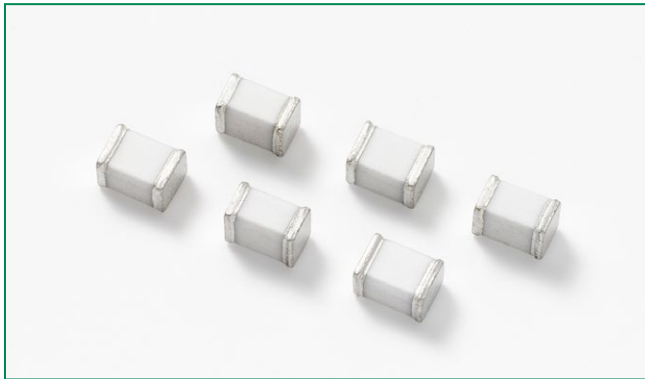


### SE Series



#### Agency Approvals

| AGENCY  | AGENCY FILE NUMBER |
|---|--------------------|
|  | E128662            |

#### 2 Electrode GDT Graphical Symbol



#### Additional Information



**Datasheet**



**Resources**



**Samples**

#### Description

Littelfuse SE series GDT offers high surge ratings in a miniature package. It's designed for surface mounting on PCB with small size 3.2x1.6x1.6mm. Low insertion loss is perfectly suited to broadband equipment applications. The capacitance does not vary with voltage, and will not cause operational problems with ADSL2+, where capacitance variation across Tip and Ring is undesirable. These devices are extremely robust and are able to divert a 500A-600A pulse in a miniature package 1206 without destruction.

#### Features

- RoHS compliant and Lead-free
- GHz working frequency
- Excellent stability on multiple pulse duty cycle
- Excellent response to fast rising transients.
- Ultra Low Insertion Loss
- 0.5-0.6KA surge capability tested with 8/20 $\mu$ S pulse as defined by IEC 61000-4-5
- Ultra small devices offered in a variety of mounting lead forms
- Non-Radioactive
- Low capacitance (<0.5pF)
- Voltage Ranges 140V to 500V
- UL recognized
- Conforms to ITU-T K12, IEC 1000-4-5
- Square Outline

#### Applications

- Communication equipment
- CATV equipment
- Test equipment
- Data lines
- Power supplies
- Telecom SLIC protection
- Broadband equipment
- ADSL equipment, including ADSL2+
- XDSL equipment
- Satellite and CATV equipment
- General telecom equipment

**Electrical Characteristics**

| Part Number | Device Specifications (at 25°C) |     |     |                                       |   |                       | Life Ratings        |                   |                                |              |   |  |         |
|-------------|---------------------------------|-----|-----|---------------------------------------|---|-----------------------|---------------------|-------------------|--------------------------------|--------------|---|--|---------|
|             | DC Breakdown in Volts (@100V/s) |     |     | Impulse Breakdown in Volts (@100V/μs) | Impulse Breakdown In Volts (@1 Kv/μsec) | Insulation Resistance | Capacitance (@1MHz) | Arc Voltage (@1A) | Glow to Arc Transition Current | Glow Voltage | Nominal Impulse Discharge Current (x10 @3/20μs) | Nominal Impulse Discharge Current (x10 @5/320μs) |         |
|             | MIN                             | TYP | MAX |                                       |   |                       |                     |                   |                                |              |   |  | MIN     |
| SE140       | 98                              | 140 | 182 | 800                                   | 900                                     | >1GΩ (at 100VDC)      | <0.5 pf             | ~10 V             | <1.0 A                         | ~60 V        | 0.5 kA  | 150 A  |         |
| SE200       | 140                             | 200 | 260 | 700                                   | 1100                                    |                       |                     |                   |                                |              |   |  | <0.3 pf |
| SE230       | 172                             | 230 | 276 | 600                                   | 800                                     |                       |                     |                   |                                |              |   |  | <0.5 pf |
| SE350       | 265                             | 350 | 495 | 900                                   | 1150                                    |                       |                     |                   |                                |              |   |  | <0.5 pf |
| SE470       | 329                             | 470 | 611 | 1050                                  | 1200                                    |                       |                     |                   |                                |              |   |  | <0.3 pf |
| SE500       | 400                             | 500 | 600 | 1050                                  | 1200                                    |                       |                     |                   |                                |              |   |  | <0.3 pf |

**Product Characteristics**

|  |  |
|--|--|
| <b>Materials</b>                           | Device Tin Plated 17.5±12.5 Microns<br>Construction Ceramic Insulator. |
| <b>Storage and Operational Temperature</b> | -40 to +90 °C  |

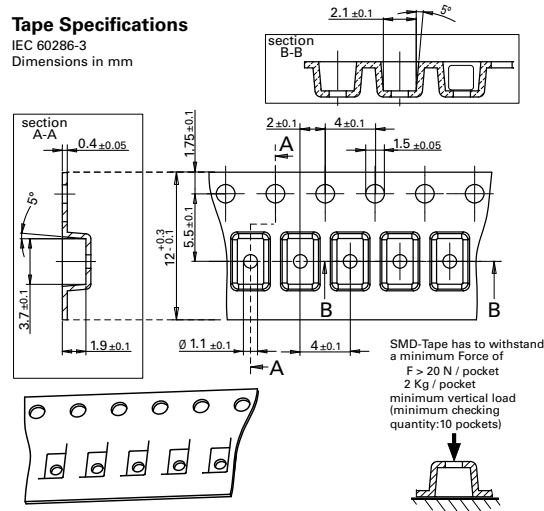
**Voltage vs. Time Characteristic**



**Tape and Reel Dimensions (IEC 60286-3, dimension in mm)**

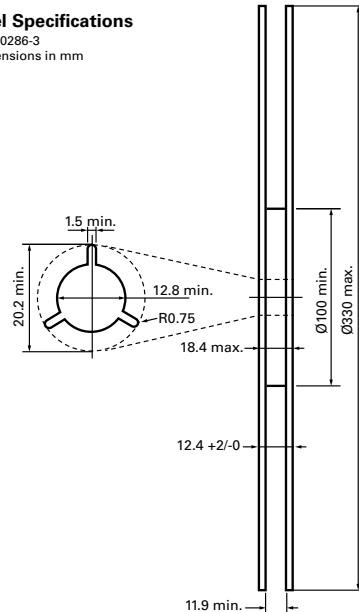
**Tape Specifications**

IEC 60286-3  
Dimensions in mm



**Reel Specifications**

IEC 60286-3  
Dimensions in mm

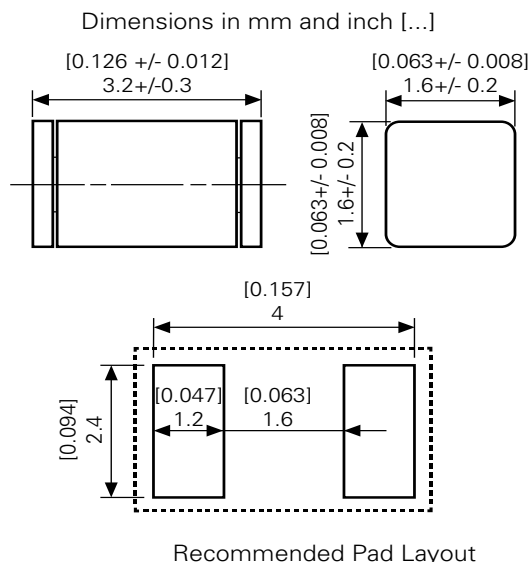


### Soldering Parameters - Reflow Soldering (Surface Mount Devices)

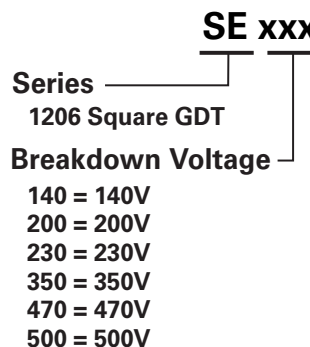
|  |                                    |                         |
|--|------------------------------------|-------------------------|
| Reflow Condition                                       |                                    | Pb – Free assembly      |
| Pre Heat   | - Temperature Min ( $T_{s(min)}$ ) | 150°C                   |
|  | - Temperature Max ( $T_{s(max)}$ ) | 200°C                   |
|  | - Time (Min to Max) ( $t_s$ )      | 60 – 180 secs           |
| Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak) |                                    | 3°C/second max          |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                   |                                    | 5°C/second max          |
| Reflow   | - Temperature ( $T_L$ ) (Liquidus) | 217°C                   |
|  | - Temperature ( $t_L$ )            | 60 – 150 seconds        |
| Peak Temperature ( $T_p$ )                             |                                    | 260 <sup>+0/-5</sup> °C |
| Time within 5°C of actual peak Temperature ( $t_p$ )   |                                    | 10 – 30 seconds         |
| Ramp-down Rate   |                                    | 6°C/second max          |
| Time 25°C to peak Temperature ( $T_p$ )                |                                    | 8 minutes Max.          |
| Do not exceed  |                                    | 260°C                   |



### Device Dimensions



### Part Numbering System and Ordering Information



### Packaging

| Part Number | Packaging Option | Quantity |
|-------------|------------------|----------|
| SE140       | Tape and Reel    | 3,000    |
| SE200       | Tape and Reel    | 3,000    |
| SE230       | Tape and Reel    | 3,000    |
| SE350       | Tape and Reel    | 3,000    |
| SE470       | Tape and Reel    | 3,000    |
| SE500       | Tape and Reel    | 3,000    |

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