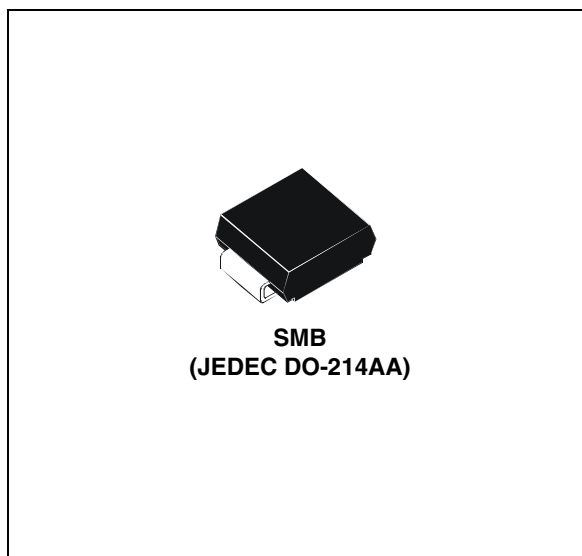


### Features

- Bidirectional crowbar protection
- Repetitive peak pulse current ( $T_{amb}$  -40 °C to +85 °C)
  - $I_{PP} = 100$  A (10/1000  $\mu$ s)
  - $I_{PP} = 200$  A (5/310  $\mu$ s)
  - $I_{PP} = 500$  A (2/10  $\mu$ s)
- Breakdown voltage: from 72 V to 310 V
- Operating  $T_j$  max: 150 °C
- Micro capacitance technology
- JEDEC registered package outline

### Complies with the following standards

- Telcordia GR-1089
- ITU-T K20/21/45 enhanced level
- TIA-968
- YD/T 950 / 993 / 1082
- IEC 61000-4-5
- IEC 61000-4-2 level 4
  - $\pm 15$  kV (air discharge)
  - $\pm 8$  kV (contact discharge)
- MIL STD 883H - Method 3015-8 Class 3B
- Resin meets UL 94, V0
- MIL-STD-750, method 2026 solderability
- EIA STD RS-481 and IEC 60286-3 packing
- IPC 7531 footprint
- UL497B recognized, UL file E136224



### Description

The devices in the SMP-0SCMC series are micro capacitance Trisils designed to protect broadband telecommunication equipment such as DSL modems, subscriber gateways and DSLAMs from lightning surges and power faults.

Trisils are not subject to aging and provide a failsafe mode in short circuit for a better protection. They are used to help equipment to meet main standards such as UL60950, IEC950 / CSA C22.2 and UL1459.

The SMP-0SCMC series is packaged in SMB.

TM: Trisil is a trademark of STMicroelectronics

# 1 Characteristics

**Table 1. Absolute ratings ( $-40\text{ }^{\circ}\text{C} < T_{\text{amb}} < 85\text{ }^{\circ}\text{C}$ ) for repetitive peak pulse current  $I_{\text{PP}}$**

|                                   |         |      |        |        |        |       |        |         |        |               |
|-----------------------------------|---------|------|--------|--------|--------|-------|--------|---------|--------|---------------|
| <b>Voltage pulse</b>              | 0.5/700 | 2/10 | 1.2/50 | 10/160 | 10/560 | 9/720 | 10/360 | 10/1000 | 10/700 | $\mu\text{s}$ |
| <b>Current pulse</b>              | 0.2/310 | 2/10 | 8/20   | 10/160 | 10/560 | 5/320 | 10/360 | 10/1000 | 5/310  | $\mu\text{s}$ |
| <b><math>I_{\text{PP}}</math></b> | 100     | 500  | 400    | 200    | 150    | 200   | 175    | 100     | 200    | A             |

**Table 2. Absolute ratings ( $T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$ ) for other parameters**

| Symbol           | Parameter                                                              | Value                                                                                                                             | Unit               |
|------------------|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------------|
| $I_{\text{TSM}}$ | Non repetitive surge peak on-state current (sinusoidal) <sup>(1)</sup> | $t = 10\text{ ms}$<br>61<br>$t = 0.2\text{ s}$<br>18<br>$t = 1\text{ s}$<br>9<br>$t = 2\text{ s}$<br>7<br>$t = 15\text{ mn}$<br>4 | A                  |
| $T_{\text{stg}}$ | Storage temperature range                                              | -55 to 150                                                                                                                        | $^{\circ}\text{C}$ |
| $T_{\text{j}}$   | Operating junction temperature range                                   | -40 to 150                                                                                                                        | $^{\circ}\text{C}$ |
| $T_{\text{L}}$   | Maximum lead temperature for soldering during 10 s.                    | 260                                                                                                                               | $^{\circ}\text{C}$ |

1. In fail safe mode, the device acts as a short circuit.

**Figure 1. Electrical characteristics - definitions ( $T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$ )**

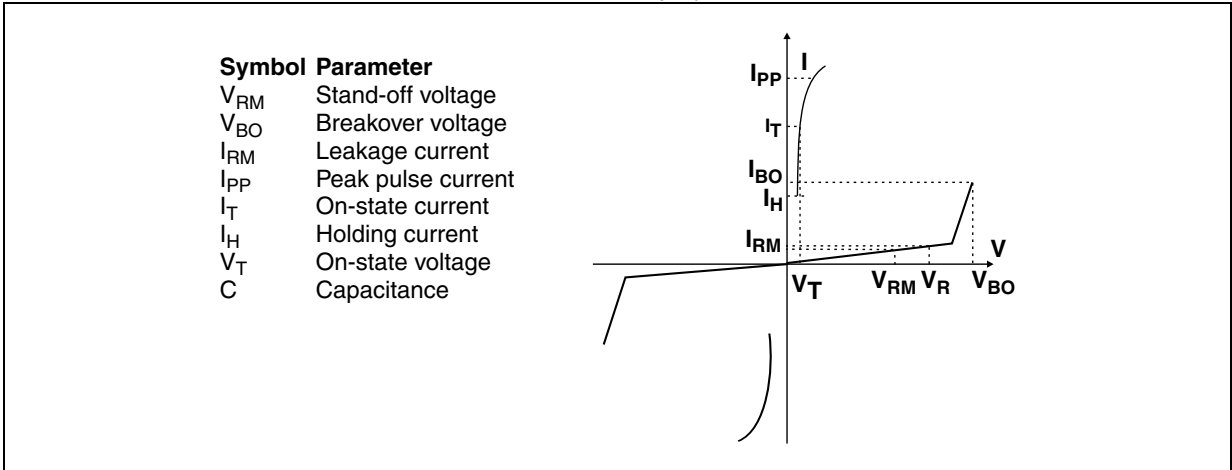


Table 3. Electrical characteristics - values ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ )

| Order code  | $I_{RM} \text{ max @ } V_{RM}$ |     | $V_{BR}$ | $V_{BO}$ | $I_H$ | $V_T \text{ @ } 2.2\text{ A}$ | $C \text{ @ } 2\text{ V}$ | $C \text{ @ } 50\text{ V}$ | $\alpha T^{(1)}$           |
|-------------|--------------------------------|-----|----------|----------|-------|-------------------------------|---------------------------|----------------------------|----------------------------|
|             | Max.                           |     | Typ.     | Max.     | Min.  | Max.                          | Max.                      | Max.                       | $10^{-4}/^{\circ}\text{C}$ |
|             | $\mu\text{A}$                  | V   | V        | V        | mA    | V                             | pF                        | pF                         |                            |
| SMP0720SCMC | 5                              | 65  | 72       | 88       | 150   | 3                             | 80                        | 45                         | 9                          |
| SMP0900SCMC | 5                              | 75  | 90       | 98       | 150   | 3                             | 80                        | 45                         | 9.1                        |
| SMP1100SCMC | 5                              | 90  | 110      | 130      | 150   | 3                             | 75                        | 40                         | 9.3                        |
| SMP1300SCMC | 5                              | 120 | 130      | 160      | 150   | 3                             | 75                        | 40                         | 9.5                        |
| SMP1500SCMC | 5                              | 140 | 150      | 180      | 150   | 3                             | 75                        | 40                         | 9.7                        |
| SMP1800SCMC | 5                              | 170 | 180      | 220      | 150   | 3                             | 70                        | 35                         | 9.9                        |
| SMP2100SCMC | 5                              | 180 | 210      | 240      | 150   | 3                             | 45                        | 25                         | 10.2                       |
| SMP2300SCMC | 5                              | 190 | 230      | 260      | 150   | 3                             | 45                        | 25                         | 10.3                       |
| SMP2600SCMC | 5                              | 220 | 260      | 300      | 150   | 3                             | 40                        | 20                         | 10.6                       |
| SMP3100SCMC | 5                              | 275 | 310      | 350      | 150   | 3                             | 40                        | 20                         | 11                         |

1. For  $V_{BR}$  versus junction temperature, use the following formula:  $V_{BR} \text{ @ } T_J = V_{BR} \text{ @ } 25\text{ }^{\circ}\text{C} \times (1 + \alpha T \times (T_J - 25))$

Figure 2. Pulse waveform

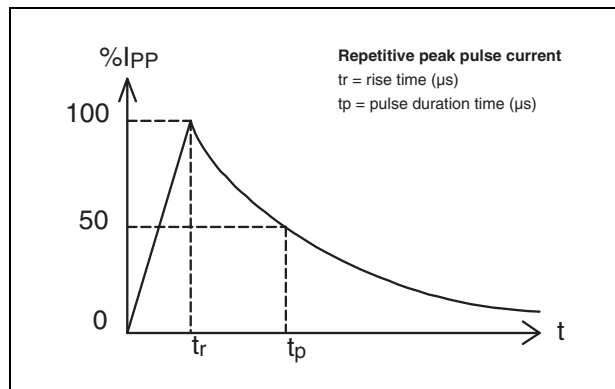


Figure 3. Non repetitive surge peak on-state current versus overload duration

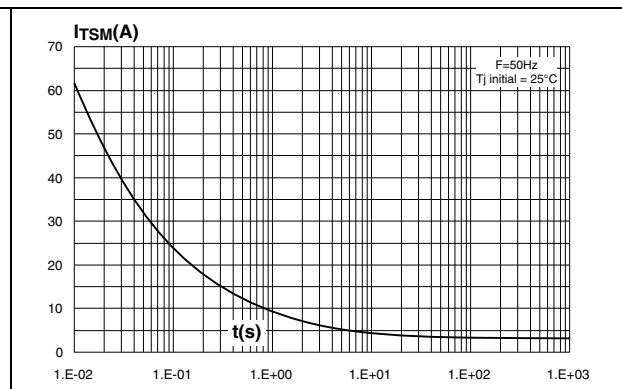


Figure 4. Relative variation of holding current versus junction temperature

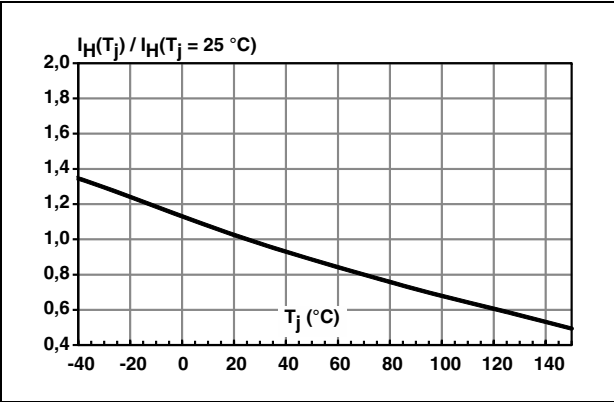


Figure 5. Percentage of change of break over voltage versus junction temperature

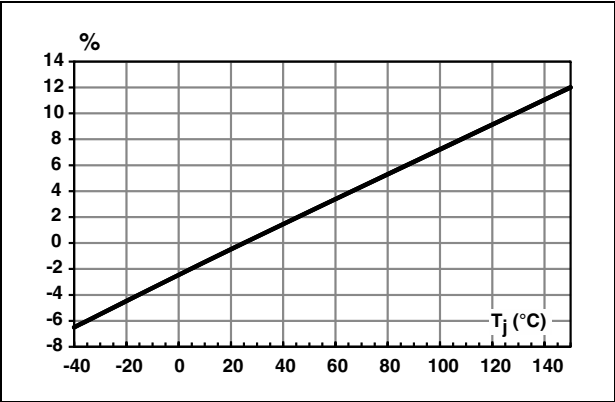
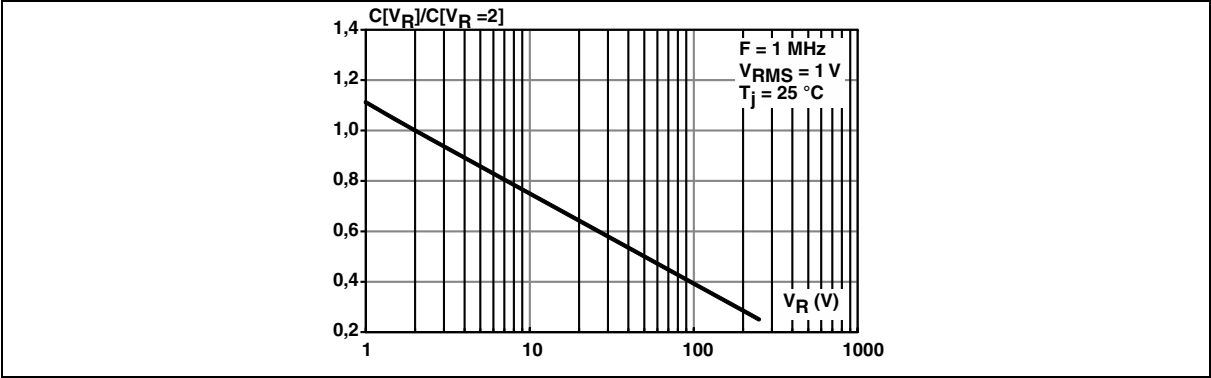


Figure 6. Relative variation of junction capacitance versus reverse applied voltage (typical values)



## 2 Package information

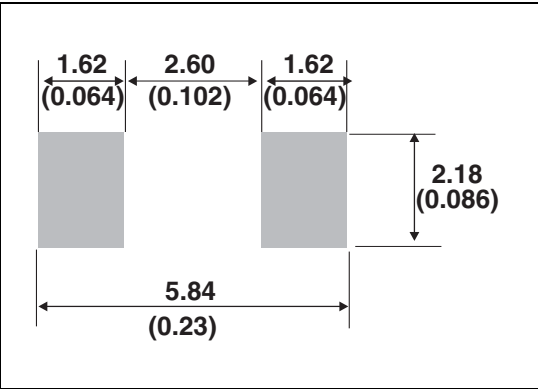
- Epoxy meets UL94, V0
- Lead-free package

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK® is an ST trademark.

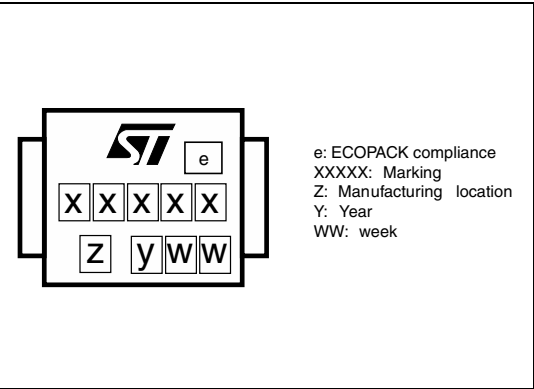
**Table 4. SMB dimensions**

| Ref. | Dimensions  |      |        |       |
|------|-------------|------|--------|-------|
|      | Millimeters |      | Inches |       |
|      | Min.        | Max. | Min.   | Max.  |
| A1   | 1.90        | 2.45 | 0.075  | 0.096 |
| A2   | 0.05        | 0.20 | 0.002  | 0.008 |
| b    | 1.95        | 2.20 | 0.077  | 0.087 |
| c    | 0.15        | 0.40 | 0.006  | 0.016 |
| E    | 5.10        | 5.60 | 0.201  | 0.220 |
| E1   | 4.05        | 4.60 | 0.159  | 0.181 |
| D    | 3.30        | 3.95 | 0.130  | 0.156 |
| L    | 0.75        | 1.50 | 0.030  | 0.059 |

**Figure 7. Footprint dimensions in mm (inches)**



**Figure 8. Marking layout**



### 3 Ordering information

**Table 5. Ordering information**

| Order code  | Marking | Package | Weight | Base qty | Delivery mode |
|-------------|---------|---------|--------|----------|---------------|
| SMP0720SCMC | P07CM   | SMB     | 98 mg  | 2500     | Tape and reel |
| SMP0900SCMC | P09CM   |         |        |          |               |
| SMP1100SCMC | P11CM   |         |        |          |               |
| SMP1300SCMC | P13CM   |         |        |          |               |
| SMP1500SCMC | P15CM   |         |        |          |               |
| SMP1800SCMC | P18CM   |         |        |          |               |
| SMP2100SCMC | P21CM   |         |        |          |               |
| SMP2300SCMC | P23CM   |         |        |          |               |
| SMP2600SCMC | P26CM   |         |        |          |               |
| SMP3100SCMC | P31CM   |         |        |          |               |

### 4 Revision history

**Table 6. Document revision history**

| Date        | Revision | Changes          |
|-------------|----------|------------------|
| 17-Jan-2013 | 1        | Initial version. |

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