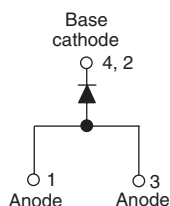


Schottky Rectifier, 3.0 A


D-PAK


FEATURES

- Popular D-PAK outline
- Small foot print, surface mountable
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Lead (Pb)-free ("PbF" suffix)
- Designed and qualified for AEC Q101 level


RoHS*
COMPLIANT

PRODUCT SUMMARY

$I_{F(AV)}$	3.0 A
V_R	20 to 40 V

DESCRIPTION

The MBRD320PbF, MBRD330PbF, MBRD340PbF 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.

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 Apk, $T_J = 125^\circ C$	0.49	V
T_J		- 40 to 150	$^\circ C$

VOLTAGE RATINGS

PARAMETER	SYMBOL	MBRD320PbF	MBRD330PbF	MBRD340PbF	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 $T_L = 133^\circ C$, 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}	$T_J = 25^\circ C$, $I_{AS} = 1 A$, $L = 16 mH$	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

* Pb containing terminations are not RoHS compliant, exemptions may apply

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 D-PAK (similar to 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

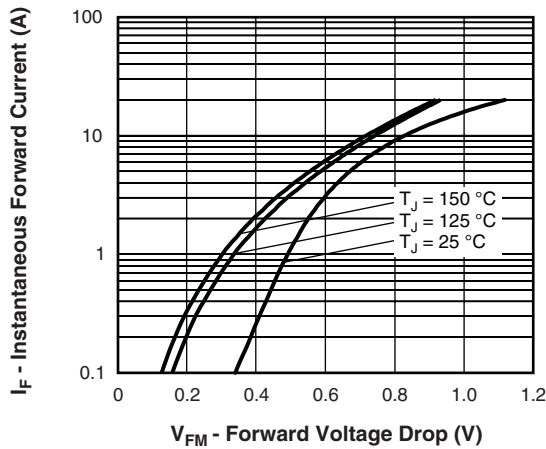


Fig. 1 - Maximum Forward Voltage Drop Characteristics

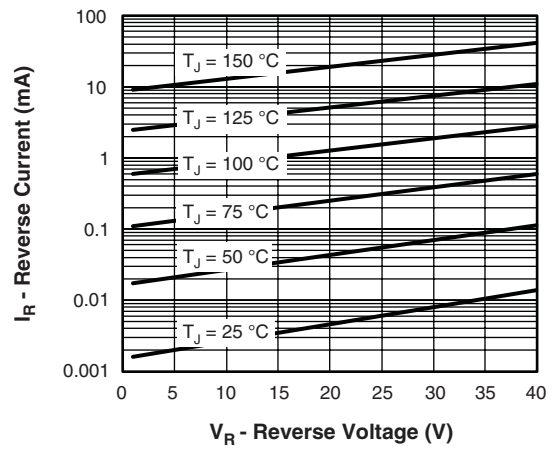


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

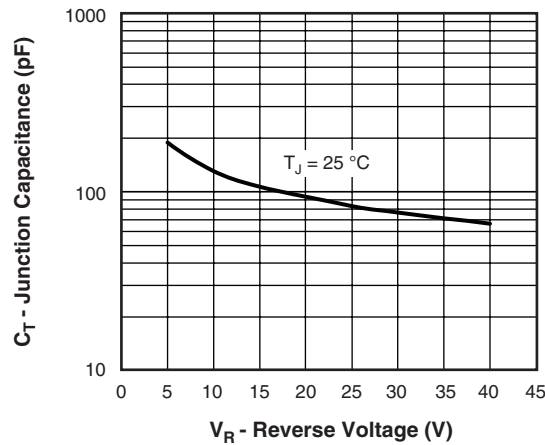


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

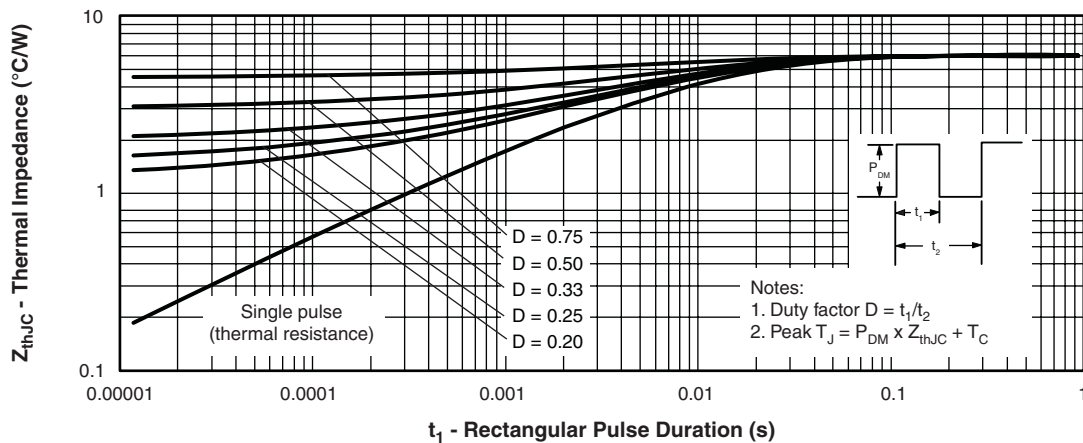


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

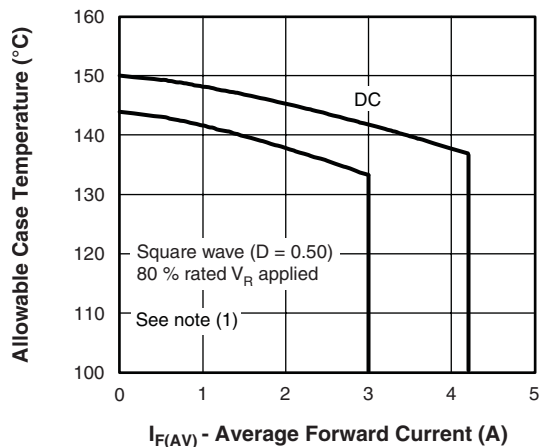


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

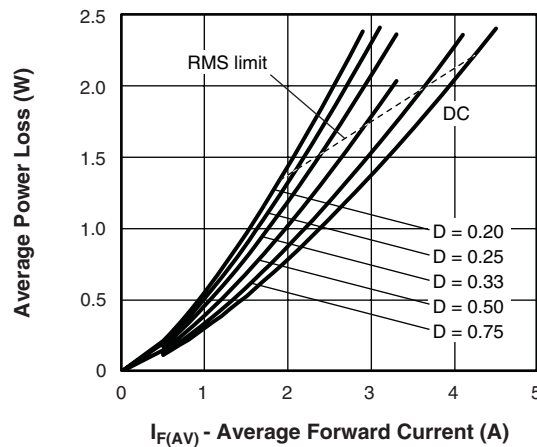


Fig. 6 - Forward Power Loss Characteristics

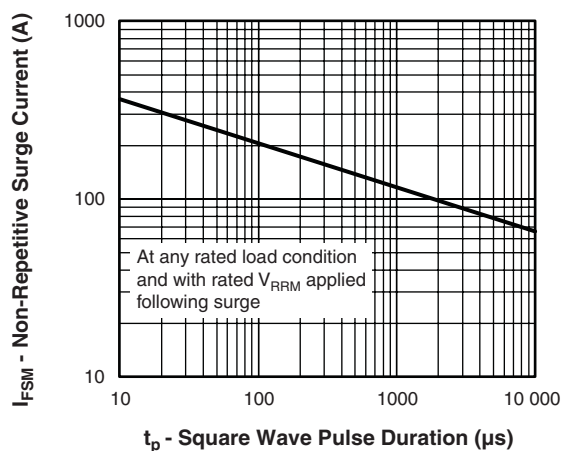


Fig. 7 - Maximum Non-Repetitive Surge Current

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	MBR	D	3	40	TR	PbF
	1	2	3	4	5	6
1	-	Schottky MBR series				
2	-	D = TO-252AA (D-PAK)				
3	-	Current rating (3 = 3 A)				
4	-	Voltage ratings				20 = 20 V 30 = 30 V 40 = 40 V
5	-	<ul style="list-style-type: none">• None = Tube (50 pieces)• TR = Tape and reel• TRL = Tape and reel (left oriented)• TRR = Tape and reel (right oriented)				
6	-	<ul style="list-style-type: none">• None = Standard production• PbF = Lead (Pb)-free				

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95016
Part marking information	http://www.vishay.com/doc?95059
Packaging information	http://www.vishay.com/doc?95033



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