

Surface-Mount Standard Rectifier



LINKS TO ADDITIONAL RESOURCES



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

| 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 |

| 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

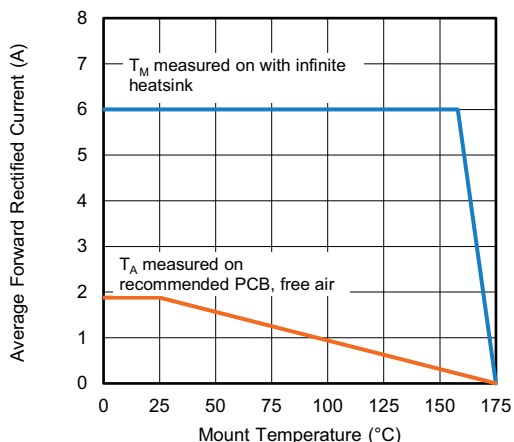
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

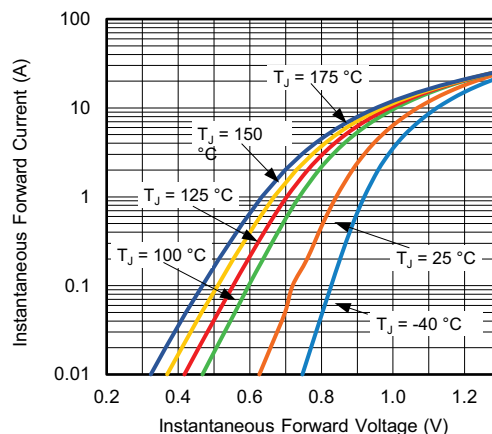


Fig. 3 - Typical Instantaneous Forward Characteristics

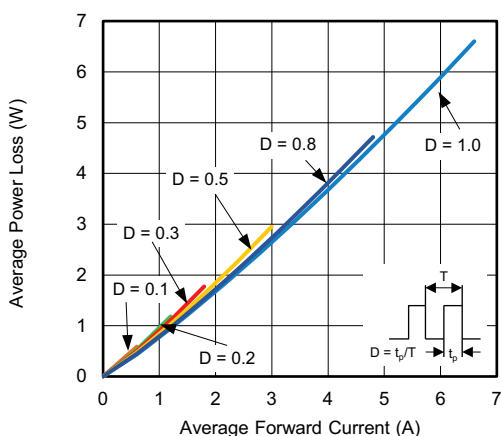


Fig. 2 - Forward Power Loss Characteristics

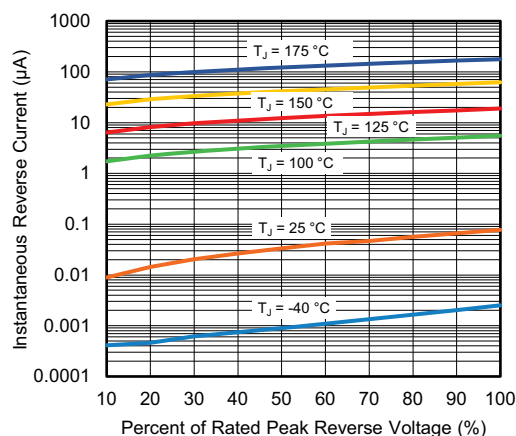


Fig. 4 - Typical Reverse Leakage Characteristics

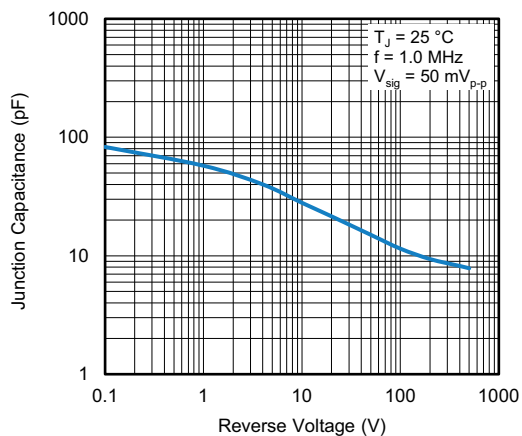


Fig. 5 - Typical Junction Capacitance

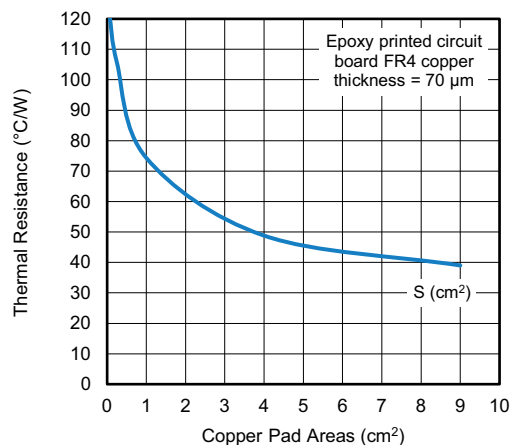


Fig. 7 - Thermal Resistance Junction -to-Ambient vs. Copper Pad Areas

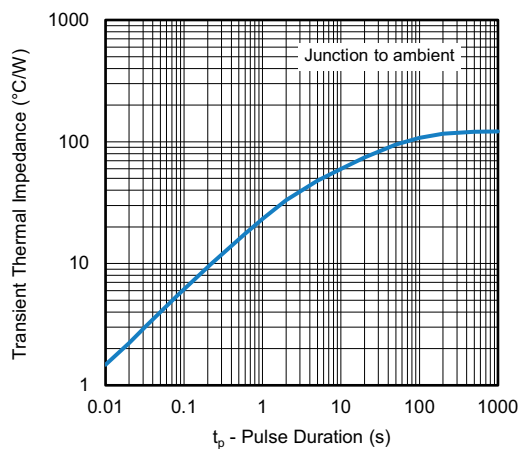
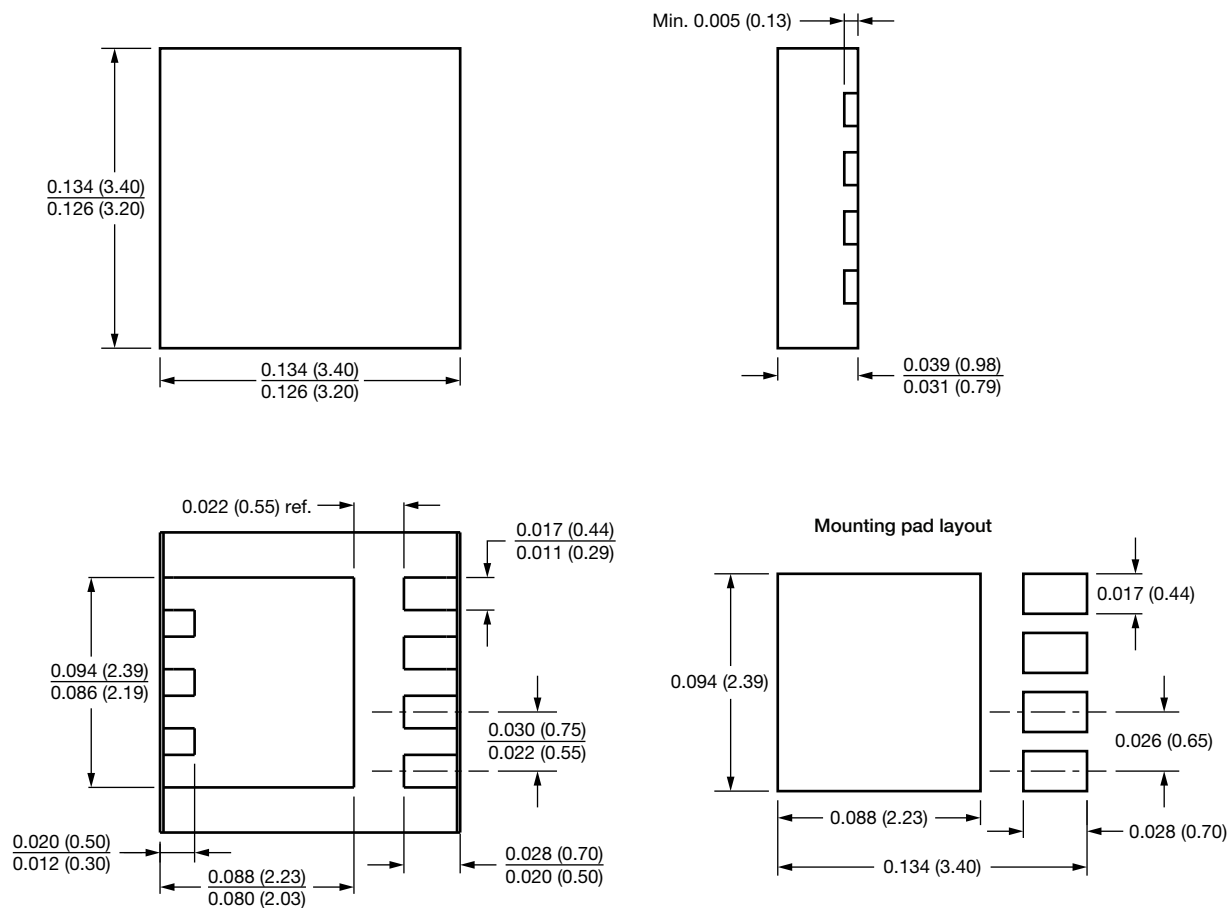


Fig. 6 - Typical Transient Thermal Impedance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DFN33A





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