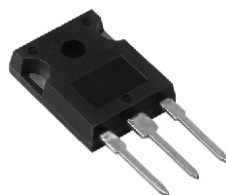
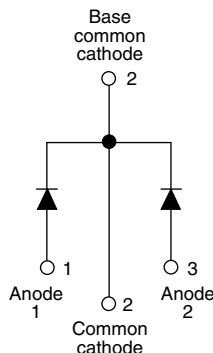


Schottky Rectifier, 2 x 20 A


TO-247AC


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)



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

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 µs 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 per device	I _{F(AV)}	T _C = 108 °C, 50 % duty cycle, rectangular waveform	20	A
			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 x V _R typical	1.5	A



ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	$V_{FM}^{(1)}$	20 A	$T_J = 25\text{ }^{\circ}\text{C}$	0.72	V
			$T_J = 125\text{ }^{\circ}\text{C}$	0.62	
Maximum instantaneous reverse current	I_{RM}	$T_J = 25\text{ }^{\circ}\text{C}$	Rated DC voltage	1.0	mA
		$T_J = 125\text{ }^{\circ}\text{C}$		100	
Maximum junction capacitance	C_T	$V_R = 5\text{ }V_{DC}$, (test signal range 100 kHz to 1 MHz) $25\text{ }^{\circ}\text{C}$		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/ μ s

Note(1) Pulse width < 300 μ s, 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	

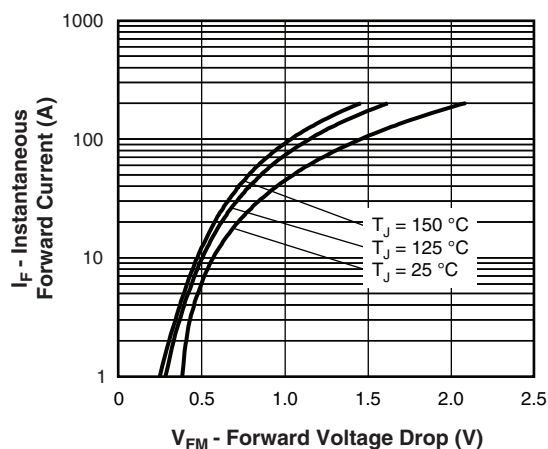


Fig. 1 - Maximum Forward Voltage Drop Characteristics

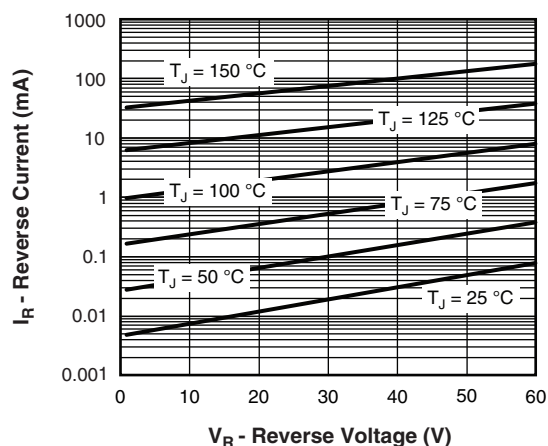


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

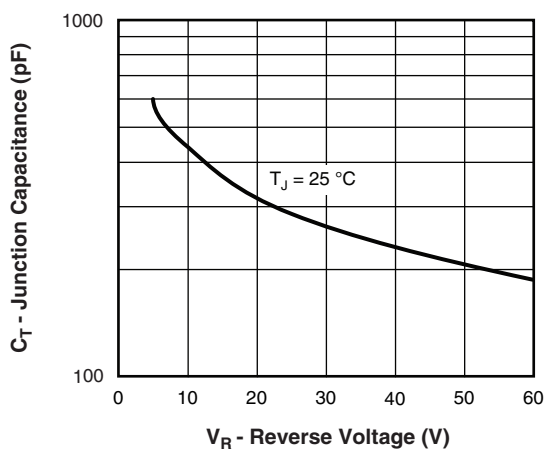
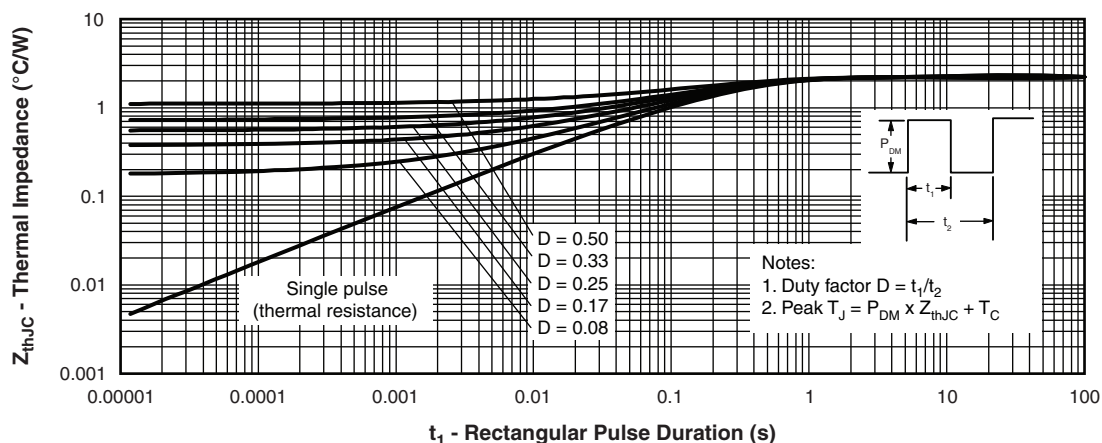


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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

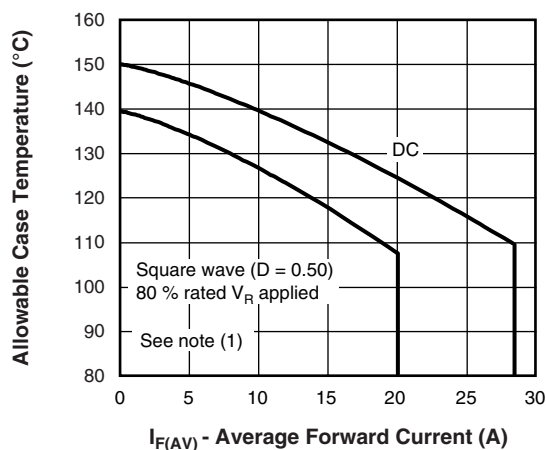


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

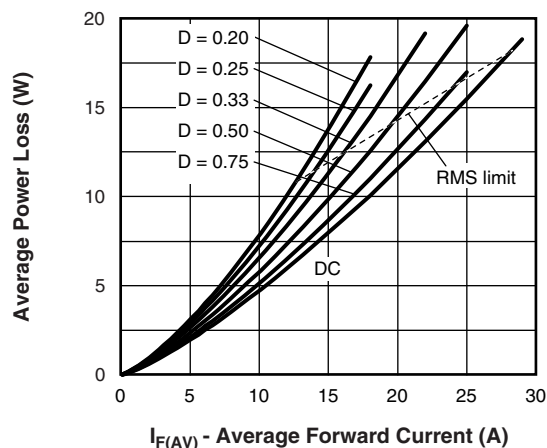


Fig. 6 - Forward Power Loss Characteristics

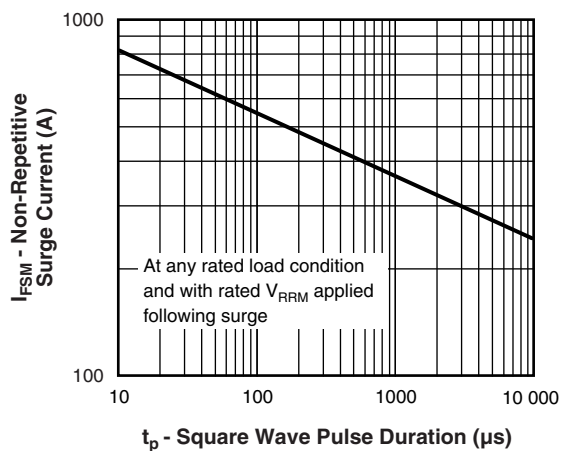


Fig. 7 - Maximum Non-Repetitive Surge Current

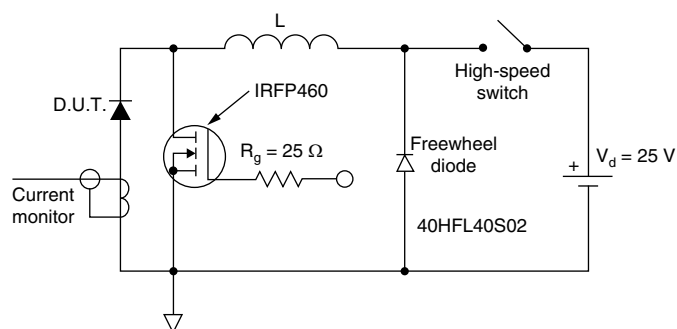


Fig. 8 - Unclamped Inductive Test Circuit

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$;
 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 $V_{R1} = 80\%$ rated V_R

**ORDERING INFORMATION TABLE**

Device code	VS-	MBR	40	60	WT	PbF
	①	②	③	④	⑤	⑥

- | | | |
|----------|---|--|
| 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 <ul style="list-style-type: none">• PbF = Lead (Pb)-free and RoHS compliant• -N3 = Halogen-free, RoHS compliant, and totally lead (Pb)-free |

ORDERING INFORMATION (Example)

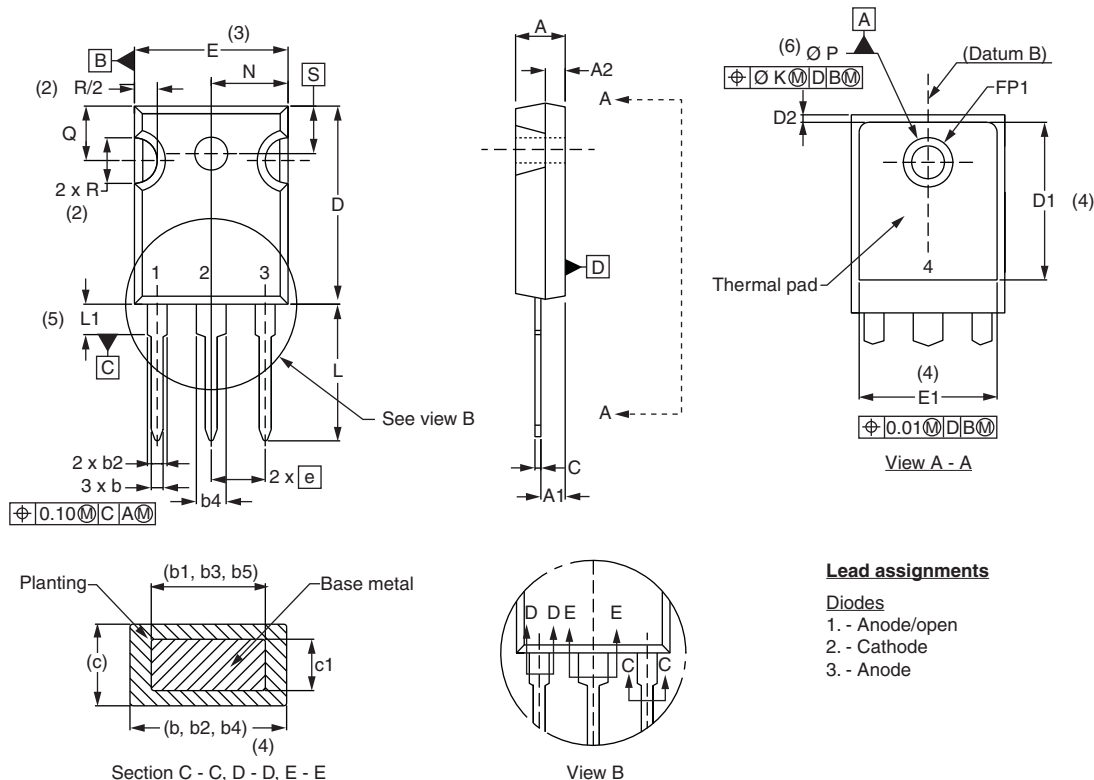
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-MBR4060WTPbF	25	500	Antistatic plastic tube
VS-MBR4060WT-N3	25	500	Antistatic plastic tube

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



DIMENSIONS in millimeters and inches



Lead assignments

Diodes

1. - Anode/open
2. - Cathode
3. - Anode

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.65	5.31	0.183	0.209	
A1	2.21	2.59	0.087	0.102	
A2	1.50	2.49	0.059	0.098	
b	0.99	1.40	0.039	0.055	
b1	0.99	1.35	0.039	0.053	
b2	1.65	2.39	0.065	0.094	
b3	1.65	2.37	0.065	0.094	
b4	2.59	3.43	0.102	0.135	
b5	2.59	3.38	0.102	0.133	
c	0.38	0.86	0.015	0.034	
c1	0.38	0.76	0.015	0.030	
D	19.71	20.70	0.776	0.815	3
D1	13.08	-	0.515	-	4

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
D2	0.51	1.30	0.020	0.051	
E	15.29	15.87	0.602	0.625	3
E1	13.72	-	0.540	-	
e	5.46 BSC		0.215 BSC		
FK	2.54		0.010		
L	14.20	16.10	0.559	0.634	
L1	3.71	4.29	0.146	0.169	
N	7.62 BSC		0.3		
ΦP	3.56	3.66	0.14	0.144	
$\Phi P1$	-	6.98	-	0.275	
Q	5.31	5.69	0.209	0.224	
R	4.52	5.49	1.78	0.216	
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) ΦP 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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