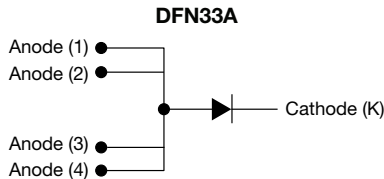
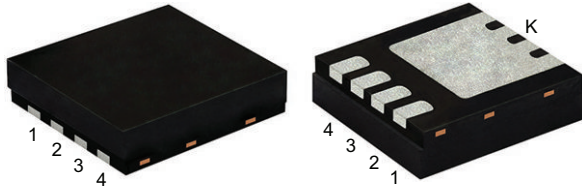


## Surface-Mount Standard Rectifier



### LINKS TO ADDITIONAL RESOURCES



### SPICE

[Models](#)

### FEATURES

- Low-profile package  
- typical height of 0.88 mm
- Leadless DFN package with side-wettable flanks suitable for customer AOI (Automatic Optical Inspection)
- Ideal for automated replacement
- Oxide planar chip junction
- Low forward voltage drop
- Typical IR less than 0.1  $\mu\text{A}$
- ESD capability
- 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)

AUTOMOTIVE  
GRADE  
Available



RoHS  
COMPLIANT  
HALOGEN  
FREE

### TYPICAL APPLICATIONS

General purpose, power line polarity protection and rail-to-rail protection in consumer, industrial, and automotive applications.

### MECHANICAL DATA

**Case:** DFN33A

Molding compound meets UL 94 V-0 flammability rating

Base P/N-M3 - halogen-free, RoHS-compliant

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

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	4 A
$V_{RRM}$	200 V, 400 V, 600 V
$I_{FSM}$	70 A
$V_F$ at $I_F = 4$ A ( $T_J = 125$ °C)	0.84 V
$T_J$ max.	175 °C
Package	DFN33A
Circuit configuration	Single

MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)					
PARAMETER	SYMBOL	SE40N3D	SE40N3G	SE40N3J	UNIT
Device marking code		4D	4G	4J	
Maximum repetitive peak reverse voltage	$V_{RRM}$	200	400	600	V
Maximum average forward rectified current (fig.1)	$I_{F(AV)}^{(1)}$	4			A
	$I_{F(AV)}^{(2)}$	1.68			
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	$I_{FSM}$	70			A
Operating junction temperature range	$T_J^{(3)}$	-55 to +175			°C
Storage temperature range	$T_{STG}$	-55 to +175			

### Notes

(1) With infinite heatsink

(2) Free air, mounted on recommended copper pad area

(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 <sub>J</sub> = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I <sub>F</sub> = 2 A	T <sub>J</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.88	-	V
	I <sub>F</sub> = 4 A			0.94	1.05	
	I <sub>F</sub> = 2 A	T <sub>J</sub> = 125 °C		0.77	-	
	I <sub>F</sub> = 4 A			0.84	0.98	
Reverse current	Rated V <sub>R</sub>	T <sub>J</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	-	5	µA
		T <sub>J</sub> = 125 °C		12	100	
Typical junction capacitance	4.0 V, 1 MHz		C <sub>J</sub>	32	-	pF

Notes

- (1) Pulse test: 300 µs pulse width, 1 % duty cycle
- (2) Pulse test: pulse width ≤ 5 ms

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise specified)					
PARAMETER	SYMBOL	TYP.	MAX.	UNIT	
Thermal resistance	R <sub>θJA</sub> <sup>(1)(2)</sup>	126	157	°C/W	
	R <sub>θJM</sub> <sup>(3)</sup>	2.9	3.6		

Notes

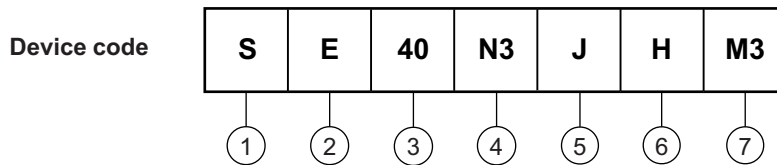
- (1) The heat generated must be less than the thermal conductivity from junction-to-ambient: dP<sub>D</sub>/dT<sub>J</sub> < 1/R<sub>θJA</sub>
- (2) Thermal resistance junction-to-ambient to follow JEDEC® 51-2A, device mounted on FR4 PCB, 2 oz., standard footprint
- (3) Thermal resistance junction-to-mount to follow JEDEC 51-14 transient dual interface test method (TDIM)

IMMUNITY TO ELECTRICAL STATIC DISCHARGE TO THE FOLLOWING STANDARDS (T <sub>A</sub> = 25 °C unless otherwise noted)					
STANDARD	TEST TYPE	TEST CONDITIONS	SYMBOL	CLASS	VALUE
AEC-Q101-001	Human body model (contact mode)	C = 100 pF, R = 1.5 kΩ	V <sub>C</sub>	H3B	> 8 kV
AEC-Q101-005	Charge device mode	Refer to AEC-Q101-005		C3	> 1000 V
JESD22-A114	Human body model (contact mode)	C = 100 pF, R = 1.5 kΩ		3B	> 8 kV
IEC 61000-4-2 <sup>(2)</sup>	Human body model (contact mode)	C = 150 pF, R = 330 Ω		4	> 8 kV
	Human body model (air-discharge mode) <sup>(1)</sup>	C = 150 pF, R = 330 Ω		4	> 15 kV

Notes

- (1) Immunity to IEC 61000-4-2 air discharge mode has a typical performance > 30 kV
- (2) System ESD standard

ORDERING INFORMATION TABLE



- 1** - Vishay standard recovery product
- 2** - Oxide planar chip technology
- 3** - Current rating (40 = 4 A)
- 4** - Package type (N3 = DFN33A package)
- 5** - Voltage rating (D = 200 V, G = 400 V, J = 600 V)
- 6** - Quality grade (H = AEC-Q101 qualified, otherwise = industry grade)
- 7** - 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
SE40N3J-M3/I	0.031	I	6000	13" diameter plastic tape and reel
SE40N3JHM3/I (1)	0.031	I	6000	13" diameter plastic tape and reel

**Note**

(1) AEC-Q101 qualified

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

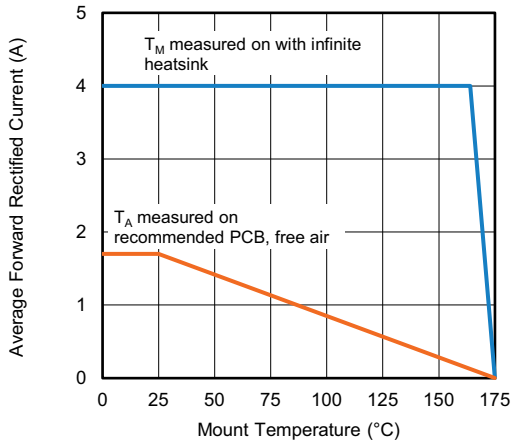


Fig. 1 - Maximum Forward Current Derating Curve

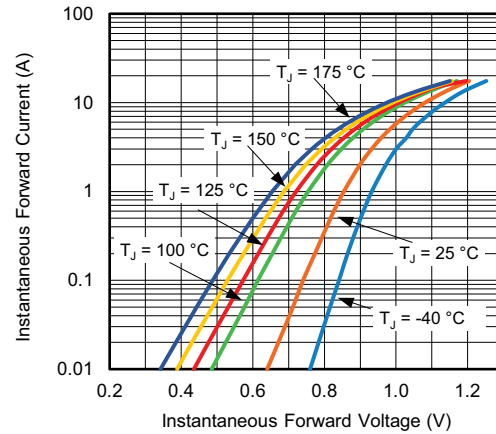


Fig. 3 - Typical Instantaneous Forward Characteristics

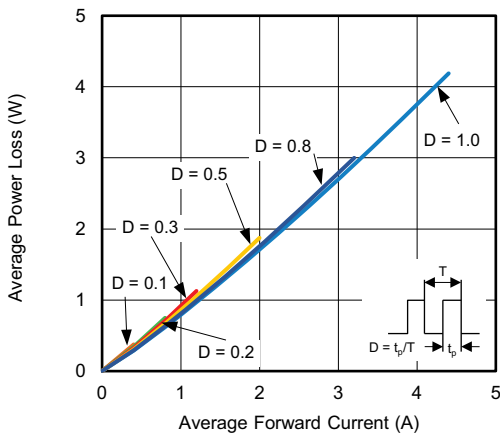


Fig. 2 - Forward Power Loss Characteristics

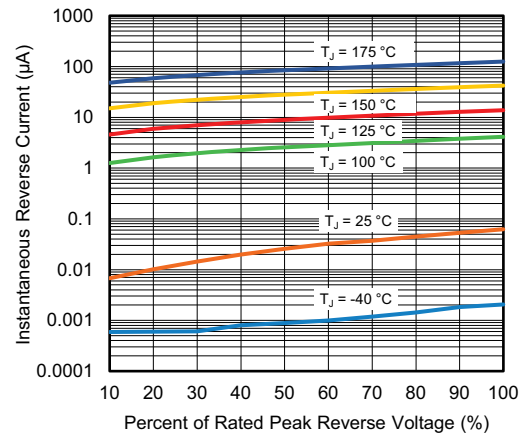


Fig. 4 - Typical Reverse Leakage Characteristics

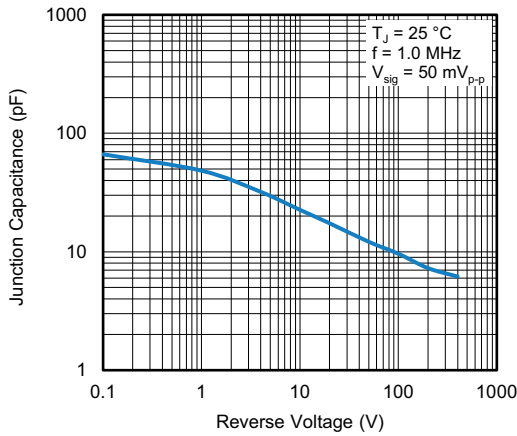


Fig. 5 - Typical Junction Capacitance

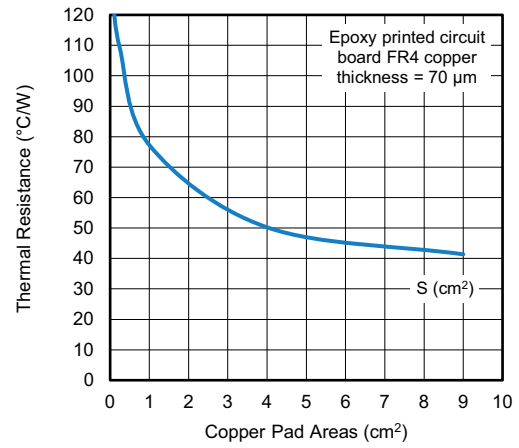


Fig. 7 - Thermal Resistance Junction -to-Ambient vs. Copper Pad Areas

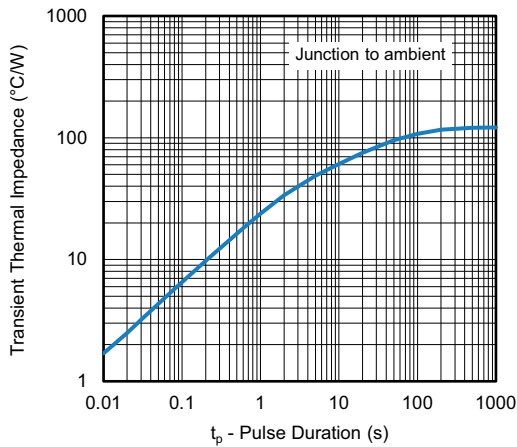
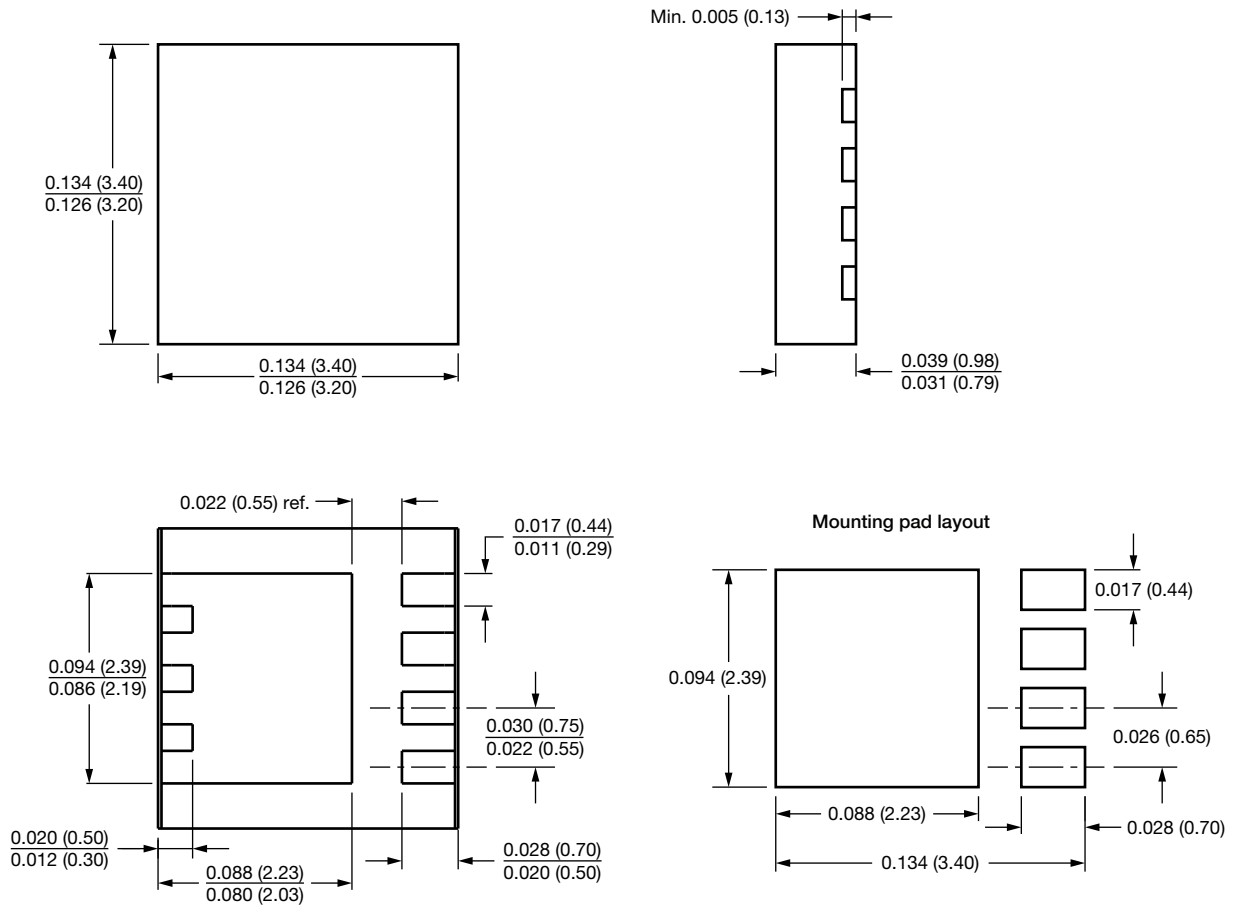


Fig. 6 - Typical Transient Thermal Impedance



### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

#### DFN33A





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