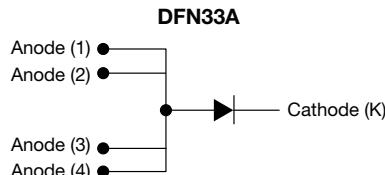
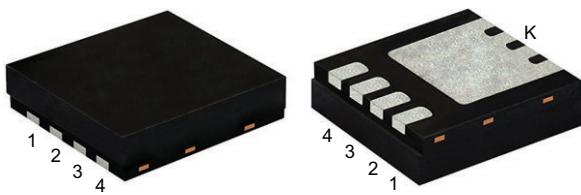


## Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier



### LINKS TO ADDITIONAL RESOURCES



### PRIMARY CHARACTERISTICS

$I_{F(AV)}$	9 A
$V_{RRM}$	200 V
$I_{FSM}$	150 A
$V_F$ at $I_F = 4.5$ A ( $T_J = 125$ °C)	0.60 V
$T_J$ max.	175 °C
Package	DFN33A
Circuit configuration	Single

### FEATURES

- Low profile package - typical height of 0.88 mm
- Leadless DFN package with side-wettable flanks suitable for customer AOI (Automatic Optical Inspection)
- Low power losses, high efficiency
- Low forward voltage drop
- 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](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
**HALOGEN**  
**FREE**

### 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	V9N3202	UNIT
Device marking code		V922	
Maximum repetitive peak reverse voltage	$V_{RRM}$	200	V
Maximum average forward rectified current (fig. 1)	$I_{F(AV)}^{(1)}$	9	A
	$I_{F(AV)}^{(2)}$	2.2	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 +175	°C
Storage temperature range	$T_{STG}$	-55 to +175	°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 ( $T_J = 25^\circ\text{C}$ unless otherwise noted)							
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT	
Instantaneous forward voltage	$I_F = 4.5 \text{ A}$	$T_J = 25^\circ\text{C}$	$V_F$ <sup>(1)</sup>	0.74	-	V	
	$I_F = 9 \text{ A}$			0.80	0.84		
	$I_F = 4.5 \text{ A}$	$T_J = 125^\circ\text{C}$		0.60	-		
	$I_F = 9 \text{ A}$			0.67	0.71		
Reverse current	$V_R = 160 \text{ V}$	$T_J = 25^\circ\text{C}$	$I_R$ <sup>(2)</sup>	0.0008	-	mA	
		$T_J = 125^\circ\text{C}$		0.7	-		
	$V_R = 200 \text{ V}$	$T_J = 25^\circ\text{C}$		-	0.1		
		$T_J = 125^\circ\text{C}$		1.5	7		
Typical junction capacitance	4.0 V, 1 MHz		$C_J$	500	-	pF	

**Notes**

(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle

(2) Pulse test: pulse width  $\leq 5 \text{ ms}$

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

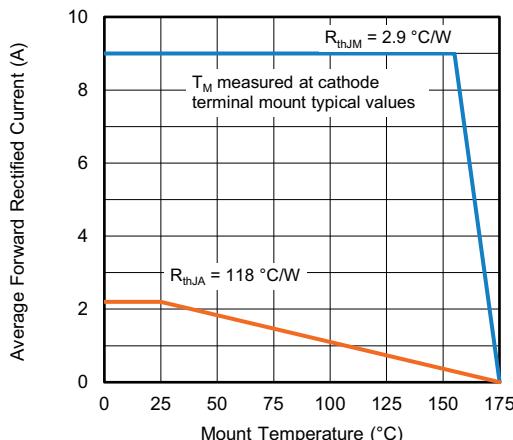
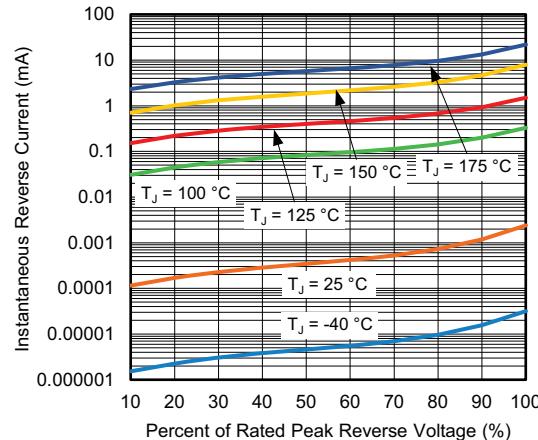
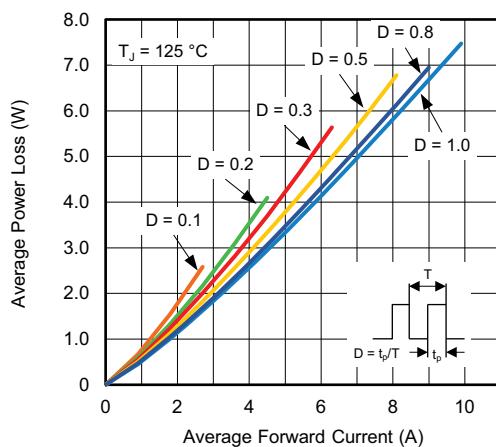
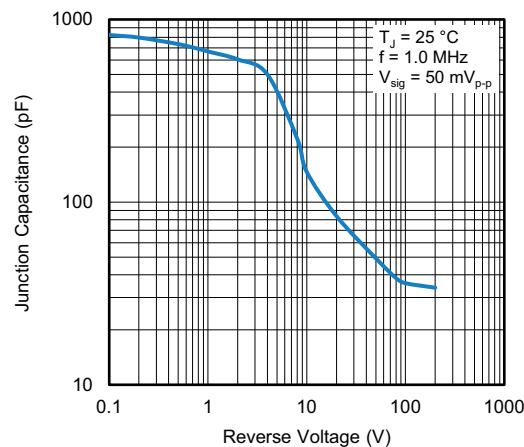
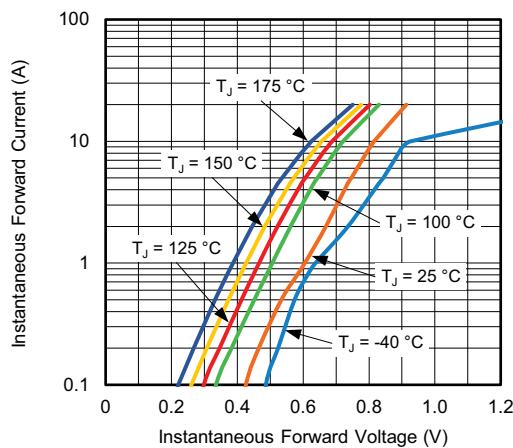
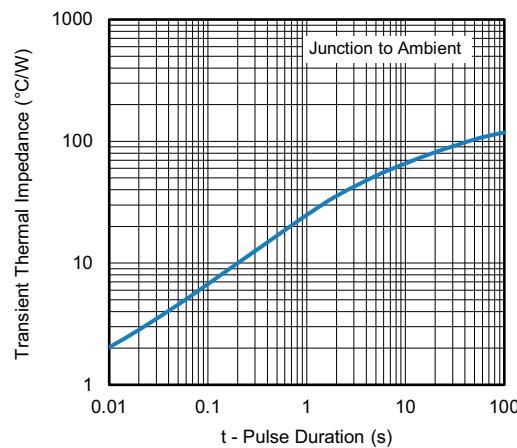
**ORDERING INFORMATION TABLE**

Device code	V	9	N3	20	2	H	M3
	1	2	3	4	5	6	7
<b>1</b>	-	Vishay TMBS product					
<b>2</b>	-	Current rating (9 = 9 A)					
<b>3</b>	-	Package type (N3 = DFN33A)					
<b>4</b>	-	Voltage rating (20 = 200 V)					
<b>5</b>	-	TMBS generation option (2 = Gen2)					
<b>6</b>	-	Quality grade (H = AEC-Q101 qualified, otherwise = industry grade)					
<b>7</b>	-	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
V9N3202-M3/I	0.031	I	6000	13" diameter plastic tape and reel
V9N3202HM3/I <sup>(1)</sup>	0.031	I	6000	13" diameter plastic tape and reel

**Note**

(1) AEC-Q101 qualified

**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

**Fig. 1 - Maximum Forward Current Derating Curve**

**Fig. 4 - Typical Reverse Characteristics**

**Fig. 2 - Forward Power Loss Characteristics**

**Fig. 5 - Typical Junction Capacitance**

**Fig. 3 - Typical Instantaneous Forward Characteristics**

**Fig. 6 - Typical Transient Thermal Impedance**

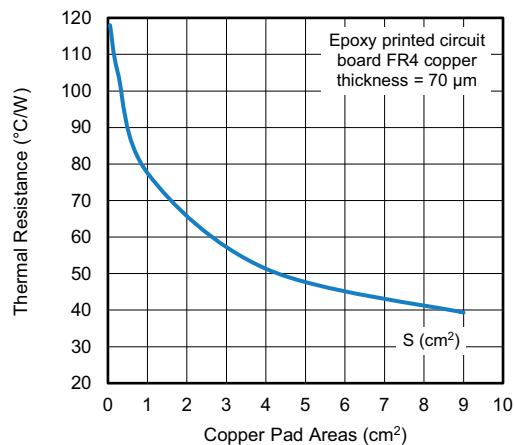
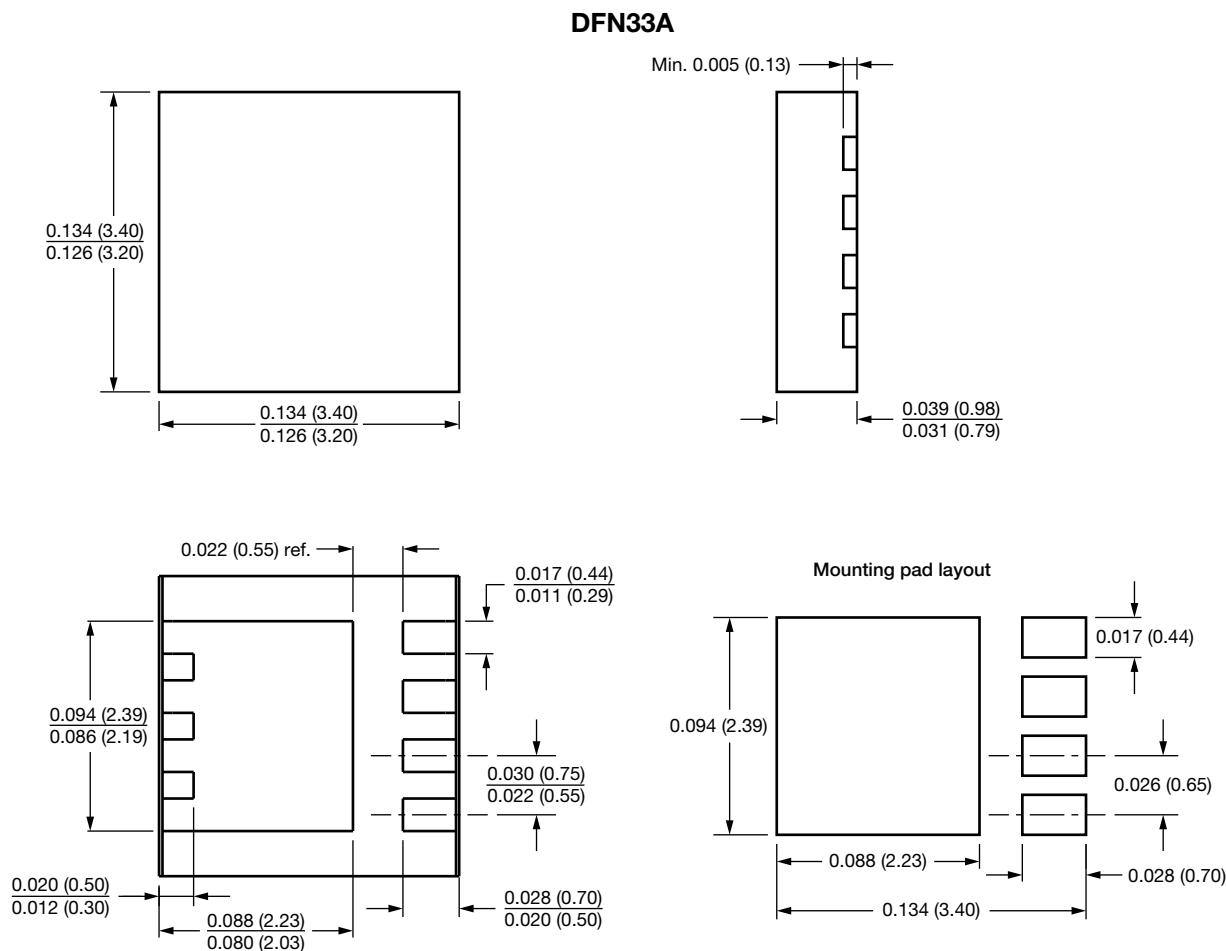


Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



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