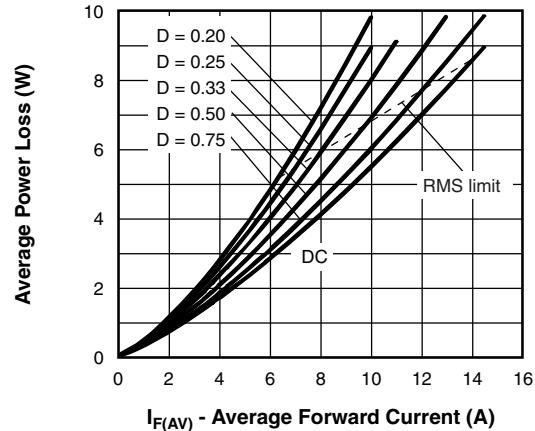


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

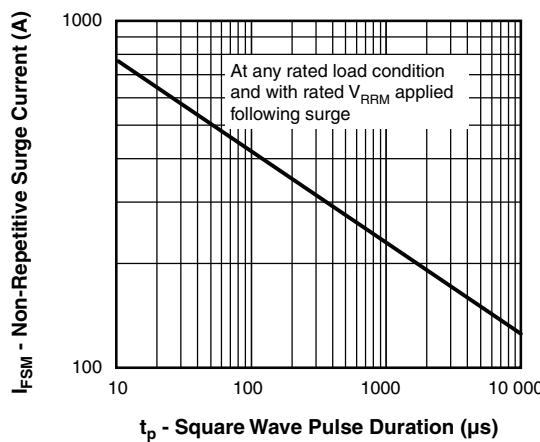


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

Note

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



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ORDERING INFORMATION TABLE

Device code	VS-	MBR	20	45	CT	PbF
	1	2	3	4	5	6

- 1** - Vishay Semiconductors product
- 2** - Schottky MBR series
- 3** - Current rating (20 = 20 A)
- 4** - Voltage ratings 35 = 35 V
45 = 45 V
- 5** - CT = Essential part number
- 6** - Environmental digit
 - 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-MBR2035CTPbF	50	1000	Antistatic plastic tube
VS-MBR2035CT-N3	50	1000	Antistatic plastic tube
VS-MBR2045CTPbF	50	1000	Antistatic plastic tube
VS-MBR2045CT-N3	50	1000	Antistatic plastic tube

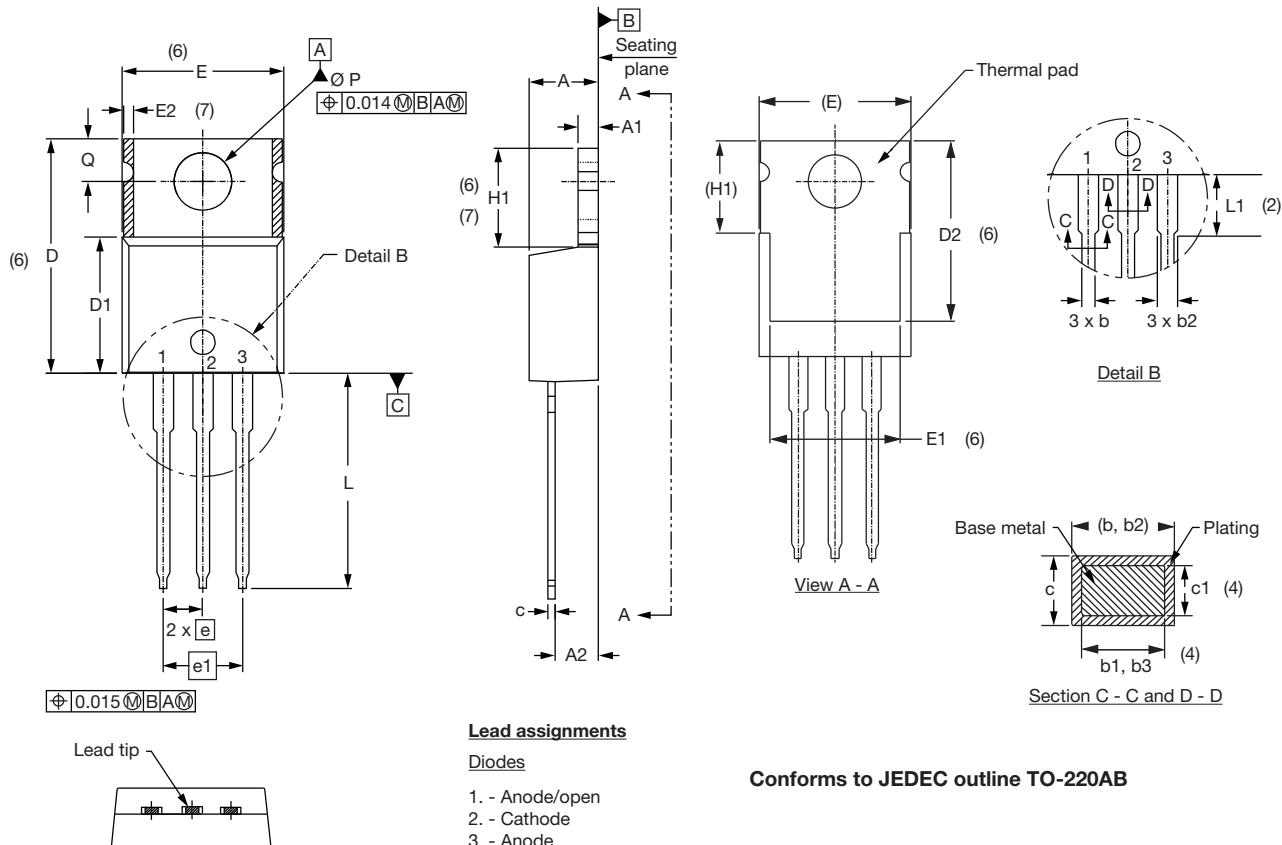
LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95222
Part marking information	www.vishay.com/doc?95225 www.vishay.com/doc?95028
SPICE model	www.vishay.com/doc?95295

Outline Dimensions

Vishay Semiconductors

TO-220AB

DIMENSIONS in millimeters and inches



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

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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