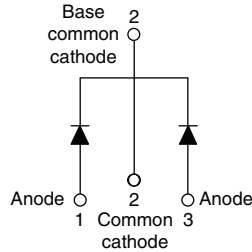


Dual High-Voltage Trench MOS Barrier Schottky Rectifier



TO-220AB



FEATURES

- 150 °C high performance Schottky diode
- Very low forward voltage drop
- Extremely low reverse leakage
- Optimized V_F vs. I_F trade off for high efficiency
- Increased ruggedness for reverse avalanche capability
- RBSOA available on demand
- Negligible switching losses
- Solder dip 260 °C, 40 s
- Full lead (Pb)-free and RoHS compliant devices
- Designed and qualified for industrial level



RoHS COMPLIANT

PRODUCT SUMMARY

$I_{F(AV)}$	2 x 20 A
V_{RRM}	100 V
Maximum V_F at 20 A at 125 °C	0.67 V

APPLICATIONS

- High efficiency SMPS
- High frequency switching
- Output rectification
- Reverse battery protection
- Freewheeling
- Dc-to-dc systems
- Increased power density systems

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
V_{RRM}		100	V
V_F	20 Apk, $T_J = 125$ °C (typical, per leg)	0.63	
T_J	Range	- 40 to 150	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	V40100L-F	UNITS
Maximum DC reverse voltage	V_R	$T_J = 25$ °C	100	V

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current per leg per device	$I_{F(AV)}$	50 % duty cycle at $T_C = 160$ °C, rectangular waveform	20	A
			40	
Maximum peak one cycle non-repetitive surge current per leg	I_{FSM}	5 μ s sine or 6 μ s rect. pulse	900	
		10 ms sine or 6 ms rect. pulse	300	
Non-repetitive avalanche energy per leg	E_{AS}	$T_J = 25$ °C, $I_{AS} = 1.5$ A, L = 60 mH	67.5	mJ
Repetitive avalanche current per leg	I_{AR}	Limited by frequency of operation and time pulse duration so that $T_J < T_{J \text{ max.}}$. I_{AS} at $T_J \text{ max.}$ as a function of time pulse See fig. 8	I_{AS} at $T_J \text{ max.}$	A

ELECTRICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS		TYP.	MAX.	UNITS
Forward voltage drop per leg	$V_{FM}^{(1)}$	5 A	$T_J = 25\text{ }^\circ\text{C}$	0.51	-	V
		10 A		0.59	-	
		20 A		0.72	0.82	
		5 A	$T_J = 125\text{ }^\circ\text{C}$	0.44	-	
		10 A		0.53	-	
		20 A		0.63	0.67	
Reverse leakage current	$I_{RM}^{(2)}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	-	1000	μA
		$T_J = 125\text{ }^\circ\text{C}$		21	45	mA
Maximum voltage rate of change	dV/dt	Rated V_R		-	10 000	V/ μs

Notes(1) Pulse width < 300 μs , duty cycle < 2 %(2) Pulse test: Pulse width \leq 40 ms

THERMAL - MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	T_J, T_{Stg}		- 40 to 150	$^\circ\text{C}$
Maximum thermal resistance, junction to case per leg	R_{thJC}	DC operation	4	$^\circ\text{C/W}$
Maximum thermal resistance, junction to case per device			2	
Typical thermal resistance, case to heatsink	R_{thCS}		0.5	
Approximate weight			2	g
			0.07	oz.
Mounting torque	minimum		6 (5)	kgf · cm (lbf · in)
	maximum		12 (10)	
Marking device		Case style TO-220AB	V40100L	



Dual High-Voltage Trench MOS Vishay High Power Products
Barrier Schottky Rectifier

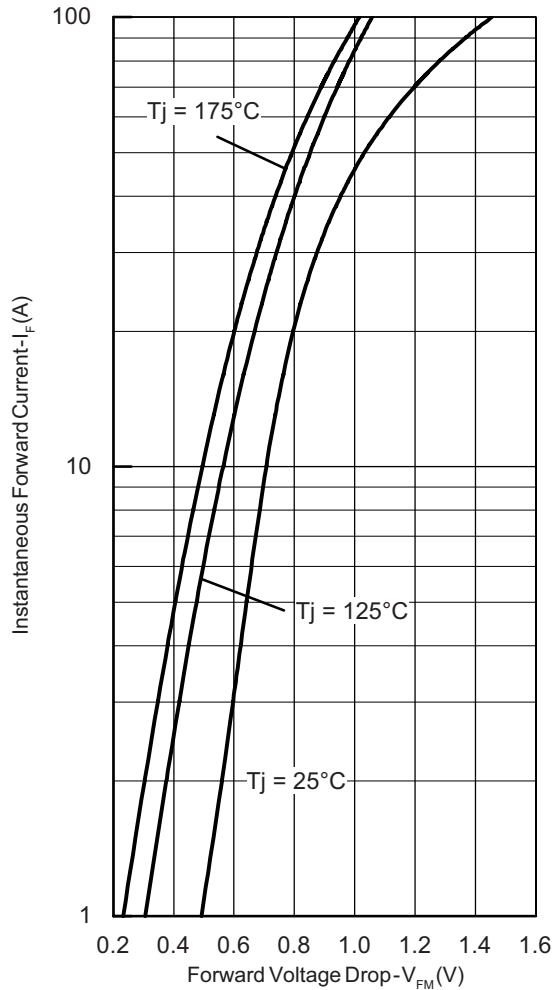


Fig. 1 - Maximum Forward Voltage Drop Characteristics

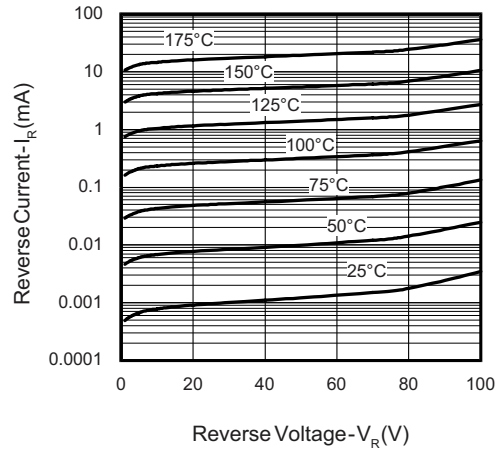


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

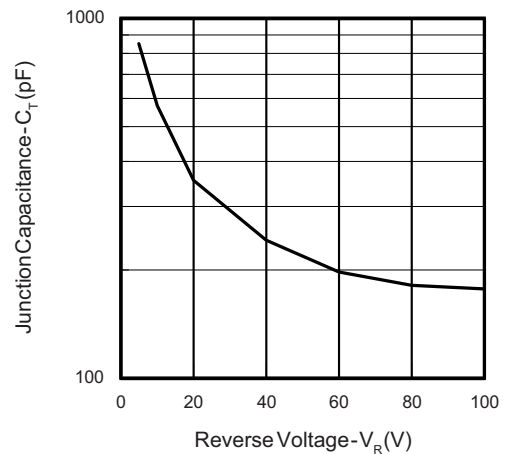


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

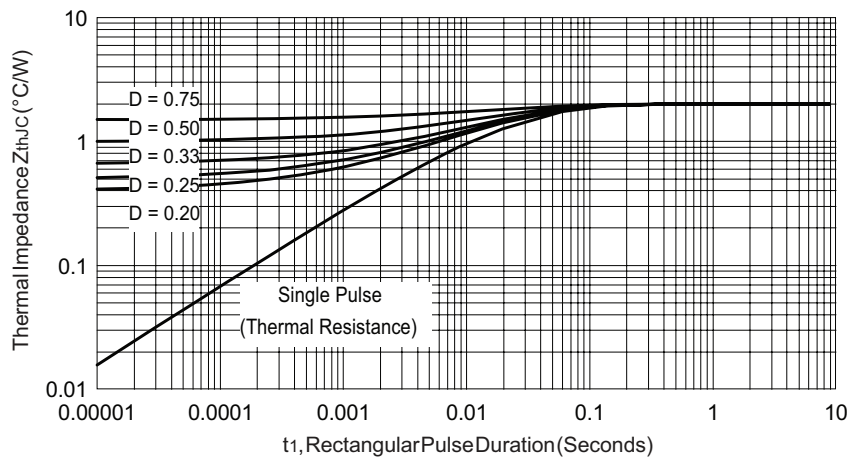


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics



Vishay High Power Products Dual High-Voltage Trench MOS Barrier Schottky Rectifier

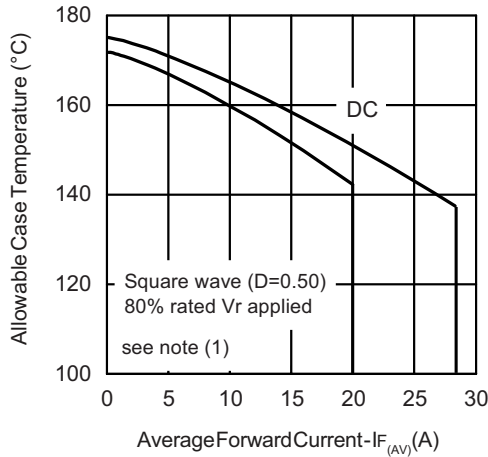


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

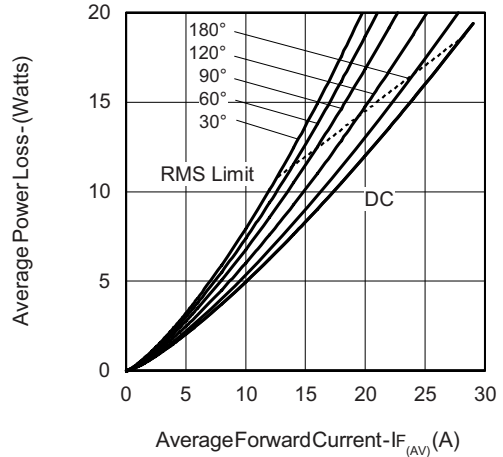


Fig. 6 - Forward Power Loss Characteristics

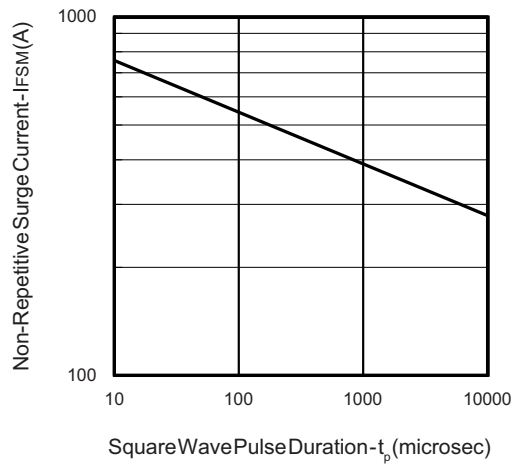


Fig. 7 - Maximum Non-Repetitive Surge Current

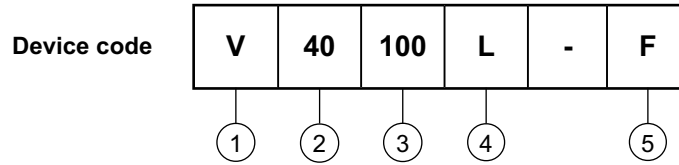
Note

- (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



Dual High-Voltage Trench MOS Vishay High Power Products
Barrier Schottky Rectifier

ORDERING INFORMATION TABLE



- 1** - Vishay
- 2** - Current rating (40 = 40 A)
- 3** - Voltage code (100 V)
- 4** - HPP manufacturing site
- 5** - Totally lead (Pb)-free and RoHS compliant

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95222
Part marking information	http://www.vishay.com/doc?95028

TO-220AB

DIMENSIONS in millimeters and inches



Lead assignments

Diodes

- 1 - Anode/open
- 2 - Cathode
- 3 - Anode

Conforms to JEDEC outline TO-220AB

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.25	4.65	0.167	0.183	
A1	1.14	1.40	0.045	0.055	
A2	2.56	2.92	0.101	0.115	
b	0.69	1.01	0.027	0.040	
b1	0.38	0.97	0.015	0.038	4
b2	1.20	1.73	0.047	0.068	
b3	1.14	1.73	0.045	0.068	4
c	0.36	0.61	0.014	0.024	
c1	0.36	0.56	0.014	0.022	4
D	14.85	15.25	0.585	0.600	3
D1	8.38	9.02	0.330	0.355	
D2	11.68	12.88	0.460	0.507	6
E	10.11	10.51	0.398	0.414	3, 6
E1	6.86	8.89	0.270	0.350	6
E2	-	0.76	-	0.030	7
e	2.41	2.67	0.095	0.105	
e1	4.88	5.28	0.192	0.208	
H1	6.09	6.48	0.240	0.255	6, 7
L	13.52	14.02	0.532	0.552	
L1	3.32	3.82	0.131	0.150	2
Ø P	3.54	3.73	0.139	0.147	
Q	2.60	3.00	0.102	0.118	
θ	90° to 93°		90° to 93°		

Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Lead dimension and finish uncontrolled in L1
- (3) Dimension D, D1 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
- (4) Dimension b1, b3 and c1 apply to base metal only
- (5) Controlling dimensions: inches
- (6) Thermal pad contour optional within dimensions E, H1, D2 and E1
- (7) Dimensions E2 x H1 define a zone where stamping and singulation irregularities are allowed
- (8) Outline conforms to JEDEC TO-220, except A2 (maximum) and D2 (minimum) where dimensions are derived from the actual package outline



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