

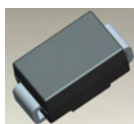
## 1.0A SURFACE MOUNT SUPER-FAST RECTIFIER

### Features

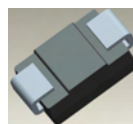
- Glass Passivated Die Construction
- Super-Fast Recovery Time For High Efficiency
- Surge Overload Rating to 30A Peak
- Ideally Suited for Automated Assembly
- **Lead Free Finish/RoHS Compliant (Note 1)**
- **Green Molding Compound (No Halogen and Antimony) (Note 2)**

### Mechanical Data

- Case: SMA
- 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 
- Polarity: Cathode Band or Cathode Notch
- Weight: 0.064 grams (approximate)



Top View



Bottom View

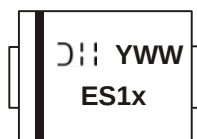
### Ordering Information (Note 3)

| Part Number | Case | Packaging        |
|-------------|------|------------------|
| ES1x-13-F   | SMA  | 5000/Tape & Reel |

\* x = Device type, e.g. ES1A-13-F

- 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



ES1x = Product type marking code, ex. ES1A  
 = Manufacturer's code marking  
 YWW = Date code marking  
 Y = Last digit of year (ex: 2 for 2002)  
 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 capacitance load, derate current by 20%.

| Characteristic                                            | Symbol              | ES1A | ES1B | ES1C | ES1D | ES1G | Unit |
|-----------------------------------------------------------|---------------------|------|------|------|------|------|------|
| Peak Repetitive Reverse Voltage                           | V <sub>RRM</sub>    |      |      |      |      |      |      |
| Working Peak Reverse Voltage                              | V <sub>RWM</sub>    | 50   | 100  | 150  | 200  | 400  | V    |
| DC Blocking Voltage (Note 5)                              | V <sub>R</sub>      |      |      |      |      |      |      |
| RMS Reverse Voltage                                       | V <sub>R(RMS)</sub> | 35   | 70   | 105  | 140  | 280  | 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           | I <sub>FSM</sub>    | 30   |      |      |      |      | A    |
| Single Half Sine-Wave Superimposed on Rated Load          |                     |      |      |      |      |      |      |

**Thermal Characteristics**

| Characteristic                                            | Symbol                            | Value       | Unit |
|-----------------------------------------------------------|-----------------------------------|-------------|------|
| Typical Thermal Resistance, Junction to Terminal (Note 4) | R <sub>θJT</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          | ES1A | ES1B | ES1C | ES1D | ES1G | Unit |
|----------------------------------------|-----------------|------|------|------|------|------|------|
| Maximum Forward Voltage Drop           | V <sub>FM</sub> | 0.90 |      |      |      | —    | V    |
|                                        |                 | 0.92 |      |      |      | 1.25 |      |
| Peak Reverse Current                   | I <sub>RM</sub> | 5.0  |      |      |      |      | μA   |
| at Rated DC Blocking Voltage (Note 5)  |                 | 200  |      |      |      |      |      |
| Maximum Reverse Recovery Time (Note 6) | t <sub>rr</sub> | 25   |      |      |      |      | ns   |
| Typical Total Capacitance (Note 7)     | C <sub>T</sub>  | 20   |      |      |      |      | pF   |

- Notes:
- Unit mounted on PC board with 5.0 mm<sup>2</sup> (0.013 mm 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.

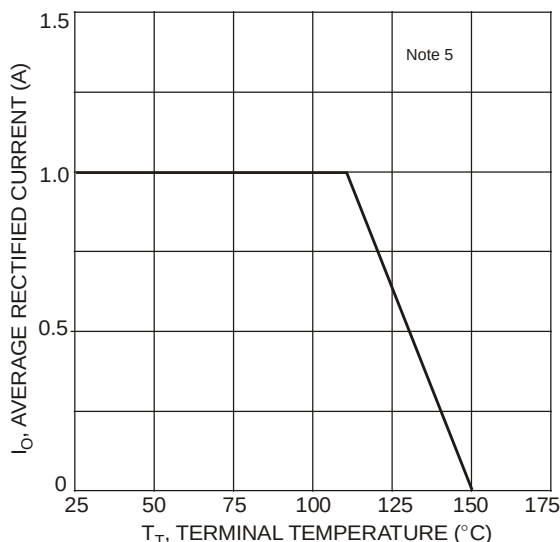


Fig. 1 Forward Current Derating Curve

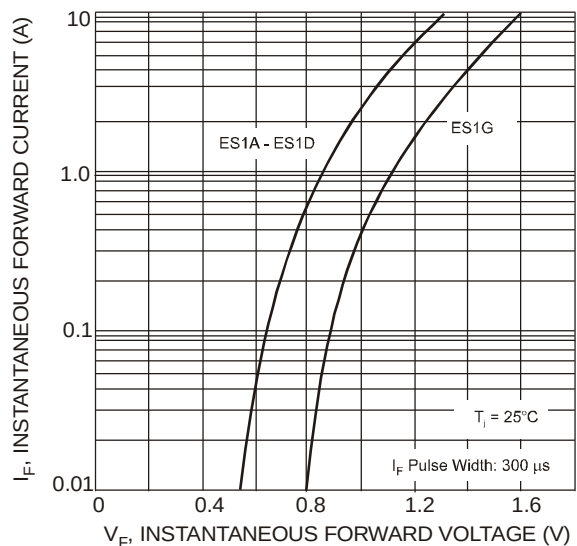


Fig. 2 Typical Forward Characteristics

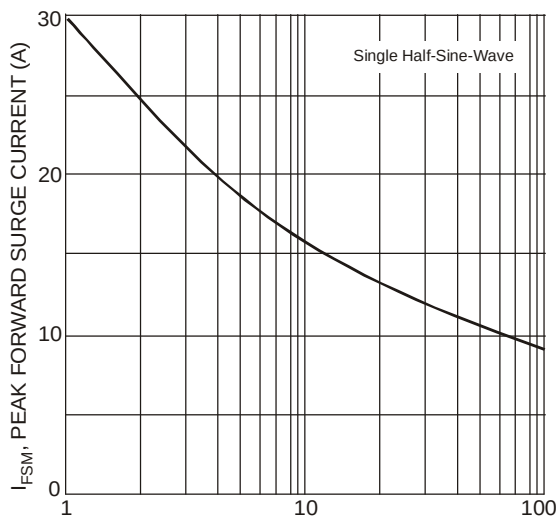


Fig. 3 Surge Current Derating Curve

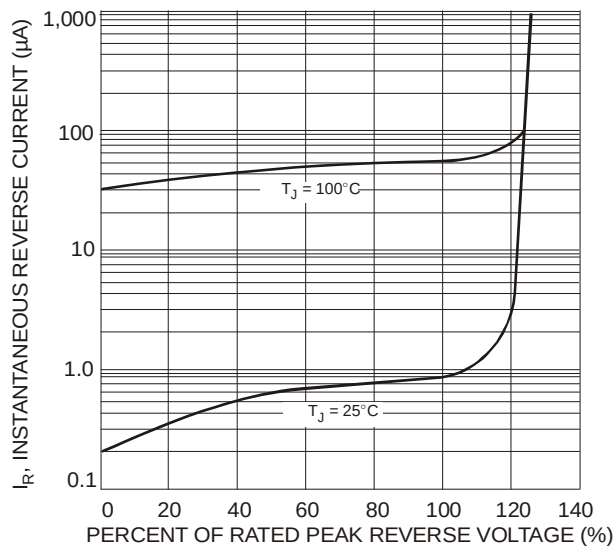
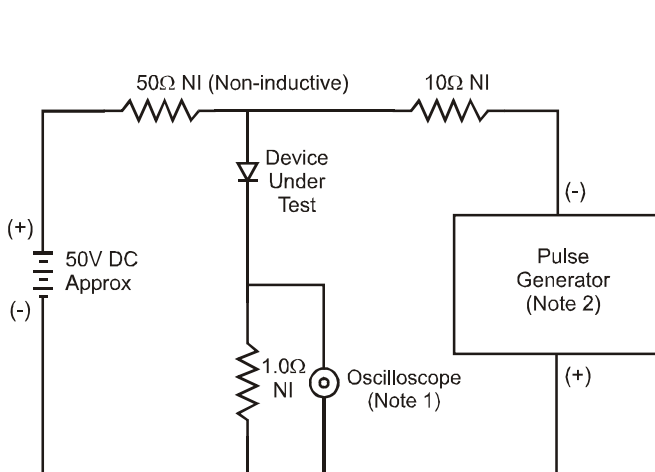
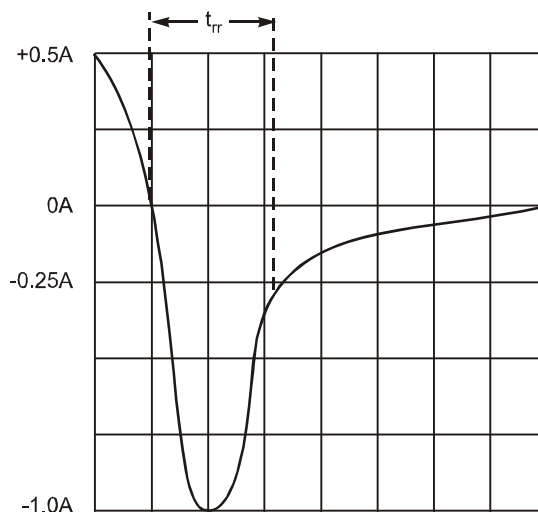


Fig. 4 Typical Reverse Characteristics



Notes:

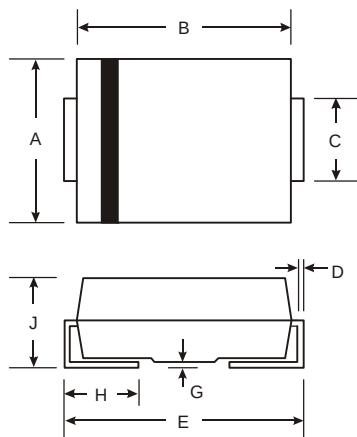
1. Rise Time = 7.0ns max. Input Impedance = 1.0MΩ, 22pF.
2. Rise Time = 10ns max. Input Impedance = 50Ω.



Set time base for 50/100 ns/cm

Fig. 5 Reverse Recovery Time Characteristic and Test Circuit

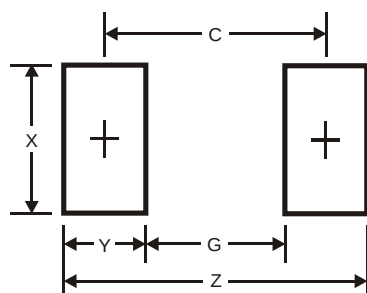
## Package Outline Dimensions



| 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   | 2.01 | 2.30 |

All Dimensions in mm

## Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z          | 6.5           |
| G          | 1.5           |
| X          | 1.7           |
| Y          | 2.5           |
| C          | 4.0           |

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