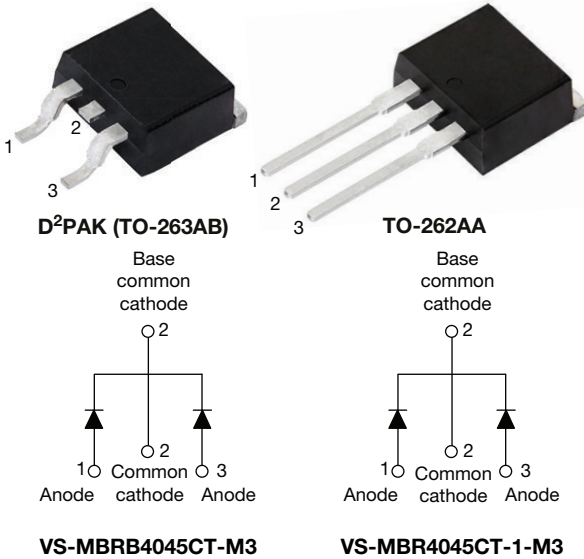


High Performance Schottky Rectifier, 2 x 20 A



FEATURES

- 150 °C T_J operation
- Low forward voltage drop
- High frequency operation
- Center tap TO-220, D²PAK and TO-262 packages
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C
- Designed and qualified according to JEDEC®-JESD 47
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



DESCRIPTION

The center tap Schottky rectifier has been optimized for low reverse leakage at high temperature. 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.

PRIMARY CHARACTERISTICS	
I _{F(AV)}	2 x 20 A
V _R	45 V
V _F at I _F	0.58 V
I _{RM} max.	95 mA at 125 °C
T _J max.	150 °C
E _{AS}	20 mJ
Package	D ² PAK (TO-263AB), TO-262AA
Circuit configuration	Common cathode

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
I _{F(AV)}	Rectangular waveform (per device)	40	A
I _{FRM}	T _C = 118 °C (per leg)	40	
V _R RM		45	V
I _{FSM}	t _p = 5 μs sine	900	A
V _F	20 A _{pk} , T _J = 125 °C	0.58	V
T _J	Range	-65 to +150	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VS-MBRB4045CT-M3 VS-MBR4045CT-1-M3	UNITS
Maximum DC reverse voltage	V _R	45	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 = 118 °C, rated V _R		20	A
				40	
Peak repetitive forward current per leg	I _{FRM}	Rated V _R , square wave, 20 kHz, T _C = 118 °C		40	
Maximum peak one cycle non-repetitive peak surge current per leg	I _{FSM}	5 μs sine or 3 μs rect. pulse	Following any rated load condition and with rated V _{RRM} applied	900	
		10 ms sine or 6 ms rect. pulse		210	
Non-repetitive avalanche energy per leg	E _{AS}	T _J = 25 °C, I _{AS} = 3 A, L = 4.4 mH		20	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		3	A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	V _{FM} ⁽¹⁾	20 A	T _J = 25 °C	0.60	V
		40 A		0.78	
		20 A	T _J = 125 °C	0.58	
		40 A		0.75	
Maximum instantaneous reverse current	I _{RM} ⁽¹⁾	T _J = 25 °C	Rated DC voltage	1	mA
		T _J = 100 °C		50	
		T _J = 125 °C		95	
Maximum junction capacitance	C _T	V _R = 5 V _{DC} (test signal range 100 kHz to 1 MHz), 25 °C		900	pF
Typical series inductance	L _S	Measured from top of terminal to mounting plane		8.0	nH
Maximum voltage rate of change	dV/dt	Rated V _R		10 000	V/μs

Note

⁽¹⁾ Pulse width < 300 μs, duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum junction temperature range	T _J			-65 to 150	°C
Maximum storage temperature range	T _{Stg}			-65 to 175	
Maximum thermal resistance, junction to case per leg	R _{thJC}	DC operation		1.5	°C/W
Typical thermal resistance, case to heatsink	R _{thCS}	Mounting surface, smooth, and greased (Only for TO-220)		0.50	
Maximum thermal resistance, junction to ambient	R _{thJA}	DC operation (For D ² PAK and TO-262)		50	
Approximate weight				2	g
				0.07	oz.
Mounting torque minimum maximum		Non-lubricated threads		6 (5)	kgf · cm (lbf · in)
				12 (10)	
Marking device		Case style D ² PAK (TO-263AB)		MBRB4045CT	
		Case style TO-262		MBR4045CT-1	

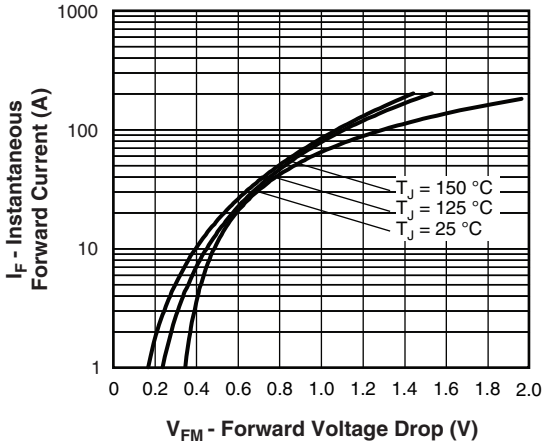


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

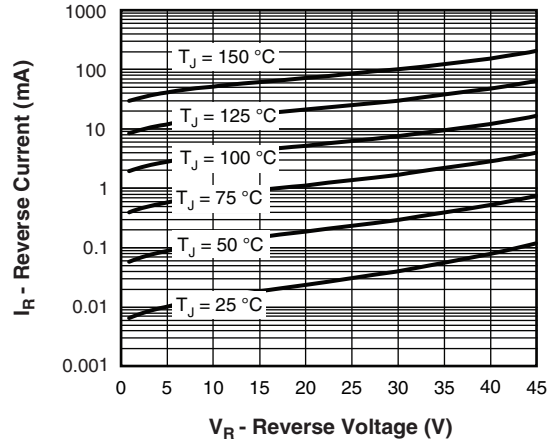


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

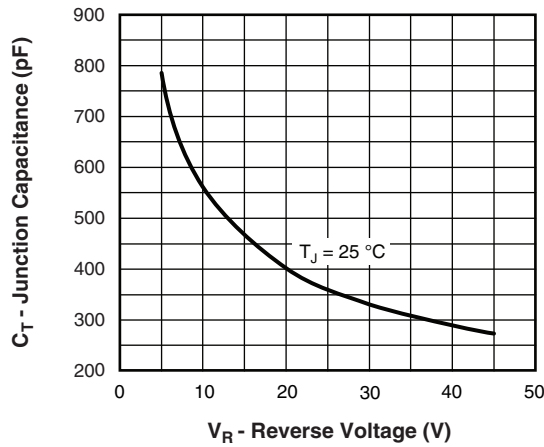


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

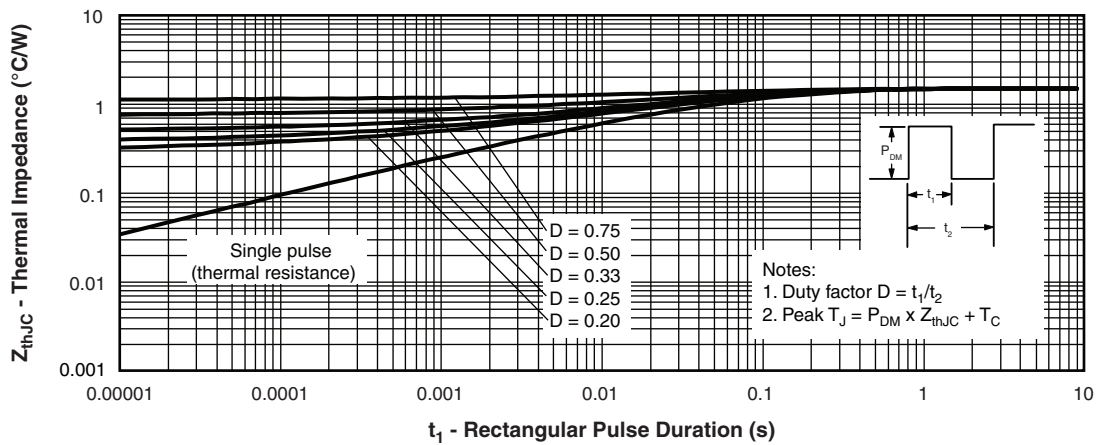


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

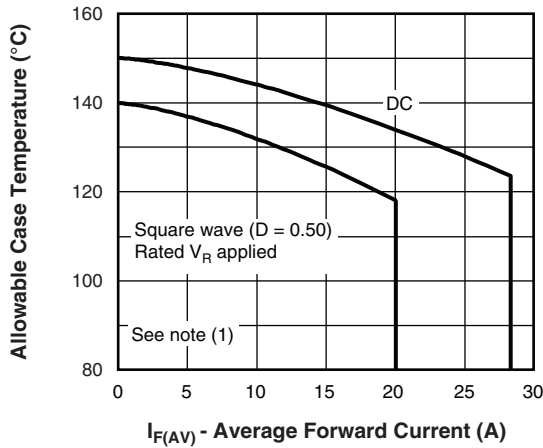


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

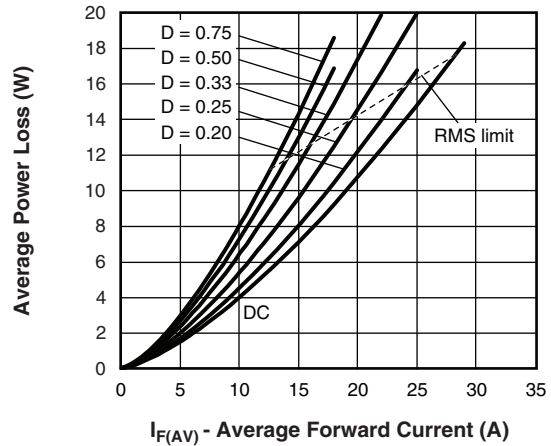


Fig. 6 - Forward Power Loss Characteristics

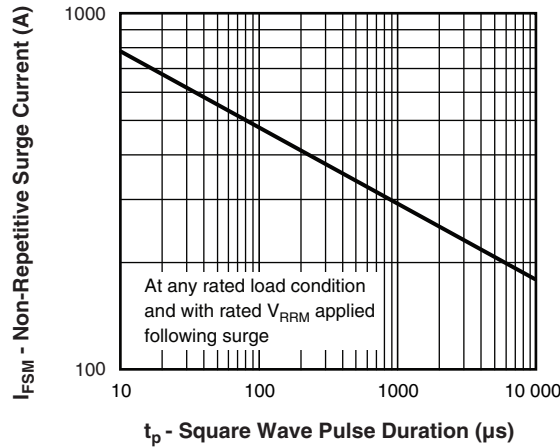


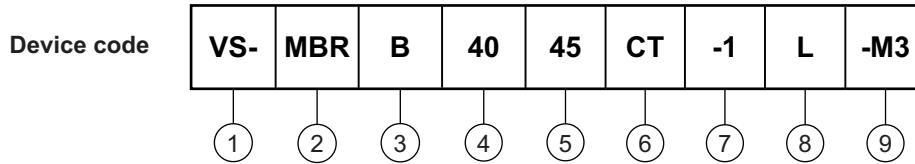
Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

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} = rated V_R



ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Essential part number
- 3** -
 - B = D²PAK **7** None
 - None = TO-262 **7** = -1
- 4** - Current rating (40 = 40 A)
- 5** - Voltage rating (45 = 45 V)
- 6** - CT = essential part number
- 7** -
 - None = D²PAK **3** = B
 - -1 = TO-262 **3** None
- 8** -
 - None = tube
 - L = tape and reel (left oriented - for D²PAK only)
 - R = tape and reel (right oriented - for D²PAK only)
- 9** - -M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free

ORDERING INFORMATION (Example)		
PREFERRED P/N	BASE QUANTITY	PACKAGING DESCRIPTION
VS-MBRB4045CTL-M3	800	13" diameter plastic tape and reel
VS-MBRB4045CT-M3	50	Antistatic plastic tubes
VS-MBRB4045CTR-M3	800	13" diameter plastic tape and reel
VS-MBR4045CT-1-M3	50	Antistatic plastic tubes

LINKS TO RELATED DOCUMENTS		
Dimensions	D ² PAK (TO-263AB)	www.vishay.com/doc?96164
	TO-262AA	www.vishay.com/doc?96165
Part marking information	D ² PAK (TO-263AB)	www.vishay.com/doc?95444
	TO-262AA	www.vishay.com/doc?95443
Packaging information		www.vishay.com/doc?96424
SPICE model		www.vishay.com/doc?95296

D²PAK

DIMENSIONS in millimeters and inches

Conforms to JEDEC[®] outline D²PAK (SMD-220)



SYMBOL	MILLIMETERS		INCHES		NOTES	SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.			MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	0.160	0.190		D1	6.86	8.00	0.270	0.315	3
A1	0.00	0.254	0.000	0.010		E	9.65	10.67	0.380	0.420	2, 3
b	0.51	0.99	0.020	0.039		E1	7.90	8.80	0.311	0.346	3
b1	0.51	0.89	0.020	0.035	4	e	2.54 BSC		0.100 BSC		
b2	1.14	1.78	0.045	0.070		H	14.61	15.88	0.575	0.625	
b3	1.14	1.73	0.045	0.068	4	L	1.78	2.79	0.070	0.110	
c	0.38	0.74	0.015	0.029		L1	-	1.65	-	0.066	3
c1	0.38	0.58	0.015	0.023	4	L2	1.27	1.78	0.050	0.070	
c2	1.14	1.65	0.045	0.065		L3	0.25 BSC		0.010 BSC		
D	8.51	9.65	0.335	0.380	2	L4	4.78	5.28	0.188	0.208	

Notes

- (1) Dimensioning and tolerancing per ASME Y14.5 M-1994
- (2) 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 outmost extremes of the plastic body
- (3) Thermal pad contour optional within dimension E, L1, D1 and E1
- (4) Dimension b1 and c1 apply to base metal only
- (5) Datum A and B to be determined at datum plane H
- (6) Controlling dimension: inches
- (7) Outline conforms to JEDEC[®] outline TO-263AB

TO-262AA

DIMENSIONS in millimeters and inches

Modified JEDEC® outline TO-262



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	0.160	0.190	
A1	2.03	3.02	0.080	0.119	
b	0.51	0.99	0.020	0.039	
b1	0.51	0.89	0.020	0.035	4
b2	1.14	1.78	0.045	0.070	
b3	1.14	1.73	0.045	0.068	4
c	0.38	0.74	0.015	0.029	
c1	0.38	0.58	0.015	0.023	4
c2	1.14	1.65	0.045	0.065	
D	8.51	9.65	0.335	0.380	2
D1	6.86	8.00	0.270	0.315	3
E	9.65	10.67	0.380	0.420	2, 3
E1	7.90	8.80	0.311	0.346	3
e	2.54 BSC		0.100 BSC		
L	13.46	14.10	0.530	0.555	
L1	-	1.65	-	0.065	3
L2	3.56	3.71	0.140	0.146	

Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) 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 outmost extremes of the plastic body
- (3) Thermal pad contour optional within dimension E, L1, D1 and E1
- (4) Dimension b1 and c1 apply to base metal only
- (5) Controlling dimension: inches
- (6) Outline conform to JEDEC® TO-262 except A1 (max.), b (min., max.), b1 (min.), b2 (max.), c (min.), c1(min.), c2 (max.), D (min.), E (max.), L1 (max.), L2 (min., max.)



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