

Description

The AR1203P3 is a low capacitance TVS array, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting voltage sensitive high-speed data lines. The AR1203P3 complies with the IEC 61000-4-2 (ESD) with $\pm 25\text{kV}$ air and $\pm 20\text{kV}$ contact discharge. It is assembled into a 6-pin DFN1616-6 lead-free package. Each device will protect up to four high-speed lines. The combination of small size, low capacitance, and high surge capability makes them ideal for use in applications such as USB ports.

Features

- Low capacitance: 0.4pF typical (I/O to I/O)
- Ultra low leakage: nA level
- Low operating voltage: 5V
- Low clamping voltage
- Up to 3 data lines and one power line protects
- Complies with following standards:
 - IEC 61000-4-2 (ESD) immunity test
 - Air discharge: $\pm 25\text{kV}$
 - Contact discharge: $\pm 20\text{kV}$
- RoHS Compliant

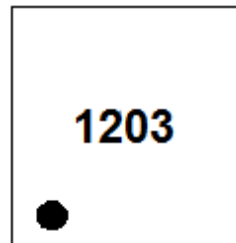
Mechanical Characteristics

- Package: DFN1616-6
- Case Material: "Green" Molding Compound
- Terminal Connections: See Diagram Below
- Marking Information: See Below

Applications

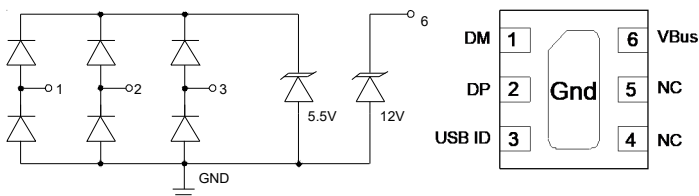
- USB 2.0
- USB OTG

Marking Information



1203 = Device Marking Code
 Dot denotes Pin1

Dimensions and Pin Configuration



Circuit Diagram

Pin Schematic

Ordering Information

Part Number	Packaging	Reel Size
AR1203P3	3000/Tape & Reel	7 inch

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
DP, DM, USB ID (Pins 1, 2, 3)			
Peak Pulse Power (8/20 μs)	Ppk	100	W
Peak Pulse Current (8/20 μs)	I _{PP}	5	A
ESD per IEC 61000-4-2 (Air)	VESD	± 25	kV
ESD per IEC 61000-4-2 (Contact)		± 20	
Operating Temperature Range	T _J	-55 to +125	$^{\circ}\text{C}$
Storage Temperature Range	T _{stg}	-55 to +150	$^{\circ}\text{C}$
VBus (Pin 6)			
Peak Pulse Power (8/20 μs)	Ppk	300	W
Peak Pulse Current (8/20 μs)	I _{PP}	12	A
ESD per IEC 61000-4-2 (Air)	VESD	± 25	kV
ESD per IEC 61000-4-2 (Contact)		± 20	
Operating Temperature Range	T _J	-55 to +125	$^{\circ}\text{C}$
Storage Temperature Range	T _{stg}	-55 to +150	$^{\circ}\text{C}$

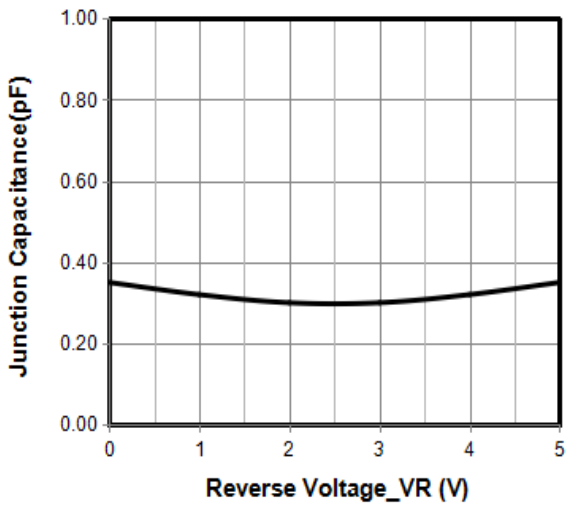
Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

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 ground
Breakdown Voltage	V _{BR}	6.5			V	I _T = 1mA, any I/O to ground
Reverse Leakage Current	I _R			0.5	μA	V _{RWM} = 5.5V, any I/O to ground
Clamping Voltage	V _C			10	V	I _{PP} = 1A (8 x 20 μs pulse), any I/O pin to ground
Clamping Voltage	V _C			20	V	I _{PP} = 5A (8 x 20 μs pulse), any I/O pin to ground
Junction Capacitance	C _J			0.5	pF	V _R = 0V, f = 1MHz, between I/O pins
Junction Capacitance	C _J			0.8	pF	V _R = 0V, f = 1MHz, any I/O pin to ground

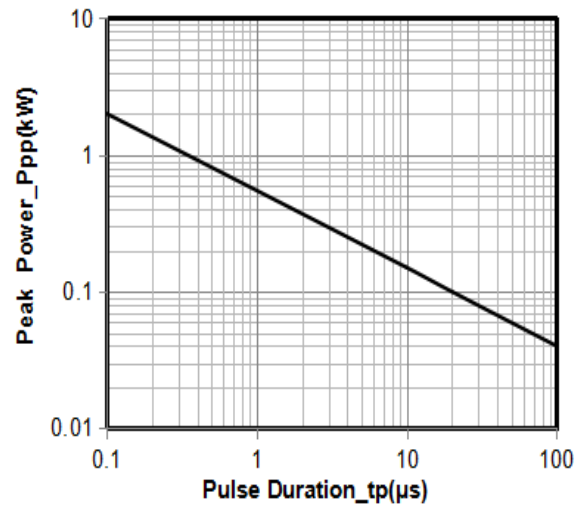
Note: I/O Pins are 1, 2, 3

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
VBus TVS						
Reverse Working Voltage	VRWM			12	V	Pin 6 to ground
Breakdown Voltage	VBR	13.3		18	V	IT = 1mA, pin 6 to ground
Reverse Leakage Current	IR			0.2	μA	VRWM = 12V, pin 6 to ground
Clamping Voltage	VC			18	V	I _{PP} = 1A (8 x 20μs pulse), pin 6 to ground
Clamping Voltage	VC			25	V	I _{PP} = 12A (8 x 20μs pulse), pin 6 to ground
Junction Capacitance	CJ			100	pF	VR = 0V, f = 1MHz, pin 6 to ground

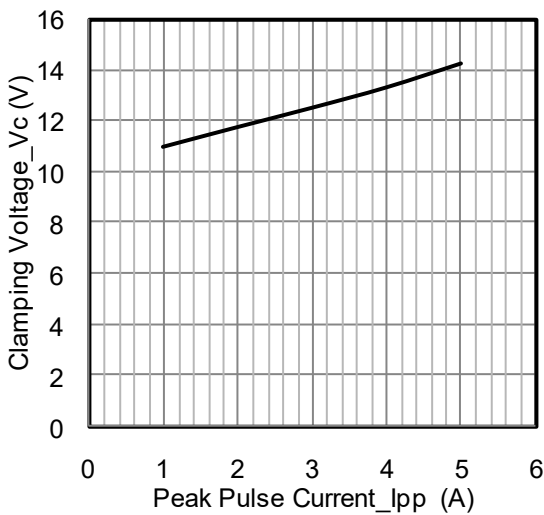
Typical Performance Characteristics ($T_A=25^\circ\text{C}$ unless otherwise Specified)



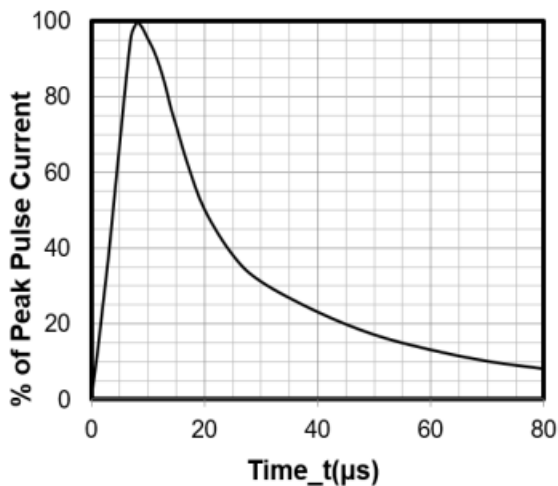
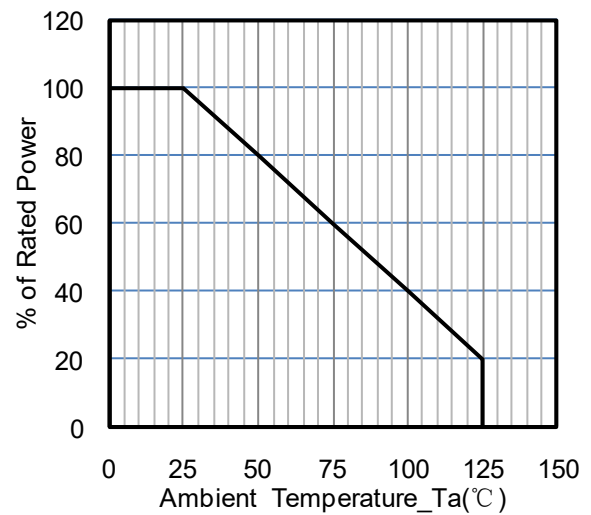
Junction Capacitance vs. Reverse Voltage



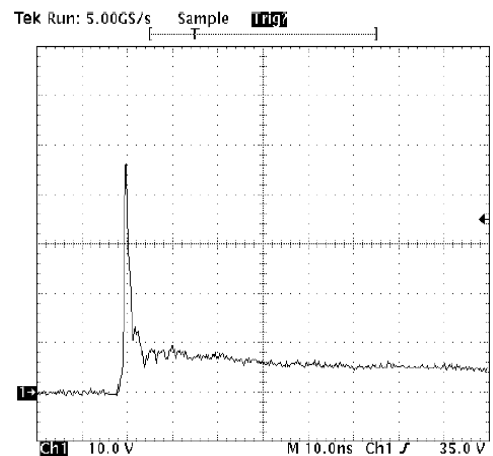
Peak Pulse Power vs. Pulse Time



Clamping Voltage vs. Peak Pulse Current



8 X 20μs Pulse Waveform

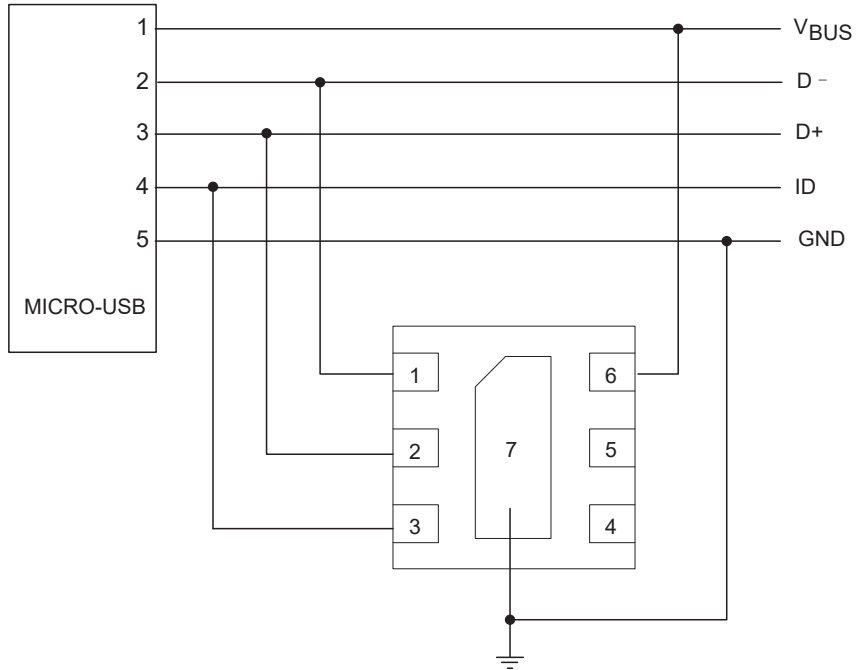


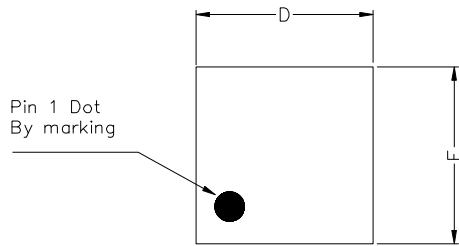
Note: Data is taken with a 10x attenuator

ESD Clamping Voltage

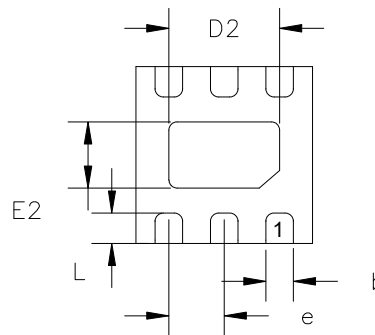
8 kV Contact per IEC61000-4-2

AR1203P3 on USB Port Application

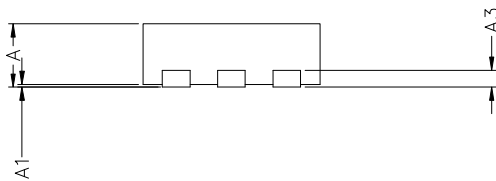


DFN1616-6 Package Outline Drawing


TOP VIEW

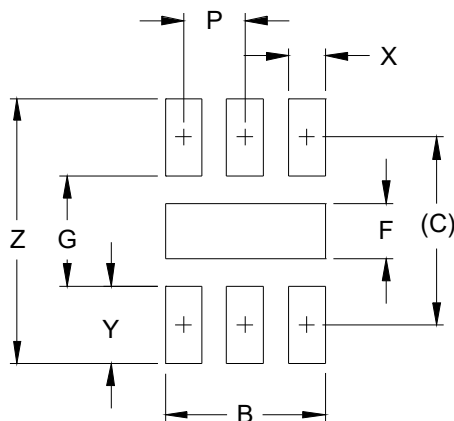


BOTTOM VIEW



SIDE VIEW

COMMON DIMENSIONS(MM)			
PKG. REF.	UT: ULTRA THIN		
	MIN.	NOM.	MAX.
A	0.50	0.55	0.60
A1	0.00	-	0.05
A3	0.15 REF.		
D	1.55	1.60	1.65
E	1.55	1.60	1.65
D2	0.90	1.00	1.05
E2	0.50	0.60	0.65
L	0.20	0.25	0.30
b	0.20	0.25	0.30
e	0.50 BSC		

Suggested Land Pattern


DIMENSIONS		
DIM	INCHES	MILLIMETERS
B	.051	1.30
C	.060	1.52
P	.020	0.50
F	.018	0.45
G	.035	0.89
X	.012	0.30
Y	.025	0.63
Z	.085	2.15

Contact In-

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