# THE DATASHEET OF

# B130Q-13-F

# 1.0A SURFACE MOUNT SCHOTTKY BARRIER RECTIFIER

## Product Summary

B120Q/BQ-B140Q/BQ

| $V_{RRM}$ (V) | $I_O$ (A) | $V_F$ Max (V) $T_A$ = +25°C | $I_R$ Max (mA) $T_A$ = +25°C |
|---|---|---|---|
| 20/30/40 | 1.0 | 0.5 | 0.5 |

B150Q/BQ, B160Q/BQ

| $V_{RRM}$ (V) | $I_O$ (A) | $V_F$ Max (V) $T_A$ = +25°C | $I_R$ Max (mA) $T_A$ = +25°C |
|---|---|---|---|
| 50/60 | 1.0 | 0.7 | 0.5 |

## 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 (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

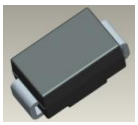
## Description and Applications

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

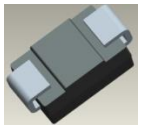
- Polarity Protection Diode
- Re-Circulating Diode
- Switching Diode
- Blocking Diode
- Freewheel Diode

## 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 e3
- Polarity: Cathode Band or Cathode Notch
- Weight:
  - SMA 0.064 grams (Approximate)
  - SMB 0.093 grams (Approximate)



Top View



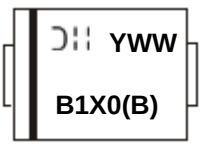
Bottom View

## 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) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
2. See https://www.diodes.com/quality/lead-free/ 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 https://www.diodes.com/quality/.
5. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

## Marking Information




B1X0 = Product Type Marking Code, ex: B140Q (SMA Package)
B1X0B = Product Type Marking Code, ex: B160BQ (SMB Package)
= Manufacturers' Code Marking
YWW = Date Code Marking
Y = Last Digit of Year (ex: 8 for 2018)
WW = Week Code (01 to 53)

## Maximum Ratings (@$T_A$ = +25°C, unless otherwise specified.)

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

| Characteristic | Symbol | B120Q/BQ | B130Q/BQ | B140Q/BQ | B150Q/BQ | B160Q/BQ | Unit |
|---|---|---|---|---|---|---|---|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | 20 | 30 | 40 | 50 | 60 | V |
| RMS Reverse Voltage | $V_{R(RMS)}$ | 14 | 21 | 28 | 35 | 42 | V |
| Average Rectified Output Current @ $T_T$ = +130°C | $I_O$ | 1.0 | | | | | A |
| Non-Repetitive Peak Forward Surge Current 8.3ms Single Half Sine-Wave Superimposed on Rated Load | $I_{FSM}$ | 30 | | | | | A |
| Electrostatic Discharge | HBM | 4000 | | | | | V |
| Electrostatic Discharge | MM | 400 | | | | | V |
| Electrostatic Discharge | CDM | 1 | | | | | kV |

## Thermal Characteristics

| Characteristic | Symbol | B120Q/BQ | B130Q/BQ | B140Q/BQ | B150Q/BQ | B160Q/BQ | Unit |
|---|---|---|---|---|---|---|---|
| Typical Thermal Resistance Junction to Ambient (Note 6) | $R_{\theta JA}$ | 115 | | | | | °C/W |
| Typical Thermal Resistance Junction to Ambient (Note 7) | $R_{\theta JA}$ | 65 | | | | | °C/W |
| Operating and Storage Temperature Range | $T_J$, $T_{STG}$ | -65 to +150 | | | | | °C |

## Electrical Characteristics (@$T_A$ = +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 | $V_F$ | —<br>— | —<br>— | 0.5<br>0.7 | V | $I_F$ = 1.0A<br>$I_F$ = 1.0A |
| Leakage Current (Note 8) | $I_R$ | —<br>— | —<br>— | 0.5<br>10 | mA | @ Rated $V_R$, $T_A$ = +25°C<br>@ Rated $V_R$, $T_A$ = +100°C |
| Total Capacitance | $C_T$ | — | — | 110 | pF | $V_R$ = 4V, f = 1MHz |
| Switching Speed | $t_{RR}$ | — | 12 | — | ns | $I_F$ = 0.5A, $I_R$ = 1A, $I_{RR}$ = 0.25A (RG1) |

Notes: 6. 1*MRP FR-4 PC board, 2oz.
7. With 50mm*50mm*23mm Al heatsink.
8. Short duration pulse test used to minimize self-heating effect.

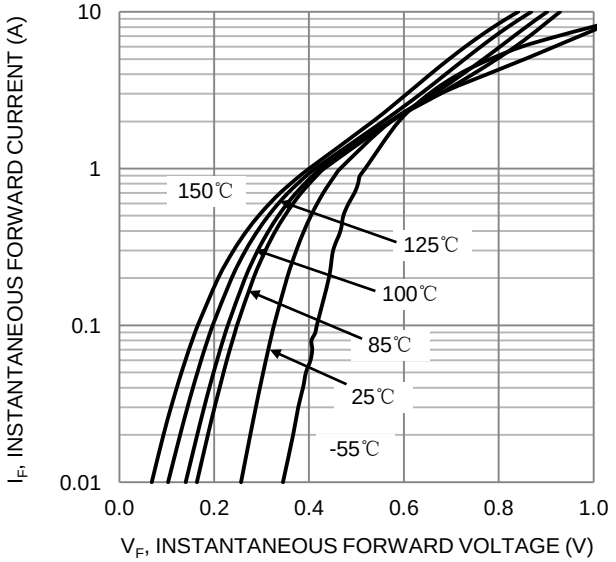



Figure 1. Typical Forward Characteristics
B120Q/BQ-B140Q/BQ

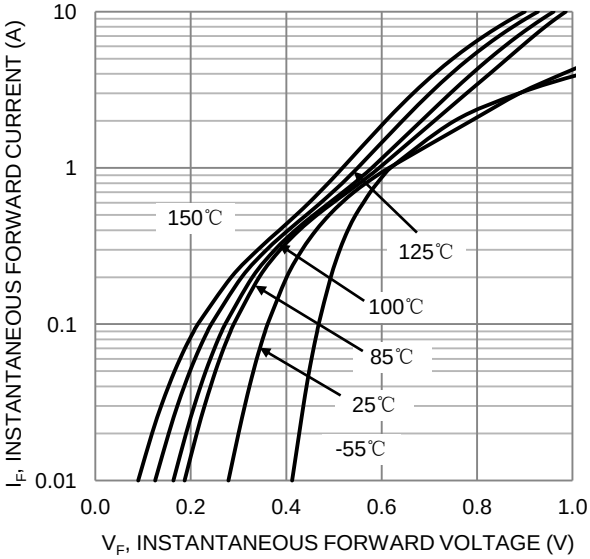



Figure 2. Typical Forward Characteristics
B150Q/BQ - B160Q/BQ

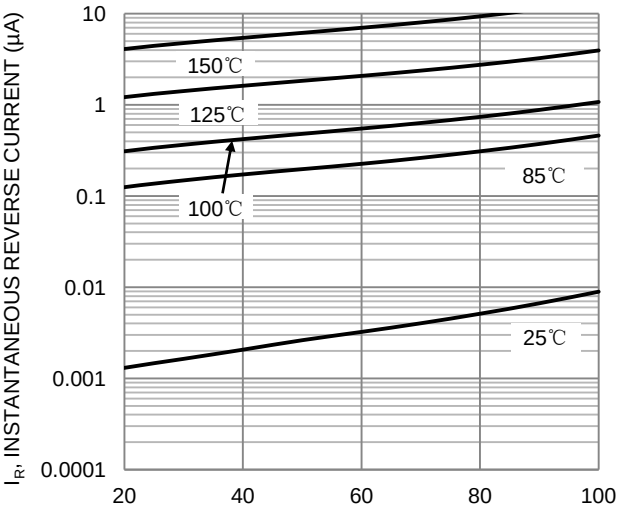



Figure 3. Typical Reverse Characteristics
B120Q/BQ - B140Q/BQ

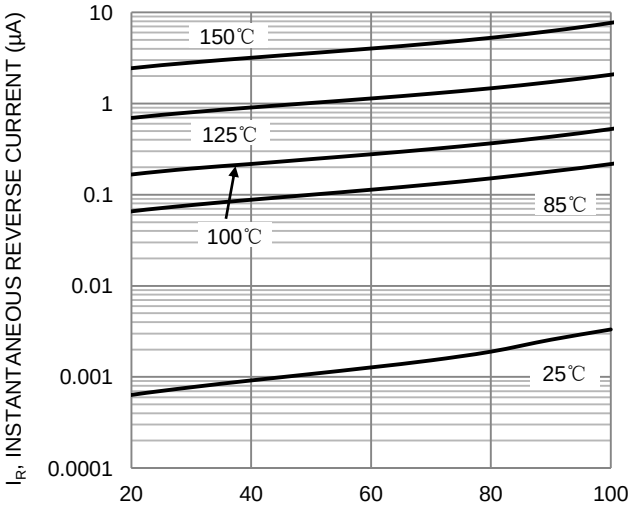



Figure 4. Typical Reverse Characteristics
B150Q/BQ - B160Q/BQ

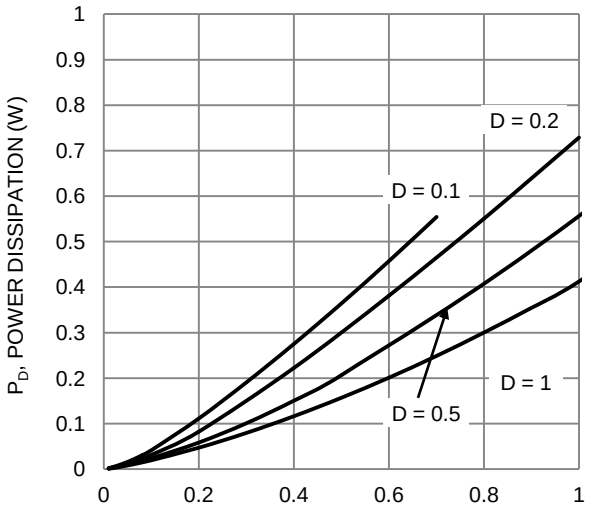



Figure 5. Forward Power Dissipation $T_J$ = 125ºC
B120Q/BQ - B140Q/BQ

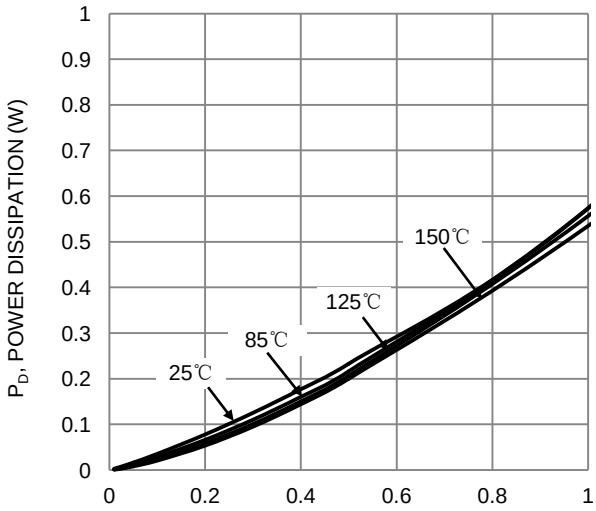



Figure 6. Forward Power Dissipation D = 0.5
B120Q/BQ - B140Q/BQ

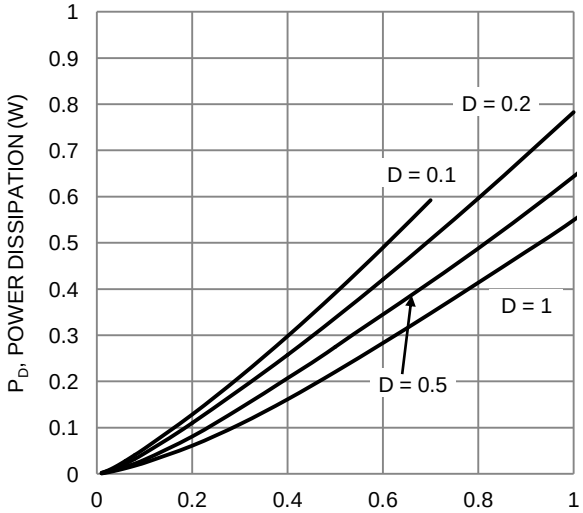



Figure 7. Forward Power Dissipation $T_J$ = 125ºC
B150Q/BQ - B160Q/BQ

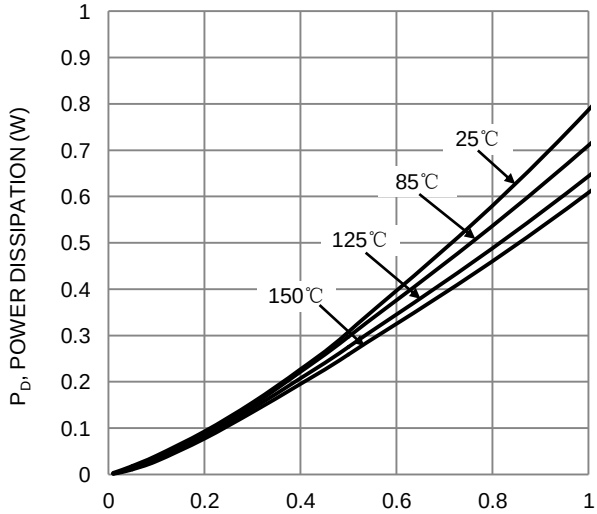



Figure 8. Forward Power Dissipation D = 0.5
B150Q/BQ - B160Q/BQ

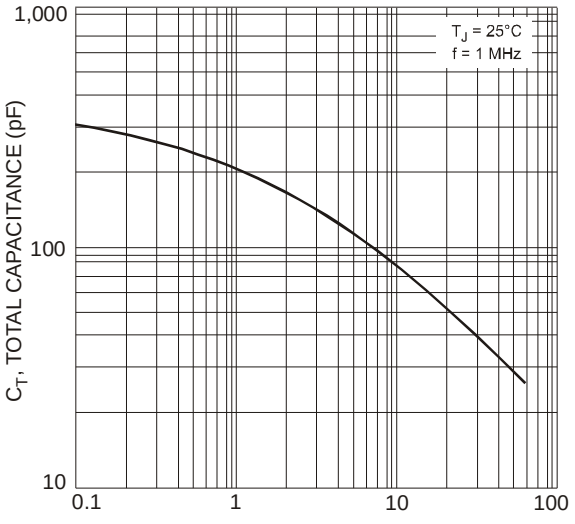



Figure 9. Total Capacitance vs. Reverse Voltage

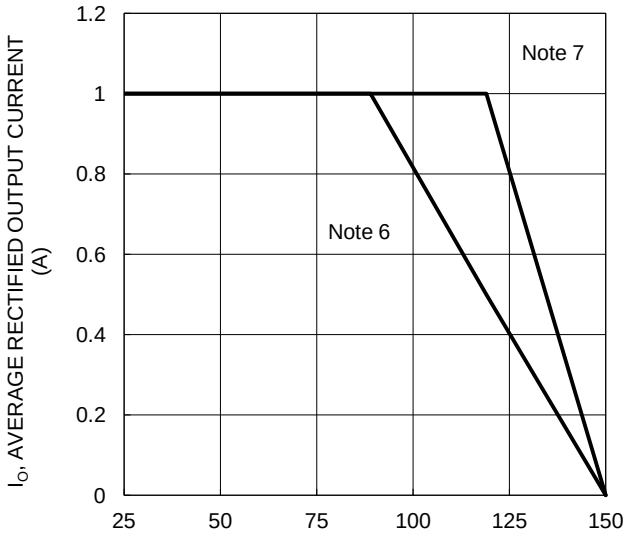



Figure 10. DC Forward Current Derating

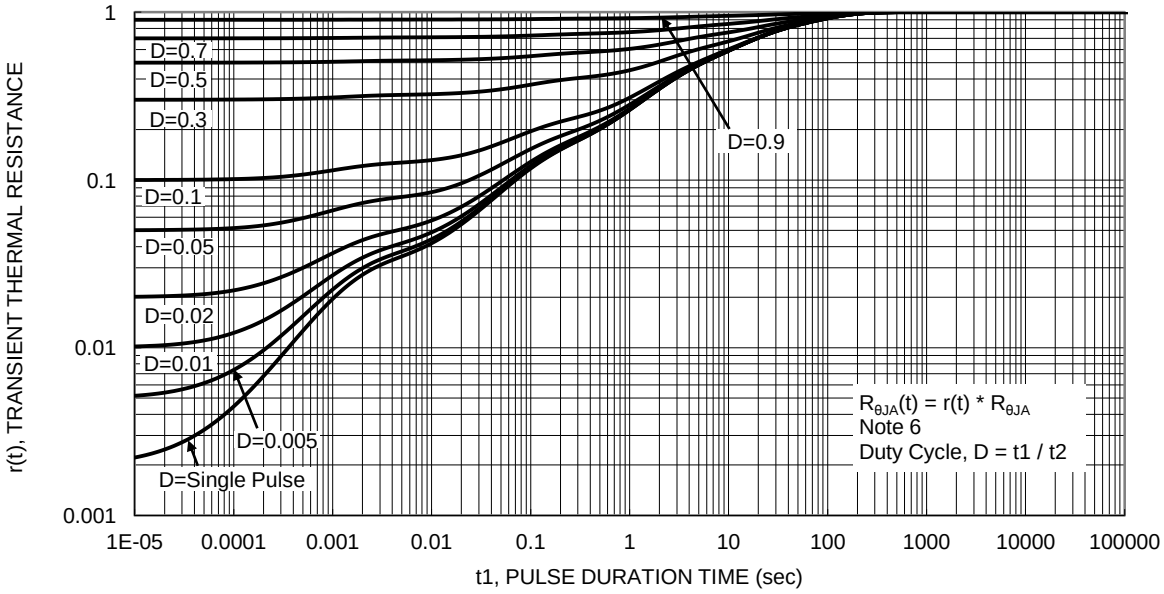
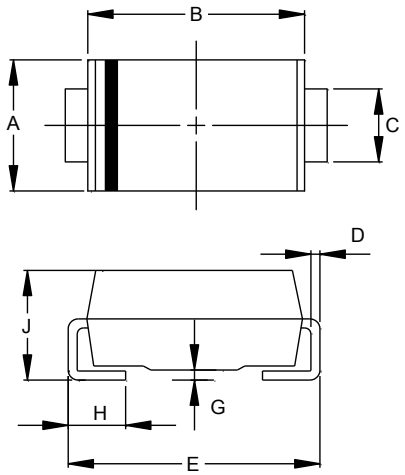



Figure 11. Transient Thermal Resistance: SMA

## Package Outline Dimensions

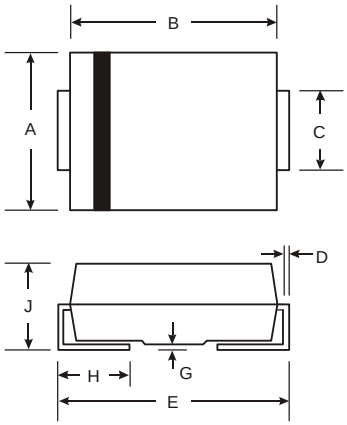
Please see http://www.diodes.com/package-outlines.html for the latest version.

**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**

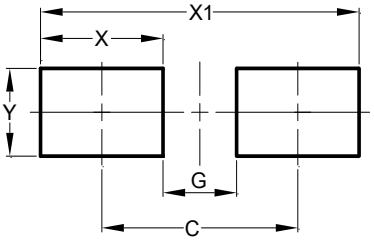



| SMB | | |
|---|---|---|
| **Dim** | **Min** | **Max** |
| **A** | 3.30 | 3.94 |
| **B** | 4.06 | 4.57 |
| **C** | 1.96 | 2.21 |
| **D** | 0.15 | 0.31 |
| **E** | 5.00 | 5.59 |
| **G** | 0.05 | 0.20 |
| **H** | 0.76 | 1.52 |
| **J** | 2.00 | 2.50 |
| **All Dimensions in mm** | | |

## Suggested Pad Layout

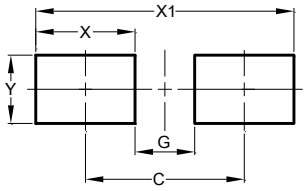
Please see http://www.diodes.com/package-outlines.html for the latest version.

**SMA**




| Dimensions | Value (in mm) |
|---|---|
| **C** | 4.00 |
| **G** | 1.50 |
| **X** | 2.50 |
| **X1** | 6.50 |
| **Y** | 1.70 |

**SMB**




| Dimensions | Value (in mm) |
|---|---|
| **C** | 4.30 |
| **G** | 1.80 |
| **X** | 2.50 |
| **X1** | 6.80 |
| **Y** | 2.30 |

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