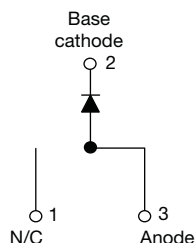


## High Performance Schottky Rectifier, 7.5 A



TO-263AB (D²PAK)



### FEATURES

- 150 °C T<sub>J</sub> 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**

### PRODUCT SUMMARY

Package	TO-263AB (D²PAK)
I <sub>F(AV)</sub>	7.5 V
V <sub>R</sub>	35 V/45 V
V <sub>F</sub> at I <sub>F</sub>	0.57
I <sub>RM</sub> max.	15 mA at 125 °C
T <sub>J</sub> max.	150 °C
Diode variation	Single die
E <sub>AS</sub>	7.0 mJ

### 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 <sub>F(AV)</sub>	Rectangular waveform	7.5	A
V <sub>RRM</sub>		35, 45	V
I <sub>FSM</sub>	t <sub>p</sub> = 5 μs sine	690	A
V <sub>F</sub>	7.5 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-MBRB735PbF	VS-MBRB745PbF	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> = 131 °C, rated V <sub>R</sub>	7.5	A
Non-repetitive peak surge current	I <sub>FSM</sub>	5 μs sine or 3 μs rect. pulse	690	
		Surge applied at rated load condition halfwave single phase 60 Hz	150	
Non-repetitive avalanche energy	E <sub>AS</sub>	T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 2 A, L = 3.5 mH	7	mJ
Repetitive avalanche current	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	A

**ELECTRICAL SPECIFICATIONS**

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  $\mu$ 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	R <sub>thJC</sub>	DC operation	3.0	°C/W
Typical thermal resistance, case to heatsink	R <sub>thCS</sub>	Mounting surface, smooth and greased	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	

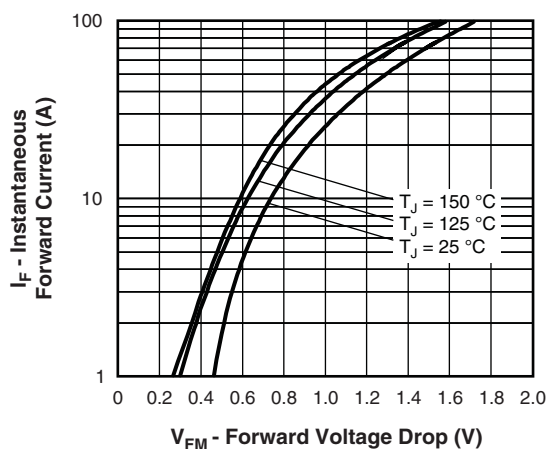


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

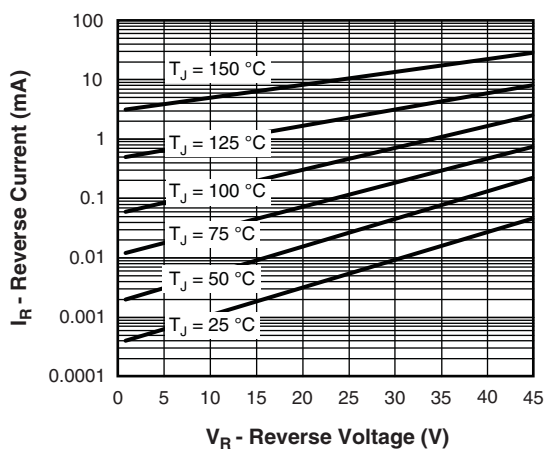


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

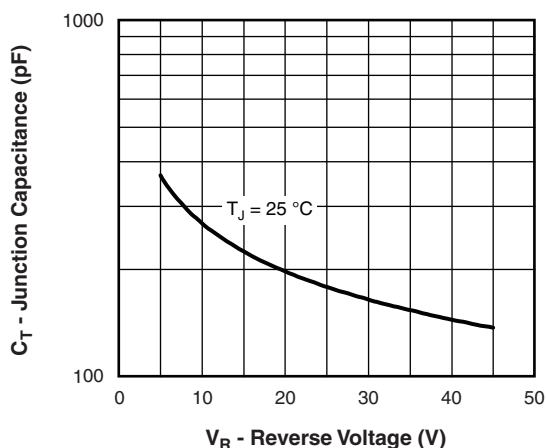


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

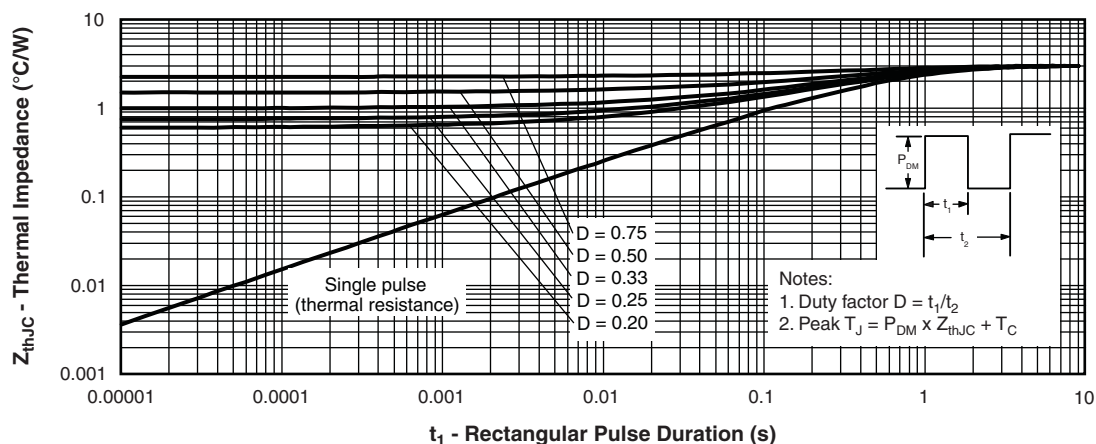


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

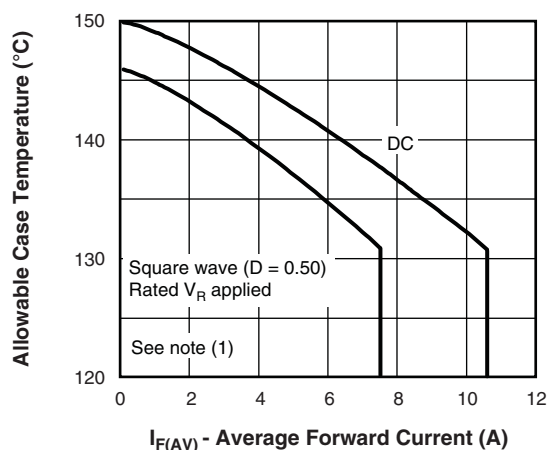


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

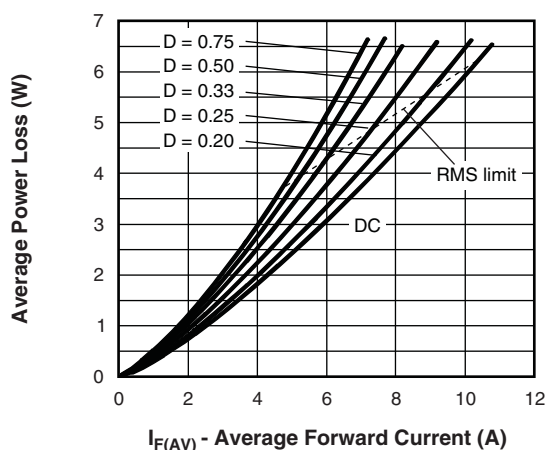


Fig. 6 - Forward Power Loss Characteristics

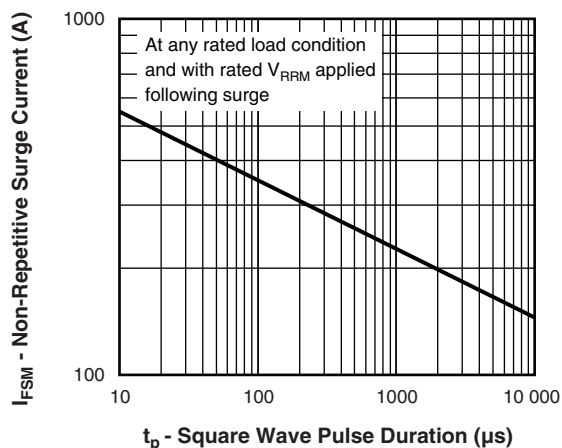


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

## Note

- (1) Formula used:  $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$ ;  
 $P_d$  = 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	B	7	45	TRL	PbF
	1	2	3	4	5	6	7

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

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>
SPIICE 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
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	0.160	0.190	
A1	0.00	0.254	0.000	0.010	
b	0.51	0.99	0.020	0.039	
b1	0.51	0.89	0.020	0.035	4
b2	1.14	1.78	0.045	0.070	
b3	1.14	1.73	0.045	0.068	4
c	0.38	0.74	0.015	0.029	
c1	0.38	0.58	0.015	0.023	4
c2	1.14	1.65	0.045	0.065	
D	8.51	9.65	0.335	0.380	2

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
D1	6.86	8.00	0.270	0.315	3
E	9.65	10.67	0.380	0.420	2, 3
E1	7.90	8.80	0.311	0.346	3
e	2.54 BSC		0.100 BSC		
H	14.61	15.88	0.575	0.625	
L	1.78	2.79	0.070	0.110	
L1	-	1.65	-	0.066	3
L2	1.27	1.78	0.050	0.070	
L3	0.25 BSC		0.010 BSC		
L4	4.78	5.28	0.188	0.208	

#### 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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