

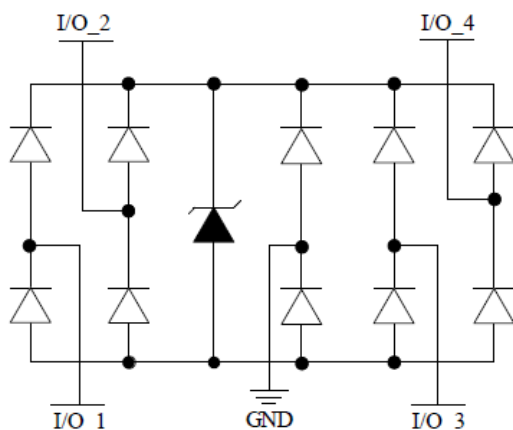
Description

HWET05041P is an ultra-low - capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. With typical capacitance of 0.2pF only, HWET05041P is designed to protect parasitic – sensitive systems 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), IEC 61000-4-4 (electrical fast transient - EFT) (40A, 5/50 ns), very fast charged device model (CDM) ESD and cable discharge event (CDE), etc. HWET05041P uses small DFN-10L package. Each HWET05041P device can protect four high-speed data lines. The combined features of ultra-low capacitance, ultra-small size and high ESD robustness make HWET05041P ideal for high-speed data ports and high-frequency lines (e.g., HDMI & DVI) applications. The low clamping voltage of the HWET05041P guarantees a minimum stress on the protected IC.

Mechanical Characteristics

- DFN-10L package
- Flammability Rating: UL 94V-0
- Marking: Part number
- Packaging: Tape and Reel

Circuit Diagram



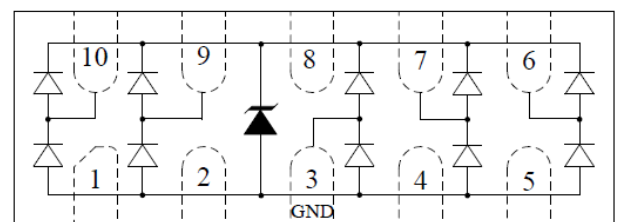
Features

- Transient protection for high-speed data lines
IEC 61000-4-2 (ESD) $\pm 25\text{kV}$ (Air)
 $\pm 17\text{kV}$ (Contact)
- IEC 61000-4-4 (EFT) 40A (5/50 ns)
- IEC 61000-4-5(surge) 4.5A(8/20us)
- Cable Discharge Event (CDE)
- Package optimized for high-speed lines
- Ultra-small package (2.5mm*1.0mm*0.55mm)
- Protects four data lines
- Low capacitance: 0.2pF Typical (I/O-I/O)
- Low leakage current: 0.1 μ A @ VRWM (Typ.)
- Low clamping voltage
- Each I/O pin can withstand over 1000 ESD strikes for $\pm 8\text{kV}$ contact discharge

Applications

- Serial ATA
- PCI Express
- Desktops, Servers and Notebooks
- MDDI Ports
- USB2.0/3.0 Power and Data Line Protection
- Display Ports
- High Definition Multi-Media Interface (HDMI)
- Digital Visual Interfaces (DVI)

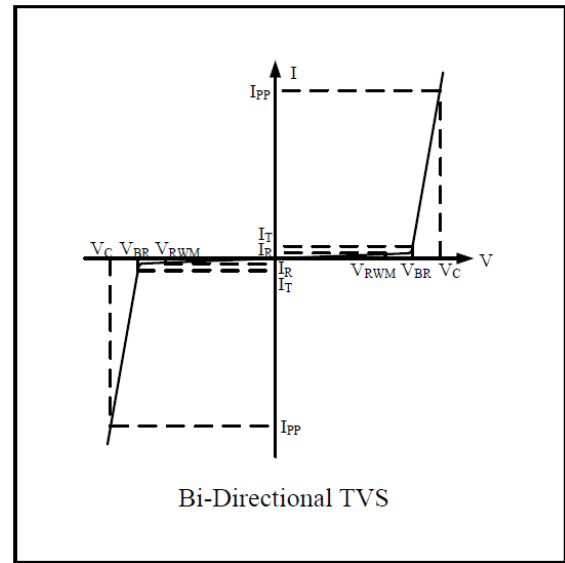
Pin Configuration



DFN-10L
(Top View)

Electrical characteristics (Ta = 25 °C)

Symbol	Parameter
V_{RWM}	Nominal Reverse Working Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{BR}	Reverse Breakdown Voltage @ I_T
I_T	Test Current for Reverse Breakdown
V_C	Clamping Voltage @ I_{PP}
I_{PP}	Maximum Peak Pulse Current
C_{ESD}	Parasitic Capacitance
V_R	Reverse Voltage
f	Small Signal Frequency
I_F	Forward Current
V_F	Forward Voltage @ I_F

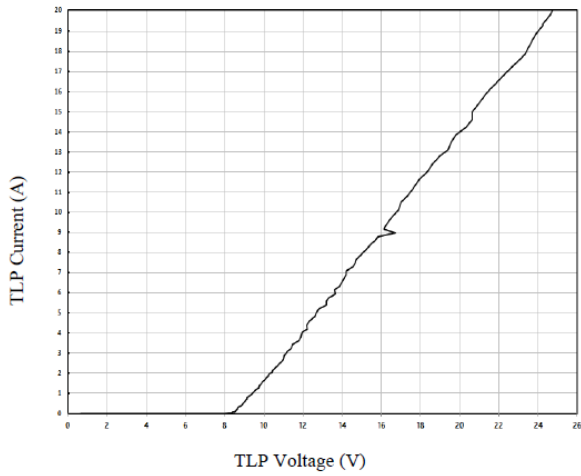


Symbol	Test Condition	Minimum	Typical	Maximum	Units
V_{RWM}		3.3		5	V
I_R	$V_{RWM} = 5V, T = 25^\circ C$ Between I/O and GND		0.1	1	μA
V_{BR}	$I_T = 1mA$ Between I/O and GND	5			V
V_C	$I_{PP} = 1A, t_p = 8/20\mu s$ Between I/O and GND			12	V
V_C	$I_{PP} = 8.0A, t_p = 100ns^{(1)}$ $I_{PP} = 16.0A, t_p = 100ns$			15	V
R_{dyn}	IEC61000-4-2 0-6KV, $T=25^\circ C$ Contact, I/O to GND		0.5		Ω
C_{ESD}	$V_R = 0V, f = 1MHz$ Between I/O and GND		0.2	0.28	pF
C_{ESD}	$V_R = 0V, f = 1MHz$ Between I/O and I/O		0.2	0.28	pF

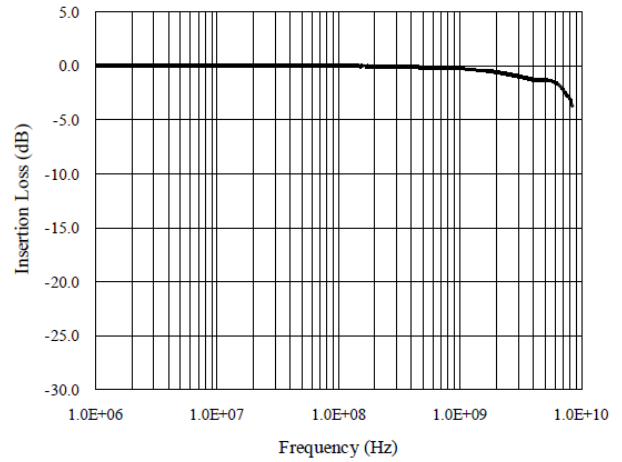
Absolute Maximum Rating

Symbol	Parameter	Value	Units
Ppk	Peak Pulse Power ($t_p=8/20\mu s$)	60	Watts
Ipp	Peak Pulse Current ($t_p=8/20\mu s$)	4.5	A
V_{ESD}	ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	± 25 ± 17	kV
T_{OPT}	Operating Temperature	-55/+125	$^\circ C$
T_{STG}	Storage Temperature	-55/+150	$^\circ C$

TLP Measurement of I/O to GND

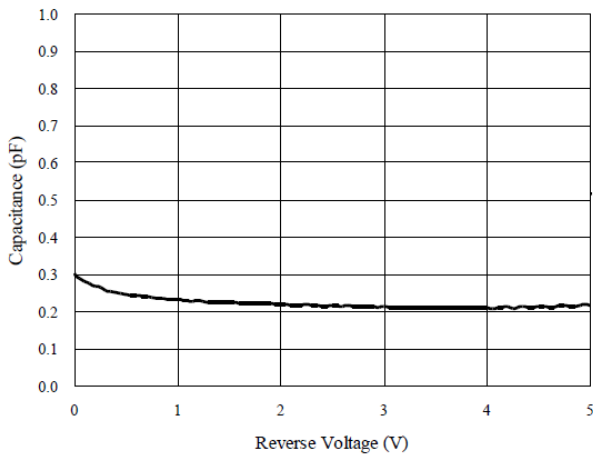


Insertion Loss S21 of I/O to GND

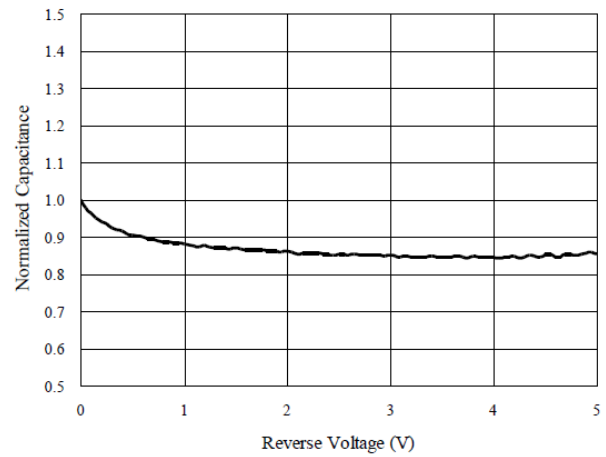


Capacitance vs. Voltage of I/O to GND (f = 1MHz)

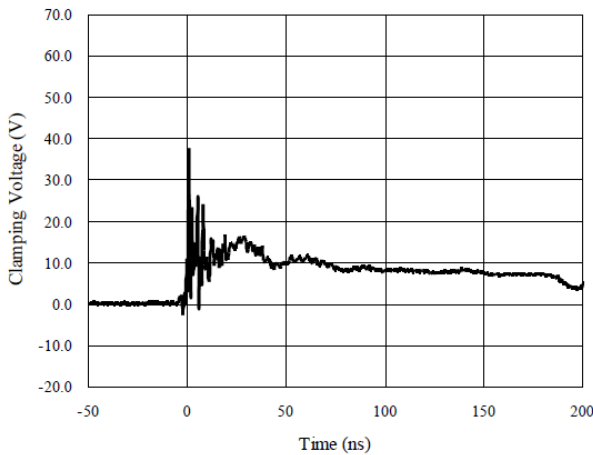
Capacitance vs. Reverse Voltage



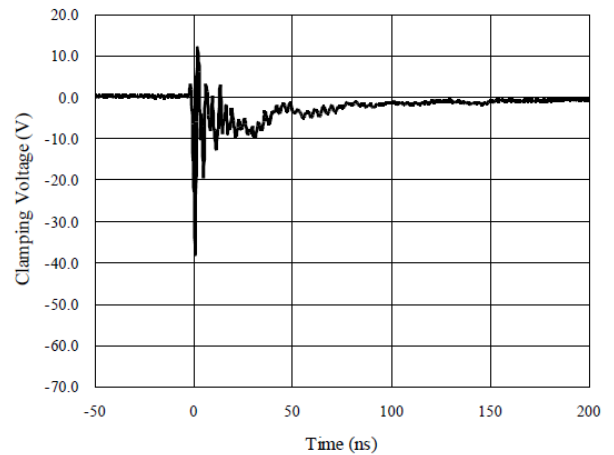
Normalized Capacitance vs. Reverse Voltage



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

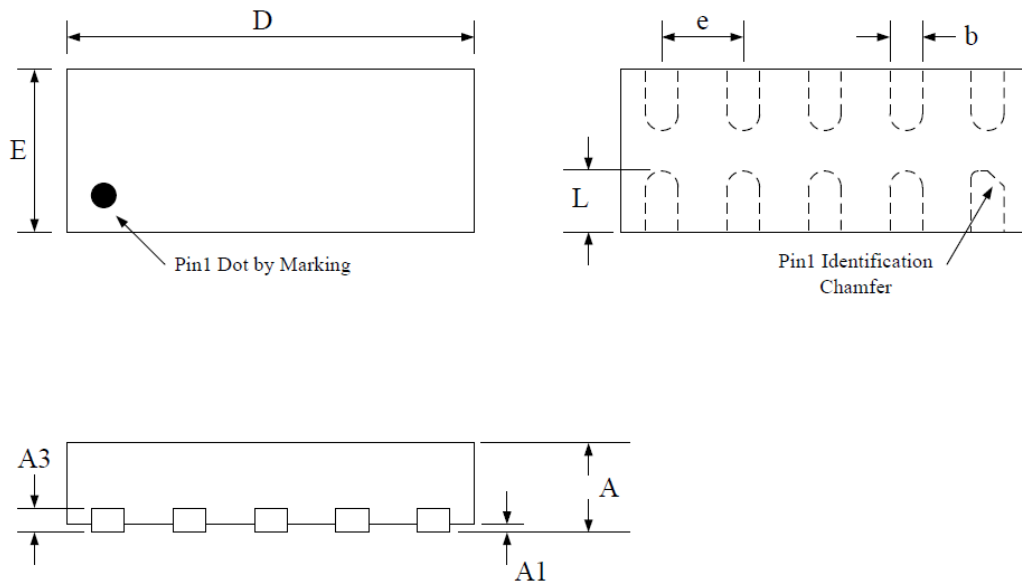


ESD Clamping of I/O to GND (-8kV Contact per IEC 61000-4-2)



Package Outline

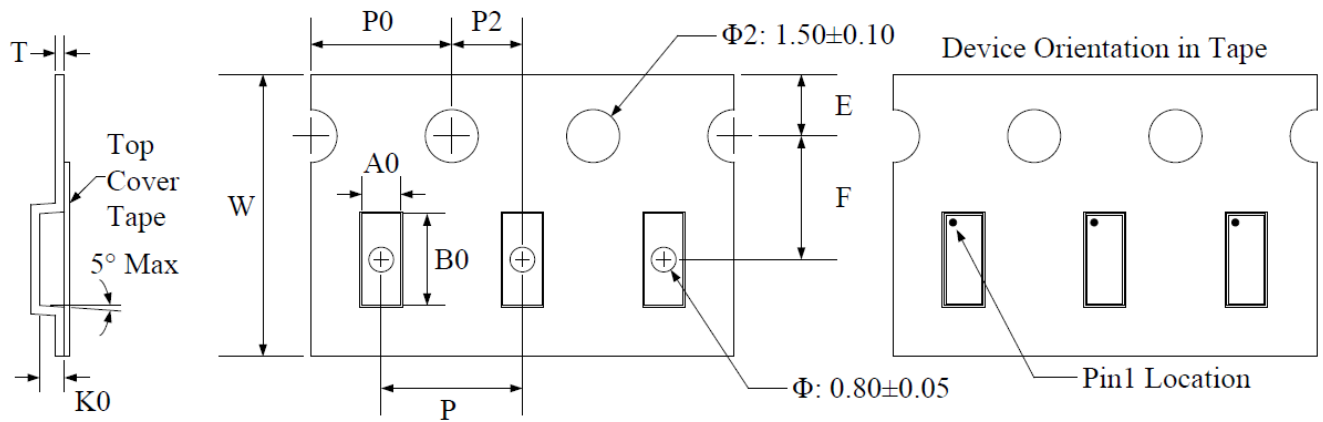
- DFN-10L package
- Thermally-Enhanced
- MSL-1 Level



Package Dimensions (Controlling dimensions are in millimeters)

Symbol	Dimensions (mm)		Dimensions (Inches)	
	Minimum	Maximum	Minimum	Maximum
A	0.500	0.600	0.020	0.024
A1	0.000	0.050	0.000	0.002
A3	0.15REF.		0.006REF.	
b	0.150	0.250	0.006	0.010
D	2.450	2.550	0.096	0.100
E	0.950	1.050	0.037	0.041
e	0.500 BSC		0.020 BSC	
L	0.300	0.400	0.012	0.016

Tape and Reel Specification



Symbol	W	A0	B0	K0	E	F	P	P0	P2	T
Dimensions (mm)	8.00+0.3 -0.1	1.23±0.05	2.7±0.05	0.7±0.05	1.75±0.1	3.5±0.05	4.0±0.1	4.0±0.1	2.0±0.05	0.25±0.02