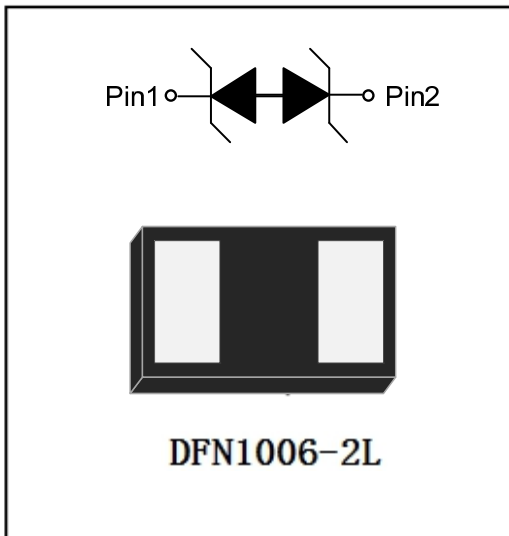


## 1-Line, Bi-directional, Transient Voltage Suppressor



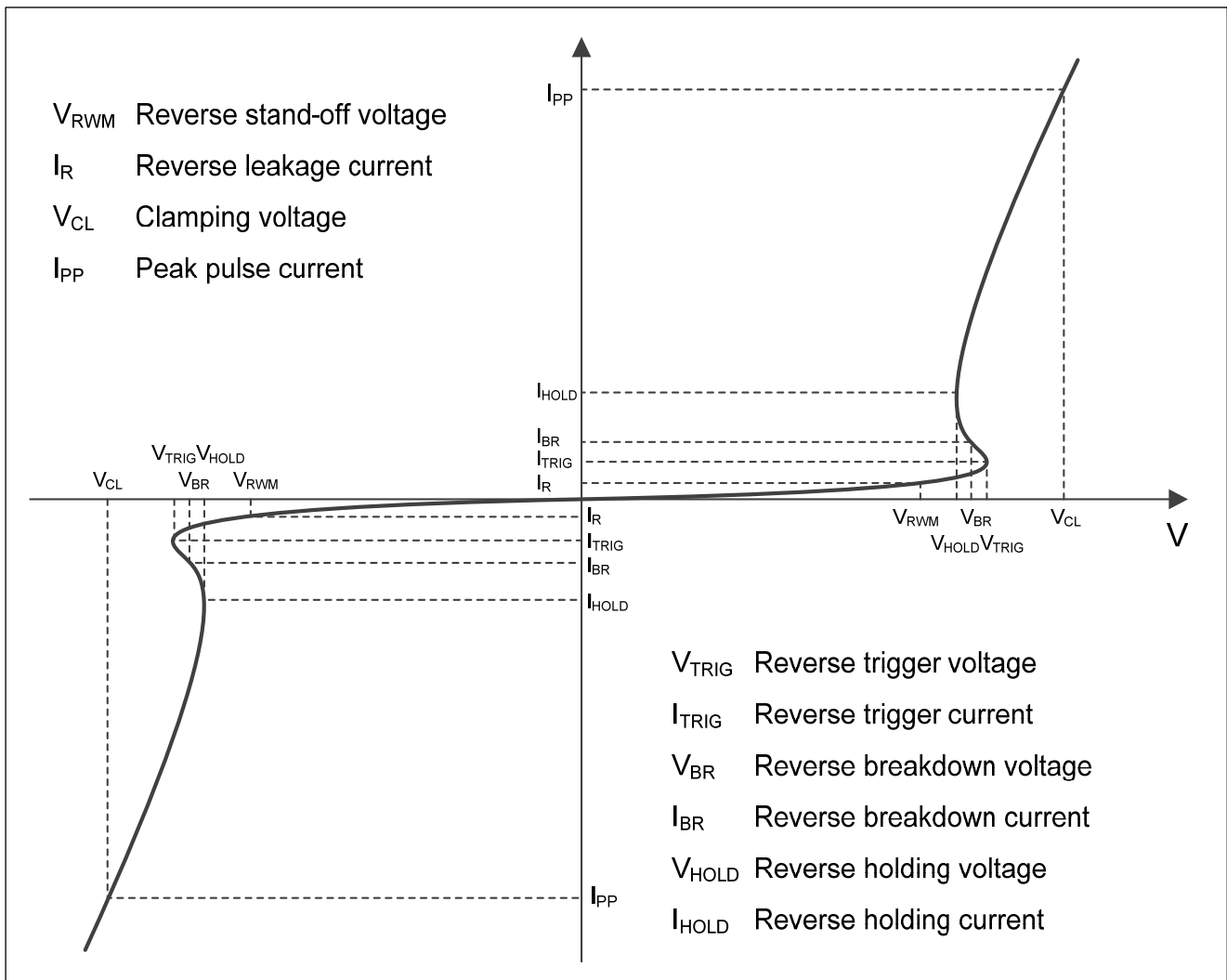
### Features

- Stand-off voltage:  $\pm 4.5\text{V}$  Max
- Transient protection for each line according to IEC61000-4-2(ESD):  $\pm 30\text{kV}$  (contact)  
IEC61000-4-4 (EFT): 40A (5/50ns)  
IEC61000-4-5(surge): 40A (8/20 $\mu\text{s}$ )
- Ultra-low capacitance:  $C_J = 65\text{pF}$  typ
- Low leakage current
- Low clamping voltage:  $V_{CL} = 7.0\text{V}$  typ. @  $I_{PP} = 16\text{A}$  (TLP)
- Solid-state silicon technology

### Mechanical Data

- **Package:** DFN1006-2L
- **Terminals:** Tin plated leads, solderable per J-STD-002 and JESD22-B102
- **Polarity:** No marking on bi-directional types
- **Marking:** 4G

### ■ Definitions of electrical characteristics





# ESD4V5LBA

## ■Maximum Ratings

PARAMETER	SYMBOL	Rating	UNIT
Peak pulse power ( $t_p = 8/20\mu s$ )	$P_{pk}$	400	W
Peak pulse current ( $t_p = 8/20\mu s$ )	$I_{PP}$	40	A
ESD according to IEC61000-4-2 air discharge	$V_{ESD}$	$\pm 30$	KV
ESD according to IEC61000-4-2 contact discharge		$\pm 30$	KV
Junction temperature	$T_J$	125	$^{\circ}C$
Operating temperature	$T_{OP}$	-40~85	$^{\circ}C$
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				$\pm 4.5$
Reverse leakage current	$I_R$	$\mu A$	$V_{RWM} = \pm 4.5V$			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	
Dynamic resistance <sup>1)</sup>	$R_{DYN}$	$\Omega$			0.09	
Clamping voltage <sup>2)</sup>	$V_{CL}$	V	$V_{ESD} = 8kV$		9	
Clamping voltage <sup>3)</sup>	$V_{CL}$	V	$I_{PP} = 1A, t_p = 8/20\mu s$		4.9	6
		V	$I_{PP} = 20A, t_p = 8/20\mu s$		6.5	8
		V	$I_{PP} = 40A, t_p = 8/20\mu s$		9	10
Junction capacitance	$C_J$	$\mu F$	$V_R = 0V, f = 1MHz$		65	75

(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.

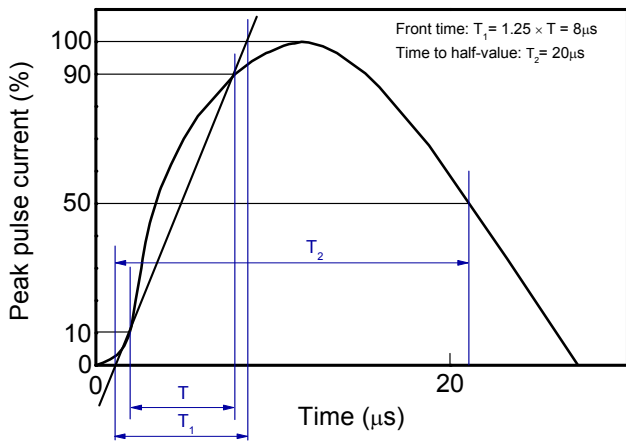
## ■Ordering Information (Example)

PREFERED P/N	UNIT WEIGHT(mg)	MINIMUM PACKAGE (pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
ESD4V5LBA	Approximate 0.9	10000	100000	400000	Tape & reel

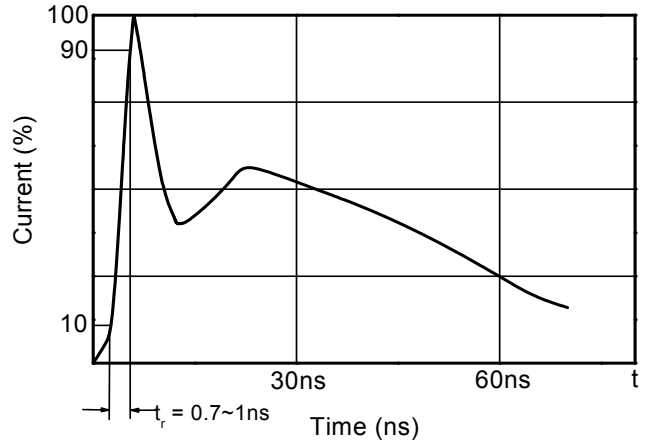


## ■ Characteristics (Typical)

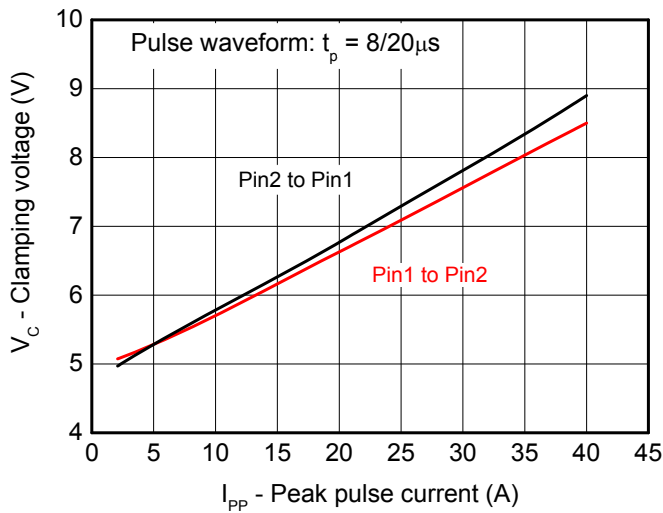
### 8/20 $\mu$ s waveform per IEC61000-4-5



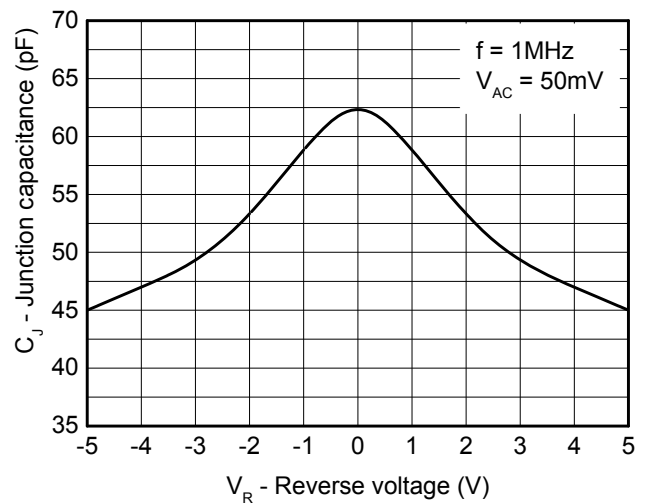
### Contact discharge current waveform per IEC61000-4-2



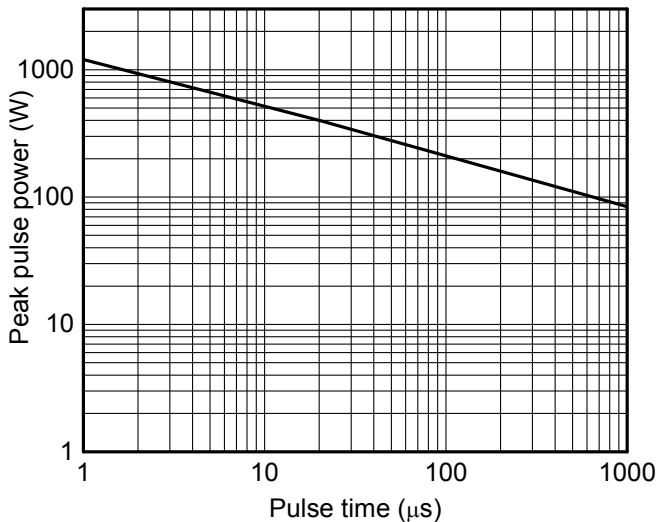
### Clamping voltage vs. Peak pulse current



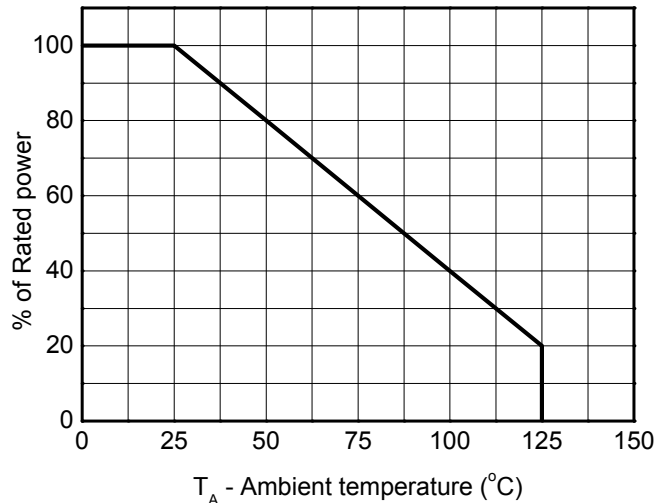
### Capacitance vs. Reverse voltage



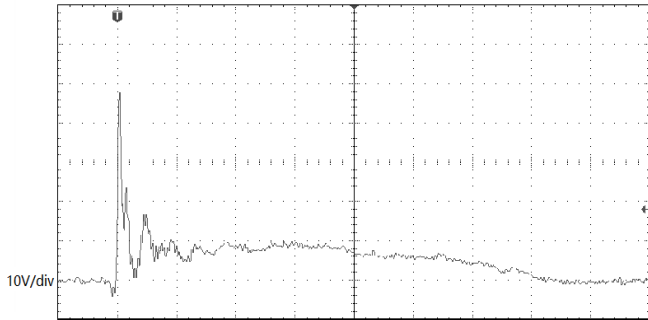
### Non-repetitive peak pulse power vs. Pulse time



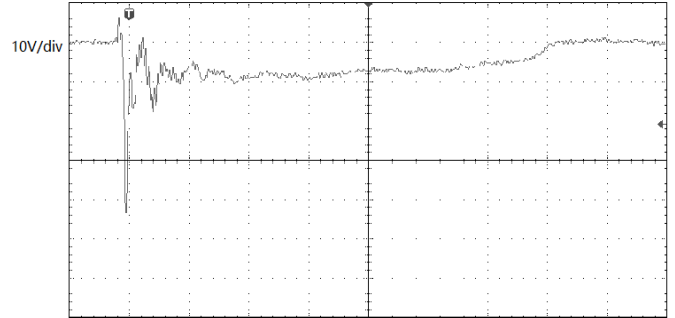
### Power derating vs. Ambient temperature



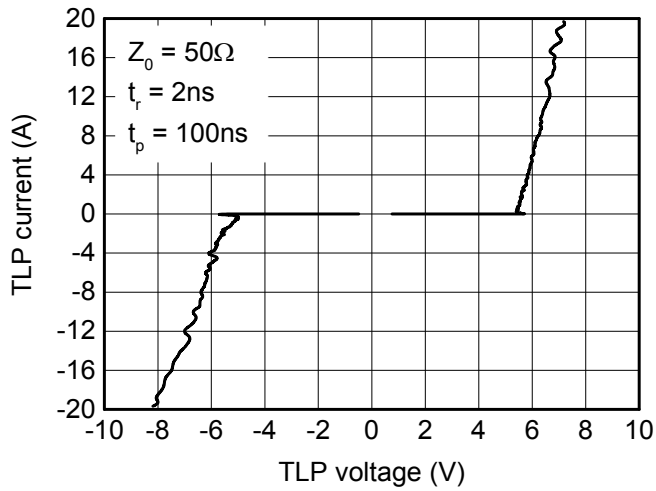
**ESD clamping**  
(+8kV contact discharge per IEC61000-4-2)



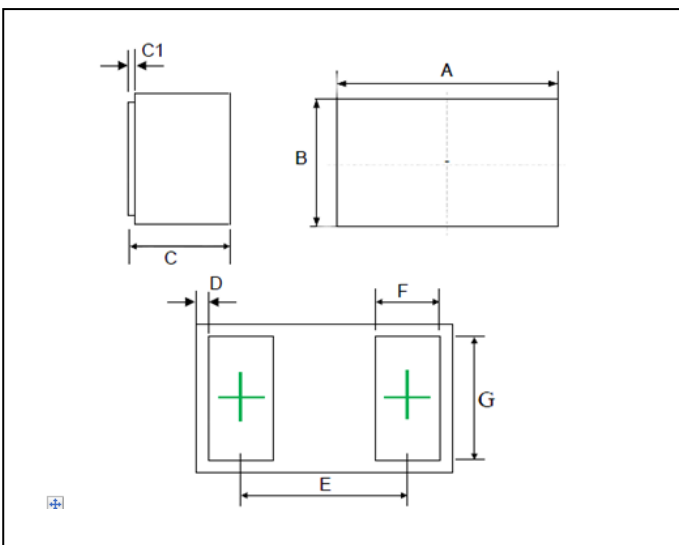
**ESD clamping**  
(-8kV contact discharge per IEC61000-4-2)



**TLP Measurement**



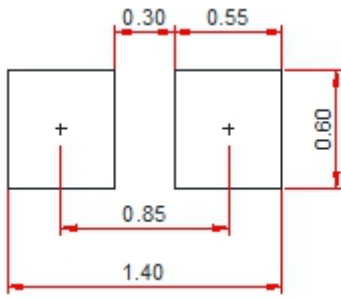
## ■ Outline Dimensions



Symbol	min. (mm)	Max. (mm)
A	0.95	1.05
B	0.55	0.65
C	0.4	0.5
C1		0.05
D	0.01	0.08
E		0.65
F	0.2	0.3
G	0.45	0.55



## ■ Recommend land pattern (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



## ESD4V5LBA

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