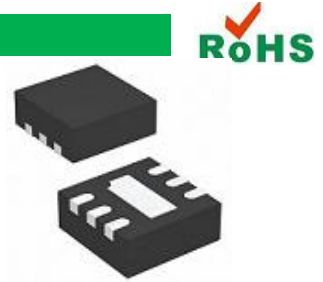


## Ultra Low Capacitance TVS Diode Array

### APPLICATION

- ◆ USB 2.0 and USB OTG



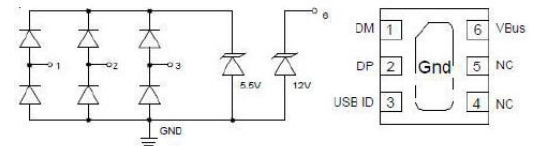
### IEC COMPATIBILITY

Package: DFN1616-6

- ◆ IEC61000-4-2 (ESD)  $\pm 25$ kV (air),  $\pm 20$ kV (contact)
- ◆ IEC61000-4-4 (EFT) 40A (5/50ns)

### FEATURES

- ◆ Ultra low capacitance: 0.4pF typical (I/O to I/O)
- ◆ Ultra low leakage: nA level
- ◆ Working voltage: 12V
- ◆ Low clamping voltage
- ◆ Up to 3 data lines and one power line protects



Circuit Diagram

Pin Schematic

### Electrical Characteristics

Parameter	Symbol	Value	Unit
DP, DM, USB ID (Pins1, 2, 3)			
Peak Pulse Power (tp=8/20 $\mu$ s waveform)	P <sub>pp</sub>	100	W
Peak Pulse Current (8/20 $\mu$ s)	I <sub>pp</sub>	5	A
ESD per IEC 61000-4-2 (Air)	V <sub>ESD</sub>	$\pm 25$	kV
ESD per IEC 61000-4-2 (Contact)		$\pm 20$	
Operating Temperature Range	T <sub>J</sub>	-55 to +125	°C
Storage Temperature Range	T <sub>stg</sub>	-55 to +150	°C
VBus (Pin 6)			
Peak Pulse Power (tp=8/20 $\mu$ s waveform)	P <sub>pp</sub>	300	W
Peak Pulse Current (8/20 $\mu$ s)	I <sub>pp</sub>	12	A
ESD per IEC 61000-4-2 (Air)	V <sub>ESD</sub>	$\pm 25$	kV
ESD per IEC 61000-4-2 (Contact)		$\pm 20$	
Operating Temperature Range	T <sub>J</sub>	-55 to +125	°C
Storage Temperature Range	T <sub>stg</sub>	-55 to +150	°C

Ultra Low Capacitance TVS Diode Array



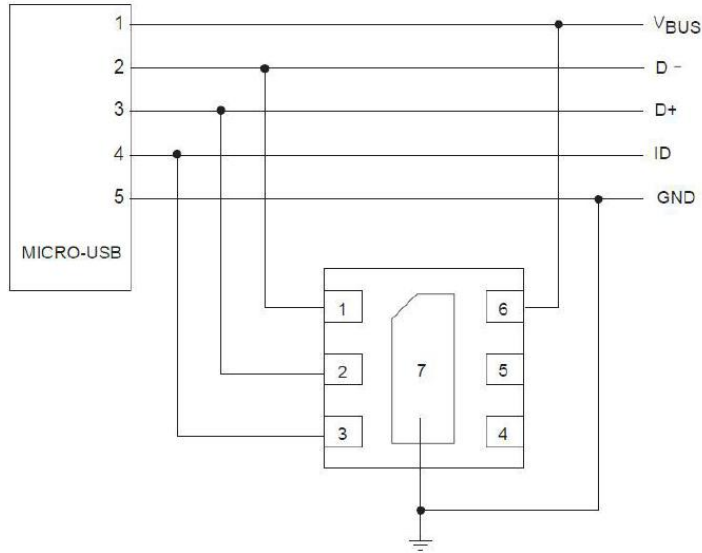
Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
DP, DM, USB ID TVS						
Reverse Working Voltage	$V_{RWM}$			5.5	V	Any I/O to GND
Breakdown Voltage	$V_{BR}$	6.5			V	$I_T = 1\text{mA}$ , any I/O to GND
Reverse Leakage Current	$I_R$			0.5	$\mu\text{A}$	$V_{RWM} = 5.5\text{V}$ , any I/O to GND
Clamping Voltage	$V_C$			10	V	$I_{PP} = 1\text{A}$ (8 x 20 $\mu\text{s}$ pulse) any I/O pin to ground
Clamping Voltage	$V_C$			20	V	$I_{PP} = 5\text{A}$ (8 x 20 $\mu\text{s}$ pulse) any I/O pin to ground
Junction Capacitance	$C_J$		0.4	0.5	pF	$V_R = 0\text{V}$ , $f = 1\text{MHz}$ , I/O to I/O
Junction Capacitance	$C_J$		0.6	0.8	pF	$V_R = 0\text{V}$ , $f = 1\text{MHz}$ , I/O to GND

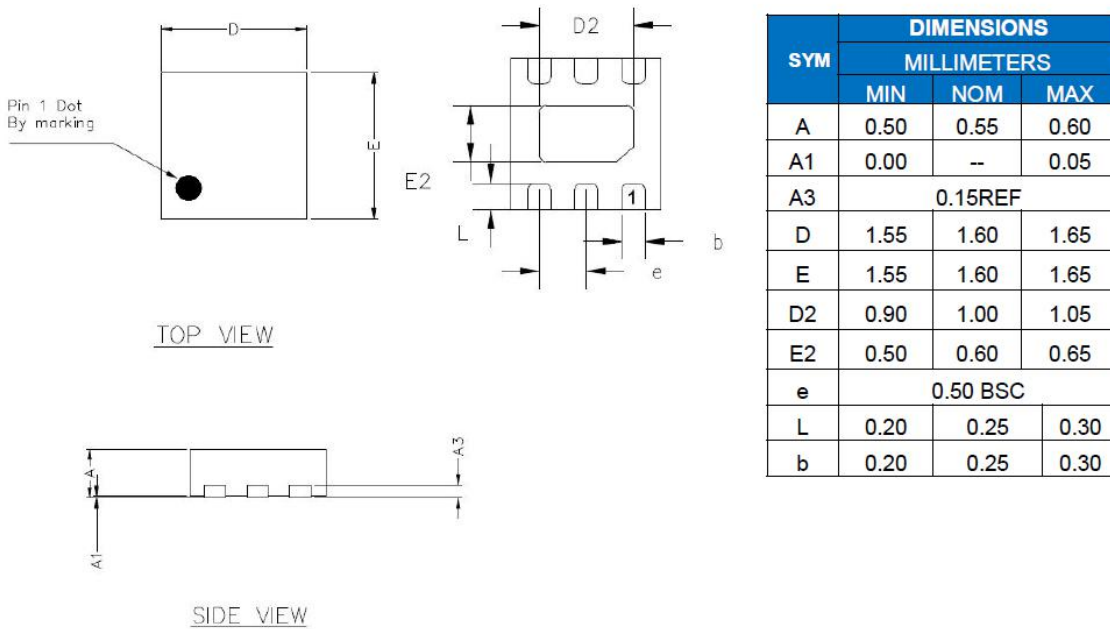
Note: I/O Pins are 1, 2, 3

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
VBus TVS						
Reverse Working Voltage	$V_{RWM}$			12	V	Pin 6 to Gnd
Breakdown Voltage	$V_{BR}$	13.3		18	V	$I_T = 1\text{mA}$ , Pin 6 to Gnd
Reverse Leakage Current	$I_R$			0.2	$\mu\text{A}$	$V_{RWM} = 12\text{V}$ , Pin 6 to Gnd
Clamping Voltage	$V_C$			18	V	$I_{PP} = 1\text{A}$ (8 x 20 $\mu\text{s}$ pulse) Pin 6 to Gnd
Clamping Voltage	$V_C$			25	V	$I_{PP} = 12\text{A}$ (8 x 20 $\mu\text{s}$ pulse) Pin 6 to Gnd
Junction Capacitance	$C_J$			100	pF	$V_R = 0\text{V}$ , $f = 1\text{MHz}$ , Pin 6 to Gnd

on USB Port Application



Package Mechanical Data



Ordering Information

Part Number	Qty per Reel	Reel Size	Package	Delivery Time
<b>HAH1214P3</b>	3000pcs	7inch	DFN1616-6	7days