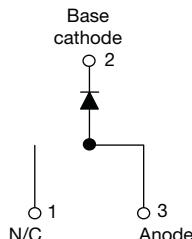


## High Performance Schottky Rectifier, 7.5 A


TO-263AB (D<sup>2</sup>PAK)


PRODUCT SUMMARY	
Package	TO-263AB (D <sup>2</sup> PAK)
$I_{F(AV)}$	7.5 V
$V_R$	35 V/45 V
$V_F$ at $I_F$	0.57
$I_{RM}$ max.	15 mA at 125 °C
$T_J$ max.	150 °C
Diode variation	Single die
$E_{AS}$	7.0 mJ

### FEATURES

- 150 °C  $T_J$  operation
- High frequency operation
- Low forward voltage drop
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT  
HALOGEN  
FREE

### DESCRIPTION

The VS-MBRB7... 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.

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	7.5	A
$V_{RRM}$		35, 45	V
$I_{FSM}$	$t_p = 5 \mu s$ sine	690	A
$V_F$	$7.5 A_{pk}$ , $T_J = 125$ °C	0.57	V
$T_J$	Range	-65 to +150	°C

VOLTAGE RATINGS				
PARAMETER	SYMBOL	VS-MBRB735PbF	VS-MBRB745PbF	UNITS
Maximum DC reverse voltage	$V_R$	35	45	V
Maximum working peak reverse voltage	$V_{RWM}$			

ABSOLUTE MAXIMUM RATINGS								
PARAMETER	SYMBOL	TEST CONDITIONS			VALUES	UNITS		
Maximum average forward current	$I_{F(AV)}$	$T_J = 131$ °C, rated $V_R$			7.5	A		
Non-repetitive peak surge current	$I_{FSM}$	5 $\mu s$ sine or 3 $\mu s$ rect. pulse	Following any rated load condition and with rated $V_{RRM}$ applied		690			
		Surge applied at rated load condition halfwave single phase 60 Hz			150			
Non-repetitive avalanche energy	$E_{AS}$	$T_J = 25$ °C, $I_{AS} = 2$ A, $L = 3.5$ mH			7	mJ		
Repetitive avalanche current	$I_{AR}$	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		

<b>ELECTRICAL SPECIFICATIONS</b>						
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum forward voltage drop	V <sub>FM</sub> <sup>(1)</sup>	15 A	T <sub>J</sub> = 25 °C	0.84	V	
		7.5 A	T <sub>J</sub> = 125 °C	0.57		
		15 A		0.72		
Maximum instantaneous reverse current	I <sub>RM</sub> <sup>(1)</sup>	T <sub>J</sub> = 25 °C	Rated DC voltage	0.1	mA	
		T <sub>J</sub> = 125 °C		15		
Maximum junction capacitance	C <sub>T</sub>	V <sub>R</sub> = 5 V <sub>DC</sub> (test signal range 100 kHz to 1 MHz), 25 °C		400	pF	
Typical series inductance	L <sub>S</sub>	Measured from top of terminal to mounting plane		8.0	nH	
Maximum voltage rate of change	dV/dt	Rated V <sub>R</sub>		10 000	V/μs	

**Note**

<sup>(1)</sup> Pulse width < 300 μs, duty cycle < 2 %

<b>THERMAL - MECHANICAL SPECIFICATIONS</b>						
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	R <sub>thJC</sub>	DC operation		3.0	°C/W	
Typical thermal resistance, case to heatsink	R <sub>thCS</sub>			0.50		
Approximate weight				2	g	
				0.07	oz.	
Mounting torque	minimum			6 (5)	kgf · cm (lbf · in)	
	maximum			12 (10)		
Marking device		Case style D <sup>2</sup> PAK		MBRB735		
				MBRB745		

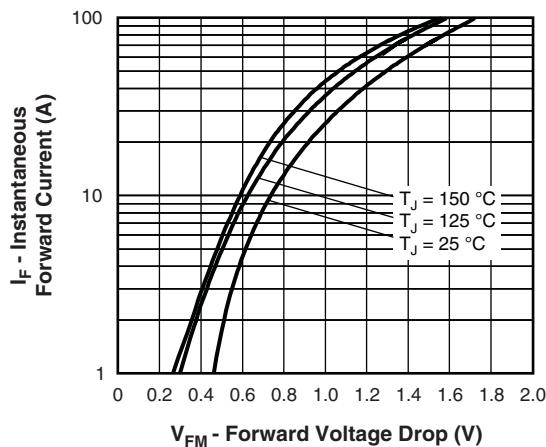


Fig. 1 - Maximum Forward Voltage Drop Characteristics  
(Per Leg)

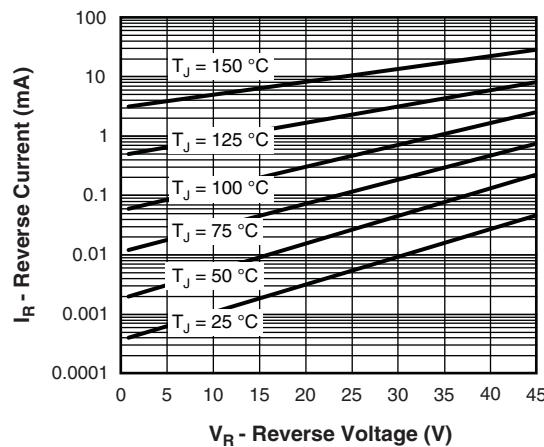


Fig. 2 - Typical Values of Reverse Current vs.  
Reverse Voltage (Per Leg)

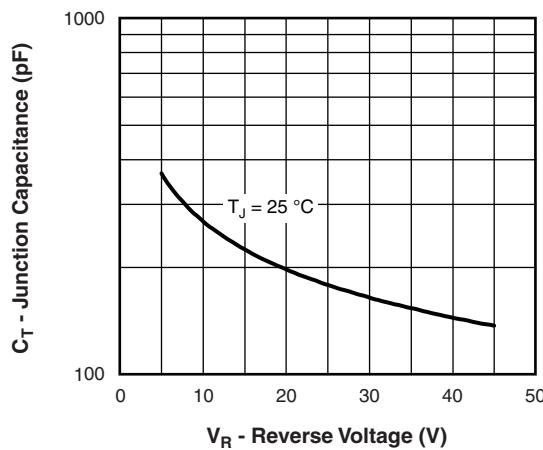


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

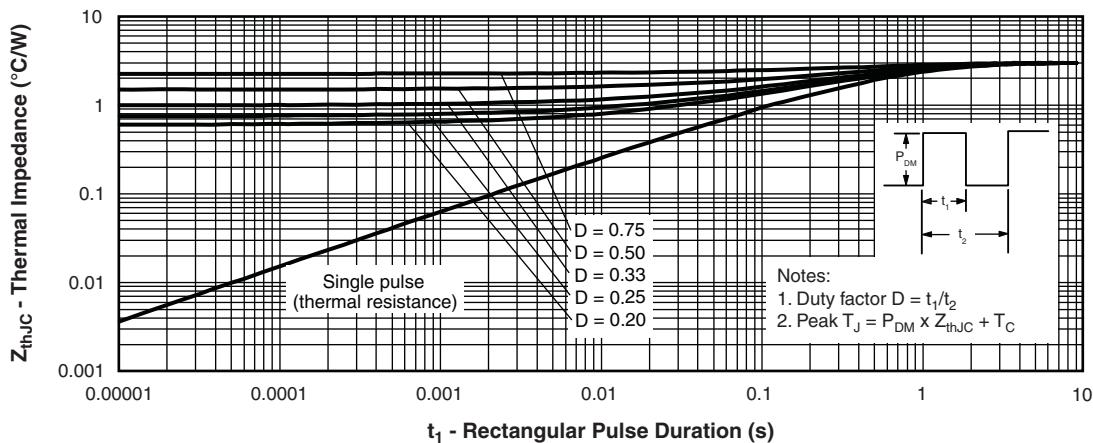


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

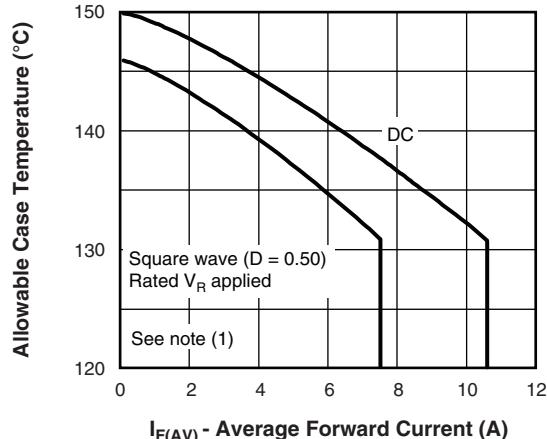


Fig. 5 - Maximum Allowable Case Temperature vs.  
Average Forward Current

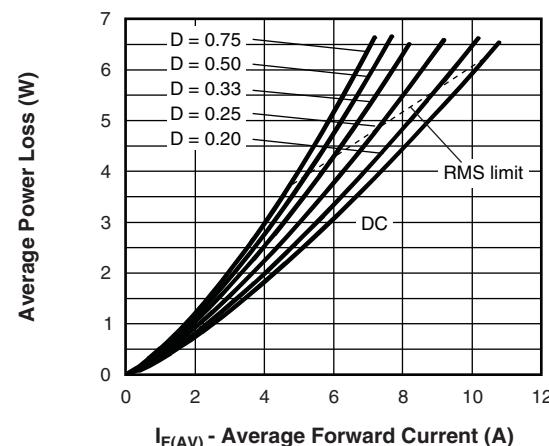


Fig. 6 - Forward Power Loss Characteristics

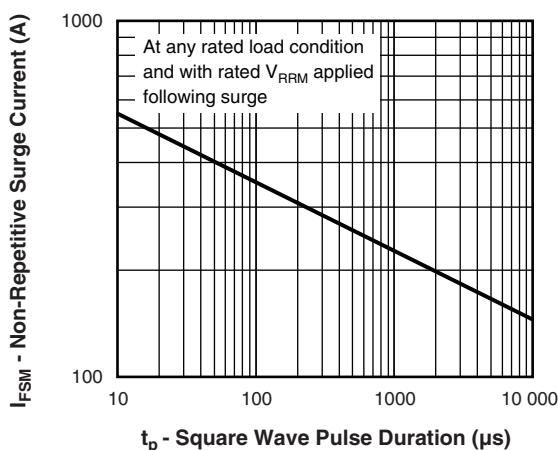


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

#### Note

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

**ORDERING INFORMATION TABLE**

Device code	VS-	MBR	B	7	45	TRL	PbF
	1	2	3	4	5	6	7

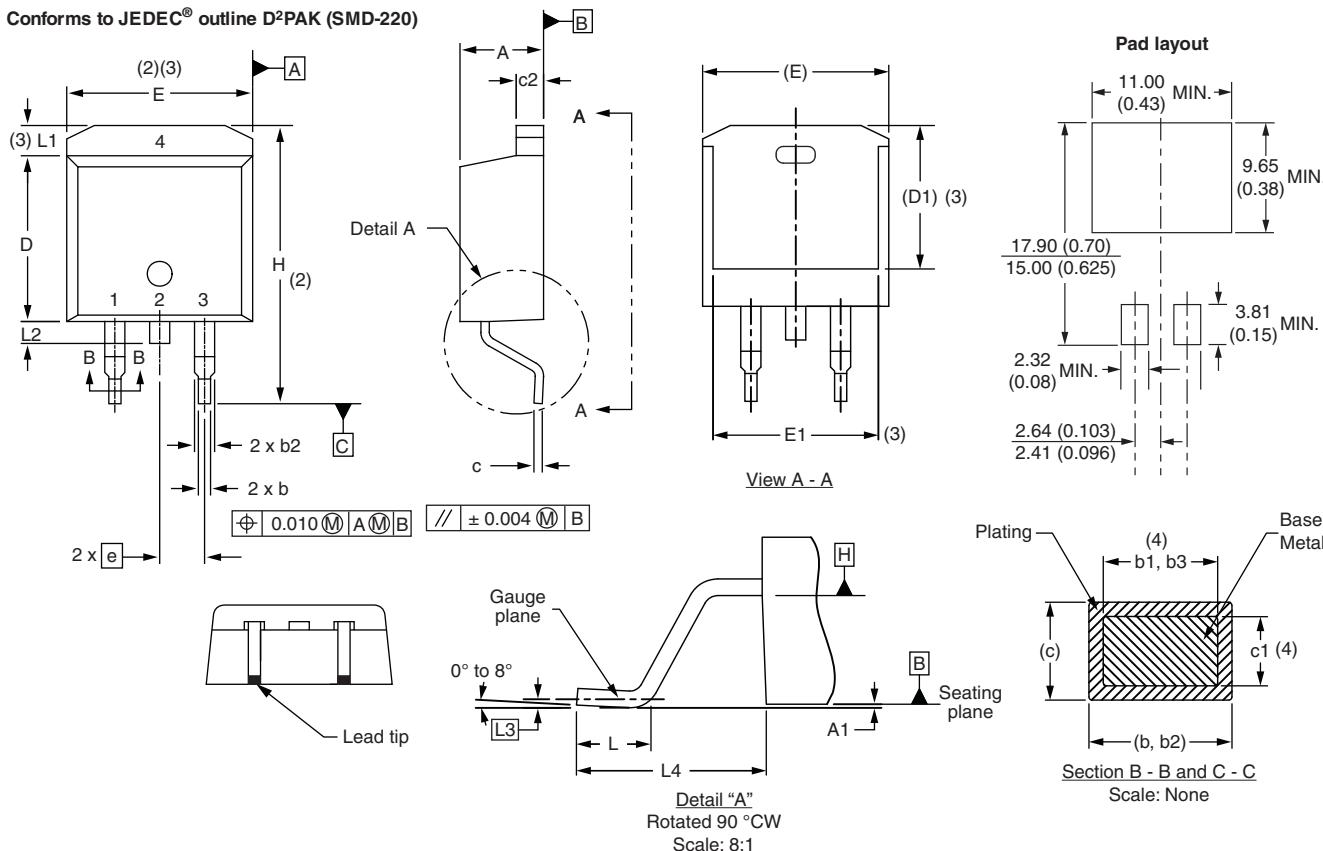
- 1** - Vishay Semiconductors product
- 2** - Essential part number
- 3** - • B = surface mount  
• None = TO-220
- 4** - Current rating (7 = 7.5 A)
- 5** - Voltage ratings
  - 35 = 35 V
  - 45 = 45 V
- 6** - • None = tube (50 pieces)  
• TRL = tape and reel (left oriented - for D<sup>2</sup>PAK only)  
• TRR = tape and reel (right oriented - for D<sup>2</sup>PAK only)
- 7** - PbF = lead (Pb)-free

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95046">www.vishay.com/doc?95046</a>
Part marking information	<a href="http://www.vishay.com/doc?95054">www.vishay.com/doc?95054</a>
Packaging information	<a href="http://www.vishay.com/doc?95032">www.vishay.com/doc?95032</a>
SPICE model	<a href="http://www.vishay.com/doc?95298">www.vishay.com/doc?95298</a>

## D<sup>2</sup>PAK

**DIMENSIONS** in millimeters and inches

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



Symbol	Millimeters		Inches		Notes		Symbol	Millimeters		Inches		Notes
	Min.	Max.	Min.	Max.				Min.	Max.	Min.	Max.	
A	4.06	4.83	0.160	0.190			D1	6.86	8.00	0.270	0.315	3
A1	0.00	0.254	0.000	0.010			E	9.65	10.67	0.380	0.420	2, 3
b	0.51	0.99	0.020	0.039			E1	7.90	8.80	0.311	0.346	3
b1	0.51	0.89	0.020	0.035	4		e	2.54 BSC		0.100 BSC		
b2	1.14	1.78	0.045	0.070			H	14.61	15.88	0.575	0.625	
b3	1.14	1.73	0.045	0.068	4		L	1.78	2.79	0.070	0.110	
c	0.38	0.74	0.015	0.029			L1	-	1.65	-	0.066	3
c1	0.38	0.58	0.015	0.023	4		L2	1.27	1.78	0.050	0.070	
c2	1.14	1.65	0.045	0.065			L3	0.25 BSC		0.010 BSC		
D	8.51	9.65	0.335	0.380	2		L4	4.78	5.28	0.188	0.208	

## Notes

**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

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