

Description

YS0501P1 is 1-Line Ultra Low Capacitance Bi-Directional ElectroStatic Discharge Protection Device, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting voltagesensitive data lines.

YS0501P1 complies with the IEC 61000-4-2 (ESD) standard with $\pm 20\text{KV}$ air and $\pm 15\text{KV}$ contact discharge. It is assembled into a $0.6 \times 1 \times 0.5\text{mm}$ lead-free package. YS0501P1 is an ideal choice to protect MDDI, DVI, Display Port, HDMI 1.3 & 1.4, USB 2.0 & 3.0, PCI Express, SATA, USB Port, etc.



Features

- 1-Line Ultra Low Capacitance Bi-Directional
- Ultra low leakage
- Low operating voltage
- Low clamping voltage
- Silicon technology
- Epoxy resin package
- Complies with following standards:
 - IEC 61000-4-2 (ESD) immunity test
 - Air discharge: $\pm 20\text{KV}$
 - Contact discharge: $\pm 15\text{KV}$
 - IEC61000-4-4 (EFT) 40A (5/50ns)
 - IEC61000-4-5 (Lightning) 4A (8/20us)
- RoHS Compliant

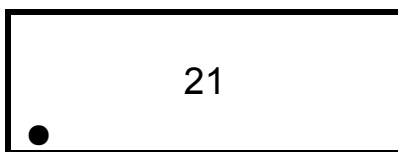
Mechanical Characteristics

- Package: DFN1006 ($0.6 \times 1 \times 0.5\text{mm}$)
- Lead Finish: NiPdAu
- Case Material: “Green” Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020

Applications

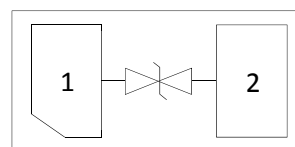
- MDDI
- DVI
- Display Port
- HDMI 1.3 & 1.4, USB 2.0 & 3.0
- PCI Express, SATA
- USB Port

Marking Information



21 = Marking Code
Dot denotes Pin1

Pin Configuration



Summary of Packing Options

| Package | Packing Description | Packing Quantity | Industry Standard |
|---------|---------------------|------------------|-------------------|
| DFN1006 | 8mm tape/7" reel | 10000PCS/Reel | EIA-481-1 |

Absolute Maximum Ratings

| Parameter | Symbol | Value | Units |
|-----------------------------------|-------------------|------------|--------------|
| Reverse Working Voltage | V_{RWM} | 5 | V |
| Peak Pulse Power (8/20 μ s) | P_{PK} | 80 | W |
| Peak Pulse Current (8/20 μ s) | I_{PK} | 4 | A |
| ESD per IEC 61000-4-2 (Air) | $V_{ESD-Air}$ | 20 | KV |
| ESD per IEC 61000-4-2 (Contact) | $V_{ESD-Contact}$ | 15 | KV |
| Operating Temperature Range | T_J | -55 to 125 | $^{\circ}$ C |
| Storage Temperature Range | T_{STG} | -55 to 150 | $^{\circ}$ C |

Electrical Parameters

| Parameter | Symbol | Min | Typ | Max | Units | Conditions | Remarks |
|---|----------|-----|------|------|---------|------------|----------|
| Breakdown Voltage | V_{BR} | 6 | 8 | 9 | V | IBR=1mA | |
| Reverse Leakage Current | I_R | | | 0.5 | μ A | VRWM=5V | |
| Clamping Voltage (8/20 μ s) | V_C | | | 12 | V | IPP=1A | |
| Maximum Clamping Voltage (8/20 μ s) | V_{CM} | | | 20 | V | IPK=4A | |
| Junction Capacitance | C_J | | 0.26 | 0.35 | pF | VDC=0V | f = 1MHz |

Rating And Characteristic Curves ($T_A=25^\circ\text{C}$ unless otherwise noted)

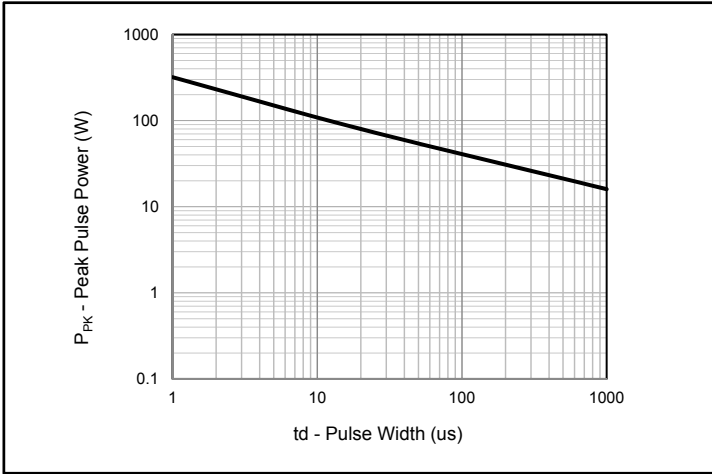


Fig.1 - Peak Pulse Power Rating

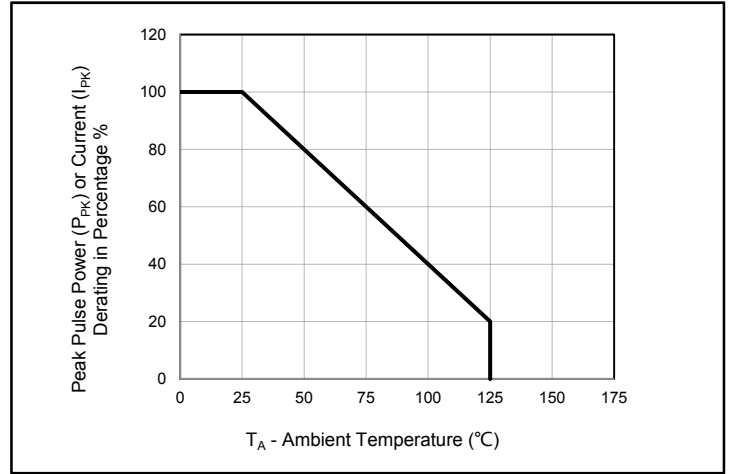


Fig.2 - Pulse Derating Curve

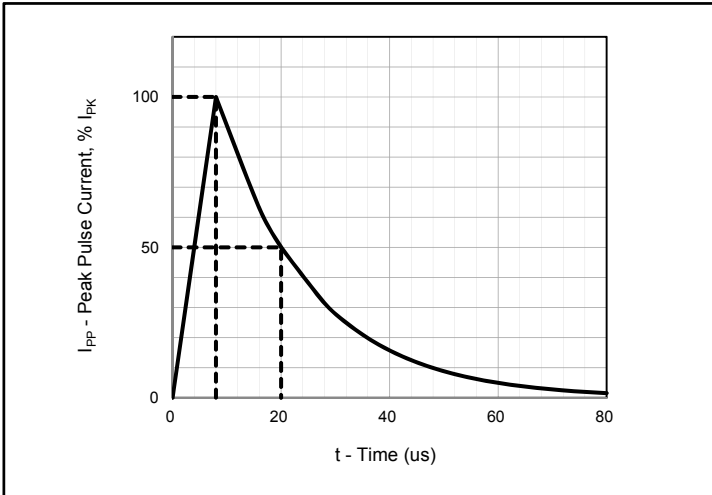


Fig.3 - 8/20us Pulse Waveform

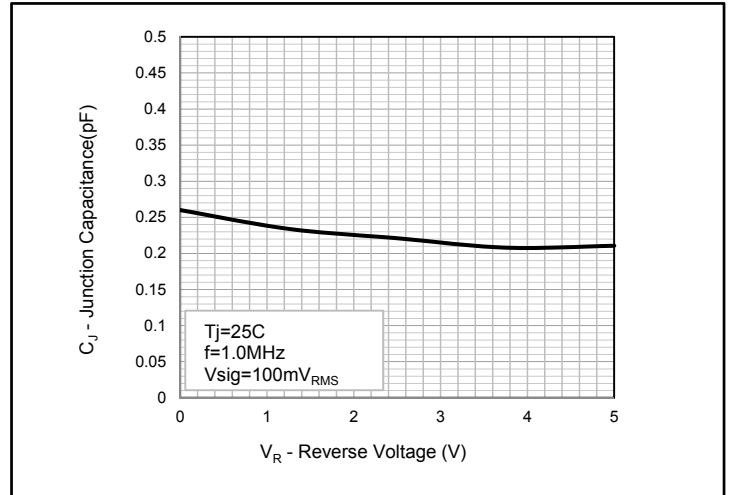


Fig.4 - Typical Junction Capacitance

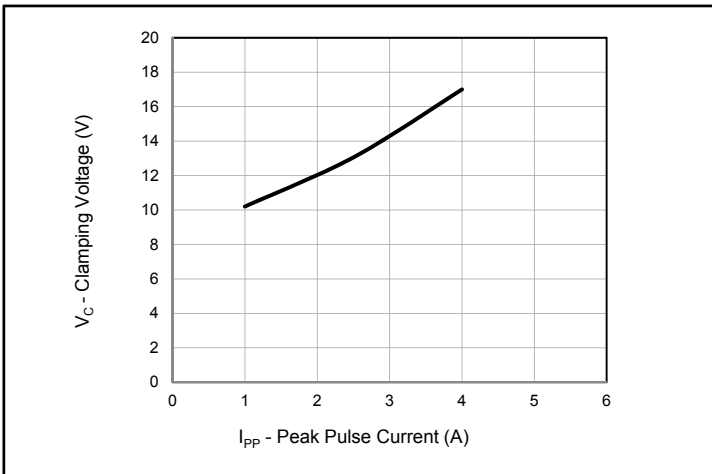
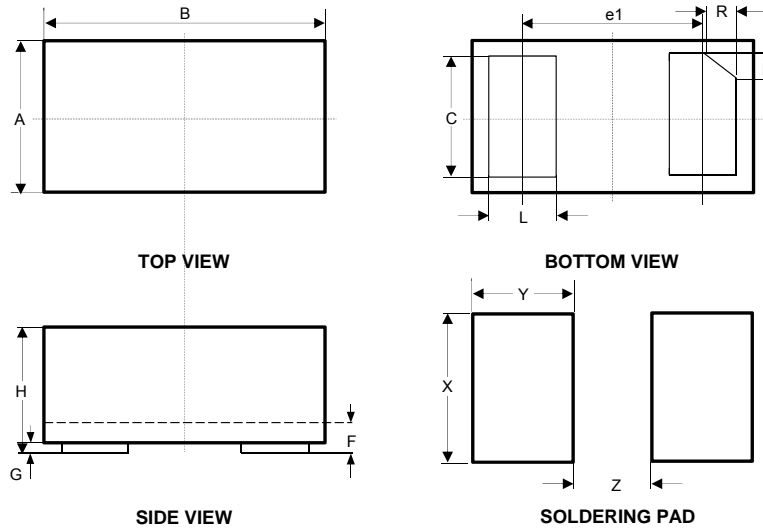


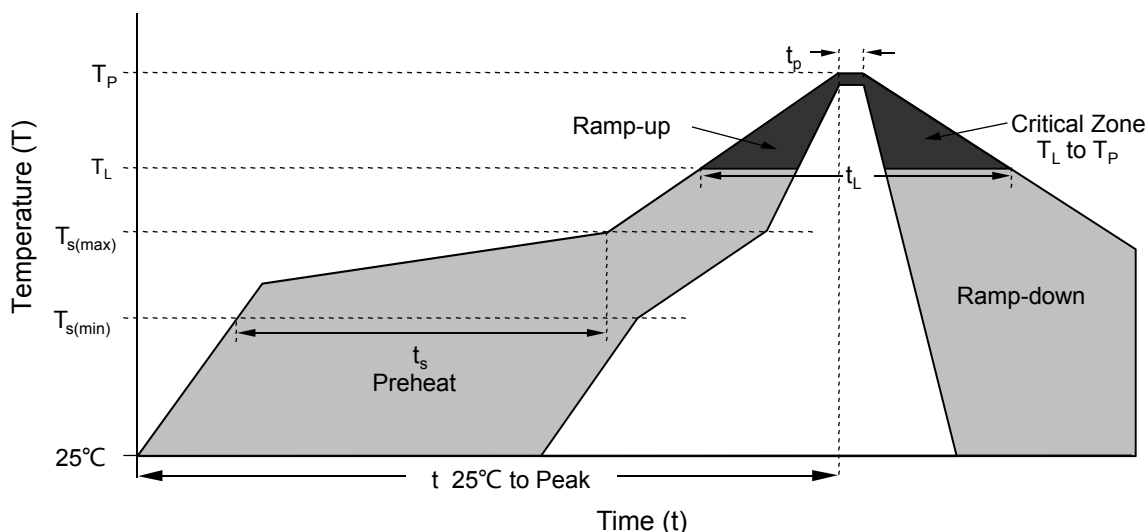
Fig.5 - Clamping Voltage

Package Dimensions



| DFN1006 | | | | | | |
|-----------|--------|-------|-------|-------------|------|------|
| Dimension | Inches | | | Millimeters | | |
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.022 | 0.024 | 0.026 | 0.55 | 0.6 | 0.65 |
| B | 0.037 | 0.039 | 0.041 | 0.95 | 1 | 1.05 |
| C | 0.018 | | 0.022 | 0.45 | | 0.55 |
| L | 0.008 | | 0.012 | 0.2 | | 0.3 |
| F | 0.005 | | 0.007 | 0.12 | | 0.18 |
| G | - | | 0.002 | - | | 0.05 |
| H | 0.018 | 0.02 | 0.022 | 0.45 | 0.5 | 0.55 |
| e1 | | 0.026 | | | 0.65 | |
| R | 0.003 | | 0.007 | 0.07 | | 0.17 |
| R | 0.003 | | 0.007 | 0.07 | | 0.17 |
| X | | 0.024 | | | 0.6 | |
| Y | | 0.02 | | | 0.5 | |
| Z | | 0.012 | | | 0.3 | |

Soldering Parameters



| Reflow Condition | | Lead-free assembly |
|--|------------------------------------|-------------------------|
| Pre Heat | - Temperature Min ($T_{s(min)}$) | 150°C |
| | - Temperature Max ($T_{s(max)}$) | 200°C |
| | - Time (min to max) (t_s) | 60 – 180 secs |
| Average ramp up rate (Liquidus Temp (T_L) to peak) | | 3°C/second max |
| $T_{s(max)}$ to T_L - Ramp-up Rate | | 3°C/second max |
| Reflow | - Temperature (T_L) (Liquidus) | 217°C |
| | - Time (t_L) | 60 – 150 secs |
| Peak Temperature (T_P) | | 260 ^{+0/-5} °C |
| Time within 5°C of actual peak Temperature (t_p) | | 20 – 40 secs |
| Ramp-down Rate | | 6°C/second max |
| Time 25°C to peak Temperature (t) | | 8 minutes Max. |
| Do not exceed | | 260°C |

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