

## Transient voltage suppressor for dual voltage SLIC

Datasheet – production data

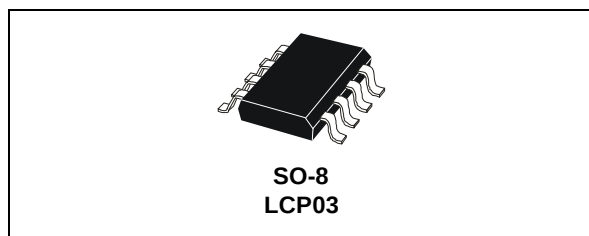


Figure 1. Functional diagram

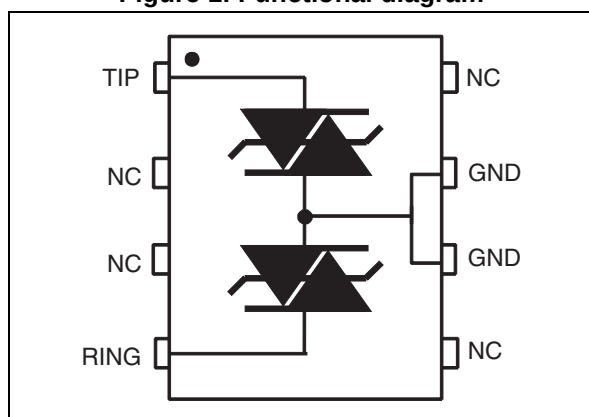
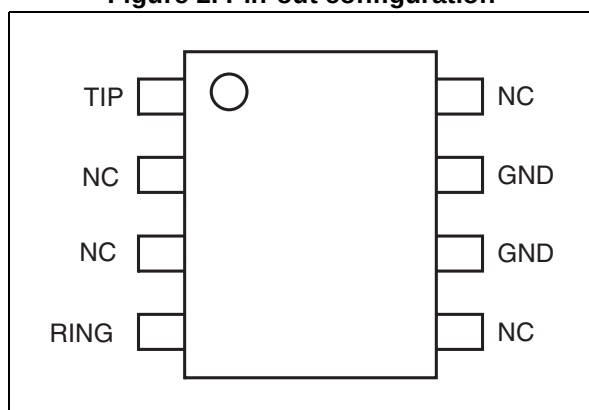


Figure 2. Pin-out configuration



### Features

- Protection IC recommended for ringing SLICs
- Negative stand-off voltage:  $V_R = -53\text{ V}$
- Positive stand-off voltage:  $V_R = 83\text{ V}$
- Peak pulse current:  $I_{PP} = 60\text{ A}$  (5/310  $\mu\text{s}$ )
- Holding current:  $I_H = 150\text{ mA min.}$

### Applications

- Central office (CO)
- Private branch exchange (PBX)
- Digital loop carrier (DLC)
- Digital subscriber line access multiplexer (DSLAM)
- Fiber in the Loop (FITL)
- Wireless local loop (WLL)
- Hybrid fiber coax (HFC)
- ISDN terminal adapter
- Cable modem

### Description

The LCP03 has been developed to protect SLICs operating on both negative and positive battery supplies. It provides crowbar mode protection for both TIP and RING lines. The surge suppression is assumed for each wire by two thyristor structures, one dedicated to positive surges the second one for negative surges.

LCP03 can be used to help equipment to meet various standards such as UL1950, IEC 60950 / CSAC22.2, UL1459 and TIA-968-A (formerly FCC part68). A Trisil™ meets UL94 V0. (Trisils are UL497B approved - file: E136224).

TM: Trisil is a trademark of STMicroelectronics

# 1 Characteristics

**Table 1. Compliant with the following standards**

| Standard                    | Peak surge voltage (V) | Voltage waveform                 | Required peak current (A)                  | Current waveform                | Minimum series resistor to meet standard ( $\Omega$ ) |
|-----------------------------|------------------------|----------------------------------|--------------------------------------------|---------------------------------|-------------------------------------------------------|
| GR-1089 Core First level    | 2500<br>1000           | 2/10 $\mu$ s<br>10/1000 $\mu$ s  | 500<br>100                                 | 2/10 $\mu$ s<br>10/1000 $\mu$ s | 14<br>24                                              |
| GR-1089 Core Second level   | 5000                   | 2/10 $\mu$ s                     | 500                                        | 2/10 $\mu$ s                    | 29                                                    |
| GR-1089 Core Intra-building | 1500                   | 2/10 $\mu$ s                     | 100                                        | 2/10 $\mu$ s                    | 0                                                     |
| ITU-T-K20/K21               | 6000<br>4000<br>1500   | 10/700 $\mu$ s                   | 150<br>100<br>37.5                         | 5/310 $\mu$ s                   | 60<br>27<br>0                                         |
| ITU-T-K20 (IEC61000-4-2)    | 8000<br>15000          | 1/60 ns                          | ESD contact discharge<br>ESD air discharge |                                 | 0<br>0                                                |
| IEC61000-4-5                | 4000<br>4000           | 10/700 $\mu$ s<br>1.2/50 $\mu$ s | 100<br>100                                 | 5/310 $\mu$ s<br>8/20 $\mu$ s   | 27<br>0                                               |

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

| Symbol               | Parameter                                                                                                                                                                                                        |                                                                                              | Value                | Unit               |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|----------------------|--------------------|
| $I_{PP}$             | Peak pulse current                                                                                                                                                                                               | 10/1000 $\mu$ s<br>5/310 $\mu$ s<br>2/10 $\mu$ s                                             | 30<br>60<br>130      | A                  |
| $I_{TSM}$            | Non repetitive surge peak on-state current (F = 50 Hz)<br>$I_{TSM}$ value specified for each line<br>$I_{TSM}$ value can be applied on both lines at the same time (GND capability is twice the line $I_{TSM}$ ) | $t_p = 20\text{ ms}$<br>$t_p = 0.2\text{ s}$<br>$t_p = 1\text{ s}$<br>$t_p = 15\text{ min.}$ | 8<br>5<br>3.5<br>1.4 | A                  |
| $V_{Gn}$<br>$V_{Gp}$ | Negative battery voltage range<br>Positive battery voltage range                                                                                                                                                 |                                                                                              | 53<br>83             | V                  |
| $T_j$                | Operating junction temperature range                                                                                                                                                                             |                                                                                              | 150                  | $^{\circ}\text{C}$ |
| $T_{stg}$            | Storage temperature range                                                                                                                                                                                        |                                                                                              | -55 to +150          | $^{\circ}\text{C}$ |
| $T_L$                | Lead solder temperature (10 s duration)                                                                                                                                                                          |                                                                                              | 260                  | $^{\circ}\text{C}$ |

Figure 3. Pulse waveform

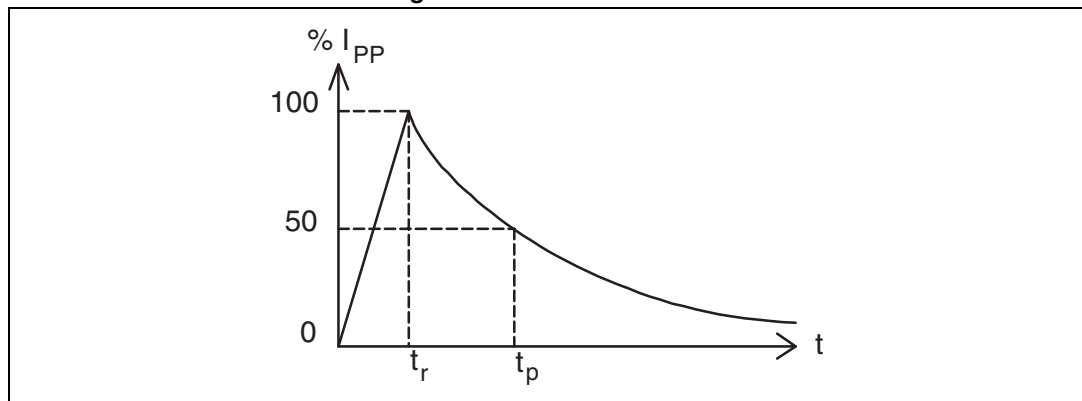


Table 3. Dynamic electrical characteristics

| Symbol           | Parameter                          | Test conditions                                               | Min | Typ | Max | Unit |
|------------------|------------------------------------|---------------------------------------------------------------|-----|-----|-----|------|
| I <sub>HN</sub>  | Negative holding current           |                                                               | 150 |     |     | mA   |
| I <sub>RN</sub>  | Leakage current at V <sub>R-</sub> |                                                               |     |     | 5   | μA   |
| I <sub>RP</sub>  | Leakage current at V <sub>R+</sub> |                                                               |     |     | 5   | μA   |
| V <sub>BOP</sub> | Positive breakover voltage         | 1.5 kV<br>10/700 μs<br>R <sub>s</sub> = 20 Ω                  |     |     | 110 | V    |
| V <sub>BON</sub> | Negative breakover voltage         |                                                               |     |     | 75  |      |
| C                | Capacitance                        | V <sub>R</sub> = 50 V bias, V <sub>RMS</sub> = 1 V, F = 1 MHz |     | 10  |     | pF   |
|                  |                                    | V <sub>R</sub> = 2 V bias, V <sub>RMS</sub> = 1 V, F = 1 MHz  |     | 22  |     | pF   |

Figure 4. Relative variation of holding current versus junction temperature

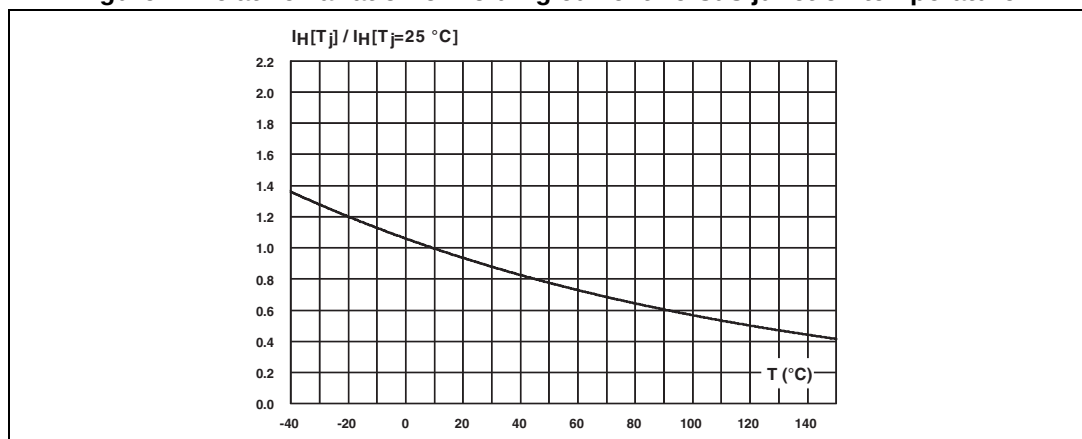
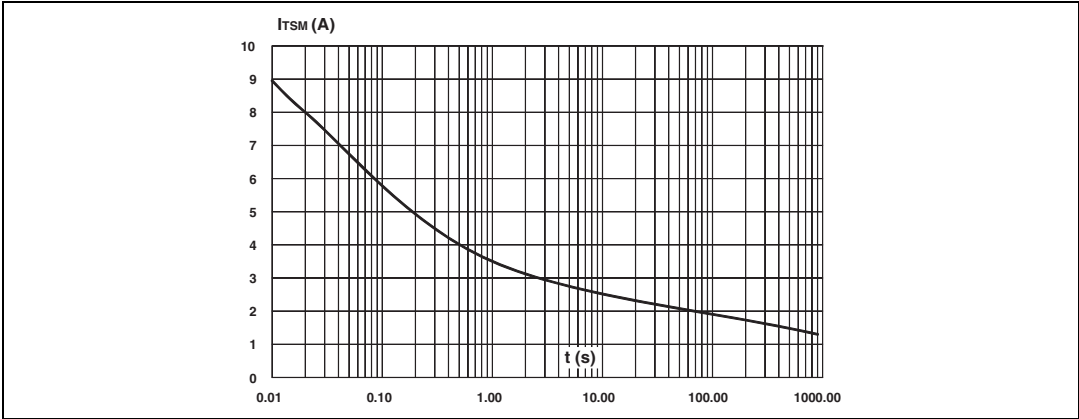


Figure 5. Maximum non repetitive surge peak on state current versus overload duration



## 2 Package information

- Epoxy meets UL94, V0
- Lead-free packages

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Figure 6. SO-8 dimension definitions

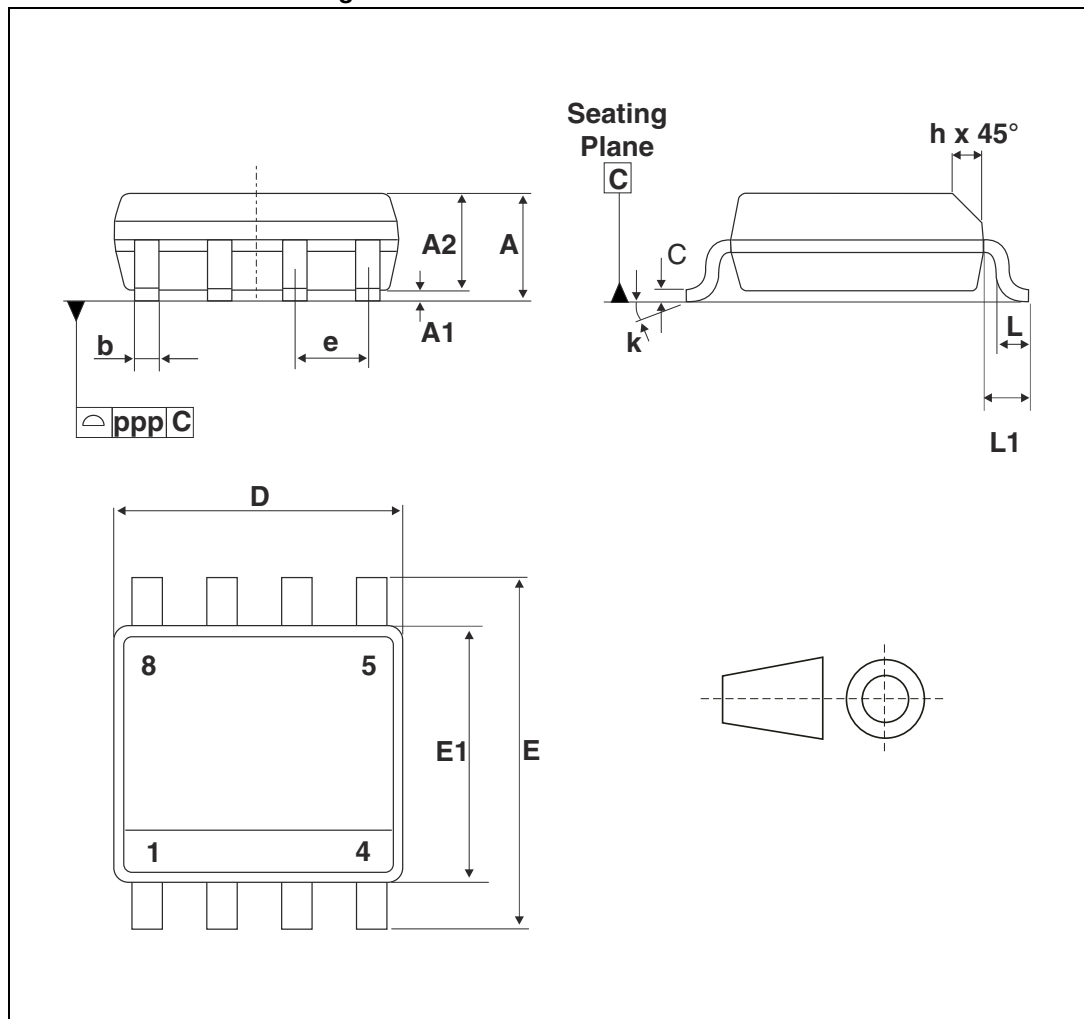


Table 4. SO-8 dimension values

| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    |             |      | 1.75 |        |       | 0.069 |
| A1   | 0.1         |      | 0.25 | 0.004  |       | 0.010 |
| A2   | 1.25        |      |      | 0.049  |       |       |
| b    | 0.28        |      | 0.48 | 0.011  |       | 0.019 |
| C    | 0.17        |      | 0.23 | 0.007  |       | 0.009 |
| D    | 4.80        | 4.90 | 5.00 | 0.189  | 0.193 | 0.197 |
| E    | 5.80        | 6.00 | 6.20 | 0.228  | 0.236 | 0.244 |
| E1   | 3.80        | 3.90 | 4.00 | 0.150  | 0.154 | 0.157 |
| e    |             | 1.27 |      |        | 0.050 |       |
| h    | 0.25        |      | 0.50 | 0.010  |       | 0.020 |
| L    | 0.40        |      | 1.27 | 0.016  |       | 0.050 |
| L1   |             | 1.04 |      |        | 0.041 |       |
| k    | 0°          |      | 8°   | 0°     |       | 8°    |
| ppp  |             |      | 0.10 |        |       | 0.004 |

Figure 7. Footprint, dimensions in mm (inches)

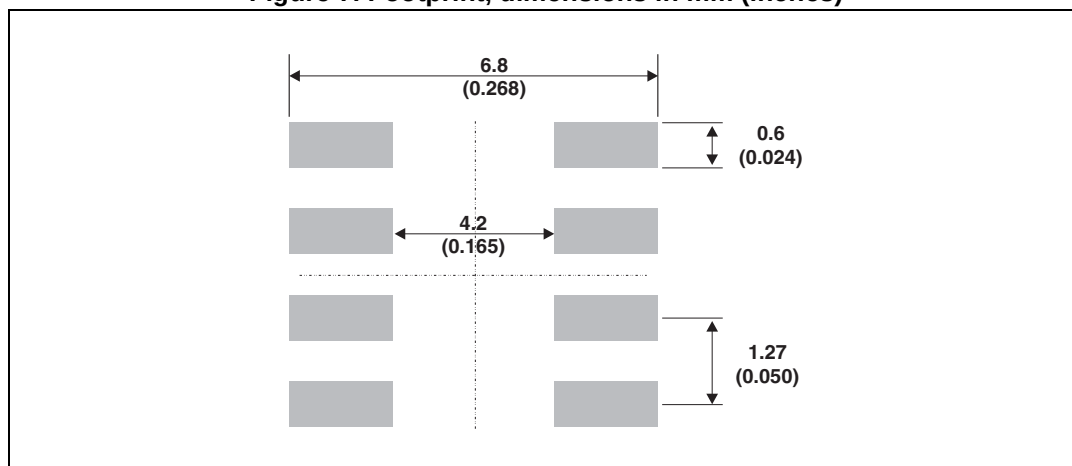
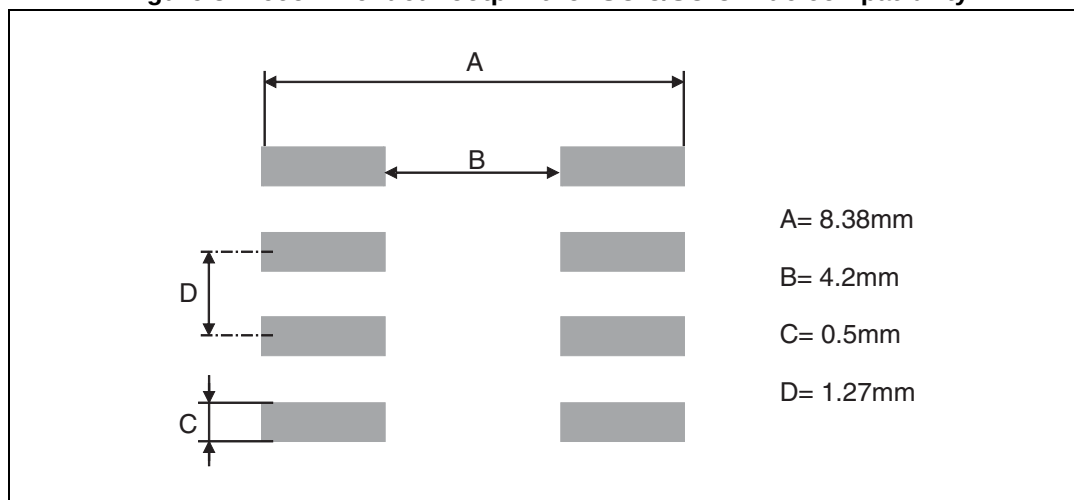


Figure 8. Recommended footprint for SO-8/SO-8 wide compatibility



### 3 Ordering information

**Table 5. Ordering information**

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|------------|---------|---------|--------|----------|---------------|
| LCP03-1501 | LCP03   | SO-8    | 79 mg  | 2500     | Tape and reel |

### 4 Revision history

**Table 6. Document revision history**

| Date        | Revision | Changes          |
|-------------|----------|------------------|
| 17-Oct-2013 | 1        | Initial release. |

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