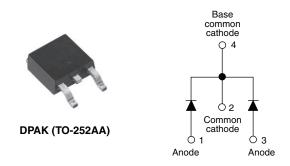


Vishay Semiconductors

# High Performance Schottky Rectifier, 2 x 3 A



PRIMARY CHARACTERISTICS							
I <sub>F(AV)</sub> 2 x 3 A							
V <sub>R</sub>	50 V, 60 V						
V <sub>F</sub> at I <sub>F</sub>	0.65 V						
I <sub>RM</sub> typ.	15 mA at 125 °C						
T <sub>J</sub> max.	150 °C						
E <sub>AS</sub>	6 mJ						
Package	DPAK (TO-252AA)						
Circuit configuration	Common cathode						

### FEATURES

- Low forward voltage drop
- Guard ring for enhanced ruggedness and long RoHS
   term reliability
- Popular DPAK outline
- · Center tap configuration
- 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 <u>www.vishay.com/doc?99912</u>

#### DESCRIPTION

The VS-MBRD650CT-M3, VS-MBRD660CT-M3 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.

MAJOR RATINGS AND CHARACTERISTICS									
SYMBOL	CHARACTERISTICS	VALUES	UNITS						
I <sub>F(AV)</sub>	Rectangular waveform	6	А						
V <sub>RRM</sub>		50/60	V						
I <sub>FSM</sub>	t <sub>p</sub> = 5 μs sine	490	А						
V <sub>F</sub>	3 A <sub>pk</sub> , T <sub>J</sub> = 125 °C (per leg)	0.65	V						
TJ	Range	-40 to +150	°C						

VOLTAGE RATINGS							
PARAMETER	SYMBOL	VS-MBRD650CT-M3	VS-MBRD660CT-M3	UNITS			
Maximum DC reverse voltage	V <sub>R</sub>	50	60	V			
Maximum working peak reverse voltage	V <sub>RWM</sub>	50	00	V			

ABSOLUTE MAXIMUM RATINGS								
PARAMETER		SYMBOL	TEST CONDI	VALUES	UNITS			
Maximum average forwardper legcurrentper deviceSee fig. 5per device			$I_{F(AV)}$ 50 % duty cycle at T <sub>C</sub> = 128 °C, rectangular waveform		3.0	•		
		I <sub>F(AV)</sub>			6			
Maximum peak one cycle non-repetitive surge current See fig. 7		I <sub>FSM</sub>	5 µs sine or 3 µs rect. pulse	Following any rated load	490	A		
			10 ms sine or 6 ms rect. pulse	condition and with rated V <sub>RRM</sub> applied	75			
Non-repetitive avalanche energy per leg		E <sub>AS</sub>	T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 1 A, L = 12 mH		6	mJ		
Repetitive avalanche current per leg		I <sub>AR</sub>	Current decaying linearly to zero in 1 $\mu$ s Frequency limited by T <sub>J</sub> maximum V <sub>A</sub> = 1.5 x V <sub>R</sub> typical		0.6	А		

RoHS

HALOGEN

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 1
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# VS-MBRD650CT-M3, VS-MBRD660CT-M3

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### Vishay Semiconductors

ELECTRICAL SPECIFICATIONS								
PARAMETER	SYMBOL	TEST CO	TEST CONDITIONS					
		3 A	T <sub>.1</sub> = 25 °C	0.7				
Maximum forward voltage drop per leg	V <sub>FM</sub> <sup>(1)</sup>	6 A	1j=25 0	0.9	V			
See fig. 1	VFM (''	3 A	T. = 125 °C	0.65				
		6 A	1j=125 C	0.85				
Maximum reverse leakage current per leg	I <sub>RM</sub> <sup>(1)</sup>	T <sub>J</sub> = 25 °C	$V_{\rm B}$ = Rated $V_{\rm B}$	0.1	mA			
Maximum reverse leakage current per leg		T <sub>J</sub> = 125 °C	V <sub>R</sub> = naleu V <sub>R</sub>	30				
Typical reverse leakage current	I <sub>RM</sub> <sup>(1)</sup>	$T_J = 125 \text{ °C}$ $V_R = \text{Rated } V_R$		15	mA			
Typical junction capacitance per leg	CT	$V_{R} = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz), 25 °C		145	pF			
Typical series inductance per leg	L <sub>S</sub>	Measured lead to lead 5 r	5.0	nH				
Maximum voltage rate of change	dV/dt	Rated V <sub>R</sub>	10 000	V/µs				

Note

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

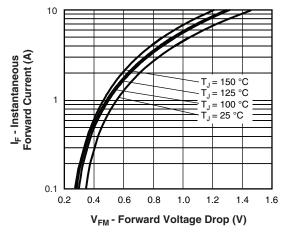
THERMAL - MECHANICAL SPECIFICATIONS								
PARAMETER		SYMBOL	TEST CONDITIONS	VALUES	UNITS			
Maximum junction and storage temperature range		T <sub>J</sub> <sup>(1)</sup> , T <sub>Stg</sub>		-40 to +150	°C			
Maximum thermal resistance, junction to case	per leg		DC operation	6				
	per device	R <sub>thJC</sub>	See fig. 4	3	°C/W			
Maximum thermal resistance, junction to ambient		R <sub>thJA</sub>		80				
Approximate weight				0.3	g			
Approximate weight				0.01	oz.			
Marking device			Case style DPAK (TO-252AA)	MBRD650CT				
			Case signe DI AIX (10-232AA)	MBRD660CT				

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



# VS-MBRD650CT-M3, VS-MBRD660CT-M3

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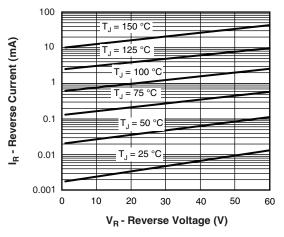


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

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

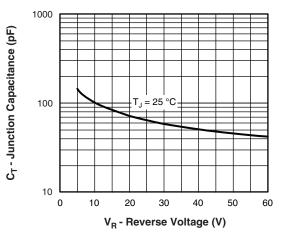


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

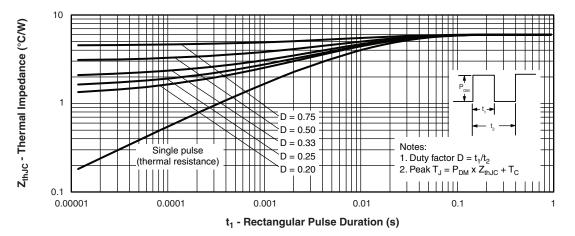


Fig. 4 - Maximum Thermal Impedance  $Z_{\text{thJC}}$  Characteristics (Per Leg)

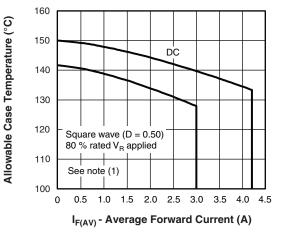
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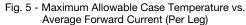
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## VS-MBRD650CT-M3, VS-MBRD660CT-M3

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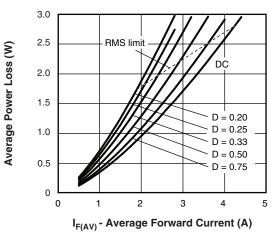


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

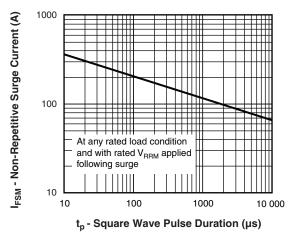
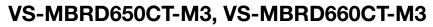


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

#### Note

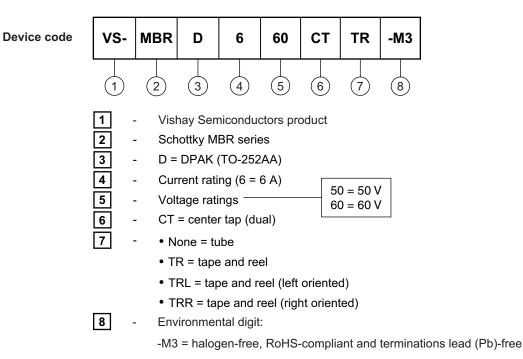


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### **ORDERING INFORMATION TABLE**

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ORDERING INFORMATION (Example)									
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION						
VS-MBRD650CT-M3	75	3000	Antistatic plastic tube						
VS-MBRD650CTTR-M3	2000	2000	13" diameter reel						
VS-MBRD650CTTRL-M3	3000	3000	13" diameter reel						
VS-MBRD650CTTRR-M3	3000	3000	13" diameter reel						
VS-MBRD660CT-M3	75	3000	Antistatic plastic tube						
VS-MBRD660CTTR-M3	2000	2000	13" diameter reel						
VS-MBRD660CTTRL-M3	3000	3000	13" diameter reel						
VS-MBRD660CTTRR-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	NOTES	NOTES		SYMBOL	MILLIN	IETERS	INC	HES	NOTES
STNIDUL	MIN.	MAX.	MIN.	MAX.	NOTES		STIVIDUL	MIN.	MAX.	MIN.	MAX.	NOTES		
А	2.18	2.39	0.086	0.094			е	2.29	BSC	0.090	BSC			
A1	-	0.13	-	0.005			Н	9.40	10.41	0.370	0.410			
b	0.64	0.89	0.025	0.035			L	1.40	1.78	0.055	0.070			
b2	0.76	1.14	0.030	0.045			L1	2.74	BSC	0.108	REF.			
b3	4.95	5.46	0.195	0.215	3		L2	0.51	BSC	0.020	BSC			
С	0.46	0.61	0.018	0.024			L3	0.89	1.27	0.035	0.050	3		
c2	0.46	0.89	0.018	0.035			L4	-	1.02	-	0.040			
D	5.97	6.22	0.235	0.245	5		L5	1.14	1.52	0.045	0.060	2		
D1	5.21	-	0.205	-	3		Ø	0°	10°	0°	10°			
E	6.35	6.73	0.250	0.265	5		Ø1	0°	15°	0°	15°			
E1	4.32	-	0.170	-	3		Ø2	25°	35°	25°	35°			

#### Notes

<sup>(1)</sup> Dimensioning and tolerancing as per ASME Y14.5M-1994

<sup>(2)</sup> Lead dimension uncontrolled in L5

<sup>(3)</sup> 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 0.10") 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

<sup>(6)</sup> Dimension b1 and c1 applied to base metal only

<sup>(7)</sup> Datum A and B to be determined at datum plane H

<sup>(8)</sup> Outline conforms to JEDEC<sup>®</sup> outline TO-252AA



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