

## Transil™ array for data line protection

### Features

- High surge capability Transil array:  
I<sub>PP</sub> = 40 A (8/20 μs)
- Peak pulse power : 300 W (8/20 μs)
- Up to 6 bidirectional Transil functions
- Low clamping factor ( $V_{CL} / V_{BR}$ ) at high current level
- Low leakage current
- ESD protection up to 15 kV

### Complies with the following standards

- IEC 61000-4-2 level 4
  - 15 kV (air discharge)
  - 8 kV (contact discharge)
- MIL STD 883G- Method 3015-7: class 3B
  - 25 kV (human body model)

### Applications

Data transmission lines protection, such as:

- Unipolar signal up to 5.5 V
- Bipolar signal in the ± 2.5 V range

### Description

Transil diode arrays provide high overvoltage protection by clamping action. Their instantaneous response to transient overvoltages makes them particularly suited to protect voltage sensitive devices such as MOS technology and low voltage supplied IC's.

The ITA series allies high surge capability against energetic pulses with high voltage performance against ESD.

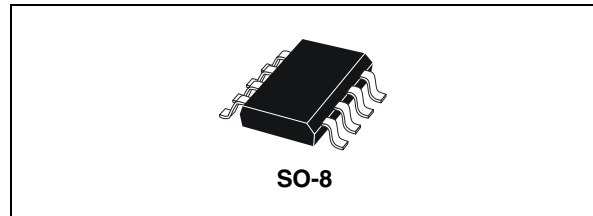
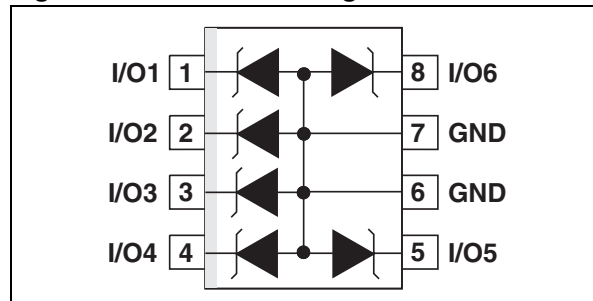


Figure 1. Functional diagram



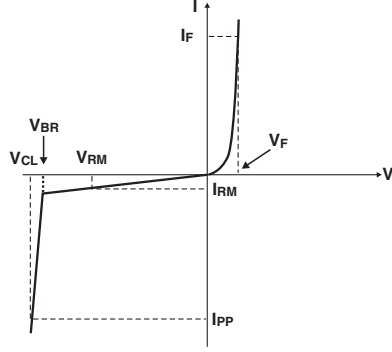
# 1 Characteristics

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

| Symbol    | Parameter   |                           | Value       | Unit                 |
|-----------|---|---------------------------|-------------|----------------------|
| $P_{PP}$  | Peak pulse power (8/20 $\mu\text{s}$ ) <sup>(1)</sup>   | $T_j$ initial = $T_{amb}$ | 300         | W                    |
| $I_{PP}$  | Peak pulse current (8/20 $\mu\text{s}$ ) <sup>(1)</sup> | $T_j$ initial = $T_{amb}$ | 40          | A                    |
| $I^2t$    | Wire $I^2t$ value <sup>(1)</sup>                        |                           | 0.6         | $\text{A}^2\text{s}$ |
| $T_j$     | Maximum operating junction temperature                  |                           | 125         | $^{\circ}\text{C}$   |
| $T_{stg}$ | Storage temperature range                               |                           | -55 to +150 | $^{\circ}\text{C}$   |
| $T_L$     | Maximum lead temperature for soldering during 10 s      |                           | 260         | $^{\circ}\text{C}$   |

1. For surges greater than the specified maximum value, the I/O will first present a short-circuit and after an open circuit caused by the wire melting.

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

| Symbol     | Parameter                       |    |  |   |                             |    |                             |    |                            |          |               |   |
|------------|---------------------------------|----|---|---|-----------------------------|----|-----------------------------|----|----------------------------|----------|---------------|---|
| $V_{RM}$   | Stand-off voltage               |    |   |   |                             |    |                             |    |                            |          |               |   |
| $V_{BR}$   | Breakdown voltage               |    |   |   |                             |    |                             |    |                            |          |               |   |
| $V_{CL}$   | Clamping voltage                |    |   |   |                             |    |                             |    |                            |          |               |   |
| $I_{RM}$   | Leakage current                 |    |   |   |                             |    |                             |    |                            |          |               |   |
| $I_{PP}$   | Peak pulse current              |    |   |   |                             |    |                             |    |                            |          |               |   |
| $\alpha T$ | Voltage temperature coefficient |    |   |   |                             |    |                             |    |                            |          |               |   |
| $V_F$      | Forward voltage drop            |    |   |   |                             |    |                             |    |                            |          |               |   |
| C          | Capacitance                     |    |   |   |                             |    |                             |    |                            |          |               |   |
| Order code | $V_{BR}$ @ $I_R$                |    | $I_{RM}$ @ $V_{RM}$   |   | $V_{CL}$ @ $I_{PP}$         |    | $V_{CL}$ @ $I_{PP}$         |    | $\alpha T$                 | C        | $V_F$ @ $I_F$ |   |
|            | min. (1)                        |    | max.  |   | max. 8/20 $\mu\text{s}$ (1) |    | max. 8/20 $\mu\text{s}$ (1) |    | max.                       | max. (2) | max.          |   |
|            | V                               | mA | $\mu\text{A}$   | V | V                           | A  | V                           | A  | $10^{-4}/^{\circ}\text{C}$ | pF       | V             | A |
| ITA6V1U1   | 6.51                            | 1  | 10  | 5 | 10                          | 10 | 12                          | 25 | 4                          | 1500     | 1.3           | 1 |

1. Between I/O pin and ground.
2. Between two input pins at 0 V Bias, F = 1 MHz.

Figure 2. Pulse waveform

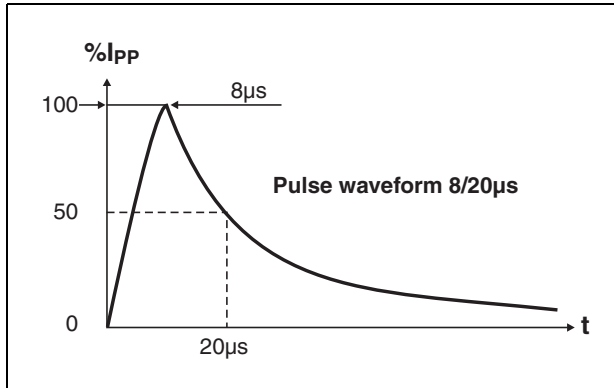


Figure 3. Typical peak pulse power versus exponential pulse duration

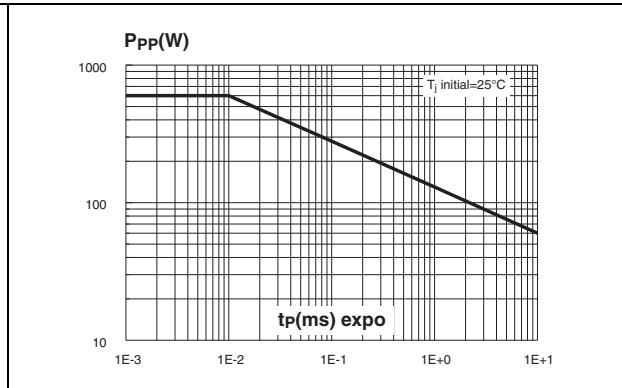


Figure 4. Clamping voltage versus peak pulse current (exponential waveform 8/20 µs)

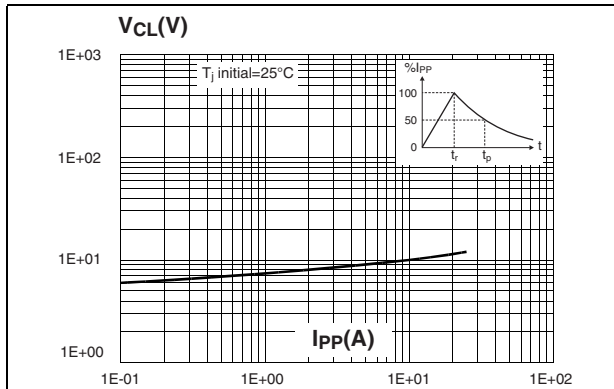


Figure 5. Peak current Idc inducing open circuit of the wire for one input/output versus pulse duration (typical values)

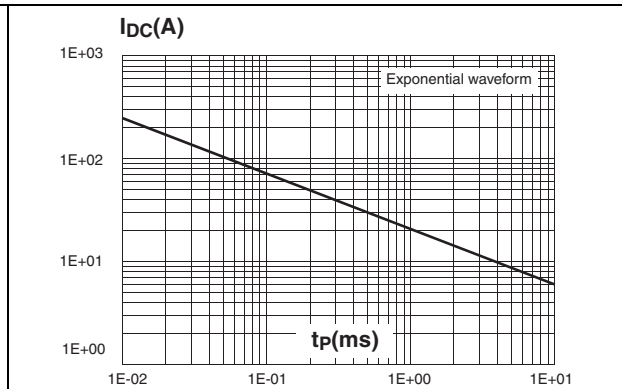


Figure 6. Junction capacitance versus reverse applied voltage for one input/output (typical values)

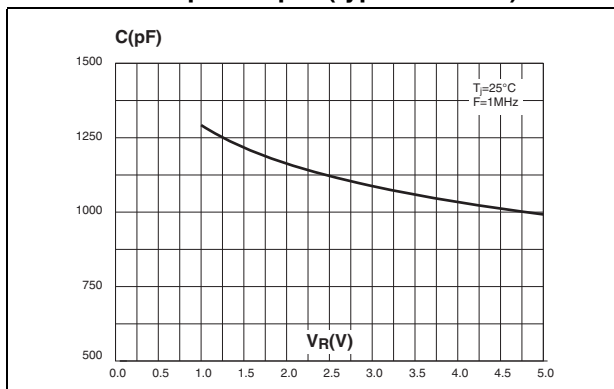
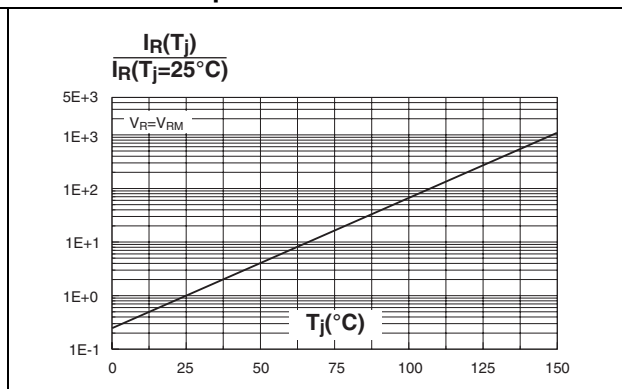


Figure 7. Relative variation of leakage current versus junction temperature



## 2 Application information

Figure 8.  $\mu$ P I/O lines

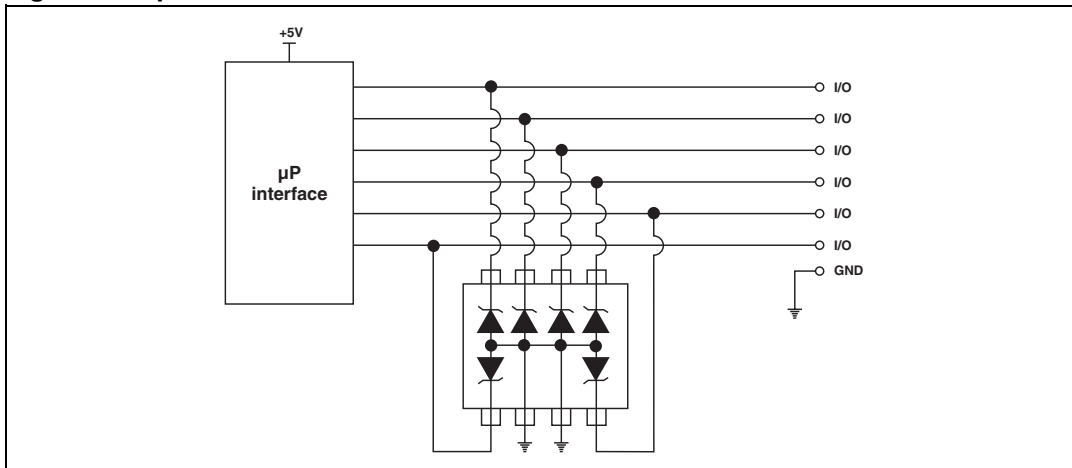
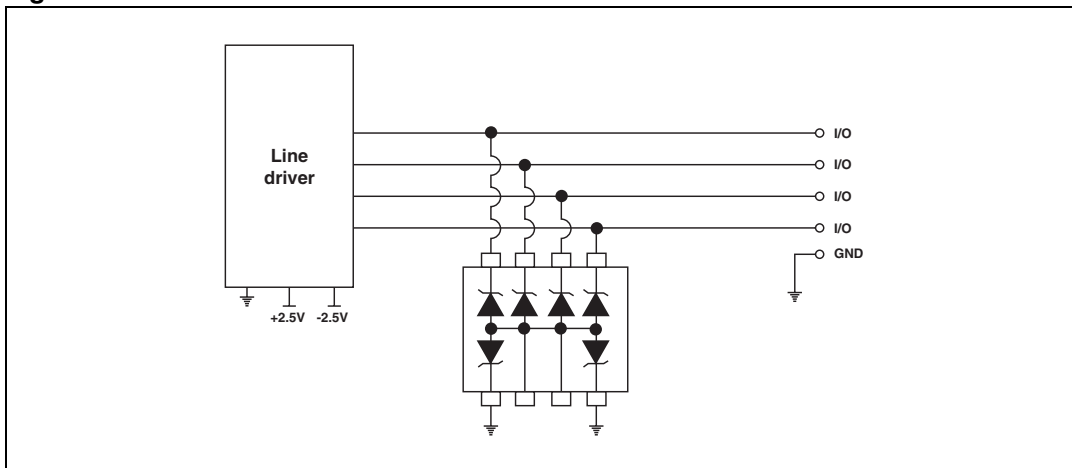
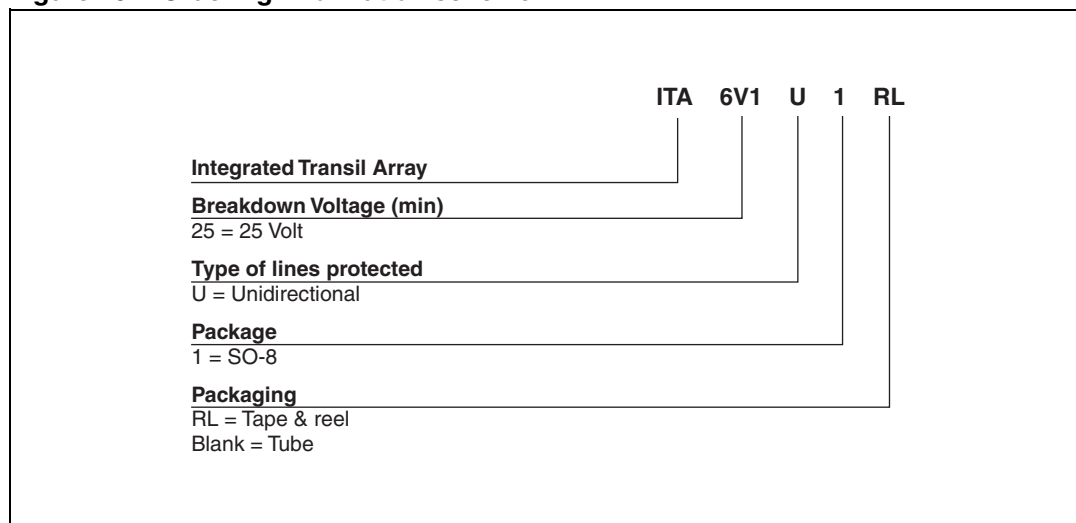


Figure 9.  $\pm 2.5$  V datalines



### 3 Ordering information scheme

Figure 10. Ordering information scheme



# 4 Package information

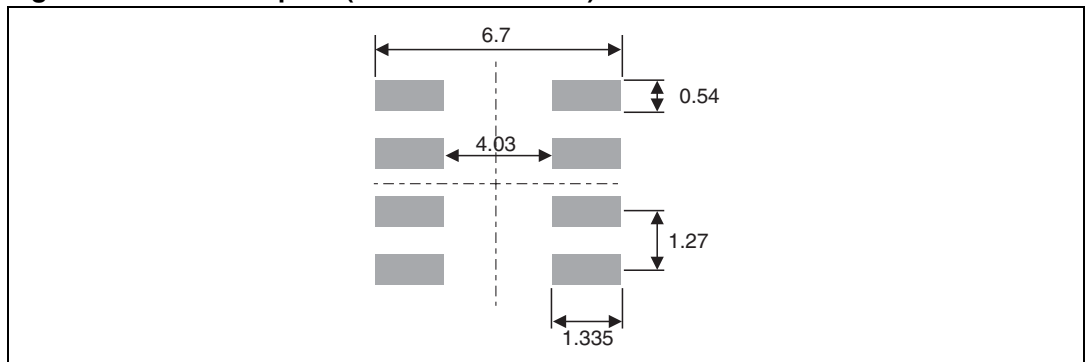
- Epoxy meets UL94, V0

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: [www.st.com](http://www.st.com).

**Table 3. SO-8 dimensions**

| 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     |
| ccc  |             |      | 0.10 |        |       | 0.004 |

**Figure 11. SO-8 footprint (dimensions in mm)**



## 5 Ordering Information

Table 4. ordering information

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|------------|---------|---------|--------|----------|---------------|
| ITA6V1U1   | 6V1U1   | SO-8    | 0.08 g | 2000     | Tube          |
| ITA6V1U1RL | 6V1U1   |         |        | 2500     | Tape and reel |

## 6 Revision history

Table 5. Document revision history

| Date        | Revision | Changes  |
|-------------|----------|--|
| 13-Dec-2004 | 1        | Initial release.   |
| 07-Nov-2007 | 2        | Reformatted to current standards.<br>SO-8 package dimensions update. |

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