# THE DATASHEET OF

# B140AF-13

NEW PRODUCT

## Product Summary

B120AF/B130AF/B140AF

| $V_{RRM}$ (V) | $I_O$ (A) | $V_{F(MAX)}$ (V) @ +25°C | $I_{R(MAX)}$ (mA) @ +25°C |
|---|---|---|---|
| 20 | 1 | 0.5 | 0.1 |
| 30 | 1 | 0.5 | 0.1 |
| 40 | 1 | 0.5 | 0.2 |

## Features and Benefits

- Reduced Low Forward Voltage Drop ($V_F$); Better Efficiency and Cooler Operation
- Reduced High-Temperature Reverse Leakage; Increased Reliability against Thermal Runaway Failure in High Temperature Operation
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## Description and Applications

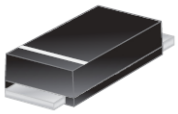
The Schottky rectifier providing low $V_F$ and excellent reverse leakage stability at high temperatures, this device is ideal for use in general rectification applications such as:

- Boost Diode
- Blocking Diode
- Recirculating Diode

## Mechanical Data

- Case: SMAF
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Polarity: Cathode Band
- Weight: 0.036 grams (Approximate)

SMAF



Top View

## Ordering Information (Note 4)

| Part Number | Case | Packaging |
|---|---|---|
| B120AF-13 | SMAF | 10,000/Tape & Reel |
| B130AF-13 | SMAF | 10,000/Tape & Reel |
| B140AF-13 | SMAF | 10,000/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 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. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

## Marking Information




B1XXAF = Product Type Marking Code, ex: B120AF
= Manufacturers' Code Marking
YWW = Date Code Marking
Y = Last Digit of Year (ex: 7 for 2017)
WW = Week Code (01 to 53)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## 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 | B120AF | B130AF | B140AF | Unit |
|---|---|---|---|---|---|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage | $V_{RRM}$<br>$V_{RWM}$<br>$V_{RM}$ | 20 | 30 | 40 | V |
| Average Rectified Output Current | $I_O$ | 1 | | | A |
| Non-Repetitive Peak Forward Surge Current 8.3ms<br>Single Half Sine-Wave Superimposed on Rated Load | $I_{FSM}$ | 30 | | | A |

## Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Typical Thermal Resistance Junction to Ambient (Note 5) | $R_{\theta JA}$ | 95 | °C/W |
| Typical Thermal Resistance Junction to Case (Note 5) | $R_{\theta JC}$ | 45 | °C/W |
| Operating and Storage Temperature Range | $T_J$, $T_{STG}$ | -55 to +150 | °C |

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

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Forward Voltage Drop | $V_F$ | —<br>— | 0.455<br>0.40 | 0.50<br>— | V | $I_F$ = 1A, $T_J$ = +25°C<br>$I_F$ = 1A, $T_J$ = +125°C |
| Leakage Current (Note 6) B120AF<br>B130AF<br>B140AF | $I_R$ | —<br>—<br>—<br>— | 0.005<br>0.006<br>0.010<br>6.0 | 0.10<br>0.10<br>0.20<br>— | mA | $V_R$ = 20V, $T_J$ = +25°C<br>$V_R$ = 30V, $T_J$ = +25°C<br>$V_R$ = 40V, $T_J$ = +25°C<br>$V_R$ = 40V, $T_J$ = +125°C |
| Typical Capacitance | $C_T$ | — | 50 | — | pF | $V_R$ = 4.0V, f = 1MHz |

Notes: 5. Device mounted on FR-4 substrate, 0.4" x 0.5", 2oz, single-sided, PC boards with 0.2" x 0.25" copper pad.
6. Short duration pulse test used to minimize self-heating effect.


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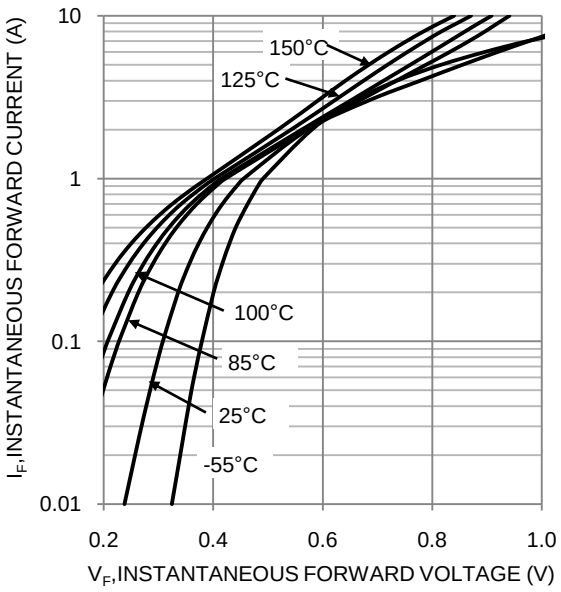


Figure 1. Typical Forward Characteristics

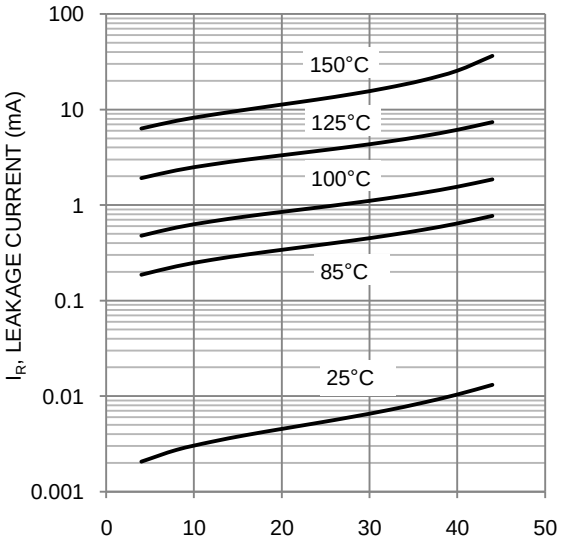


Figure 2. Typical Reverse Characteristics

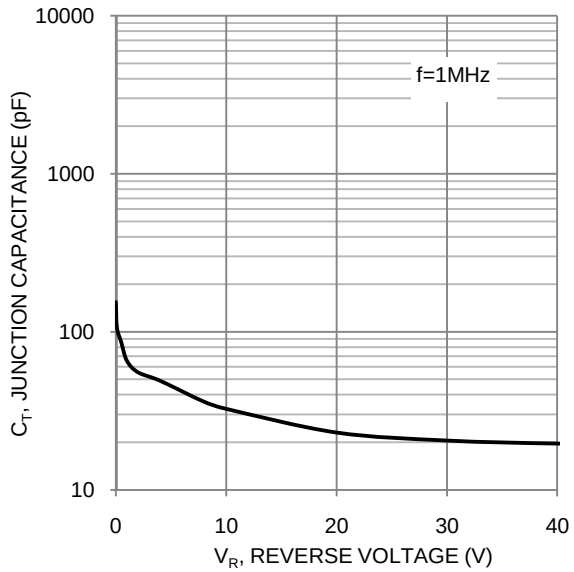


Figure 3. Typical Junction Capacitance

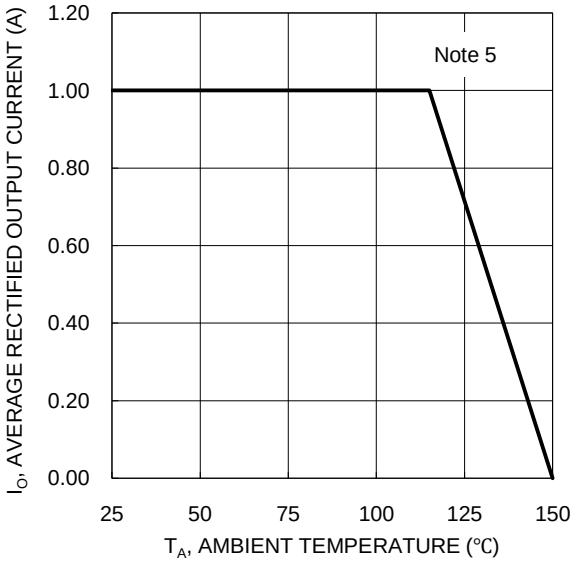


Figure 4. DC Forward Current Derating


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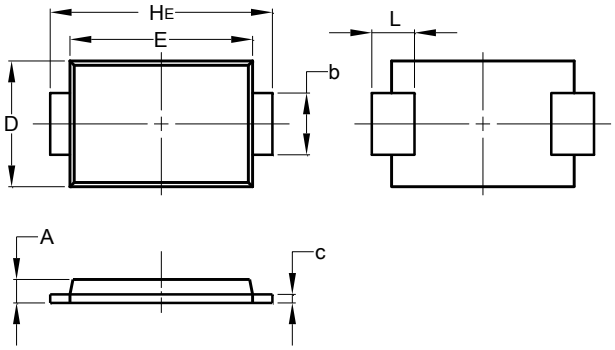
## Package Outline Dimensions

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

**SMAF**

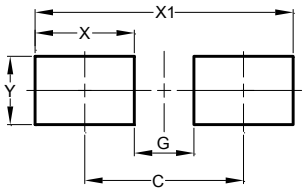



| SMAF | | |
|---|---|---|
| **Dim** | **Min** | **Max** |
| **A** | 0.90 | 1.10 |
| **b** | 1.25 | 1.65 |
| **c** | 0.10 | 0.40 |
| **D** | 2.25 | 2.95 |
| **E** | 3.95 | 4.60 |
| **$H_E$** | 4.80 | 5.60 |
| **L** | 0.50 | 1.50 |
| **All Dimensions in mm** | | |

## Suggested Pad Layout

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

**SMAF**




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