



CHENMKO ENTERPRISE CO.,LTD

Halogens free devices

SURFACE MOUNT

Ultra Low Capacitance ESD Protection Array
For High Speed I/O Port

ULTVSB5VCESGP

Features

- ESD Protect for Super Speed Differential Signaling (above 5Gb/s) channels
- Protects six I/O lines and one V_{DD} line
- Provide ESD protection for each channel to IEC 61000-4-2, (ESD) $\pm 15\text{kV}$ (air), $\pm 8\text{kV}$ (contact)
- For 5V and below 5V operating voltage
- Ultra low capacitance: 0.35pF max.
- Fast turn-on and Low clamping voltage
- Array of surge rated diodes with internal equivalent TVS diode
- Solid-state silicon-avalanche and active circuit triggering technology
- Back-drive protection for power-down mode
- **Green part**

Applications

- USB3.0
- HDMI 1.4
- High Speed I/O Ports in Any Electronic Product

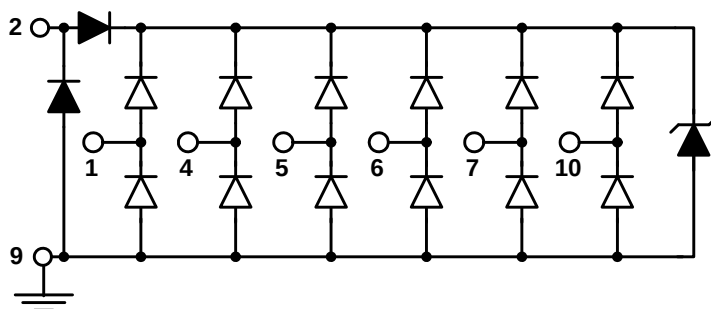
Description

ULTVSB5VCESGP is a design which includes ESD rated diode arrays to protect high speed data interfaces. The ULTVSB5VCESGP has been specifically designed to protect sensitive components which are connected to data and transmission lines from over-voltage caused by Electrostatic Discharging (ESD).

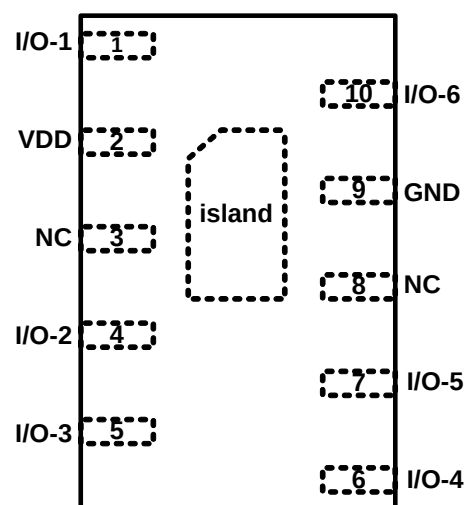
ULTVSB5VCESGP is a unique design which includes surge rated, ultra low capacitance steering diodes and a unique design of clamping cell which is an equivalent TVS diode in a single package. During transient conditions, the steering diodes direct the transient to either the power supply line or to ground line. The internal unique design of clamping cell prevents over-voltage on the power line, protecting any downstream components. Besides, there is a back-drive protection design in ULTVSB5VCESGP for power-down mode operation.

ULTVSB5VCESGP 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



DFN4120P10E
(Top View)



CHENMKO ENTERPRISE CO.,LTD

Halogens free devices

SURFACE MOUNT

*Ultra Low Capacitance ESD Protection Array
For High Speed I/O Port*

ULTVSQB5VCESGP

SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS			
PARAMETER	PARAMETER	RATING	UNITS
Operating Supply Voltage (VDD-GND)	V_{DC}	6	V
ESD per IEC 61000-4-2 (Air)	V_{ESD}	± 15	kV
ESD per IEC 61000-4-2 (Contact)		± 8	
Lead Soldering Temperature	T_{SOL}	260 (10 sec.)	$^{\circ}C$
Operating Temperature	T_{OP}	-40 to +85	$^{\circ}C$
Storage Temperature	T_{STO}	-55 to +150	$^{\circ}C$
DC Voltage at any I/O pin	V_{IO}	(GND – 0.5) to (VDD + 0.5)	V

ELECTRICAL CHARACTERISTICS						
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Reverse Stand-Off Voltage	V_{RWM}	Pin 2 to pin 9, $T=25^{\circ}C$.			5	V
Reverse Leakage Current	I_{Leak}	$V_{RWM} = 5V$, $T=25^{\circ}C$, Pin 2 to pin 9.			2.5	μA
Channel Leakage Current	$I_{CH-Leak}$	$V_{Pin\ 2} = 5V$, $V_{Pin\ 9} = 0V$, $T=25^{\circ}C$.			1	μA
Reverse Breakdown Voltage	V_{BV}	$I_{BV} = 1mA$, $T=25^{\circ}C$, Pin 2 to Pin 9.	6			V
Forward Voltage	V_F	$I_F = 15mA$, $T=25^{\circ}C$, Pin 9 to Pin 2.		0.8	1.2	V
ESD Clamping Voltage –I/O	V_{clamp_io}	IEC 61000-4-2 +6kV, $T=25^{\circ}C$, Contact mode, Any Channel pin to Ground.		13		V
ESD Clamping Voltage –VDD	V_{clamp_VDD}	IEC 61000-4-2 +6kV, $T=25^{\circ}C$, Contact mode, VDD pin to Ground.		10		V
ESD Dynamic Turn-on Resistance –I/O	$R_{dynamic_io}$	IEC 61000-4-2, 0~+6kV, $T=25^{\circ}C$, Contact mode, Any Channel pin to Ground.		0.35		Ω
ESD Dynamic Turn-on Resistance –VDD	$R_{dynamic_VDD}$	IEC 61000-4-2, 0~+6kV, $T=25^{\circ}C$, Contact mode, VDD pin to Ground.		0.2		Ω
Channel Input Capacitance	C_{IN}	$V_{pin2} = 5V$, $V_{pin9} = 0V$, $V_{IN} = 2.5V$, $f = 1MHz$, $T=25^{\circ}C$, Any Channel pin to Ground.		0.27	0.35	pF
Channel to Channel Input Capacitance	C_{CROSS}	$V_{pin2} = 5V$, $V_{pin9} = 0V$, $V_{IN} = 2.5V$, $f = 1MHz$, $T=25^{\circ}C$, Between Channel pins.		0.05	0.07	pF



CHENMKO ENTERPRISE CO.,LTD

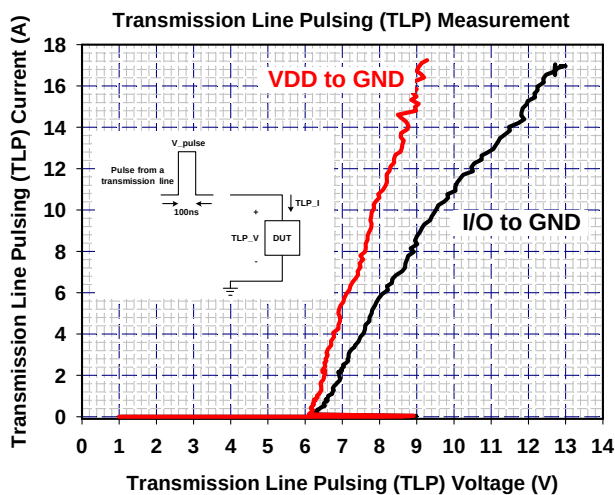
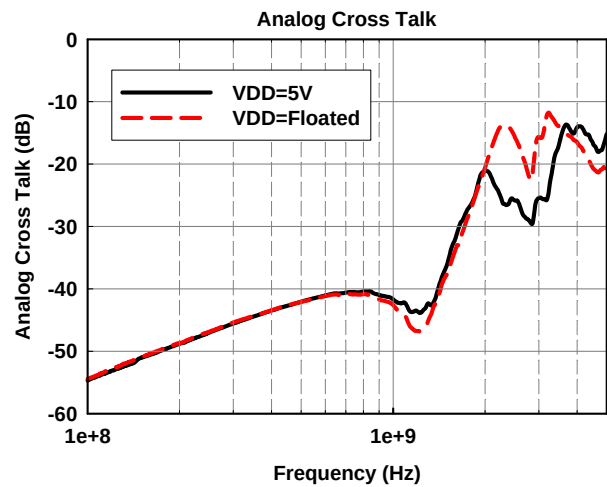
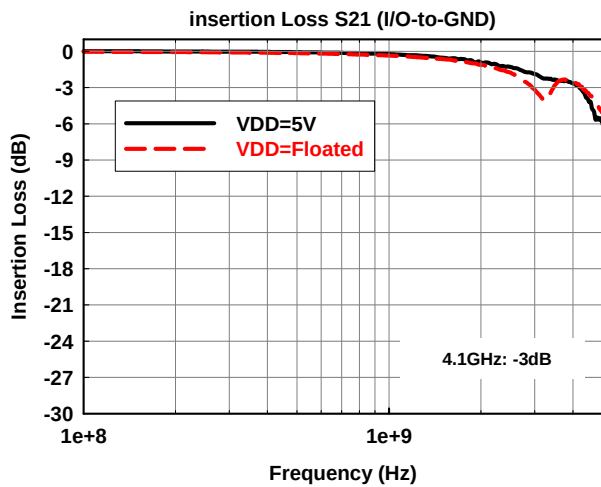
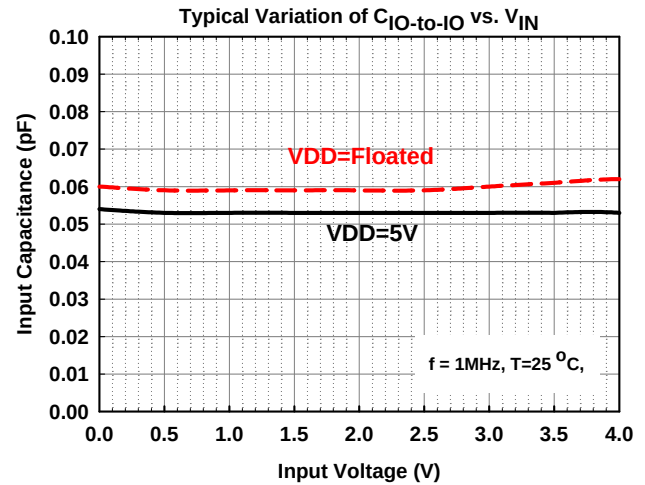
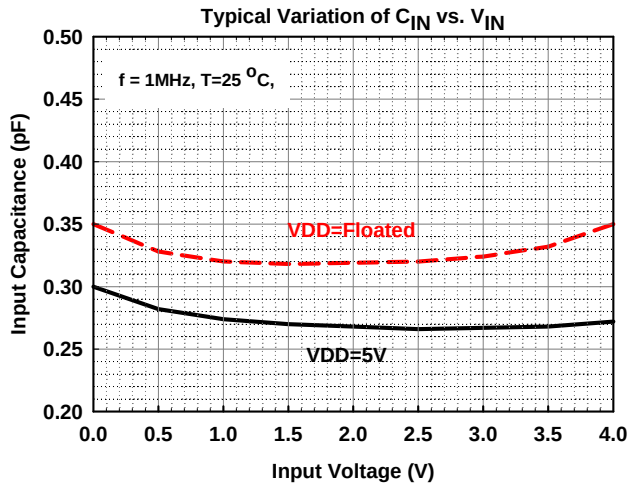
Halogens free devices

SURFACE MOUNT

Ultra Low Capacitance ESD Protection Array
For High Speed I/O Port

ULTVSQB5VCESGP

Typical Characteristics





CHENMKO ENTERPRISE CO.,LTD

Halogens free devices

SURFACE MOUNT

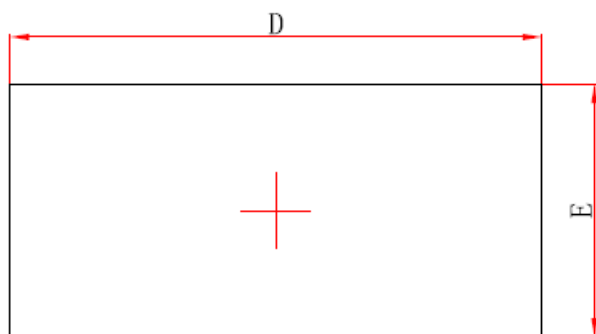
*Ultra Low Capacitance ESD Protection Array
For High Speed I/O Port*

ULTVSB5VCESGP

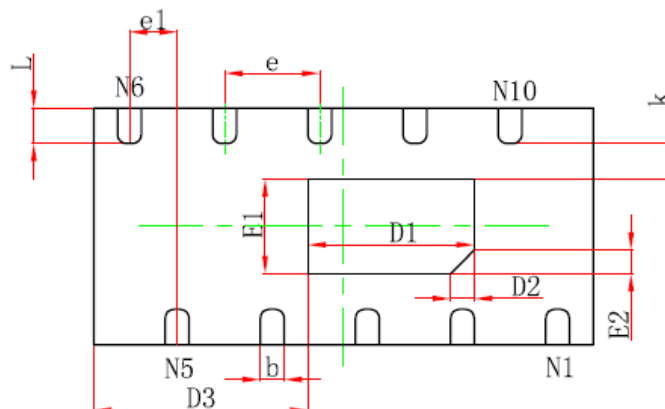
Mechanical Details

DFN4120P10E

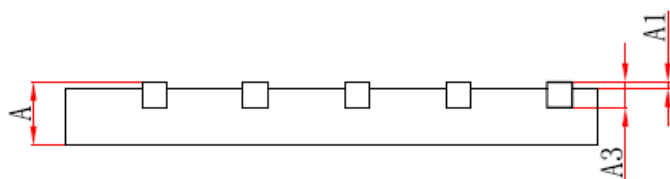
PACKAGE DIAGRAMS AND DIMENSIONS



Top View



Bottom View



Side View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.450	0.550	0.018	0.022
A1	0.000	0.050	0.000	0.002
A3	0.152 REF		0.006REF	
D	4.050	4.150	0.159	0.163
E	1.950	2.050	0.077	0.081
D1	1.300	1.500	0.051	0.059
E1	0.700	0.900	0.028	0.035
D3	1.650	1.850	0.065	0.073
D2	0.200REF		0.008REF	
E2	0.200REF		0.008REF	
k	0.200MIN		0.008MIN	
b	0.150	0.250	0.006	0.010
e	0.800TYP		0.031TYP	
e1	0.350	0.450	0.014	0.018
L	0.250	0.350	0.010	0.014



CHENMKO ENTERPRISE CO.,LTD

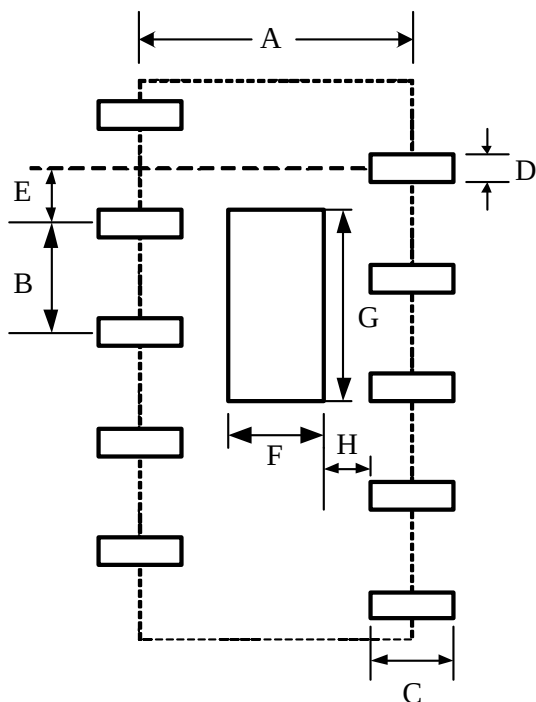
Halogens free devices

SURFACE MOUNT

Ultra Low Capacitance ESD Protection Array
For High Speed I/O Port

ULTVSQB5VCESGP

LAND LAYOUT

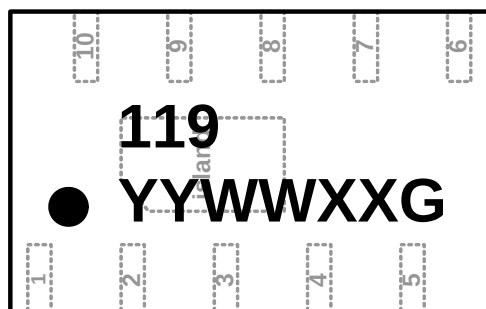


Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.924	2.076	0.076	0.082
B	0.800TYP.		0.031TYP.	
C	0.600TYP		0.023TYP.	
D	0.150	0.250	0.006	0.010
E	0.400TYP		0.015TYP.	
F	0.700	0.900	0.028	0.035
G	1.300	1.500	0.051	0.059
H	0.200MIN.		0.008MIN	

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



Part Number	Marking Code
ULTVSQB5VCESGP	119

119 = Device Code
YYWW = Date Code
XX = Control Code
G = Green part