

## SP6150 Series 100pF 30kV EMI Filter Array





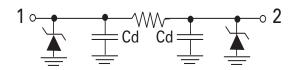




#### **Description**

The Littelfuse SP6150 SPA series integrates EMI filter (C-R-C) into SOT23-3 package providing greater than -25dB attenuation at 400MHz. Additionally, it is capable of shunting ±30kV ESD strikes (IEC61000-4-2, contact discharge) away from sensitive electronic components.

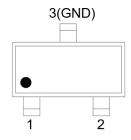
### **Functional Block Diagram**



### **Features**

- EMI filtering of frequencies from 400MHz to 3GHz
- ESD, IEC 61000-4-2, ±30kV contact, ±30kV air
- Moisture Sensitivity Level(MSL -1)
- Lead free and RoHS compliant

#### **Pinout**



## **Applications**

- · Keypad interface for portable electronics
- LCD and camera display interfaces for handsets
- Connector interfaces for portable electronics
- Mobile phone
- Smartphone
- Portable navigation component



#### **Absolute Maximum Ratings**

| Symbol            | Parameter             | Value      | Units |
|-------------------|-----------------------|------------|-------|
| $P_R$             | DC Power per Resistor | 100        | mW    |
| T <sub>OP</sub>   | Operating Temperature |            | °C    |
| T <sub>STOR</sub> | Storage Temperature   | -55 to 150 | °C    |

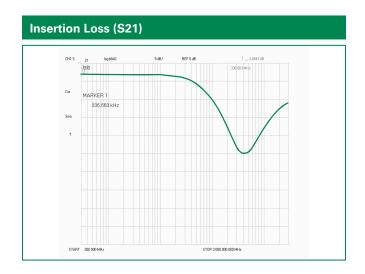
CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the component. This is a stress only rating and operation of the component at these or any other conditions above those indicated in the operational sections of this specification is not implied.

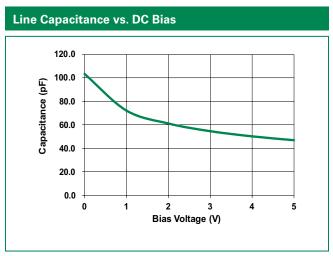
| Electrical Characteristics (T <sub>OP</sub> =25°C) |                   |   |     |     |      |       |
|--|-------------------|---|-----|-----|------|-------|
| Parameter  | Symbol            | Test Conditions                                       | Min | Тур | Max  | Units |
| Reverse Standoff Voltage                           | V <sub>RWM</sub>  |   |     |     | 5.0  | V     |
| Breakdown Voltage                                  | V <sub>BR</sub>   | I <sub>R</sub> =1mA                                   | 6.0 |     |      | V     |
| Reverse Leakage Current                            | I <sub>LEAK</sub> | V <sub>RWM</sub> =5V                                  |     |     | 1.0  | μΑ    |
| Resistance   | R <sub>A</sub>    |   | 40  | 50  | 57.5 | Ω     |
| Diode Capacitance <sup>1,2</sup>                   | C <sub>D</sub>    | V <sub>R</sub> =0V,f=1MHz                             |     | 50  |      | pF    |
| Line Capacitance <sup>1,2</sup>                    | C <sub>L</sub>    | V <sub>R</sub> =0V,f=1MHz                             | 80  | 100 | 120  | pF    |
| CCD \\\(i\theta\) \(a\theta\)                      | \ \/              | IEC 61000-4-2 (Contact Discharge)                     | ±30 |     |      | kV    |
| ESD Withstand Voltage <sup>1</sup>                 | V <sub>ESD</sub>  | IEC 61000-4-2 (Air Discharge)                         | ±30 |     |      | kV    |
| Cutoff Frequency <sup>3</sup>                      | F <sub>-3dB</sub> | Above this frequency, appreciable attenutation occurs | 46  | 60  |      | MHz   |

Notes: 1 Parameter is guaranteed by design and/or component characterization.

<sup>2</sup> Total line capacitance is two times the diode capacitance (C<sub>p</sub>).

 $^3~50\Omega$  source and  $50\Omega$  load termination

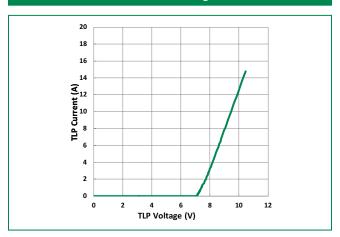




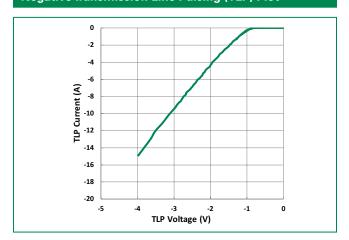
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## Positive Transmission Line Pulsing (TLP) Plot



## **Negative Transmission Line Pulsing (TLP) Plot**



## IEC 61000 -4-2 +8 kV Contact ESD Clamping Voltage



## IEC 61000 -4-2 -8 kV Contact ESD Clamping Voltage

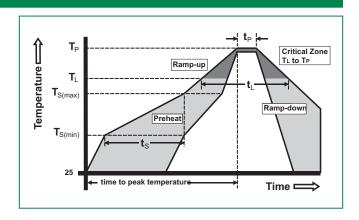


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#### **Soldering Parameters**

| Reflow Condition   |   | Pb – Free assembly      |  |
|--|---|-------------------------|--|
|  | -Temperature Min (T <sub>s(min)</sub> )   | 150°C                   |  |
| Pre Heat   | -Temperature Max (T <sub>s(max)</sub> )   | 200°C                   |  |
|  | -Time (min to max) (t <sub>s</sub> )      | 60 – 180 secs           |  |
| Average ramp up rate (Liquidus) Temp (T <sub>L</sub> ) to peak |   | 3°C/second max          |  |
| $T_{S(max)}$ to $T_{L}$  | - Ramp-up Rate                            | 3°C/second max          |  |
| Reflow   | -Temperature (T <sub>L</sub> ) (Liquidus) | 217°C                   |  |
| nellow   | -Temperature (t <sub>L</sub> )            | 60 – 150 seconds        |  |
| Peak Temp  | erature (T <sub>P</sub> )                 | 260 <sup>+0/-5</sup> °C |  |
| Time within 5°C of actual peak Temperature (t,)                |   | 20 - 40 seconds         |  |
| Ramp-down Rate   |   | 6°C/second max          |  |
| Time 25°C to peak Temperature (T <sub>p</sub> )                |   | 8 minutes Max.          |  |
| Do not exceed  |   | 260°C                   |  |



#### **Product Characteristics**

| Lead Plating       | Matte Tin  |  |
|--------------------|--|--|
| Lead Material      | Copper Alloy   |  |
| Lead Coplanarity   | 0.004 inches(0.102mm)                                  |  |
| Substrate Material | Silicon  |  |
| Body Material      | Molded Compound  |  |
| Flammability       | UL Recognized compound meeting flammability rating V-0 |  |

## **Part Marking System**

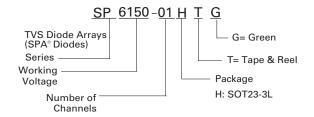


F : Assembly code D : Date code

| A 1 - 1 - 1 | 1       | - 45   |
|-------------|---------|--------|
| Ordering    | Intorno | ation  |
| Oracining   |         | utivii |

| Part Number  | Package  | Min. Order Qty. |  |
|--------------|----------|-----------------|--|
| SP6150-01HTG | SOT23-3L | 3000            |  |

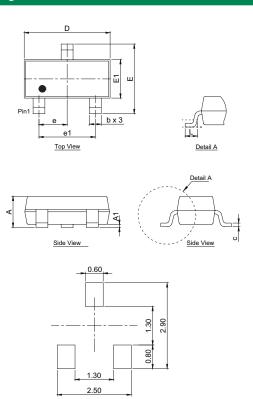
## **Part Numbering System**



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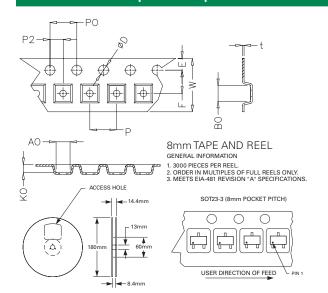
#### Package Dimensions — SOT23-3



| Package | SOT23-3            |      |           |             |  |     |
|---------|--------------------|------|-----------|-------------|--|-----|
| Pins    | 3                  |      |           |             |  |     |
| JEDEC   | TO-236             |      |           |             |  |     |
|         | Millimeters Inches |      |           | Millimeters |  | hes |
|         | Min                | Max  | Min       | Max         |  |     |
| Α       | 0.90               | 1.15 | 0.035     | 0.045       |  |     |
| A1      | 0.00               | 0.10 | 0.000     | 0.004       |  |     |
| b       | 0.30               | 0.51 | 0.012     | 0.020       |  |     |
| С       | 0.08               | 0.20 | 0.003     | 0.008       |  |     |
| D       | 2.80               | 3.04 | 0.110     | 0.120       |  |     |
| E       | 2.10               | 2.64 | 0.083     | 0.104       |  |     |
| E1      | 1.20               | 1.40 | 0.047     | 0.055       |  |     |
| е       | 0.95 BSC           |      | 0.038 BSC |             |  |     |
| e1      | 1.90 BSC           |      | 0.075 BSC |             |  |     |
| L       | 0.30               | 0.55 | 0.012     | 0.022       |  |     |

Recommended soldering pad layout (unit :mm) Drawing# : H03-B

#### Embossed Carrier Tape & Reel Specification — SOT23-3



| Symbol | Millimeters |      | Inches |       |
|--------|-------------|------|--------|-------|
|        | Min         | Max  | Min    | Max   |
| Е      | 1.65        | 1.85 | 0.065  | 0.073 |
| F      | 3.40        | 3.60 | 0.134  | 0.142 |
| P2     | 1.90        | 2.10 | 0.075  | 0.083 |
| D      | 1.40        | 1.60 | 0.055  | 0.063 |
| P0     | 3.90        | 4.10 | 0.154  | 0.161 |
| W      | 7.70        | 8.30 | 0.303  | 0.327 |
| P      | 3.90        | 4.10 | 0.154  | 0.161 |
| A0     | 3.05        | 3.25 | 0.120  | 0.128 |
| В0     | 2.67        | 2.87 | 0.105  | 0.113 |
| K0     | 1.12        | 1.32 | 0.044  | 0.052 |
| t      | 0.22        | 0.24 | 0.009  | 0.009 |

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