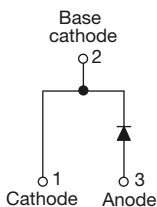


## High Performance Schottky Rectifier, 7.5 A



TO-220AC 2L



### 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
- Designed and qualified according to JEDEC®-JESD 47
- 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-MBR7... 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.

### PRIMARY CHARACTERISTICS

$I_{F(AV)}$	7.5 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
$E_{AS}$	7 mJ
Package	TO-220AC 2L
Circuit configuration	Single

### 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 <sub>pk</sub> , $T_J = 125$ °C	0.57	V
$T_J$	Range	-65 to +150	°C

### VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-MBR735-M3	VS-MBR745-M3	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	$I_{F(AV)}$	$T_C = 131$ °C, rated $V_R$	7.5	A
Non-repetitive peak surge current	$I_{FSM}$	5 $\mu s$ sine or 3 $\mu s$ rect. pulse	690	A
		Surge applied at rated load condition half wave 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

**ELECTRICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	$V_{FM}^{(1)}$	15 A	$T_J = 25\text{ }^{\circ}\text{C}$	0.84	V
		7.5 A	$T_J = 125\text{ }^{\circ}\text{C}$	0.57	
		15 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	
Maximum junction capacitance	$C_T$	$V_R = 5\text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^{\circ}\text{C}$		400	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 $V_R$		1000	V/ $\mu$ s

**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	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 TO-220AC 2L	MBR735	
			MBR745	

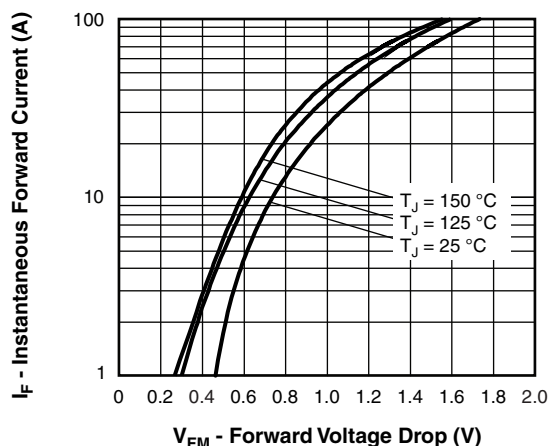


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

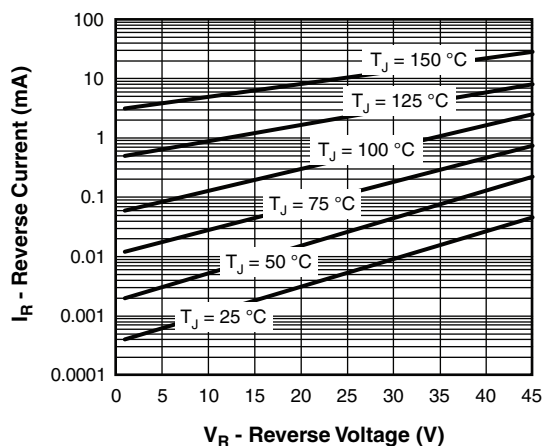


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

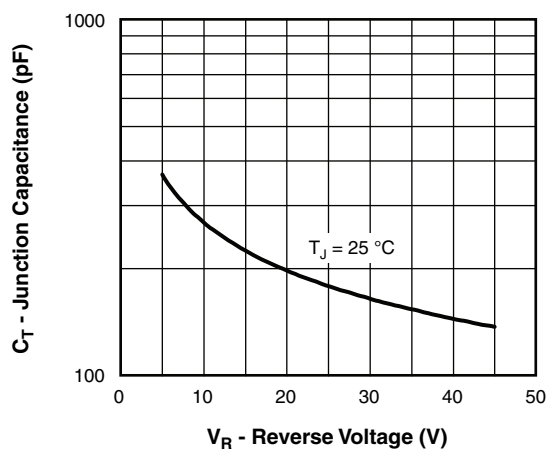
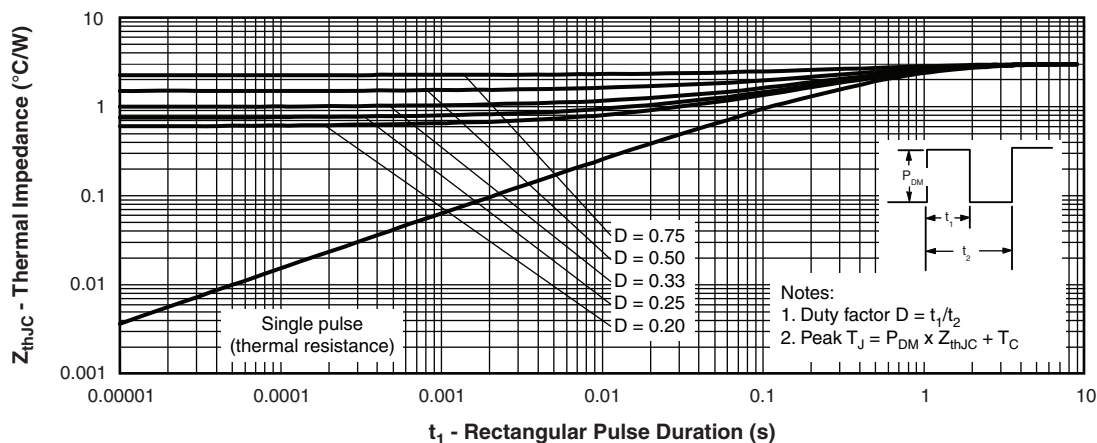


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)


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

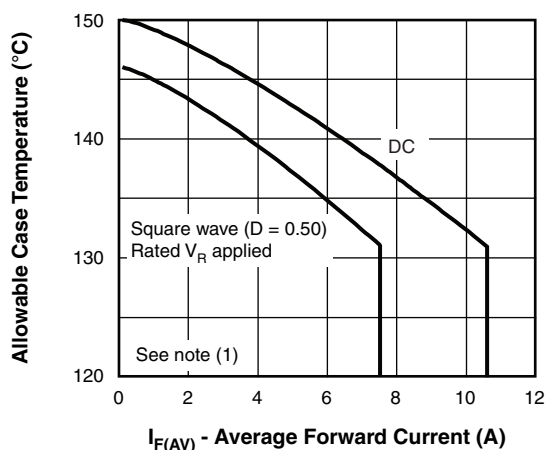


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

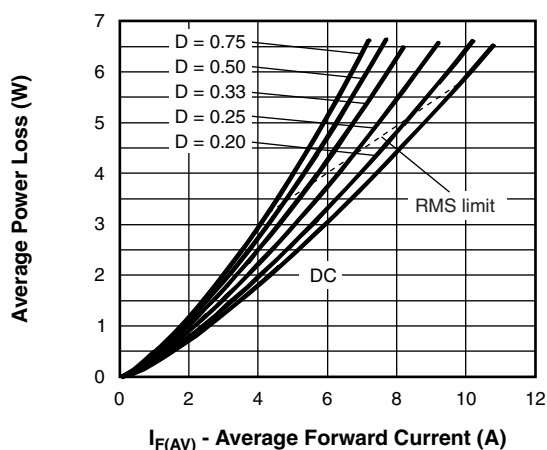


Fig. 6 - Forward Power Loss Characteristics

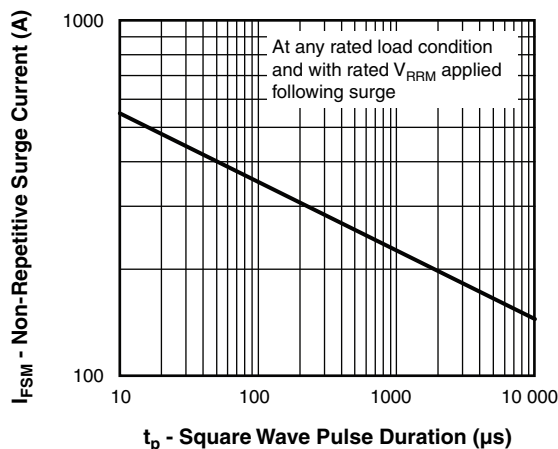
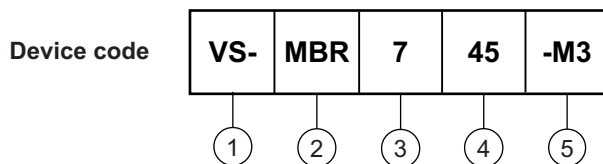


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

#### 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



- |   |                                 |           |
|---|---------------------------------|-----------|
| 1 | - Vishay Semiconductors product |           |
| 2 | - Schottky MBR series           |           |
| 3 | - Current rating (7.5 A)        | 35 = 35 V |
| 4 | - Voltage ratings               | 45 = 45 V |
| 5 | - Environmental digit           |           |

-M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free

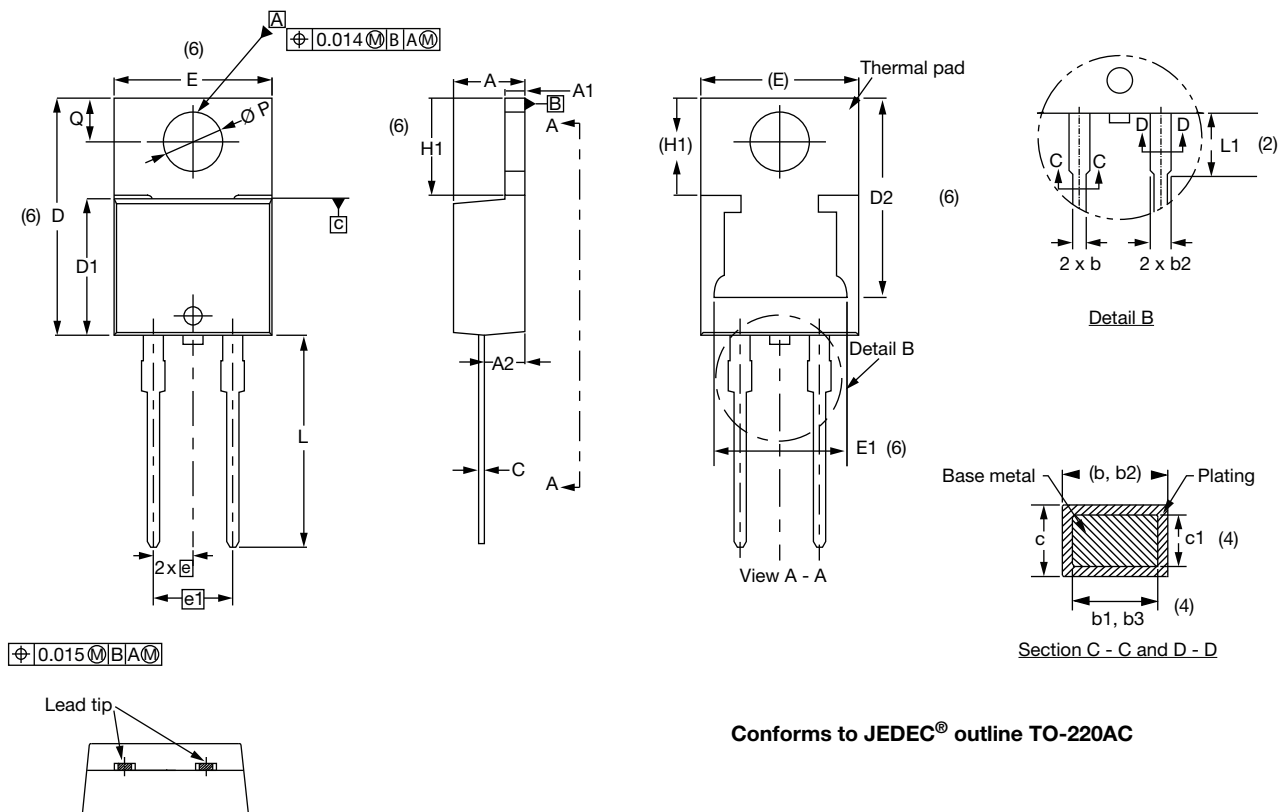
ORDERING INFORMATION (Example)		
PREFERRED P/N	BASE QUANTITY	PACKAGING DESCRIPTION
VS-MBR735-M3	50	Antistatic plastic tubes
VS-MBR745-M3	50	Antistatic plastic tubes

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?96156">www.vishay.com/doc?96156</a>
Part marking information	<a href="http://www.vishay.com/doc?95391">www.vishay.com/doc?95391</a>
SPICE model	<a href="http://www.vishay.com/doc?95298">www.vishay.com/doc?95298</a>



### TO-220AC 2L

**DIMENSIONS** in millimeters and inches



Conforms to JEDEC® outline TO-220AC

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	2.50	2.92	0.098	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	15.35	0.585	0.604	3
D1	8.38	9.02	0.330	0.355	
D2	11.68	13.30	0.460	0.524	6, 7
E	10.11	10.51	0.398	0.414	3, 6
E1	6.86	8.89	0.270	0.350	6
e	2.41	2.67	0.095	0.105	
e1	4.88	5.28	0.192	0.208	
H1	6.09	6.48	0.240	0.255	6
L	13.52	14.02	0.532	0.552	
L1	3.32	3.82	0.131	0.150	2
Ø P	3.54	3.91	0.139	0.154	
Q	2.60	3.00	0.102	0.118	

#### 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) Outline conforms to JEDEC® TO-220, except D2



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