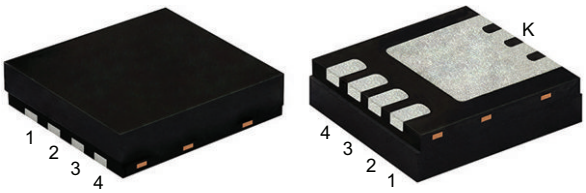
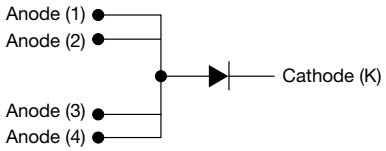
Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier



DFN33A



FEATURES

- Low profile package - typical height of 0.88 mm
- Leadless DFN package with side-wettable flanks suitable for customer AOI (Automatic Optical Inspection)
- Very low reverse leakage by TMBS Gen3 technology
- Low power losses, high efficiency
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available
  - Automotive ordering code; base P/NHM3
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE Available

RoHS COMPLIANT

HALOGEN FREE

LINKS TO ADDITIONAL RESOURCES

Ultra Librarian EDA / CAD | Related Documents | Packages | Marking | Application Notes

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	9 A
V_{RRM}	60 V
I_{FSM}	150 A
V_F at I_F = 4.5 A (T_J = 125 °C)	0.36 V
T_J max.	150 °C
Package	DFN33A
Circuit configuration	Single

TYPICAL APPLICATIONS

For use in low voltage, high frequency inverters, freewheeling, DC/DC converters, and polarity protection applications.

MECHANICAL DATA

Case: DFN33A

Molding compound meets UL 94 V-0 flammability rating

Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade

Base P/NHM3 - halogen-free, RoHS-compliant, and AEC-Q101 qualified

Terminals: matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 and HM3 suffix meet JESD 201 class 2 whisker test

MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)			
PARAMETER	**SYMBOL**	**V9N3L63**	**UNIT**
Device marking code		9L63	
Maximum repetitive peak reverse voltage	V_{RRM}	60	V
Maximum average forward rectified current (fig. 1)	$I_{F(AV)}$ (1)	9	A
	$I_{F(AV)}$ (2)	3.1	A
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	I_{FSM}	150	A
Operating junction temperature range	T_J (3)	-40 to +150	°C
Storage temperature range	T_{STG}	-55 to +150	°C

Notes

(1) With infinite heatsink

(2) Free air, mounted on FR4 PCB, 2 oz., standard footprint

(3) The heat generated must be less than the thermal conductivity from junction-to-ambient: $dP_D/dT_J < 1/R_{\theta JA}$

ELECTRICAL CHARACTERISTICS (T_J = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I_F = 4.5 A	T_J = 25 °C	V_F (1)	0.44	-	V
	I_F = 9 A			0.52	0.58	
	I_F = 4.5 A	T_J = 125 °C		0.36	-	
	I_F = 9 A			0.47	0.53	
Reverse current	V_R = 60 V	T_J = 25 °C	I_R (2)	-	0.2	mA
		T_J = 125 °C		6	15	
Typical junction capacitance	4.0 V, 1 MHz		C_J	1550	-	pF

Notes

(1) Pulse test: 300 µs pulse width, 1 % duty cycle

(2) Pulse test: pulse width ≤ 5 ms

THERMAL CHARACTERISTICS (T_A = 25 °C unless otherwise specified)				
PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Thermal resistance	$R_{\theta JA}$ (1)(2)	118	148	°C/W
	$R_{\theta JA}$ (3)	-	65	
	$R_{\theta JM}$ (4)	2.9	3.63	

Notes

(1) The heat generated must be less than the thermal conductivity from junction-to-ambient: $dP_D/dT_J < 1/R_{\theta JA}$

(2) Thermal resistance junction-to-ambient to follow JEDEC® 51-2A, device mounted on FR4 PCB, 2 oz., standard footprint

(3) Thermal resistance junction-to-ambient, free air with device mounted on FR4 PCB, 2 oz., 20 mm x 20 mm pad area

(4) Thermal resistance junction-to-mount to follow JEDEC 51-14 transient dual interface test method (TDIM)

ORDERING INFORMATION TABLE

Device code

V	9	N3	L	6	3	H	M3
1	2	3	4	5	6	7	8

1 - Vishay TMBS product

2 - Current rating (9 = 9 A)

3 - Package type (N3 = DFN33A)

4 - Process type option (L = low V_F)

5 - Voltage rating (6 = 60 V)

6 - TMBS generation option (3 = Gen3)

7 - Quality grade (H = AEC-Q101 qualified, otherwise = industry grade)

8 - Material / environmental category (M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free)

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
V9N3L63-M3/I	0.031	I	6000	13" diameter plastic tape and reel
V9N3L63HM3/I (1)	0.031	I	6000	13" diameter plastic tape and reel

Note

(1) AEC-Q101 qualified

RATINGS AND CHARACTERISTICS CURVES (T_A = 25 °C unless otherwise noted)

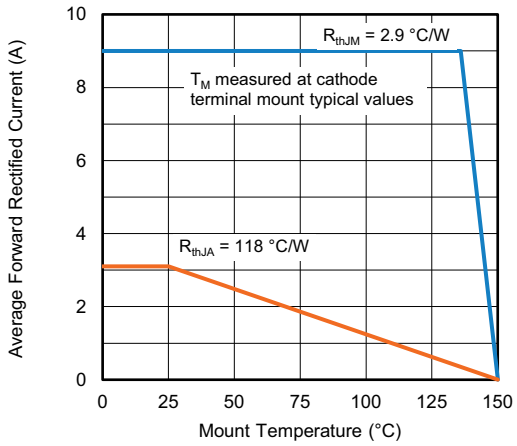


Fig. 1 - Maximum Forward Current Derating Curve

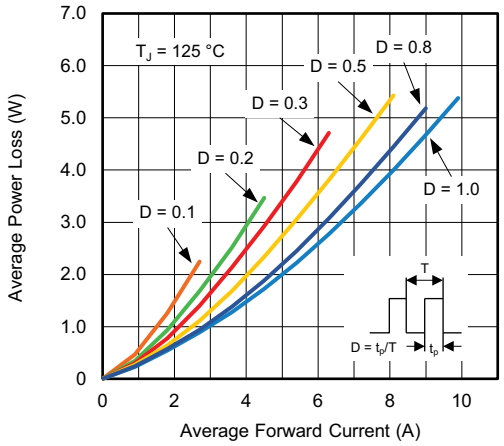


Fig. 2 - Forward Power Loss Characteristics

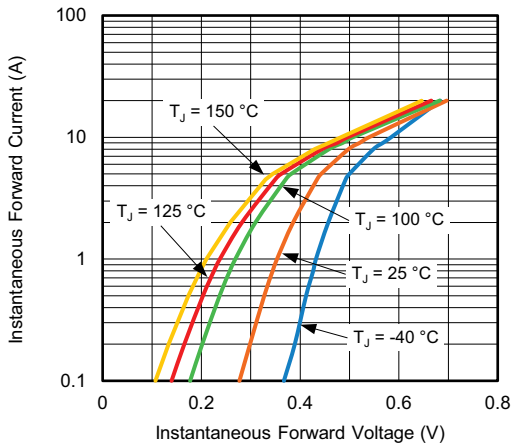


Fig. 3 - Typical Instantaneous Forward Characteristics

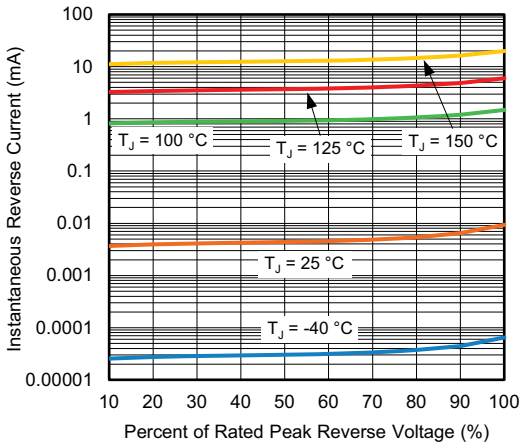


Fig. 4 - Typical Reverse Characteristics

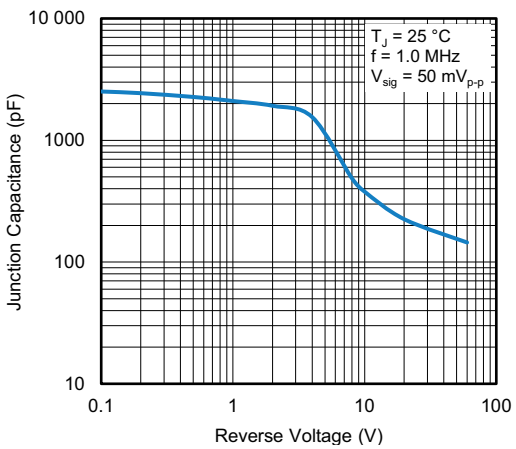


Fig. 5 - Typical Junction Capacitance

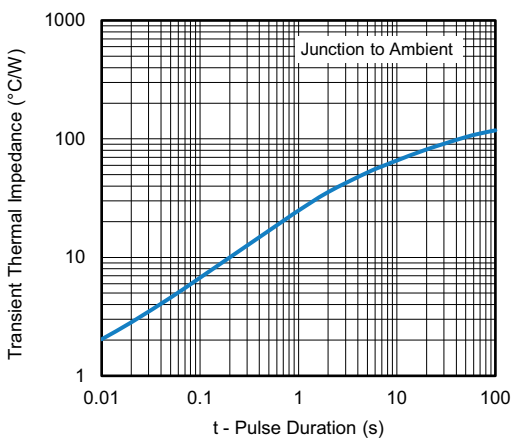


Fig. 6 - Typical Transient Thermal Impedance

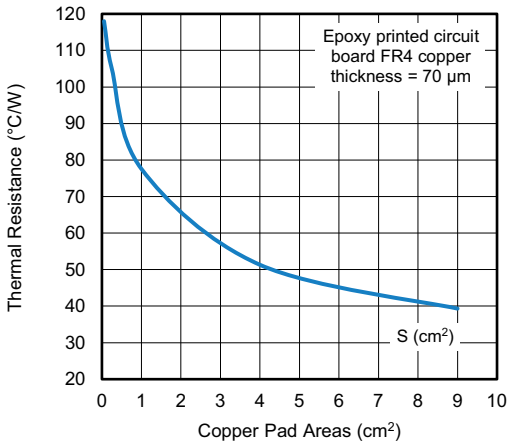
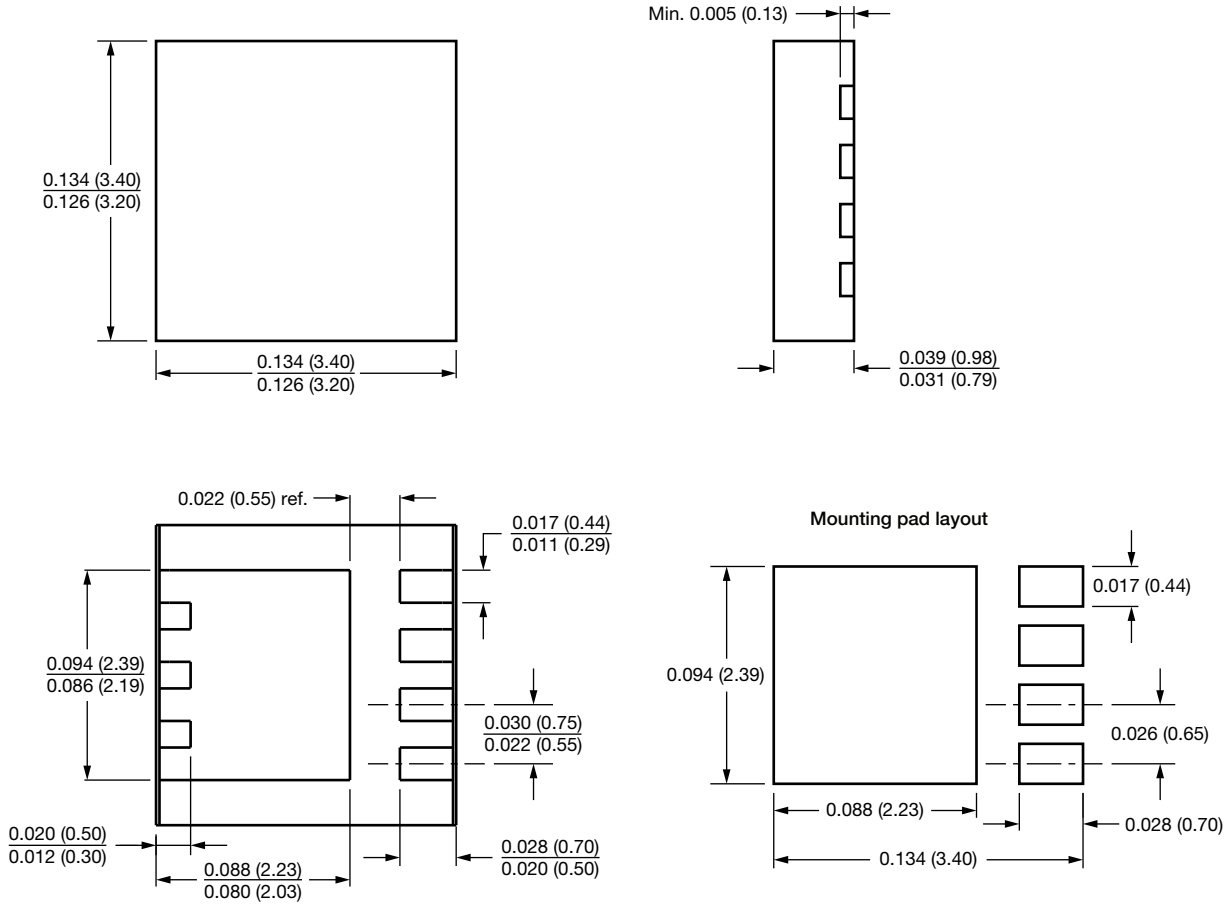


Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DFN33A



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.