Littelfuse
Expertise Applied | Answers Delivered

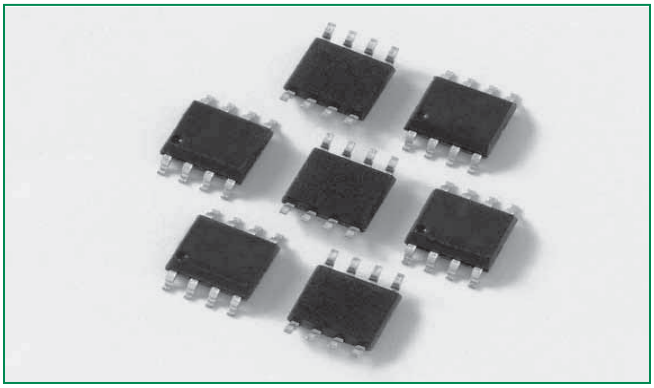
**NOT RECOMMENDED FOR NEW DESIGNS**

***SPLV2.8-4BTG*** is eventually going to be replaced by the ***SLVU2.8-4BTG*** TVS Diode Array with identical form, fit, and function. Please use this device for new or future designs and more detail can be found on Littelfuse.com

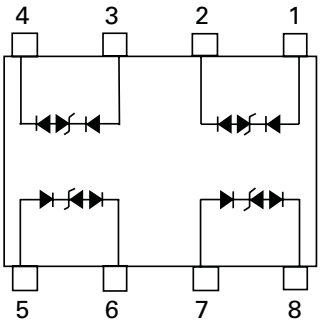
GREEN

# SPLV2.8-4 Series 2.8V 40A TVS Array

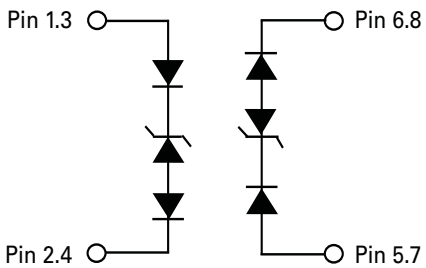




## Pinout




## Functional Block Diagram




## Description

The SPLV2.8-4 was designed to protect low voltage, CMOS devices from ESD and lightning induced transients. There is a compensating diode in series with each low voltage TVS to present a low loading capacitance to the line being protected. These robust structures can safely absorb repetitive ESD strikes at ±30kV (contact discharge) per IEC61000-4-2 standard and each structure can safely dissipate up to 40A (IEC61000-4-5, $t_P$=8/20µs) with very low clamping voltages.

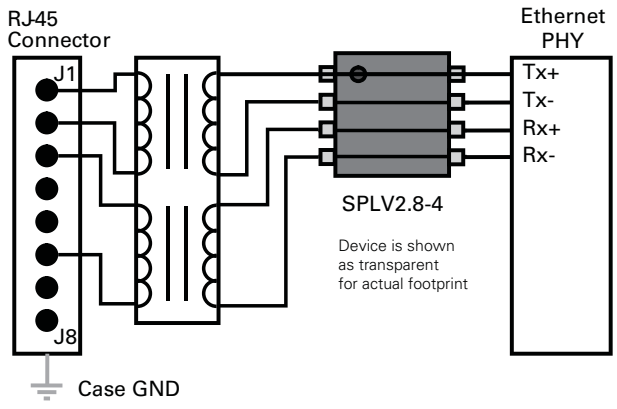
## Features

- ESD, IEC61000-4-2, ±30kV contact, ±30kV air
- EFT, IEC61000-4-4, 40A (5/50ns)
- Lightning, IEC61000-4-5, 40A (8/20µs)
- Low capacitance of 2pF per line
- Low leakage current of 1µA (MAX) at 2.8V
- SOIC-8 pin (JEDEC MS-012) configuration allows for simple flow-through layout

## Applications

- 10/100/1000 Ethernet
- WAN/LAN Equipment
- Switching Systems
- Desktops, Servers, and Notebooks
- Analog Inputs
- Base Stations

## Application Example



**NOT RECOMMENDED FOR NEW DESIGNS**

***SPLV2.8-4BTG*** is eventually going to be replaced by the ***SLVU2.8-4BTG*** TVS Diode Array with identical form, fit, and function. Please use this device for new or future designs and more detail can be found on Littelfuse.com

## Electrical Characteristics ($T_{OP}$ = 25°C)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| Reverse Standoff Voltage | $V_{RWM}$ | $I_R \leq 1\mu A$ | | | 2.8 | V |
| Reverse Breakdown Voltage | $V_{BR}$ | $I_T$=2μA | 3.0 | | | V |
| Snap Back Voltage | $V_{SB}$ | $I_T$=50mA | 2.8 | | | V |
| Reverse Leakage Current | $I_{LEAK}$ | $V_R$=2.8V (Each Line) | | | 1 | μA |
| Clamping Voltage[1] | $V_C$ | $I_{PP}$=5A, $t_P$=8/20μs (Each Line) | | 7.0 | 8.5 | V |
| Clamping Voltage[1] | $V_C$ | $I_{PP}$=24A, $t_P$=8/20μs (Each Line) | | 13.9 | 15.0 | V |
| ESD Withstand Voltage[1] | $V_{ESD}$ | IEC61000-4-2 (Contact) | ±30 | | | kV |
| | | IEC61000-4-2 (Air) | ±30 | | | kV |
| Dynamic Resistance | $R_{DYN}$ | $(V_{C2} - V_{C1}) / (I_{PP2} - I_{PP1})$ (Each Line) | | 0.4 | | Ω |
| Diode Capacitance[1] | $C_D$ | $V_R$=0V, f=1MHz (Each Line) | | 2.0 | 2.5 | pF |

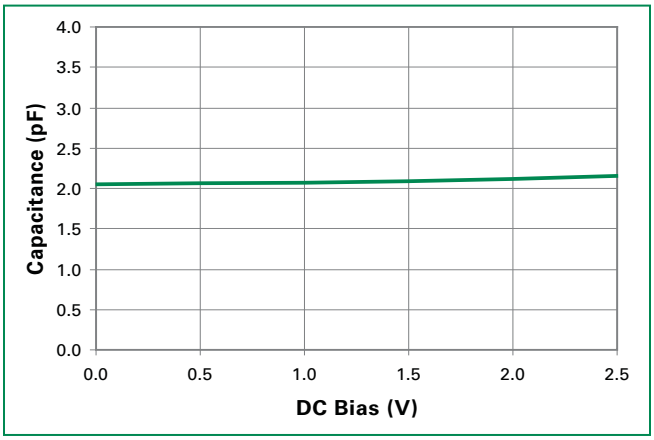
Note: [1]Parameter is guaranteed by design and/or device characterization.

## Absolute Maximum Ratings

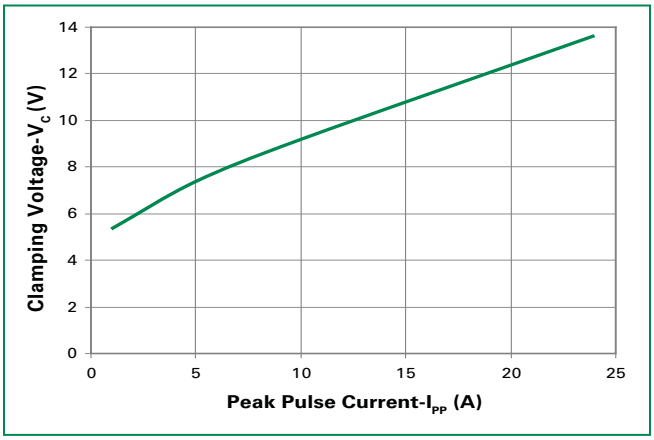
| Parameter | Rating | Units |
|---|---|---|
| Peak Pulse Power ($t_P$=8/20μs) | 600 | W |
| Peak Pulse Current ($t_P$=8/20μs) | 40 | A |
| Operating Temperature | -40 to 85 | °C |
| Storage Temperature | -60 to 150 | °C |

*CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.*

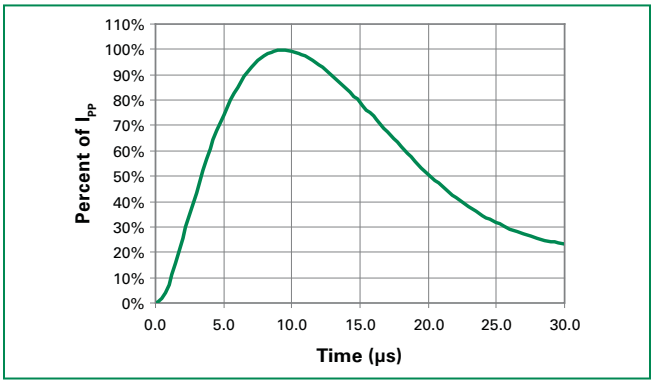
## Figure 1: Capacitance vs. Reverse Voltage




## Figure 2: Clamping Voltage vs. $I_{PP}$




## Figure 3: Pulse Waveform



Littelfuse
Expertise Applied | Answers Delivered

**NOT RECOMMENDED FOR NEW DESIGNS**

***SPLV2.8-4BTG*** is eventually going to be replaced by the ***SLVU2.8-4BTG*** TVS Diode Array with identical form, fit, and function. Please use this device for new or future designs and more detail can be found on Littelfuse.com



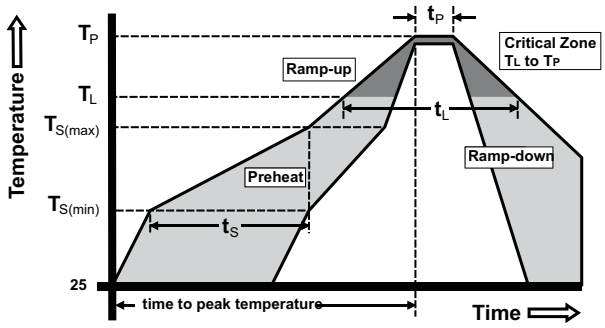
## Product Characteristics

| | |
|---|---|
| **Lead Plating** | Matte Tin |
| **Lead Material** | Copper Alloy |
| **Lead Coplanarity** | 0.0004 inches (0.102mm) |
| **Substitute Material** | Silicon |
| **Body Material** | Molded Epoxy |
| **Flammability** | UL 94 V-0 |

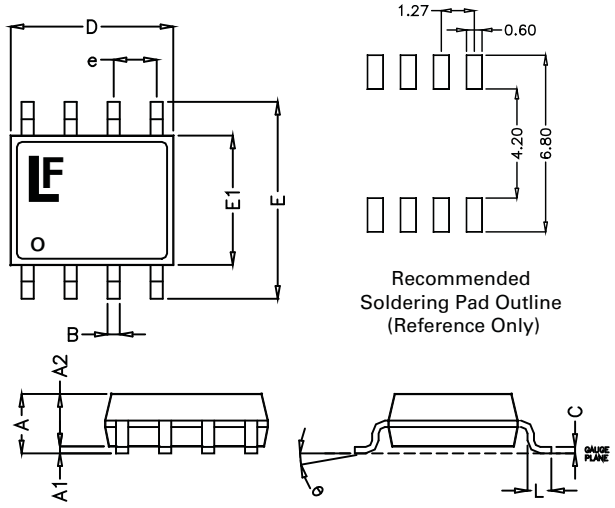
Notes :
1. All dimensions are in millimeters
2. Dimensions include solder plating.
3. Dimensions are exclusive of mold flash & metal burr.
4. Blo is facing up for mold and facing down for trim/form, i.e. reverse trim/form.
5. Package surface matte finish VDI 11-13.

## Soldering Parameters

| | | |
|---|---|---|
| Reflow Condition | | Pb – 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 | | 5°C/second max |
| $T_{S(max)}$ to $T_L$ - Ramp-up Rate | | 5°C/second max |
| Reflow | -Temperature ($T_L$) (Liquidus) | 217°C |
| | -Temperature ($t_L$) | 60 – 150 seconds |
| Peak Temperature ($T_P$) | | $260^{+0/-5}$ °C |
| Time within 5°C of actual peak Temperature ($t_p$) | | 20 – 40 seconds |
| Ramp-down Rate | | 5°C/second max |
| Time 25°C to peak Temperature ($T_P$) | | 8 minutes Max. |
| Do not exceed | | 260°C |




## Package Dimensions — Mechanical Drawings and Recommended Solder Pad Outline

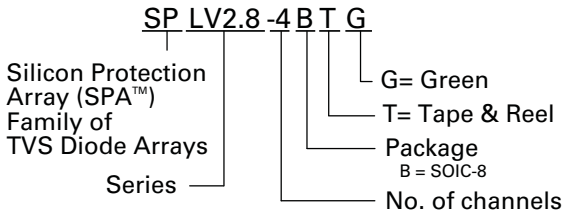



| Package | SOIC | | | |
|---|---|---|---|---|
| Pins | 8 | | | |
| JEDEC | MS-012 | | | |
| | Millimetres | | Inches | |
| | Min | Max | Min | Max |
| **A** | 1.35 | 1.75 | 0.053 | 0.069 |
| **A1** | 0.10 | 0.25 | 0.004 | 0.010 |
| **A2** | 1.25 | 1.65 | 0.050 | 0.065 |
| **B** | 0.31 | 0.51 | 0.012 | 0.020 |
| **c** | 0.17 | 0.25 | 0.007 | 0.010 |
| **D** | 4.80 | 5.00 | 0.189 | 0.197 |
| **E** | 5.80 | 6.20 | 0.228 | 0.244 |
| **E1** | 3.80 | 4.00 | 0.150 | 0.157 |
| **e** | 1.27 BSC | | 0.050 BSC | |
| **L** | 0.40 | 1.27 | 0.016 | 0.050 |

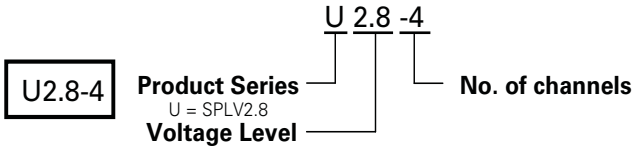
**NOT RECOMMENDED FOR NEW DESIGNS**

***SPLV2.8-4BTG*** is eventually going to be replaced by the ***SLVU2.8-4BTG*** TVS Diode Array with identical form, fit, and function. Please use this device for new or future designs and more detail can be found on Littelfuse.com

## Part Numbering System



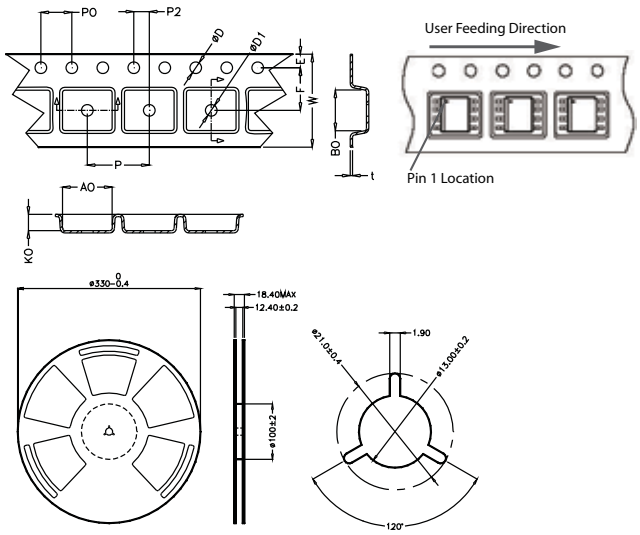

## Part Marking System




## Ordering Information

| Part Number | Package | Marking | Min. Order Qty. |
|---|---|---|---|
| SPLV2.8-4BTG | SOIC-8 | U2.8-4 | 2500 |

## Embossed Carrier Tape & Reel Specification — SOIC Package




| Symbol | Millimetres | | Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| **E** | 1.65 | 1.85 | 0.065 | 0.073 |
| **F** | 5.4 | 5.6 | 0.213 | 0.22 |
| **P2** | 1.95 | 2.05 | 0.077 | 0.081 |
| **D** | 1.5 | 1.6 | 0.059 | 0.063 |
| **D1** | 1.50 Min | | 0.059 Min | |
| **P0** | 3.9 | 4.1 | 0.154 | 0.161 |
| **10P0** | 40.0 +/- 0.20 | | 1.574 +/- 0.008 | |
| **W** | 11.9 | 12.1 | 0.468 | 0.476 |
| **P** | 7.9 | 8.1 | 0.311 | 0.319 |
| **A0** | 6.3 | 6.5 | 0.248 | 0.256 |
| **B0** | 5.1 | 5.3 | 0.2 | 0.209 |
| **K0** | 2 | 2.2 | 0.079 | 0.087 |
| **t** | 0.30 +/- 0.05 | | 0.012 +/- 0.002 | |