

1.Description

The TPD4E02B04DQAR is designed to protect voltage sensitive components from ESD and transient voltage events. Excellent clamping capability. Low leakage, and fast response time, make these parts ideal for ESD protection on designs where board space is at a premium.

2.Features

- IEC 61000-4-2 Level 4 ESD Protection
 - $\pm 12\text{kV}$ Contact Discharge
 - $\pm 17\text{kV}$ Air Discharge
- IEC 61000-4-4 EFT Protection
 - 40A (5/50ns)
- IEC 61000-4-5 Surge
 - 8A (8/20us)
- RoHS compliance
- Protecting four I/O lines
- Ultra-low Capacitance:0.6pF (Typical)
- Low clamping voltage
- Low leakage current
- Solid-state silicon technology

3.Applications

- HDMI/USB2.0
- Monitors and flat panel displays
- 10/100/1000 ethernet
- Notebook computers
- SIM ports
- ATM interface

4.Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Size
TPD4E02B04DQAR	DFN2510-10L	.3324P	Halogen free	Tape & Reel	3000 PCS	UL 94V-0	7 inches

Table-1 Ordering information

5.Pin Configuration and Functions

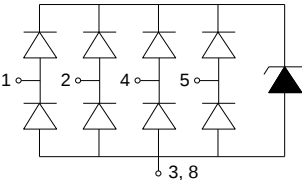
Pin	Name	Description	Outline (PODA)	Circuit Diagram
1,2,4,5	IO	Connect to IO	Note 1 	
3,8	GND	Connect to GND		
Others	NC	No Connection		

Table-2 Pin configuration

Note1:

This diagram is only an electrical schematic, and the actual pin size is based on POD.

6.Specification

6.1. Absolute Maximum rating

Over operating free-air temperature range (unless otherwise noted)

Parameters	Symbol	Min.	Max.	Unit
Peak pulse power (tp=8/20us)@25°C	P _{pk}	-	120	W
Peak pulse current (tp=8/20us)@25°C	I _{PP}		8	A
ESD (IEC61000-4-2 air discharge) @25°C	V _{ESD}	-	±17	kV
ESD (IEC61000-4-2 contact discharge) @25°C	V _{ESD}	-	±12	kV
Junction temperature	T _J	-	150	°C
Operating temperature	T _{OP}	-40	125	°C
Storage temperature	T _{STG}	-55	150	°C
Lead temperature	T _L	-	260	°C

Table-3 Absolute Maximum rating

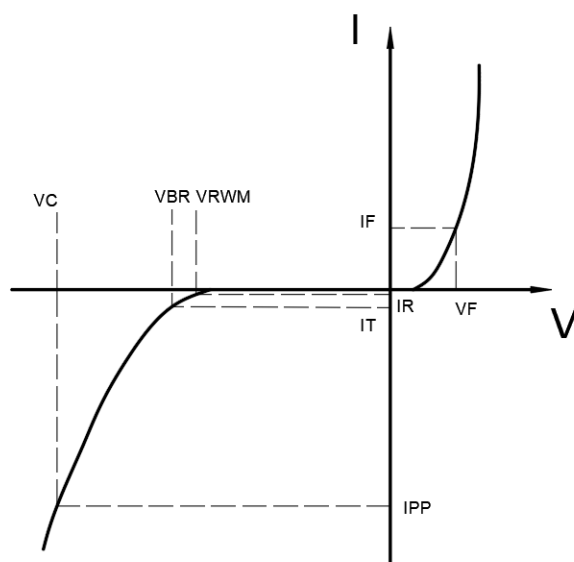
6.2. Eletrical Characteristics

At TA = 25°C unless otherwise noted

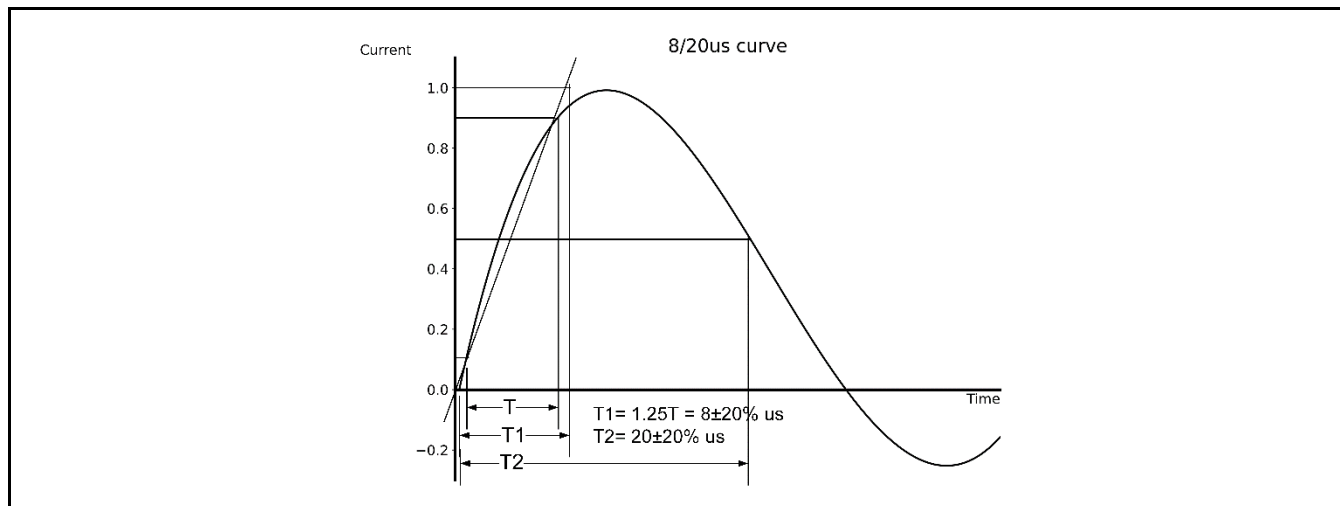
Parameters	Symbol	conditions	Min.	Typ.	Max.	Unit
Reverse stand-off voltage	V_{RWM}				3.3	V
Reverse Breakdown Voltage	V_{BR}	$I_T = 1mA$	4.0			V
Reverse Leakage Current	I_R	$V_{RWM} = 3.3V$			1	uA
Clamping Voltage	V_{CL}	$I_{PP} = 1A$; TP=8/20us		6.0	9.0	V
Clamping Voltage	V_{CL}	$I_{PP} = 8A$; TP=8/20us		12.0	15.0	V
Junction capacitance	C_J	I/O pins to ground; $V_R = 0V$; $f = 1MHz$		0.6	1.0	pF
		Between I/O pins; $V_R = 0V$; $f = 1MHz$		0.3	0.5	

Table-4 Electrical Characteristics

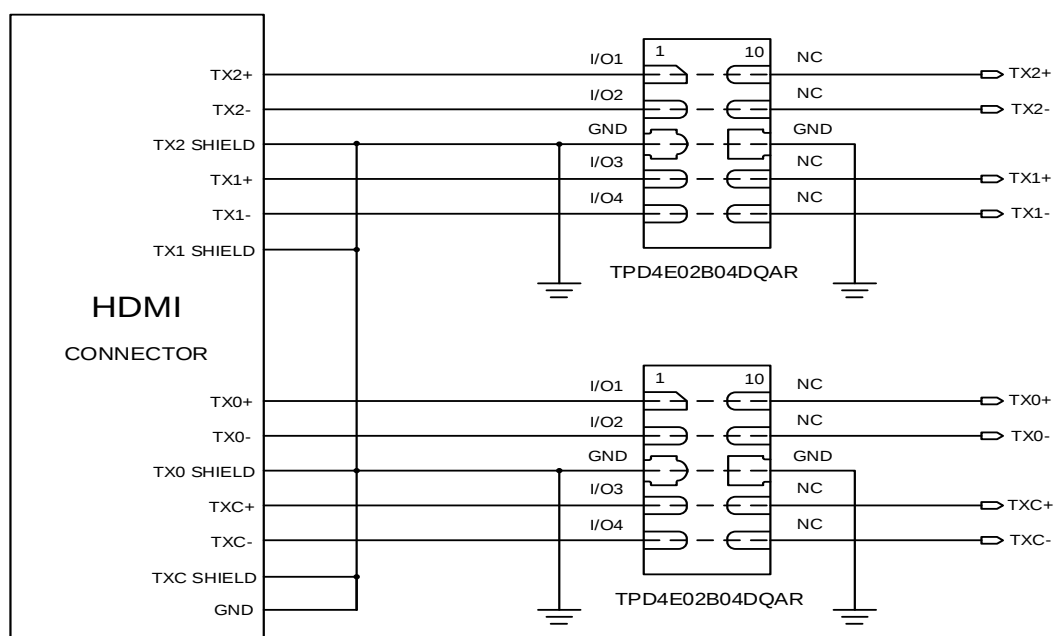
Symbol	Parameters
V_{RWM}	Peak Reverse Working Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Voltage @ I_T
I_T	Test Current
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
I_F	Forward Current
V_F	Forward Voltage @ I_F



7. Typical Characteristic



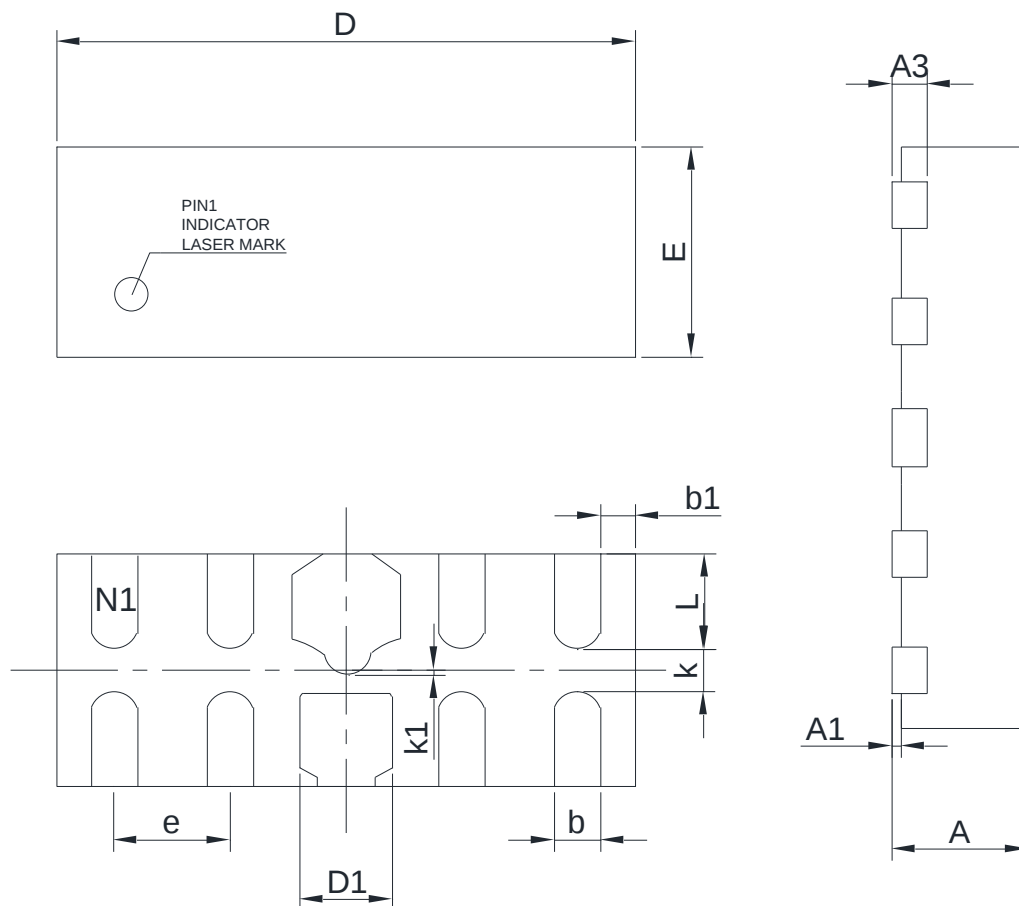
8. Typical Application



Typical HDMI Interface Application

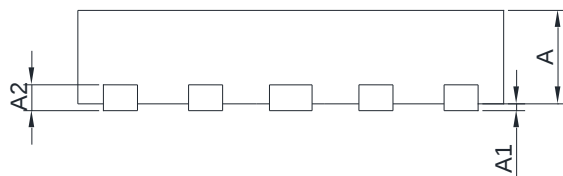
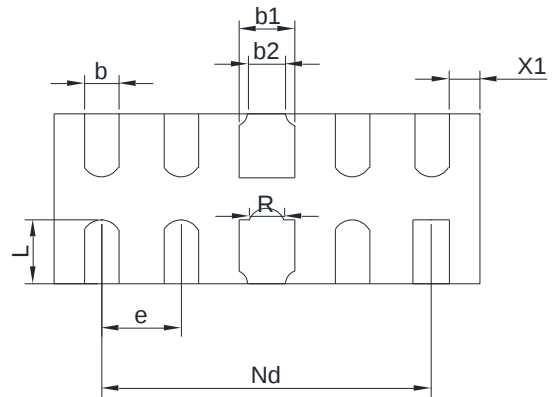
9.Dimension (DFN2510-10L)

POD A(C)



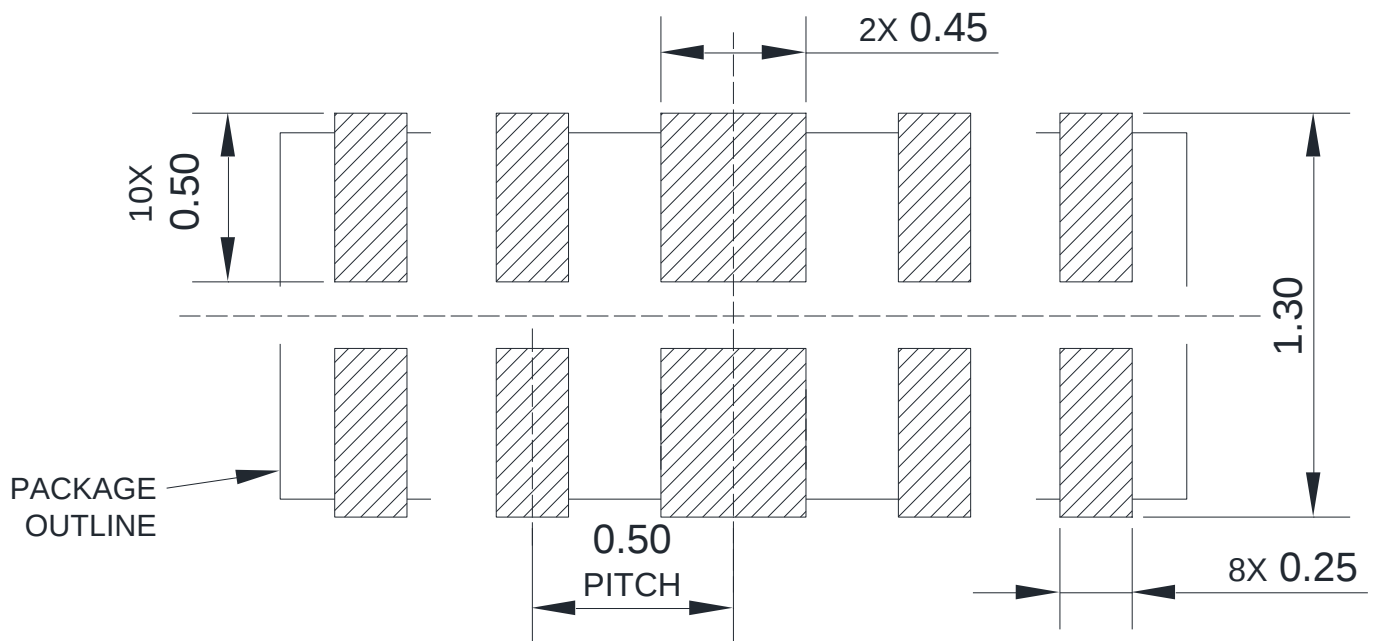
Dimensions in Millimeter							
Symbol	Min.	Nom.	Max.	Symbol	Min.	Nom.	Max.
A	0.450	0.500	0.550	D	2.450	2.500	2.550
A1	0.000	0.025	0.050	E	0.950	1.000	1.050
A3	0.110 REF			e	0.500 TYP		
b	0.180	0.220	0.260	k1	0.060	0.080	0.100
b1	0.100	0.150	0.200	L	0.350	0.400	0.450
D1	0.350	0.400	0.450	K	0.210	0.220	0.230

POD B(A)



Dimensions in Millimeter(mm)					
SYMBOL	MIN	MAX	SYMBOL	MIN	MAX
A	0.50	0.60	b2	0.20REF	
A1	0.00	0.05	D	2.45	2.55
A2	0.15REF		E	0.95	1.05
b	0.15	0.25	L	0.33	0.43
b1	0.35	0.45	e	0.50BSC	
Nd	2.00BSC		X1	0.22	0.28

10.Recommended Soldering Footprint



DIMENSIONS: MILLIMETERS

Flow (wave) soldering (solder dipping)

Product	Peak Temperature	Dipping Time
Pb device	245°C±5°C	5sec±1sec
Pb-Free device	260°C+0/-5°C	5sec±1sec



This integrated circuit can be damaged by ESD. BYSEMI Corporation recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedure can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.