

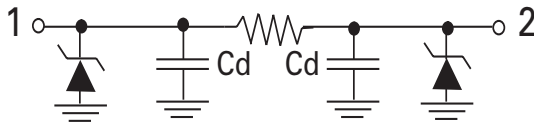
## SP6150 Series 100pF 30kV EMI Filter Array



### 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  $\pm 30\text{kV}$  ESD strikes (IEC61000-4-2, contact discharge) away from sensitive electronic components.

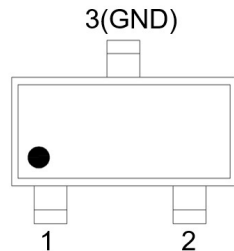
### Functional Block Diagram



### Features

- EMI filtering of frequencies from 400MHz to 3GHz
- ESD, IEC 61000-4-2,  $\pm 30\text{kV}$  contact,  $\pm 30\text{kV}$  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
$T_{OP}$	Operating Temperature	-40 to 125	°C
$T_{STOR}$	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 ( $T_{OP}=25^{\circ}\text{C}$ )

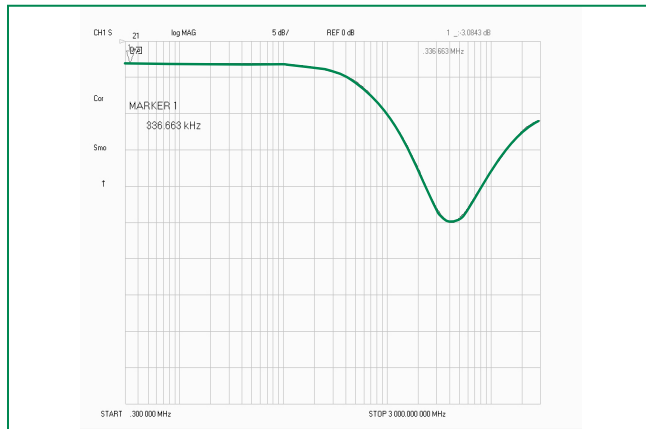
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	$V_{RWM}$				5.0	V
Breakdown Voltage	$V_{BR}$	$I_R=1\text{mA}$	6.0			V
Reverse Leakage Current	$I_{LEAK}$	$V_{RWM}=5\text{V}$			1.0	$\mu\text{A}$
Resistance	$R_A$		40	50	575	$\Omega$
Diode Capacitance <sup>1,2</sup>	$C_D$	$V_R=0\text{V}, f=1\text{MHz}$		50		pF
Line Capacitance <sup>1,2</sup>	$C_L$	$V_R=0\text{V}, f=1\text{MHz}$	80	100	120	pF
ESD Withstand Voltage <sup>1</sup>	$V_{ESD}$	IEC 61000-4-2 (Contact Discharge)	$\pm 30$			kV
		IEC 61000-4-2 (Air Discharge)	$\pm 30$			kV
Cutoff Frequency <sup>3</sup>	$F_{-3\text{dB}}$	Above this frequency, appreciable attenuation occurs	46	60		MHz

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

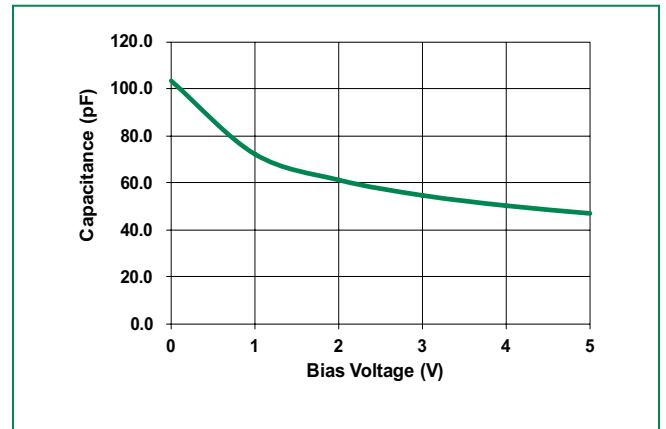
<sup>2</sup> Total line capacitance is two times the diode capacitance ( $C_D$ ).

<sup>3</sup> 50 $\Omega$  source and 50 $\Omega$  load termination

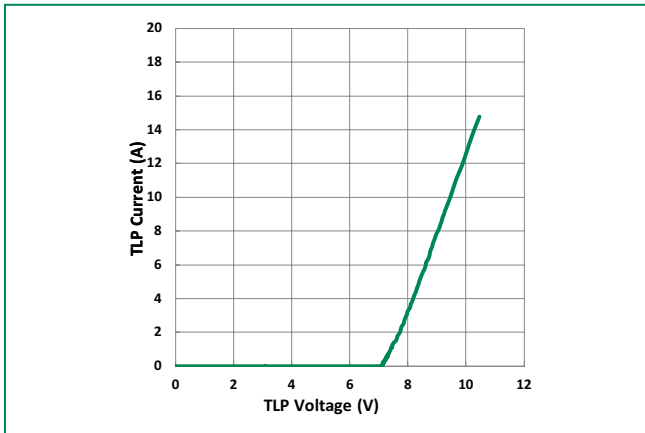
### Insertion Loss (S21)



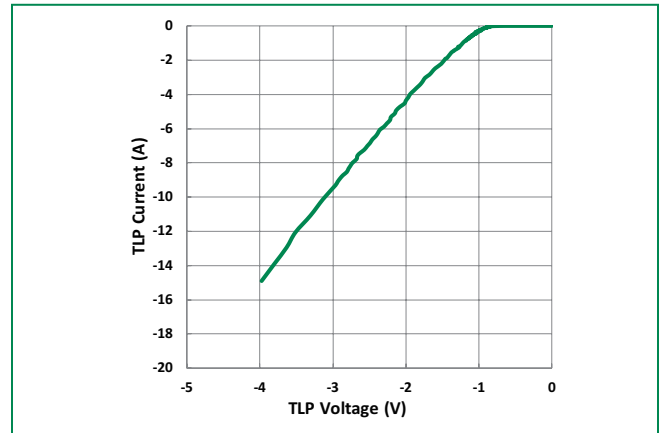
### Line Capacitance vs. DC Bias



**Positive Transmission Line Pulsing (TLP) Plot**



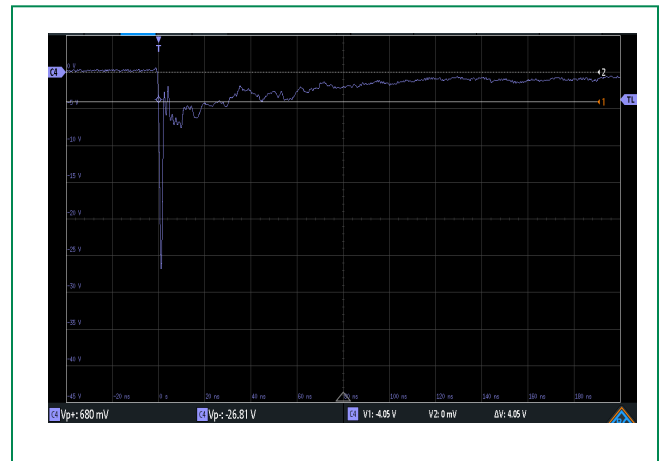
**Negative Transmission Line Pulsing (TLP) Plot**



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

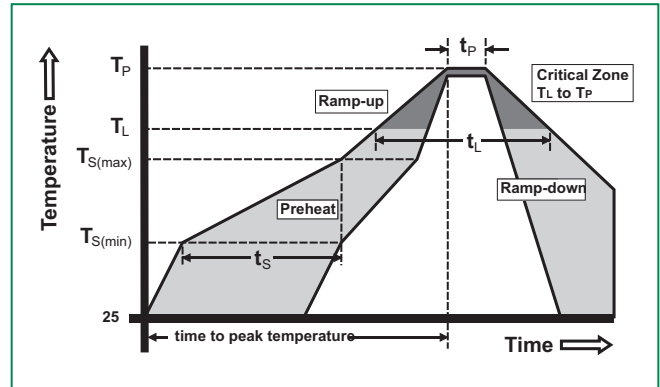


**IEC 61000 -4-2 -8 kV Contact ESD Clamping Voltage**



**Soldering Parameters**

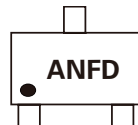
Reflow Condition		Pb – Free assembly
Pre Heat	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (min to max) ( $t_s$ )	60 – 180 secs
Average ramp up rate (Liquidus) Temp ( $T_L$ ) to peak		3°C/second max
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		3°C/second max
Reflow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



**Product Characteristics**

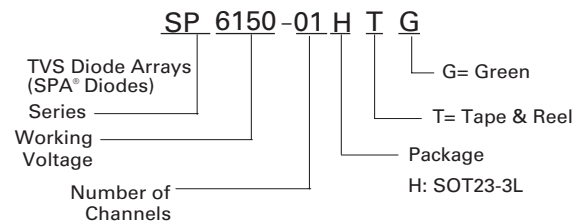
<b>Lead Plating</b>	Matte Tin
<b>Lead Material</b>	Copper Alloy
<b>Lead Coplanarity</b>	0.004 inches(0.102mm)
<b>Substrate Material</b>	Silicon
<b>Body Material</b>	Molded Compound
<b>Flammability</b>	UL Recognized compound meeting flammability rating V-0

**Part Marking System**



AN : Part code  
F : Assembly code  
D : Date code

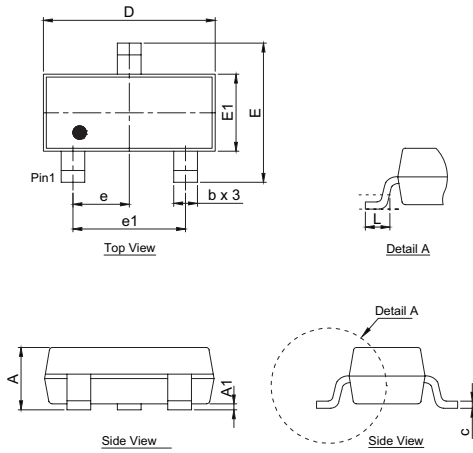
**Part Numbering System**



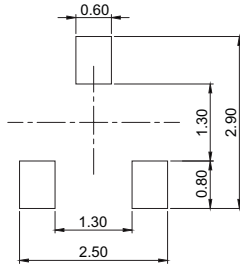
**Ordering Information**

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

**Package Dimensions — SOT23-3**

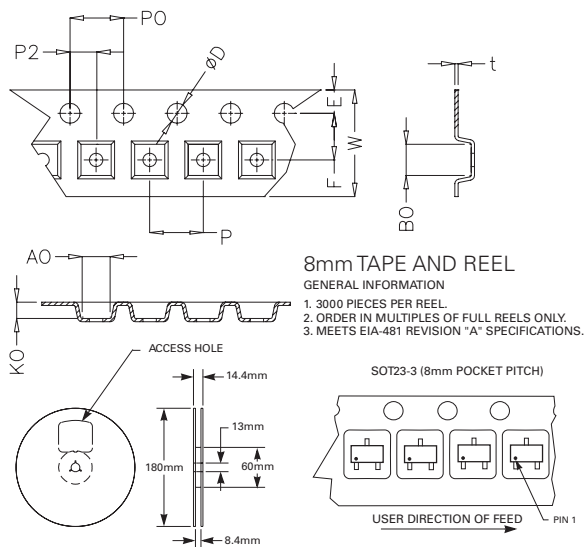


Package	SOT23-3			
Pins	3			
JEDEC	TO-236			
	Millimeters		Inches	
	Min	Max	Min	Max
<b>A</b>	0.90	1.15	0.035	0.045
<b>A1</b>	0.00	0.10	0.000	0.004
<b>b</b>	0.30	0.51	0.012	0.020
<b>c</b>	0.08	0.20	0.003	0.008
<b>D</b>	2.80	3.04	0.110	0.120
<b>E</b>	2.10	2.64	0.083	0.104
<b>E1</b>	1.20	1.40	0.047	0.055
<b>e</b>	0.95 BSC		0.038 BSC	
<b>e1</b>	1.90 BSC		0.075 BSC	
<b>L</b>	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
<b>E</b>	1.65	1.85	0.065	0.073
<b>F</b>	3.40	3.60	0.134	0.142
<b>P2</b>	1.90	2.10	0.075	0.083
<b>D</b>	1.40	1.60	0.055	0.063
<b>P0</b>	3.90	4.10	0.154	0.161
<b>W</b>	7.70	8.30	0.303	0.327
<b>P</b>	3.90	4.10	0.154	0.161
<b>A0</b>	3.05	3.25	0.120	0.128
<b>B0</b>	2.67	2.87	0.105	0.113
<b>K0</b>	1.12	1.32	0.044	0.052
<b>t</b>	0.22	0.24	0.009	0.009

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