

## SuperESD – ESD321DPYR(ES)

## 1. Description

The ESD321DPYR(ES) is designed to protect voltage sensitive components from ESD and transient voltage events. Excellent clamping capability, low leakage, and fast response time, make these parts ideal for ESD protection on designs where board space is at a premium.

## 2. Features

- IEC 61000-4-2 Level 4 ESD Protection
  - $\pm 20\text{kV}$  Contact Discharge
  - $\pm 20\text{kV}$  Air Discharge
- 60W Peak pulse Power (8/20us)
- Low clamping voltage
- Working voltage: 5V
- Low leakage current
- RoHS compliant
- Protecting one Uni-directional line
- Junction capacitance: 0.5pF Typ.

## 3. Applications

- Cellular handsets and accessories
- Portable Digital Assistants
- Notebooks & Handhelds
- Digital Cameras
- MP3 Players
- Peripherals

## 4. Ordering Information

| Part Number    | Package    | Marking | Material     | Packing     | Quantity per reel | Flammability Rating | Reel Size |
|----------------|------------|---------|--------------|-------------|-------------------|---------------------|-----------|
| ESD321DPYR(ES) | DFN1006-2L | J5L     | Halogen free | Tape & Reel | 10,000 PCS        | UL 94V-0            | 7 inches  |

Table-1 Ordering information

## 5. Pin Configuration and Functions

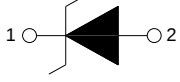
| Pin | Name | Description    | Outline                                                                                     | Circuit Diagram                                                                     |
|-----|------|----------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1   | IO   | Connect to IO  | Note 1<br> |  |
| 2   | GND  | Connect to GND |                                                                                             |                                                                                     |

Table-2 Pin configuration

Note1:

This diagram is only an electrical schematic, and the actual pin size is based on POD.

## 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>  | -    | 60   | W    |
| Peak pulse current (tp=8/20us)@25°C        | I <sub>PP</sub>  |      | 4    | A    |
| ESD (IEC61000-4-2 air discharge) @25°C     | V <sub>ESD</sub> | -    | ±20  | kV   |
| ESD (IEC61000-4-2 contact discharge) @25°C | V <sub>ESD</sub> | -    | ±20  | 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

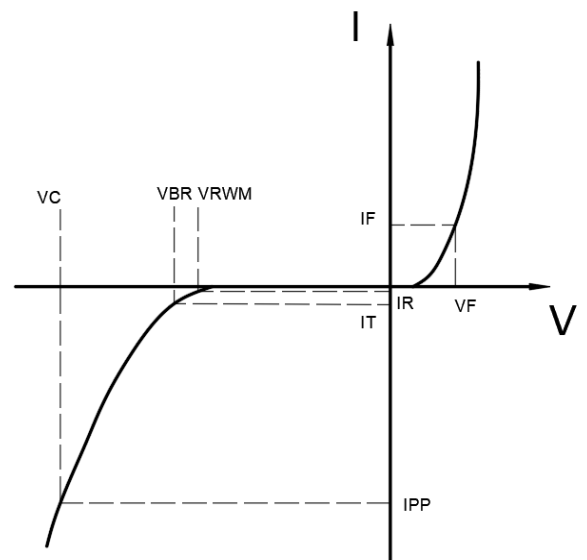
## 6.2. Electrical Characteristics

At TA = 25°C unless otherwise noted

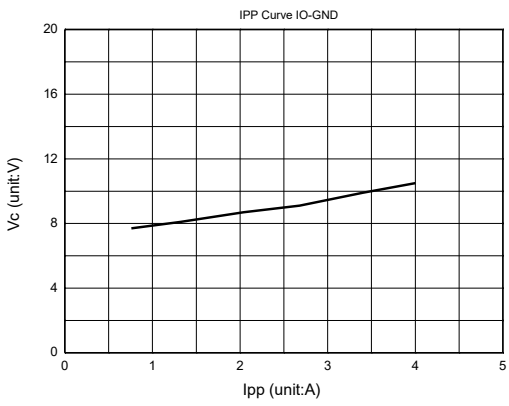
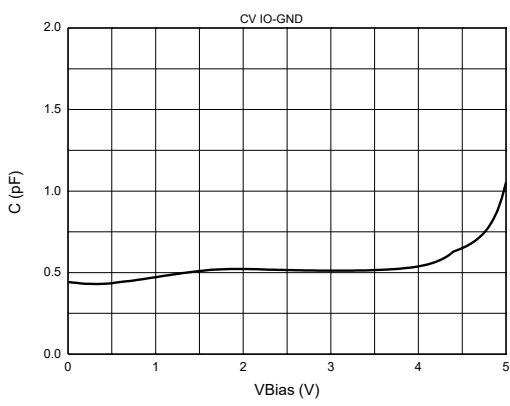
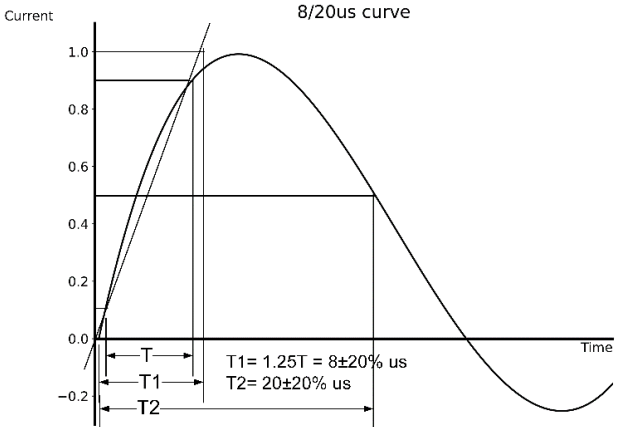
| Parameter                 | Symbol    | Conditions                      | Min. | Typ. | Max. | Units   |
|---------------------------|-----------|---------------------------------|------|------|------|---------|
| Reverse Stand-off Voltage | $V_{RWM}$ |                                 |      |      | 5.0  | V       |
| Reverse Breakdown Voltage | $V_{BR}$  | $I_T=1mA$                       | 6.0  |      |      | V       |
| Reverse Leakage Current   | $I_R$     | $V_{RWM}=5V$                    |      |      | 1.0  | $\mu A$ |
| Clamping Voltage          | $V_C$     | $I_{PP}=1A$ ; $t_p=8/20\mu s$   |      | 8.0  | 9.5  | V       |
| Clamping Voltage          | $V_C$     | $I_{PP}=4A$ ; $t_p=8/20\mu s$   |      | 10.5 | 13.0 | V       |
| Junction Capacitance      | $C_J$     | I/O to GND; $V_R=0V$ ; $f=1MHz$ |      | 0.5  | 0.6  | pF      |

Table-4 Electrical Characteristics

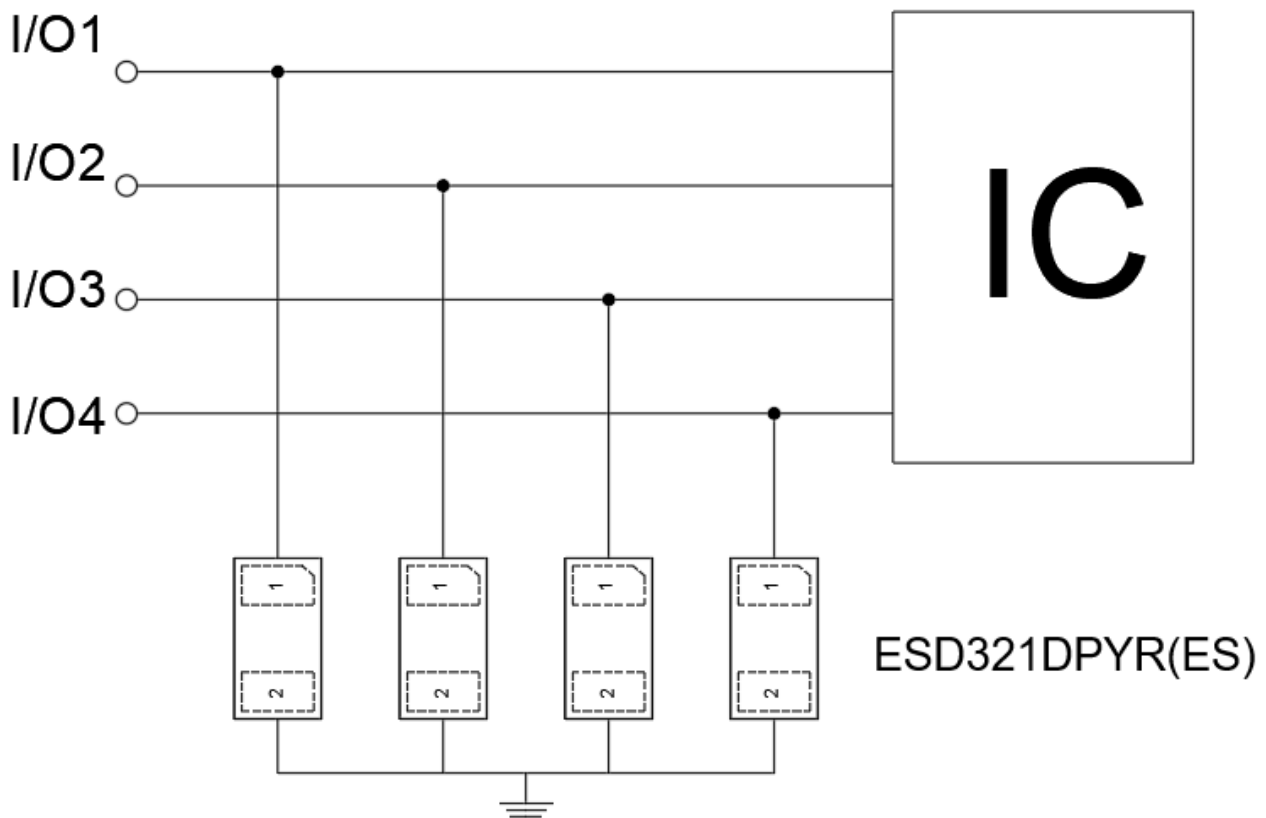
| Symbol    | Parameters                          |
|-----------|-------------------------------------|
| $V_{RWM}$ | Peak Reverse Working Voltage        |
| $I_R$     | Reverse Leakage Current @ $V_{RWM}$ |
| $V_{BR}$  | Breakdown Voltage @ $I_T$           |
| $I_T$     | Test Current              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



7. Typical Characteristic

|                                                                                                                                           |                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Figure1: Clamping Voltage vs. Peak Pulse Current</p>  | <p>Figure2: Junction Capacitance vs. Reverse Voltage</p>  |
| <p>Figure3: 8 X 20us Pulse Waveform</p>                 |                                                                                                                                             |

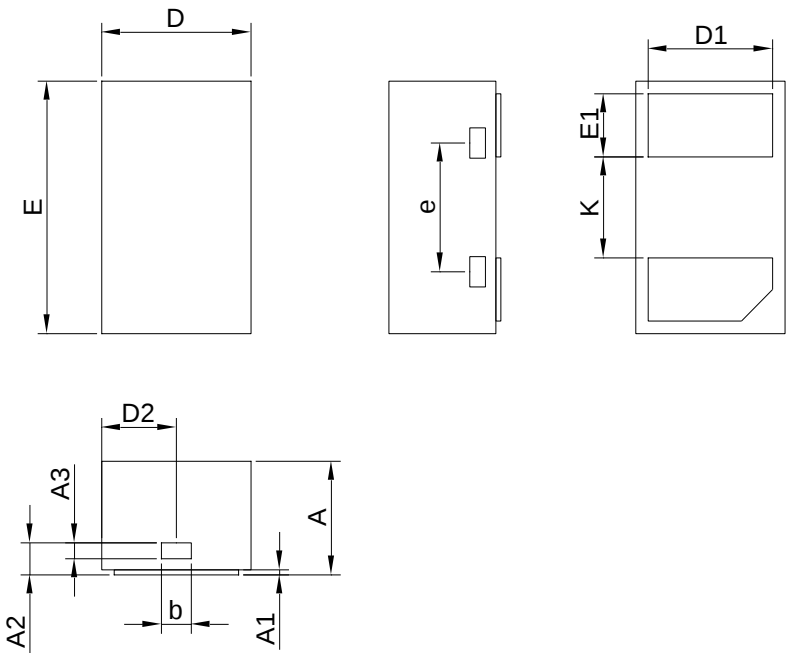
## 8. Typical Application



Typical Interface Application

9. Dimension (DFN1006-2L)

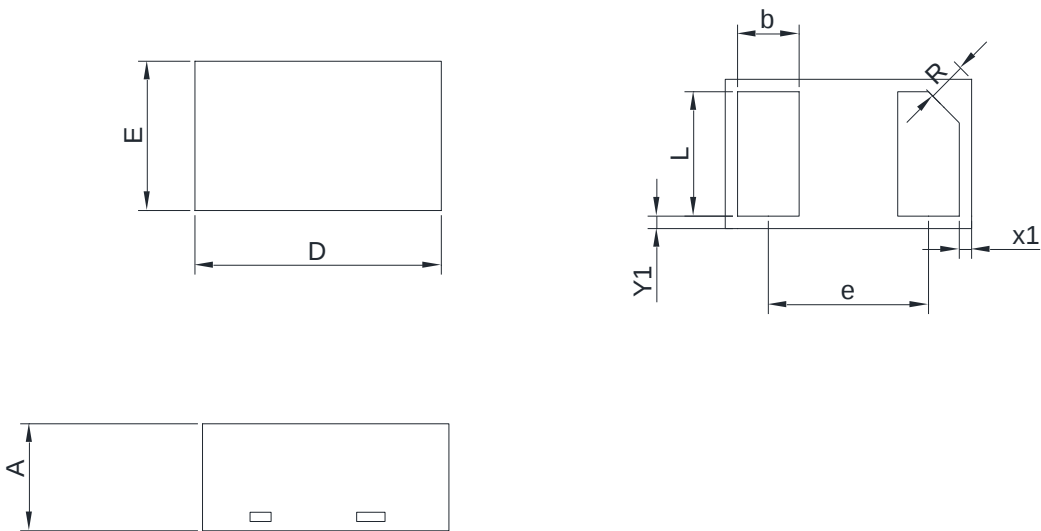
POD A(Q)



Units in millimeters

| Symbol | Min.  | Nom.  | Max.  | Symbol | Min.  | Nom.  | Max.  |
|--------|-------|-------|-------|--------|-------|-------|-------|
| A      | 0.350 | 0.450 | 0.550 | D1     | 0.400 | 0.500 | 0.600 |
| A1     | 0.000 | 0.020 | 0.050 | D2     | 0.200 | 0.300 | 0.400 |
| A2     | 0.077 | 0.127 | 0.207 | E      | 0.900 | 1.000 | 1.100 |
| A3     | 0.013 | 0.063 | 0.113 | E1     | 0.150 | 0.250 | 0.350 |
| b      | 0.070 | 0.120 | 0.200 | e      | 0.360 | 0.410 | 0.460 |
| D      | 0.500 | 0.600 | 0.700 | k      | 0.300 | 0.400 | 0.500 |

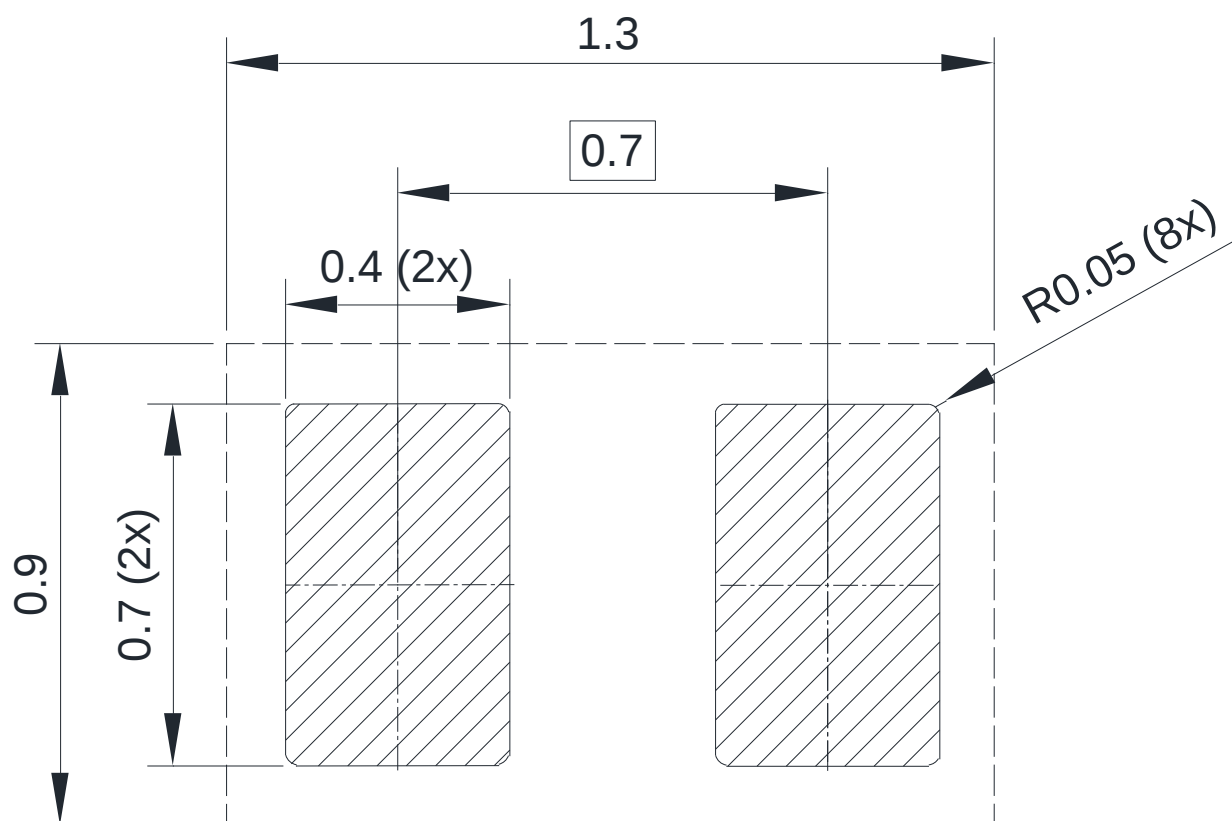
POD B(A)



Units in millimeters

| Symbol | Min.  | Nom. | Max. | Symbol | Min.  | Nom. | Max.  |
|--------|-------|------|------|--------|-------|------|-------|
| A      | 0.45  | 0.50 | 0.55 | R      | 0.07  | 0.10 | 0.13  |
| D      | 0.95  | 1.00 | 1.05 | X1     | 0.025 |      | 0.065 |
| E      | 0.55  | 0.60 | 0.65 | Y1     | 0.025 |      | 0.065 |
| b      | 0.20  | 0.25 | 0.30 |        |       |      |       |
| L      | 0.45  | 0.50 | 0.55 |        |       |      |       |
| e      | 0.675 |      |      |        |       |      |       |

## 10. Recommended Soldering Footprint



DIMENSIONS: MILLIMETERS

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