



CHENMKO ENTERPRISE CO.,LTD

Ultra Low Capacitance ESD Protection Array
VOLTAGE 5 V

ULTVSFA5VESGP

Halogens free devices

Features

- ESD Protect for USB DP, DM, and ID Pins operating up to **5V**
- ESD Protect for USB VBus operating up to **28V**
- Provide transient protection for high-speed data lines to
IEC 61000-4-2 (ESD) $\pm 15\text{kV}$ (air), $\pm 12\text{kV}$ (contact)
IEC 61000-4-2 (EFT) 40A (5/50ns)
- Ultra low capacitance (**0.65pF typ.**) on DP, DM, and ID Pins
- Fast turn-on and Low clamping voltage
- Array of ESD rated diodes with internal equivalent TVS diode
- Small DFN package (1.6 x 1.6 x 0.45 mm) saves board space
- Solid-state silicon-avalanche and active circuit triggering technology

Applications

- **USB 2.0**
- **USB OTG**
- **Mobile Phones**
- **Hand Held Portable Applications**

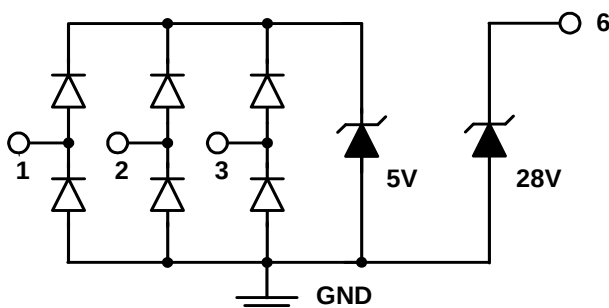
Description

ULTVSFA5VESFGP is a design which includes ESD rated diode arrays to protect high speed data interfaces. The ULTVSFA5VESGP has specifically designed to protect sensitive components which are connected to data and transmission lines from over-voltage caused by Electrostatic Discharging (ESD).

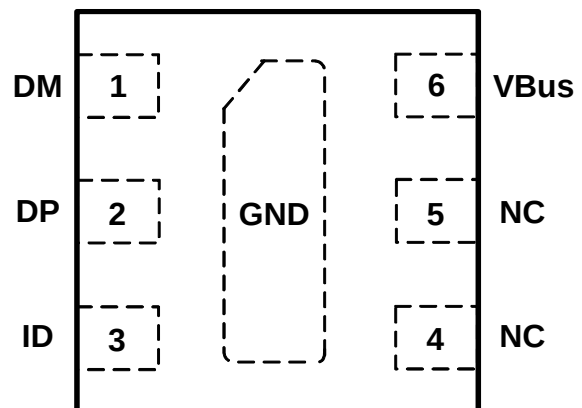
ULTVSFA5VESGP is specifically designed to protect portable devices that utilize the USB port for battery charging. The unique design which includes low capacitance steering diodes and a clamping cell which is an equivalent TVS diode for protection of the USB data (DP, DM) and USB ID pins operating up to 5 volts. In addition, a separate clamping cell which is an equivalent TVS diode is designed for protection of the USB voltage bus (VBus) operating up to 28V.

ULTVSFA5VESGP may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 ($\pm 15\text{kV}$ air, $\pm 8\text{kV}$ contact discharge).

Circuit Diagram



Pin Configuration



DFN1616P6X (Top View)

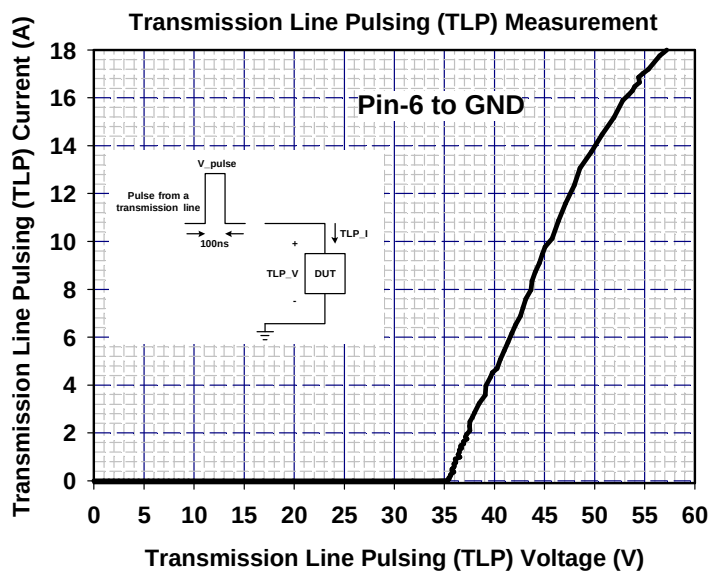
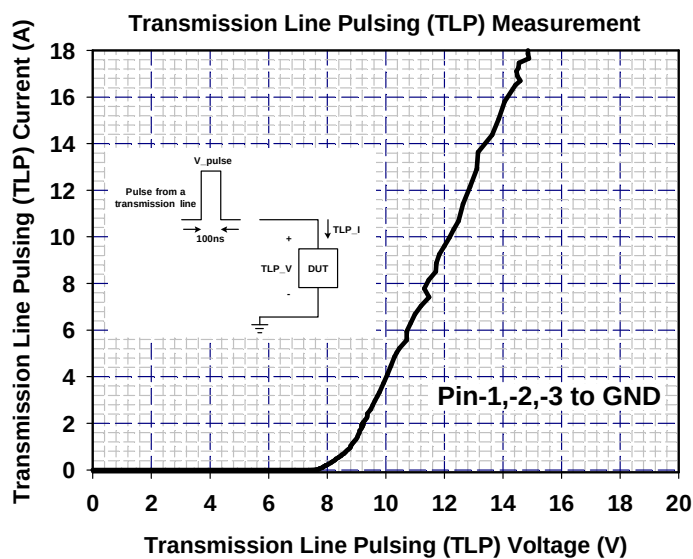
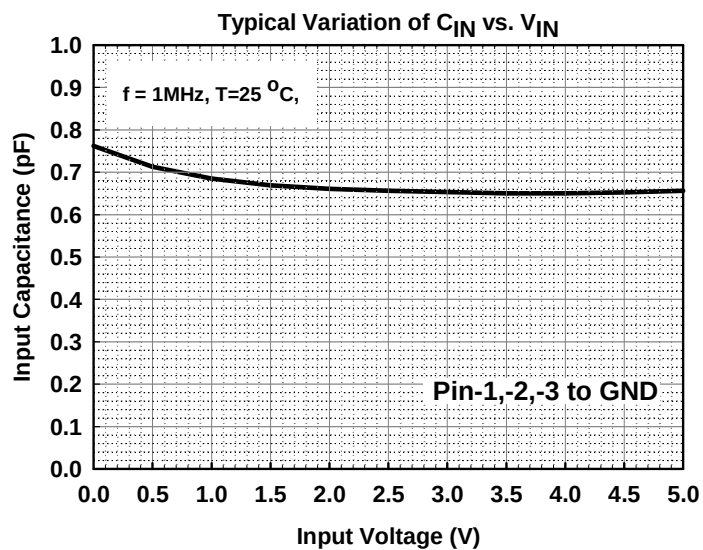
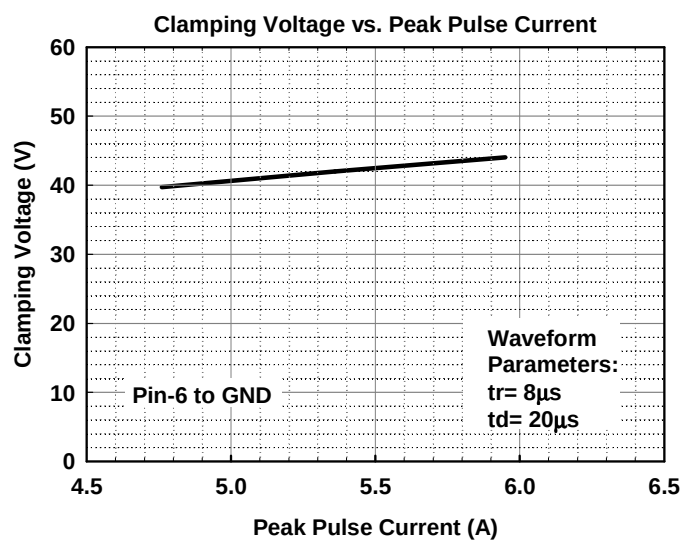
SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS			
PARAMETER	PARAMETER	RATING	UNITS
DP, DM, USB ID (Pin 1, 2, 3)			
Peak Pulse Current (tp=8/20μs)	I _{PP_IO}	3	A
Operating Supply Voltage (I/O-GND)	V _{DC_IO}	5.5	V
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	V _{ESD_IO}	±15 ±12	kV
VBus (Pin 6)			
Peak Pulse Current (tp=8/20μs)	I _{PP_VBus}	5	A
Operating Supply Voltage (VBus-GND)	V _{DC_VBus}	30.8	V
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	V _{ESD_VBus}	±30 ±30	kV
Lead Soldering Temperature	T _{SOL}	260 (10 sec.)	°C
Operating Temperature	T _{OP}	-55 to +85	°C
Storage Temperature	T _{STO}	-55 to +150	°C

ELECTRICAL CHARACTERISTICS						
DP, DM, USB ID (Pin 1, 2, 3)						
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Reverse Stand-Off Voltage	V _{RWM}	Pin-1,-2,-3 to GND, T=25 °C			5	V
Reverse Leakage Current	I _{Leak}	V _{RWM} = 5V, T=25 °C, Pin-1,-2,-3 to GND			1	μA
Reverse Breakdown Voltage	V _{BV}	I _{BV} = 1mA, T=25 °C, Pin-1,-2,-3 to GND	6.5		9.5	V
Forward Voltage	V _F	I _F = 15mA, T=25 °C, GND to Pin-1,-2,-3	0.6		1.2	V
ESD Clamping Voltage	V _{clamp}	IEC 61000-4-2 +6kV, T=25 °C, Contact mode, Pin-1,-2,-3 to GND		15		V
Channel Input Capacitance	C _{IN}	V _{IN} = 2.5V, f = 1MHz, T=25 °C, Pin-1,-2,-3 to GND		0.65	0.8	pF

ELECTRICAL CHARACTERISTICS						
VBus (Pin 6)						
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Reverse Stand-Off Voltage	V_{RWM}	Pin-6 to GND, T=25 °C			28	V
Reverse Leakage Current	I_{Leak}	$V_{RWM} = 28V$, T=25 °C, Pin-6 to GND			1	μA
Reverse Breakdown Voltage	V_{BV}	$I_{BV} = 1mA$, T=25 °C, Pin-6 to GND	31		40	V
Forward Voltage	V_F	$I_F = 15mA$, T=25 °C, GND to Pin-6	0.6		1.2	V
ESD Clamping Voltage	V_{clamp}	IEC 61000-4-2 +6kV, T=25 °C, Contact mode, Pin-6 to GND		55		V
Channel Input Capacitance	C_{IN}	$V_{IN} = 0V$, f = 1MHz, T=25 °C, Pin-6 to GND			100	pF

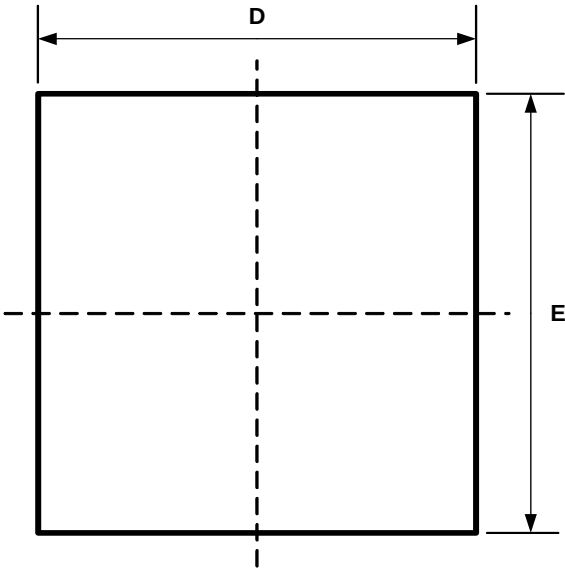
Typical Characteristics



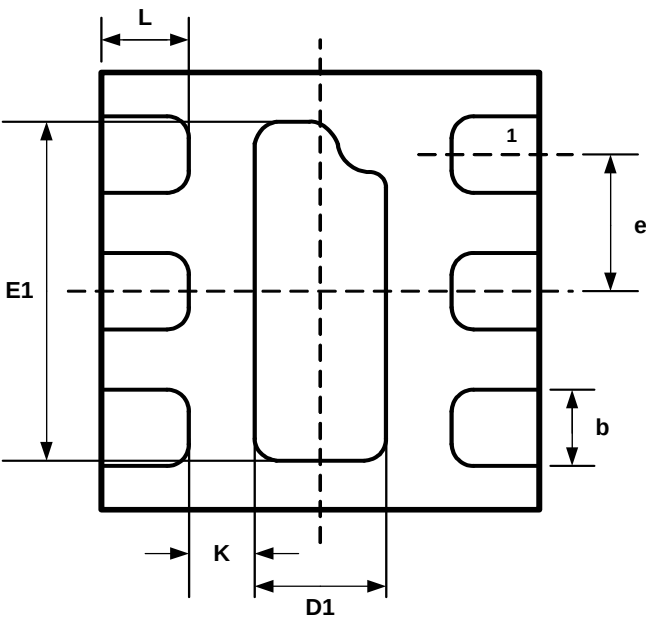
Mechanical Details

DFN1616P6X

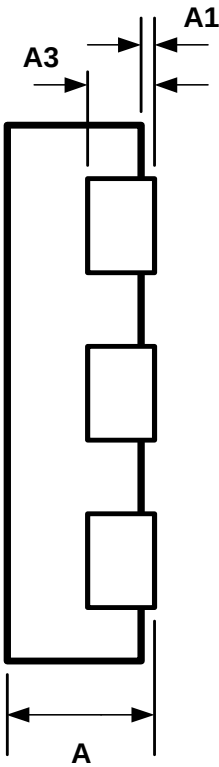
PACKAGE DIAGRAMS AND DIMENSIONS



TOP VIEW



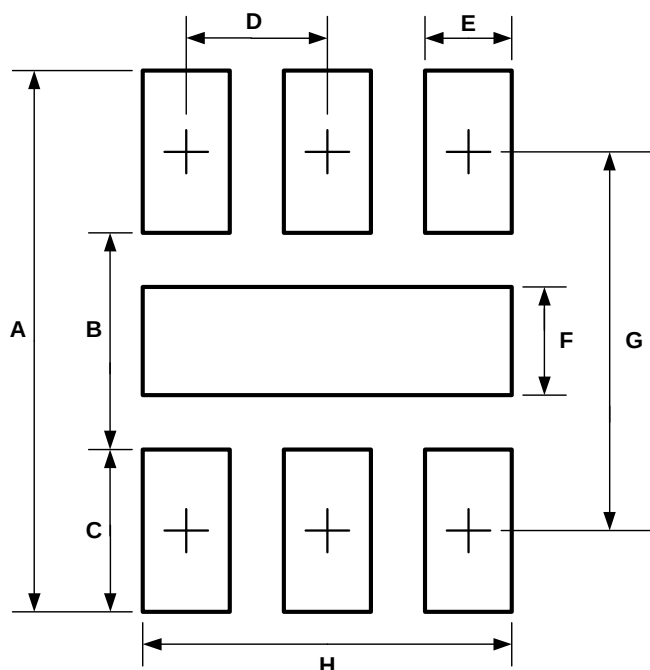
BOTTOM VIEW



SIDE VIEW

Symbol	Millimeters		
	MIN.	NOM.	MAX.
A	0.40	0.45	0.50
A1	0.00	0.02	0.05
A3	---	0.127 REF	---
b	0.20	0.25	0.30
D1	0.25	0.40	0.50
E1	1.05	1.20	1.30
D	1.50	1.60	1.70
E	1.50	1.60	1.70
e	0.50 BSC		
K	0.15	---	---
L	0.28	0.33	0.38

LAND LAYOUT

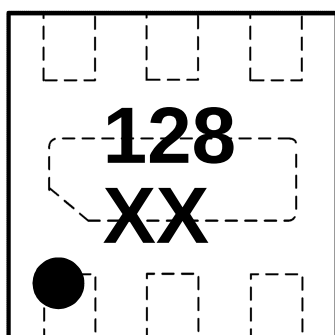


DIMENSIONS		
DIM	INCHES	MILLIMETERS
A	0.085	2.15
B	0.035	0.89
C	0.025	0.63
D	0.020	0.50
E	0.012	0.30
F	0.018	0.45
G	0.060	1.52
H	0.051	1.30

Notes:

This LAND LAYOUT is for reference purposes only. Please consult your manufacturing partners to ensure your company's PCB design guidelines are met.

MARKING CODE



128 = Device Code
XX = Date Code

Part Number	Marking Code
ULTVSFA5VESGP	128