TRCLAMP1265P

Low Capacitance Surge Protection for USB Interfaces

Features

- Low operating voltage: I/O(5V),VBS(13.5V)
- Ultra low capacitance: I/O(0.3pF,Typ)
- Ultra low leakage: nA level
- Low clamping voltage
- –IEC 61000-4-2 (ESD) immunity test
  Air discharge: ±30kV
  Contact discharge: ±30kV
  –IEC61000-4-4 (EFT) 40A (5/50ns)
  –IEC61000-4-5 (Lightning) (8/20μs)
  I/O(4A),VBS(160A)
- 6-pin leadless package
- These are Pb−Free Devices
- Response Time is Typically < 1 ns

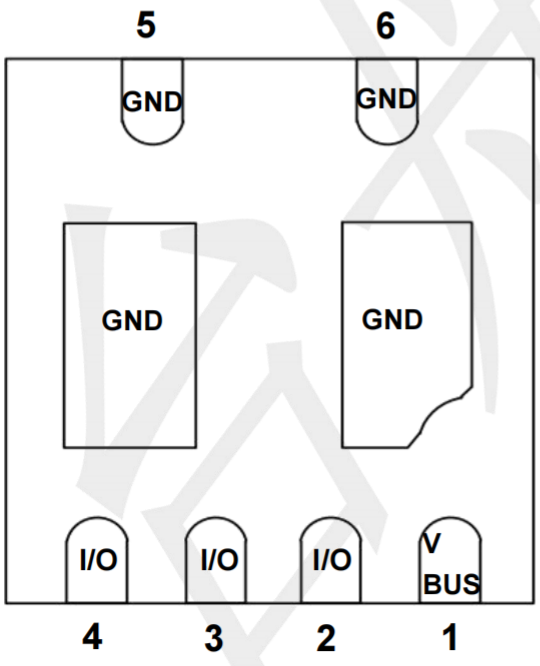
Mechanical Characteristics

- Package: DFN2018-6
- Lead Finish: Matte Tin
- Case Material: “Green” Molding Compound
- Terminal Connections: See Diagram Below
- -IEC 61000-4-2 (ESD) immunity test

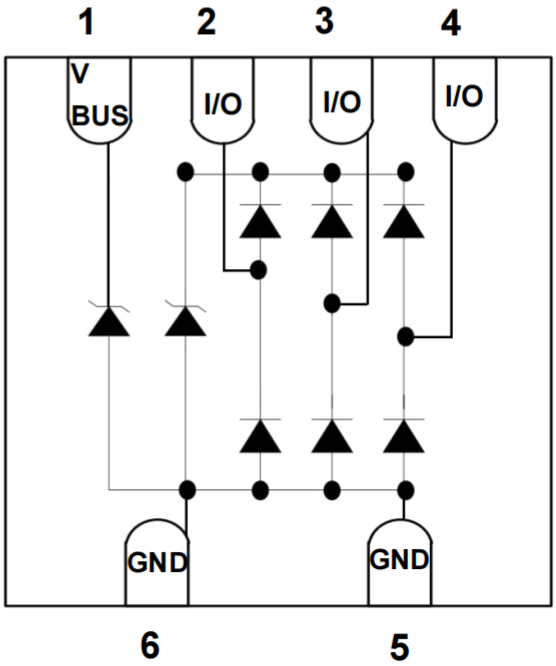
Applications

- Cellular Handsets and Accessories
- Personal Digital Assistants
- Notebooks and Handhelds
- Portable Instrumentation
- Protection for the VBUS circuit on USB2.0 Fast Charging

Dimensions and Pin Configuration



Bottom View



Top View

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

Parameter	Symbol	Value	Unit
Peak Pulse Current (8/20μs) VBUS (Pin 1)	Ipp	160	A
Peak Pulse Current (8/20μs) I/O (Pin 2-4)	Ipp	4	A
ESD per IEC 61000−4−2 (Air) ESD per IEC 61000−4−2 (Contact)	VESD	±30 ±30	KV
Operating Temperature Range	TJ	−55 to +125	°C
Storage Temperature Range	Tstg	−55 to +150	°C

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

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
USB V_{BUS} (Pin 1)						
Reverse Working Voltage	VRWM	--	--	13.5	V	
Breakdown Voltage	VBR	13.8	14.5	--	V	IT= 1mA,pin1 to ground
Forward Voltage	VF	--	0.7	1.0	V	IF=1mA, GND to Pin 1
Reverse Leakage Current	IR	--	--	1	uA	VRWM=13.5V
Clamping Voltage	VC	--	16.5	18	V	Ipp=30A(8x 20us pulse)
Clamping Voltage	VC	--	28	--	V	Ipp=160A(8x 20us pulse)
Junction Capacitance	CJ	--	1300	2500	pF	VR = 0V, f = 1MHz
I/O (Pin 2,3,4)						
Reverse Working Voltage	VRWM	--	--	5	V	
Breakdown Voltage	VBR	5.8	6.5	--	V	IT= 1mA,Pin 2, 3,4 to GND
Forward Voltage	VF	--	0.7	1.0	V	IF=1mA, GND to Pin 2,3,4
Reverse Leakage Current	IR	--	--	0.1	uA	VRWM=5V
Clamping Voltage	VC	--	--	10	V	Ipp=1A(8x 20us pulse)
Clamping Voltage	VC	--	--	12	V	Ipp=4A(8x 20us pulse)
Junction Capacitance	CJ	--	0.3	0.6	pF	VR = 0V, f = 1MHz

Characteristic Curves

Fig1. 8/20μs Pulse Waveform

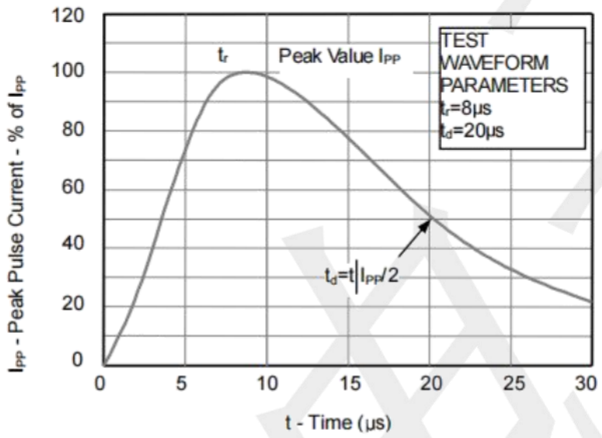


Fig2. ESD Pulse Waveform (according to IEC 61000-4-2)

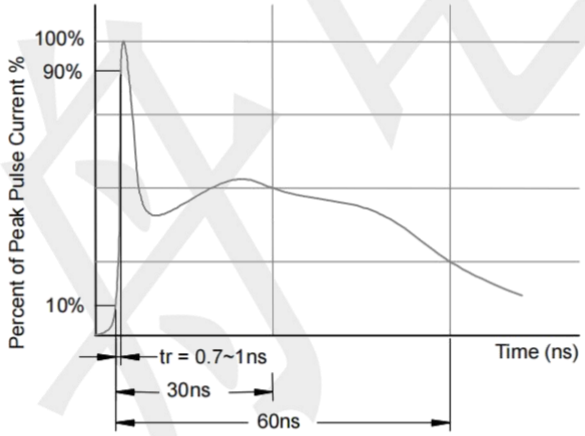
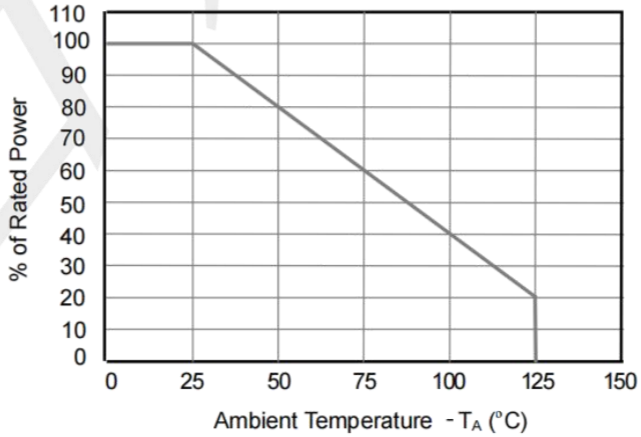
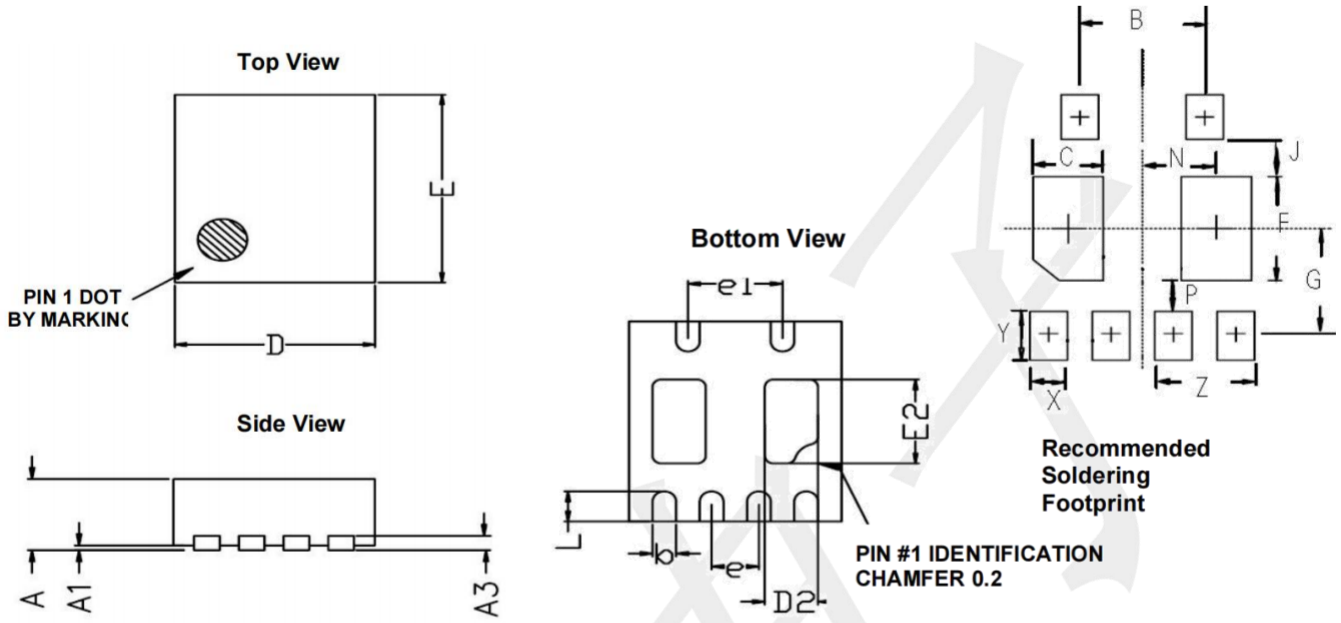


Fig3. Power Derating Curve



Package Outline & Dimensions DFN2018-6



Symbol	Millimeters			Inches		
	Min	Typ	Max	Min	Typ	Max
A	0.50	0.55	0.60	0.020	0.022	0.024
A1	0.00	-	0.05	0.000	-	0.002
A3		0.15Ref			0.006Ref	
D	1.75	1.80	1.85	0.069	0.071	0.073
E	1.95	2.00	2.05	0.077	0.079	0.081
b	0.15	0.20	0.25	0.006	0.008	0.010
L	0.20	0.30	0.40	0.008	0.012	0.016
D2	0.35	0.45	0.55	0.014	0.018	0.022
E2	0.74	0.84	0.94	0.029	0.033	0.037
e		0.40 BSC			0.016 BSC	
e1		0.80 BSC			0.031 BSC	
B		0.80 BSC			0.031 BSC	
C	0.35	0.45	0.55	0.014	0.018	0.022
F	0.81	0.84	0.87	0.032	0.033	0.034
G	0.82	0.85	0.88	0.032	0.033	0.034
J	0.24	0.25	0.26	0.010	0.010	0.010
N	0.47	0.48	0.49	0.018	0.019	0.020
P	0.24	0.25	0.26	0.010	0.010	0.010
X	0.23	0.24	0.25	0.009	0.009	0.009
Y	0.35	0.36	0.37	0.014	0.014	0.014
Z	0.62	0.64	0.66	0.024	0.025	0.026