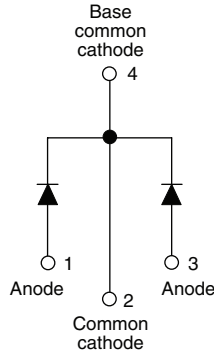


## Schottky Rectifier, 2 x 3 A



D-PAK



### FEATURES

- Popular D-PAK outline
- Center tap configuration
- 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

### DESCRIPTION

The MBRD650CTPbF, MBRD660CTPbF surface mount, center tap, Schottky rectifier series 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.

### PRODUCT SUMMARY

$I_{F(AV)}$	2 x 3 A
$V_R$	50/60 V

### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	6	A
$V_{RRM}$		50/60	V
$I_{FSM}$	$t_p = 5 \mu s$ sine	490	A
$V_F$	3 Apk, $T_J = 125^\circ C$ (per leg)	0.65	V
$T_J$	Range	- 40 to 150	$^\circ C$

### VOLTAGE RATINGS

PARAMETER	SYMBOL	MBRD650CTPbF	MBRD660CTPbF	UNITS
Maximum DC reverse voltage	$V_R$	50	60	V
Maximum working peak reverse voltage	$V_{RWM}$			

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current See fig. 5	$I_{F(AV)}$	50 % duty cycle at $T_C = 128^\circ C$ , rectangular waveform	3.0	A
			6	
Maximum peak one cycle non-repetitive surge current See fig. 7	$I_{FSM}$	5 $\mu s$ sine or 3 $\mu s$ rect. pulse	490	
		10 ms sine or 6 ms rect. pulse	75	
Non-repetitive avalanche energy per leg	$E_{AS}$	$T_J = 25^\circ C$ , $I_{AS} = 1 A$ , $L = 12 mH$	6	mJ
Repetitive avalanche current per leg	$I_{AR}$	Current decaying linearly to zero in 1 $\mu s$ Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical	0.6	A

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

# MBRD650CTPbF/MBRD660CTPbF



Vishay High Power Products Schottky Rectifier, 2 x 3 A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop per leg See fig. 1	$V_{FM}^{(1)}$	3 A	$T_J = 25\text{ }^\circ\text{C}$	0.7	V
		6 A		0.9	
		3 A	$T_J = 125\text{ }^\circ\text{C}$	0.65	
		6 A		0.85	
Maximum reverse leakage current per leg See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	0.1	mA
		$T_J = 125\text{ }^\circ\text{C}$		15	
Typical junction capacitance per leg	$C_T$	$V_R = 5\text{ }V_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$		145	pF
Typical series inductance per leg	$L_S$	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/ $\mu$ s

**Note**

(1) Pulse width < 300  $\mu$ s, duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum junction and storage temperature range	$T_J^{(1)}, T_{Stg}$			- 40 to 150	$^\circ\text{C}$
Maximum thermal resistance, junction to case	$R_{thJC}$	DC operation See fig. 4		6	$^\circ\text{C/W}$
				3	
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)		MBRD650CT	
				MBRD660CT	

**Note**

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



# MBRD650CTPbF/MBRD660CTPbF

Schottky Rectifier, 2 x 3 A Vishay High Power Products

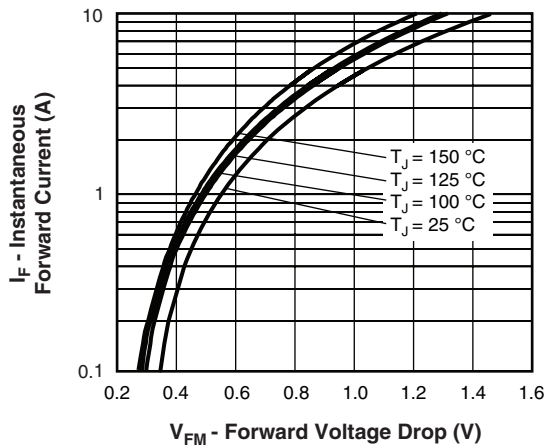


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

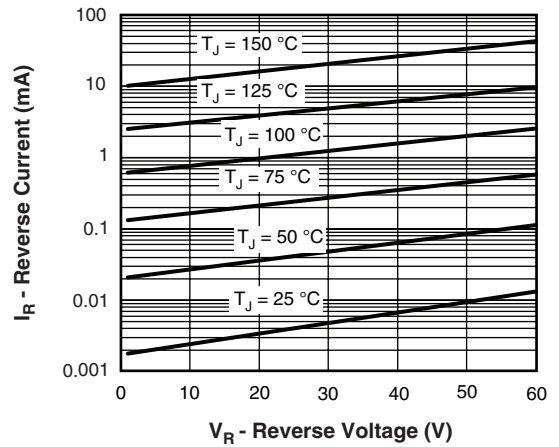


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

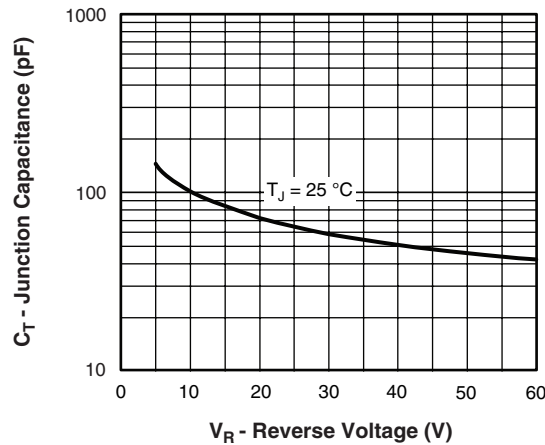


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

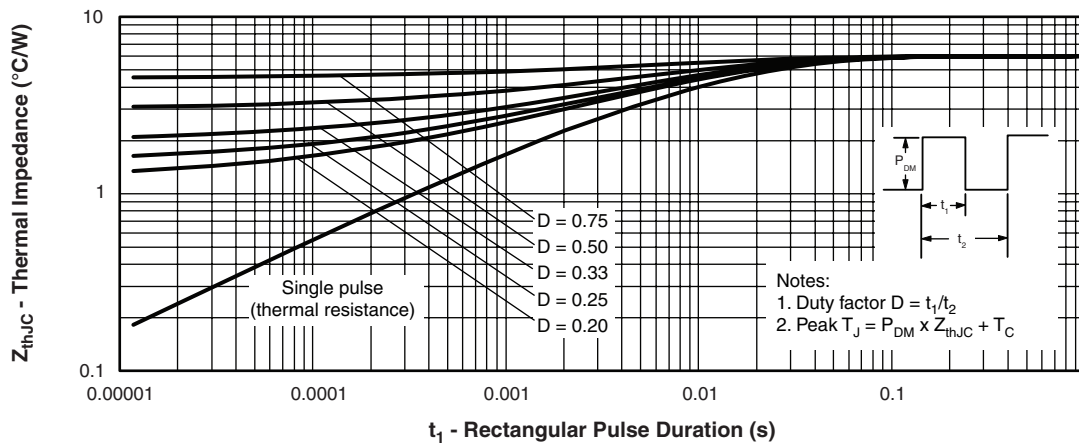


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

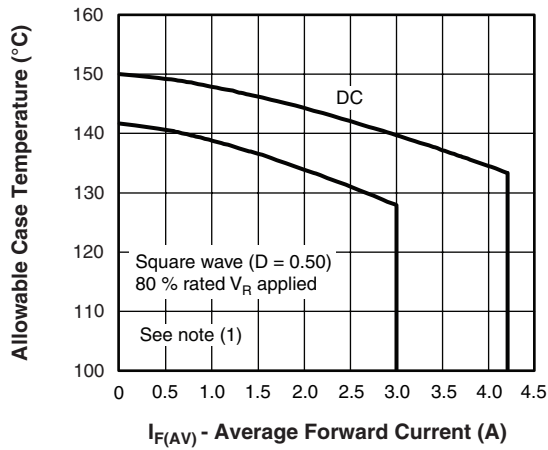


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

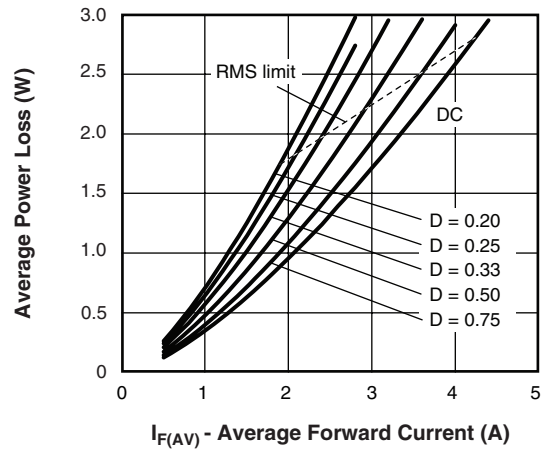


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

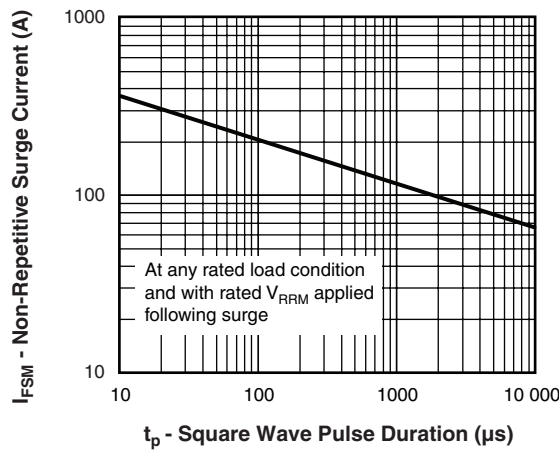


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

**Note**

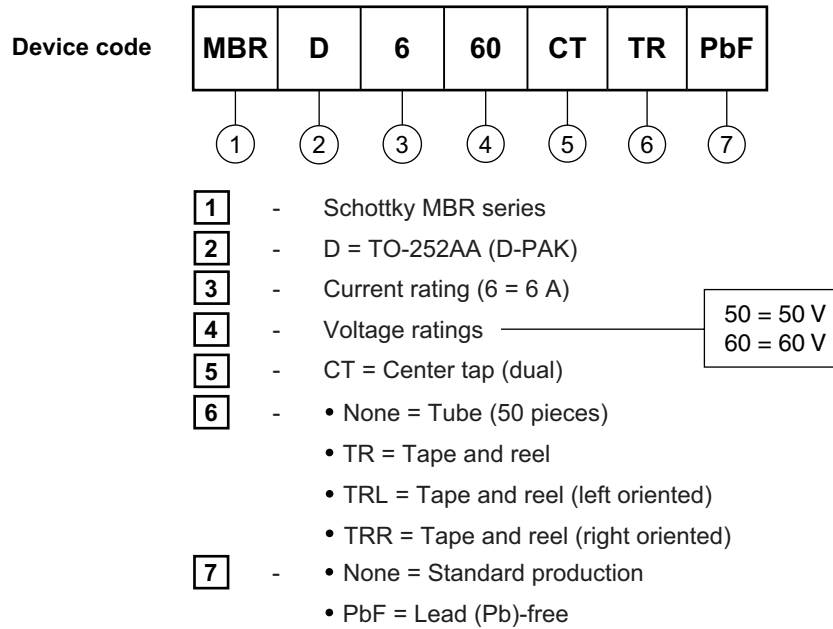
- (1) Formula used:  $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$ ;  
 $P_d$  = Forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 6);  
 $P_{d_{REV}}$  = Inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1} = 80\%$  rated  $V_R$



# MBRD650CTPbF/MBRD660CTPbF

Schottky Rectifier, 2 x 3 A Vishay High Power Products

## ORDERING INFORMATION TABLE



LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95016">http://www.vishay.com/doc?95016</a>
Part marking information	<a href="http://www.vishay.com/doc?95059">http://www.vishay.com/doc?95059</a>
Packaging information	<a href="http://www.vishay.com/doc?95033">http://www.vishay.com/doc?95033</a>



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