



**THE DATASHEET OF  
ES3B-13-F**

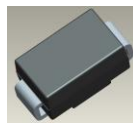


## Features

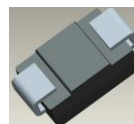
- Glass Passivated Die Construction
- Super-Fast Recovery Time for High Efficiency
- Surge Overload Rating to 100A Peak
- Ideally Suited for Automated Assembly
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

## 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

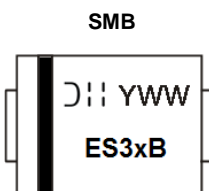
## Ordering Information (Note 4)

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), 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. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## 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: 0 for 2020)  
 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	ES3A/AB	ES3B/BB	ES3C/CB	ES3D/DB	Unit
Peak Repetitive Reverse Voltage	V <sub>RRM</sub>					
Working Peak Reverse Voltage	V <sub>RWM</sub>	50	100	150	200	V
DC Blocking Voltage (Note 5)	V <sub>R</sub>					
RMS Reverse Voltage	V <sub>R(RMS)</sub>	35	70	105	140	V
Average Rectified Output Current @ T <sub>T</sub> = +100°C	I <sub>O</sub>	3.0				A
Non-Repetitive Peak Forward Surge Current 8.3ms Single Half Sine-Wave Superimposed on Rated Load	I <sub>FSM</sub>	100				A

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Typical Thermal Resistance, Junction to Terminal	R <sub>θJT</sub>	10	°C/W
Typical Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	50	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

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

Characteristic	Symbol	Value	Unit
Maximum Forward Voltage @ I <sub>F</sub> = 3.0A	V <sub>FM</sub>	0.9	V
Peak Reverse Current @ T <sub>A</sub> = +25°C at Rated DC Blocking Voltage (Note 5)	I <sub>RM</sub>	10 500	μA
Maximum Reverse Recovery Time (Note 7)	t <sub>RR</sub>	25	ns
Typical Total Capacitance (Note 8)	C <sub>T</sub>	45	pF

- Notes:
5. Short duration pulse test used to minimize self-heating effect.
  6. Unit mounted on PC board with 5.0 mm<sup>2</sup> (0.013 mm thick) copper pads as heat sink.
  7. Measured with I<sub>F</sub> = 0.5A, I<sub>R</sub> = 1.0A, I<sub>RR</sub> = 0.25A. See Figure 5.
  8. Measured at 1.0MHz and applied reverse voltage of 4.0V DC.

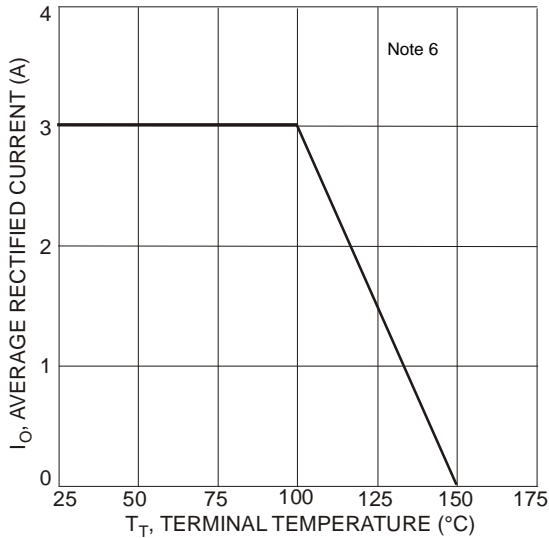


Fig. 1 Forward Current Derating Curve

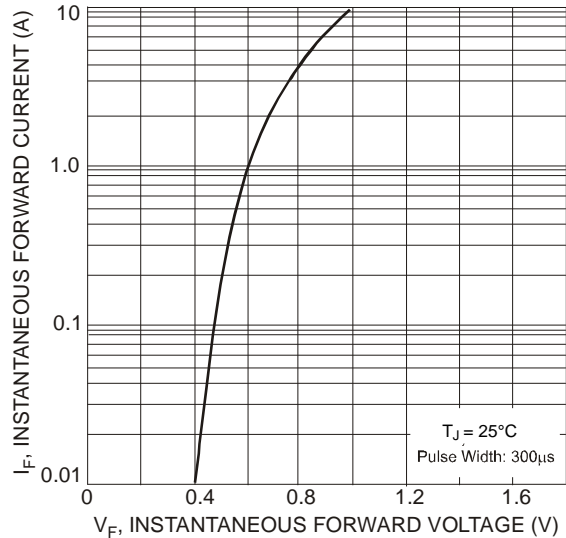


Fig. 2 Typical Forward Characteristics

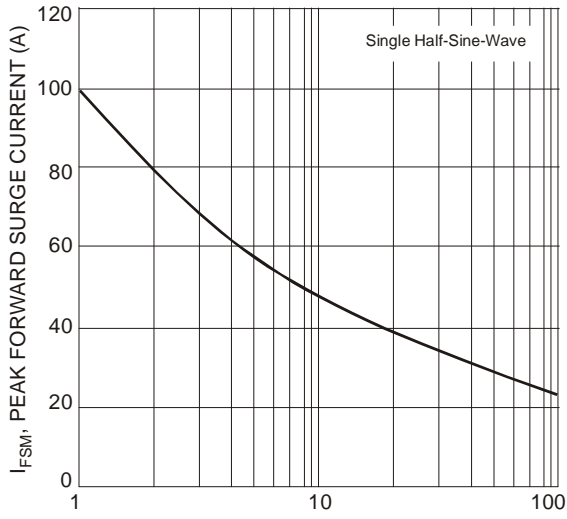


Fig. 3 Surge Current Derating Curve

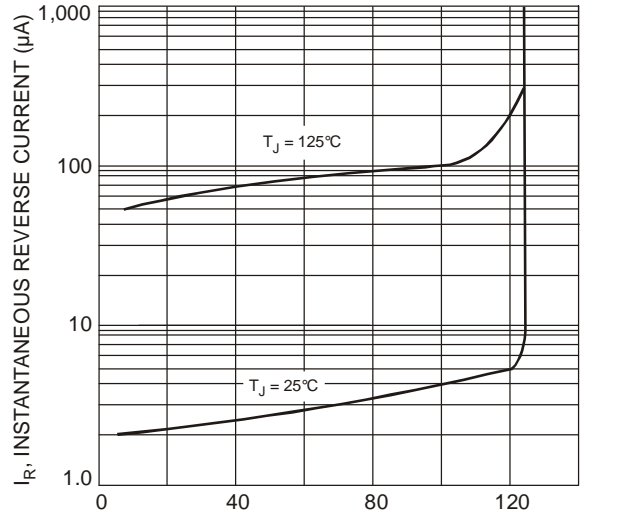
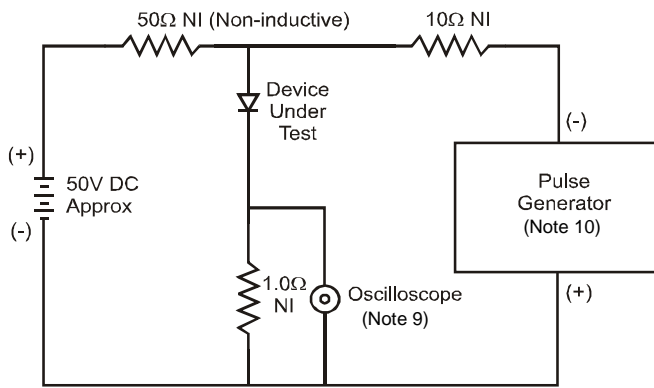
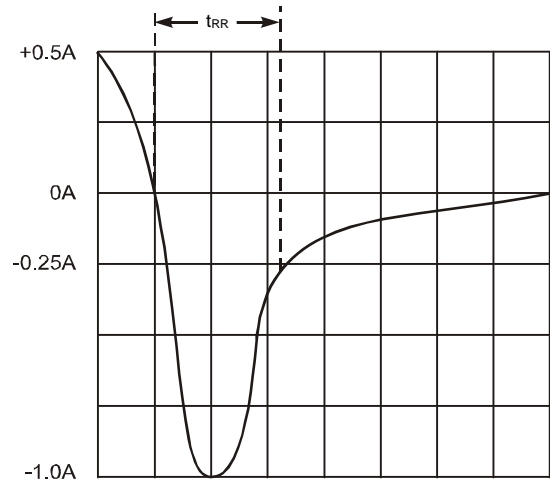


Fig. 4 Typical Reverse Characteristics



Notes:  
 9. Rise Time = 7.0ns max. Input Impedance = 1.0M $\Omega$ , 22pF.  
 10. Rise Time = 10ns max. Input Impedance = 50 $\Omega$ .



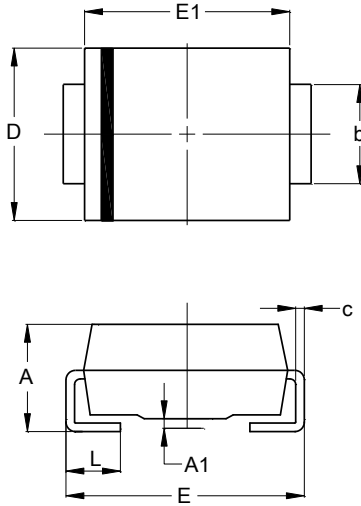
Set time base for 50/100 ns/cm

Fig. 5 Reverse Recovery Time Characteristic and Test Circuit

**Package Outline Dimensions**

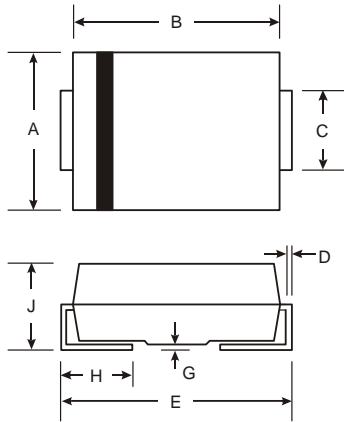
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SMB**



SMB		
Dim	Min	Max
A	2.00	2.50
A1	0.05	0.20
b	1.96	2.21
c	0.15	0.31
D	3.30	3.94
E	5.00	5.59
E1	4.06	4.57
L	0.76	1.52
All Dimensions in mm		

**SMC**

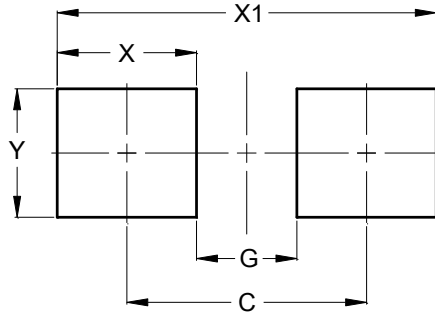


SMC		
Dim	Min	Max
A	5.59	6.22
B	6.60	7.11
C	2.75	3.18
D	0.15	0.31
E	7.75	8.13
G	0.10	0.20
H	0.76	1.52
J	2.00	2.50
All Dimensions in mm		

**Suggested Pad Layout**

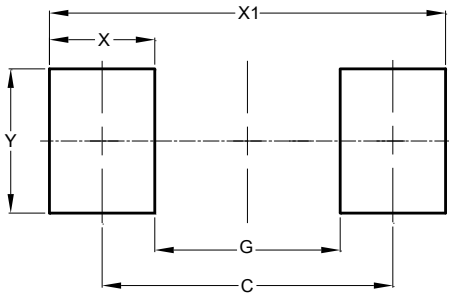
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**SMB**



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

**SMC**



Dimensions	Value (in mm)
C	6.90
G	4.40
X	2.50
X1	9.40
Y	3.30

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