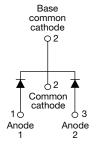


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Vishay Semiconductors

# High Performance Schottky Rectifier, 2 x 15 A





DODAIC	TO 000 A D
D-PAK	(TO-263AB)

PRIMARY CHARACTERISTICS								
I <sub>F(AV)</sub>	2 x 15 A							
$V_{R}$	30 V							
V <sub>F</sub> at I <sub>F</sub>	0.34 V							
I <sub>RM</sub>	183 mA at 125 °C							
T <sub>J</sub> max.	150 °C							
E <sub>AS</sub>	13 mJ							
Package	D <sup>2</sup> PAK (TO-263AB)							
Circuit configuration	Common cathode							

#### **FEATURES**

- 150 °C T<sub>J</sub> operation
- Center tap configuration
- · Very 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 <a href="https://www.vishay.com/doc?99912"><u>www.vishay.com/doc?99912</u></a>

#### **DESCRIPTION**

This center tap Schottky rectifier has been optimized for very low forward voltage drop, with moderate leakage. 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.

MAJOR RATINGS AND CHARACTERISTICS									
SYMBOL	YMBOL CHARACTERISTICS VALUES U								
I <sub>F(AV)</sub>	Rectangular waveform	30	Α						
V <sub>RRM</sub>		30	V						
I <sub>FSM</sub>	$t_p = 5 \mu s sine$	1100	Α						
V <sub>F</sub>	15 A <sub>pk</sub> , T <sub>J</sub> = 125 °C (per leg)	0.34	V						
T <sub>J</sub>	Range	-55 to +150	°C						

VOLTAGE RATINGS							
PARAMETER	SYMBOL	VS-MBRB3030CTL-M3	UNITS				
Maximum DC reverse voltage	$V_R$	30	V				
Maximum working peak reverse voltage	$V_{RWM}$	30	V				

ABSOLUTE MAXIMUM RATINGS								
PARAMETER	SYMBOL	TEST CONDI	TEST CONDITIONS					
Maximum average per leg		50 % duty cycle at To = 121 °C	: rectangular waveform	15				
See fig. 5 per device	I <sub>F(AV)</sub>	50 % duty cycle at T <sub>C</sub> = 121 °C rectangular waveform		30				
Maximum peak one cycle non-repetitive surge current per leg	I <sub>FSM</sub>	5 µs sine or 3 µs rect. pulse	Following any rated load condition and with	1100	A			
See fig. 7		10 ms sine or 6 ms rect. pulse	rated V <sub>RRM</sub> applied	360				
Non-repetitive avalanche energy per leg	E <sub>AS</sub>	T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 3 A, L = 2.9 mH		13	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		3	А			

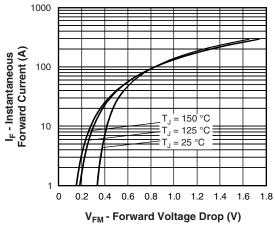


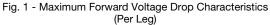
ELECTRICAL SPECIFICATIONS								
PARAMETER	SYMBOL	TEST CO	VALUES	UNITS				
Maximum forward voltage drop per leg See fig. 1		15 A	T <sub>.1</sub> = 25 °C	0.47	V			
	V <sub>FM</sub> <sup>(1)</sup>	30 A	11 = 23 0	0.55				
	VFM (1)	15 A	T 105 °C	0.34				
		30 A	T <sub>J</sub> = 125 °C	0.45				
Maximum reverse leakage current per leg	I <sub>RM</sub> <sup>(1)</sup>	T <sub>J</sub> = 25 °C	$V_{\rm B}$ = Rated $V_{\rm B}$	2	mA			
See fig. 2		T <sub>J</sub> = 125 °C	V <sub>R</sub> = nateu V <sub>R</sub>	183				
Threshold voltage	V <sub>F(TO)</sub>	T T massimum		0.22	V			
Forward slope resistance	r <sub>t</sub>	$T_J = T_J$ maximum		6.76	mΩ			
Maximum junction capacitance per leg	C <sub>T</sub>	V <sub>R</sub> = 5 V <sub>DC</sub> (test signal ran	2840	pF				
Typical series inductance per leg	L <sub>S</sub>	Measured lead to lead 5 r	8.0	nΗ				
Maximum voltage rate of change	dV/dt	Rated V <sub>R</sub>	10 000	V/µs				

#### Note

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

THERMAL - MECHANICAL SPECIFICATIONS								
PARAMETER		SYMBOL	TEST CONDITIONS	VALUES	UNITS			
Maximum junction and storage temperature range		T <sub>J</sub> , T <sub>Stg</sub>		- 55 to 150	°C			
Maximum thermal resistance,	per leg	D	DC operation	2.0	°C/W			
junction to case	per package	$R_{thJC}$	DC operation	1.0				
Typical thermal resistance, case to heatsink		R <sub>thCS</sub>	Mounting surface, smooth and greased	0.50	2,			
Approximate weight				2	g			
Approximate weight				0.07	oz.			
Mounting torque	minimum			6 (5)	kgf · cm			
Mounting torque	maximum			12 (10)	(lbf $\cdot$ in)			
Marking device			Case style D <sup>2</sup> PAK (TO-263AB)	MBRB3	030CTL			





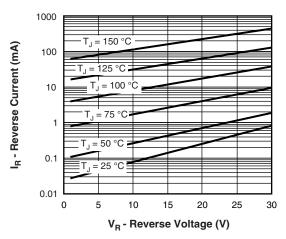


Fig. 2 - Typical Values of Reverse Current vs.Reverse Voltage (Per Leg)

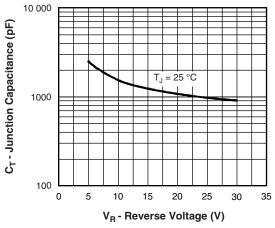


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

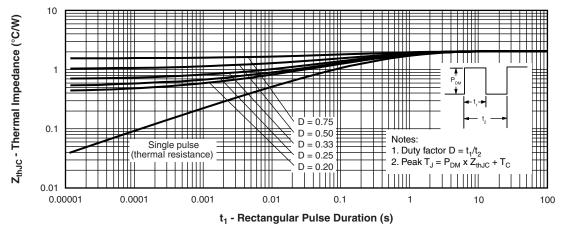


Fig. 4 - Maximum Thermal Impedance Z<sub>thJC</sub> Characteristics (Per Leg)

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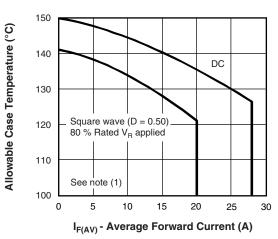


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

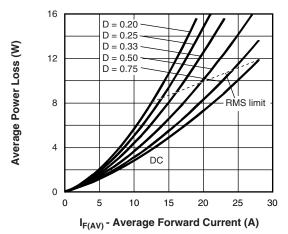
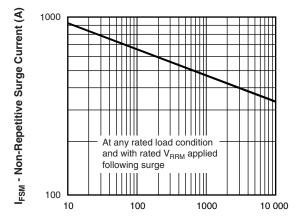


Fig. 6 - Forward Power Loss Characteristics (Per Leg)



 $t_p$  - Square Wave Pulse Duration ( $\mu$ s) Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

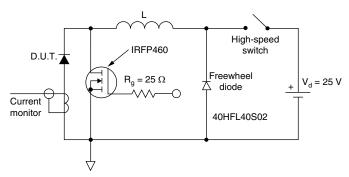


Fig. 8 - Unclamped Inductive Test Circuit

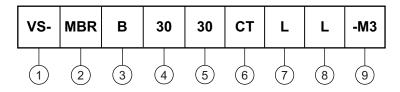
#### Note

 $\begin{array}{ll} \text{(1)} & \text{Formula used: } T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}; \\ Pd = \text{forward power loss} = I_{F(AV)} \times V_{FM} \text{ at } (I_{F(AV)}/D) \text{ (see fig. 6)}; \\ Pd_{REV} = \text{inverse power loss} = V_{R1} \times I_R \text{ (1 - D)}; I_R \text{ at } V_{R1} = 10 \text{ V}. \end{array}$ 



### **ORDERING INFORMATION TABLE**

Device code



1 - Vishay Semiconductors product

2 - Schottky MBR series

4 - Current rating (30 = 30 A)

Voltage rating (30 = 30 V)

- CT = center tap (dual)

7 - L = low V<sub>F</sub>

8 - • None = tube

• L = tape and reel (left oriented - for  $D^2PAK$  only)

• R = tape and reel (right oriented - for  $D^2PAK$  only)

9 - -M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free

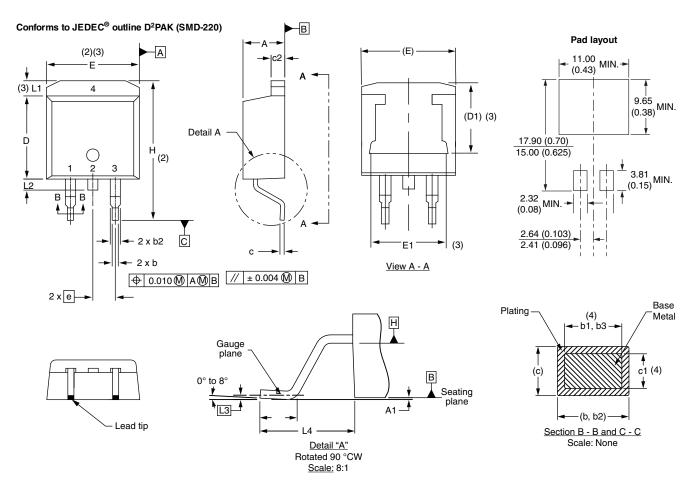
ORDERING INFORMATION (Example)										
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION							
VS-MBRB3030CTL-M3	50	1000	Antistatic plastic tube							
VS-MBRB3030CTLR-M3	800	800	13" diameter reel							
VS-MBRB3030CTLL-M3	800	800	13" diameter reel							

LINKS TO RELATED DOCUMENTS							
Dimensions	www.vishay.com/doc?96164						
Part marking information	www.vishay.com/doc?95444						
Packaging information	www.vishay.com/doc?96424						



# D<sup>2</sup>PAK

#### **DIMENSIONS** in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		IES NOTES		SYMBOL	MILLIM	ETERS	INC	HES	NOTES
STWIBOL	MIN.	MAX.	MIN.	MAX.	NOTES		STWBOL	MIN.	MAX.	MIN.	MAX.	NOTES
Α	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			Е	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		е	2.54	BSC	0.100	BSC	
b2	1.14	1.78	0.045	0.070			Н	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	
С	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

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