

UD info Corp.

Industrial USB FLASH DISK

MDU-AF Series

Product DataSheet

UD info CORP.

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Revision History

Revision	Draft Date	History	Author
1.0	2014/5/20	New release	Migo Huang
1.1	2014/1/8	<i>Modify Part number decoding</i>	Migo Huang



1 Description

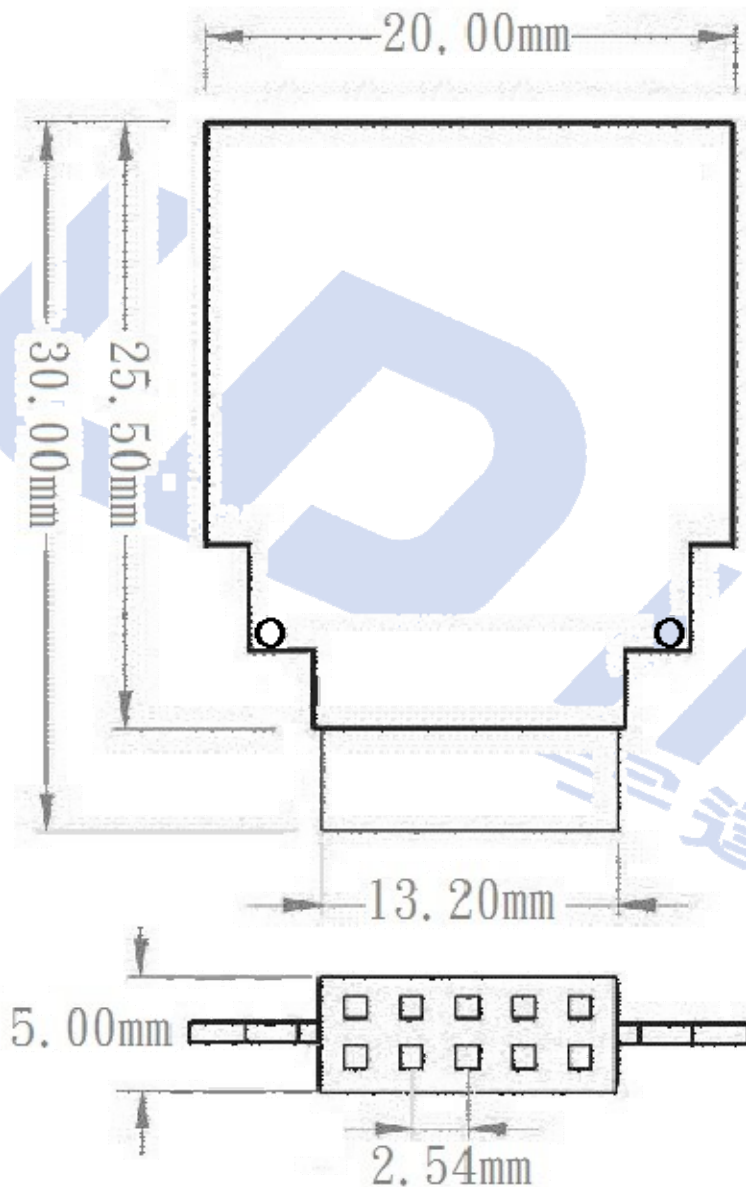
The MDU product provides high capacity. This USB Flash Disk, which is compatible of USB 2.0 and complies with High-speed USB 2.0 interface, has vertical and horizontal version as optional. The device feature's attractive small form factor, the connectivity over USB2.0, and the NAND flash architecture provide a faster data transmission rate.

2 Features

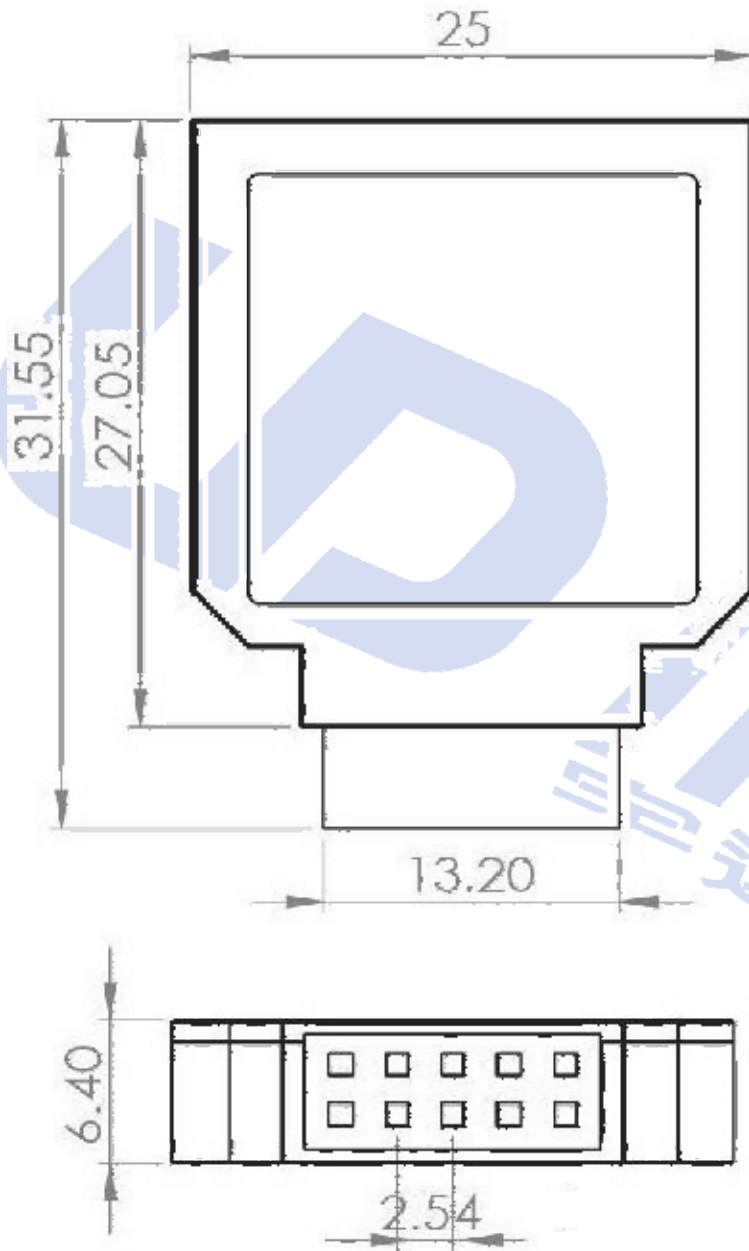
- Compliant with USB specification 2.0
- Support High-speed USB 2.0 interface
- backward compatible with USB 1.1
- Support low power mode
- Support smart application
 - Support partition management and lock disk function
 - Support password protection for access security
- No external power or battery needed
- LED indicates the usage status of USB Flash Disk

3 Dimensions

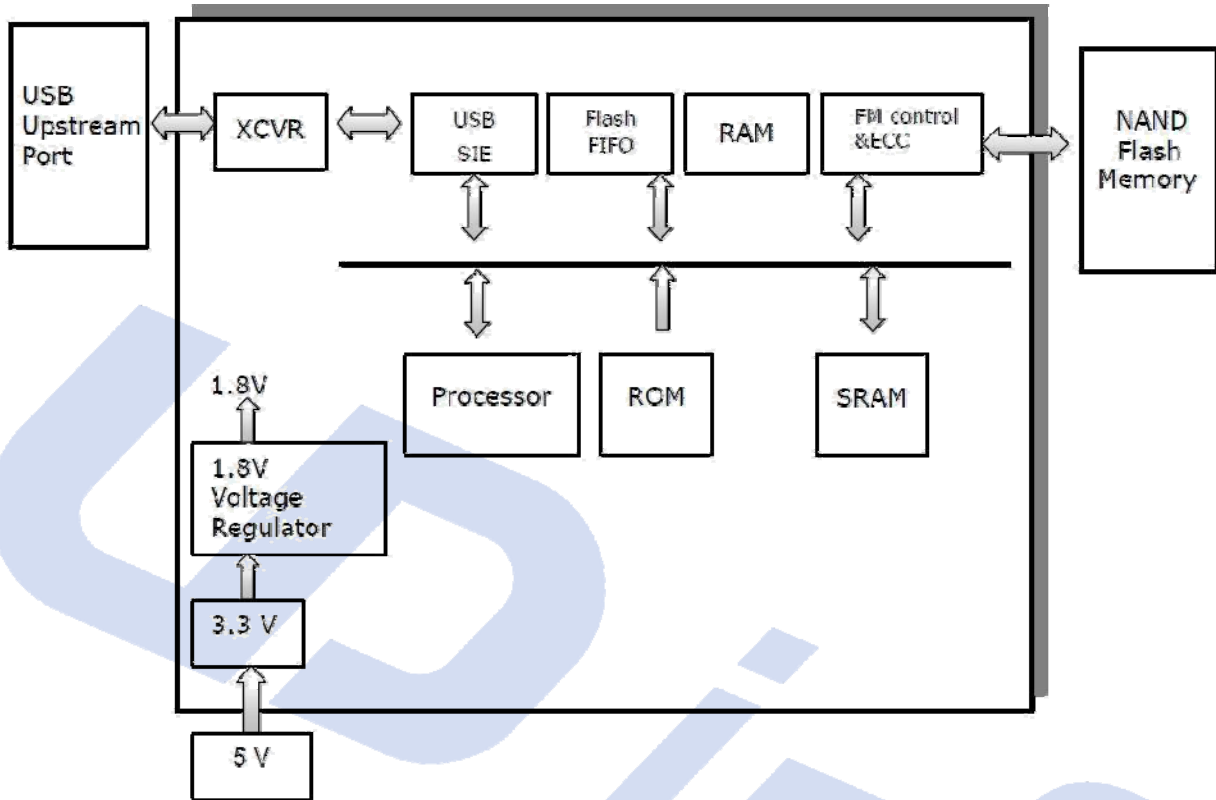
➤ Vertical Product



➤ Vertical Product (housing)



4 Block Diagram



5 Pin Assignments

Pin Number	Pin Name	Pin Number	Pin Name
1	VCC	2	NC
3	USB DATA -	4	NC
5	USB DATA +	6	NC
7	VSS	8	NC
9	NC	10	NC

6 Specifications

Host Interface	USB 2.0	
Storage Capacity	128MB-16GB	
Weight	18 g	
Data Retention	10 years	
MTBF	> 2,000,000 hours	
Erase Cycles	>100,000 times	
Media Transfer Rate	Read:	30M Byte/sec
	Write:	25M Byte /sec
Power Supply	DC 5V ± 10% via the USB port	
Temperature Range	Standard Temperature	Operation: 0°C~ +70°C Storage: -20°C~ +80°C
	Wide Temperature	Operation: -40°C~ +85°C Storage: -50°C~ +95°C
Driver	Only in Win98/Win98SE need.	

7 Electrical Characteristics

7.1 Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
AV_{CC5V}	5V Power Supply	-0.25 to $A_{CC} + 0.25$	V
V_{CC}	Power Supply	-0.3 to $V_{CC} + 0.3$	V
V_{IN}	Input Voltage	-0.3 to 3.6	V
V_{OUT}	Output Voltage	-0.3 to $V_{CC} + 0.3$	V
T_{STG}	Storage Temperature	-40 to 150	°C
V_{CC3V}	3.3V Power Supply	250	mA
V_{18}	1.8 Power Supply	250	mA

7.2 Recommended Operating Conditions

Symbol	Parameter	MIN	TYP	MAX	Unit
A_{DD}	5V Power Supply	4.0	5.0	5.25	V
V_{CC}	Power Supply	3.0	3.3	3.6	V
V_{DD}	Digital Supply	1.62	1.8	1.98	V
V_{IN}	Input Voltage	0	3.3	3.6	V
T_{OPRS}	Operating Standard Temperature	0		70	°C

7.3 General DC Characteristics

Symbol	Parameter	Condition	MIN	TYP	MAX	Unit
I_{IN}	Input current	No pull-up or pull-down	-10	±1	10	μA
I_{OZ}	Tri-state leakage current		-10	±1	10	μA
C_{IN}	Input capacitance	Pad Limit		2.8		pF
C_{OUT}	Output capacitance	Pad Limit		2.8		pF
C_{BID}	Bi-directional buffer capacitance	Pad Limit		2.8		pF

7.4 DC Electrical Characteristics of 3.3V I/O Cells

Symbol	Parameter	Condition	MIN	TYP	MAX	Unit
V _{CC}	Power supply	3.3V I/O	3.0	3.3	3.6	V
V _{il}	Input low voltage	LVTTTL			0.8	V
V _{ih}	Input high voltage		2.0			V
V _{ol}	Output low voltage	I _{ol} =2~16mA			0.4	V
V _{oh}	Output high voltage	I _{oh} =2~16mA	2.4			V
R _{pu}	Input pull-up resistance	PU=high, PD=low	55	75	110	KΩ
R _{pd}	Input pull-down resistance	PU=low, PD=high	40	75	150	KΩ
I _{in}	Input leakage current	V _{in} = VCC or 0	-10	±1	10	μA
I _{oz}	Tri-state output leakage current		-10	±1	10	μA

7.5 USB Transceiver electrical characteristics

Symbol	Parameter	Condition	MIN	MAX	Unit
AV _{CC}	Analog supply Voltage		3.0	3.6	V
V _{CC}	Digital supply Voltage		1.62	1.98	V
I _{CC}	Operating supply current	High speed operating at 480 MHz		55	mA
I _{CC (susp)}	Suspend supply current	In suspend mode, current with 1.5kΩ pull-up resistor on pin RPU disconnected		120	μA

7.6 Static characteristic : Digital pin

Symbol	Parameter	MIN	MAX	Unit
Input levels				
V_{IL}	Low-level input voltage		0.8	V
V_{IH}	High-level input voltage	2.0		V
Output levels				
V_{OH}	High-level output voltage	VCCH-0.2		V
V_{OL}	Low-level output voltage		0.2	V

$$AV_{CC} = 3.0V \sim 3.$$

6V ; VDDU, $V_{CC} = 1.62V \sim 1.98V$; Temp = $0^{\circ}C \sim 70^{\circ}C$

7.7 Static characteristic : Analog I/O pins (DP/DM)

Symbol	Parameter	Condition	MIN	TYP	MAX	Unit
USB2.0 Transceiver (HS)						
Input Levels (differential receiver)						
V_{HSDIFF}	High speed differential input sensitivity	$ V_{I(DP)} - V_{I(DM)} $ measured at the connection as application circuit	300			mV
V_{HSCM}	High speed data signaling common mode voltage range		-50		500	mV
V_{HSSQ}	High speed squelch detection threshold	Squelch detected			100	mV
		No squelch detected	150			mV
V_{HSDSC}	High speed disconnection detection threshold	Disconnection detected	625			mV
		Disconnection not detected			525	mV

Output Levels						
V_{HSOI}	High speed idle level output voltage(differential)		-10		10	mV
V_{HSOL}	High speed low level output voltage(differential)		-10		10	mV
V_{HSOH}	High speed high level output voltage(differential)		-360		400	mV
V_{CHIRPJ}	Chirp-J output voltage(differential)		700		1100	mV
V_{CHIRPK}	Chirp-K output voltage(differential)		-900		-500	mV
Resistance						
R_{DRV}	Driver output impedance	Equivalent resistance used as internal chip only	3	6	9	Ω
		Overall resistance including external resistor	40.5	45	49.5	Ω
Termination						
V_{TERM}	Termination voltage for pull-up resistor on pin RPU		3.0		3.6	V
USB1.1 Transceiver(FS/LS)						
Input Levels(differential receiver)						
V_{DI}	Differential input sensitivity	$ V_{I(DP)} - V_{I(DM)} $	0.2			V
V_{CM}	Differential common mode voltage		0.8		2.5	V
Input Levels(single-ended receivers)						
V_{SE}	Single ended receiver threshold		0.8		2.0	V
Output levels						
V_{OL}	Low-level output voltage		0		0.3	V
V_{OH}	High-level output voltage		2.8		3.6	V

$AV_{CC}=3.0V\sim 3.6V$; $V_{CC}=1.62V\sim 1.98V$; $Temp=0^{\circ}C\sim 70^{\circ}C$

7.8 Dynamic characteristic

Symbol	Parameter	Condition	MIN	TYP	MAX	Unit
Driver Characteristics						
High-Speed Mode						
t_{HSR}	High-speed differential rise time		500			ps
t_{HSF}	High-speed differential fall time		500			ps
Full-Speed Mode						
t_{FR}	Rise time	CL=50pF; 10 to 90 % of $ V_{OH}-V_{OL} $	4		20	ns
t_{FF}	Fall time	CL=50pF; 90 to 10 % of $ V_{OH}-V_{OL} $	4		20	ns
t_{FRMA}	Differential rise/fall time matching (t_R / t_{FF})	Excluding the first transition from idle mode	90		110	%
V_{CRS}	Output signal crossover voltage	Excluding the first transition from idle mode	1.3		2.0	V
Low-Speed Mode						
t_{LR}	Rise time	CL=200pF -600pF 10 to 90 % of $ V_{OH}-V_{OL} $	75		300	ns
t_{LF}	Fall time	CL=200pF -600pF 90 to 10 % of $ V_{OH}-V_{OL} $	75		300	ns
t_{LRMA}	Differential rise/fall time matching (t_{LR} / t_{LF})	Excluding the first transition from idle mode	80		125	%
V_{CRS}	Output signal crossover voltage	Excluding the first transition from idle mode	1.3		2.0	V
V_{OH}	High-level output voltage		2.8		3.6	V

8 Part number Decoder

MDU-X⁴X⁵AFX⁸X⁹X¹⁰X¹¹X¹² X¹³ X¹⁴ X¹⁵

X ¹ X ² X ³	X ⁴ X ⁵	X ⁶ X ⁷	X ⁸ X ⁹ X ¹⁰ X ¹¹ X ¹²	X ¹³	X ¹⁴	X ¹⁵
MDU	0V	AF	128MB 002GB 256MB 004GB 512MB 008GB 001GB 016GB	P	C I	F R
<p>X¹⁴ C: Standard (0°C ~ +70°C) I: Industrial (-40°C ~ +85°C)</p> <p>X¹⁵ F: Fixed mode R: Removable mode</p>						