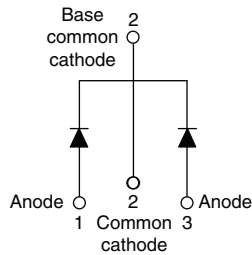


## Schottky Rectifier, 2 x 15 A


**TO-220AB**


### 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)



### PRODUCT SUMMARY

Package	TO-220AB
$I_{F(AV)}$	2 x 15 A
$V_R$	45 V
$V_F$ at $I_F$	See Electrical table
$I_{RM}$ max.	100 mA at 125 °C
$T_J$ max.	150 °C
Diode variation	Common cathode
$E_{AS}$	10 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)	30	A
$V_{RRM}$		35/45	V
$I_{FRM}$	$T_C = 123$ °C (per leg)	30	A
$I_{FSM}$	$t_p = 5$ $\mu$ s sine	1020	
$V_F$	20 A <sub>pk</sub> , $T_J = 125$ °C	0.6	V
$T_J$	Range	- 65 to 150	°C

### VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-MBR3045CTPbF	VS-MBR3045CT-N3	UNITS
Maximum DC reverse voltage	$V_R$	45	45	V
Maximum working peak reverse voltage	$V_{RWM}$			

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	$T_C = 123$ °C, rated $V_R$	15 30	A
Peak repetitive forward current per leg	$I_{FRM}$	Rated $V_R$ , square wave, 20 kHz, $T_C = 123$ °C	30	
Non-repetitive peak surge current	$I_{FSM}$	5 $\mu$ s sine or 3 $\mu$ s rect. pulse	1020	
		Surge applied at rated load conditions halfwave, single phase, 60 Hz	200	
Non-repetitive avalanche energy per leg	$E_{AS}$	$T_J = 25$ °C, $I_{AS} = 2$ A, $L = 5$ mH	10	mJ
Repetitive avalanche current per leg	$I_{AR}$	Current decaying linearly to zero in 1 $\mu$ s Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical	2	A

**ELECTRICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	$V_{FM}^{(1)}$	30 A	$T_J = 25\text{ }^{\circ}\text{C}$	0.76	V
		20 A	$T_J = 125\text{ }^{\circ}\text{C}$	0.6	
		30 A		0.72	
Maximum instantaneous reverse current	$I_{RM}^{(1)}$	$T_J = 25\text{ }^{\circ}\text{C}$	Rated DC voltage	1	mA
		$T_J = 125\text{ }^{\circ}\text{C}$		100	
Threshold voltage	$V_{F(TO)}$	$T_J = T_J \text{ maximum}$		0.29	V
Forward slope resistance	$r_t$			13.6	mΩ
Maximum junction capacitance	$C_T$	$V_R = 5\text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^{\circ}\text{C}$		800	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  $\mu$ s, duty cycle < 2 %**THERMAL - MECHANICAL SPECIFICATIONS**

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	1.5	°C/W
Typical thermal resistance, case to heatsink	R <sub>thCS</sub>	Mounting surface, smooth and greased Only for TO-220	0.50	
Maximum thermal resistance, junction to ambient	R <sub>thJA</sub>	DC operation For D <sup>2</sup> PAK and TO-262	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	MBR3045CT	

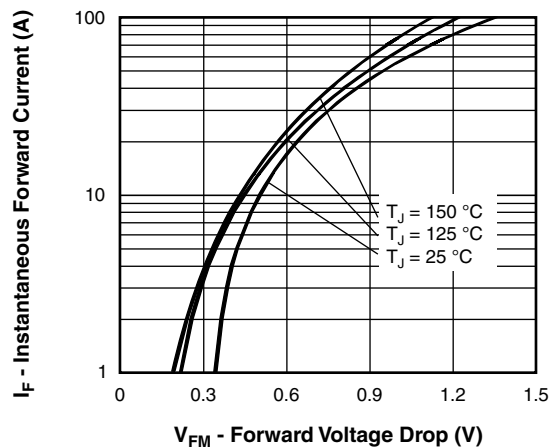


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

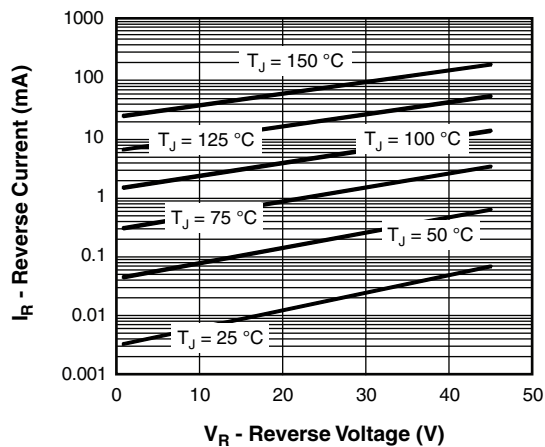


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

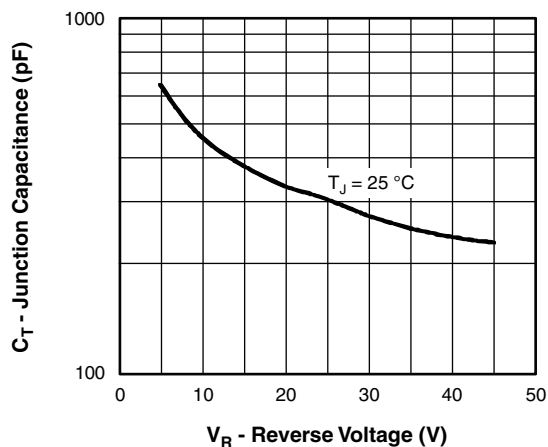


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

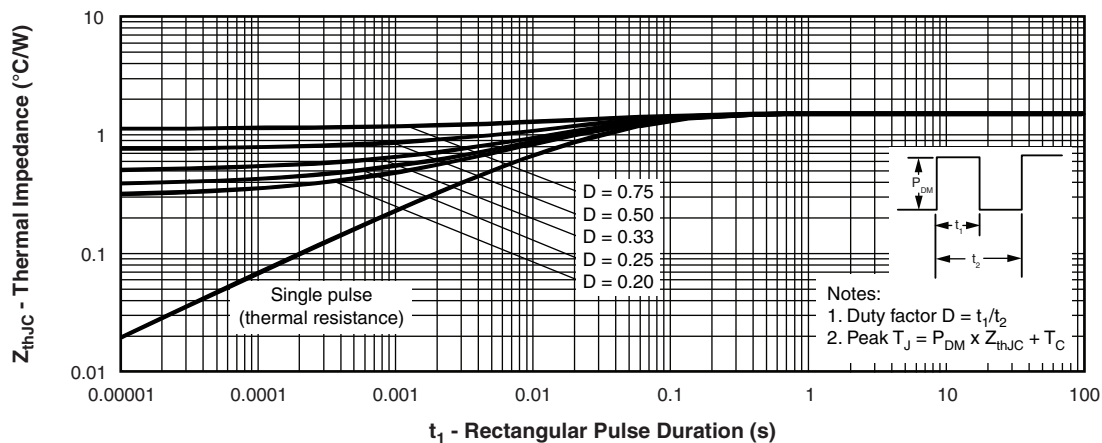


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

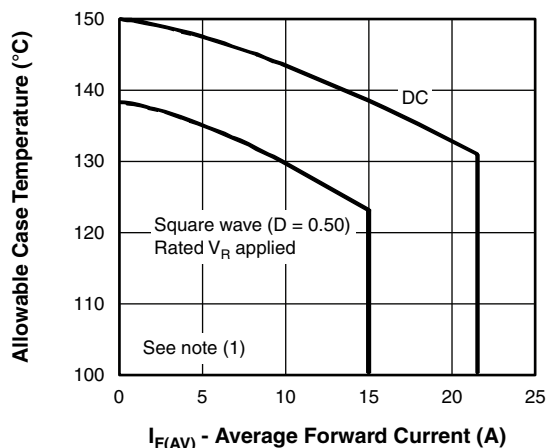


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

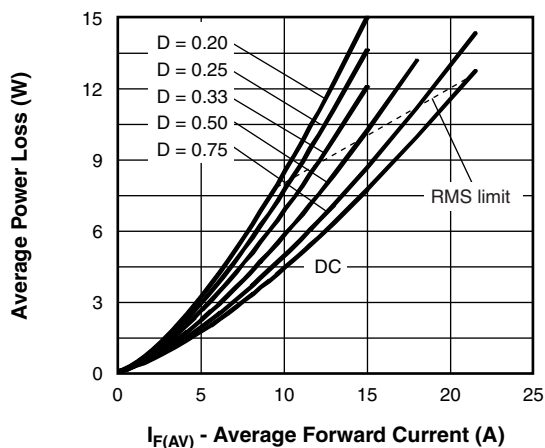


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

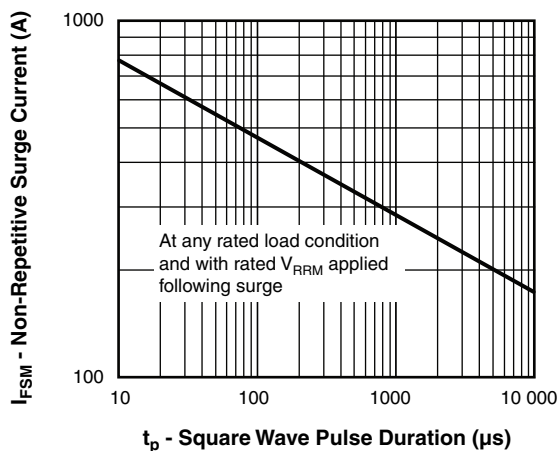


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

#### 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	<b>VS-</b>	<b>MBR</b>	<b>30</b>	<b>45</b>	<b>CT</b>	<b>PbF</b>
	①	②	③	④	⑤	⑥

- |          |   |                               |
|----------|---|-------------------------------|
| <b>1</b> | - | Vishay Semiconductors product |
| <b>2</b> | - | Schottky MBR series           |
| <b>3</b> | - | Current rating (30 = 30 A)    |
| <b>4</b> | - | Voltage ratings (045 = 45 V)  |
| <b>5</b> | - | CT = Essential part number    |
| <b>6</b> | - | Environmental digit           |
- PbF = Lead (Pb)-free and RoHS compliant
  - -N3 = Halogen-free, RoHS compliant, and totally lead (Pb)-free

<b>ORDERING INFORMATION (Example)</b>			
<b>PREFERRED P/N</b>	<b>QUANTITY PER T/R</b>	<b>MINIMUM ORDER QUANTITY</b>	<b>PACKAGING DESCRIPTION</b>
VS-MBR3045CTPbF	50	1000	Antistatic plastic tube
VS-MBR3045CT-N3	50	1000	Antistatic plastic tube

<b>LINKS TO RELATED DOCUMENTS</b>		
Dimensions		<a href="http://www.vishay.com/doc?95222">www.vishay.com/doc?95222</a>
Part marking information	TO-220AB PbF	<a href="http://www.vishay.com/doc?95225">www.vishay.com/doc?95225</a>
	TO-220AB -N3	<a href="http://www.vishay.com/doc?95028">www.vishay.com/doc?95028</a>



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