

## Product Summary

B120Q/BQ-B140Q/BQ

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

B150Q/BQ, B160Q/BQ

$V_{RRM}$ (V)	$I_O$ (A)	$V_F$ Max (V) $T_A = +25^\circ\text{C}$	$I_R$ Max (mA) $T_A = +25^\circ\text{C}$
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

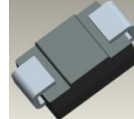
- Guard Ring Die Construction for Transient Protection
- Ideally Suited for Automated Assembly
- Low Power Loss, High Efficiency
- Surge Overload Rating to 30A Peak
- For Use in Low-Voltage, High-Frequency Inverters
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 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 (E3)
- Polarity: Cathode Band or Cathode Notch
- Weight:
  - SMA 0.064 grams (Approximate)
  - SMB 0.093 grams (Approximate)



Top View



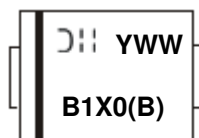
Bottom View

## 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)  
 3|| = 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<sub>A</sub> = +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	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 Single Half Sine-Wave Superimposed on Rated Load	I <sub>FSM</sub>			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 <sub>θJA</sub>			115			°C/W
Typical Thermal Resistance Junction to Ambient (Note 7)	R <sub>θJA</sub>			65			°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 B150Q/BQ, B160Q/BQ	V <sub>F</sub>	—	—	0.5 0.7	V	I <sub>F</sub> = 1.0A I <sub>F</sub> = 1.0A
Leakage Current (Note 8)	I <sub>R</sub>	—	—	0.5 10	mA	@ Rated V <sub>R</sub> , T <sub>A</sub> = +25°C @ 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
Switching Speed	t <sub>RR</sub>	—	12	—	ns	I <sub>F</sub> = 0.5A, I <sub>R</sub> = 1A, I <sub>RR</sub> = 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.

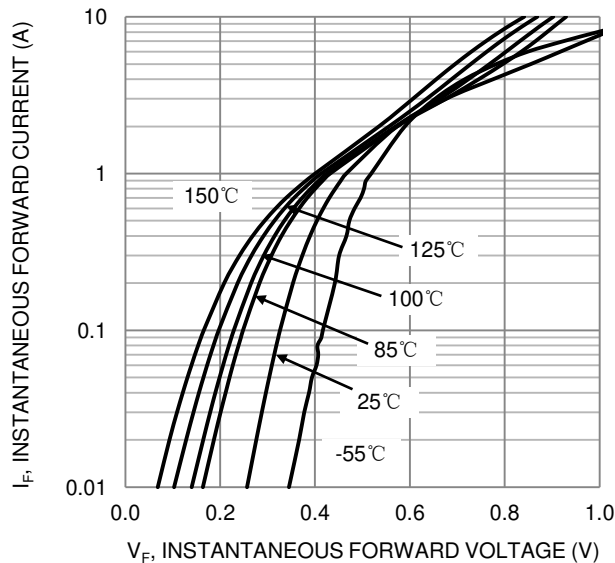


Figure 1. Typical Forward Characteristics  
B120Q/BQ-B140Q/BQ

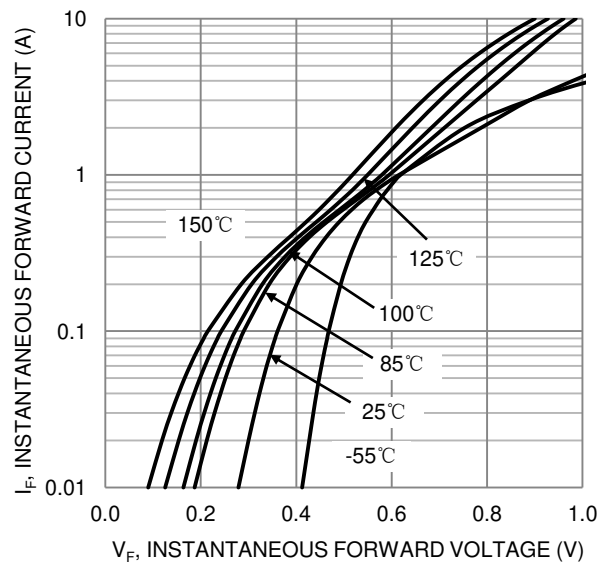


Figure 2. Typical Forward Characteristics  
B150Q/BQ - B160Q/BQ

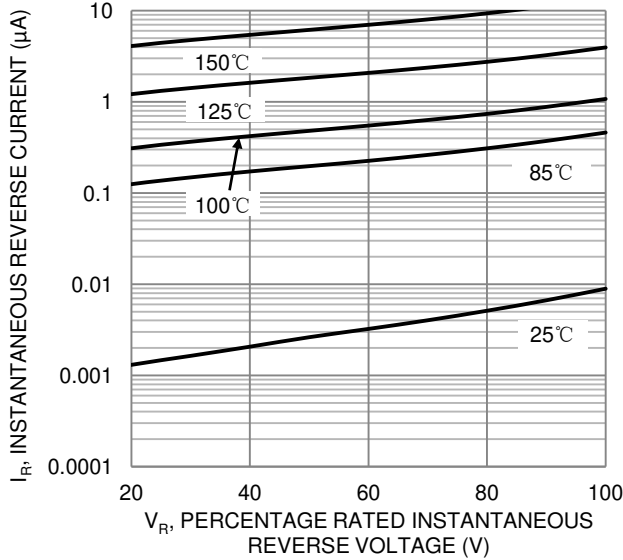


Figure 3. Typical Reverse Characteristics  
B120Q/BQ - B140Q/BQ

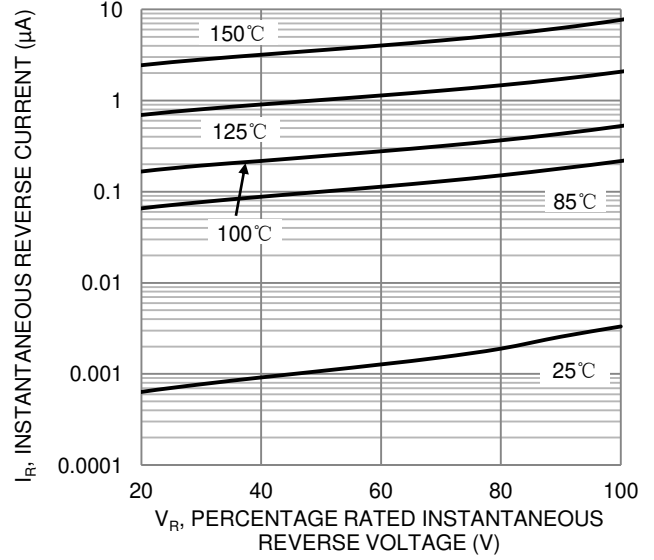


Figure 4. Typical Reverse Characteristics  
B150Q/BQ - B160Q/BQ

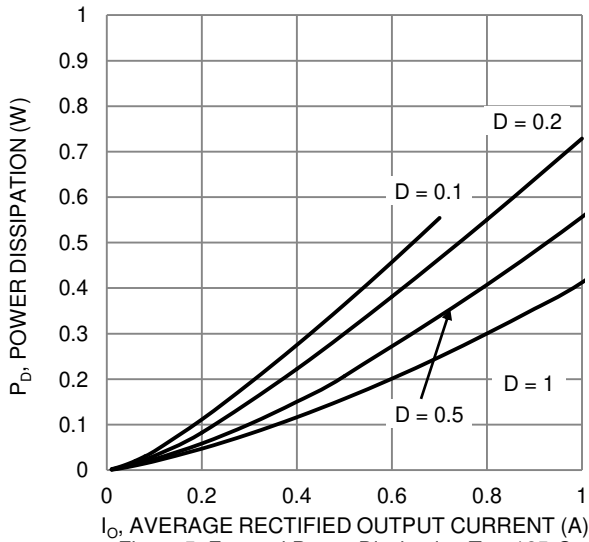


Figure 5. Forward Power Dissipation  $T_J = 125^\circ\text{C}$   
B120Q/BQ - B140Q/BQ

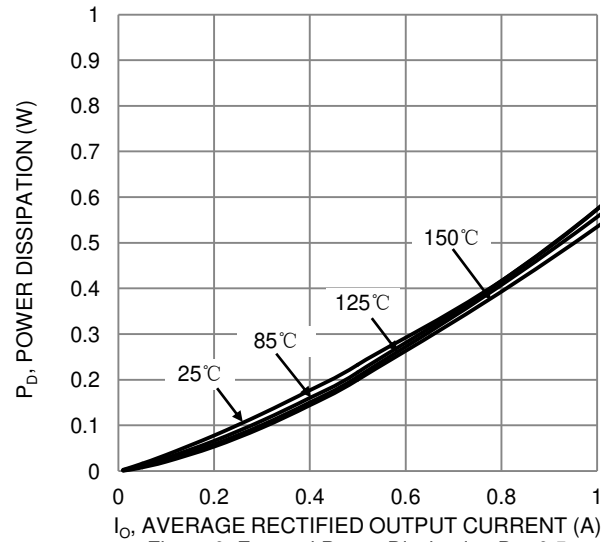


Figure 6. Forward Power Dissipation  $D = 0.5$   
B120Q/BQ - B140Q/BQ

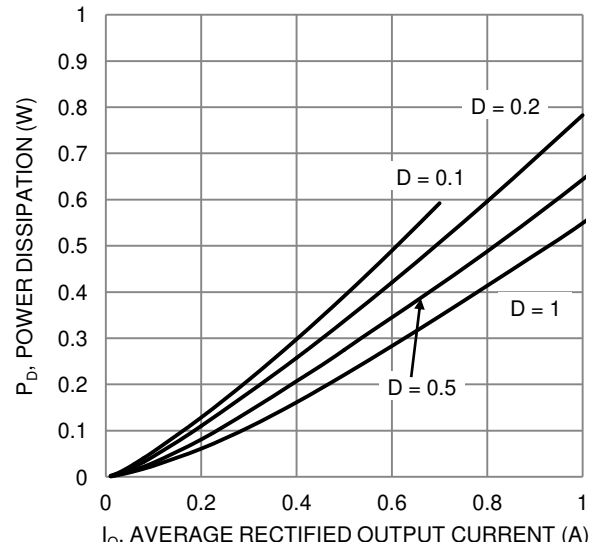


Figure 7. Forward Power Dissipation  $T_J = 125^\circ\text{C}$   
B150Q/BQ - B160Q/BQ

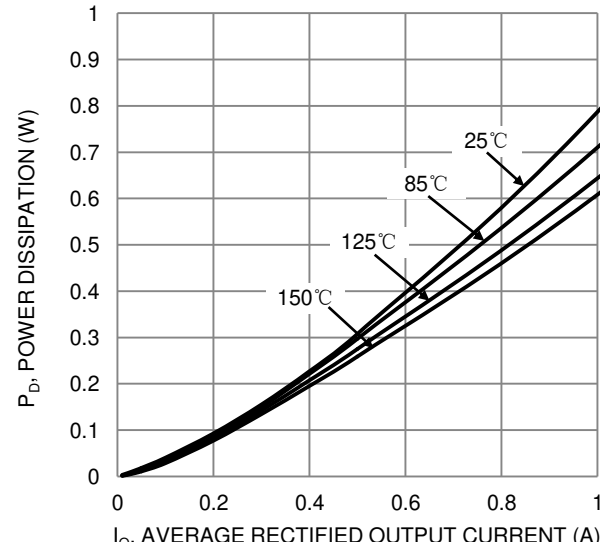


Figure 8. Forward Power Dissipation  $D = 0.5$   
B150Q/BQ - B160Q/BQ

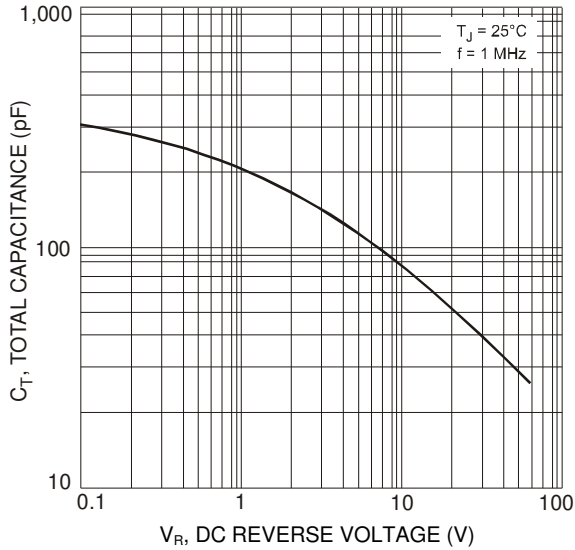


Figure 9. Total Capacitance vs. Reverse Voltage

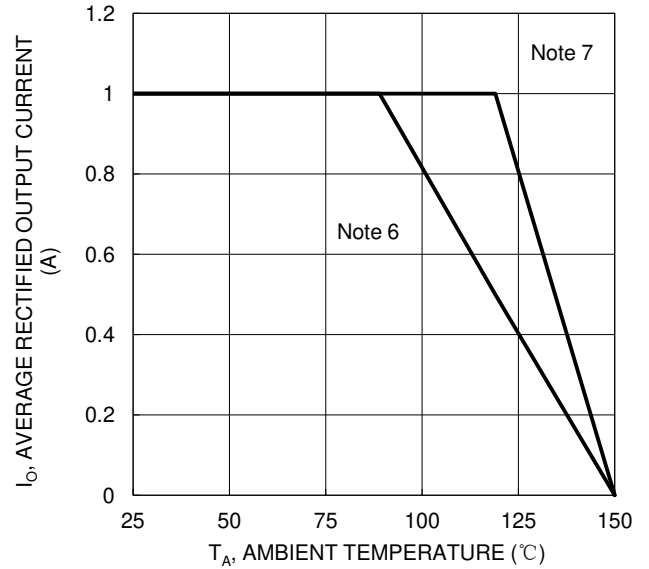


Figure 10. DC Forward Current Derating

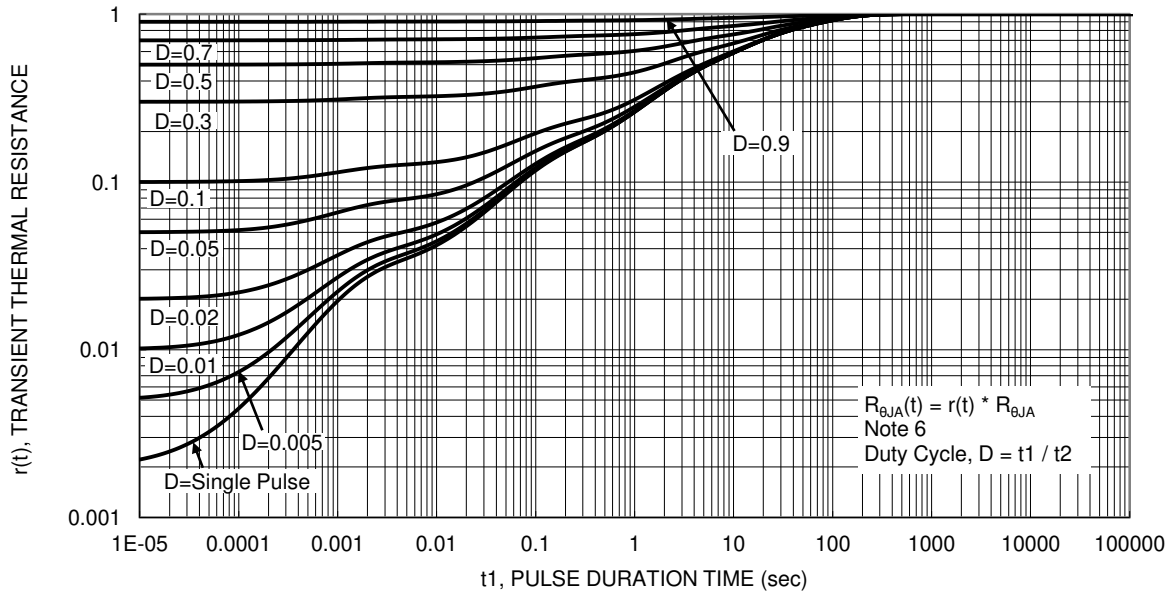
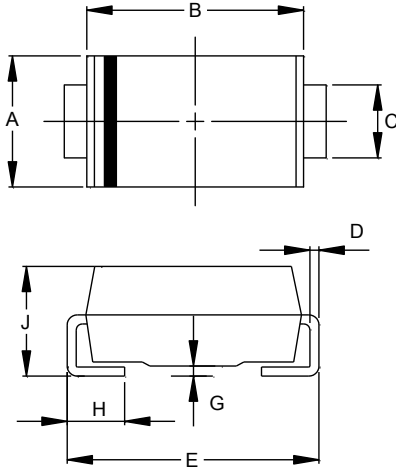


Figure 11. Transient Thermal Resistance: SMA

**Package Outline Dimensions**

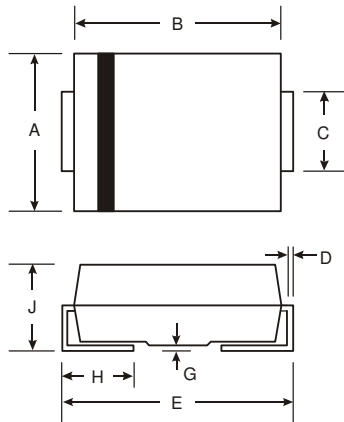
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**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**

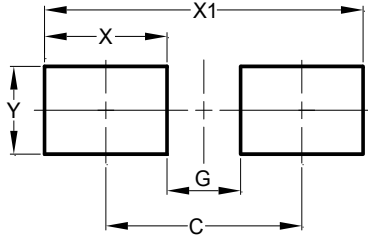


SMB		
Dim	Min	Max
A	3.30	3.94
B	4.06	4.57
C	1.96	2.21
D	0.15	0.31
E	5.00	5.59
G	0.05	0.20
H	0.76	1.52
J	2.00	2.50
All Dimensions in mm		

**Suggested Pad Layout**

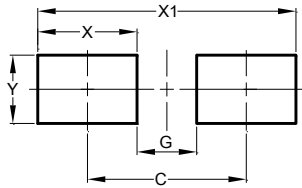
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**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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