

# UD info Corp.

## USB FLASH DISK UF3-V2UH Series Product DataSheet



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## Revision History

Revision	Draft Date	History	Author
1.0	2019/07/03	New release	Migo.Huang
1.1	2022/2/23	Add BiCS4 FLASH Related info	Migo.Huang
1.2	2023/2/09	Add BiCS5 FLASH Related info	Migo.Huang
1.3	2023/6/9	Add BiCS5 pSLC info	Migo.Huang



## Product Overview

- **Capacity**
  - BiCS3 TLC: 16GB-512GB
  - BiCS3 pSLC: 4GB-128GB
  - BiCS4 TLC: 32GB-512GB
  - BiCS4 pSLC 8GB-128GB
  - BiCS5 TLC: 64GB-512GB
  - BiCS5 pSLC: 8GB-128GB
- **USB Interface**
  - SuperSpeed up to 5Gbit/sec for USB 3.2 Gen 1
  - HighSpeed up to 480Mbits/sec for USB 2.0
  - FullSpeed up to 12Mbits/sec for USB 1.1
- **Performance**<sup>Note2</sup>
  - BiCS3 TLC R/W up to 240 / 160 MB/s
  - BiCS3 pSLC R/W up to 240 / 160 MB/s
  - BiCS4 TLC R/W up to 210 / 100 MB/s
  - BiCS4 pSLC R/W up to 240 / 120 MB/s
  - BiCS5 TLC R/W up to 220 / 100 MB/s
  - BiCS5 pSLC R/W up to 220 / 120 MB/s
- **Power Consumption**<sup>Note1</sup>
  - Read mode: 230 mA
  - Write mode: 220 mA
  - Suspend mode: 1.5 (mA)
- **Advanced Flash Management**
  - Bad Block Management
  - SMART
  - ECC
  - Wear Leveling
- **Low Power Management**
- **Temperature Range**
  - Operation (Standard): 0°C ~ 70°C
  - Operation (Wide): -40°C ~ 85°C
  - Storage: -40°C ~ 85°C
- **Compliant**
  - RoHS
  - CE & FCC

### Notes:

1. Please see "Power Consumption" for details.
2. The performance is obtained from CrystalDiskMark.

## 1. INTRODUCTION

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### 1.1. General Description

The UF3 is a super speed USB 3.2 GEN 1 removable flash disk drive with USB 3.2 GEN 1 connection (backward compatible with USB 2.0/1.1) and supports various storage capacities.

UF3 is so compact that you can take it with you anywhere in your pocket. With the high capacity of the UF3, you can use it as an external removable hard drive. Now, you don't have to carry a laptop computer with you to work if you have access to a computer. "Bring your data only." Moreover, UF3 **does not require** any battery, cables or software drivers. It is compatible with any desktop or notebook computers with USB port. Experience the light weighted, compact design, super performance and fast data transfer with

### 1.2. Flash management

#### 1.2.1 Error Correction Code (ECC)

Flash memory cells will deteriorate with use, which might generate random bit errors in the stored data. Thus, UF3 applies the BCH ECC algorithm, which can detect and correct errors occurred during read process, ensure data been read correctly, as well as protect data from corruption.

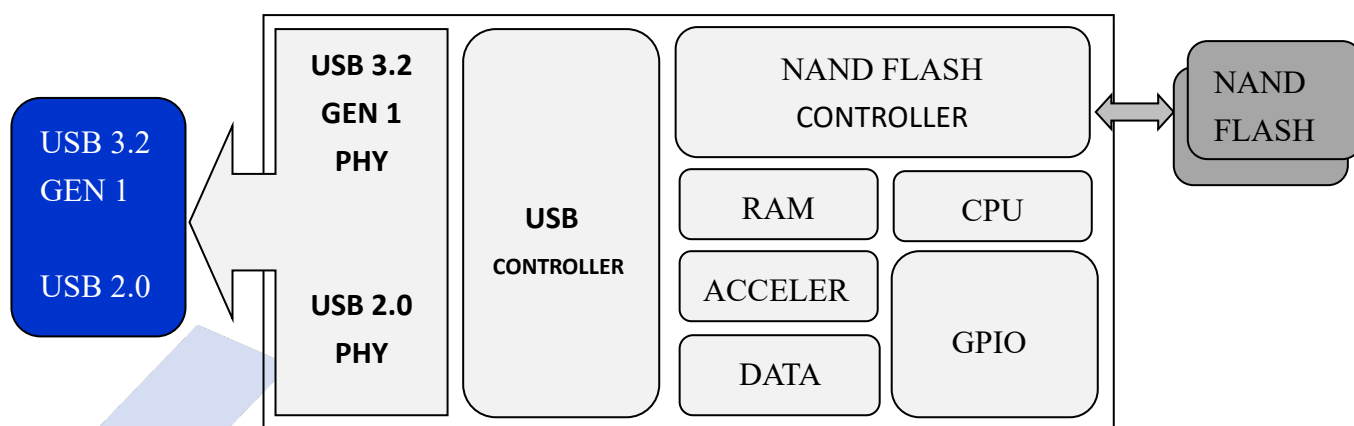
#### 1.2.2 Wear Leveling

NAND flash devices can only undergo a limited number of program/erase cycles, and in most cases, the flash media are not used evenly. If some area get updated more frequently than others, The lifetime of the device would be reduced significantly. Thus, wear leveling technique is applied to extend the lifespan of NAND flash by evenly distributing write and erase cycles across the media. UInfo provides advanced wear leveling algorithm, which can efficiently spread out the flash usage through the whole flash media area. Moreover, by implementing both dynamic and static wear leveling algorithms, the life expectancy of the NAND flash is greatly improved.

#### 1.2.3 Bad Block Management

Bad blocks are blocks that include one or more invalid bits, and their reliability is not guaranteed. Blocks that are identified and marked as bad by the manufacturer are referred to as "initial bad blocks". Bad blocks that are developed during the lifespan of the flash are named "later bad blocks". UInfo implements an efficient bad block management algorithm to detect the factory-produced bad blocks and manages any bad blocks that appear with use. The practice further prevents data being stored into bad blocks and improves the data reliability.

### 1.3. Block Diagram



Block Diagram

## 2. PRODUCT SPECIFICATIONS

- **Capacity**
  - BiCS3 TLC: 16GB-512GB
  - BiCS3 pSLC: 4GB-128GB
  - BiCS4 TLC: 32GB-512GB
  - BiCS4 pSLC 4GB-128GB
  - BiCS5 TLC: 64GB-512GB
  - BiCS5 pSLC: 8GB-128GB
- Compatible with USB specification revision 3.2 GEN1 and backward compatible 2.0 & 1.1
- Support Windows 2000 SP4 and Windows XP **without** device driver.
- Support Windows Vista, Windows 7, Windows 8 and Windows 10 **without** device driver.
- Support Linux Kernel ver 2.4.0 or above **without** device driver. (USB 1.1 speed)
- Support Linux Kernel ver 2.4.10 or above **without** device driver. (USB 2.0 speed)
- Support Linux Kernel ver 2.6.31 or later **without** device driver (USB 3.2 Gen1 speed).
- No external power is required - DC 4.5V ~ 5.5V from USB port.
- Low power consumption
- Hot Plug & Play without driver installation
- **Transfer rate for USB interface**
  - Super Speed up to 5Gbit/sec for USB 3.2 GEN 1
  - High speed up to 480Mbits/sec for USB 2.0
  - Full speed up to 12Mbits/sec for USB 1.1

➤ Performance

Flash Type	Capacity	Performance (MB/s) CrystalDisk Win10	
		Read	Write
BiCS3 TLC	16GB	240	50
	32GB	240	50
	64GB	240	100
	128GB	240	160
	256GB	240	160
	512GB	240	160
BiCS3 pSLC	4GB	240	50
	8GB	240	50
	16GB	240	100
	32GB	240	120
	64GB	240	160
	128GB	240	160
BiCS4 TLC	32GB	210	30
	64GB	210	30
	128GB	210	60
	256GB	210	100
	512GB	210	100
BiCS4 pSLC	8GB	240	50
	16GB	240	50
	32GB	240	50
	64GB	240	120
	128GB	240	120
BiCS5 TLC	64GB	200	40
	128GB	220	100
	256GB	220	100
	512GB	220	100
BiCS5 pSLC	8GB	210	60
	16GB	210	60
	32GB	210	60
	64GB	210	120
	128GB	210	120

The above values are for reference only, it may change according to the flash memory used.

### 3. ENVIRONMENTAL SPECIFICATIONS



#### 3.1. Environmental Conditions

##### 3.1.1. Temperature and Humidity

- Temperature:
  - Storage: -40°C to 85°C
  - Operational (Standard grade): 0°C to 70°C
  - Operational (Wide grade): -40°C to 85°C
- Humidity:
  - Standard grade: RH 90% under 40°C (operational)
  - Wide grade: RH 95% under 55°C (operational)

##### ➤ High Temperature Test Condition

	Temperature	Humidity	Test Time
Operation (Standard)	70°C	0% RH	72 hours
Operation (Wide)	85°C	0% RH	72 hours
Storage (Standard)	85°C	0% RH	72 hours
Storage (Wide)	85°C	0% RH	168 hours

Result: No any abnormality is detected.

##### ➤ Low Temperature Test Condition

	Temperature	Humidity	Test Time
Operation (Standard)	0°C	0% RH	72 hours
Operation (Wide)	-40°C	0% RH	72 hours
Storage (Standard)	-40°C	0% RH	72 hours
Storage (Wide)	-40°C	0% RH	168 hours

Result: No any abnormality is detected.

##### ➤ High Humidity Test Condition

	Temperature	Humidity	Test Time
Operation (Standard)	40°C	93% RH	24 hours
Operation (Wide)	55°C	95% RH	72 hours
Storage (Standard)	40°C	95% RH	72 hours
Storage (Wide)	55°C	95% RH	96 hours

Result: No any abnormality is detected.



## ➤ Temperature Cycle Test

	Temperature	Test Time	Cycle
Operation (Standard)	0°C	30 min	10 cycles
	70°C	30 min	
Operation (Wide)	-40°C	30 min	20 cycles
	85°C	30 min	
Storage (Standard)	-40°C	30 min	10 cycles
	85°C	30 min	
Storage (Wide)	-40°C	30 min	50 cycles
	85°C	30 min	

Result: No any abnormality is detected.

## 3.1.2. Shock

### ➤ Shock Specification

	Acceleration Force	Half Sin Pulse Duration
Non-Operational	1500G	0.5ms
Operational	1500G	0.5ms

Result: No any abnormality is detected when power on.

## 3.1.3. Vibration

### ■ Vibration Specification

	Condition		Vibration Orientation
	Frequency/Displacement	Frequency/Acceleration	
Operational	20Hz~80Hz/1.52mm	80Hz~2000Hz/20G	X, Y, Z axis/60 min for each

Result: No any abnormality is detected when power on.

## 3.1.4. Drop

### ■ Drop Specification

	Height of Drop	Number of Drop
Non-operational	80cm free fall	6 face of each unit, 2 times each

Result: No any abnormality is detected when power on.

### 3.1.5. Bending

■ Bending Specification

	Force	Action
Non-operational	≥ 20N	Hold 1min/5times

Result: No any abnormality is detected when power on.

### 3.1.6. Torque

■ Torque Specification

	Force	Action
Non-operational	1.263N-m or ±10 deg	Hold 1min/5times

Result: No any abnormality is detected when power on.

### 3.1.7. Electrostatic Discharge (ESD)

■ Contact ESD Specification

Device	Capacity	Temperature	Relative Humidity	+/- 4KV	Result
USB	128GB	24.0°C	49% (RH)	Device functions are affected, but EUT will be back to its normal or operational state automatically.	PASS

### 3.2. Certification

- RoHS
- CE / FCC

## 4. ELECTRICAL SPECIFICATIONS



### 4.1. Absolute Maximum Ratings

Parameter	Min.	Typ.	Max.	Unit
Operating Temperature (Commercial)	0	25	70	°C
Storage Temperature (Commercial)	-25	25	85	°C
Operating Temperature (Industrial)	-40	25	85	°C
Storage Temperature (Industrial)	-40	25	85	°C
1.1V regulator power supply	1.04	1.12	1.2	V
1.8V regulator power supply	1.76	1.86	2	V
3.3V Regulator Power Supply	3.15	3.3	3.45	V
5.0V Regulator Power Supply	3	5	5.5	V
2.5V regulator power supply	2.35	2.5	2.7	V
1.2V regulator power supply	1.13	1.2	1.3	V

### 4.2. Power Consumption

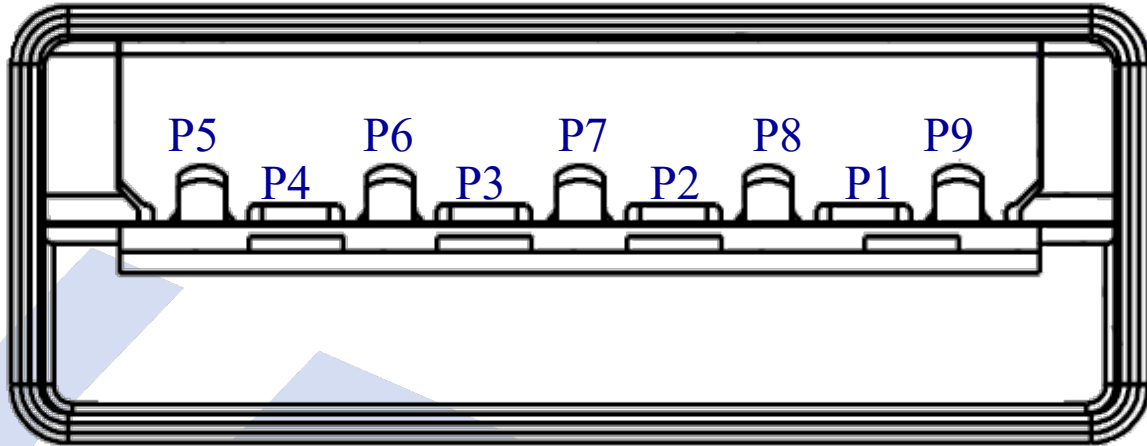
Power Consumption (mA)			
Read	Write	Normal	Suspend
230	216	75	1.20

The above values are for reference only, it may change according to the flash memory used.

## 5. INTERFACE



### 5.1. Pin Assignment and Descriptions



Pin Number	Type	Function
P1	V <sub>BUS</sub>	Power
P2	D-	USB 2.0 differential pair
P3	D+	USB 2.0 differential pair
P4	GND	Ground
P5	StdA_SSRX-	SuperSpeed receiver differential pair
P6	StdA_SSRX+	SuperSpeed receiver differential pair
P7	GND_DRAIN	Ground
P8	StdA_SSTX-	SuperSpeed receiver differential pair
P9	StdA_SSTX+	SuperSpeed receiver differential pair
Shell	Shield	Connector Shell

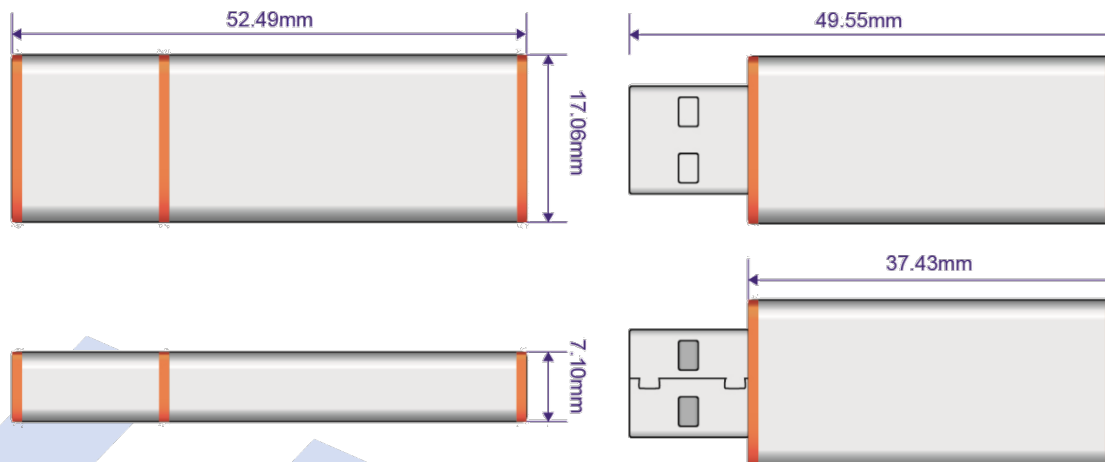
## 6. DC CHARACTERS



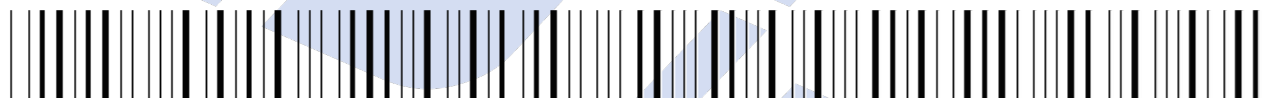
### DC characteristics of I/O Cells

Parameter		Min.	Typ.	Max.
Supply Voltage VDDIO (3.3V)		2.7V	3.3V	3.6V
Supply Voltage VDDIO (1.8V)		1.7V	1.8V	1.95V
VREF		0.49*VDDIO	0.5*VDDIO	0.51*VDDIO
VILH (3.3V)	AC Input High Voltage-VIH	0.8 * VDDIO		
	AC Input Low Voltage-VIL	0.2 * VDDIO		
	DC Input High Voltage-VIH	0.7 xVDDIO		VDDIO +0.3
	DC Input Low Voltage-VIL	VSSIO-0.3		0.3 * VDDIO
VILH (1.8V)	AC Input High Voltage-VIH	0.8 * VDDIO		
	AC Input Low Voltage-VIL	0.2 * VDDIO		
	DC Input High Voltage-VIH	0.7 xVDDIO		VDDIO +0.3
	DC Input Low Voltage-VIL	VSSIO-0.3		0.3 xVDDIO
	AC Input High Voltage-VIH	VREF + 0.250		
	AC Input Low Voltage-VIL	VREF - 0.250		
	DC Input High Voltage-VIH	VREF + 0.125		VDDIO +0.3
	DC Input Low Voltage-VIL	VSSIO-0.3		VREF - 0.125
Pu / Pd Resistance (Ω) (1.2V)	Pull-up 5K	3K	5K	7K
	Pull-up 5.5K	3.3K	5.5K	7.7K
	Pull-up 37.5K	22.5K	37.5K	52.5K
	Pull-down 37.5K	22.5K	37.5K	52.5K
Pu / Pd Resistance (Ω) (1.8V)	Pull-up 5K	3K	5K	7K
	Pull-up 5.5K	3.3K	5.5K	7.7K
	Pull-up 37.5K	22.5K	37.5K	52.5K
	Pull-down 37.5K	22.5K	37.5K	52.5K

## 7. PHYSICAL DIMENSION



## 8. BARCODE DESCRIPTION



U F 3 V 2 U H 5 1 2 G B A R P

Part Number  
Manufacturing

XXXXXXXXXX-YYMMDDXX

## 9. PARTNUMBER DECODER

UF3- V2UH<sup>8</sup>X<sup>9</sup>X<sup>10</sup>X<sup>11</sup>X<sup>12</sup> X<sup>13</sup> X<sup>14</sup> X<sup>15</sup>

X <sup>1</sup> X <sup>2</sup> X <sup>3</sup>	X <sup>4</sup> X <sup>5</sup>	X <sup>6</sup> X <sup>7</sup>	X <sup>8</sup> X <sup>9</sup> X <sup>10</sup> X <sup>11</sup> X <sup>12</sup>	X <sup>13</sup>	X <sup>14</sup>	X <sup>15</sup>
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			4GB	64GB	A: 3D TLC Standard (0°C ~ +70°C)		
UF3	V2	UH	8GB	128GB	B: 3D TLC Industrial (-40°C ~ +85°C)	F: Fixed	P
			16GB	256GB	V: 3D pSLC Standard (0°C ~ +70°C)	R: Removable	
			32GB	512GB	W: 3D pSLC Industrial (-40°C ~ +85°C)		