



### FEATURES

- ✧ Solid-state silicon-avalanche technology
- ✧ Up to four I/O lines of protection
- ✧ Low operating voltage:3.3V
- ✧ Ultra low capacitance: 0.25pF typical(I/O to I/O)
- ✧ Low operating and clamping voltage
- ✧ Low leakage current
- ✧ RoHS compliant

### MAIN APPLICATIONS

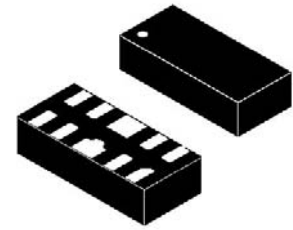
- ✧ Digital visual interface(DVI)
- ✧ Display port TM interface
- ✧ MDDI ports
- ✧ PCI express
- ✧ SATA interfaces
- ✧ High definition multi-media interface(HDMI)

### PROTECTION SOLUTION TO MEET

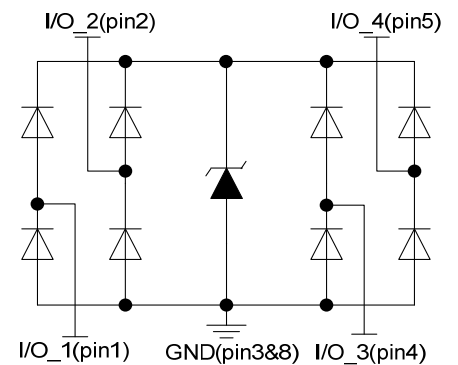
- ✧ IEC61000-4-2 (ESD)  $\pm 10\text{kV}$  (air),  $\pm 10\text{kV}$  (contact)
- ✧ IEC61000-4-4 (EFT)40A(5/50ns)
- ✧ IEC61000-4-5 (Lightning) 7A (8/20 $\mu\text{s}$ )

### MECHANICAL CHARACTERISTICS

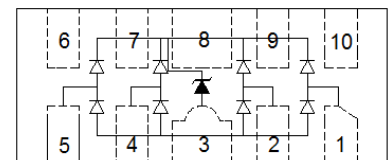
- ✧ DFN2510-10L package
- ✧ Molding compound flammability rating: UL 94V-0
- ✧ Quantity per reel: 3,000pcs
- ✧ Lead finish: lead free
- ✧ Marking code: 3324P



DFN2510-10L



Pin configuration



Top view

**ABSOLUTE MAXIMUM RATINGS** ( $T_A=25^{\circ}\text{C}$ , RH=45%-75%, unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak pulse power dissipation on 8/20 $\mu\text{s}$ waveform	$P_{PP}$	70	W
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	$V_{ESD}$	$\pm 10$ $\pm 10$	kV
Lead soldering temperature	$T_L$	260 (10 sec.)	$^{\circ}\text{C}$
Operating junction temperature range	$T_J$	-55 to +125	$^{\circ}\text{C}$
Storage temperature range	$T_{STG}$	-55 to +150	$^{\circ}\text{C}$

**ELECTRICAL CHARACTERISTICS** ( $T_A=25^{\circ}\text{C}$ )

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse working voltage	$V_{RWM}$	I/O to GND			3.3	V
Reverse breakdown voltage	$V_{BR}$	I/O to GND@ $I_T=1\text{mA}$	4		10	V
Reverse leakage current	$I_R$	I/O to GND @ $V_{RWM}=3.3\text{V}$			0.1	$\mu\text{A}$
Clamping voltage	$V_C^{①}$	$I_{PP}=4\text{A}$ , $t_P=100\text{ns}$		6.5		V
		$I_{PP}=16\text{A}$ , $t_P=100\text{ns}$		9.0		V
Dynamic resistance	$R_{DYN}^{①}$	$t_P=100\text{ns}$		0.23		$\Omega$
Clamping voltage	$V_C^{②}$	$I_{PP}=1\text{A}$ , $t_P=8/20\mu\text{s}$		5.5	6.5	V
		$I_{PP}=5\text{A}$ , $t_P=8/20\mu\text{s}$		7.5	8.5	V
		$I_{PP}=7\text{A}$ , $t_P=8/20\mu\text{s}$		9	10.5	V
Junction capacitance	$C_J$	$V_{RWM}=0\text{V}$ , $f=1\text{MHz}$ I/O pin to GND		0.5	0.6	pF
		$V_{RWM}=0\text{V}$ , $f=1\text{MHz}$ Between I/O pins		0.25	0.35	pF

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

② Non-repetitive current pulse, according to IEC61000-4-5.

RATINGS AND V-I CHARACTERISTICS CURVES (T<sub>A</sub>=25°C, unless otherwise noted)

FIG.1: V- I curve characteristics (Uni-directional)

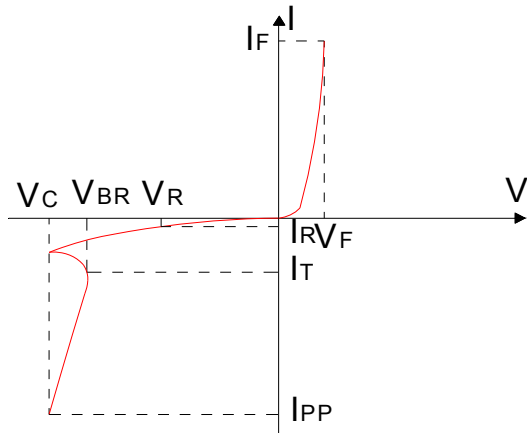


FIG.2: Pulse waveform (8/20µs)

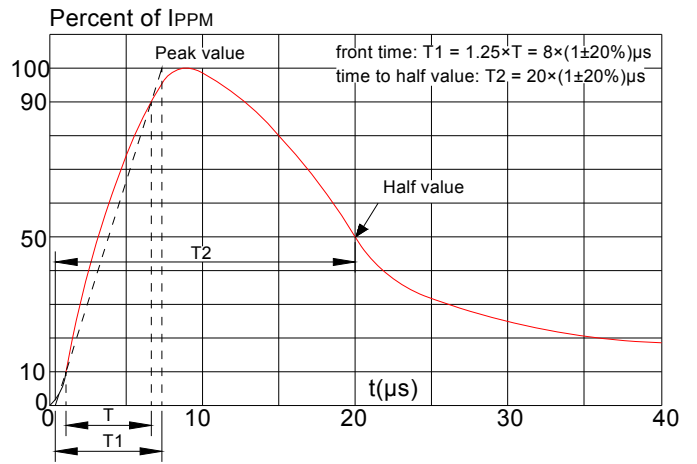


FIG.3: Pulse derating curve

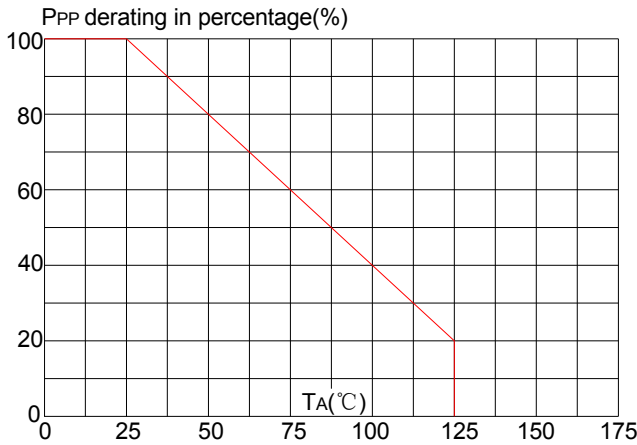


FIG.4: ESD clamping (10KV contact)

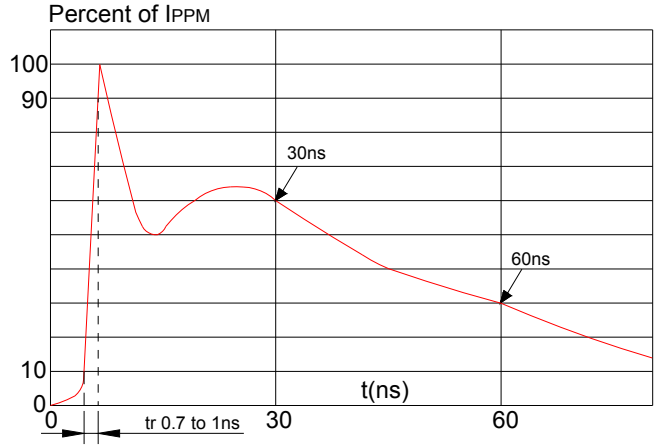
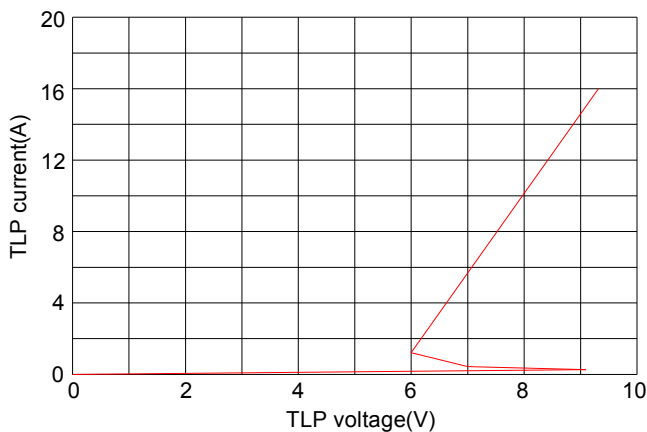
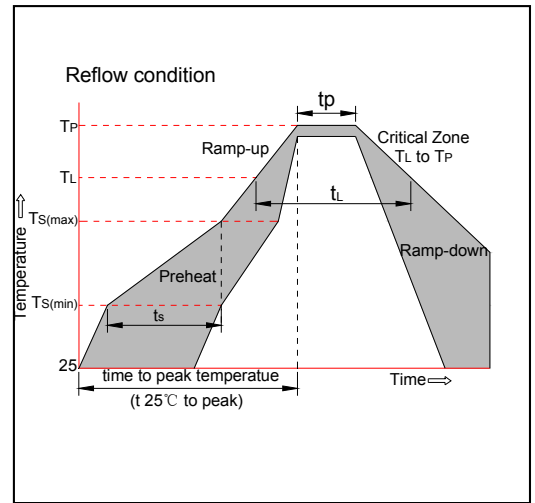


FIG.5: TLP testing of I/O to GND

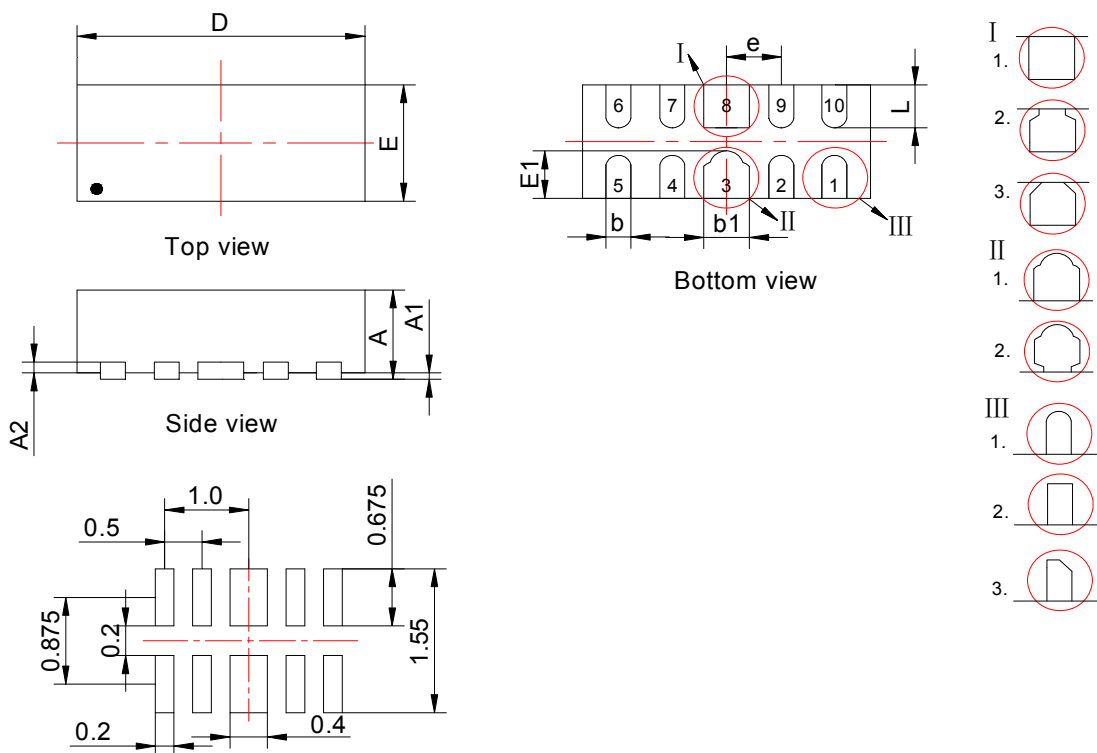


**SOLDERING PARAMETERS**

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



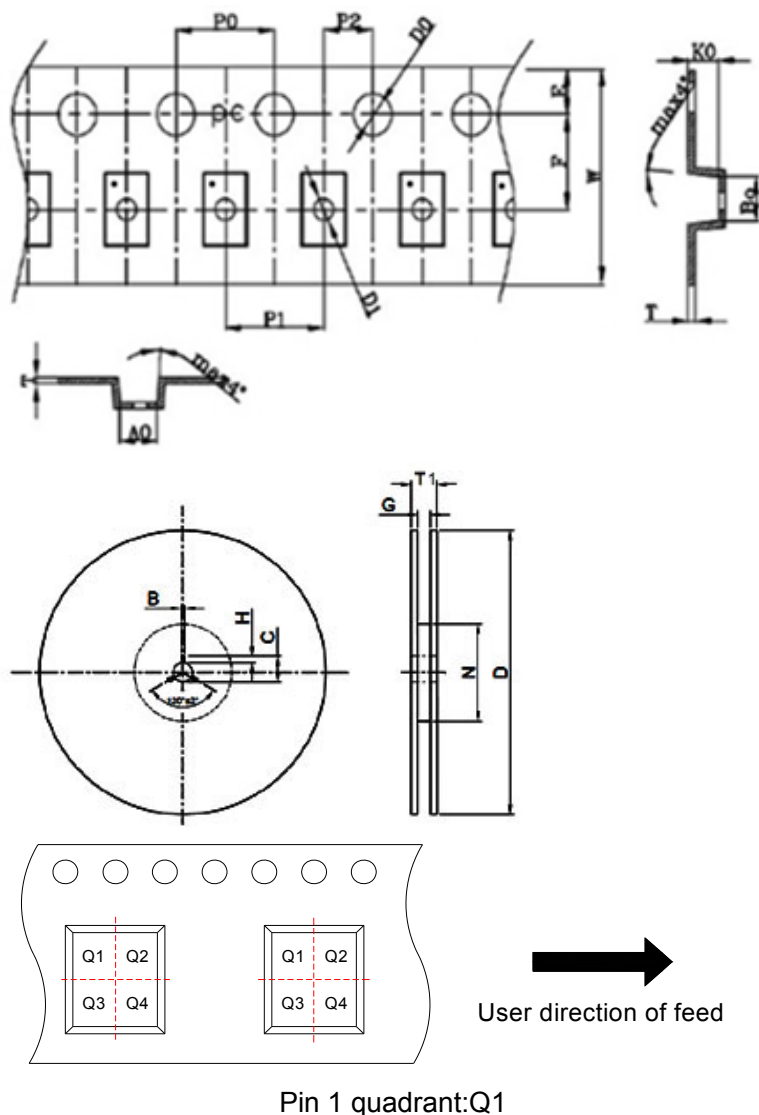
PACKAGE MECHANICAL DATA



Recommended soldering footprint

Symbol	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.46	0.53	0.60	0.018	0.021	0.024
A1	0.00	0.02	0.05	0.000	0.001	0.002
A2	0.15Ref.			0.006Ref.		
b	0.15	0.20	0.25	0.006	0.008	0.010
b1	0.35	0.40	0.45	0.014	0.016	0.018
D	2.40	2.50	2.60	0.094	0.098	0.102
E	0.90	1.00	1.10	0.035	0.039	0.043
E1	0.30	0.40	0.56	0.012	0.016	0.022
e	0.50BSC			0.020BSC		
L	0.30	0.40	0.45	0.012	0.016	0.018

**TAPE AND REEL INFORMATION-DFN2510-10L**




Symbol	Dimensions	
	Millimeters	Inches
	Typ.	Typ.
A0	1.20	0.047
B0	2.75	0.108
K0	0.70	0.028
P0	4.00	0.157
P1	4.00	0.157
P2	2.00	0.079
T	0.20	0.008
E	1.75	0.069
F	3.50	0.138
D0	1.55	0.061
D1	0.60	0.024
W	8.0	0.315
B	2.0	0.079
H	4.0	0.157
C	13.0	0.512
G	8.4	0.331
T1	14.9(max)	0.587(max)
N	60.0	2.362
D	178.0	7.000

**ORDERING INFORMATION**

Part Number	Package	Quantity Per Reel (PCS)	Reel Size
JEU3324P	DFN2510-10L	3,000	7 Inch

**MARKING CODE**

Part Number	Marking Code
JEU3324P	

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