

# UD info Corp.

Industrial SD Card  
SDC-09UD (3D NAND)  
Product DataSheet

**UD info CORP.**

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## Revision History

Revision	Draft Date	History	Author
1.0	2018/3/12	New release	Golden Lee
1.1	2018/9/20	Update performance	Golden Lee
1.2	2019/1/7	Update P/N decoder Update Performance	Golden Lee



## Product Overview

- **Capacity**
  - 3D TLC: 16GB up to 256GB
  - 3D pSLC: 8GB up to 64GB
- **Flash Type**
  - Flash Type: 3D NAND
- **Bus Speed Mode**
  - UHS-I
- **Performance**
  - Read up to 95MB/s
  - Write up to 75MB/s
- **Power Consumption<sup>Note1</sup>**
  - Power Up Current < 250uA
  - Standby Current < 1000uA
  - Read Current < 400mA
  - Write Current < 400mA
- **Advanced Flash Management**
  - Static and Dynamic Wear Leveling
  - Bad Block Management
  - Auto-Read Refresh
  - Embedded mode
- **CPRM (Content Protection for Recordable Media)**
- **Temperature Range**
  - Operation (Standard): 0°C ~ 70°C
  - Operation (Gold): -25°C ~ 85°C
  - Operation (Wide): -40°C ~ 85°C
  - Storage: -40°C ~ 85°C
- **Compliant**
  - RoHS
  - CE & FCC

### Notes:

1. Please see "Power Consumption" for details.

## 1. INTRODUCTION

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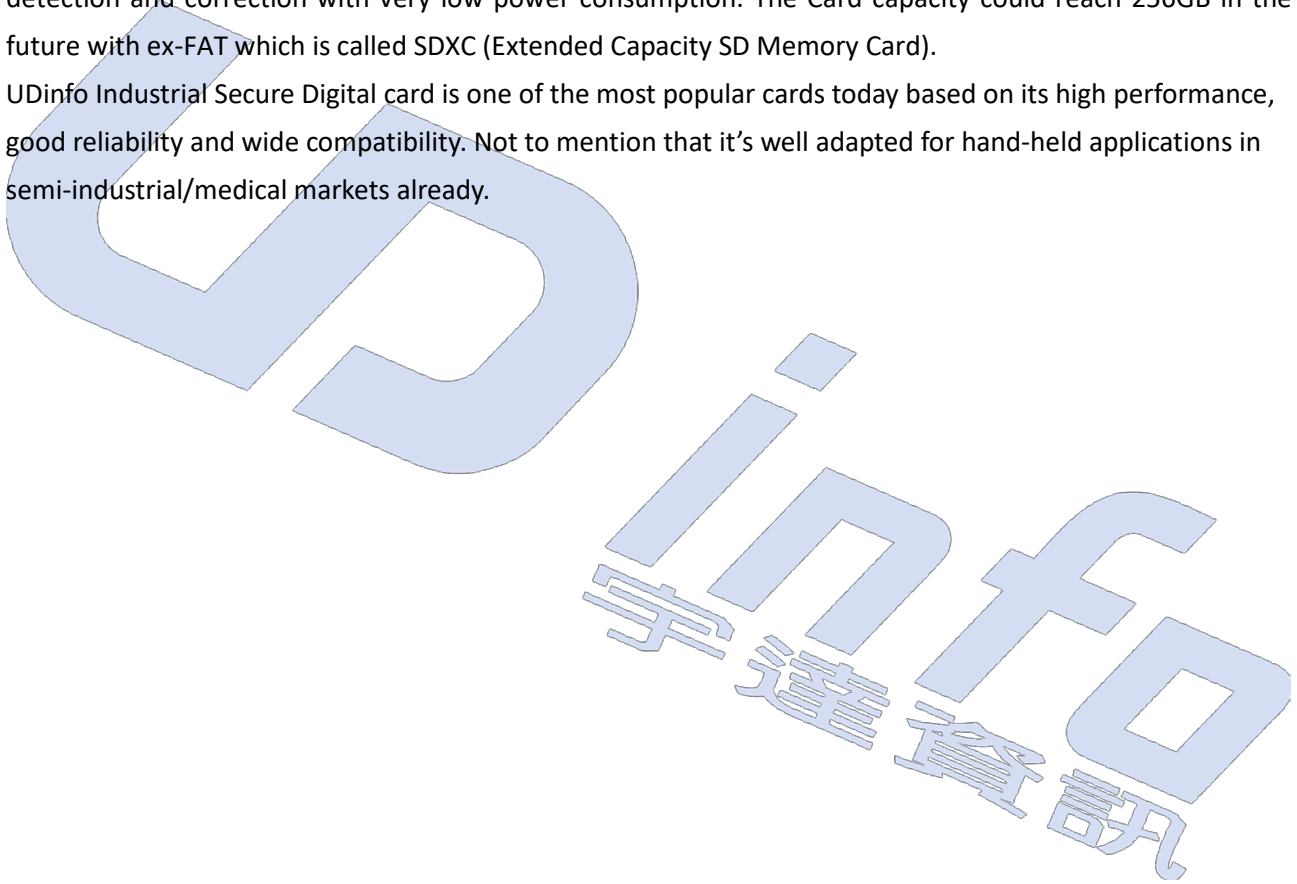


### 1.1. General Description

The Secure Digital (SD) card version 6.10 is fully compliant with the specification released by SD Card Association. The Command List supports [Part 1 Physical Layer Specification Ver6.10 Final] definitions. Card capacities of non-secure area and secure area support [Part 3 Security Specification Ver4.0 Final] Specifications.

The SD card is based on 9-pin interface, designed to operate at a maximum operating frequency of 100MHz. It can alternate communication protocol between the SD mode and SPI mode. It performs data error detection and correction with very low power consumption. The Card capacity could reach 256GB in the future with ex-FAT which is called SDXC (Extended Capacity SD Memory Card).

UDinfo Industrial Secure Digital card is one of the most popular cards today based on its high performance, good reliability and wide compatibility. Not to mention that it's well adapted for hand-held applications in semi-industrial/medical markets already.



## 2. PRODUCT SPECIFICATIONS



- **Capacity**
    - 3D TLC: 16GB up to 256GB
    - 3D pSLC: 8GB up to 64GB
  - **Operation Temp. Range**
    - Standard: 0°C ~ 70°C
    - Gold: -25°C ~ 85°C
    - Wide: -40°C ~ 85°C
  - **Storage Temp. Range**
    - -40°C ~ 85°C
  - **Support SD system specification version 3.0**
  - **Card capacity of non-secure area and secure area support [Part 3 Security Specification Ver4.0 Final] Specifications**
  - **Support SD SPI mode**
  - **Designed for read-only and read/write cards**
  - **Bus Speed Mode (use 4 parallel data lines)**
    - **UHS-I mode**
      - SDR12: SDR up to 25MHz, 1.8V signaling
      - SDR25: SDR up to 50MHz, 1.8V signaling
      - SDR50: 1.8V signaling, frequency up to 100MHz, up to 50 MB/sec
      - SDR104: 1.8V signaling, frequency up to 208MHz, up to 104 MB/sec
      - DDR50: 1.8V signaling, frequency up to 50MHz, sampled on both clock edges, up to 50 MB/sec
- Note:** Timing in 1.8V signaling is different from that of 3.3V signaling.
- **The command list supports [Part 1 Physical Layer Specification Ver6.10 Final] definitions**
  - **Copyrights Protection Mechanism**
    - Compliant with the highest security of SDMI standard
  - **Support CPRM (Content Protection for Recordable Media) of SD Card**
  - **Password Protection of cards (optional)**
  - **Write Protect feature using mechanical switch**
  - **Built-in write protection features (permanent and temporary)**

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- $\pm 4$ KV ESD protection in contact pads
- Operation voltage range: 2.7 ~ 3.6V
- Performance

Capacity	Specification	Flash			Sequential	
		Density	Process	Bit-per-cell	Read (MB/s)	Write (MB/s)
16GB	CL10, V10, A1	16GB x 1	Bics3	TLC	95	30
32GB	CL10, V30, A1	16GB x 2	Bics3	TLC	95	60
	CL10, V10, A1	32GB x 1	Bics3	TLC	95	30
	CL10, high reliability	32GB x 1	Bics3	TLC	95	15
64GB	CL10, V30, A1	16GB x 4	Bics3	TLC	95	75
	CL10, V30, A1	32GB x 2	Bics3	TLC	95	60
	CL10, high reliability	32GB x 2	Bics3	TLC	95	25
128GB	CL10, V30, A1	32GB x 4	Bics3	TLC	95	75
	CL10, high reliability	32GB x 4	Bics3	TLC	95	25
256GB	CL10, V30, A1	32GB x 8	Bics3	TLC	95	75
	CL10, high reliability	32GB x 8	Bics3	TLC	95	25
8GB	CL10, V30, A1	32GB x 1	Bics3	pSLC	95	55
16GB	CL10, V30, A1	32GB x 2	Bics3	pSLC	95	75
32GB	CL10, V30, A1	32GB x 4	Bics3	pSLC	95	75
64GB	CL10, V30, A1	32GB x 8	Bics3	pSLC	95	75

### 3. ENVIRONMENTAL SPECIFICATIONS



#### 3.1. Environmental Conditions

##### Temperature and Humidity

- Storage Temperature Range
  - -40°C ~ 85°C
- Operation Temperature Range
  - Standard Temperature: 0°C ~ 70°C
  - Gold Temperature: -25°C ~ 85°C
  - Wide Temperature: -40°C ~ 85°C

**Table 3-1 High Temperature Test Condition (Standard)**

	Temperature	Humidity	Test Time
<b>Operation</b>	85°C	0% RH	168 hours
<b>Storage</b>	85°C	0% RH	500 hours

**Result:** No any abnormality is detected.

**Table 3-2 High Temperature Test Condition (Wide)**

	Temperature	Humidity	Test Time
<b>Operation</b>	85°C	0% RH	300 hours
<b>Storage</b>	85°C	0% RH	500 hours

**Result:** No any abnormality is detected.

**Table 3-3 Low Temperature Test Condition (Standard)**

	Temperature	Humidity	Test Time
<b>Operation</b>	-25°C	0% RH	168 hours
<b>Storage</b>	-40°C	0% RH	300 hours

**Result:** No any abnormality is detected.

**Table 3-4 Low Temperature Test Condition (Wide)**

	Temperature	Humidity	Test Time
<b>Operation</b>	-40°C	0% RH	168 hours
<b>Storage</b>	-40°C	0% RH	500 hours

**Result:** No any abnormality is detected.



**Table 3-5 High Humidity Test Condition**

	Temperature	Humidity	Test Time
<b>Operation</b>	40°C	95% RH	4 hours
<b>Storage</b>	40°C	95% RH	500 hours

**Result:** No any abnormality is detected.

**Table 3-6 High Humidity Test Condition**

	Temperature	Humidity	Test Time
<b>Operation</b>	55°C	95% RH	4 hours
<b>Storage</b>	55°C	95% RH	500 hours

**Result:** No any abnormality is detected.

**Table 3-7 Temperature Cycle Test (Standard)**

	Temperature	Test Time	Cycle
<b>Operation</b>	-25°C	30 min	20 Cycles
	85°C	30 min	
<b>Storage</b>	-40°C	30 min	20 Cycles
	85°C	30 min	

**Result:** No any abnormality is detected.

**Table 3-8 Temperature Cycle Test (Wide)**

	Temperature	Test Time	Cycle
<b>Operation</b>	-40°C	30 min	20 Cycles
	85°C	30 min	
<b>Storage</b>	-40°C	30 min	50 Cycles
	85°C	30 min	

**Result:** No any abnormality is detected.

**Shock**

**Table 3-9 Shock Specification**

	Acceleration Force	Half Sin Pulse Duration
Industrial SD card	1500G	0.5ms

**Result:** No any abnormality is detected when power on.

**Vibration**

**Table 3-10 Vibration Specification**

	Condition		Vibration Orientation
	Frequency/Displacement	Frequency/Acceleration	
Industrial SD card	20Hz~80Hz/1.52mm	80Hz~2000Hz/20G	X, Y, Z axis/30 min for each

**Result:** No any abnormality is detected when power on.

**Drop**

**Table 3-11 Drop Specification**

	Height of Drop	Number of Drop
Industrial SD card	150cm free fall	6 face of each unit

**Result:** No any abnormality is detected when power on.

**Bending**

**Table 3-12 Bending Specification**

	Force	Action
Industrial SD card	≥ 10N	Hold 1min/5times

**Result:** No any abnormality is detected when power on.

**Torque**

**Table 3-13 Torque Specification**

	Force	Action
Industrial SD card	0.15N-m or +/-2.5 deg	Hold 30 seconds/5times

**Result:** No any abnormality is detected when power on.

**Salt Spray Test**

**Table 3-14 Salt Spray Test**

	Temperature	Concentration	Duration
Industrial SD card	35°C	3% NaCl	Storage for 24 hours

**Result:** No any abnormality is detected when power on.

**Waterproof Test**

**Table 3-15 Waterproof Test**

	Condition	Duration
Industrial SD card	Water temperature: 25°C Water depth: The lowest point of unit is locating 1000mm below surface.	Submerge for 30 minutes

**Result: JIS IPX7 compliance.** No any abnormality is detected when power on

**X-Ray Exposure Test**

**Table 3-16 X-Ray Exposure Test**

	Condition	Duration
Industrial SD card	0.1 Gy of medium energy radiation (70 keV to 140keV, cumulative does per year) to both sides of the card.	Storage for 30mins

**Result: ISO 7816-1 compliance.** No any abnormality is detected when power on

**Switch Cycle Test**

**Table 3-17 Switch Cycle Test**

	Applied Force	Result
Industrial SD card	0.4~0.5 N 1000 times	PASS

**Result:** No any abnormality is detected when power on

**Durability Test**

**Table 3-18 Durability Test**

	Mating cycle	Result
Industrial SD card	10000 times	PASS

**Result:** No any abnormality is detected when power on

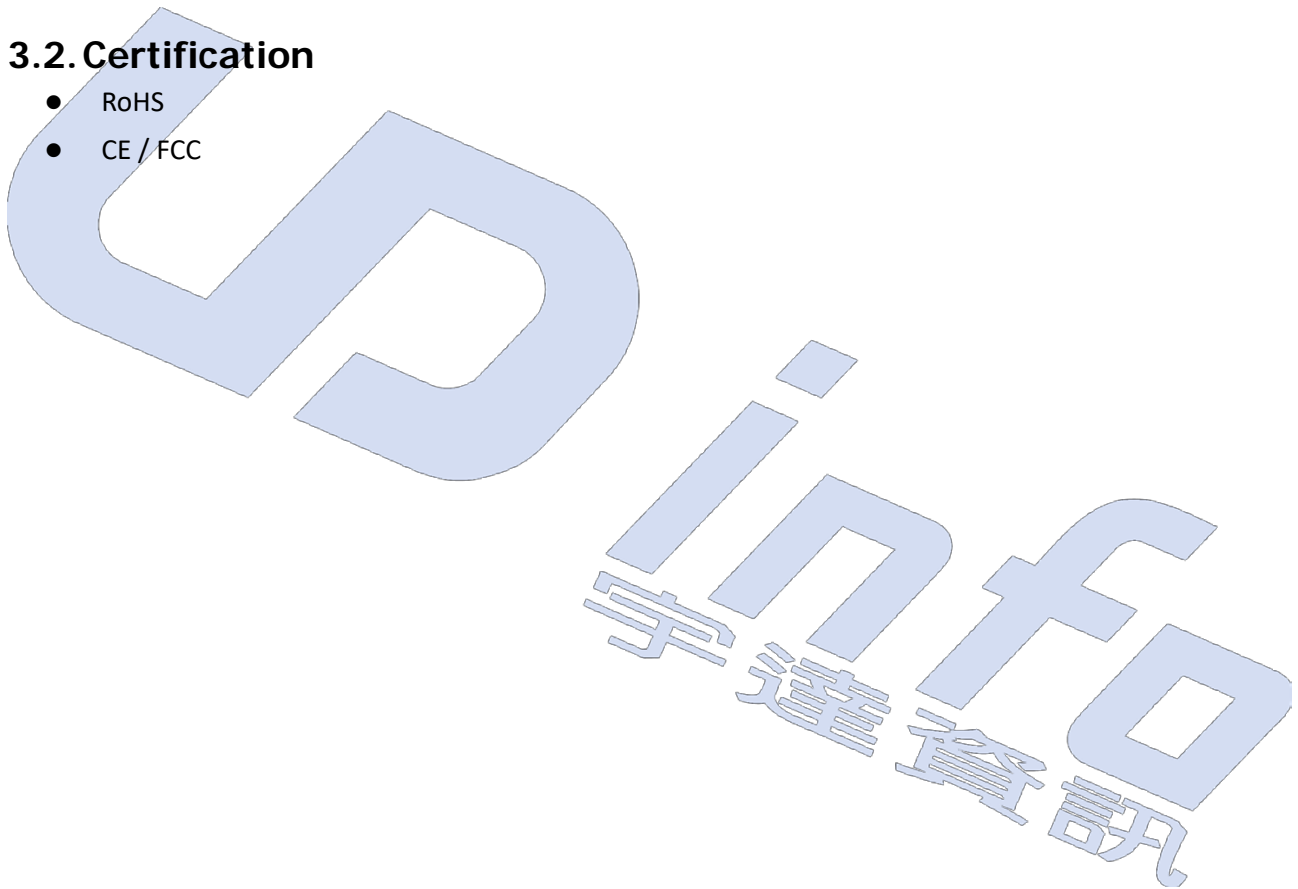
**Electrostatic Discharge (ESD)**

**Table 3-19 Contact ESD Specification**

	Condition	Result
Industrial SD card	Contact: +/- 4KV each item 25 times Air: +/- 8KV 10 times	PASS

**3.2. Certification**

- RoHS
- CE / FCC



## 4. SD CARD COMPARISON



Table 4-1 Comparing SD6.X Standard / SD6.0 SDHC and SD6.0 SDXC

	SD6.10 Standard	SD6.10 SDHC	SD6.10 SDXC
Addressing Mode	Byte (1 byte unit)	Block (512 byte unit)	Block (512 byte unit)
HCS/CCS bits of ACMD41	Support	Support	Support
CMD8 (SEND_IF_COND)	Support	Support	Support
CMD16 (SET_BLOCKLEN)	Support	Support (Only CMD42)	Support (Only CMD42)
Partial Read	Support	Not Support	Not Support
Lock/Unlock Function	Mandatory	Mandatory	Mandatory
Write Protect Groups	Optional	Not Support	Not Support
Supply Voltage 2.0v – 2.7v (for initialization)	Not Support	Not Support	Not Support
Total Bus Capacitance for each signal line	40pF	40pF	40pF
CSD Version (CSD_STRUCTURE Value)	1.0 (0x0)	2.0 (0x1)	2.0 (0x1)
Speed Class	Optional	Mandatory (Class 2 / 4 / 6 / 10)	Mandatory (Class 2 / 4 / 6 / 10)

## 5. ELECTRICAL SPECIFICATIONS



### 5.1. Power Consumption

The table below is the power consumption of SD card with different flash memory types.

**Table 5-1 Power Consumption of Industrial SD card**

Flash Mode		Max. Power Up Current (uA)	Max. Standby Current (uA)	Max. Read Current (mA)	Max. Write Current (mA)
Default Speed Mode		250	1000	150	150
High Speed Mode		250	1000	200	200
UHS-I Mode	UHS50/DDR50	250	1000	400	400
	UHS104	250	1000	400	400

**Note:**

1. Data transfer mode is single channel.
2. Power consumption may differ according to flash configuration, SDR configuration, or platform

### 5.2. DC Characteristic

#### 5.2.1. Bus Operation Conditions for 3.3V Signaling

**Table 5-2 Threshold Level for High Voltage Range**

Parameter	Symbol	Min.	Max	Unit	Condition
Supply Voltage	VDD	2.7	3.6	V	
Output High Voltage	VOH	0.75*VDD		V	IOH=-2mA VDD Min
Output Low Voltage	VOL		0.125*VDD	V	IOL=2mA VDD Min
Input High Voltage	VIH	0.625*VDD	VDD+0.3	V	
Input Low Voltage	VIL	VSS-0.3	0.25*VDD	V	
Power Up Time			250	ms	From 0V to VDD min

**Table 5-3 Peak Voltage and Leakage Current**

Parameter	Symbol	Min	Max.	Unit	Remarks
Peak voltage on all lines		-0.3	V <sub>DD</sub> +0.3	V	
<b>All Inputs</b>					
Input Leakage Current		-10	10	uA	
<b>All Outputs</b>					
Output Leakage Current		-10	10	uA	

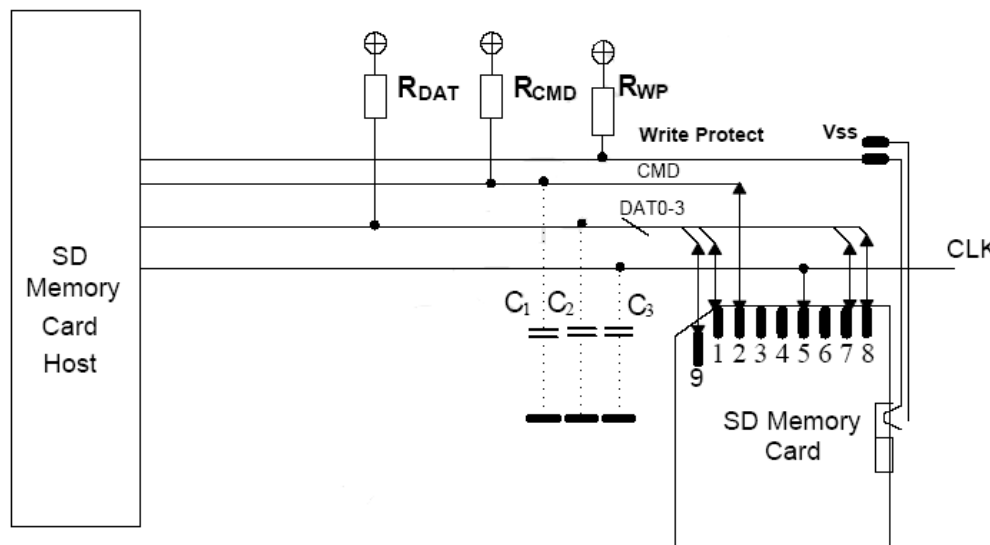
**Table 5-4 Threshold Level for 1.8V Signaling**

Parameter	Symbol	Min.	Max	Unit	Condition
Supply Voltage	VDD	2.7	3.6	V	
Regulator Voltage	VDDIO	1.7	1.95	V	Generated by VDD
Output High Voltage	VOH	1.4	-	V	IOH=-2mA
Output Low Voltage	VOL	-	0.45	V	IOL=2mA
Input High Voltage	VIH	1.27	2.00	V	
Input Low Voltage	VIL	Vss-0.3	0.58	V	

**Table 5-5 Input Leakage Current for 1.8V Signaling**

Parameter	Symbol	Min	Max.	Unit	Remarks
Input Leakage Current		-2	2	uA	DAT3 pull-up is disconnected.

**5.2.2. Bus Signal Line Load**



**Figure 5-1 Bus Circuitry Diagram**

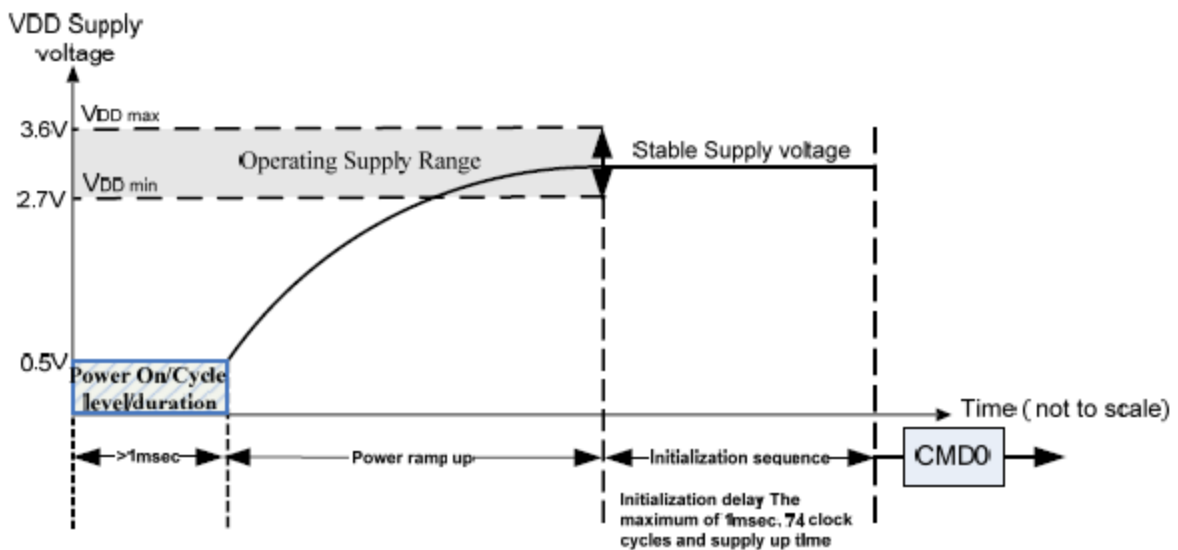
**Bus Operation Conditions – Signal Line’s Load**

Total Bus Capacitance = CHOST + CBUS + N CCARD

Parameter	symbol	Min	Max	Unit	Remark
Pull-up resistance	$R_{CMD}$ $R_{DAT}$	10	100	k $\Omega$	to prevent bus floating
Total bus capacitance for each signal line	$C_L$		40	pF	1 card CHOST+CBUS shall not exceed 30 pF
Card Capacitance for each signal pin	CCARD		10	pF	
Maximum signal line inductance			16	nH	
Pull-up resistance inside card (pin1)	RDAT3	10	90	k $\Omega$	May be used for card detection
Capacity Connected to Power Line	CC		5	uF	To prevent inrush current

**5.2.3. Power Up Time**

Host needs to keep power line level less than 0.5V and more than 1ms before power ramp up.



**Power On or Power Cycle**

Followings are requirements for Power on and Power cycle to assure a reliable SD Card hard reset.

- (1) Voltage level shall be below 0.5V.
- (2) Duration shall be at least 1ms.

**Power Supply Ramp Up**

The power ramp up time is defined from 0.5V threshold level up to the operating supply voltage which is

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stable between VDD (min.) and VDD (max.) and host can supply SDCLK.

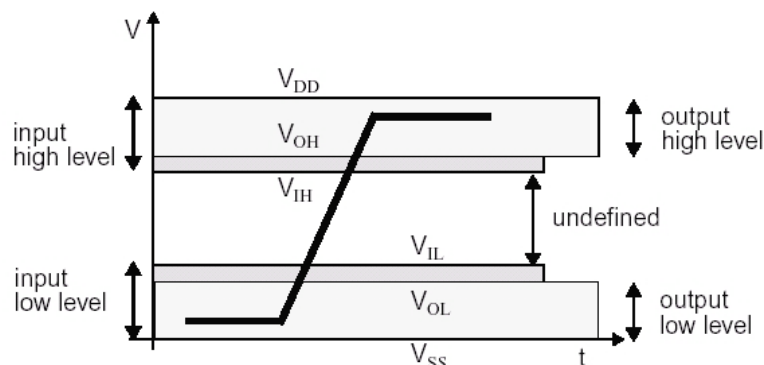
Followings are recommendations of Power ramp up:

- (1) Voltage of power ramp up should be monotonic as much as possible.
- (2) The minimum ramp up time should be 0.1ms.
- (3) The maximum ramp up time should be 35ms for 2.7-3.6V power supply.

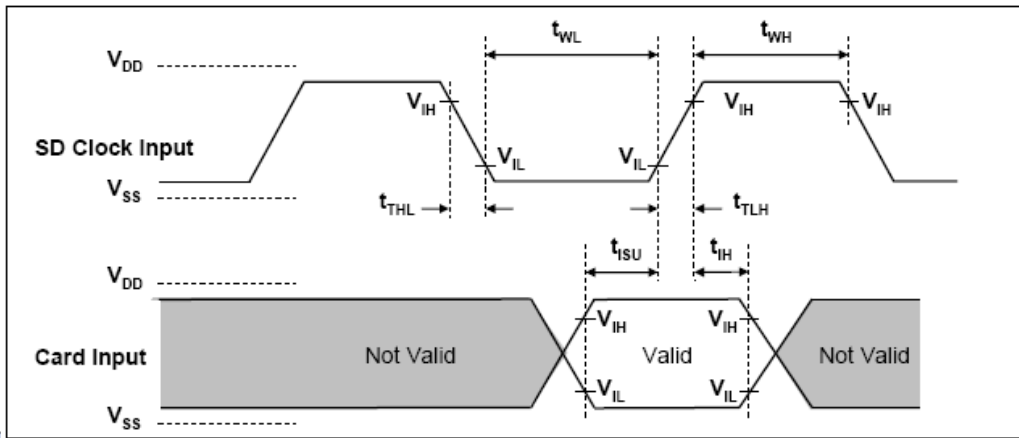
### Power Down and Power Cycle

- (1) When the host shuts down the power, the card VDD shall be lowered to less than 0.5Volt for a minimum period of 1ms. During power down, DAT, CMD, and CLK should be disconnected or driven to logical 0 by the host to avoid a situation that the operating current is drawn through the signal lines.
- (2) If the host needs to change the operating voltage, a power cycle is required. Power cycle means the power is turned off and supplied again. Power cycle is also needed for accessing cards that are already in *Inactive State*. To create a power cycle the host shall follow the power down description before power up the card (i.e. the card VDD shall be once lowered to less than 0.5Volt for a minimum period of 1ms).

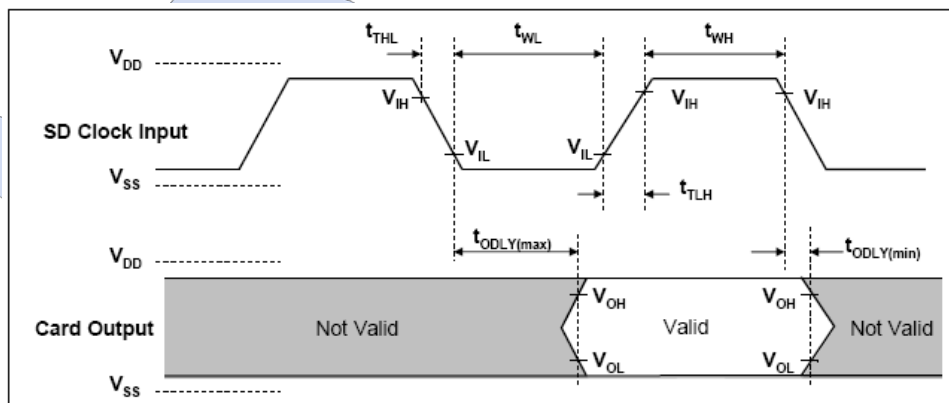
### 5.3. AC Characteristic



5.3.1. SD Interface Timing (Default)



Card Input Timing (Default Speed Card)



Card Output Timing (Default Speed Mode)

Parameter	Symbol	Min	Max	Unit	Remark
<b>Clock CLK (All values are referred to min(V<sub>IH</sub>) and max(V<sub>IL</sub>))</b>					
Clock frequency Data Transfer Mode	f <sub>PP</sub>	0	25	MHz	C <sub>card</sub> ≤ □ 10 pF (1 card)
Clock frequency Identification Mode	f <sub>OD</sub>	0(1)/100	400	kHz	C <sub>card</sub> ≤ □ 10 pF (1 card)
Clock low time	t <sub>WL</sub>	10		ns	C <sub>card</sub> ≤ □ 10 pF (1 card)
Clock high time	t <sub>WH</sub>	10		ns	C <sub>card</sub> ≤ □ 10 pF (1 card)
Clock rise time	t <sub>TLH</sub>		10	ns	C <sub>card</sub> ≤ □ 10 pF (1 card)
Clock fall time	t <sub>THL</sub>		10	ns	C <sub>card</sub> ≤ □ 10 pF (1 card)
<b>Inputs CMD, DAT (referenced to CLK)</b>					
Input set-up time	t <sub>ISU</sub>	5		ns	C <sub>card</sub> ≤ □ 10 pF (1 card)
Input hold time	t <sub>IH</sub>	5		ns	C <sub>card</sub> ≤ □ 10 pF

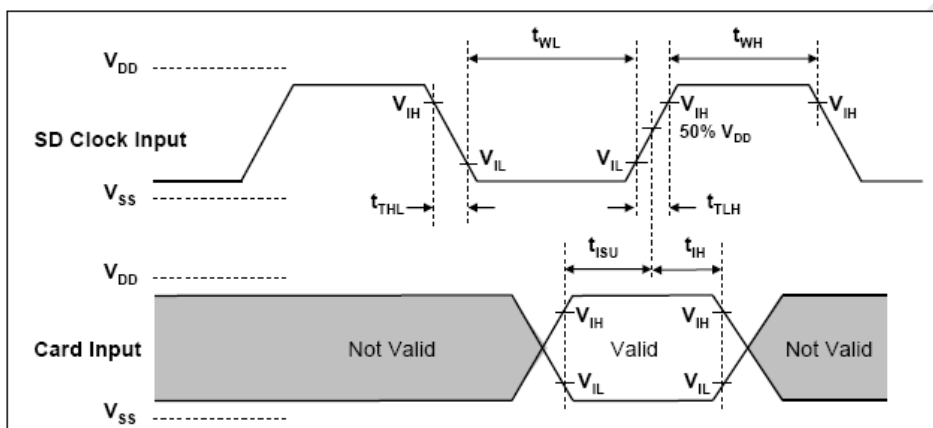
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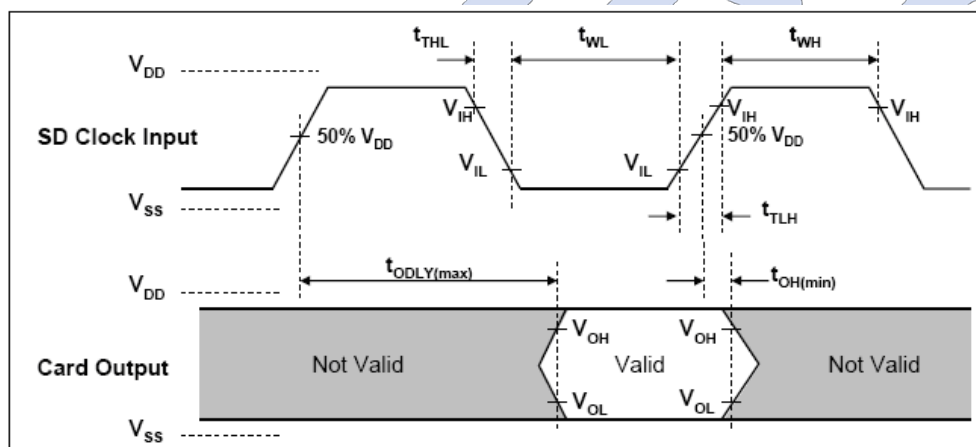
					(1 card)
<b>Outputs CMD, DAT (referenced to CLK)</b>					
Output Delay time during Data Transfer Mode	$t_{ODLY}$	0	14	ns	$C_L \leq 40$ pF (1 card)
Output Delay time during Identification Mode	$t_{ODLY}$	0	50	ns	$C_L \leq 40$ pF (1 card)

(1) 0Hz means to stop the clock. The given minimum frequency range is for cases where continuous clock is required.

### 5.3.2. SD Interface Timing (High-Speed Mode)



Card Input Timing (High Speed Card)



Card Output Timing (High Speed Mode)

Parameter	Symbol	Min	Max	Unit	Remark
<b>Clock CLK (All values are referred to min(<math>V_{IH}</math>) and max(<math>V_{IL}</math>))</b>					
Clock frequency Data Transfer Mode	$f_{PP}$	0	50	MHz	$C_{card} \leq 10$ pF (1 card)
Clock low time	$t_{WL}$	7		ns	$C_{card} \leq 10$ pF (1 card)

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Clock high time	$t_{WH}$	7		ns	$C_{card} \leq 10 \text{ pF}$ (1 card)
Clock rise time	$t_{TLH}$		3	ns	$C_{card} \leq 10 \text{ pF}$ (1 card)
Clock fall time	$t_{THL}$		3	ns	$C_{card} \leq 10 \text{ pF}$ (1 card)
<b>Inputs CMD, DAT (referenced to CLK)</b>					
Input set-up time	$t_{ISU}$	6		ns	$C_{card} \leq 10 \text{ pF}$ (1 card)
Input hold time	$t_{IH}$	2		ns	$C_{card} \leq 10 \text{ pF}$ (1 card)
<b>Outputs CMD, DAT (referenced to CLK)</b>					
Output Delay time during Data Transfer Mode	$t_{ODLY}$		14	ns	$C_L \leq 40 \text{ pF}$ (1 card)
Output Hold time	$T_{OH}$	2.5		ns	$C_L \leq 15 \text{ pF}$ (1 card)
Total System capacitance of each line <sup>1</sup>	$C_L$		40	pF	$CL \leq 15 \text{ pF}$ (1 card)

(1) In order to satisfy severe timing, the host shall drive only one card.

### 5.3.3. SD Interface Timing (SDR12, SDR25 and SDR50 Modes)

#### Input

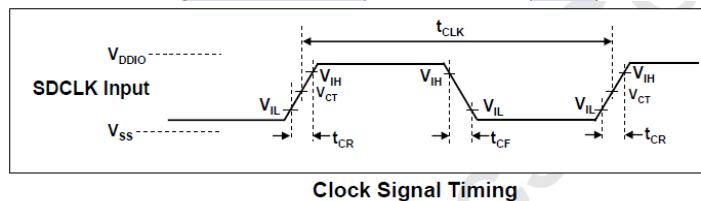
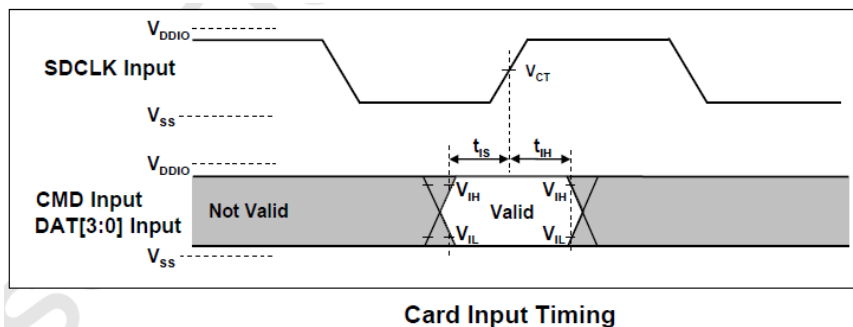


Table 5-6 Clock Signal Timing

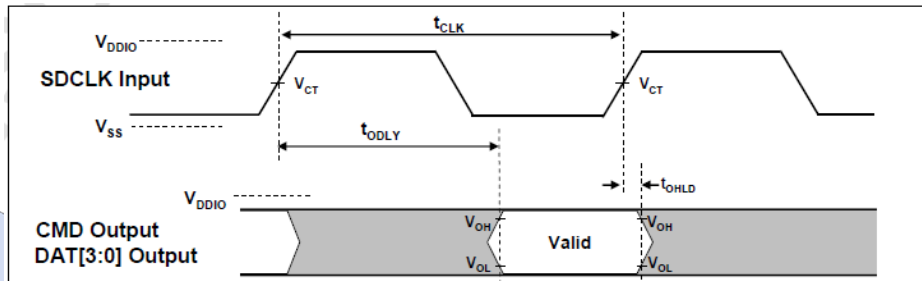
Symbol	Min	Max	Unit	Remark
tCLK	4.80	-	ns	208MHz (Max.), Between rising edge, $V_{CT} = 0.975V$
tCR, tCF	-	$0.2 * t_{CLK}$	ns	$t_{CR}, t_{CF} < 2.00ns$ (max.) at 100MHz, $C_{CARD} = 10pF$
Clock Duty	30	70	%	

#### SDR50 Input Timing



Symbol	Min	Max	Unit	SDR50 Mode
t <sub>ls</sub>	3.00	-	ns	CCARD =10pF, VCT= 0.975V
t <sub>IH</sub>	0.80	-	ns	CCARD =5pF, VCT= 0.975V

**Output**

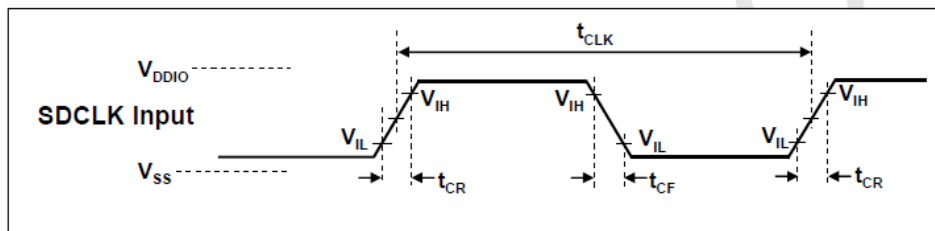


Output Timing of Fixed Data Window

Table 5-7 Output Timing of Fixed Data Window

Symbol	Min	Max	Unit	Remark
t <sub>ODLY</sub>	-	7.5	ns	t <sub>CLK</sub> >=10.0ns, CL=30pF, using driver Type B, for SDR50
t <sub>ODLY</sub>	-	14	ns	t <sub>CLK</sub> >=20.0ns, CL=40pF, using driver Type B, for SDR25 and SDR12,
TOH	1.5	-	ns	Hold time at the t <sub>ODLY</sub> (min.), CL=15pF

5.3.4.SD Interface Timing (DDR50 Mode)



Clock Signal Timing

Symbol	Min	Max	Unit	Remark
t <sub>CLK</sub>	20	-	ns	50MHz (Max.), Between rising edge
t <sub>CR</sub> , t <sub>CF</sub>	-	0.2* t <sub>CLK</sub>	ns	t <sub>CR</sub> , t <sub>CF</sub> < 4.00ns (max.) at 50MHz, CCARD=10pF
Clock Duty	45	55	%	

Table 5-8 Bus Timings – Parameters Values (DDR50 Mode)

Parameter	Symbol	Min	Max	Unit	Remark
<b>Input CMD (referenced to CLK rising edge)</b>					
Input set-up time	$t_{ISU}$	6	-	ns	$C_{card} \leq 10$ pF (1 card)
Input hold time	$t_{IH}$	0.8	-	ns	$C_{card} \leq 10$ pF (1 card)
<b>Output CMD (referenced to CLK rising edge)</b>					
Output Delay time during Data Transfer Mode	$t_{ODLY}$		13.7	ns	$C_L \leq 30$ pF (1 card)
Output Hold time	$T_{OH}$	1.5	-	ns	$C_L \geq 15$ pF (1 card)
<b>Inputs DAT (referenced to CLK rising and falling edges)</b>					
Input set-up time	$t_{ISU2x}$	3	-	ns	$C_{card} \leq 10$ pF (1 card)
Input hold time	$t_{IH2x}$	0.8	-	ns	$C_{card} \leq 10$ pF (1 card)
<b>Outputs DAT (referenced to CLK rising and falling edges)</b>					
Output Delay time during Data Transfer Mode	$t_{ODLY2x}$	-	7.0	ns	$C_L \leq 25$ pF (1 card)
Output Hold time	$T_{OH2x}$	1.5	-	ns	$C_L \geq 15$ pF (1 card)

## 6. INTERFACE



### 6.1. Pad Assignment and Descriptions

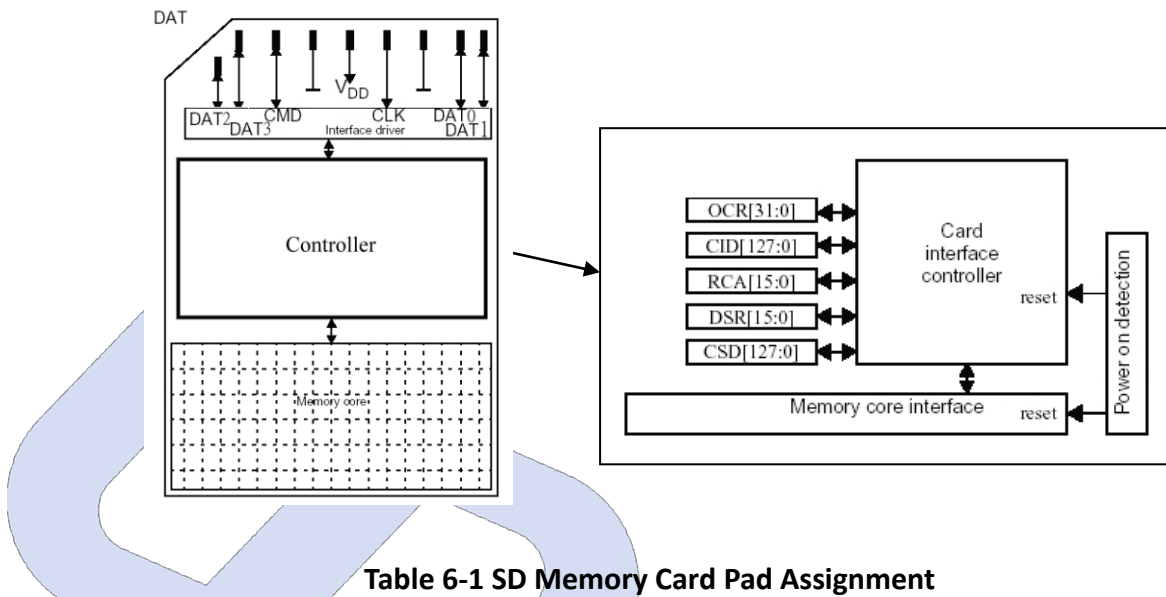


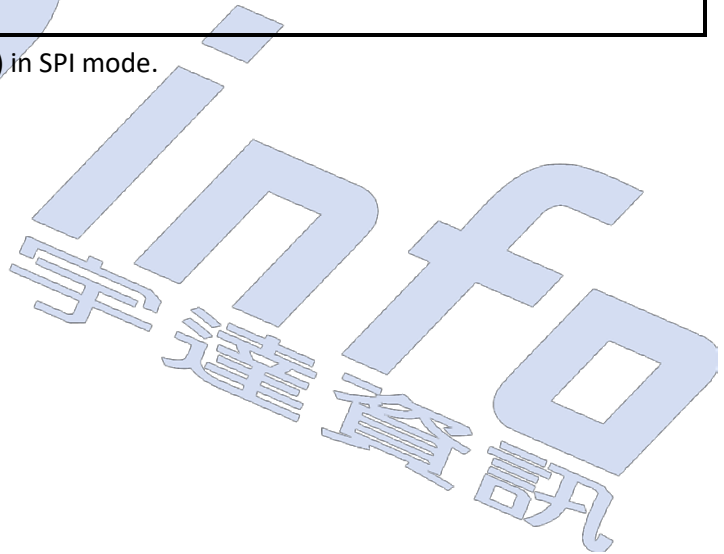
Table 6-1 SD Memory Card Pad Assignment

pin	SD Mode			SPI Mode		
	Name	Type <sup>1</sup>	Description	Name	Type	Description
1	CD/DAT3 <sup>2</sup>	I/O/PP <sup>3</sup>	Card Detect/ Data Line[bit3]	CS	I <sup>3</sup>	Chip Select (net true)
2	CMD	PP	Command/Response	DI	I	Data In
3	V <sub>SS1</sub>	S	Supply voltage ground	VSS	S	Supply voltage ground
4	V <sub>DD</sub>	S	Supply voltage	VDD	S	Supply voltage
5	CLK	I	Clock	SCLK	I	Clock
6	V <sub>SS2</sub>	S	Supply voltage ground	VSS2	S	Supply voltage ground
7	DAT0	I/O/PP	Data Line[bit0]	DO	O/PP	Data Out
8	DAT1	I/O/PP	Data Line[bit1]	RSV		
9	DAT2	I/O/PP	Data Line[bit2]	RSV		

- (1) S: power supply, I: input; O: output using push-pull drivers; PP: I/O using push-pull drivers.
- (2) The extended DAT lines (DAT1-DAT3) are input on power up. They start to operate as DAT lines after SET\_BUS\_WIDTH command. The Host shall keep its own DAT1-DAT3 lines in input mode as well while they are not used. It is defined so in order to keep compatibility to MultiMedia Cards.
- (3) At power up, this line has a 50Kohm pull up enabled in the card. This resistor serves two functions: Card detection and Mode Selection. For Mode Selection, the host can drive the line high or let it be pulled high to select SD mode. If the host wants to select SPI mode, it should drive the line low. For Card detection, the host detects that the line is pulled high. This pull-up should be disconnected by the user during regular data transfer with SET\_CLR\_CARD\_DETECT (ACMD42) command.

Name	Width	Description
CID	128bit	Card identification number; card individual number for identification. <b>Mandatory</b>
RCA1	16bit	Relative card address; local system address of a card, dynamically suggested by the card and approved by the host during initialization. <b>Mandatory</b>
DSR	16bit	Driver Stage Register; to configure the card's output drivers. <b>Optional</b>
CSD	128bit	Card Specific Data; information about the card operation conditions. <b>Mandatory</b>
SCR	64bit	SD Configuration Register; information about the SD Memory Card's Special Features capabilities <b>Mandatory</b>
OCR	32bit	Operation conditions register. <b>Mandatory.</b>
SSR	512bit	SD Status; information about the card proprietary features <b>Mandatory</b>
OCR	32bit	Card Status; information about the card status <b>Mandatory</b>

(1) RCA register is not used (or available) in SPI mode.

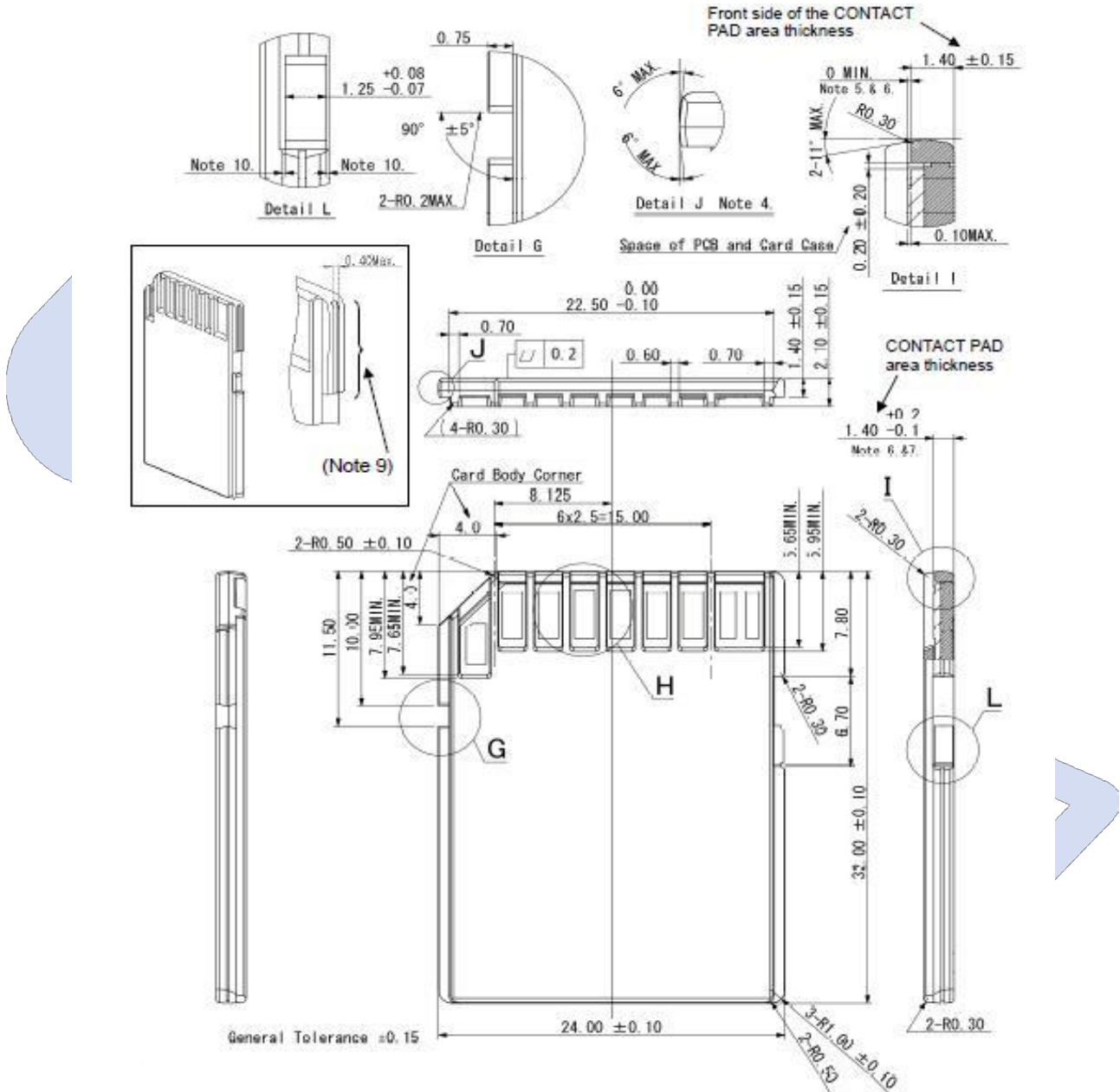




## 7. PHYSICAL DIMENSION



Dimension: 32mm(L) x 24mm(W) x 2.1mm(H)



UD info CORP. TEL: +886-2-7713-6050 FAX: +86-2-8511-3151

3F-4, No.8, Ln. 609, Sec. 5, Chongxin Rd., Sanchong Dist., New Taipei City 241, Taiwan (R.O.C.)

## 8. PARTNUMBER DECODER



SDC-09UDX<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>
SDC	09	UD	008GB 016GB 032GB 064GB 128GB 256GB	A: 3D TLC Standard (0°C ~ +70°C) J: 3D TLC Gold (-25°C ~ +85°C) B: 3D TLC Industrial (-40°C ~ +85°C) V: 3D pSLC Standard (0°C ~ +70°C) Q: 3D pSLC Gold (-25°C ~ +85°C) W: 3D pSLC Industrial (-40°C ~ +85°C)	2: Speed Class 2 (CL2) 4: Speed Class 4 (CL4) 6: Speed Class 6 (CL6) A: Speed Class 10 (CL10) S: UHS-I Class1 (UHS-I-U1) T: UHS-I Class3 (UHS-I-U3) B: Video Speed 6 (V6) C: Video Speed 10 (V10) D: Video Speed 30 (V30) E: Video Speed 60 (V60) F: Video Speed 90 (V90) G: App Class1 (A1) H: App Class2 (A2)	P

