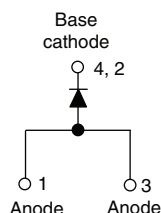




High Performance Schottky Rectifier, 3.0 A



DPAK (TO-252AA)



FEATURES

- Low forward voltage drop
- Guard ring for enhanced ruggedness and long term reliability
- Popular DPAK outline
- Small foot print, surface mountable
- High frequency operation
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

DESCRIPTION

The VS-MBRD320-M3, VS-MBRD330-M3, VS-MBRD340-M3 surface mount Schottky rectifier has been designed for applications requiring low forward drop and small foot prints on PC boards. Typical applications are in disk drives, switching power supplies, converters, freewheeling diodes, battery charging, and reverse battery protection.

PRIMARY CHARACTERISTICS

$I_{F(AV)}$	3.0 A
V_R	20 V, 30 V, 40 V
V_F at I_F	0.49 V
I_{RM}	20 mA at 125 °C
T_J max.	150 °C
E_{AS}	8 mJ
Package	DPAK (TO-252AA)
Circuit configuration	Single

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	3.0	A
V_{RRM}		20 to 40	V
I_{FSM}	$t_p = 5 \mu s$ sine	490	A
V_F	3 A _{pk} , $T_J = 125$ °C	0.49	V
T_J		-40 to +150	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-MBRD320-M3	VS-MBRD330-M3	VS-MBRD340-M3	UNITS
Maximum DC reverse voltage	V_R	20	30	40	V
Maximum working peak reverse voltage	V_{RWM}				

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	50 % duty cycle at $T_L = 133$ °C, rectangular waveform	3.0	A
Maximum peak one cycle non-repetitive surge current	I_{FSM}	5 μs sine or 3 μs rect. pulse	490	
		10 ms sine or 6 ms rect. pulse	75	
Non-repetitive avalanche energy	E_{AS}	$T_J = 25$ °C, $I_{AS} = 1$ A, $L = 16$ mH	8.0	mJ
Repetitive avalanche current	I_{AR}	Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical	1.0	A



ELECTRICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS		TYP.	MAX.	UNITS
Maximum forward voltage drop See fig. 1	$V_{FM}^{(1)}$	3 A	$T_J = 25\text{ }^{\circ}\text{C}$	0.48	0.6	V
		6 A		0.58	0.7	
		3 A	$T_J = 125\text{ }^{\circ}\text{C}$	0.41	0.49	
		6 A		0.55	0.625	
Maximum reverse leakage current See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^{\circ}\text{C}$	$V_R = \text{Rated } V_R$	0.02	0.2	mA
		$T_J = 125\text{ }^{\circ}\text{C}$		10.7	20	
Typical junction capacitance	C_T	$V_R = 5\text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz), $25\text{ }^{\circ}\text{C}$		189	-	pF
Typical series inductance	L_S	Measured lead to lead 5 mm from package body		5.0	-	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 temperature range	$T_J^{(1)}$		-40 to +150	$^{\circ}\text{C}$
Maximum storage temperature range	T_{Stg}		-40 to +175	
Maximum thermal resistance, junction to case	R_{thJC}	DC operation See fig. 4	6.0	$^{\circ}\text{C/W}$
Maximum thermal resistance, junction to ambient	R_{thJA}		80	
Approximate weight			0.3	g
			0.01	oz.
Marking device		Case style DPAK (TO-252AA)	MBRD320	
			MBRD330	
			MBRD340	

Note

⁽¹⁾ $\frac{dP_{tot}}{dT_J} < \frac{1}{R_{thJA}}$ thermal runaway condition for a diode on its own heatsink

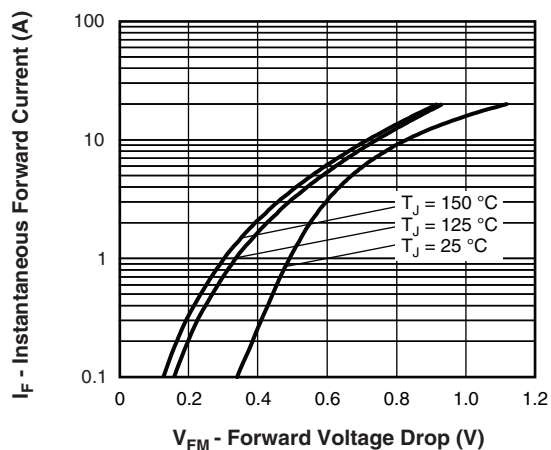


Fig. 1 - Maximum Forward Voltage Drop Characteristics

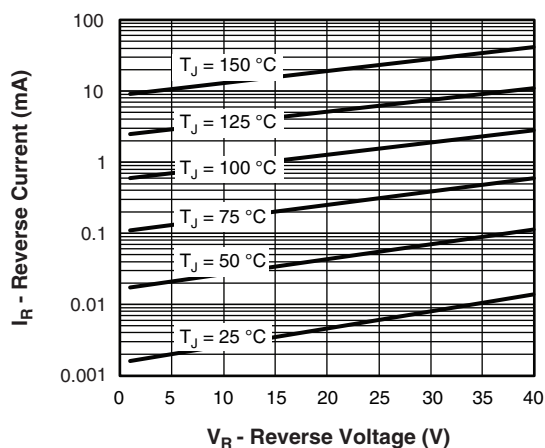


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

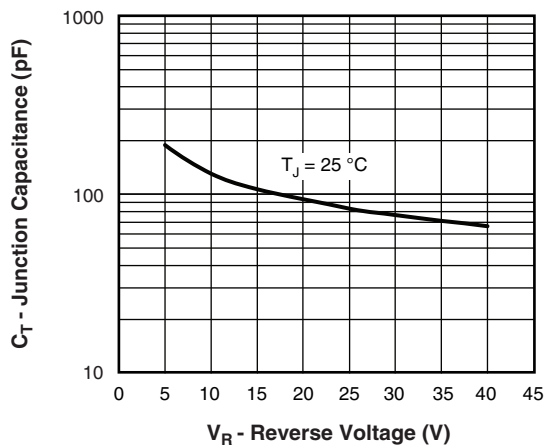
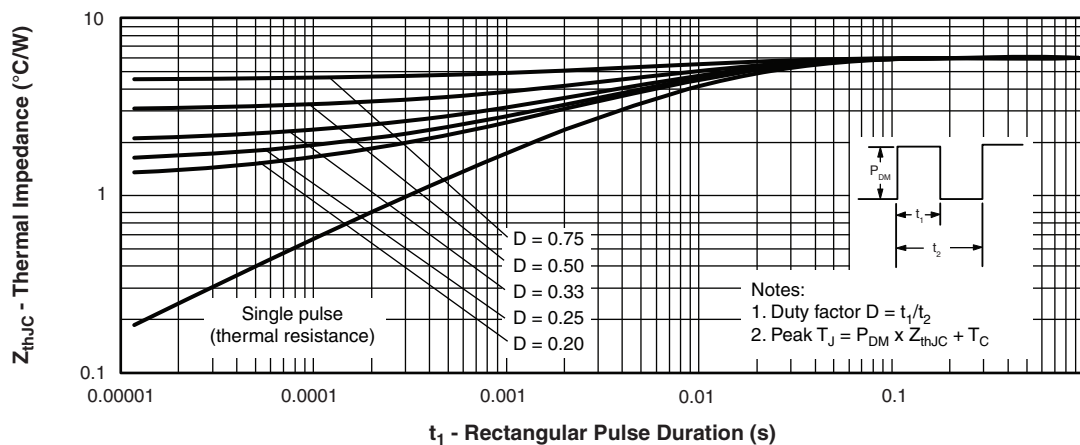


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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

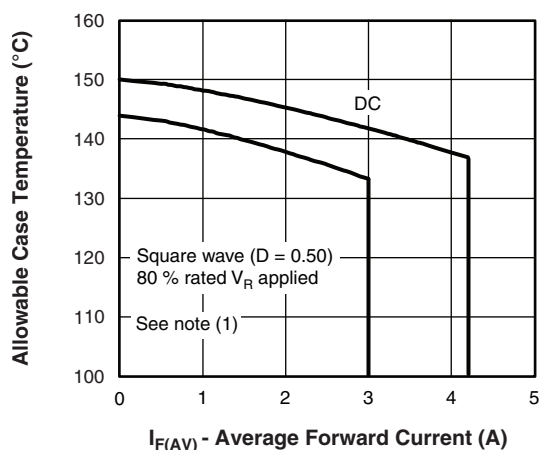


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

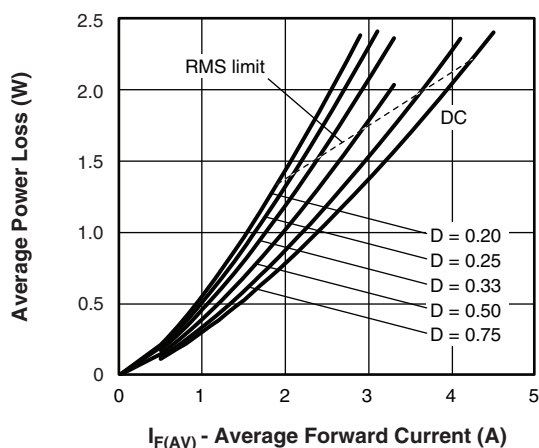


Fig. 6 - Forward Power Loss Characteristics

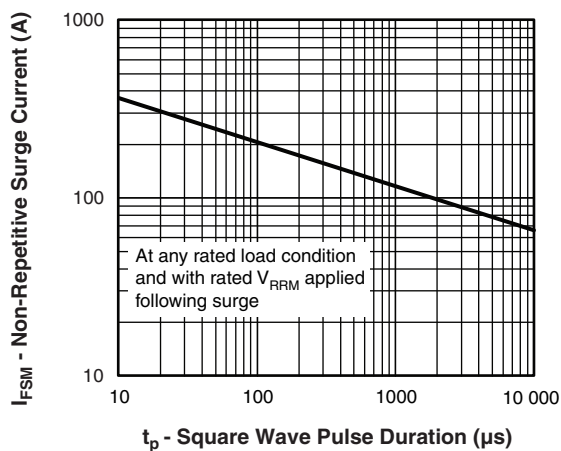


Fig. 7 - Maximum Non-Repetitive Surge Current

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$;
 P_d = forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
 $P_{d_{REV}}$ = 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	D	3	40	TR	-M3
	1	2	3	4	5	6	7
1	Vishay Semiconductors product						
2	Schottky MBR series						
3	D = TO-252AA (DPAK)						
4	Current rating (3 = 3 A)						
5	Voltage ratings						
6	<ul style="list-style-type: none">None = tubeTR = tape and reelTRL = tape and reel (left oriented)TRR = tape and reel (right oriented)						
7	Environmental digit:						
	-M3 = halogen-free, RoHS-compliant and terminations lead (Pb)-free						

ORDERING INFORMATION (Example)			
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-MBRD320-M3	75	3000	Antistatic plastic tube
VS-MBRD320TR-M3	2000	2000	13" diameter reel
VS-MBRD320TRL-M3	3000	3000	13" diameter reel
VS-MBRD320TRR-M3	3000	3000	13" diameter reel
VS-MBRD330-M3	75	3000	Antistatic plastic tube
VS-MBRD330TR-M3	2000	2000	13" diameter reel
VS-MBRD330TRL-M3	3000	3000	13" diameter reel
VS-MBRD330TRR-M3	3000	3000	13" diameter reel
VS-MBRD340-M3	75	3000	Antistatic plastic tube
VS-MBRD340TR-M3	2000	2000	13" diameter reel
VS-MBRD340TRL-M3	3000	3000	13" diameter reel
VS-MBRD340TRR-M3	3000	3000	13" diameter reel

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95627
Part marking information	www.vishay.com/doc?95176
Packaging information	www.vishay.com/doc?95033

D-PAK (TO-252AA) "M"

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	2.18	2.39	0.086	0.094	
A1	-	0.13	-	0.005	
b	0.64	0.89	0.025	0.035	
b2	0.76	1.14	0.030	0.045	
b3	4.95	5.46	0.195	0.215	3
c	0.46	0.61	0.018	0.024	
c2	0.46	0.89	0.018	0.035	
D	5.97	6.22	0.235	0.245	5
D1	5.21	-	0.205	-	3
E	6.35	6.73	0.250	0.265	5
E1	4.32	-	0.170	-	3

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
e	2.29 BSC		0.090 BSC		
H	9.40	10.41	0.370	0.410	
L	1.40	1.78	0.055	0.070	
L1	2.74 BSC		0.108 REF.		
L2	0.51 BSC		0.020 BSC		
L3	0.89	1.27	0.035	0.050	3
L4	-	1.02	-	0.040	
L5	1.14	1.52	0.045	0.060	2
Ø	0°	10°	0°	10°	
Ø1	0°	15°	0°	15°	
Ø2	25°	35°	25°	35°	

Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Lead dimension uncontrolled in L5
- (3) Dimension D1, E1, L3 and b3 establish a minimum mounting surface for thermal pad
- (4) Section C - C dimension apply to the flat section of the lead between 0.13 and 0.25 mm (0.005 and 0.010") from the lead tip
- (5) 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
- (6) Dimension b1 and c1 applied to base metal only
- (7) Datum A and B to be determined at datum plane H
- (8) Outline conforms to JEDEC® outline TO-252AA



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