

4 - Channel ESD Protection Diode for USB Type-C and HDMI 2.0

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#### **Features**

- ◆ Ultra low capacitance: 0.25 pF typical (I/O to I/O)
- Ultra low leakage: nA level
- ◆ Breakdown Voltage: 5.5 V (Minimum)
- Low clamping voltage
- ♦ Complies with following standards:
  - IEC 61000-4-2 (ESD) immunity test

Air discharge: ±20kV

Contact discharge: ±15kV

- IEC61000-4-4 (EFT) 80A (5/50ns)
- IEC61000-4-5 (Lightning) : 4 A(8/20µs)
- ROHS Compliant

**Ordering Information** 

Part Number	<b>Qty per Reel</b>	Reel Size	
TPD4E02B04DQAR-TP	3000	7"	

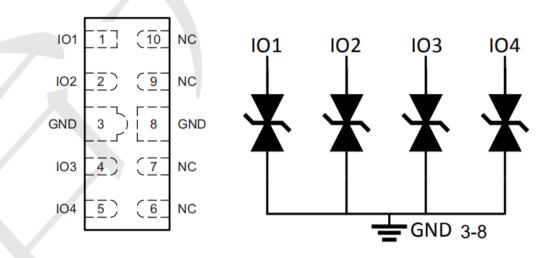
## **Mechanical Characteristics**

- ◆ Package: DFN2510-10 (2.5×1.0×0.5mm)
- ♦ Ultra low leakage: nA level
- ◆ Case Material: "Green" Molding Compound.
- ◆ UL Flammability Classification Rating 94V-0
- ♦ Moisture Sensitivity: Level 3 per J-STD-020
- ◆ Terminal Connections: See Diagram Below

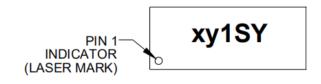
# **Applications**

- End Equipment
- ♦ Laptops and Desktops
- Set-Top Boxes
- ◆ TV and Monitors
- Mobile and Tablets

## **Dimensions and Pin Configuration**



## Marking:



1SY = Device code xy = Month code



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### Absolute Maximum Ratings (Tamb=25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20µs)	Ppk	60	W
Peak Pulse Current (8/20µs)	IPP	4	А
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	VESD	± 20 ± 15	kV
Operating Temperature Range	Tu	-55 to +125	°C
Storage Temperature Range	Tstg	-55 to +150	°C

#### Electrical Characteristics (TA=25°C unless otherwise specified)

Parameter	Symbol	Min	Тур	Max	Unit	Test Condition
Reverse Working Voltage	VRWM	-3.6		3.6	V	IIO < 10 nA
Breakdown Voltage	VBR	5.5	6.4	7.5	V	IT = 1mA, any I/O pin to ground
Breakdown Voltage	VBR	-5.5	-6.4	-7.5	V	IT = 1mA, any ground pin to I/O
Reverse Leakage Current	I <sub>R</sub>			10	nA	VIO=±2.5V any I/O pin to ground
Dynamic resistance	RDYN		0.47		Ω	any I/O pin to ground
Clamping Voltage	Vc		7.2		V	IPP = 1A (8 x 20µs pulse), any I/O pin to ground
Clamping Voltage	Vc		9		V	IPP = 4A (8 x 20µs pulse), any I/O pin to ground
Junction Capacitance	Cı		0.25	0.4	pF	VR = 0V, f = 1MHz, between I/O pins



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#### **Characteristic Curves**

Fig1. 8/20µs Pulse Waveform

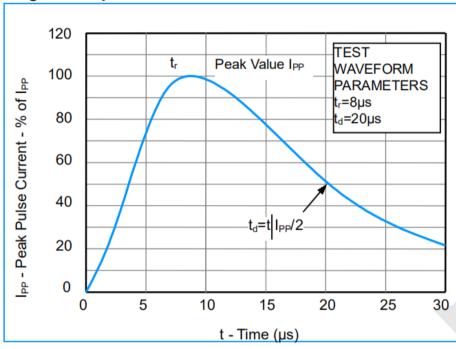
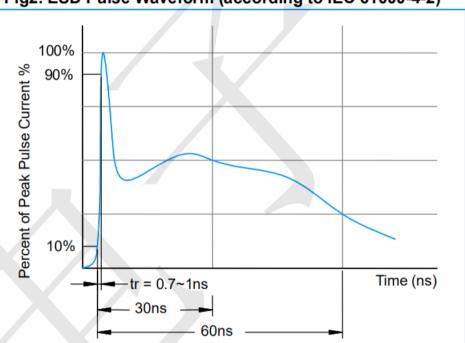
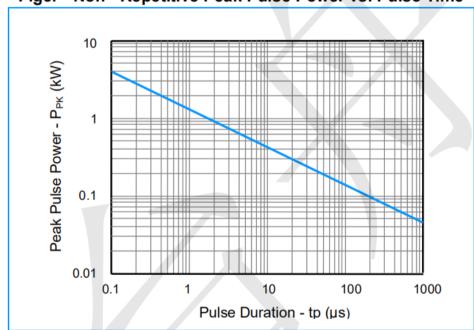


Fig2. ESD Pulse Waveform (according to IEC 61000-4-2)





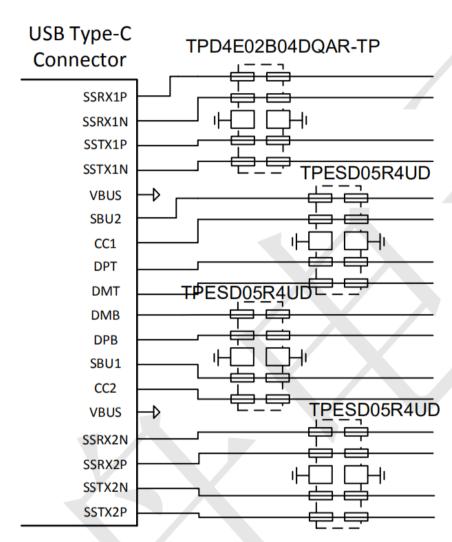




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## **Application Information**



USB 3.1 Gen 2 Type-C ESD Schematic

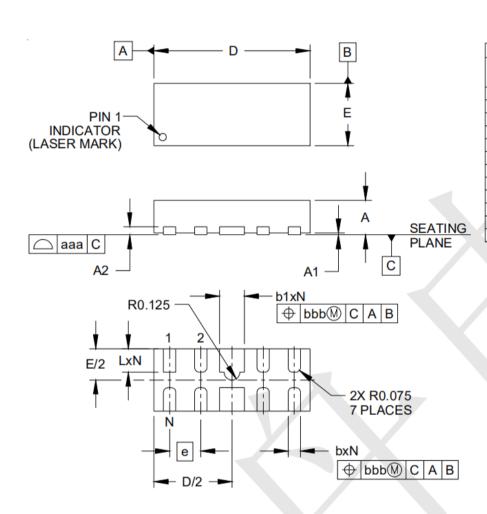




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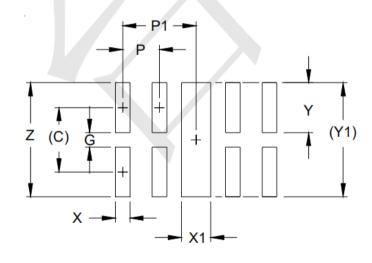
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# **Outline Drawing - DFN2510-10**



DIMENSIONS						
INCHES		MILLIMETERS				
DIM	MIN	NOM	MAX	MIN	NOM	MAX
Α	.020	.023	.026	0.50	0.58	0.65
A1	0.00	.001	.002	0.00	0.03	0.05
A2		(.005)			(0.13)	
b	.006	.008	.010	0.15	0.20	0.25
b1	.014	.016	.018	0.35	0.40	0.45
D	.094	.098	.102	2.40	2.50	2.60
Е	.035	.039	.043	0.90	1.00	1.10
е	.020 BSC			0.50 BSC		
L	.012	.015	.017	0.30	0.38	0.425
N	8				8	
aaa	.003				0.08	
bbb	.004				0.10	

### Land Pattern - DFN2510-10



DIMENSIONS				
DIM	INCHES	MILLIMETERS		
С	(.034)	(0.875)		
G	.008	0.20		
Р	.020	0.50		
P1	.039	1.00		
X	.008	0.20		
X1	.016	0.40		
Υ	.027	0.675		
Y1	(.061)	(1.55)		
Z	.061	1.55		