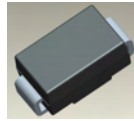


Features

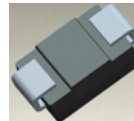
- Glass Passivated Die Construction
- Super-Fast Recovery Time For High Efficiency
- Surge Overload Rating to 100A Peak
- Ideally Suited for Automated Assembly
- **Lead Free Finish/RoHS Compliant (Note 1)**
- **Green Molding Compound (No Halogen and Antimony) (Note 2)**

Mechanical Data

- Case: SMB/SMC
- 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
- SMB Weight: 0.093 grams (approximate)
- SMC Weight: 0.21 grams (approximate)



Top View



Bottom View

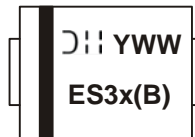
Ordering Information (Note 3)

| Part Number | Case | Packaging |
|-------------|------|------------------|
| ES3x-13-F | SMC | 3000/Tape & Reel |
| ES3xB-13-F | SMB | 3000/Tape & Reel |

* x = Device type, e.g. ES3A-13-F (SMC package); ES3AB-13-F (SMB package).

- Notes:
1. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied, see EU Directive 2002/95/EC Annex Notes.
 2. Product manufactured with Data Code 0924 (week 24, 2009) and newer are built with Green Molding Compound.
 3. For packaging details, go to our website at <http://www.diodes.com>.

Marking Information



ES3x = Product type marking code, ex: ES3A (SMC package)
 ES3xB = Product type marking code, ex: ES3AB (SMB package)
 D!! = Manufacturers' code marking
 YWW = Date code marking
 Y = Last digit of year (ex: 2 for 2002)
 WW = Week code (01 to 53)

Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

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

| Characteristic | Symbol | ES3A/AB | ES3B/BB | ES3C/CB | ES3D/DB | Unit |
|--|--------------|---------|---------|---------|---------|------|
| Peak Repetitive Reverse Voltage | V_{RRM} | | | | | |
| Working Peak Reverse Voltage | V_{RWM} | 50 | 100 | 150 | 200 | V |
| DC Blocking Voltage (Note 4) | V_R | | | | | |
| RMS Reverse Voltage | $V_{R(RMS)}$ | 35 | 70 | 105 | 140 | V |
| Average Rectified Output Current @ $T_T = 100^\circ\text{C}$ | I_O | 3.0 | | | | A |
| Non-Repetitive Peak Forward Surge Current 8.3ms Single Half Sine-Wave Superimposed on Rated Load | I_{FSM} | 100 | | | | A |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|-----------------|-------------|--------------------|
| Typical Thermal Resistance, Junction to Terminal | $R_{\theta JT}$ | 10 | $^\circ\text{C/W}$ |
| Typical Thermal Resistance, Junction to Ambient (Note 5) | $R_{\theta JA}$ | 50 | $^\circ\text{C}$ |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|---|----------|-------|---------------|
| Maximum Forward Voltage @ $I_F = 3.0\text{A}$ | V_{FM} | 0.9 | V |
| Peak Reverse Current @ $T_A = 25^\circ\text{C}$ | I_{RM} | 10 | μA |
| at Rated DC Blocking Voltage (Note 4) @ $T_A = 125^\circ\text{C}$ | | 500 | |
| Maximum Reverse Recovery Time (Note 6) | t_{rr} | 25 | ns |
| Typical Total Capacitance (Note 7) | C_T | 45 | pF |

- Notes:
4. Short duration pulse test used to minimize self-heating effect.
 5. Unit mounted on PC board with 5.0 mm^2 (0.013 mm thick) copper pads as heat sink.
 6. Measured with $I_F = 0.5\text{A}$, $I_R = 1.0\text{A}$, $I_{rr} = 0.25\text{A}$. See Figure 5.
 7. Measured at 1.0MHz and applied reverse voltage of 4.0V DC.

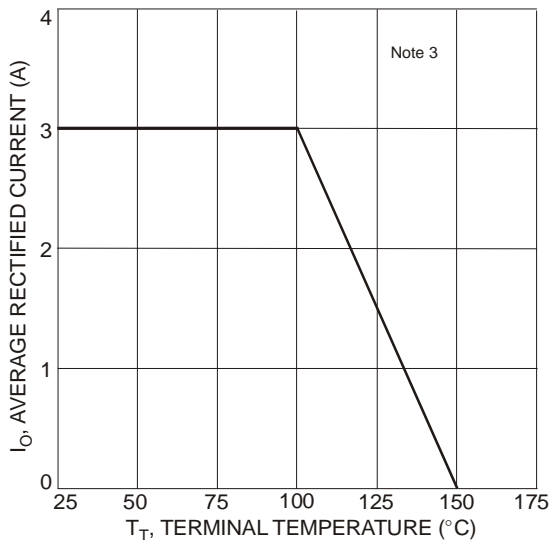


Fig. 1 Forward Current Derating Curve

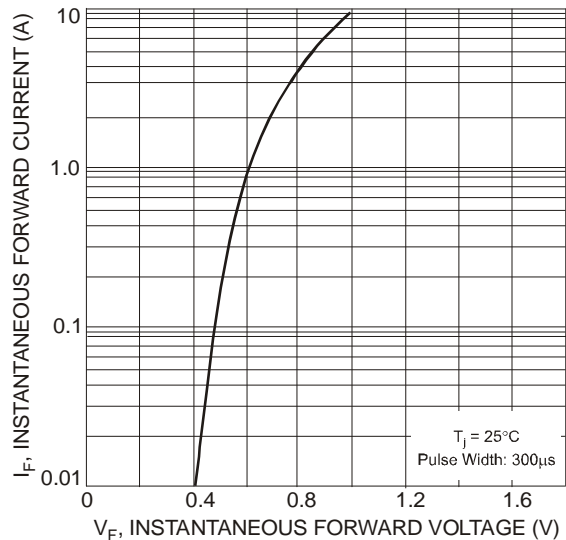


Fig. 2 Typical Forward Characteristics

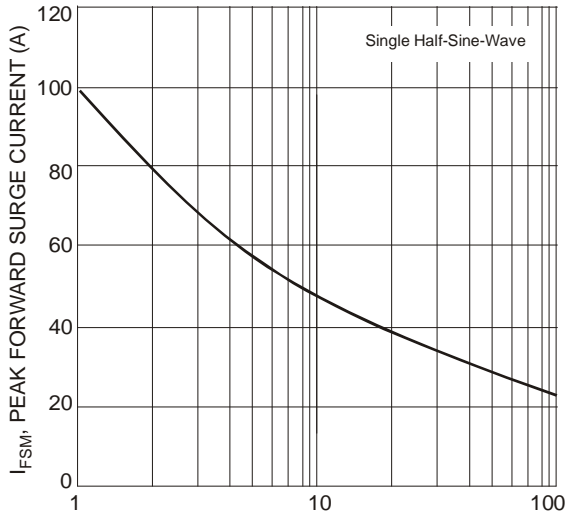


Fig. 3 Surge Current Derating Curve

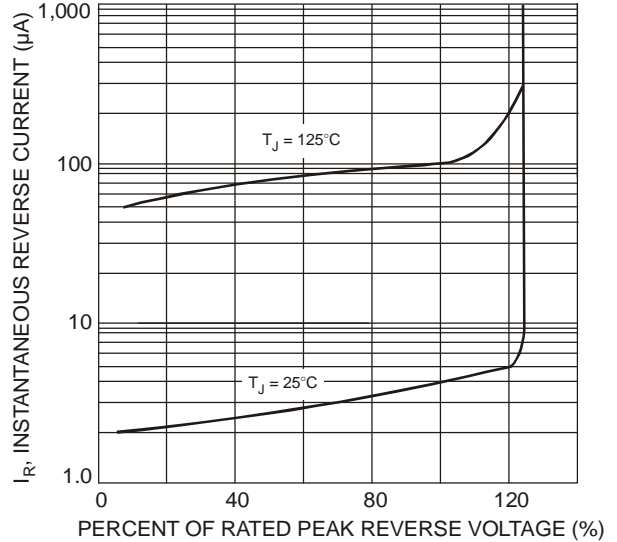
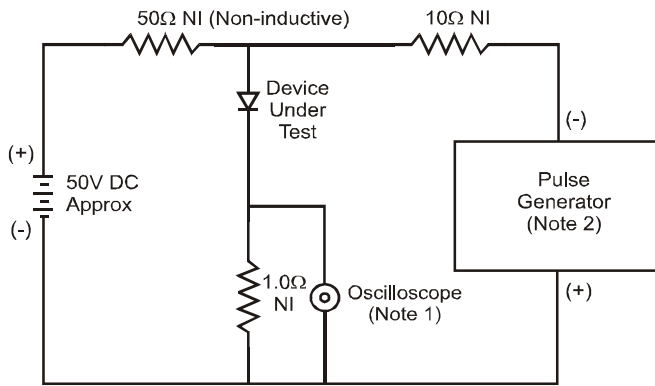
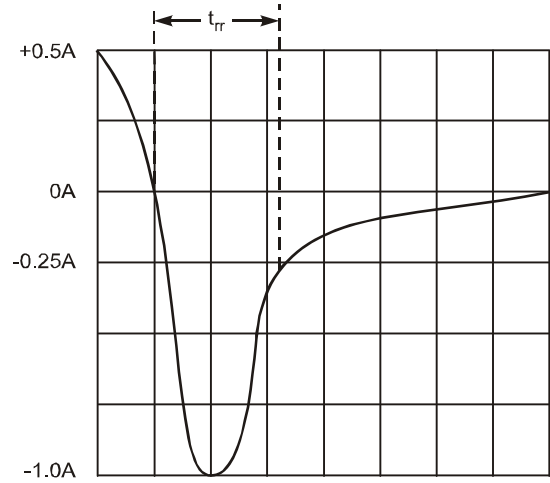


Fig. 4 Typical Reverse Characteristics



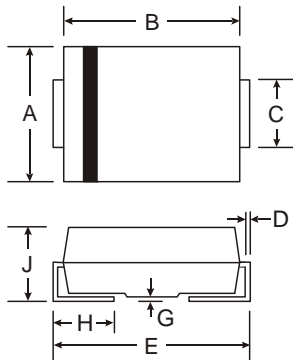
- Notes:
 1. Rise Time = 7.0ns max. Input Impedance = 1.0MΩ, 22pF.
 2. Rise Time = 10ns max. Input Impedance = 50Ω.



Set time base for 50/100 ns/cm

Fig. 5 Reverse Recovery Time Characteristic and Test Circuit

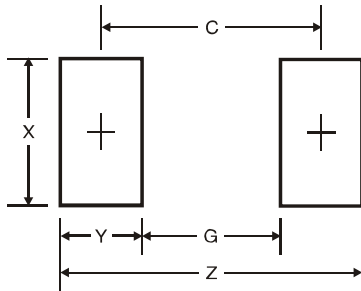
Package Outline Dimensions



| 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 | | |

| SMC | | |
|----------------------|------|------|
| Dim | Min | Max |
| A | 5.59 | 6.22 |
| B | 6.60 | 7.11 |
| C | 2.75 | 3.18 |
| D | 0.15 | 0.31 |
| E | 7.75 | 8.13 |
| G | 0.10 | 0.20 |
| H | 0.76 | 1.52 |
| J | 2.00 | 2.50 |
| All Dimensions in mm | | |

Suggested Pad Layout



| SMB Dimensions | Value (in mm) |
|----------------|---------------|
| Z | 6.7 |
| G | 1.8 |
| X | 2.3 |
| Y | 2.5 |
| C | 4.3 |

| SMC Dimensions | Value (in mm) |
|----------------|---------------|
| Z | 9.3 |
| G | 4.4 |
| X | 3.3 |
| Y | 2.5 |
| C | 6.8 |

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