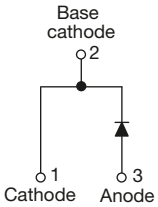
High Performance Schottky Rectifier, 16 A

TO-220AC 2L



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
- Designed and qualified according to JEDEC®-JESD 47
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT
HALOGEN FREE

DESCRIPTION

The VS-MBR16... 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	
$I_{F(AV)}$	16 A
V_R	35 V, 45 V
V_F at I_F	0.57 V
I_{RM} max.	40 mA at 125 °C
T_J max.	150 °C
E_{AS}	24 mJ
Package	2L TO-220AC
Circuit configuration	Single

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	16	A
V_{RRM}		35, 45	V
I_{FSM}	t_p = 5 µs sine	1800	A
V_F	16 A_{pk}, T_J = 125 °C	0.57	V
T_J	Range	-65 to +150	°C

VOLTAGE RATINGS				
PARAMETER	SYMBOL	VS-MBR1635-M3	VS-MBR1645-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 = 134 °C, rated V_R		16	A
Non-repetitive peak surge current	I_{FSM}	5 µs sine or 3 µs rect. pulse	Following any rated load condition and with rated V_{RRM} applied	1800	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} = 3.6 A, L = 3.7 mH		24	mJ
Repetitive avalanche current	I_{AR}	Current decaying linearly to zero in 1 µs Frequency limited by T_J maximum V_A = 1.5 x V_R typical		3.6	A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	V_{FM} (1)	16 A	T_J = 25 °C	0.63	V
			T_J = 125 °C	0.57	
Maximum instantaneous reverse current	I_{RM} (1)	T_J = 25 °C	Rated DC voltage	0.2	mA
		T_J = 125 °C		40	
Maximum junction capacitance	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz) 25 °C		1400	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 µs, duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction temperature range	T_J		-65 to +150	°C
Maximum storage temperature range	T_{Stg}		-65 to +175	
Maximum thermal resistance, junction to case	R_{thJC}	DC operation	1.50	°C/W
Typical thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth and greased	0.50	
Approximate weight			2	g
			0.07	oz.
Mounting torque — minimum			6 (5)	kgf · cm (lbf · in)
Mounting torque — maximum			12 (10)	
Marking device		Case style 2L TO-220AC (JEDEC)	MBR1635	
			MBR1645	

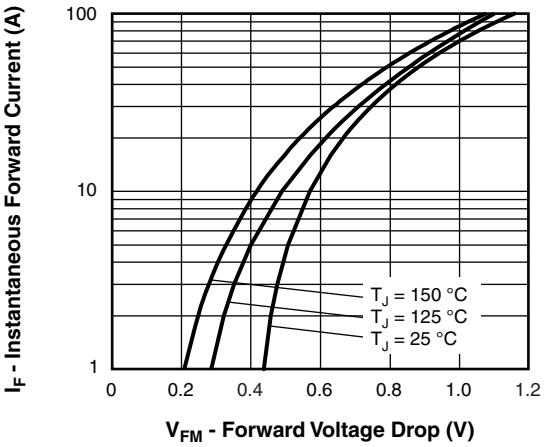


Fig. 1 - Maximum Forward Voltage Drop Characteristics

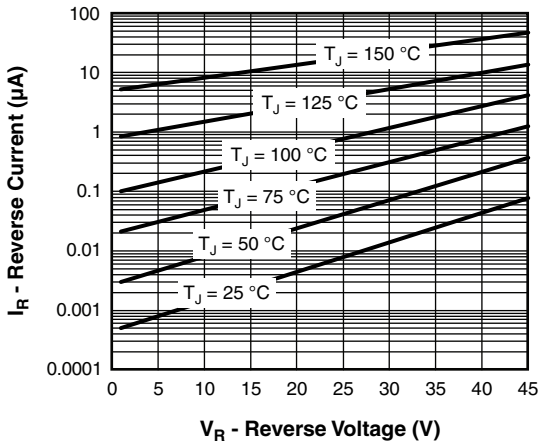


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

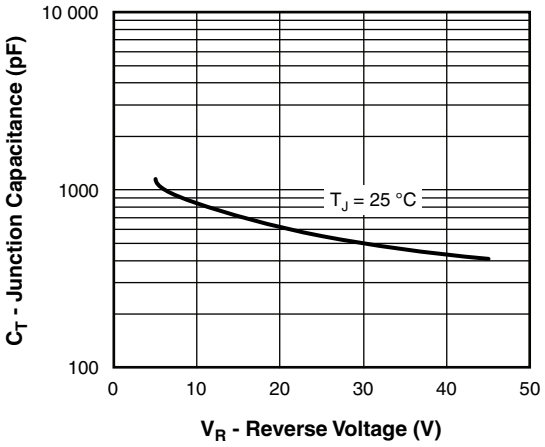


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

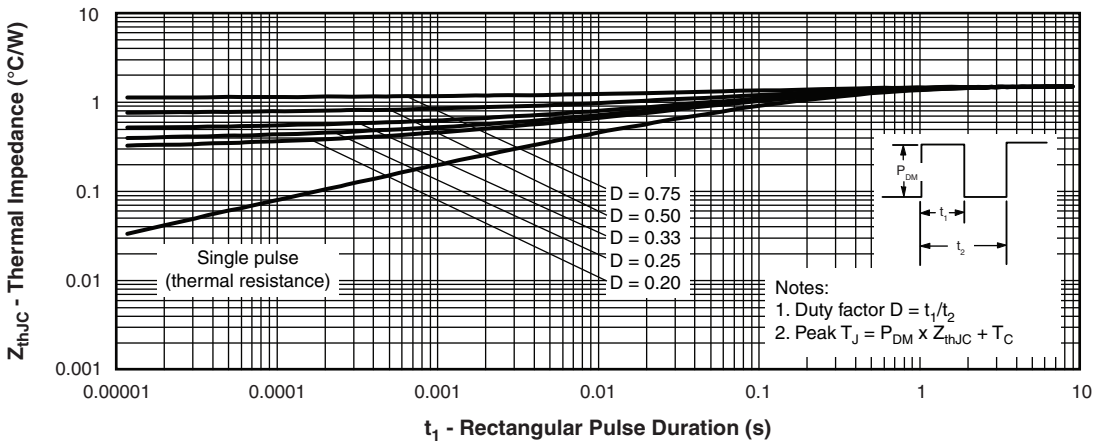


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

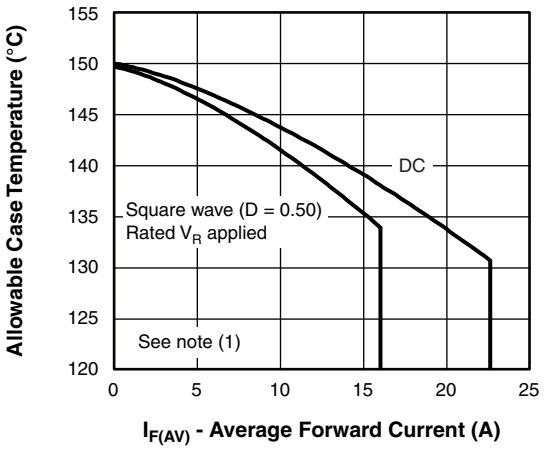


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

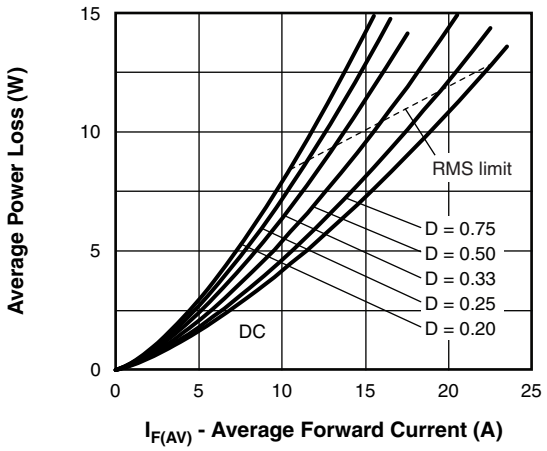


Fig. 6 - Forward Power Loss Characteristics

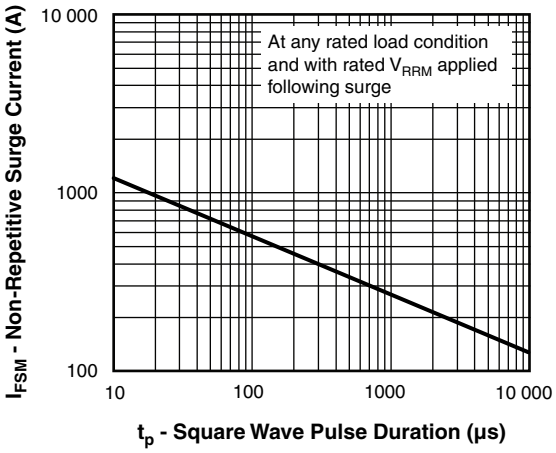


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

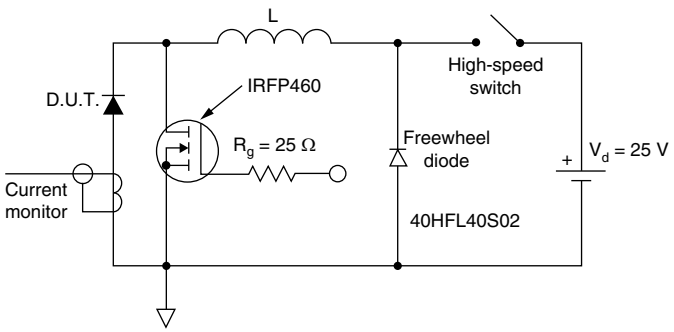


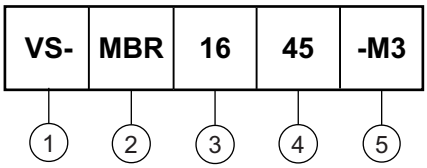
Fig. 8 - Unclamped Inductive Test Circuit

Note

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = forward power loss = $I_{F(AV)} \times V_{FM}$ at ($I_{F(AV)}$/D) (see fig. 6);
Pd_{REV} = inverse power loss = $V_{R1} \times I_R$ (1 - D); I_R at V_{R1} = rated V_R applied

ORDERING INFORMATION TABLE

Device code



1 - Vishay Semiconductors product
2 - Schottky MBR series
3 - Current rating (16 = 16 A)
4 - Voltage ratings (35 = 35 V, 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-MBR1635-M3	50	Antistatic plastic tubes
VS-MBR1645-M3	50	Antistatic plastic tubes

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?96156
Part marking information	www.vishay.com/doc?95391

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