

## Product Summary

### B120Q/BQ-B140Q/BQ

| $V_{RRM}$ (V) | $I_O$ (A) | $V_F$ Max (V)<br>$T_A = +25^\circ\text{C}$ | $I_R$ Max (mA)<br>$T_A = +25^\circ\text{C}$ |
|---------------|-----------|--------------------------------------------|---------------------------------------------|
| 20/30/40      | 1.0       | 0.5                                        | 0.5                                         |

### B150Q/BQ, B160Q/BQ

| $V_{RRM}$ (V) | $I_O$ (A) | $V_F$ Max (V)<br>$T_A = +25^\circ\text{C}$ | $I_R$ Max (mA)<br>$T_A = +25^\circ\text{C}$ |
|---------------|-----------|--------------------------------------------|---------------------------------------------|
| 50/60         | 1.0       | 0.7                                        | 0.5                                         |

## Description and Applications

This Schottky Barrier Rectifier is designed to meet the general requirements of commercial applications. It is ideally suited for use as:

- Polarity Protection Diode
- Re-Circulating Diode
- Switching Diode
- Blocking Diode
- Freewheel Diode

## Features and Benefits

- Guard Ring Die Construction for Transient Protection
- Ideally Suited for Automated Assembly
- Low Power Loss, High Efficiency
- Surge Overload Rating to 30A Peak
- For Use in Low-Voltage, High-Frequency Inverters
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Notes 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

## Mechanical Data

- Case: SMA & SMB
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Lead Free Plating (Matte Tin Finish). Solderable per MIL-STD-202, Method 208 Ⓔ
- Polarity: Cathode Band or Cathode Notch
- Weight:
  - SMA 0.064 grams (Approximate)
  - SMB 0.093 grams (Approximate)



Top View



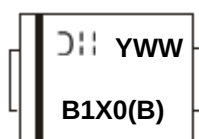
Bottom View

## Ordering Information (Note 5)

| Part Number | Qualification | Case | Packaging         |
|-------------|---------------|------|-------------------|
| B1X0Q-13-F  | Automotive    | SMA  | 5,000/Tape & Reel |
| B1X0BQ-13-F | Automotive    | SMB  | 3,000/Tape & Reel |

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to [http://www.diodes.com/product\\_compliance\\_definitions.html](http://www.diodes.com/product_compliance_definitions.html).
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



B1X0 = Product Type Marking Code, ex: B140Q (SMA Package)  
 B1X0B = Product Type Marking Code, ex: B160BQ (SMB Package)  
 311 = Manufacturers' Code Marking  
 YWW = Date Code Marking  
 Y = Last Digit of Year (ex: 16 for 2016)  
 WW = Week Code (01 to 53)

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Single phase, half wave, 60Hz, resistive or inductive load  
 For capacitance load, derate current by 20%.

| Characteristic                                             | Symbol              | B120Q/BQ | B130Q/BQ | B140Q/BQ | B150Q/BQ | B160Q/BQ | Unit |
|------------------------------------------------------------|---------------------|----------|----------|----------|----------|----------|------|
| Peak Repetitive Reverse Voltage                            | V <sub>RRM</sub>    | 20       | 30       | 40       | 50       | 60       | V    |
| Working Peak Reverse Voltage                               | V <sub>RWM</sub>    |          |          |          |          |          |      |
| DC Blocking Voltage                                        | V <sub>R</sub>      |          |          |          |          |          |      |
| RMS Reverse Voltage                                        | V <sub>R(RMS)</sub> | 14       | 21       | 28       | 35       | 42       | V    |
| Average Rectified Output Current @ T <sub>T</sub> = +130°C | I <sub>O</sub>      | 1.0      |          |          |          |          | A    |
| Non-Repetitive Peak Forward Surge Current 8.3ms            | I <sub>FSM</sub>    | 30       |          |          |          |          | A    |
| Single Half Sine-Wave Superimposed on Rated Load           |                     |          |          |          |          |          |      |

**Thermal Characteristics**

| Characteristic                                           | Symbol                            | B120Q/BQ    | B130Q/BQ | B140Q/BQ | B150Q/BQ | B160Q/BQ | Unit |
|----------------------------------------------------------|-----------------------------------|-------------|----------|----------|----------|----------|------|
| Typical Thermal Resistance Junction to Terminal (Note 6) | R <sub>θJT</sub>                  | 20          |          |          |          |          | °C/W |
| Operating and Storage Temperature Range                  | T <sub>J</sub> , T <sub>STG</sub> | -65 to +150 |          |          |          |          | °C   |

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                                          | Symbol         | Min | Typ | Max        | Unit | Test Condition                                                                                      |
|-------------------------------------------------------------------------|----------------|-----|-----|------------|------|-----------------------------------------------------------------------------------------------------|
| Forward Voltage Drop B120Q/BQ, B130Q/BQ, B140Q/BQ<br>B150Q/BQ, B160Q/BQ | V <sub>F</sub> | —   | —   | 0.5<br>0.7 | V    | I <sub>F</sub> = 1.0A<br>I <sub>F</sub> = 1.0A                                                      |
| Leakage Current (Note 7)                                                | I <sub>R</sub> | —   | —   | 0.5<br>10  | mA   | @ Rated V <sub>R</sub> , T <sub>A</sub> = +25°C<br>@ Rated V <sub>R</sub> , T <sub>A</sub> = +100°C |
| Total Capacitance                                                       | C <sub>T</sub> | —   | —   | 110        | pF   | V <sub>R</sub> = 4V, f = 1MHz                                                                       |

Notes: 6. Thermal Resistance: Junction to terminal, unit mounted on PC board with 5.0 mm<sup>2</sup> (0.013 mm thick) copper pads as heat sink.  
 7. Short duration pulse test used to minimize self-heating effect.

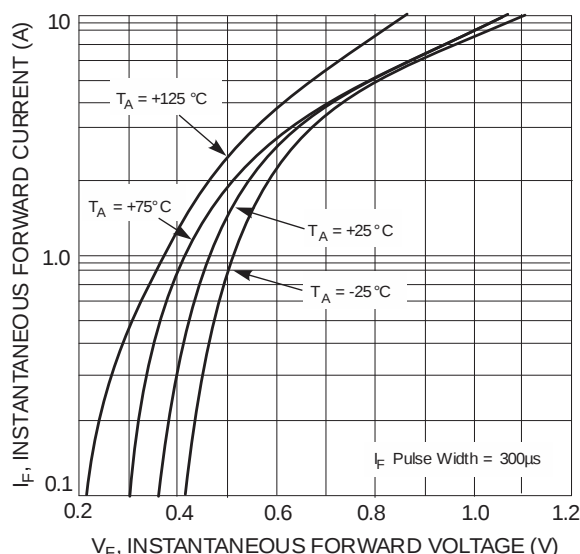


Fig.1 Typical Forward Characteristics - B120Q/BQ thru B140Q/BQ

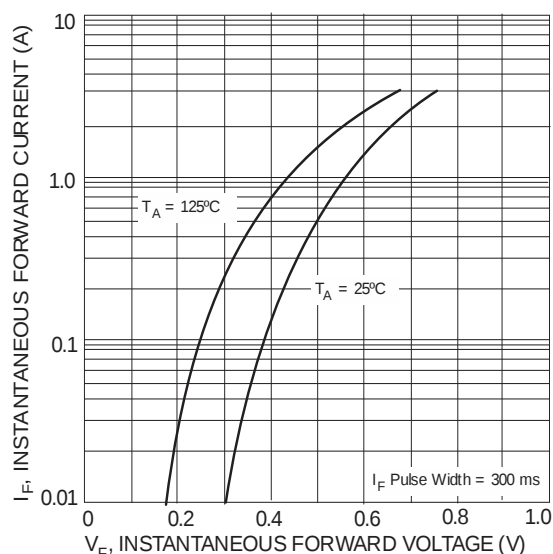


Fig.2 Typical Forward Characteristics - B150Q/BQ thru B160Q/BQ

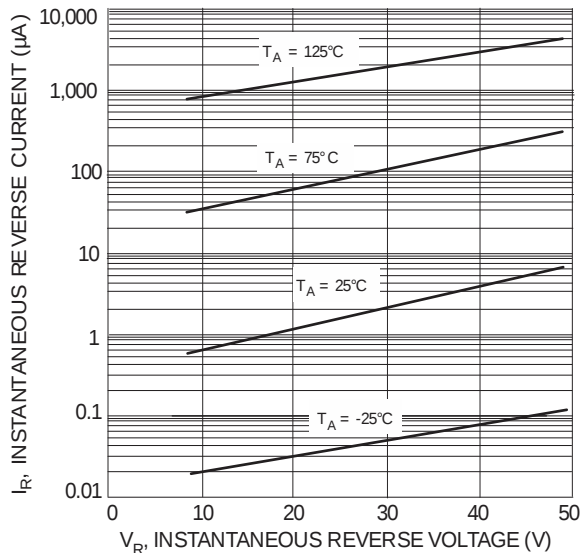


Fig.3 Typical Reverse Characteristics - B120Q/BQ thru B140Q/BQ

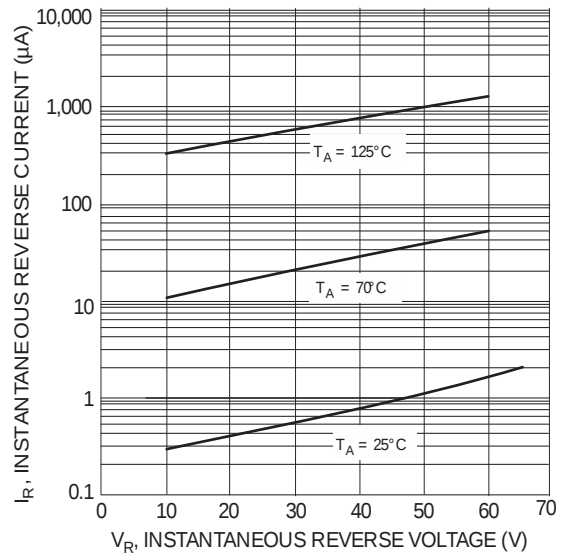


Fig.4 Typical Reverse Characteristics - B150Q/BQ thru B160Q/BQ

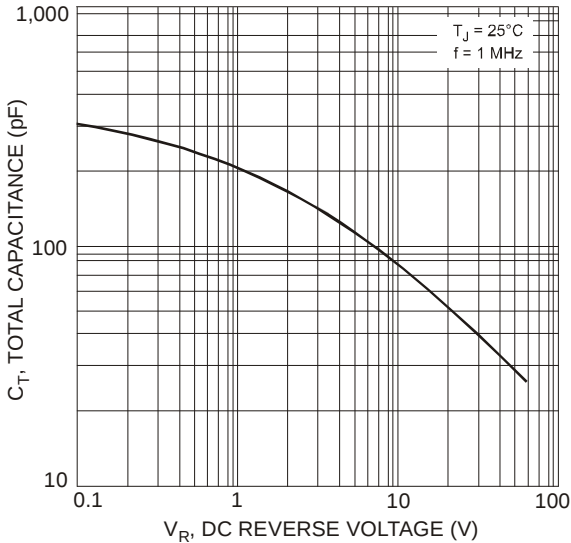


Fig. 5 Total Capacitance vs. Reverse Voltage

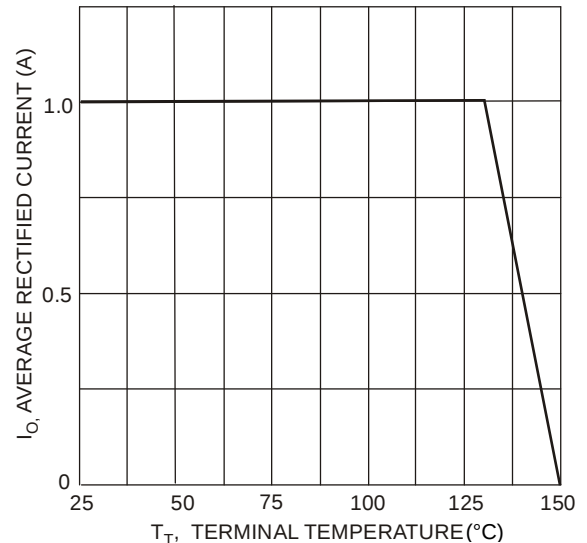


Fig. 6 Forward Current Derating Curve

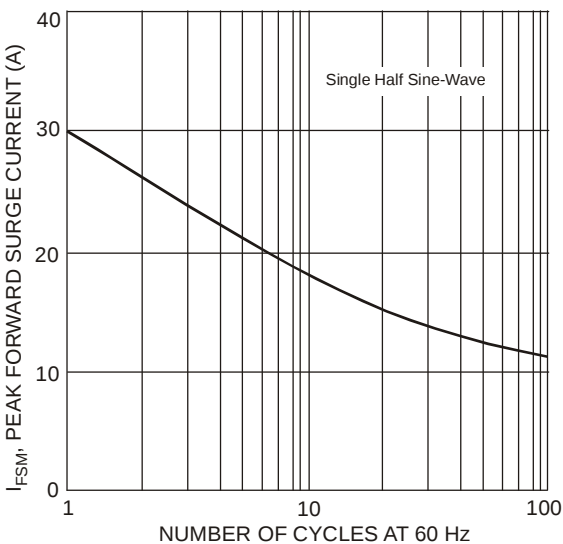
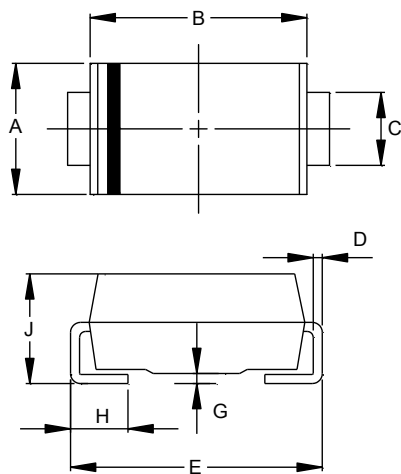


Fig. 7 Max Non-Repetitive Peak Forward Surge Current

## Package Outline Dimensions

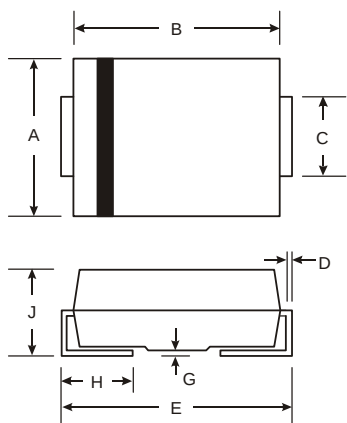
Please see AP02001 at [http://www.diodes.com/\\_files/datasheets/ap02001.pdf](http://www.diodes.com/_files/datasheets/ap02001.pdf) for the latest version.

### SMA



| SMA                  |      |      |
|----------------------|------|------|
| Dim                  | Min  | Max  |
| A                    | 2.29 | 2.92 |
| B                    | 4.00 | 4.60 |
| C                    | 1.27 | 1.63 |
| D                    | 0.15 | 0.31 |
| E                    | 4.80 | 5.59 |
| G                    | 0.05 | 0.20 |
| H                    | 0.76 | 1.52 |
| J                    | 1.96 | 2.40 |
| All Dimensions in mm |      |      |

### SMB

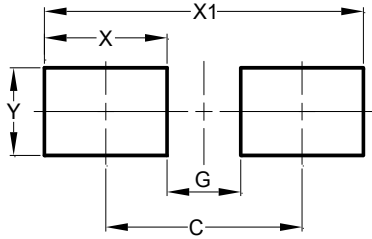


| SMB                  |      |      |
|----------------------|------|------|
| Dim                  | Min  | Max  |
| A                    | 3.30 | 3.94 |
| B                    | 4.06 | 4.57 |
| C                    | 1.96 | 2.21 |
| D                    | 0.15 | 0.31 |
| E                    | 5.00 | 5.59 |
| G                    | 0.05 | 0.20 |
| H                    | 0.76 | 1.52 |
| J                    | 2.00 | 2.50 |
| All Dimensions in mm |      |      |

## Suggested Pad Layout

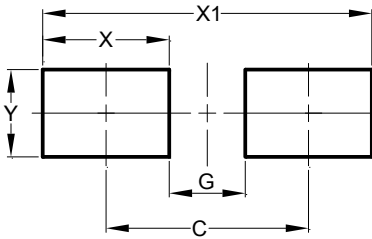
Please see AP02001 at [http://www.diodes.com/\\_files/datasheets/ap02001.pdf](http://www.diodes.com/_files/datasheets/ap02001.pdf) for the latest version.

### SMA



| Dimensions | Value (in mm) |
|------------|---------------|
| <b>C</b>   | 4.00          |
| <b>G</b>   | 1.50          |
| <b>X</b>   | 2.50          |
| <b>X1</b>  | 6.50          |
| <b>Y</b>   | 1.70          |

### SMB



| Dimensions | Value (in mm) |
|------------|---------------|
| <b>C</b>   | 4.30          |
| <b>G</b>   | 1.80          |
| <b>X</b>   | 2.50          |
| <b>X1</b>  | 6.80          |
| <b>Y</b>   | 2.30          |

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