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## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



# Virtium TuffDrive™ eUSB SSD

## VTDU31P 10-pin, 2.54mm Pitch Product Specification

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### 1.0 Introduction

Virtium TuffDrive™ eUSB SSDs are ideal solutions for server, networking, embedded and industrial applications that require a modest amount of storage and require a widely supported USB2.0 interface. Typical applications include operating system and file storage, system level diagnostics, or as a backup repository for data in DRAM in the event of a system-level power-down.

### 1.1 Features

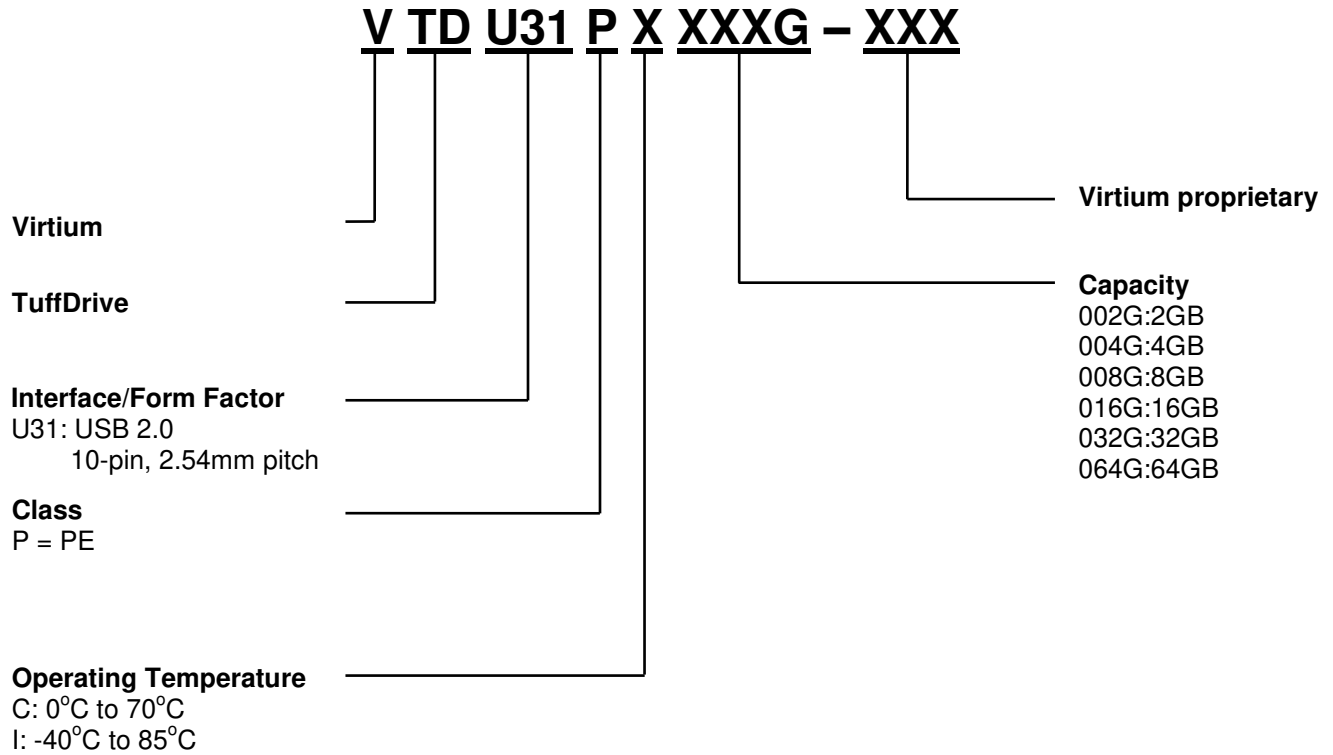
- Capacities: 2GB, 4GB, 8GB, 16GB, 32GB, 64GB
- Industrial SLC
- Sustained Performance
  - Read: Up to 34MB/s
  - Write: Up to 21MB/s
- Temperature
  - Commercial operating: 0°C to 70°C
  - Industrial operating: -40°C to 85°C
  - Non-operating: -55°C to 95°C
- Power: 5V or 3.3V interchangeable
  - Maximum:  
585 mW (5V); 390 mW (3.3V)
  - Idle:  
340 mW (5V); 225 mW (3.3V)
- Reliability
  - MTBF: 5,000,000 hours
  - SLC NAND endurance 60K @ 55°C
- Compliance
  - USB 2.0
  - RoHS
  - CE and FCC
- Operating Systems supported: Windows 7, Vista, XP, 200, ME, 98/98SE, and Mac OS 9.x and above, Linux Kernel 2.4 and above
- Supports unique VID, PID, and serial number
- Form Factor
  - Horizontal Mount
  - 2.54mm pin-pitch connector
- Mechanical Dimensions - L x W x H mm (inches)
  - 36.90 (1.453) x 26.60 (1.047) x x 9.75 (0.384)
- Weight
  - 5 +/- 0.1 g
- Environmental (Operating/non-operating):
  - MIL-STD-810F
  - Shock: 1500G, 0.5ms duration
  - Vibration: 16.4G<sub>RMS</sub>





<b>Product Specification</b>	
<b>TuffDrive eUSB SSD</b> VTDU31PxxxxG-xxx	<b>Rev: 0.982</b>

## 2.0 Ordering Information and Part Numbering System





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## 4.0 Specifications

### 4.1 Capacity

### 4.2 Capacity

Table 1: TuffDrive eUSB capacity

Unformatted Capacity (GB) <sup>(1)</sup>	User-Addressable LBA <sup>(2)</sup>	User-Addressable Capacity Bytes
2	3,907,670	2,000,727,040
4	7,815,339	4,001,453,568
8	15,630,678	8,002,907,136
16	31,261,356	16,005,814,272
32	62,522,712	32,011,628,544
64	125,045,424	64,023,257,088

(1) 1GB = 1,000,000,000 bytes

(2) LBA: Logical Block Address. Logical block size of 512 bytes (1 sector)

## 4.3 Performance

Table 2: Read/Write Performance<sup>(1)</sup>

Transfer Rate	Value	Units
Sustained Read (max) >= 8GB	34	MB/s
Sustained Write (max) >= 8GB	21	MB/s
Sustained Read (max) 4GB	27	MB/s
Sustained Write (max) 4GB	16.5	MB/s
Sustained Read (max) 2GB	25	MB/s
Sustained Write (max) 2GB	16.5	MB/s

(1) CrystalDiskMark 3.0.3

## 4.4 Environmental Specifications

### 4.4.1 Temperature and Humidity

Table 3: Temperature and Humidity

P/N	Operating Temperature (°C)	Non-Operating Temperature (°C) & Moisture Sensitivity
VTDU31PCxxxG-xxx	0°C to 70°C	-65°C to +95°C



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TuffDrive eUSB SSD VTDU31PxxxxG-xxx	Rev: 0.982

VTDU31PlxxxG-xxx	-40°C to 85°C	5% to 95% (non-condensing)
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#### 4.4.2 Shock and Vibration

Table 4: Shock and Vibration

Reliability	Test Conditions
Shock <sup>(1)</sup>	1500G, ½ sine, 0.5ms duration
Vibration <sup>(2)</sup>	16.4G <sub>RMS</sub>

- (1) MIL-STD-810F, Method 516.5
- (2) MIL-STD-810F, Method 514.5

#### 4.5 Mean Time Between Failures (MTBF)

Virtium’s TuffDrive eUSB achieves a MTBF of 5,000,000 hours predicted based on the component reliability data using Telcordia SR-332 methods at 40°C.

#### 4.6 Power Requirements

5V or 3.3V single power supply operation.

Table 5: Power Consumption

Voltage	Maximum <sup>(1)</sup>	Typical <sup>(2)</sup>	Idle
5V	585 mW	404 mW	390 mW
3.3V	340 mW	292 mW	225 mW

- (1) Max power consumption measured on 16GB TuffDrive eUSB, 100% 64KB sequential writes
- (2) 70/30 read/write workload

#### 4.7 S.M.A.R.T. Attributes

The following table defines the current Virtium SMART data attributes that are supported.

Customers may view this data using the Linux SMARTmontools package. This package and the associated **smartctl** command should be used with options **-a**, **-i**, and **-d sat** for best viewing. The command `$ smartctl -d sat -a -i /dev/sdb` was used to retrieve the data below.

Attribute ID	Attribute Name	Attribute Description
0x0C	Power Cycle Count	Number of Power On cycles
0xC4	Spare block count	The amount of available spare blocks. Attribute value. The value returned here is the percentage of remaining spare blocks summed over all flash chips, i.e.(100 × current spare blocks / initial

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Attribute ID	Attribute Name	Attribute Description
		spare blocks)
0xE5	Erase count	The value returned here is an estimation of the remaining card life, in percent, based on the number of flash block erases compared to the target number of erase cycles per block.
0xCB	ECC Error Count	Total number of ECC errors correctable and uncorrectable for the NAND data.
0xCC	Number of corrected ECC errors	The total number of correctable ECC errors that have occurred on flash read commands.
0xE8	Number of Reads	The total number of flash read commands.
0xF1	Total LBAs Written	Total number of LBAs written to the disk, divided by 65536
0xF2	Total LBAs Read	Total number of LBAs read from the disk, divided by 65536

## 4.8 Certifications and Compliance

**Table 6: Certifications and Compliance**

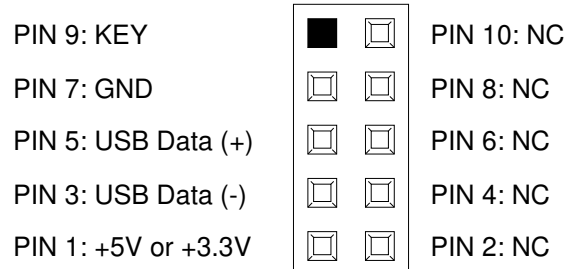
Compliance/Certification	Description
CE and FCC Compliant	Class: FCC Part 15 Subpart B Class B:2011 Declaration of Conformity registration No. STE120607699
RoHS Compliant	Restriction of Hazardous Substance Directive
UL Certified	Underwriters Laboratories, Inc. 94V-0
WEEE Certified	Waste, Electrical and Electronic Equipment Directive

## 5.0 Physical Specification

### 5.1 Pin Assignments

**Table 7: Pin Assignments**

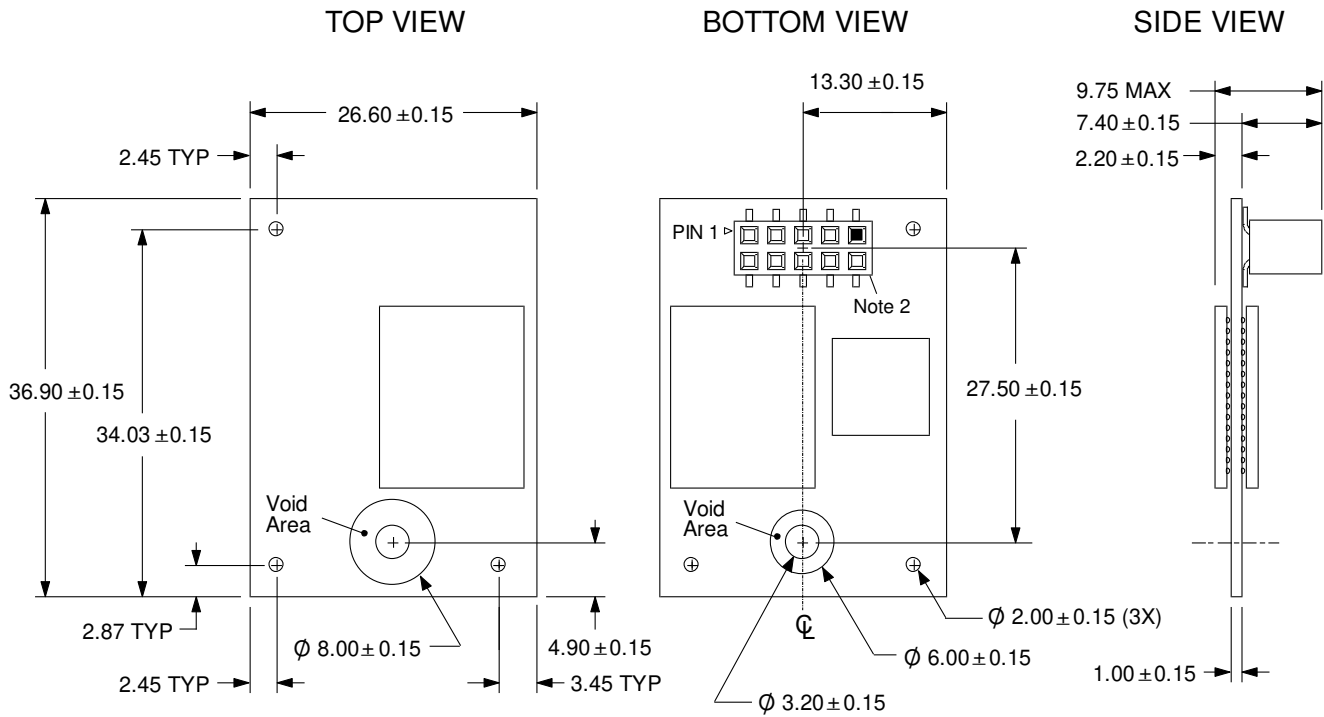
Pins	Type	Description
1	+5V or +3.3V	Input Power
3	Data -	Differential Data (-)
5	Data +	Differential Data (+)
7	GND	Ground
9	KEY	No Connect
2, 4, 6, 8, 10	NC	No Connect



**Figure 1: 10-pin socket pinout**



## 5.2 Mechanical Dimensions



- NOTES:
1. All dimensions are in millimeter
  2. Pin pitch: 2.54 mm

**Figure 2: Mechanical Dimensions**



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## 6.0 Revision History

<b>Date</b>	<b>Rev.</b>	<b>Page</b>	<b>Changes</b>
11/20/2014	0.98	All	Initial entry with 4GB and 8GB values. Initial Released. SVN 2251
1/12/2015	0.981	All	Added the 2GB . SVN 2913
2/12/2015	0.982	All	Added 64GB ; Fixed LBA to IDEMA , Fixed SMART attributes SVN 3213