

# MBRA210ET3

## Surface Mount Schottky Power Rectifier

### SMA Power Surface Mount Package

This device employs the Schottky Barrier principle in a metal-to-silicon power rectifier. Features epitaxial construction with oxide passivation and metal overlay contact. Ideally suited for low voltage, high frequency switching power supplies; free wheeling diodes and polarity protection diodes. 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

- Low  $I_R$ , Extends Battery Life
- 1st in the Market Place with a 10  $V_R$  Schottky Rectifier
- Compact Package with J-Bend Leads Ideal for Automated Handling
- Highly Stable Oxide Passivated Junction
- Guardring for Over-Voltage Protection
- Optimized for Low Leakage Current
- Pb-Free Package is Available

#### Mechanical Characteristics

- Case: Molded Epoxy
- Epoxy Meets UL 94 V-0 @ 0.125 in
- Weight: 70 mg (Approximately)
- 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
- Polarity: Polarity Band Indicates Cathode Lead
- ESD Ratings:
  - Machine Model = C
  - Human Body Model = 3B



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### SCHOTTKY BARRIER RECTIFIER 2 AMPERES 10 VOLTS



**SMA  
CASE 403D  
PLASTIC**

#### MARKING DIAGRAM



B2E1 = Device Code  
A = Assembly Location  
Y = Year  
WW = Work Week  
▪ = Pb-Free Package

#### ORDERING INFORMATION

| Device      | Package          | Shipping†        |
|-------------|------------------|------------------|
| MBRA210ET3  | SMA              | 5000/Tape & Reel |
| MBRA210ET3G | SMA<br>(Pb-Free) | 5000/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.

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## 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>$V_R$ | 10          | V                |
| Average Rectified Forward Current<br>(At Rated $V_R$ , $T_C = 125^\circ\text{C}$ )                          | $I_O$                           | 2.0         | A                |
| Non-Repetitive Peak Surge Current<br>(Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz) | $I_{FSM}$                       | 100         | A                |
| Storage/Operating Case Temperature                                                                          | $T_{stg}$ , $T_C$               | -65 to +150 | $^\circ\text{C}$ |
| Operating Junction Temperature                                                                              | $T_J$                           | -65 to +150 | $^\circ\text{C}$ |
| Voltage Rate of Change<br>(Rated $V_R$ , $T_J = 25^\circ\text{C}$ )                                         | $dv/dt$                         | 10,000      | V/ $\mu\text{s}$ |

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

## THERMAL CHARACTERISTICS

| Characteristic                                   | Symbol          | Min Pad | 1 Inch Pad | Unit                      |
|--------------------------------------------------|-----------------|---------|------------|---------------------------|
| Thermal Resistance, Junction-to-Lead (Note 1)    | $R_{\theta JL}$ | 22      | 15         | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction-to-Ambient (Note 1) | $R_{\theta JA}$ | 150     | 81         |                           |

## ELECTRICAL CHARACTERISTICS

|                                                                                                                                    |       |                          |                           |               |
|------------------------------------------------------------------------------------------------------------------------------------|-------|--------------------------|---------------------------|---------------|
| Maximum Instantaneous Forward Voltage (Note 2)<br>( $I_F = 0.1\text{ A}$ )<br>( $I_F = 1.0\text{ A}$ )<br>( $I_F = 2.0\text{ A}$ ) | $V_F$ | $T_J = 25^\circ\text{C}$ | $T_J = 100^\circ\text{C}$ | V             |
|                                                                                                                                    |       | 0.405                    | 0.275                     |               |
|                                                                                                                                    |       | 0.480                    | 0.355                     |               |
|                                                                                                                                    |       | 0.500                    | 0.385                     |               |
| Maximum Instantaneous Reverse Current<br>( $V_R = 5.0\text{ V}$ )<br>( $V_R = 10\text{ V}$ )                                       | $I_R$ | $T_J = 25^\circ\text{C}$ | $T_J = 100^\circ\text{C}$ | $\mu\text{A}$ |
|                                                                                                                                    |       | 15                       | 200                       |               |
|                                                                                                                                    |       | 50                       | 500                       |               |

1. Mounted on a 3" square FR4 PC Board with min. pads or 1" square copper heat spreader.
2. Pulse Test: Pulse Width  $\leq 250\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

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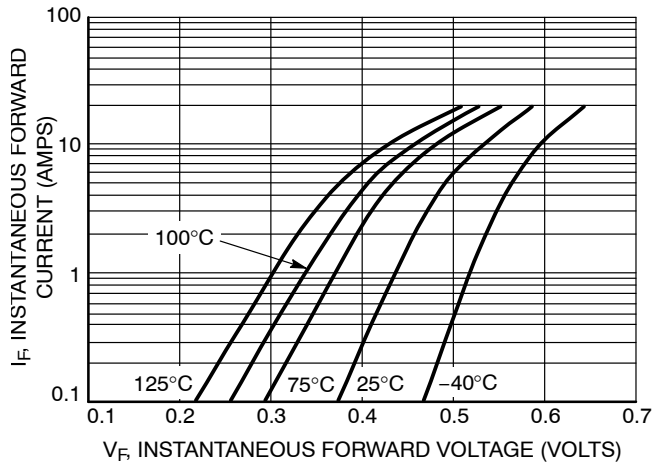


Figure 1. Typical Forward Voltage

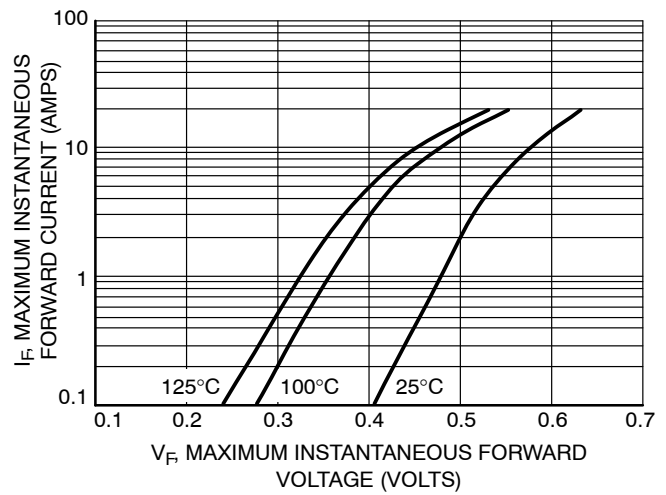


Figure 2. Maximum Forward Voltage

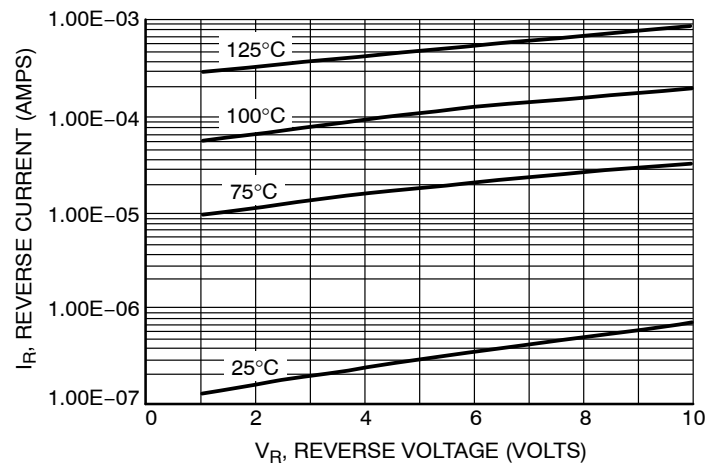


Figure 3. Typical Reverse Current

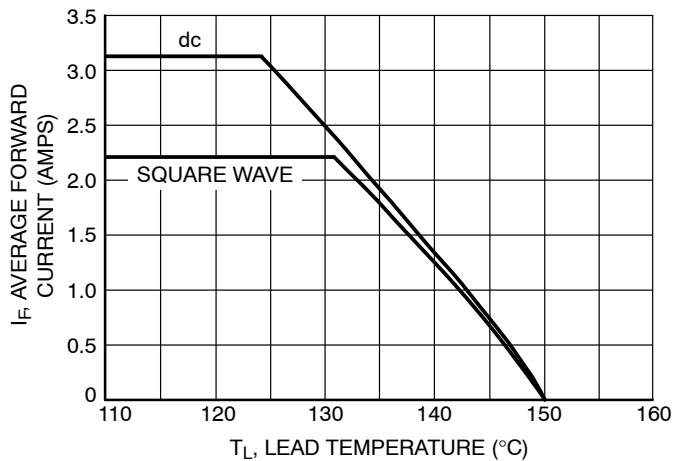


Figure 4. Current Derating - Junction to Lead

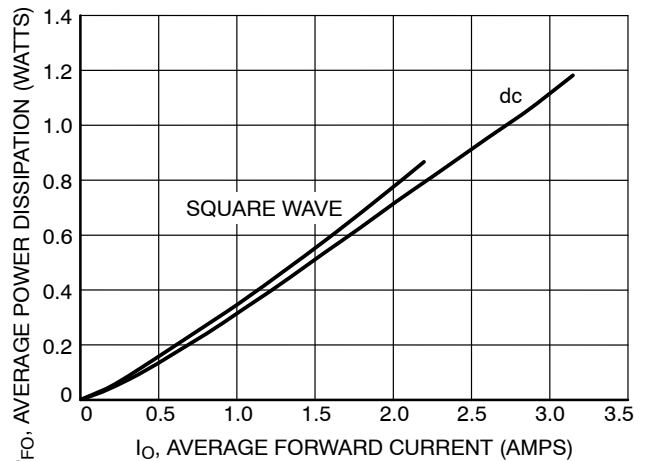


Figure 5. Forward Power Dissipation

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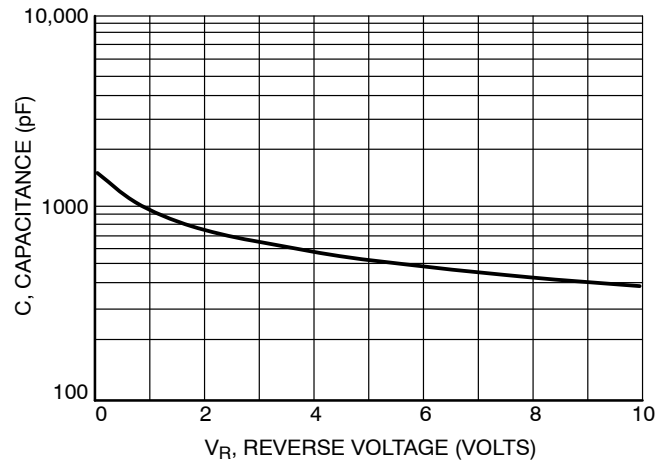


Figure 6. Typical Capacitance

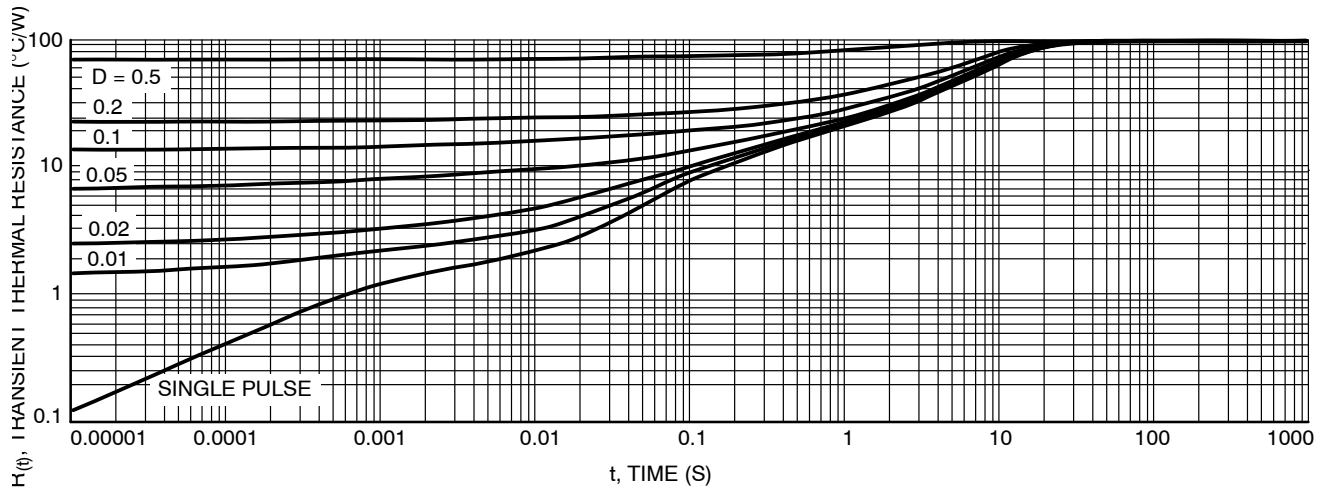


Figure 7. Thermal Response, Junction to Ambient (min pad)

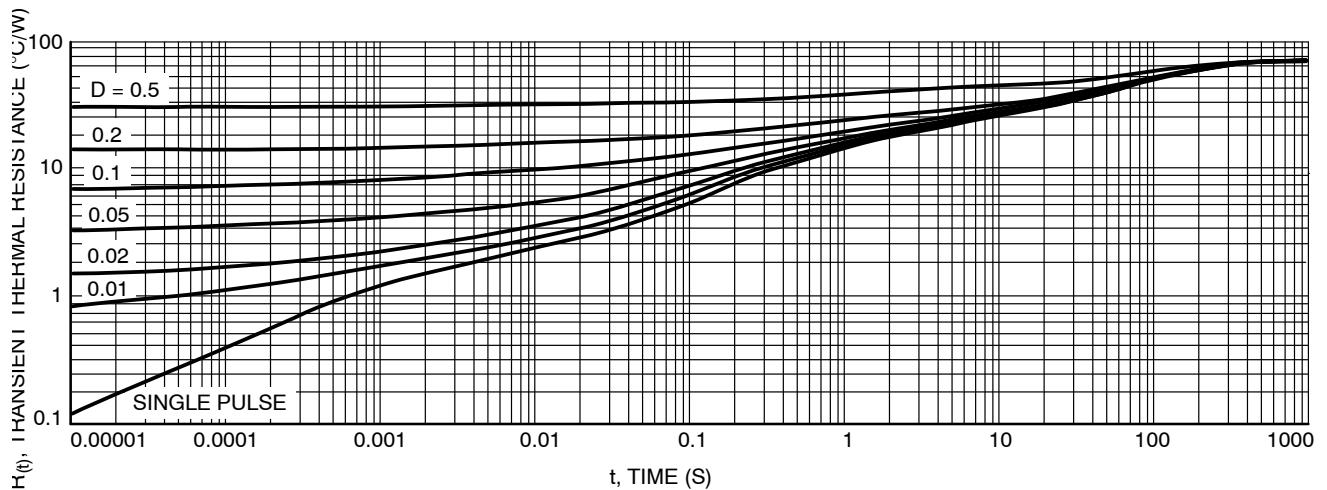
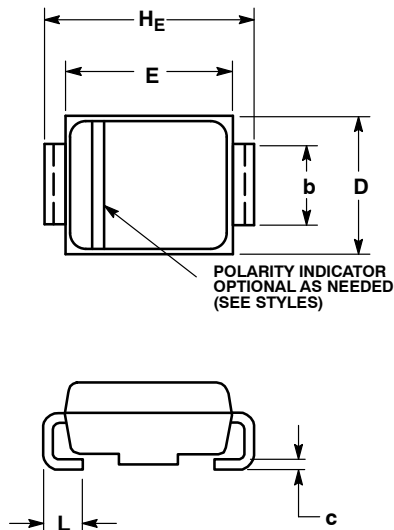


Figure 8. Thermal Response, Junction to Ambient (1 inch pad)

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## PACKAGE DIMENSIONS

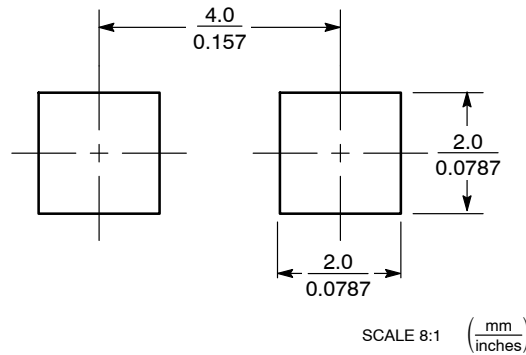
### SMA CASE 403D-02 ISSUE D



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. 403D-01 OBSOLETE, NEW STANDARD IS 403D-02.

| DIM | MILLIMETERS |      |      | INCHES |       |       |
|-----|-------------|------|------|--------|-------|-------|
|     | MIN         | NOM  | MAX  | MIN    | NOM   | MAX   |
| A   | 1.92        | 2.17 | 2.27 | 0.076  | 0.085 | 0.089 |
| A1  | 0.05        | 0.10 | 0.15 | 0.002  | 0.004 | 0.006 |
| b   | 1.27        | 1.45 | 1.63 | 0.050  | 0.057 | 0.064 |
| c   | 0.15        | 0.28 | 0.41 | 0.006  | 0.011 | 0.016 |
| D   | 2.29        | 2.60 | 2.92 | 0.090  | 0.103 | 0.115 |
| E   | 4.06        | 4.32 | 4.57 | 0.160  | 0.170 | 0.180 |
| H_E | 4.83        | 5.21 | 5.59 | 0.190  | 0.205 | 0.220 |
| L   | 0.76        | 1.14 | 1.52 | 0.030  | 0.045 | 0.060 |

### 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.

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