

Ultra Low Capacitance ESD Protection Array

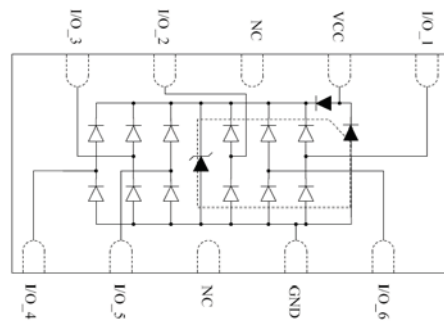
FEATURES

- * Transient protection for super-speed data lines
IEC 61000-4-2 (ESD) $\pm 15\text{kV}$ (Air)
 $\pm 8\text{kV}$ (Contact)
IEC 61000-4-4 (EFT) 40A (5/50 ns)
Cable Discharge Event (CDE)
- * ESD protection for super-speed differential signal (above 5Gb/s) channels
- * Fast turn-on and low clamping voltage
- * Protects six data lines and one VCC line
- * Ultra low capacitance: 0.3pF Typical (I/O-I/O)
- * Low leakage current: 0.1 μA @ VRWM (Typical)
- * Back-drive protection for power-down mode

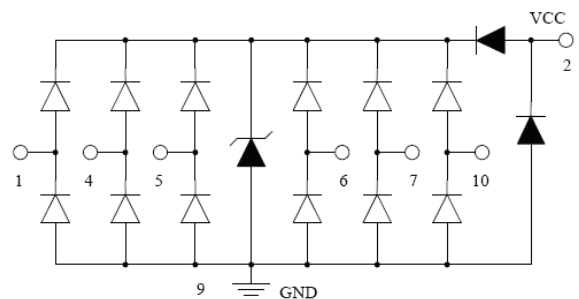
MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Ratings at 25 °C ambient temperature unless otherwise specified.
resistive or inductive load.

PIN CONFIGURATION



CIRCUIT DIAGRAM



MAXIMUM RATINGS (At TA= 25 °C unless otherwise noted)

Symbol	Parameter	Value	Units
V_{ESD}	ESD per IEC 61000-4-2 (Air)	± 25	kV
	ESD per IEC 61000-4-2 (Contact)	± 17	
T_{OPT}	Operating Temperature	-55/+125	°C
T_{STG}	Storage Temperature	-55/+150	°C

ELECTRICAL CHARACTERISTICS (At TA= 25 °C unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Units
V_{RWM}	Reverse Working Voltage	Any I/O pin to GND			5.0	V
V_{BR}	Reverse Breakdown Voltage	$I_T = 1\text{mA}$ Any I/O pin to GND	6.0		10.0	V
I_R	Reverse Leakage Current	$V_{RWM} = 5\text{V}$ Any I/O pin to GND		0.1	1.0	μA
V_C	Clamping Voltage	$I_{PP} = 1\text{A}$, $t_p = 8/20\mu\text{s}$ Any I/O pin to GND			12	V
C_{ESD1}	Capacitance 1	$V_R = 0\text{V}$, $f = 1\text{MHz}$ Between I/O pins		0.3	0.4	pF
C_{ESD2}	Capacitance 2	$V_R = 0\text{V}$, $f = 1\text{MHz}$ Any I/O pin to GND		0.6	0.8	pF

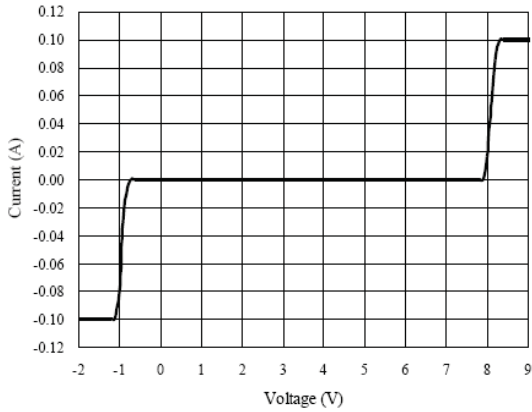
DESCRIPTION

The TEP0516LC is an ultra low capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for super-speed data interfaces. With typical capacitance of 0.3pF only, TEP0516LC is designed to protect parasitic-sensitive system against over-voltage and over current transient events. It complies with IEC 61000-4-2 (ESD), Level 4($\pm 15\text{KV}$ air, $\pm 8\text{KV}$ contact discharge), IEC61000-4-4(electrical fast transient-EFT) (40A,5/50ns),very fast charged device model (CDM)ESD and cable discharge event(CDE),etc.

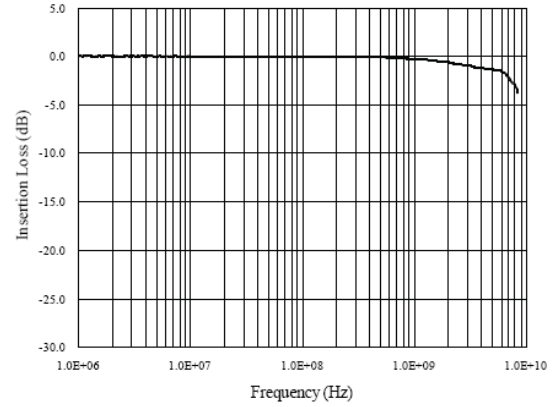
TEP0516LC uses ultra-small DFN4120-10L package. Each TEP0516LC device can protect six super-speed data lines and one VCC line. The combined features of ultra-low capacitance, small size and high ESD robustness make TEP0516LC ideal for super-speed data ports and high-frequency lines (e.g., HDMI & DVI) applications. The low clamping voltage of the TEP0516LC guarantees a minimum stress on the protected IC.

RATING AND CHARACTERISTICS CURVES (TEP0516LC)

Voltage Sweeping of I/O to GND

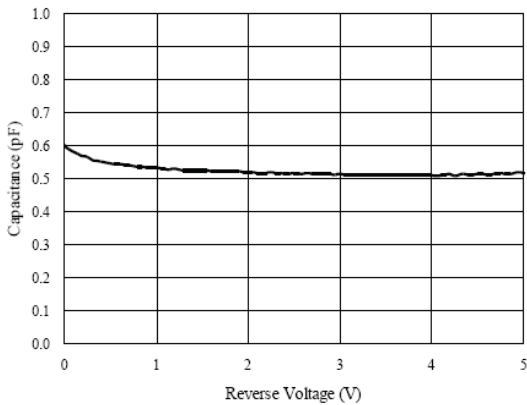


Insertion Loss S21 of I/O to GND

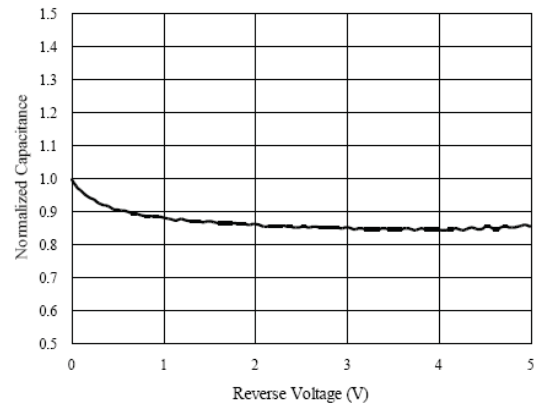


Capacitance vs. Voltage of I/O to GND (f = 1MHz)

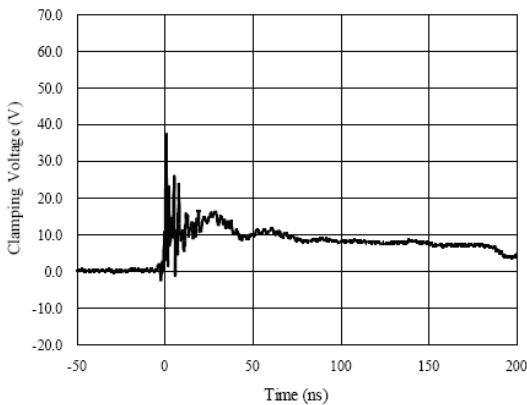
Capacitance vs. Reverse Voltage



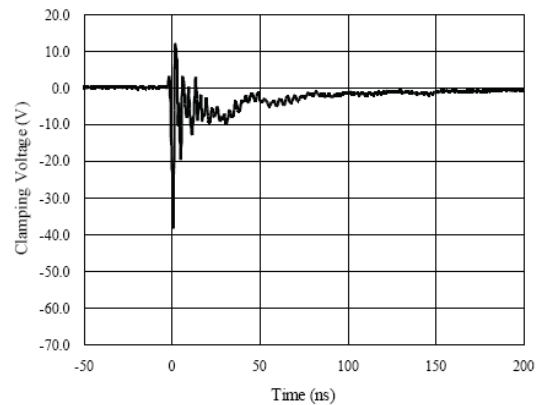
Normalized Capacitance vs. Reverse Voltage



ESD Clamping of I/O to GND (+8kV Contact per IEC 61000-4-2)



ESD Clamping of I/O to GND (-8kV Contact per IEC 61000-4-2)



1.APPLICATIONS

- ✧ USB3.0 Power and Data Line Protection
- ✧ High Definition Multi-Media Interface (HDMI)
- ✧ Digital Visual Interface (DVI)
- ✧ MDDI Ports
- ✧ Display ports
- ✧ Desktops, Servers and Notebooks

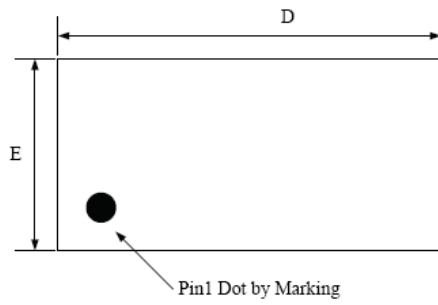
2.ORDERING INFORMATION

- ✧ Device: GESD0516ST
- ✧ Package: DFN4120-10L
- ✧ Marking: Part number, date code
- ✧ Material: Halogen free
- ✧ Packing: Tape & Reel
- ✧ Quantity per reel: 3,000pcs

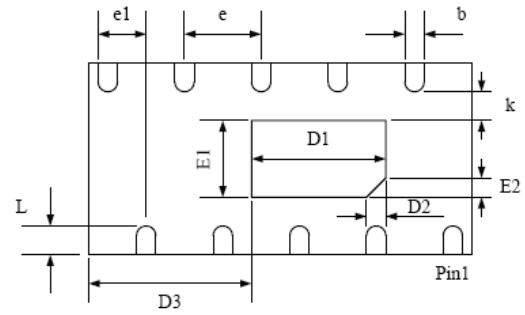
3.MACHANICAL DATA

- ✧ DFN4120-10L package
- ✧ Flammability Rating: UL 94V-0
- ✧ Packaging: Tape and Reel
- ✧ High temperature soldering guaranteed: 260 °C /10s
- ✧ Reel size: 7 inch

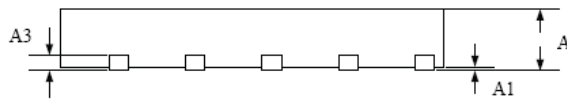
DFN4120-10L PACKAGE OUTLINE DIMENSIONS



Top View



Bottom View



Side View

Package Dimensions (Controlling dimensions are in millimeters)

Symbol	Dimensions (mm)		Dimensions (Inches)	
	Minimum	Maximum	Minimum	Maximum
A	0.450	0.550	0.018	0.022
A1	0.000	0.050	0.000	0.002
A3	0.152REF.		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

DISCLAIMER NOTICE

Rectron Inc reserves the right to make changes without notice to any product specification herein, to make corrections, modifications, enhancements or other changes. Rectron Inc or anyone on its behalf assumes no responsibility or liability for any errors or inaccuracies. Data sheet specifications and its information contained are intended to provide a product description only. "Typical" parameters which may be included on RECTRON data sheets and/ or specifications can and do vary in different applications and actual performance may vary over time. Rectron Inc does not assume any liability arising out of the application or use of any product or circuit.

Rectron products are not designed, intended or authorized for use in medical, life-saving implant or other applications intended for life-sustaining or other related applications where a failure or malfunction of component or circuitry may directly or indirectly cause injury or threaten a life without expressed written approval of Rectron Inc. Customers using or selling Rectron components for use in such applications do so at their own risk and shall agree to fully indemnify Rectron Inc and its subsidiaries harmless against all claims, damages and expenditures.