

# 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

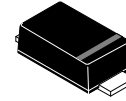
- Guardring for Stress Protection
- Low Reverse Leakage
- 175°C Operating Junction Temperature
- Epoxy Meets UL 94 V-0 @ 0.125 in
- Package Designed for Optimal Automated Board Assembly
- ESD Rating:
  - ◆ Human Body Model = 3B
  - ◆ Machine Model = M4
- NRVB Prefix for Automotive and Other Applications 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

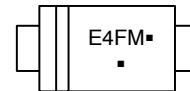
\*For additional information on our Pb-Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

## 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 <sup>†</sup>       |
|---------------|------------------------|-----------------------------|
| MBR140ESFT1G  | SOD-123FL<br>(Pb-Free) | 3,000 /<br>Tape & Reel **   |
| MBR140ESFT3G  | SOD-123FL<br>(Pb-Free) | 10,000 /<br>Tape & Reel *** |
| NRVB140ESFT1G | SOD-123FL<br>(Pb-Free) | 3,000 /<br>Tape & Reel **   |
| NRVB140ESFT3G | SOD-123FL<br>(Pb-Free) | 10,000 /<br>Tape & Reel *** |

<sup>†</sup>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<br>Working Peak Reverse Voltage<br>DC Blocking Voltage                  | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | 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<br>(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    | °C/W |
| Thermal Resistance, Junction-to-Ambient (Note 1) | $R_{tja}$ | 325   | °C/W |
| Thermal Resistance, Junction-to-Ambient (Note 2) | $R_{tja}$ | 82    | °C/W |

1. Mounted with minimum recommended pad size, PC Board FR4.
2. Mounted with 1 in. copper pad (Cu area 700 mm<sup>2</sup>).

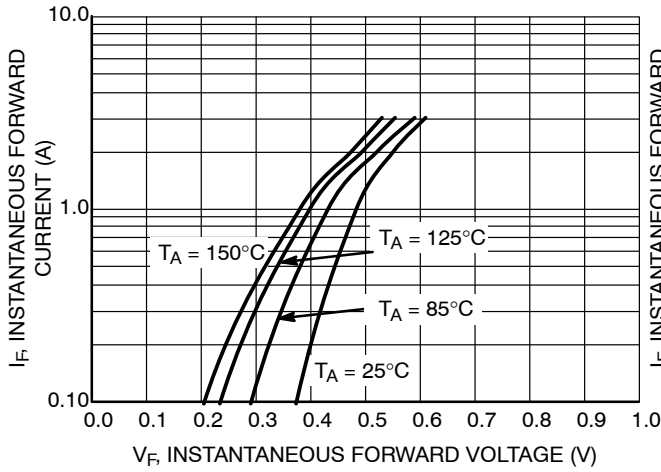
## ELECTRICAL CHARACTERISTICS

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

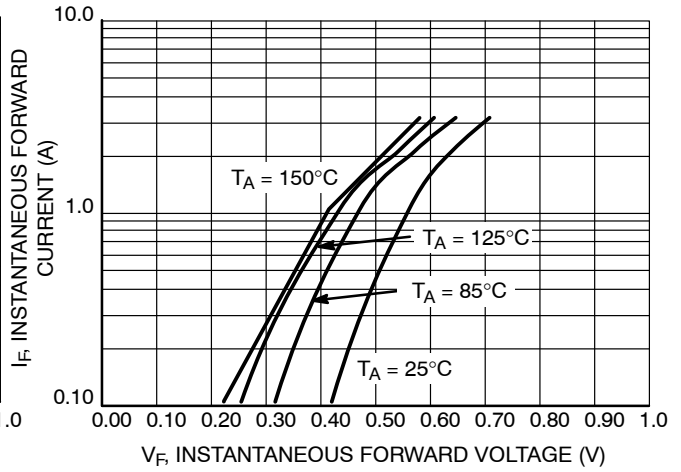
3. Pulse Test: Pulse Width ≤ 250 μs, Duty Cycle ≤ 2%.

# MBR140ESF, NRVB140ESF

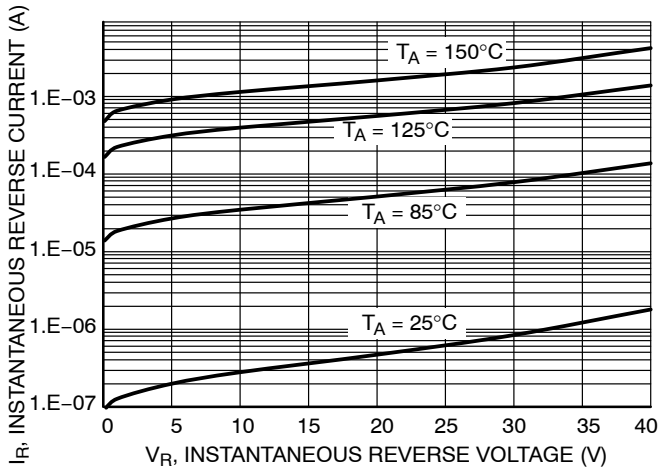
## TYPICAL CHARACTERISTICS



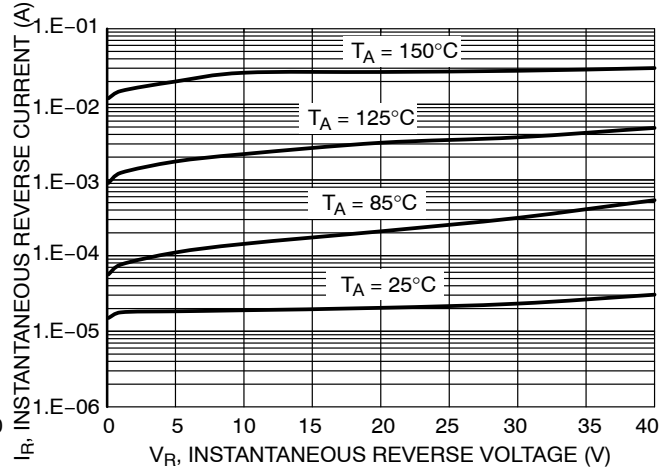
**Figure 1. Typical Instantaneous Forward Characteristics**



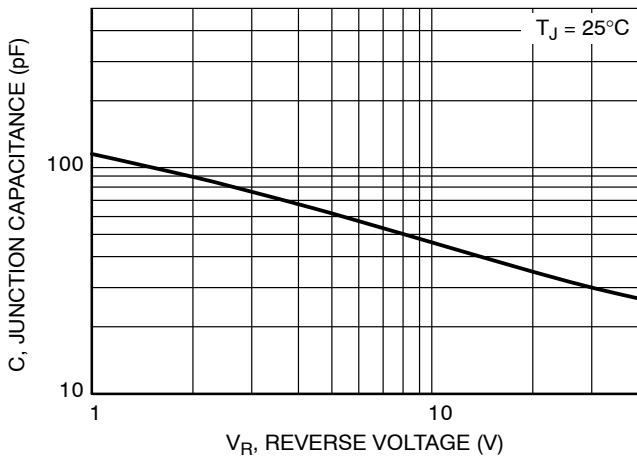
**Figure 2. Maximum Instantaneous Forward Characteristics**



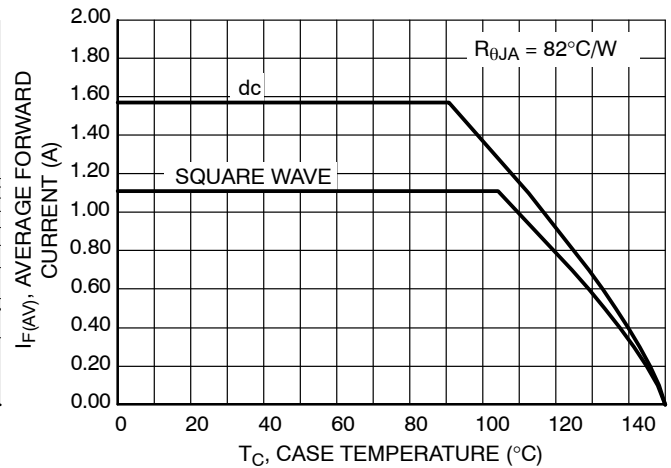
**Figure 3. Typical Reverse Characteristics**



**Figure 4. Maximum Reverse Characteristics**



**Figure 5. Typical Junction Capacitance**



**Figure 6. Current Derating, Case**

# MBR140ESF, NRVB140ESF

## TYPICAL CHARACTERISTICS

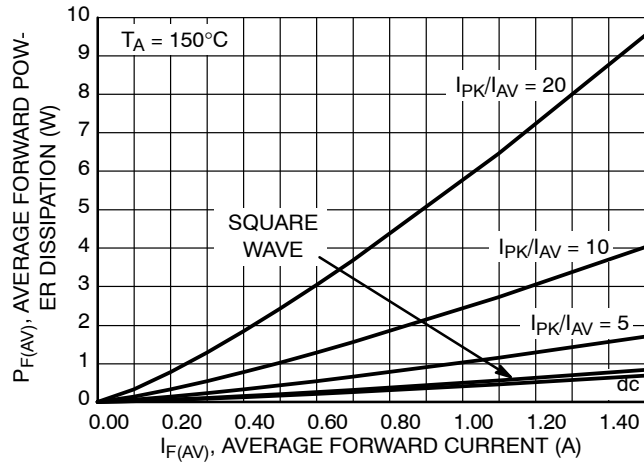


Figure 7. Forward Power Dissipation

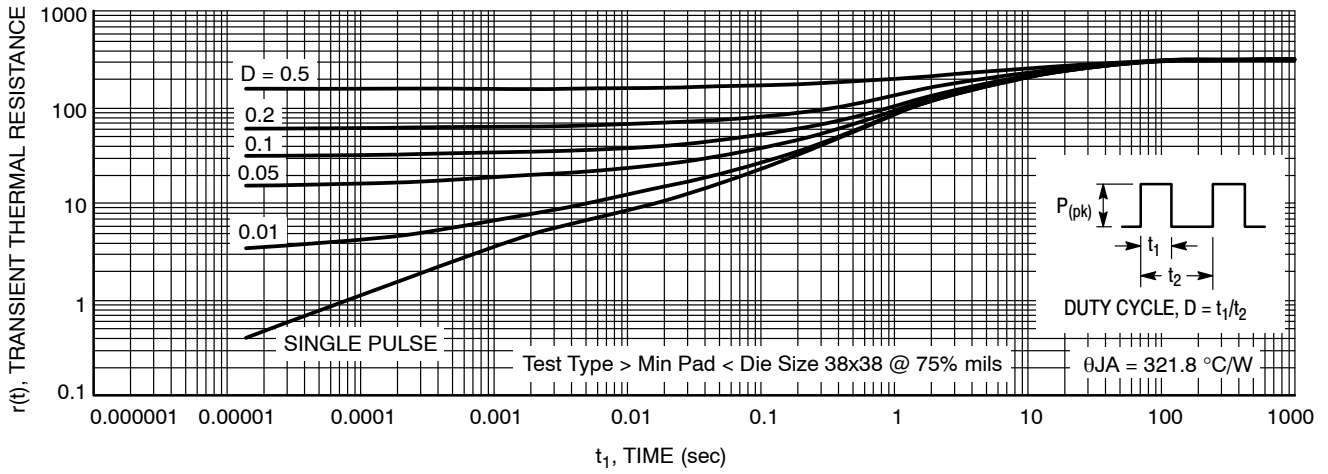


Figure 8. Thermal Response

# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

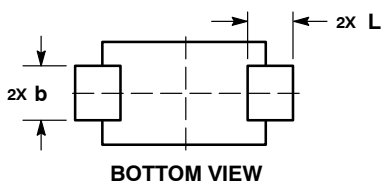
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SCALE 4:1

SOD-123FL  
CASE 498  
ISSUE D

DATE 10 MAY 2013



### RECOMMENDED SOLDERING FOOTPRINT\*



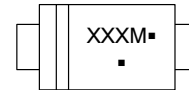
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

#### 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 |
| HE  | 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.

|                         |                    |  |
|-------------------------|--------------------|--|
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| <b>DESCRIPTION:</b>     | <b>SOD-123FL</b>   | <b>PAGE 1 OF 1</b>   |

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