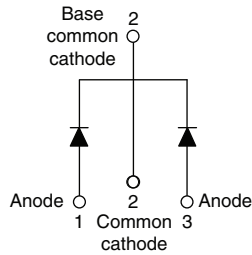


## High Performance Schottky Rectifier, 2 x 10 A


**TO-220AB**


### FEATURES

- 150 °C T<sub>J</sub> 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
- AEC-Q101 qualified meets JESD 201 class 2 whisker test
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


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

### PRODUCT SUMMARY

I <sub>F(AV)</sub>	2 x 10 A
V <sub>R</sub>	35 V, 45 V
V <sub>F</sub> at I <sub>F</sub>	0.57 V
I <sub>RM</sub> max.	15 mA at 125 °C
T <sub>J</sub> max.	150 °C
E <sub>AS</sub>	8 mJ
Package	TO-220AB
Diode variation	Common cathode

### 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>F(AV)</sub>	Rectangular waveform (per device)	20	A
V <sub>RRM</sub>		35/45	V
I <sub>FRM</sub>	T <sub>C</sub> = 135 °C (per leg)	20	A
I <sub>FSM</sub>	t <sub>p</sub> = 5 μs sine	1060	
V <sub>F</sub>	10 A <sub>pk</sub> , T <sub>J</sub> = 125 °C	0.57	V
T <sub>J</sub>	Range	-65 to 150	°C

### VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-MBR2035CTHN3	VS-MBR2045CTHN3	UNITS
Maximum DC reverse voltage	V <sub>R</sub>	35	45	V
Maximum working peak reverse voltage	V <sub>RWM</sub>			

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current	I <sub>F(AV)</sub>	T <sub>C</sub> = 135 °C, rated V <sub>R</sub>		10	A
				20	
Peak repetitive forward current per leg	I <sub>FRM</sub>	Rated V <sub>R</sub> , square wave, 20 kHz, T <sub>C</sub> = 135 °C		20	
Non-repetitive peak surge current	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	1060	
		Surge applied at rated load condition half wave, single phase, 60 Hz		150	
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	mJ
Non-repetitive avalanche energy per leg	E <sub>AS</sub>	T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 2 A, L = 4 mH		8	

**ELECTRICAL SPECIFICATIONS**

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

**Note**

<sup>(1)</sup> Pulse width < 300  $\mu$ s, duty cycle < 2 %

**THERMAL - MECHANICAL SPECIFICATIONS**

THERMAL MECHANICAL CONDITIONS				
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	2.0	°C/W
Typical thermal resistance, case to heatsink	R <sub>thCS</sub>	Mounting surface, smooth and greased (only for TO-220)	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	MBR2035CTH	
			MBR2045CTH	

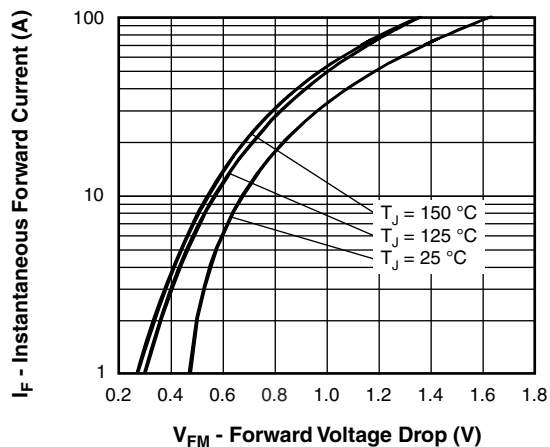


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

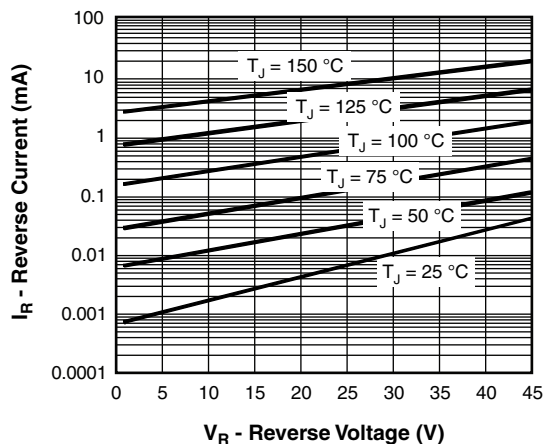


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

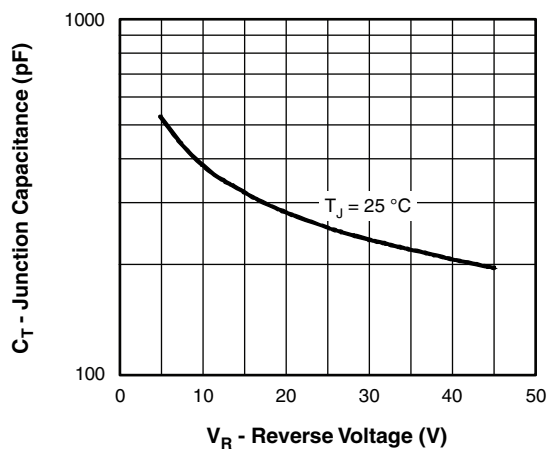
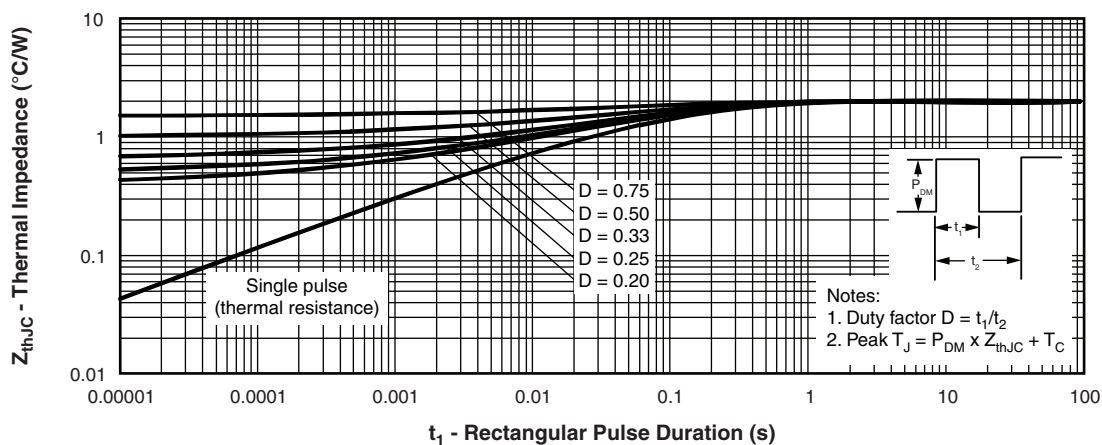


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)


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

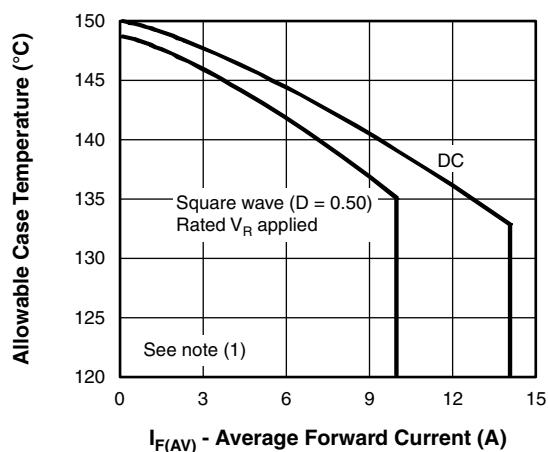


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

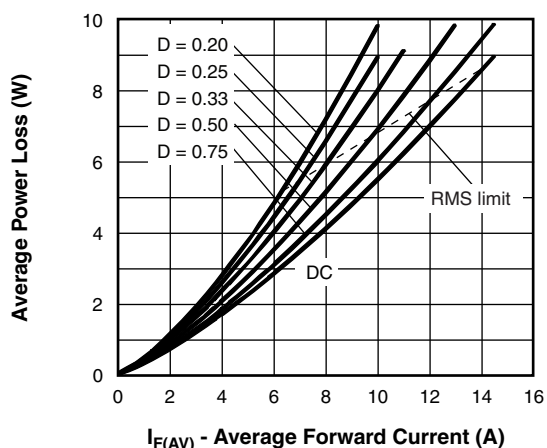


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

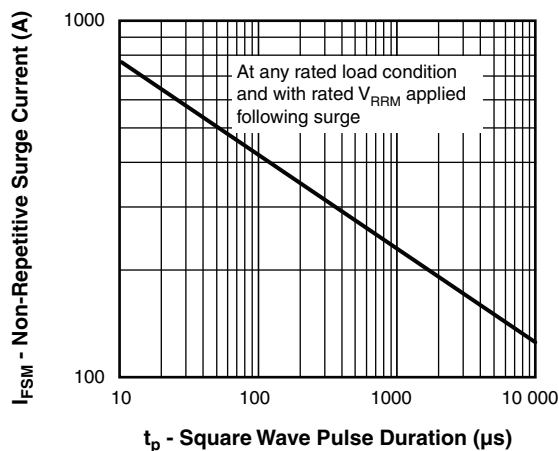


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

#### Note

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



## ORDERING INFORMATION TABLE

Device code	VS-	MBR	20	45	CT	H	N3
	1	2	3	4	5	6	7

- |          |   |                               |
|----------|---|-------------------------------|
| <b>1</b> | - | Vishay Semiconductors product |
| <b>2</b> | - | Schottky MBR series           |
| <b>3</b> | - | Current rating (20 = 20 A)    |
| <b>4</b> | - | Voltage ratings               |
| <b>5</b> | - | CT = Essential part number    |
| <b>6</b> | - | H = AEC-Q101 qualified        |
| <b>7</b> | - | Environmental digit           |
- 35 = 35 V  
45 = 45 V
- 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-MBR2035CTHN3	50	1000	Antistatic plastic tube
VS-MBR2045CTHN3	50	1000	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95222">www.vishay.com/doc?95222</a>
Part marking information TO-220AB-N3	<a href="http://www.vishay.com/doc?95028">www.vishay.com/doc?95028</a>
SPIICE model	<a href="http://www.vishay.com/doc?95295">www.vishay.com/doc?95295</a>





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