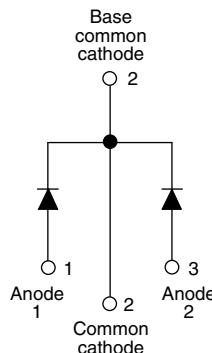


Schottky Rectifier, 2 x 20 A



TO-247AC



PRODUCT SUMMARY

Package	TO-247AC
$I_{F(AV)}$	2 x 20 A
V_R	60 V
V_F at I_F	0.62 V
I_{RM} max.	100 mA at 125 °C
T_J max.	150 °C
Diode variation	Common cathode
E_{AS}	13 mJ

FEATURES

- 150 °C T_J operation
- Very 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)



RoHS
COMPLIANT
HALOGEN
FREE
Available

DESCRIPTION

The VS-MBR4060WT... center tap Schottky rectifier has been optimized for very low forward voltage drop, with moderate leakage. 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	40	A
V_{RRM}		60	V
I_{FSM}	$t_p = 5 \mu s$ sine	1020	A
V_F	20 Apk, $T_J = 125$ °C (per leg)	0.62	V
T_J	Range	- 55 to 150	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-MBR4060WTPbF	VS-MBR4060WT-N3	UNITS
Maximum DC reverse voltage	V_R	60	60	V
Maximum working peak reverse voltage	V_{RWM}			

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current per leg	$I_{F(AV)}$	$T_J = 108$ °C, 50 % duty cycle, rectangular waveform	20	A
per device			40	
Maximum peak one cycle non-repetitive surge current per leg	I_{FSM}	5 μs sine or 3 μs rect. pulse	1020	
		10 ms sine or 6 ms rect. pulse	265	
Non-repetitive avalanche energy per leg	E_{AS}	$T_J = 25$ °C, $I_{AS} = 1.5$ A, $L = 11.5$ mH	13	mJ
Repetitive avalanche current per leg	I_{AR}	Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical	1.5	A

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum forward voltage drop	V _{FM} ⁽¹⁾	20 A	T _J = 25 °C	0.72	V	
			T _J = 125 °C	0.62		
Maximum instantaneous reverse current	I _{RM}	T _J = 25 °C	Rated DC voltage	1.0	mA	
		T _J = 125 °C		100		
Maximum junction capacitance	C _T	V _R = 5 V _{DC} , (test signal range 100 kHz to 1 MHz) 25 °C		720	pF	
Typical series inductance	L _S	Measured from top of terminal to mounting plane		7.5	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 and storage temperature range	T _J , T _{Stg}			- 55 to 150	°C
Maximum thermal resistance, junction to case per package	R _{thJC}	DC operation		2.20	°C/W
Typical thermal resistance, case to heatsink	R _{thCS}	Mounting surface, smooth and greased		1.10	
Maximum thermal resistance, junction to ambient	R _{thJA}	DC operation		50	
Approximate weight				6	g
				0.21	oz.
Mounting torque	minimum			6 (5)	kgf · cm (lbf · in)
	maximum			12 (10)	
Marking device		Case style TO-247AC		MBR4060WT	

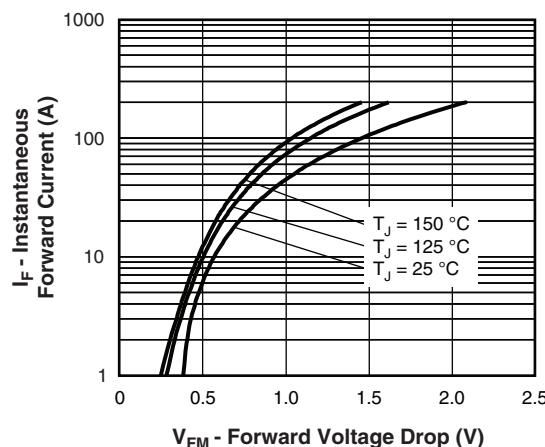


Fig. 1 - Maximum Forward Voltage Drop Characteristics

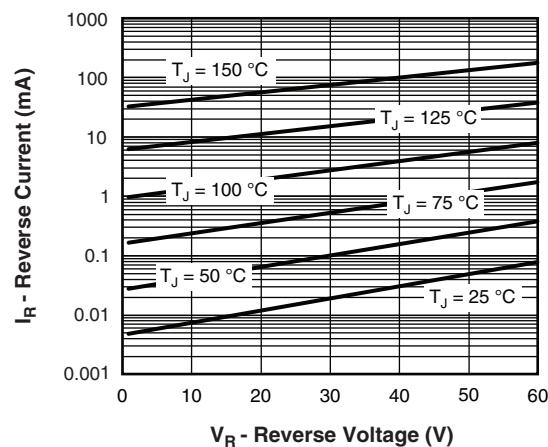


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

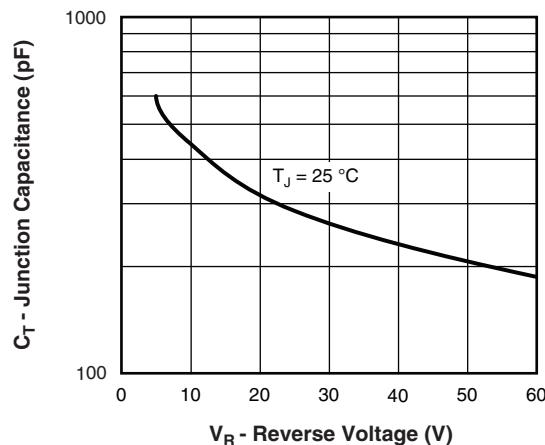


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

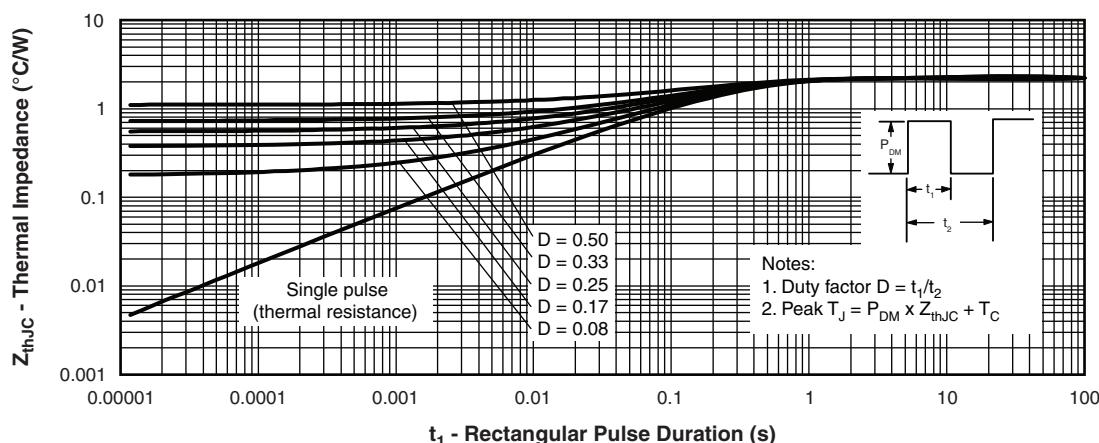


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

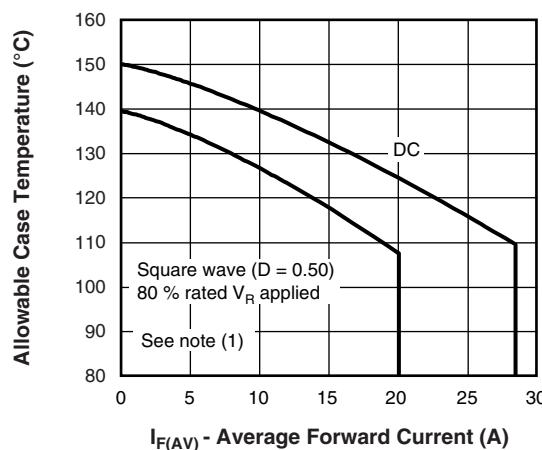


Fig. 5 - Maximum Allowable Case Temperature vs.
Average Forward Current

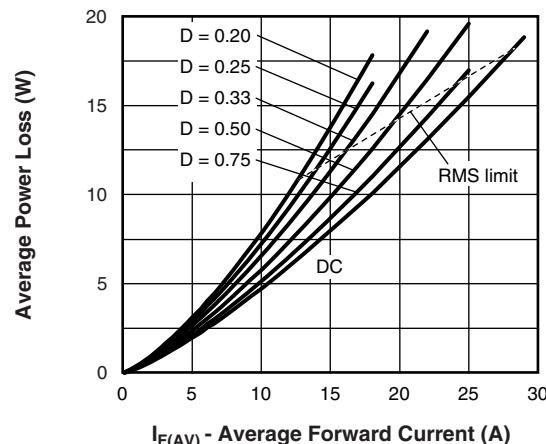


Fig. 6 - Forward Power Loss Characteristics

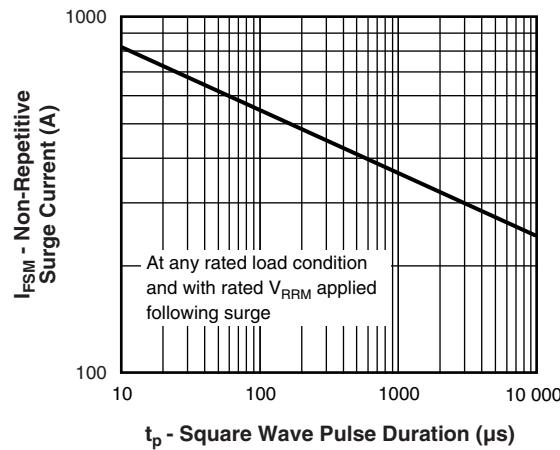


Fig. 7 - Maximum Non-Repetitive Surge Current

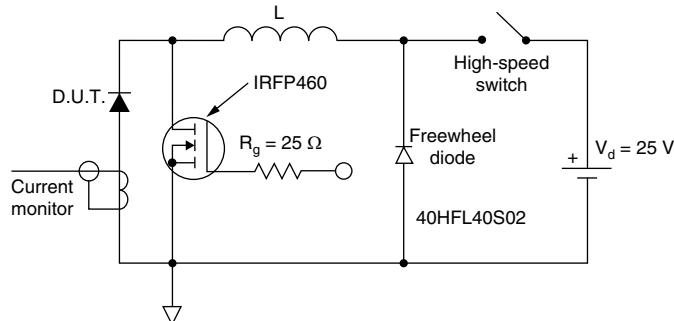
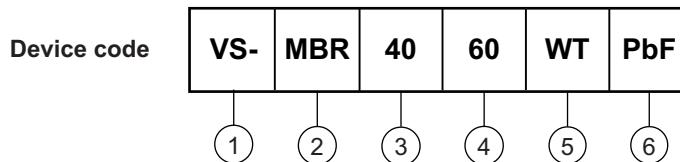


Fig. 8 - Unclamped Inductive Test Circuit

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 $V_{R1} = 80\%$ rated V_R

ORDERING INFORMATION TABLE


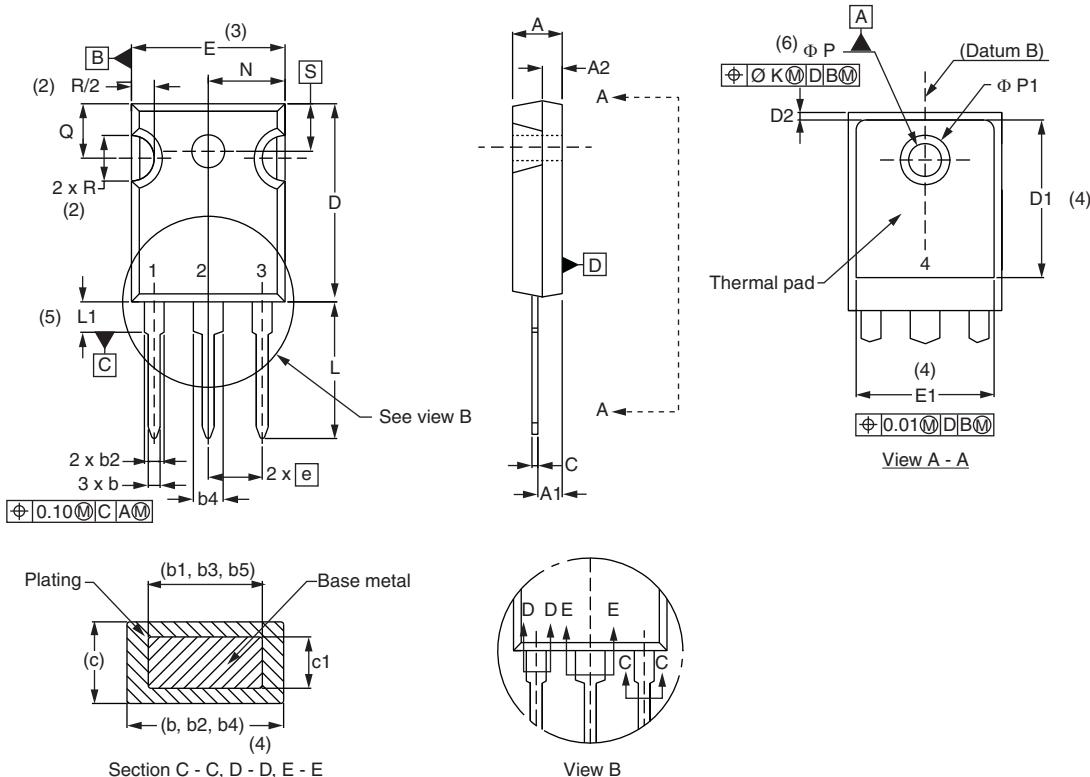
- 1** - Vishay Semiconductors product
- 2** - Schottky MBR series
- 3** - Current rating (40 = 40 A)
- 4** - Voltage rating (60 = 60 V)
- 5** - Circuit configuration:
Center tap (dual) TO-247
- 6** - Environmental digit
 - PbF = Lead (Pb)-free and RoHS compliant
 - -N3 = Halogen-free, RoHS compliant, and totally lead (Pb)-free

ORDERING INFORMATION (Example)			
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-MBR4060WTPbF	25	500	Antistatic plastic tube
VS-MBR4060WT-N3	25	500	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS		
Dimensions		www.vishay.com/doc?95223
Part marking information	TO-247AC PbF	www.vishay.com/doc?95226
	TO-247AC -N3	www.vishay.com/doc?95007

TO-247

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES	View A-A	SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.				MIN.	MAX.	MIN.	MAX.	
A	4.65	5.31	0.183	0.209			D2	0.51	1.30	0.020	0.051	
A1	2.21	2.59	0.087	0.102			E	15.29	15.87	0.602	0.625	3
A2	1.50	2.49	0.059	0.098			E1	13.72	-	0.540	-	
b	0.99	1.40	0.039	0.055			e	5.46 BSC		0.215 BSC		
b1	0.99	1.35	0.039	0.053			Ø K	2.54		0.010		
b2	1.65	2.39	0.065	0.094			L	14.20	16.10	0.559	0.634	
b3	1.65	2.34	0.065	0.092			L1	3.71	4.29	0.146	0.169	
b4	2.59	3.43	0.102	0.135			N	7.62 BSC		0.3		
b5	2.59	3.38	0.102	0.133			Ø P	3.56	3.66	0.14	0.144	
c	0.38	0.89	0.015	0.035			Ø P1	-	6.98	-	0.275	
c1	0.38	0.84	0.015	0.033			Q	5.31	5.69	0.209	0.224	
D	19.71	20.70	0.776	0.815	3		R	4.52	5.49	0.178	0.216	
D1	13.08	-	0.515	-	4		S	5.51 BSC		0.217 BSC		

Notes

- (1) Dimensioning and tolerancing per ASME Y14.5M-1994
- (2) Contour of slot optional
- (3) 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 outermost extremes of the plastic body
- (4) Thermal pad contour optional with dimensions D1 and E1
- (5) Lead finish uncontrolled in L1
- (6) Ø P to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154")
- (7) Outline conforms to JEDEC® outline TO-247 with exception of dimension c

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