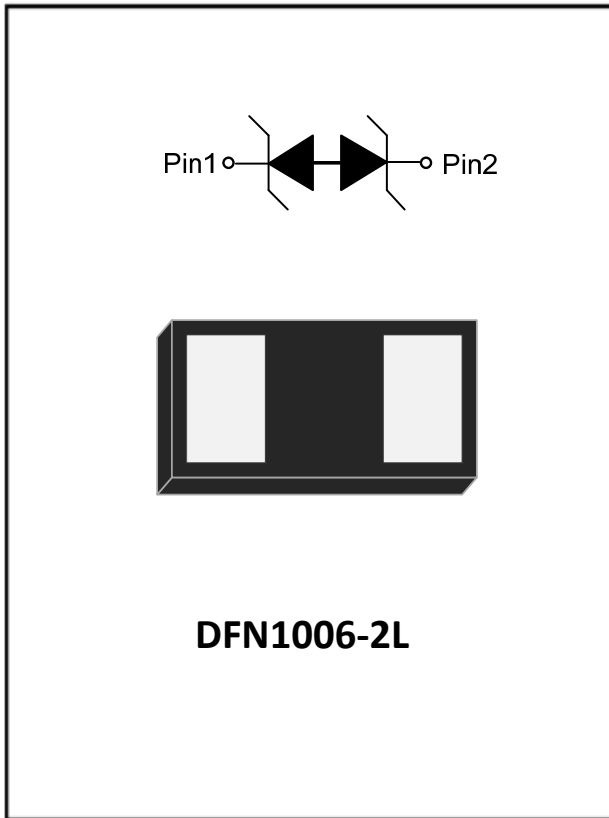


## 1-Line, Bi-directional, Transient Voltage Suppressor



### Features

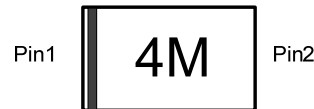
- Stand-off voltage: 4.5V Max
- Transient protection for each line according to
  - IEC61000-4-2(ESD):  $\pm 30\text{kV}$  (contact)
  - IEC61000-4-4 (EFT): 80A (5/50ns)
  - IEC61000-4-5(surge): 46A (8/20 $\mu\text{s}$ )
- Low leakage current
- Low clamping voltage:  
 $V_{CL} = 7\text{V typ. @ IPP} = 16\text{A (TLP)}$
- RoHS Compliant

### Applications

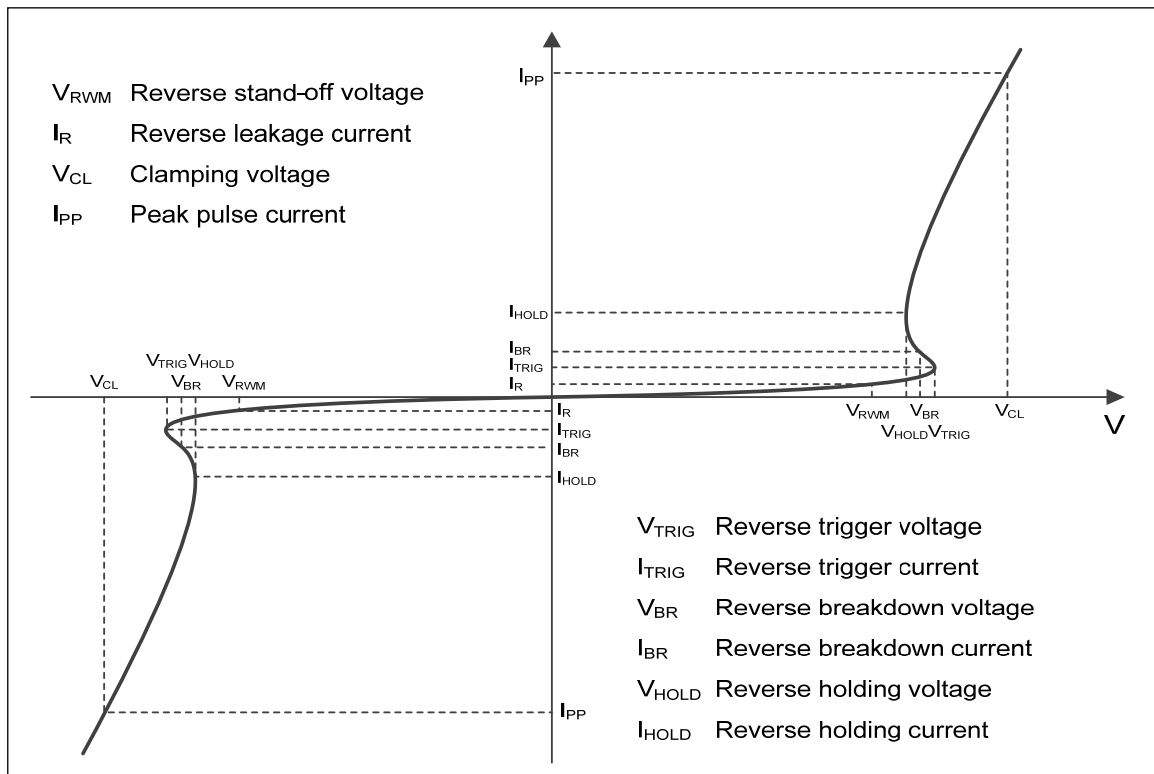
- Battery Line Protection
- Audio Line Protection
- GPIO Protection

### Mechanical Data

- Package: DFN1006-2L
- Lead Finish: Matte Tin
- Case Material: "Green" Molding Compound
- Moisture Sensitivity: Level 3 per J-STD-020
- Marking Information: See Below



### ■ Definitions of electrical characteristics





# ESD4V5LBA1

## ■Maximum Ratings

PARAMETER	SYMBOL	LIMITS	UNIT
Peak pulse power ( $t_p = 8/20\mu s$ )	$P_{pk}$	550	W
Peak pulse current ( $t_p = 8/20\mu s$ )	$I_{pp}$	46	A
ESD according to IEC61000-4-2 air discharge	$V_{ESD}$	$\pm 30$	kV
ESD according to IEC61000-4-2 contact discharge		$\pm 30$	
Junction temperature	$T_J$	125	$^{\circ}C$
Storage temperature	$T_{STG}$	-55~150	$^{\circ}C$

## ■Electrical Characteristics ( $T_a=25^{\circ}C$ Unless otherwise specified)

PARAMETER	Symbol	UNIT	Conditions	Min	Typ	Max
Reverse maximum working voltage	$V_{RWM}$	V				4.5
Reverse leakage current	$I_R$	$\mu A$	$V_{RWM} = 4.5V$			1
Reverse breakdown voltage	$V_{BR}$	V	$I_{BR} = 1mA$	4.6		
Clamping voltage <sup>1)</sup>	$V_{CL}$	V	$I_{PP} = 16A, t_p = 100ns$		7.0	
Dynamic resistance <sup>1)</sup>	$R_{DYN}$	$\Omega$			0.06	
Clamping voltage <sup>2)</sup>	$V_{CL}$	V	$V_{ESD} = 8kV$		8.0	
Clamping voltage <sup>3)</sup>	$V_{CL}$	V	$I_{PP} = 1A, t_p = 8/20\mu s$		5.7	7
		V	$I_{PP} = 20A, t_p = 8/20\mu s$		7.3	9
		V	$I_{PP} = 46A, t_p = 8/20\mu s$		10	12
Junction capacitance	$C_J$	pF	$V_R = 0V, f = 1MHz$		85	95

Notes:

(1). TLP parameter:  $Z_0 = 50\Omega, t_p = 100ns, t_r = 2ns$ , averaging window from 60ns to 80ns.  $R_{DYN}$  is calculated from 4A to 16A.

(2). Contact discharge mode, according to IEC61000-4-2.

(3). Non-repetitive current pulse, according to IEC61000-4-5.

## ■Ordering Information (Example)

PREFERRED P/N	PACKING CODE	UNIT WEIGHT(mg)	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
ESD4V5LBA1	F1	Approximate 0.9	10000	40000	400000	7" reel



# ESD4V5LBA1

## ■ Characteristics (Typical)

Fig.1 8/20 $\mu$ s waveform per IEC61000-4-5

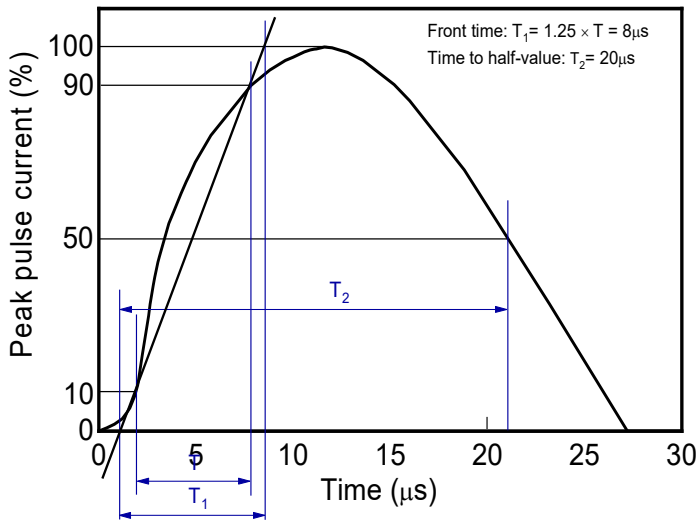


Fig.2 Contact discharge current waveform per IEC61000-4-2

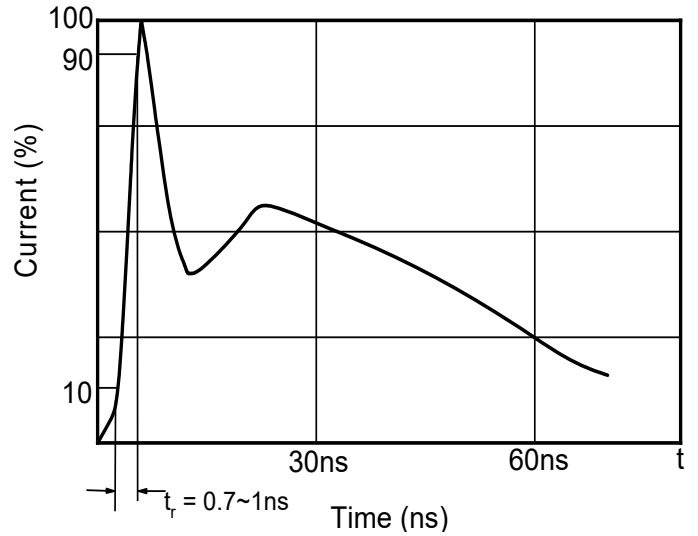


Fig.3 Clamping voltage vs. Peak pulse current

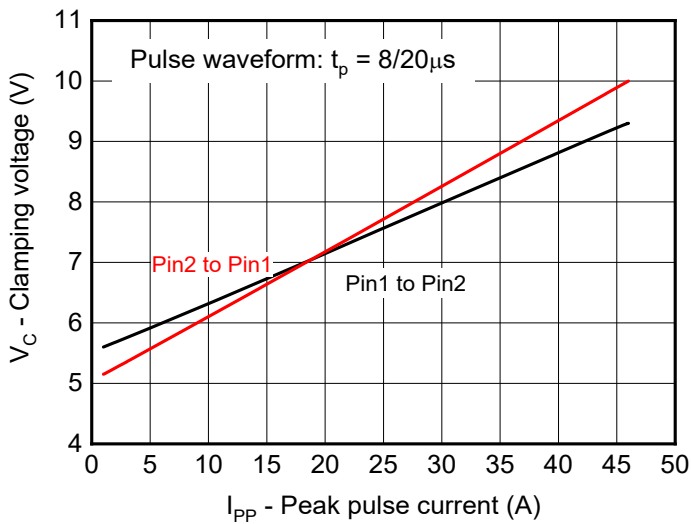


Fig.4 Capacitance vs. Reverse voltage

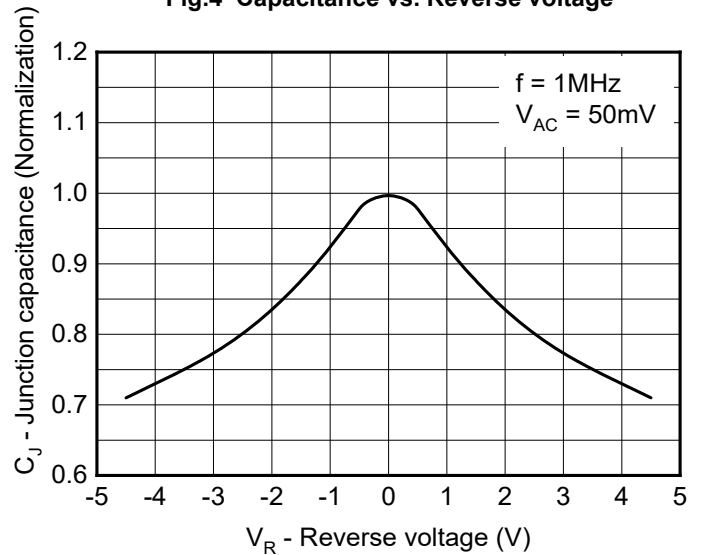


Fig.5 Non-repetitive peak pulse power vs. Pulse time

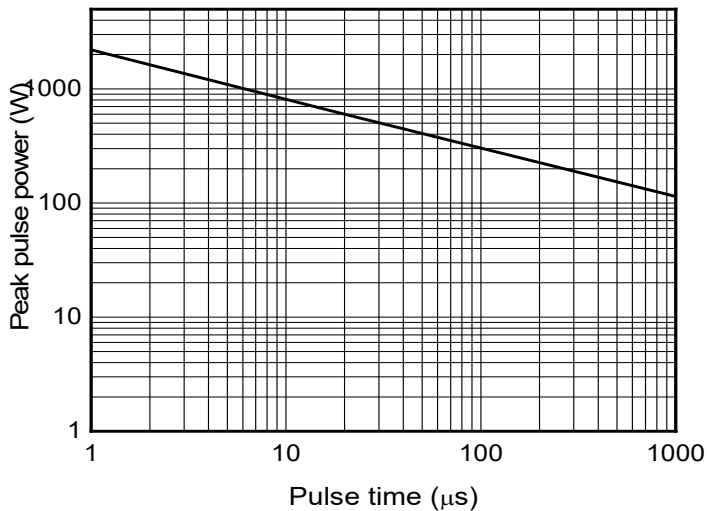
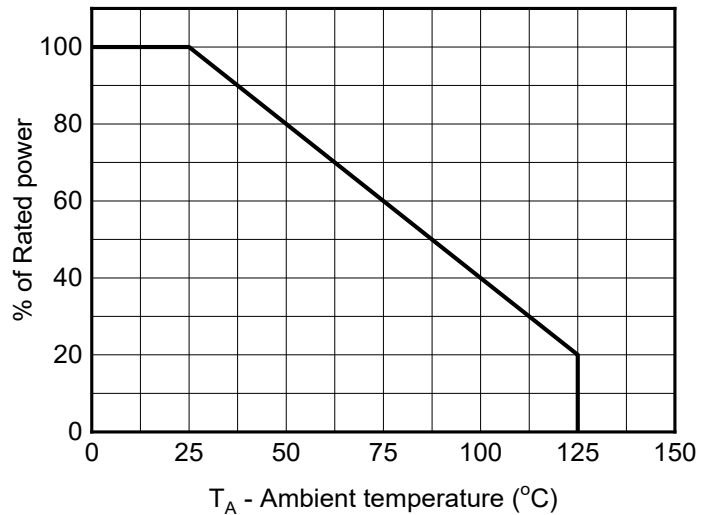


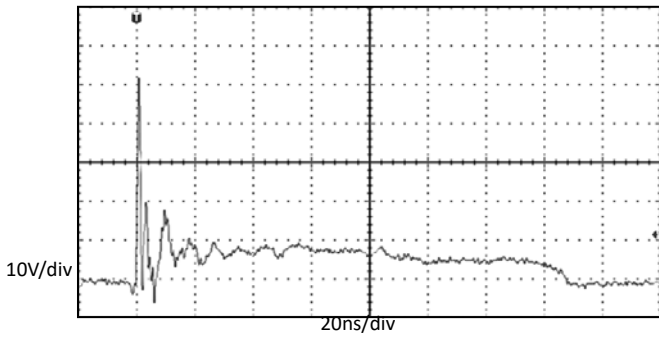
Fig.6 Power derating vs. Ambient temperature



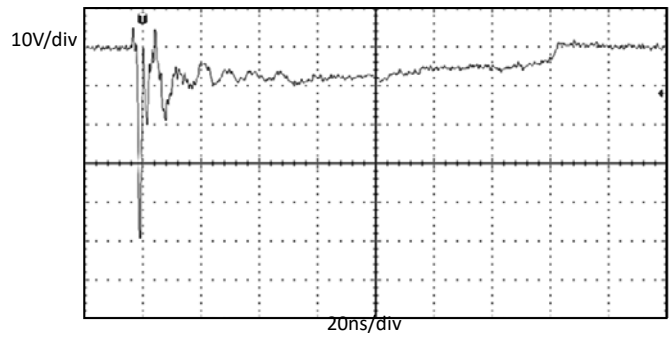


# ESD4V5LBA1

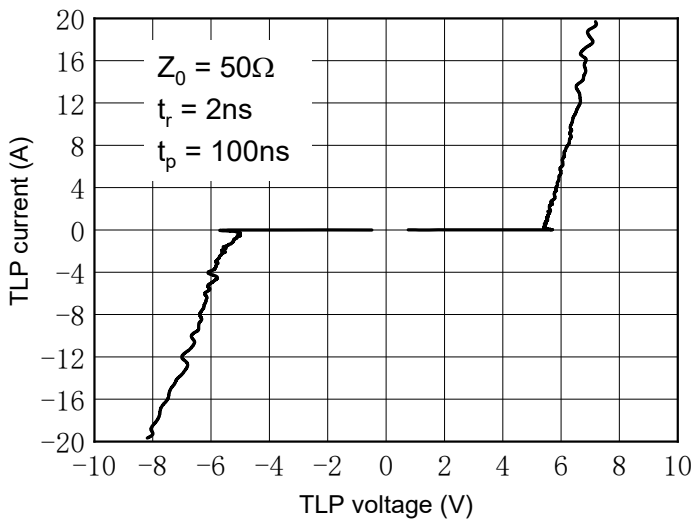
**Fig.7 ESD clamping**  
(+8kV contact discharge per IEC61000-4-2)



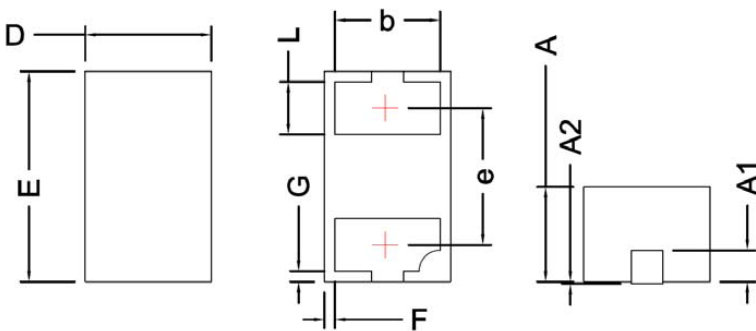
**Fig.8 ESD clamping**  
(-8kV contact discharge per IEC61000-4-2)



**Fig.9 TLP Measurement**



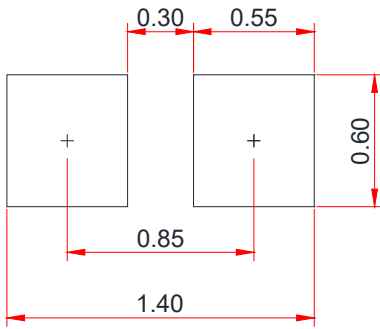
## ■ Outline Dimensions



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
D	0.50	0.60	0.70
E	0.90	1.00	1.10
A	0.35	0.45	0.55
A1	0.15 BSC		
A2			0.10
F	0.005		
G	0.005		
L	0.15	0.25	0.35
b	0.41	0.50	0.59
e	0.65 BSC		



## ■ Recommended PCB Layout



Unit:mm

### Notes:

This recommended land pattern is for reference purposes only. Please consult your manufacturing group to ensure your PCB design guidelines are met



# ESD4V5LBA1

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