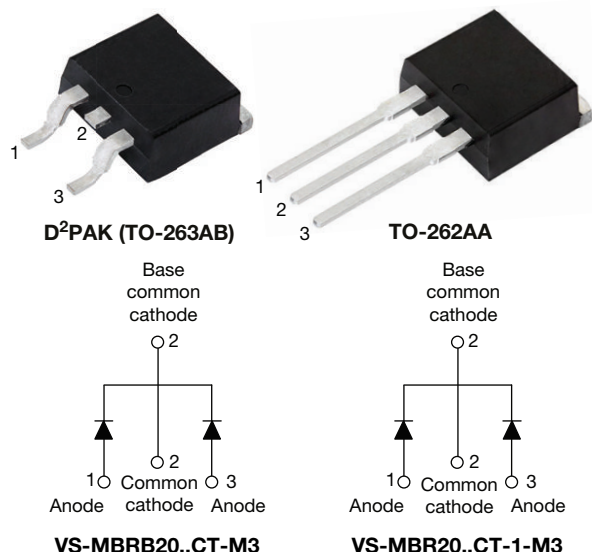


High Performance Schottky Rectifier, 2 x 10 A



FEATURES

- 150 °C T_J operation
- Center tap D²PAK (TO-263AB) and TO-262AA packages
- Low forward voltage drop
- High frequency operation
- 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



RoHS
COMPLIANT
HALOGEN
FREE

DESCRIPTION

This 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 10 A
V _R	35 V, 45 V
V _F at I _F	0.72 V
I _{RM} max.	15 mA at 125 °C
T _J max.	150 °C
E _{AS}	8 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)	20	A
I _{FRM}	T _C = 135 °C (per leg)	20	
V _{RRM}		35/45	V
I _{FSM}	t _p = 5 μs sine	1060	A
V _F	10 A _{pk} , T _J = 125 °C	0.57	V
T _J	Range	-65 to +150	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-MBRB2035CT-M3 VS-MBR2035CT-1-M3	VS-MBRB2045CT-M3 VS-MBR2045CT-1-M3	UNITS
Maximum DC reverse voltage	V _R	35	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	$I_{F(AV)}$	$T_C = 135\text{ }^{\circ}\text{C}$, rated V_R	10 20	A
Peak repetitive forward current per leg	I_{FRM}	Rated V_R , square wave, 20 kHz, $T_C = 135\text{ }^{\circ}\text{C}$	20	
Non-repetitive peak surge current	I_{FSM}	5 μs sine or 3 μs rect. pulse	1060	
		Following any rated load condition and with rated V_{RRM} applied Surge applied at rated load conditions halfwave, single phase, 60 Hz	150	
Non-repetitive avalanche energy per leg	E_{AS}	$T_J = 25\text{ }^{\circ}\text{C}$, $I_{AS} = 2\text{ A}$, $L = 4\text{ mH}$	8	mJ
Repetitive avalanche current per leg	I_{AR}	Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical	2	A

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	$V_{FM}^{(1)}$	20 A	$T_J = 25\text{ }^{\circ}\text{C}$	0.84	V
		10 A	$T_J = 125\text{ }^{\circ}\text{C}$	0.57	
		20 A		0.72	
Maximum instantaneous reverse current	$I_{RM}^{(1)}$	$T_J = 25\text{ }^{\circ}\text{C}$	Rated DC voltage	0.1	mA
		$T_J = 125\text{ }^{\circ}\text{C}$		15	
Threshold voltage	$V_{F(TO)}$	$T_J = T_J$ maximum		0.354	V
Forward slope resistance	r_t			17.6	mΩ
Maximum junction capacitance	C_T	$V_R = 5\text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz), $25\text{ }^{\circ}\text{C}$		600	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	$^{\circ}\text{C}$
Maximum storage temperature range	T_{Stg}		-65 to 175	
Maximum thermal resistance, junction to case per leg	R_{thJC}	DC operation	2.0	$^{\circ}\text{C/W}$
Typical thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth and greased	0.50	
Approximate weight			2	g
			0.07	oz.
Mounting torque	minimum	Non-lubricated threads	6 (5)	kgf · cm (lbf · in)
	maximum		12 (10)	
Marking device		Case style D ² PAK (TO-263AB)	MBRB2035CT	
			MBRB2045CT	
		Case style TO-262AA	MBR2035CT-1	
			MBR2045CT-1	

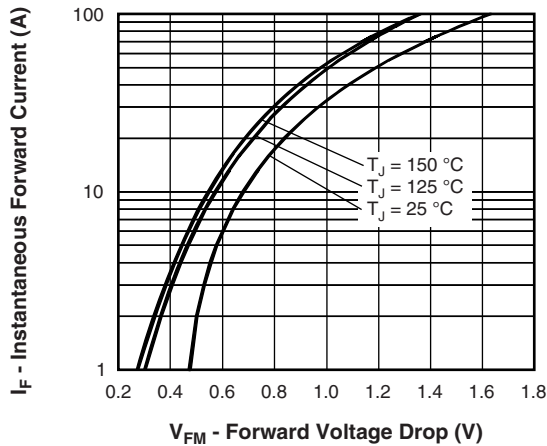


Fig. 1 - Maximum Forward Voltage Drop Characteristics
(Per Leg)

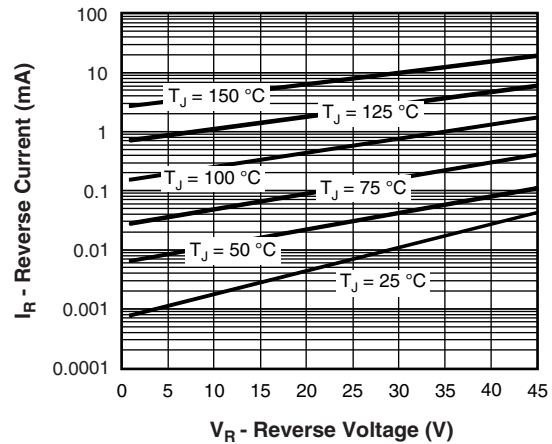


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage
(Per Leg)

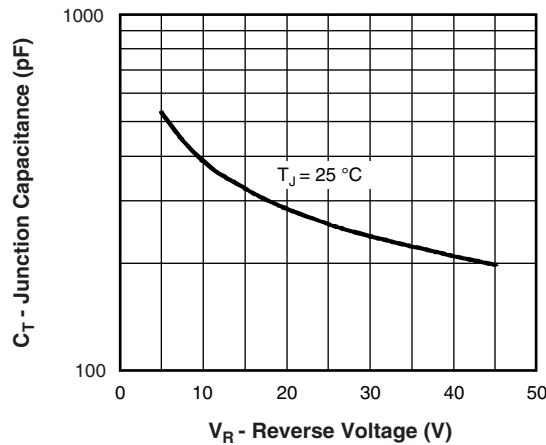


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

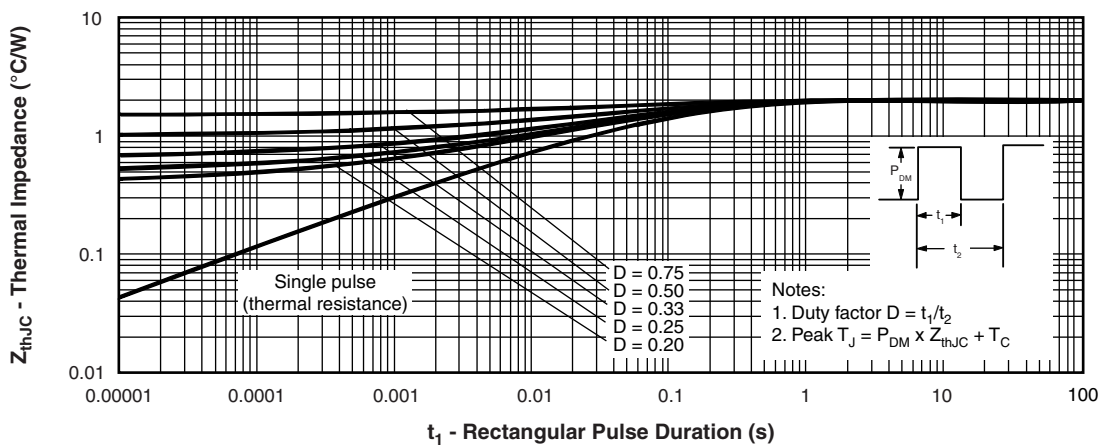


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

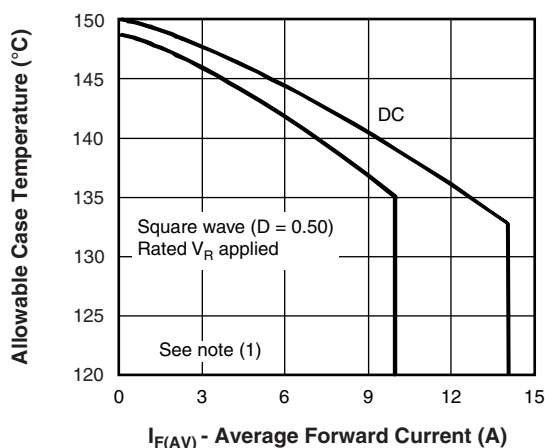


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

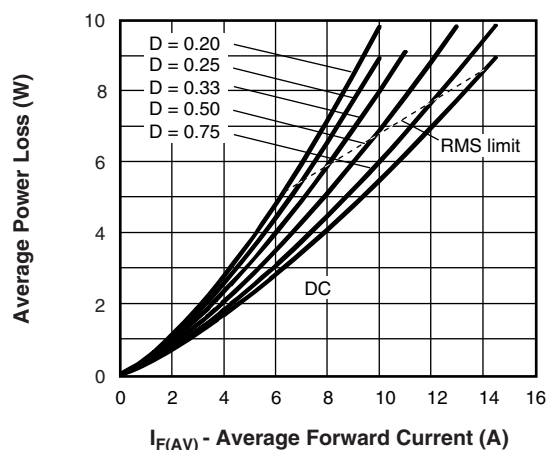


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

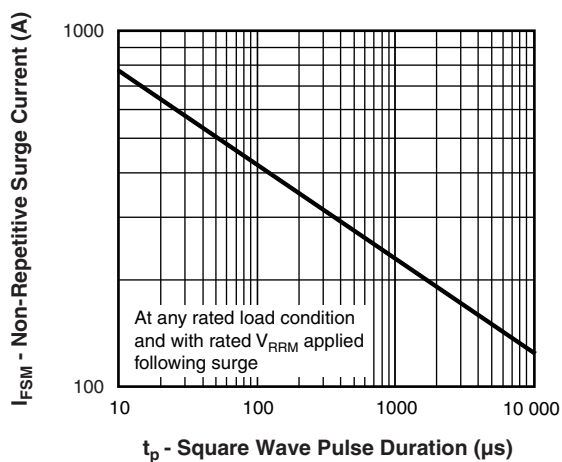


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

Note

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

ORDERING INFORMATION TABLE

Device code	VS-	MBR	B	20	45	CT	-1	L	-M3
	1	2	3	4	5	6	7	8	9

- | | | | |
|----------|---|--|---|
| 1 | - | Vishay Semiconductors product | |
| 2 | - | Essential part number | |
| 3 | - | <ul style="list-style-type: none"> • B = D²PAK (TO-263AB) • None = TO-262AA | 7 None
7 = -1 |
| 4 | - | Current rating (20 = 20 A) | |
| 5 | - | Voltage ratings | <div style="border: 1px solid black; padding: 5px; display: inline-block;"> 35 = 35 V
 45 = 45 V </div> |
| 6 | - | CT = essential part number | |
| 7 | - | <ul style="list-style-type: none"> • None = D²PAK (TO-263AB) • -1 = TO-262AA | 3 = B
3 None |
| 8 | - | <ul style="list-style-type: none"> • None = tube • L = tape and reel (left oriented - for D²PAK (TO-263AB) only) • R = tape and reel (right oriented - for D²PAK (TO-263AB) only) | |
| 9 | - | -M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free | |

ORDERING INFORMATION (Example)		
PREFERRED P/N	BASE QUANTITY	PACKAGING DESCRIPTION
VS-MBRB2035CT-M3	50	Antistatic plastic tubes
VS-MBRB2045CTL-M3	800	13" diameter plastic tape and reel
VS-MBRB2045CT-M3	50	Antistatic plastic tubes
VS-MBRB2045CTR-M3	800	13" diameter plastic tape and reel
VS-MBR2035CT-1-M3	50	Antistatic plastic tubes
VS-MBR2045CT-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?95504

D²PAK

DIMENSIONS in millimeters and inches

Conforms to JEDEC® outline D²PAK (SMD-220)



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	0.160	0.190	
A1	0.00	0.254	0.000	0.010	
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		
H	14.61	15.88	0.575	0.625	
L	1.78	2.79	0.070	0.110	
L1	-	1.65	-	0.066	3
L2	1.27	1.78	0.050	0.070	
L3	0.25 BSC		0.010 BSC		
L4	4.78	5.28	0.188	0.208	

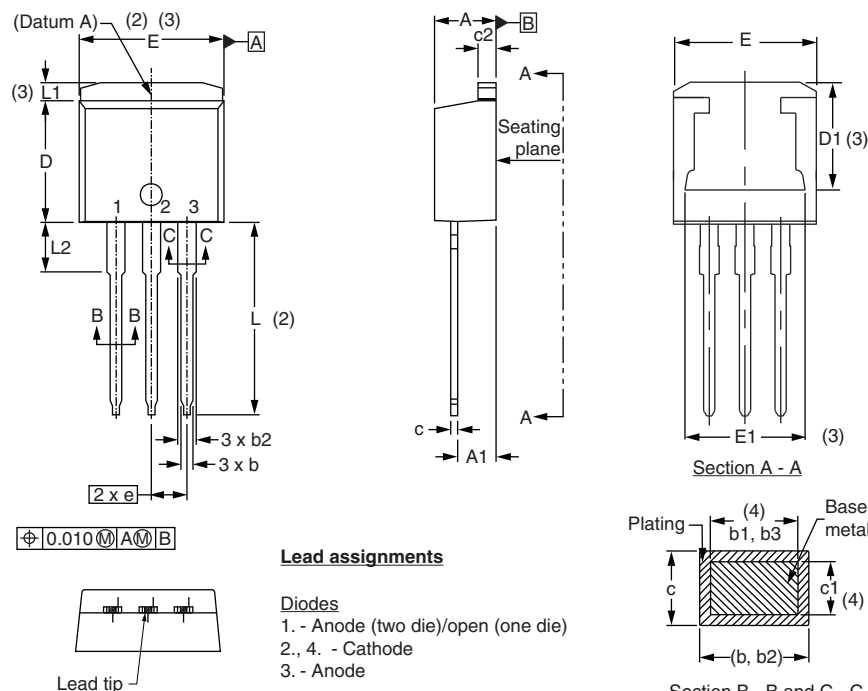
Notes

- (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

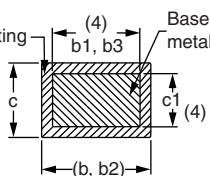
Modified JEDEC® outline TO-262



Lead assignments

Diodes

1. - Anode (two die)/open (one die)
- 2., 4. - Cathode
3. - Anode



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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