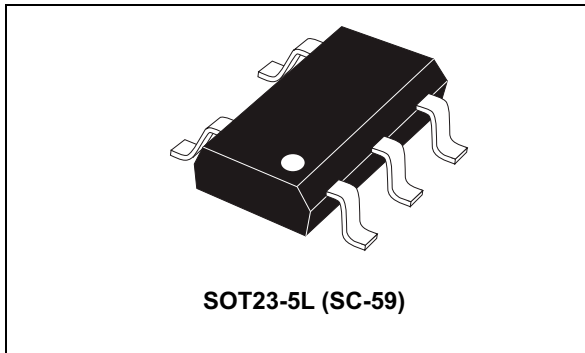


## Low capacitance TVS for high speed lines such as xDSL

Datasheet - production data



### Description

DSL02 is designed to protect DSL line drivers against surges defined in worldwide telecommunication standards. This device protects line drivers of various systems such as ADSL and VDSL. The low capacitance makes it suitable from ADSL to VDSL data rates.

DSL02 is able to survive severe conditions even when used with downgraded or oscillating gas tube.

DSL02 is also suitable to be used on other lines when IEC61000-4-5 surge capability is required.

DSL02 is packaged in a SOT23-5L.

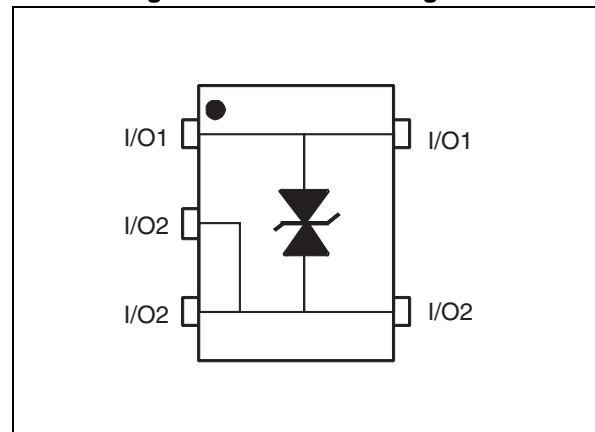
### Features

- High surge capability to comply with GR-1089 and ITU-T K20/21
- Keeps its peak power capability up to  $T_j$  max
- Stand-off voltage: 5 V, 8 V, 10 V
- Low capacitance device:  $C_{typ} = 3$  pF
- RoHS package
- Low leakage current: 0.5  $\mu$ A at 25 °C

### Complies with the following standards

- Telcordia GR-1089
  - 2.5 kV 2/10  $\mu$ s - 500 A 2/10  $\mu$ s
  - AC power fault tests
- ITU-T K20/21/45
  - 6 kV 10/700  $\mu$ s - 150 A 5/310  $\mu$ s
  - power induction tests
  - power contact tests
- IEC 61000-4-2, level 4
  - 15 kV (air discharge)
  - 8 kV (contact discharge)
- IEC 61000-4-5, level 3
  - $\pm$ 2 kV, 42  $\Omega$
- MIL STD 883G-Method 3015-7: Class 3
  - 8 kV (human body model)

**Figure 1. Functional diagram**



# 1 Characteristics

**Table 1. Absolute ratings ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ )**

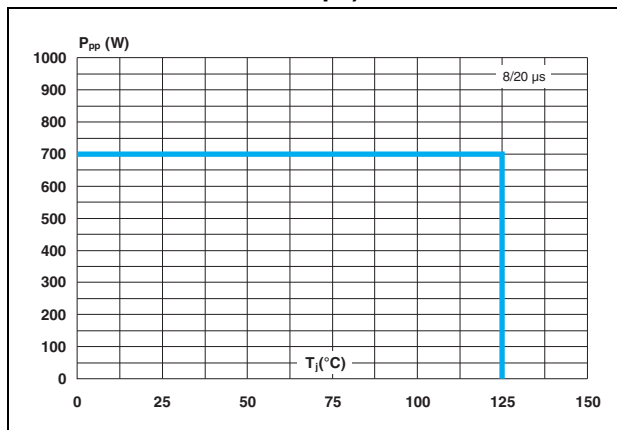
| Symbol    | Parameter                                     |                                  | Value      | Unit               |
|-----------|---|----------------------------------|------------|--------------------|
| $V_{PP}$  | Peak pulse voltage                            | IEC 61000-4-2, contact discharge | 30         | kV                 |
| $I_{pp}$  | Peak pulse current                            | 8/20 $\mu\text{s}$               | 30         | A                  |
| $T_{stg}$ | Storage temperature range                     |                                  | -55 to 150 | $^{\circ}\text{C}$ |
| $T_j$     | Operating junction temperature range          |                                  | -40 to 125 | $^{\circ}\text{C}$ |
| $T_L$     | Maximum temperature for soldering during 10 s |                                  | 260        | $^{\circ}\text{C}$ |

**Table 2. Electrical characteristics ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ )**

| Order code   | $I_{RM}$ @ $V_{RM}$ |    | $V_{BR}$ @ $I_{BR}$ |    | $V_{CL}$ @ $I_{PP}$<br>(8/20 $\mu\text{s}$ ) |    | C                      |                        | $\Delta C$             |
|--------------|---------------------|----|---------------------|----|--|----|------------------------|------------------------|------------------------|
|              | Max. $\mu\text{A}$  | V  | Min. V              | mA | Max. V                                       | A  | Typ. $\text{pF}^{(1)}$ | Max. $\text{pF}^{(1)}$ | Typ. $\text{pF}^{(2)}$ |
| DSL02-005SC5 | 0.5                 | 5  | 6                   | 1  | 18   | 24 | 3                      | 5                      | 0.3                    |
| DSL02-008SC5 | 0.5                 | 8  | 10                  | 1  | 22   | 24 | 3                      | 5                      | 0.3                    |
| DSL02-010SC5 | 0.5                 | 10 | 11                  | 1  | 24   | 24 | 3                      | 5                      | 0.3                    |

1. Test conditions:  $V_R = 2\text{ V}$  bias,  $V_{RMS} = 1\text{ V}$ ,  $F = 1\text{ MHz}$
2. Measured between 1 V and  $V_{RM}$

**Figure 2. Peak pulse power dissipation versus initial junction temperature (typical values, 8/20 $\mu\text{s}$ )**



**Figure 3. Leakage current versus junction temperature (typical values)**

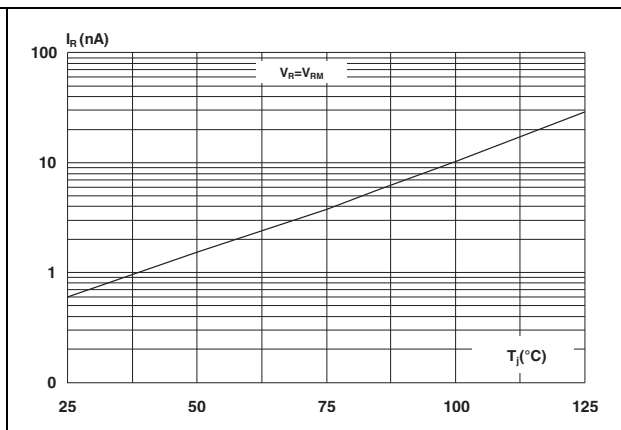


Figure 4. Junction capacitance versus reverse voltage applied (typical values)

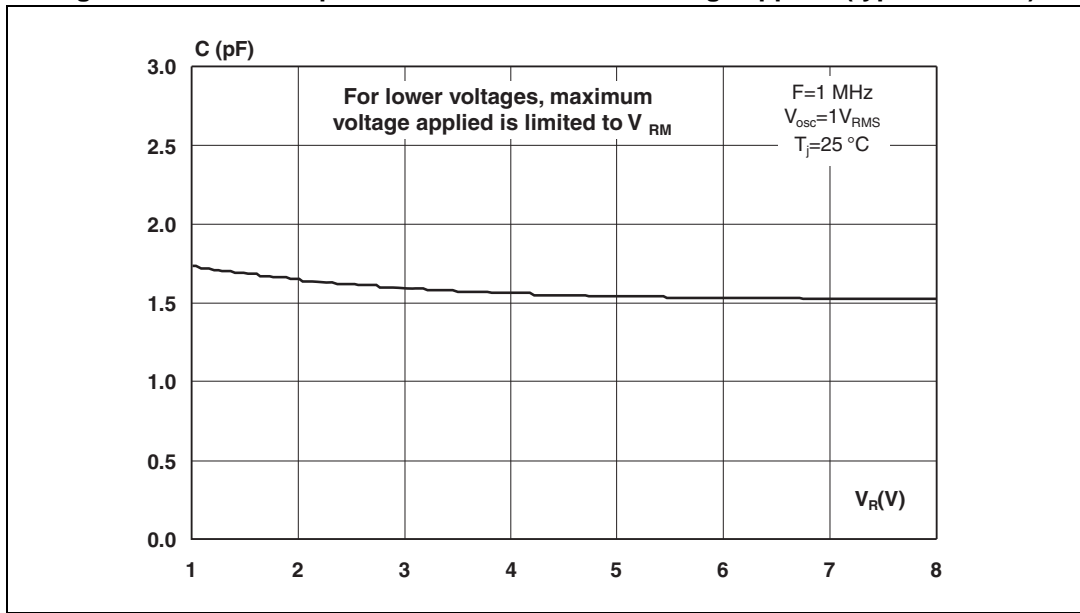
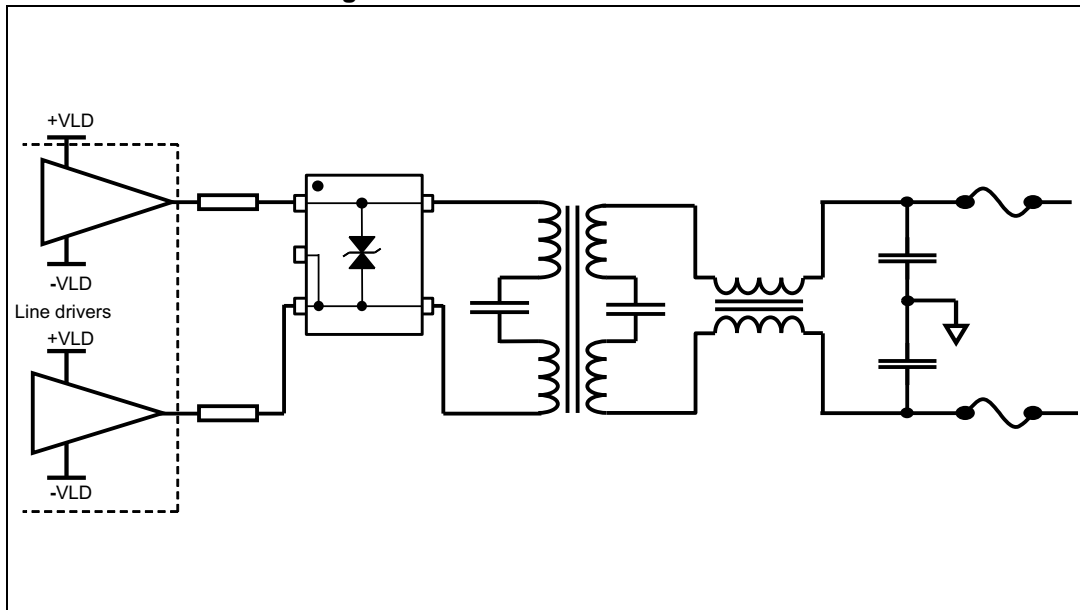


Figure 5. xDSL2 modem connection



## 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.

Figure 6. SOT23-5L dimension definitions

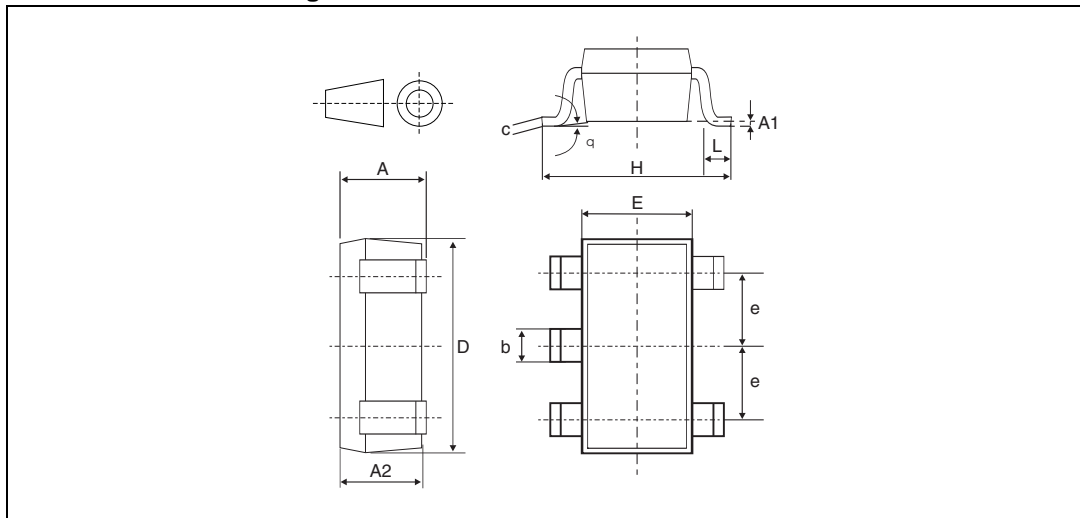


Table 3. SOT23-5L dimension values

| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 0.90        |      | 1.45 | 0.035  |       | 0.057 |
| A1   | 0           |      | 0.15 | 0      |       | 0.006 |
| A2   | 0.90        |      | 1.30 | 0.035  |       | 0.051 |
| b    | 0.30        |      | 0.50 | 0.012  |       | 0.020 |
| c    | 0.09        |      | 0.20 | 0.004  |       | 0.008 |
| D    | 2.80        |      | 3.05 | 0.11   |       | 0.118 |
| E    | 1.50        |      | 1.75 | 0.059  |       | 0.069 |
| e    |             | 0.95 |      |        | 0.037 |       |
| H    | 2.60        |      | 3.00 | 0.102  |       | 0.118 |
| L    | 0.30        |      | 0.60 | 0.012  |       | 0.024 |
| M    | 0°          |      | 10°  | 0°     |       | 10°   |

Figure 7. Footprint recommendations dimensions in mm (inches)

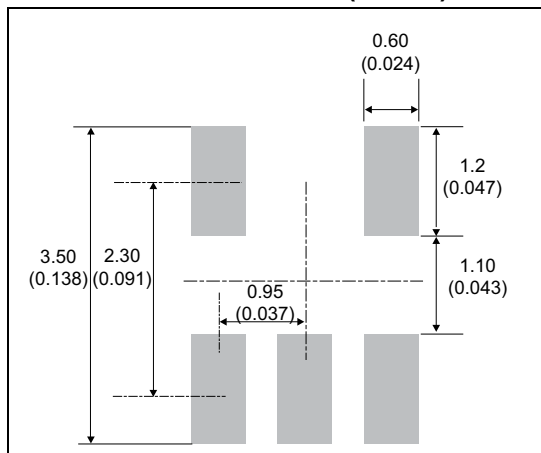
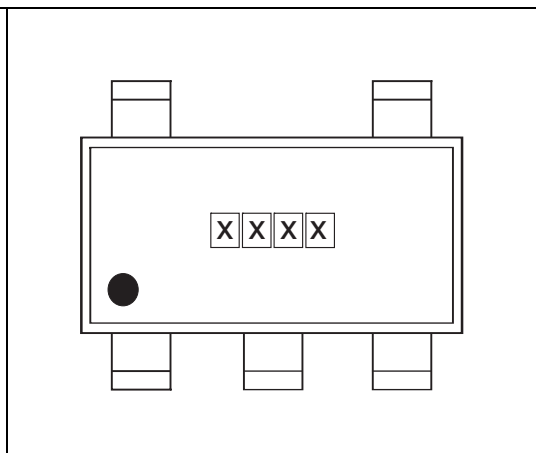
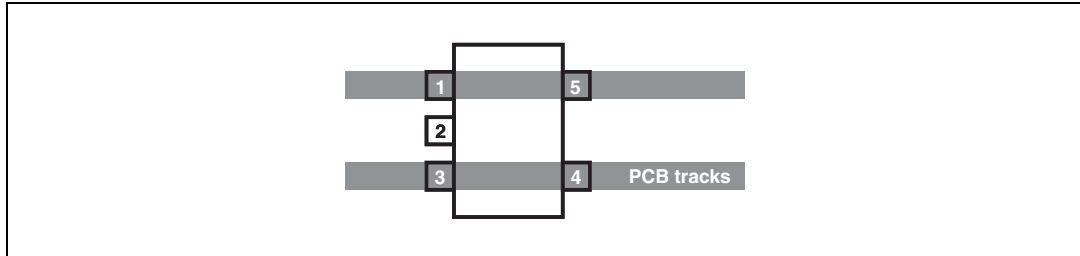


Figure 8. Marking layout



### 3 PCB recommendation

Figure 9. Recommended layout



Concerning [Figure 9](#):

- Pins 1 and 5 must be connected together.
- Pins 3 and 4 must be connected together.
- Pin 2 must not be connected

## 4 Ordering information

Figure 10. Ordering information scheme

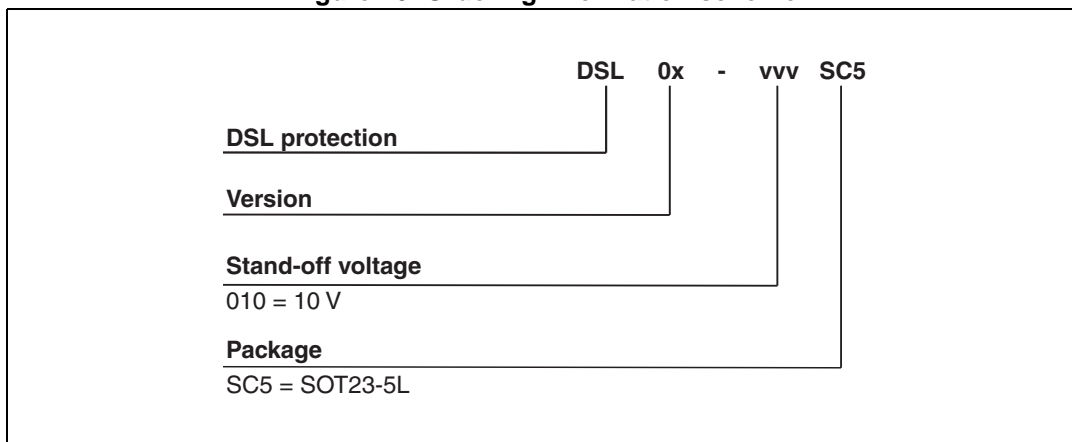


Table 4. Ordering information

| Order code   | Marking | Package  | Weight | Base qty | Delivery mode |
|--------------|---------|----------|--------|----------|---------------|
| DSL02-005SC5 | YT05    | SOT23-5L | 16 mg  | 3000     | Tape and reel |
| DSL02-008SC5 | YT08    |          |        |          |               |
| DSL02-010SC5 | YT10    |          |        |          |               |

## 5 Revision history

Table 5. Document revision history

| Date        | Revision | Changes  |
|-------------|----------|--|
| 30-Oct-2013 | 1        | Initial release.   |
| 03-Feb-2015 | 2        | Updated <i>Features</i> and <i>Description</i> . Added <i>Figure 5</i> . |

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