

## SuperESD - NUP2105L-ES

## 1. Description

The NUP2105L-ES is a Transient Voltage Suppressor Arrays that designed to protect components which are connected to data and transmission lines against electrostatic discharge (ESD), electrical fast Transients (EFT), and lightning. All pins are rated to withstand 30kV ESD pulses using the IEC61000-4-2 air discharge method.

## 2. Features

- IEC 61000-4-2 Level 4 ESD Protection
  - $\pm 30\text{kV}$  Contact Discharge
  - $\pm 30\text{kV}$  Air Discharge
- 340W Peak pulse Power (8/20us)
- Low clamping voltage
- Working voltage: 24V
- Low leakage current
- RoHS compliant
- Protecting two bidirectional lines

## 3. Applications

- Portable electronics
- Control & monitoring systems
- Servers, notebooks, and desktop PCs
- CAN bus protection
- Automotive application
- Cellular handsets and accessories

## 4. Ordering Information

| Part Number | Package | Marking | Material     | Packing     | Quantity per reel | Flammability Rating | Reel Size |
|-------------|---------|---------|--------------|-------------|-------------------|---------------------|-----------|
| NUP2105L-ES | SOT-23  | C24     | Halogen free | Tape & Reel | 3,000 PCS         | UL 94V-0            | 7 inches  |

Table-1 Ordering information

## 5. Pin Configuration and Functions

## NUP2105L-ES

Rev-1.5

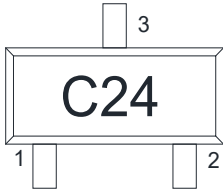
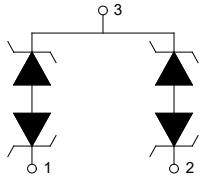
| Pin | Name | Description    | Outline                                                                            | Circuit Diagram                                                                     |
|-----|------|----------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1   | IO   | Connect to IO  |  |  |
| 2   | IO   | Connect to IO  |                                                                                    |                                                                                     |
| 3   | GND  | Connect to GND |                                                                                    |                                                                                     |

Table-2 Pin configuration

## 6. Specification

### 6.1. Absolute Maximum rating

Over operating free-air temperature range (unless otherwise noted)

| Parameters                                 | Symbol           | Min. | Max. | Unit |
|--------------------------------------------|------------------|------|------|------|
| Peak pulse power (tp=8/20us)@25°C          | P <sub>pk</sub>  | -    | 340  | W    |
| Peak pulse current (tp=8/20us)@25°C        | I <sub>PP</sub>  |      | 8    | A    |
| ESD (IEC61000-4-2 air discharge) @25°C     | V <sub>ESD</sub> | -    | ±30  | kV   |
| ESD (IEC61000-4-2 contact discharge) @25°C | V <sub>ESD</sub> | -    | ±30  | kV   |
| Junction temperature                       | T <sub>J</sub>   | -    | 150  | °C   |
| Operating temperature                      | T <sub>OP</sub>  | -40  | 125  | °C   |
| Storage temperature                        | T <sub>STG</sub> | -55  | 150  | °C   |
| Lead temperature                           | T <sub>L</sub>   | -    | 260  | °C   |

Table-3 Absolute Maximum rating

### 6.2. Electrical Characteristics

## NUP2105L-ES

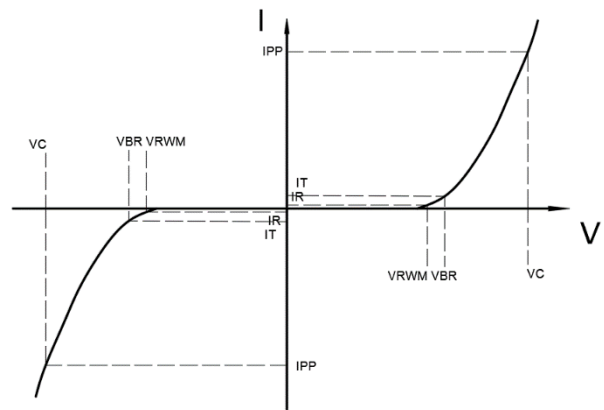
Rev-1.5

At TA = 25°C unless otherwise noted

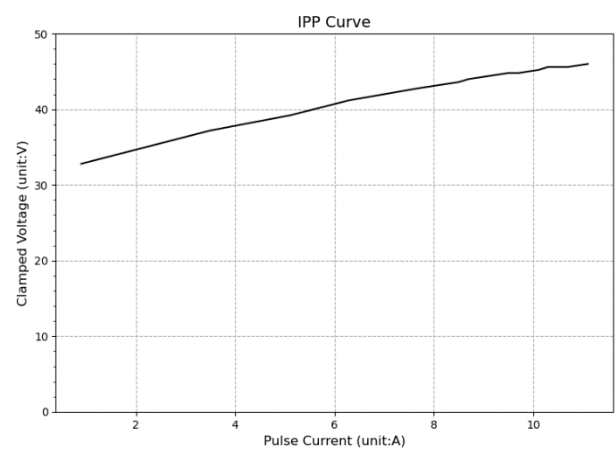
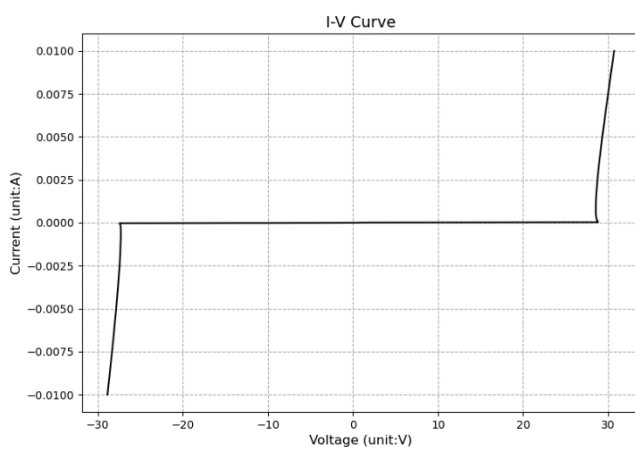
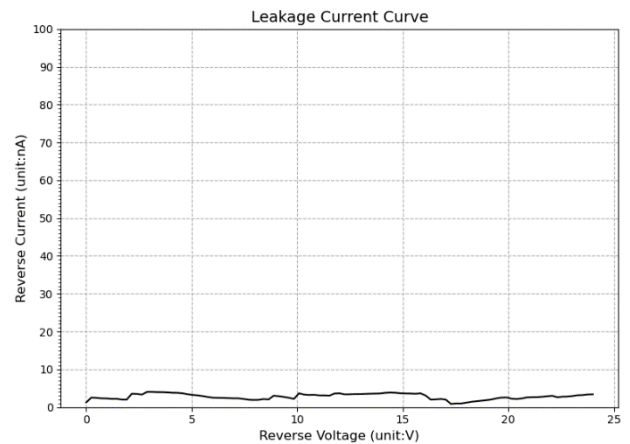
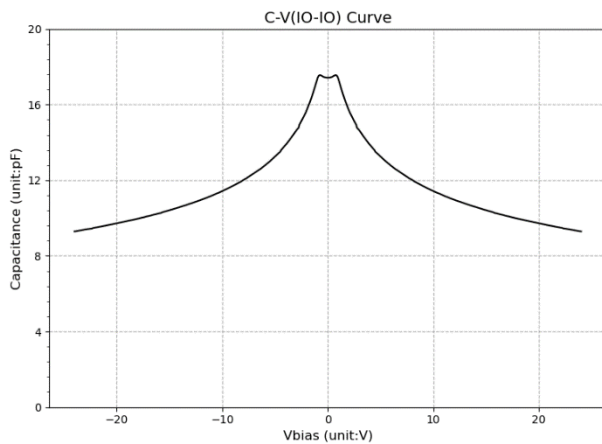
| Parameter                 | Symbol    | Conditions                    | Min. | Typ. | Max. | Units |
|---------------------------|-----------|-------------------------------|------|------|------|-------|
| Reverse Stand-off Voltage | $V_{RWM}$ |                               |      |      | 24.0 | V     |
| Reverse Breakdown Voltage | $V_{BR}$  | $I_T=1mA$                     | 26.0 | 28.0 |      | V     |
| Reverse Leakage Current   | $I_R$     | $V_{RWM}=24V$                 |      |      | 100  | nA    |
| Clamping Voltage          | $V_C$     | $I_{PP}=1A$ ; $t_p=8/20\mu s$ |      | 31.0 |      | V     |
| Clamping Voltage          | $V_C$     | $I_{PP}=8A$ ; $t_p=8/20\mu s$ |      | 43.0 |      | V     |
| Junction Capacitance      | $C_J$     | $V_R=0V$ ; $f=1MHz$           |      | 18   |      | pF    |

Table-4 Electrical Characteristics

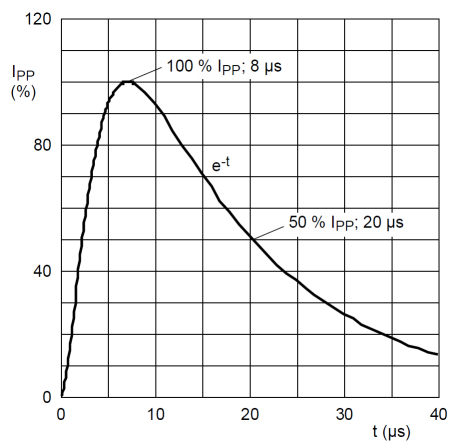
| Symbol    | Parameters                          |
|-----------|-------------------------------------|
| $V_{RWM}$ | Peak Reverse Working Voltage        |
| $I_R$     | Reverse Leakage Current @ $V_{RWM}$ |
| $V_{BR}$  | Breakdown Voltage @ $I_T$           |
| $I_T$     | Test Current                        |
| $I_{PP}$  | Maximum Reverse Peak Pulse Current  |
| $V_C$     | Clamping Voltage @ $I_{PP}$         |



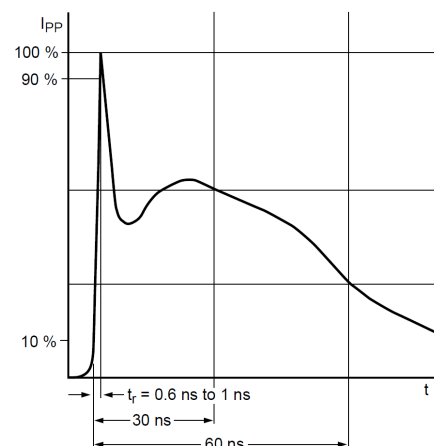
## 7. Typical Characteristic



## Measurement Wave According to IEC Standard



8/20  $\mu$ s pulse waveform according to  
IEC 61000-4-5

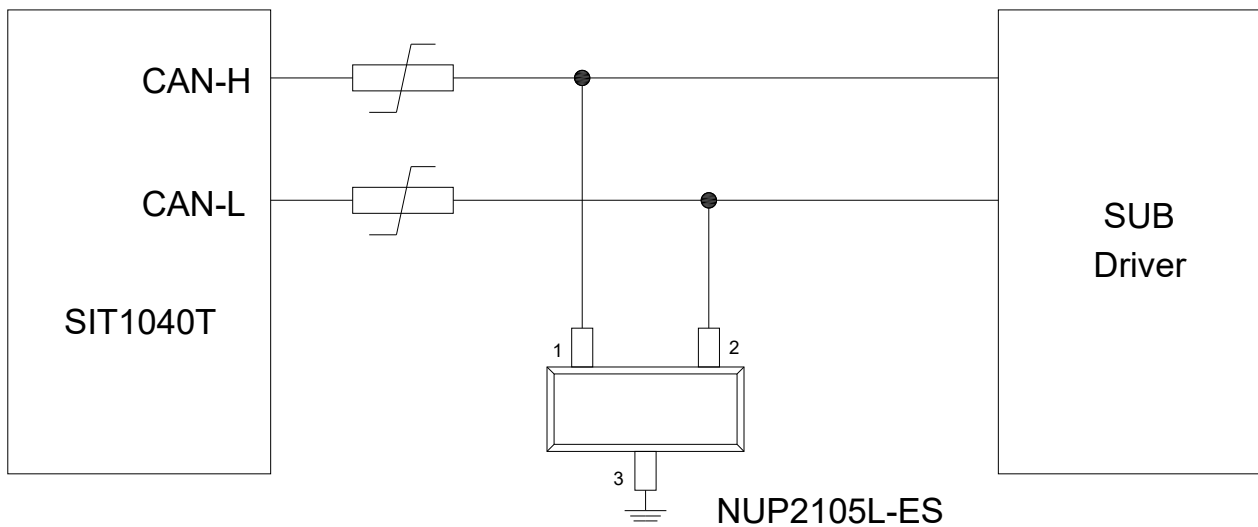


ESD pulse waveform according to  
IEC 61000-4-2

## 8. Typical Application

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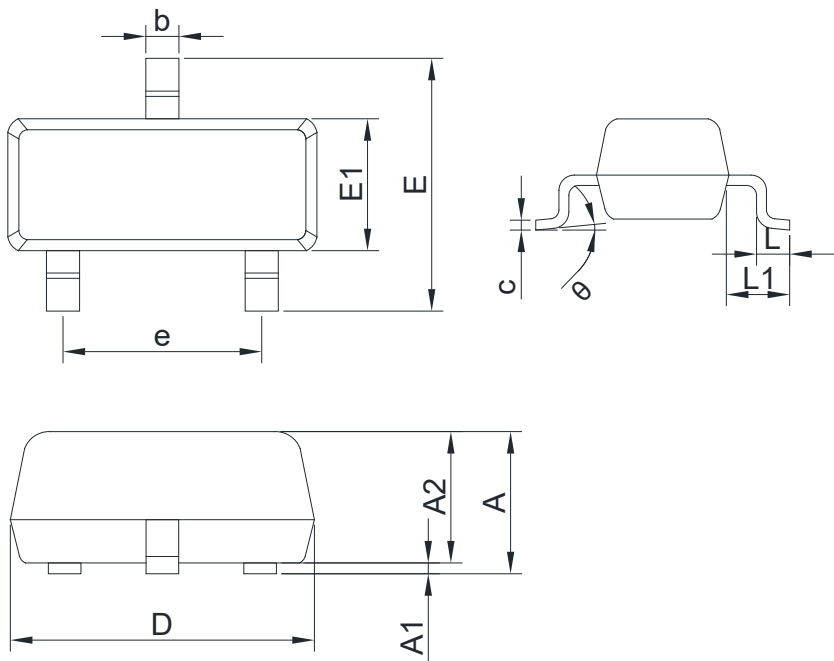
Typical Interface Application of CAN Bus Protection

## 9. Dimension (SOT-23)

**NUP2105L-ES**

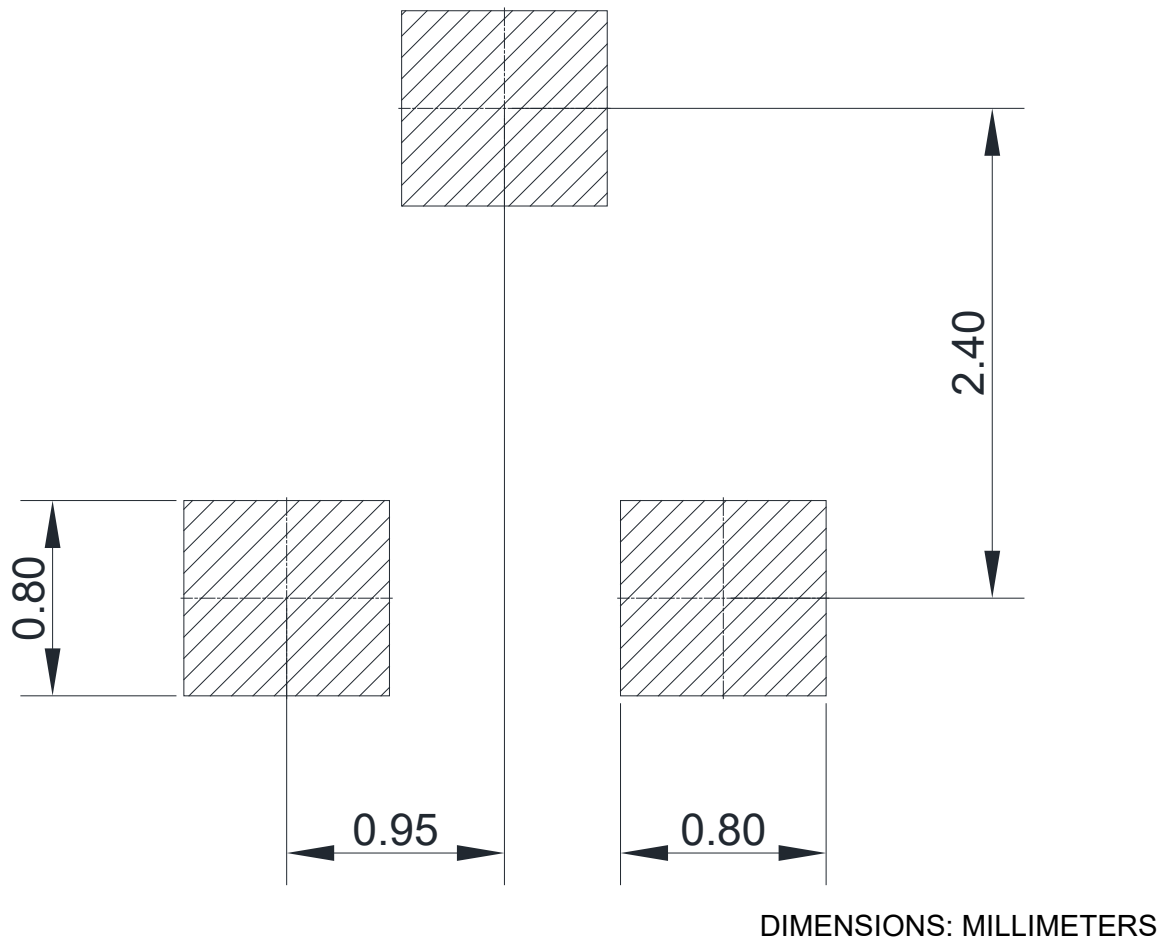
Rev-1.5

POD(Z)



| COMMON DIMENSIONS CUNITS MEASURE=MILLIMETER |      |      |          |       |       |
|---------------------------------------------|------|------|----------|-------|-------|
| SYMBOL                                      | MIN  | MAX  | SYMBOL   | MIN   | MAX   |
| A                                           | 0.90 | 1.20 | E        | 2.25  | 2.55  |
| A1                                          | 0.00 | 0.10 | E1       | 1.20  | 1.40  |
| A2                                          | 0.90 | 1.10 | e        | 1.80  | 2.00  |
| b                                           | 0.30 | 0.50 | L        | 0.30  | 0.50  |
| c                                           | 0.07 | 0.18 | L1       | 0.475 | 0.625 |
| D                                           | 2.80 | 3.04 | $\theta$ | 0°    | 8°    |

## 10. Recommended Soldering Footprint



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