

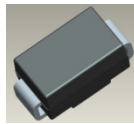
**Features**

- Glass Passivated Die Construction
- Super-Fast Recovery Time for High Efficiency
- Surge Overload Rating to 30A Peak
- Low Forward Voltage Drop and High Current Capability
- 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/>**

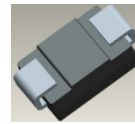
**Mechanical Data**

- Case: SMA
- Case Material: Molded Plastic. 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 or Cathode Notch
- Weight: 0.064 grams (Approximate)

**SMA**



Top View



Bottom View

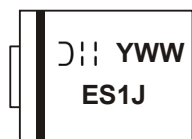
**Ordering Information** (Note 4)

Part Number	Qualification	Case	Packaging
ES1J-13-F	Commercial	SMA	5000/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. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

**Marking Information**

**SMA**



- ES1J = Product Type Marking Code
- ⌋⌋ = Manufacturer's 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	Value	Unit
Peak Repetitive Reverse Voltage	V <sub>RRM</sub>	600	V
Working Peak Reverse Voltage	V <sub>RWM</sub>		
DC Blocking Voltage (Note 6)	V <sub>R</sub>		
RMS Reverse Voltage	V <sub>R(RMS)</sub>	420	V
Average Rectified Output Current @ T <sub>T</sub> = +110°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

## Thermal Characteristics

Characteristic	Symbol	Value	Unit
Typical Thermal Resistance, Junction to Terminal (Note 5)	R <sub>θJT</sub>	30	°C/W
Typical Thermal Resistance, Junction to Air (Note 5)	R <sub>θJA</sub>	90	°C/W
Typical Thermal Resistance, Junction to Case (Note 5)	R <sub>θJC</sub>	25	°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
Minimum Reverse Breakdown Voltage (Note 6)   I <sub>R</sub> = 5μA	V <sub>(BR)R</sub>	600	V
Maximum Forward Voltage Drop   I <sub>F</sub> = 1.0A	V <sub>FM</sub>	1.30	V
Peak Reverse Current at Rated DC Blocking Voltage (Note 6)	I <sub>RM</sub>	T <sub>A</sub> = +25°C	5.0
		T <sub>A</sub> = +125°C	200
Maximum Reverse Recovery Time (Note 7)	t <sub>RR</sub>	35	ns
Typical Reverse Recovery Time (Note 7)	t <sub>RR</sub>	30	ns
Typical Total Capacitance (Note 8)	C <sub>T</sub>	20	pF

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

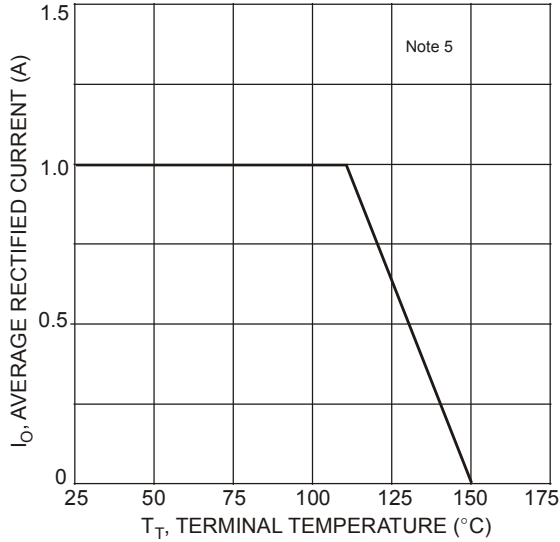


Fig. 1 Forward Current Derating Curve

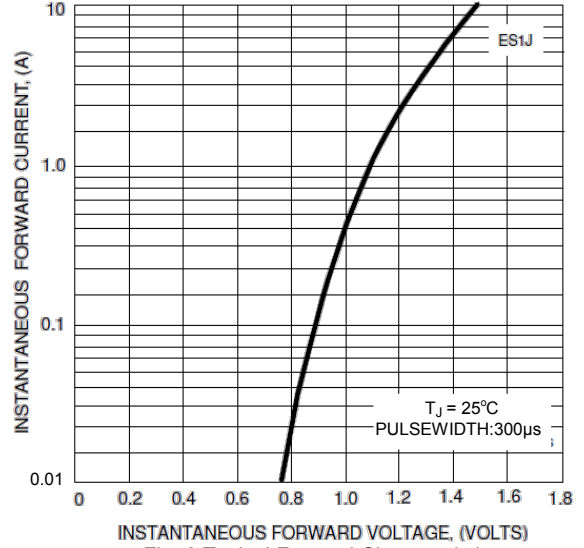


Fig. 2 Typical Forward Characteristics

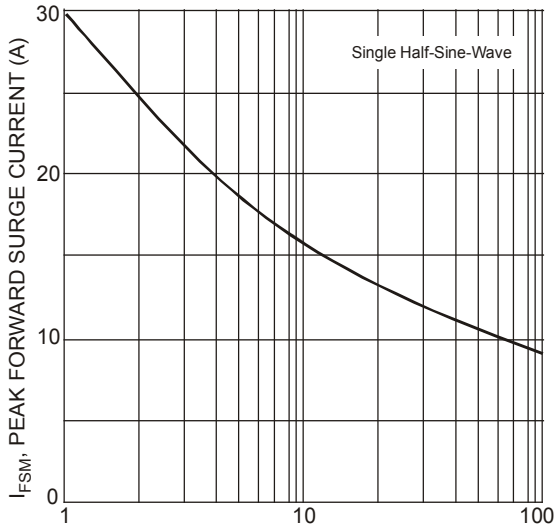


Fig. 3 Surge Current Derating Curve

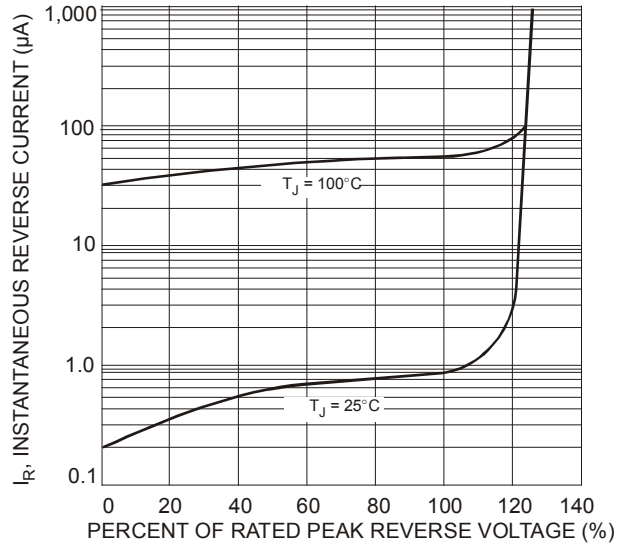
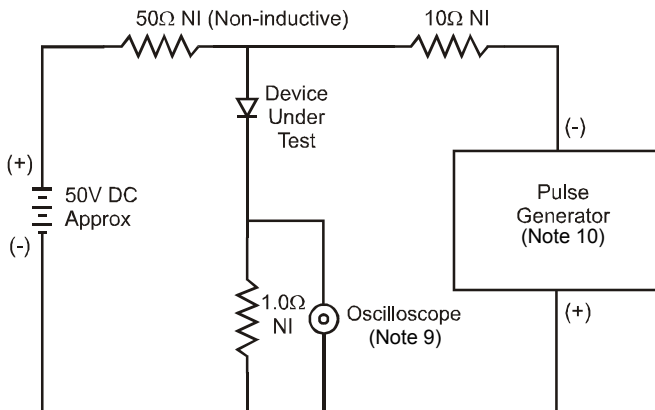
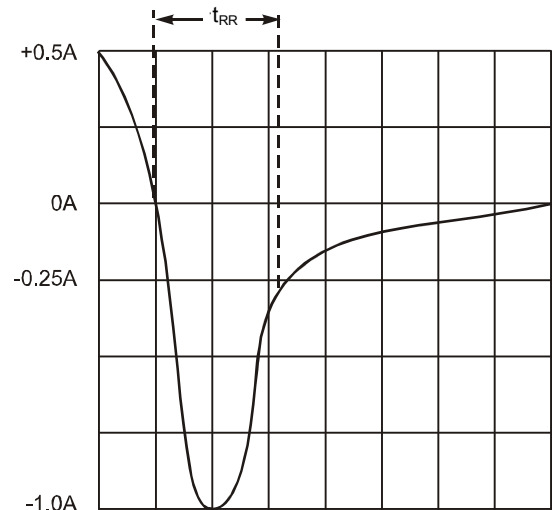


Fig. 4 Typical Reverse Characteristics



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



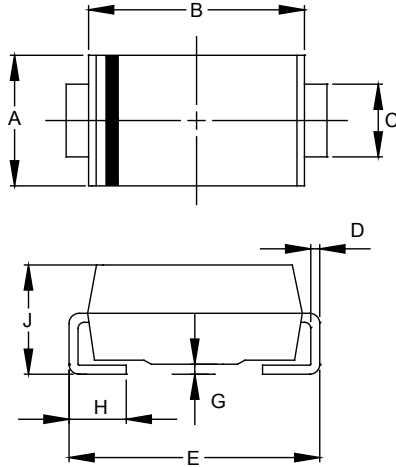
Set time base for 50/100 ns/cm

Fig. 5 Reverse Recovery Time Characteristic and Test Circuit

**Package Outline Dimensions**

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

**SMA**

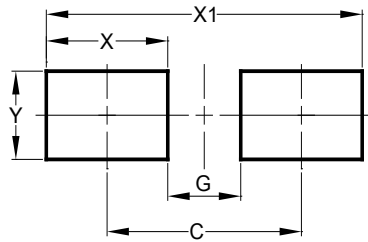


SMA		
Dim	Min	Max
A	2.29	2.92
B	4.00	4.60
C	1.27	1.63
D	0.15	0.31
E	4.80	5.59
G	0.05	0.20
H	0.76	1.52
J	1.96	2.40
All Dimensions in mm		

**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

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