

Surface Mount Schottky Power Rectifier

Plastic SOD-123 Package

MBR140ESF, NRVB140ESF

This device uses the Schottky Barrier principle with a large area metal-to-silicon power diode. Ideally suited for low voltage, high frequency rectification or as free wheeling and polarity protection diodes in surface mount applications where compact size and weight are critical to the system. This package also provides an easy to work with alternative to leadless 34 package style. Because of its small size, it is ideal for use in portable and battery powered products such as cellular and cordless phones, chargers, notebook computers, printers, PDAs and PCMCIA cards. Typical applications are AC-DC and DC-DC converters, reverse battery protection, and “Oring” of multiple supply voltages and any other application where performance and size are critical.

Features

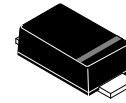
- Guardring for Stress Protection
- Low Reverse Leakage
- 175°C Operating Junction Temperature
- Epoxy Meets UL 94 V-0 @ 0.125 in
- Package Designed for Optimal Automated Board Assembly
- ESD Rating:
 - ◆ Human Body Model = 3B
 - ◆ Machine Model = M4
- NRVB Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free and are RoHS Compliant*

Mechanical Characteristics

- Device Marking: E4F
- Polarity Designator: Cathode Band
- Weight: 11.7 mg (approximately)
- Case: Epoxy, Molded
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Max. for 10 Seconds

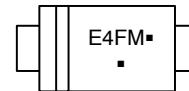
*For additional information on our Pb-Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

SCHOTTKY BARRIER RECTIFIER 1.0 AMPERES 40 VOLTS



SOD-123FL
CASE 498

MARKING DIAGRAM



- E4F = Specific Device Code
- M = Date Code
- = Pb-Free Package)

(Note: Microdot may be in either location)

ORDERING INFORMATION

| Device | Package | Shipping [†] |
|---------------|------------------------|-----------------------------|
| MBR140ESFT1G | SOD-123FL (Pb-Free) | 3,000 / Tape & Reel ** |
| MBR140ESFT3G | SOD-123FL (Pb-Free) | 10,000 / Tape & Reel *** |
| NRVB140ESFT1G | SOD-123FL (Pb-Free) | 3,000 / Tape & Reel ** |
| NRVB140ESFT3G | SOD-123FL (Pb-Free) | 10,000 / Tape & Reel *** |

[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

** 8 mm Tape, 7" Reel

*** 8 mm Tape, 13" Reel

MBR140ESF, NRVB140ESF

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---------------------------------|------------|------|
| Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage | V_{RRM} V_{RWM} V_R | 40 | V |
| Average Rectified Forward Current | I_O | 1.0 | A |
| Peak Repetitive Forward Current | I_{FRM} | 2.0 | A |
| Non-Repetitive Peak Surge Current (Non-Repetitive peak surge current, halfwave, single phase, 60 Hz) | I_{FSM} | 30 | A |
| Storage Temperature | T_{stg} | -55 to 175 | °C |
| Operating Junction Temperature | T_J | -55 to 175 | °C |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Value | Unit |
|--|-----------|-------|------|
| Thermal Resistance, Junction-to-Lead (Note 1) | R_{tjl} | 26 | °C/W |
| Thermal Resistance, Junction-to-Lead (Note 2) | R_{tjl} | 21 | |
| Thermal Resistance, Junction-to-Ambient (Note 1) | R_{tja} | 325 | |
| Thermal Resistance, Junction-to-Ambient (Note 2) | R_{tja} | 82 | |

1. Mounted with minimum recommended pad size, PC Board FR4.
2. Mounted with 1 in. copper pad (Cu area 700 mm²).

ELECTRICAL CHARACTERISTICS

| Characteristic | Symbol | Value | Unit |
|--|--------|--------------------------|------|
| Maximum Instantaneous Forward Voltage (Note 3) ($I_F = 1.0$ A) | V_F | $T_J = 25^\circ\text{C}$ | V |
| | | 0.56 | |
| Maximum Instantaneous Reverse Current (Note 3) ($V_R = 40$ V) | I_R | $T_J = 25^\circ\text{C}$ | μA |
| | | 30 | |

3. Pulse Test: Pulse Width ≤ 250 μs, Duty Cycle ≤ 2%.

MBR140ESF, NRVB140ESF

TYPICAL CHARACTERISTICS

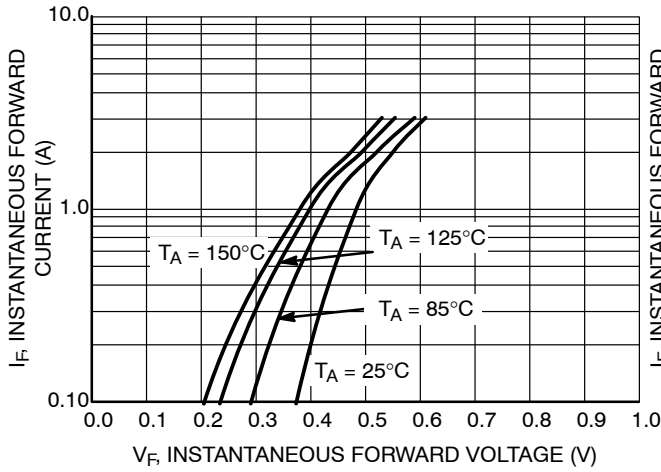


Figure 1. Typical Instantaneous Forward Characteristics

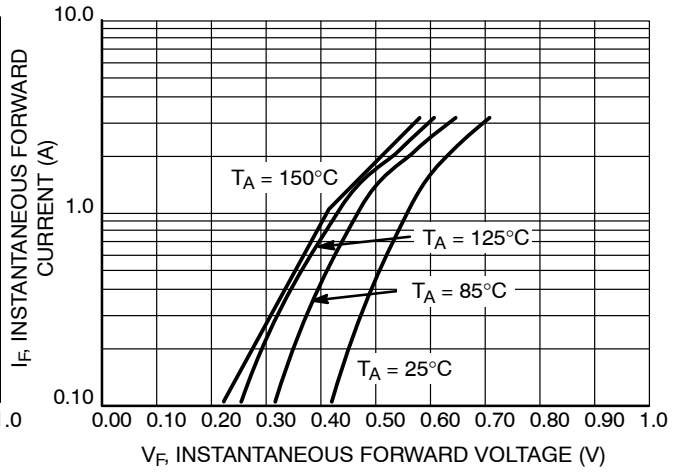


Figure 2. Maximum Instantaneous Forward Characteristics

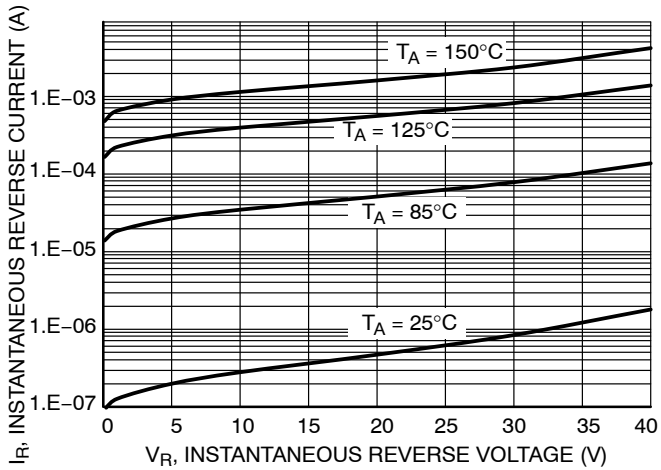


Figure 3. Typical Reverse Characteristics

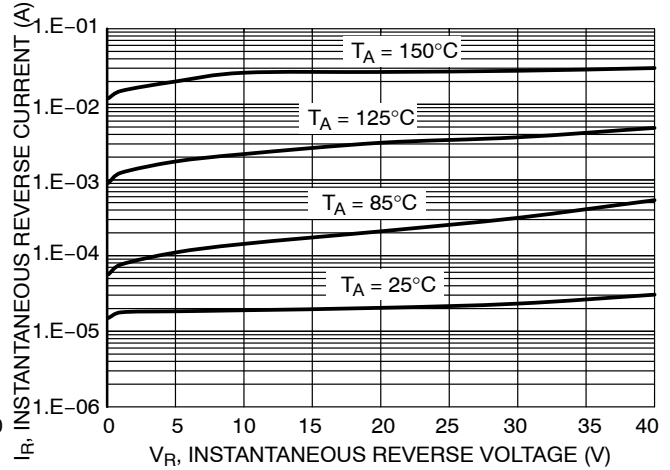


Figure 4. Maximum Reverse Characteristics

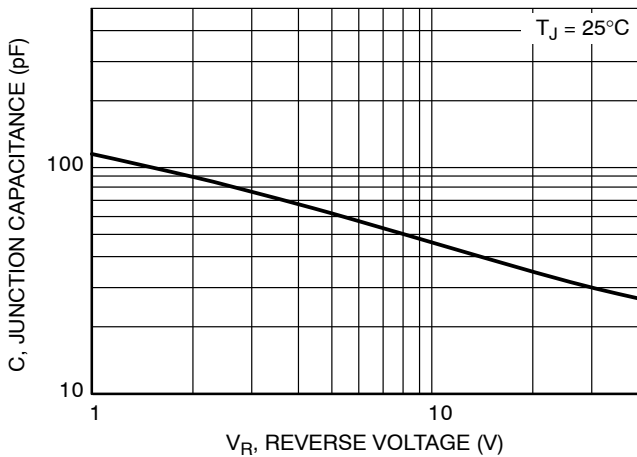


Figure 5. Typical Junction Capacitance

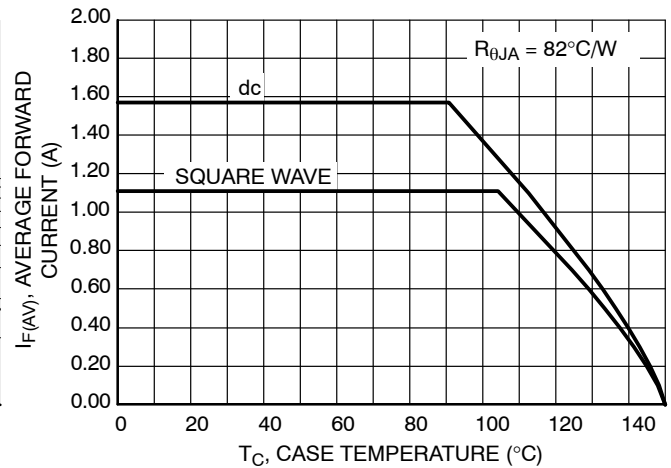


Figure 6. Current Derating, Case

MBR140ESF, NRVB140ESF

TYPICAL CHARACTERISTICS

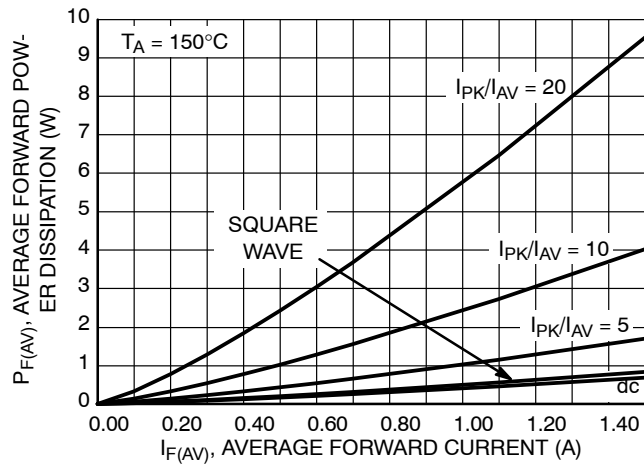


Figure 7. Forward Power Dissipation

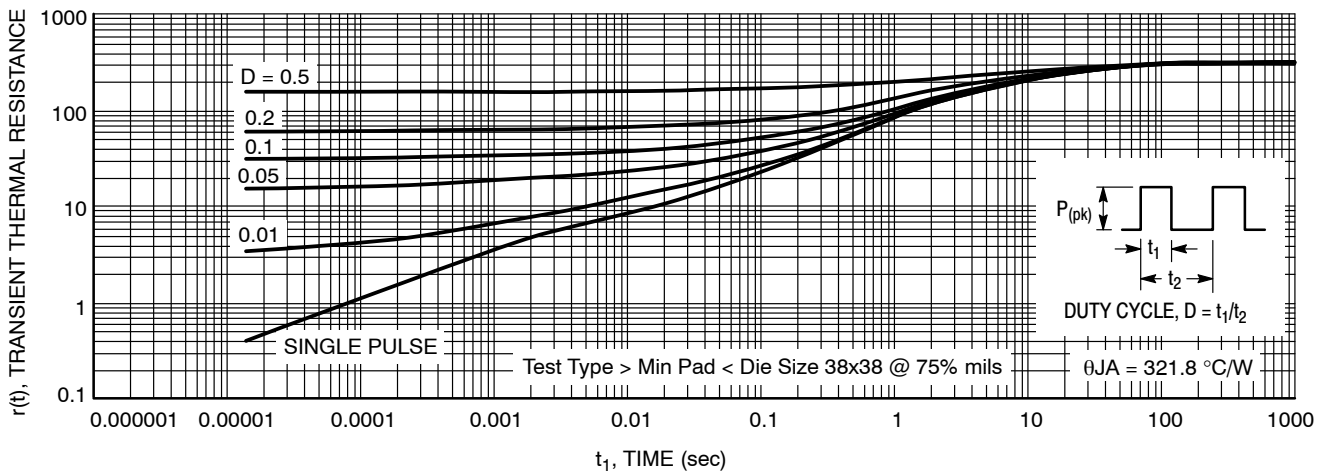
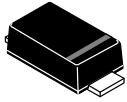


Figure 8. Thermal Response

MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

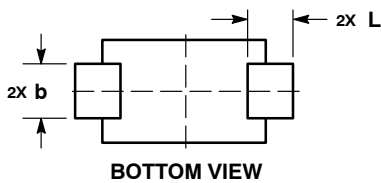
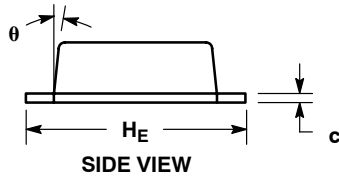
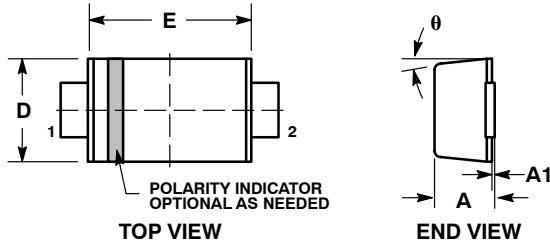
ON Semiconductor®



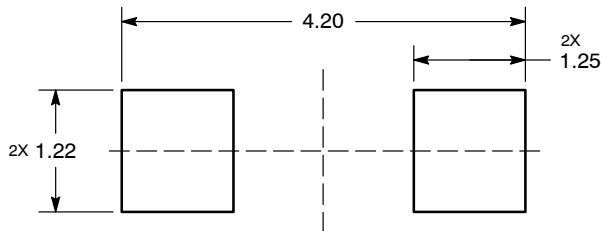
SCALE 4:1

SOD-123FL
CASE 498
ISSUE D

DATE 10 MAY 2013



RECOMMENDED SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

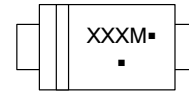
*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH.
4. DIMENSIONS D AND J ARE TO BE MEASURED ON FLAT SECTION OF THE LEAD: BETWEEN 0.10 AND 0.25 MM FROM THE LEAD TIP.

| DIM | MILLIMETERS | | | INCHES | | |
|----------------|-------------|------|------|--------|-------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.90 | 0.95 | 0.98 | 0.035 | 0.037 | 0.039 |
| A1 | 0.00 | 0.05 | 0.10 | 0.000 | 0.002 | 0.004 |
| b | 0.70 | 0.90 | 1.10 | 0.028 | 0.035 | 0.043 |
| c | 0.10 | 0.15 | 0.20 | 0.004 | 0.006 | 0.008 |
| D | 1.50 | 1.65 | 1.80 | 0.059 | 0.065 | 0.071 |
| E | 2.50 | 2.70 | 2.90 | 0.098 | 0.106 | 0.114 |
| L | 0.55 | 0.75 | 0.95 | 0.022 | 0.030 | 0.037 |
| H _E | 3.40 | 3.60 | 3.80 | 0.134 | 0.142 | 0.150 |
| θ | 0° | - | 8° | 0° | - | 8° |

GENERIC MARKING DIAGRAM*



XXX = Specific Device Code
M = Date Code
▪ = Pb-Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present.

| | | |
|------------------|-------------|--|
| DOCUMENT NUMBER: | 98AON11184D | Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red. |
| DESCRIPTION: | SOD-123FL | PAGE 1 OF 1 |

ON Semiconductor and are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. ON Semiconductor does not convey any license under its patent rights nor the rights of others.

onsemi, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:

Technical Library: www.onsemi.com/design/resources/technical-documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support

For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales