

Surface-Mount Standard Rectifier



LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	6 A
V_{RRM}	200 V, 400 V, 600 V
I_{FSM}	80 A
V_F at $I_F = 6$ A ($T_J = 125$ °C)	0.88 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)
- Ideal for automated replacement
- Oxide planar chip junction
- Low forward voltage drop
- Typical IR less than 0.1 μ 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



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

MAXIMUM RATINGS (T _A = 25 °C unless otherwise noted)					
PARAMETER	SYMBOL	SE60N3D	SE60N3G	SE60N3J	UNIT
Device marking code		6D	6G	6J	
Maximum repetitive peak reverse voltage	V _{RRM}	200	400	600	V
Maximum average forward rectified current (fig.1)	I _{F(AV)} ⁽¹⁾	6			A
	I _{F(AV)} ⁽²⁾	1.88			
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I _{FSM}	80			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 _J = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I _F = 3 A	T _J = 25 °C	V _F ⁽¹⁾	0.91	-	V
	I _F = 6 A			0.98	1.05	
	I _F = 3 A	T _J = 125 °C		0.80	-	
	I _F = 6 A			0.88	0.98	
Reverse current	Rated V _R	T _J = 25 °C	I _R ⁽²⁾	-	10	μA
		T _J = 125 °C		18	100	
Typical junction capacitance	4.0 V, 1 MHz		C _J	40	-	pF

Notes(1) Pulse test: 300 μs pulse width, 1 % duty cycle(2) Pulse test: pulse width $\leq 5\text{ ms}$

THERMAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)				
PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Thermal resistance	$R_{\theta JA}^{(1)(2)}$	122	153	$^{\circ}\text{C/W}$
	$R_{\theta JM}^{(3)}$	2.9	3.6	

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-mount to follow JEDEC 51-14 transient dual interface test method (TDIM)

IMMUNITY TO ELECTRICAL STATIC DISCHARGE TO THE FOLLOWING STANDARDS ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)					
STANDARD	TEST TYPE	TEST CONDITIONS	SYMBOL	CLASS	VALUE
AEC-Q101-001	Human body model (contact mode)	$C = 100\text{ pF}$, $R = 1.5\text{ k}\Omega$	V_C	H3B	$> 8\text{ kV}$
AEC-Q101-005	Charge device mode	Refer to AEC-Q101-005		C3	$> 1000\text{ V}$
JESD22-A114	Human body model (contact mode)	$C = 100\text{ pF}$, $R = 1.5\text{ k}\Omega$		3B	$> 8\text{ kV}$
IEC 61000-4-2 ⁽²⁾	Human body model (contact mode)	$C = 150\text{ pF}$, $R = 330\text{ }\Omega$		4	$> 8\text{ kV}$
	Human body model (air-discharge mode) ⁽¹⁾	$C = 150\text{ pF}$, $R = 330\text{ }\Omega$		4	$> 15\text{ kV}$

Notes(1) Immunity to IEC 61000-4-2 air discharge mode has a typical performance $> 30\text{ kV}$

(2) System ESD standard

ORDERING INFORMATION TABLE

Device code	S	E	60	N3	J	H	M3
	①	②	③	④	⑤	⑥	⑦
①	-	Vishay standard recovery product					
②	-	Oxide planar chip technology					
③	-	Current rating (60 = 6 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
SE60N3J-M3/I	0.031	I	6000	13" diameter plastic tape and reel
SE60N3JHM3/I ⁽¹⁾	0.031	I	6000	13" diameter plastic tape and reel

Note
⁽¹⁾ AEC-Q101 qualified

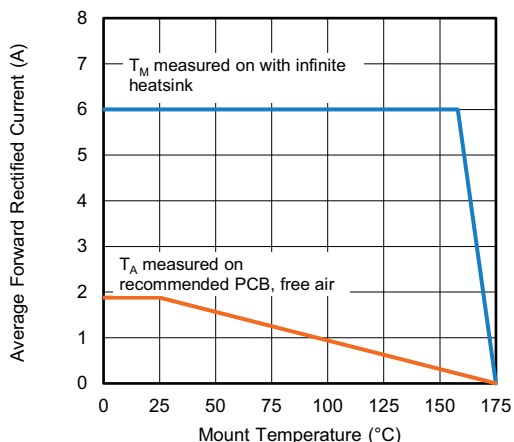
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

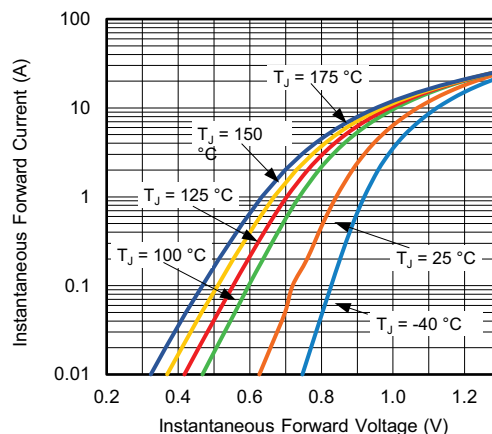


Fig. 3 - Typical Instantaneous Forward Characteristics

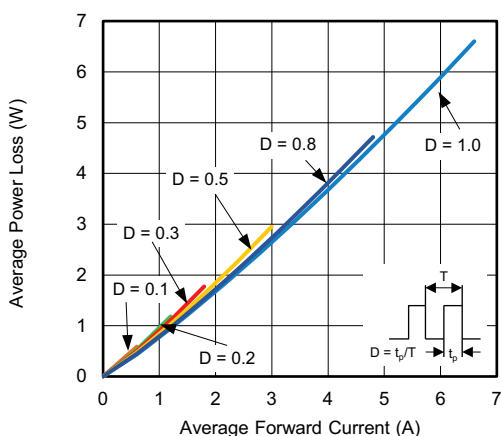


Fig. 2 - Forward Power Loss Characteristics

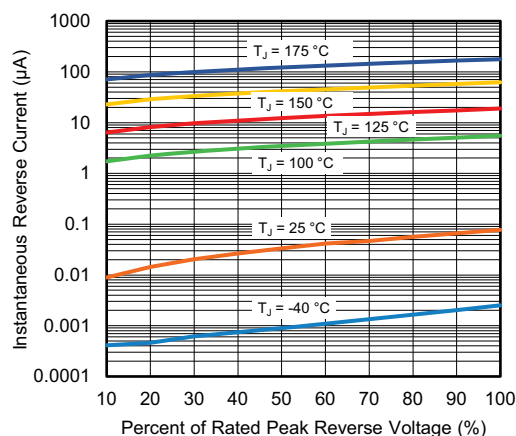


Fig. 4 - Typical Reverse Leakage Characteristics

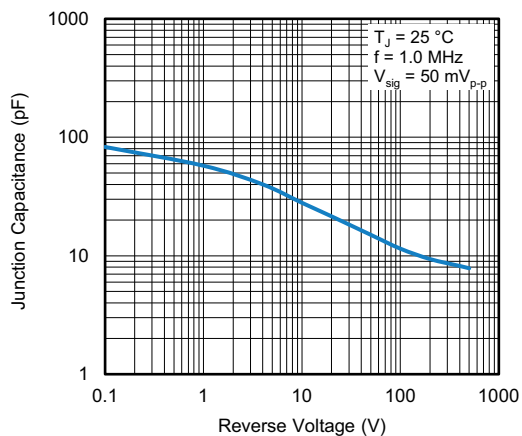


Fig. 5 - Typical Junction Capacitance

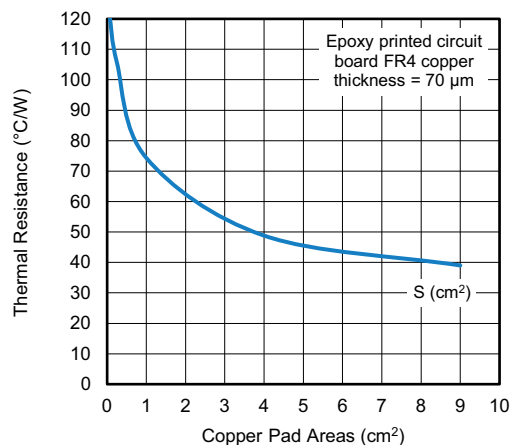


Fig. 7 - Thermal Resistance Junction -to-Ambient vs. Copper Pad Areas

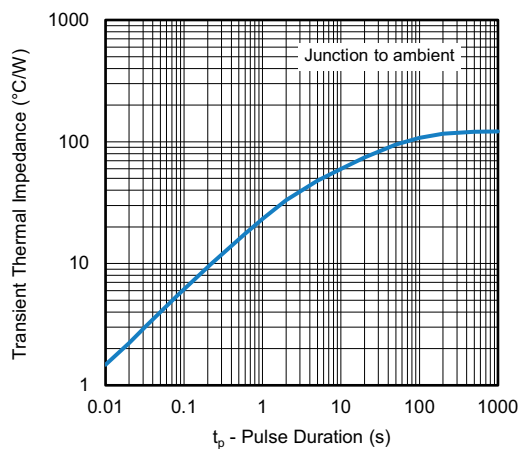
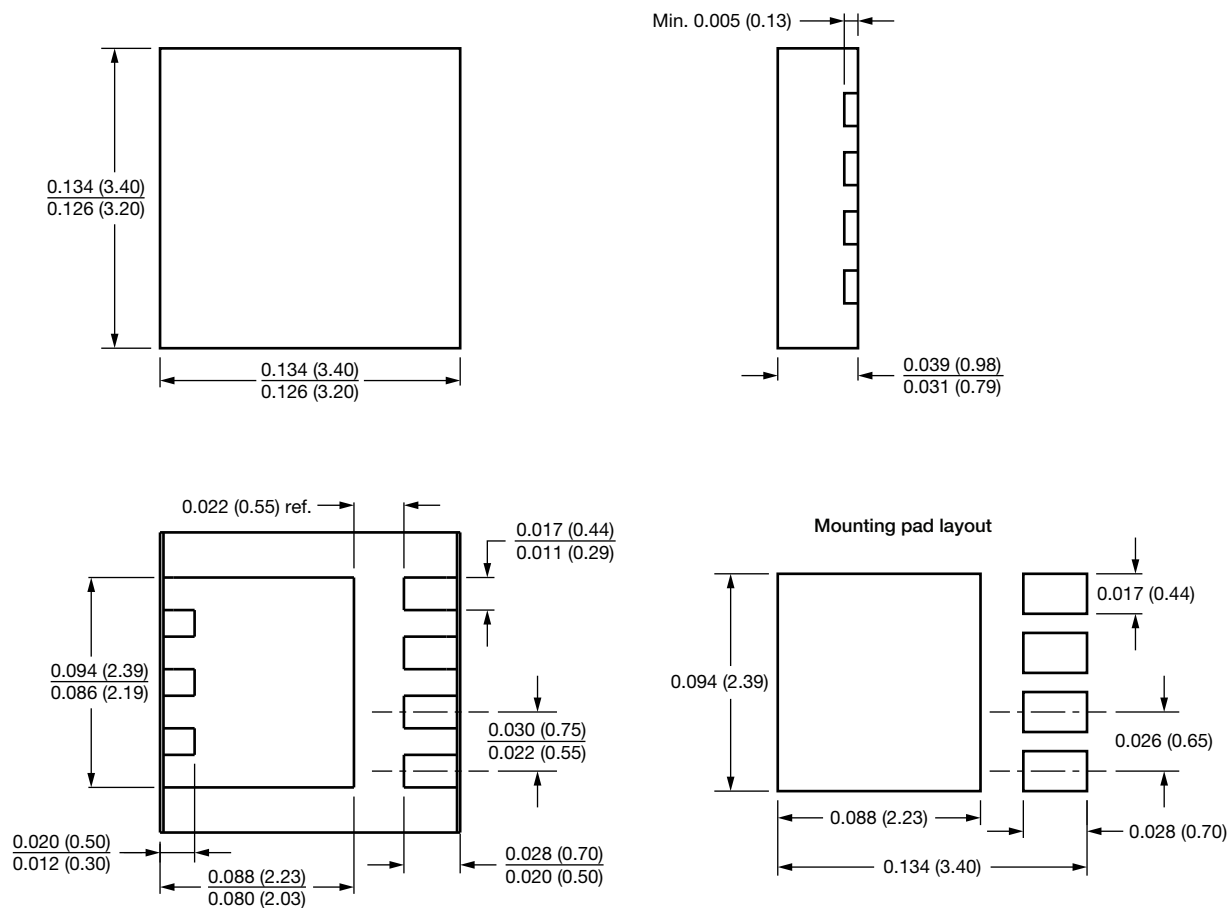


Fig. 6 - Typical Transient Thermal Impedance



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DFN33A





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