Micro SD Card™

Product Specification

Version 1.0

Table of Contents

Change History

Version	Date	Description
1.0	24/10/2005	New Release

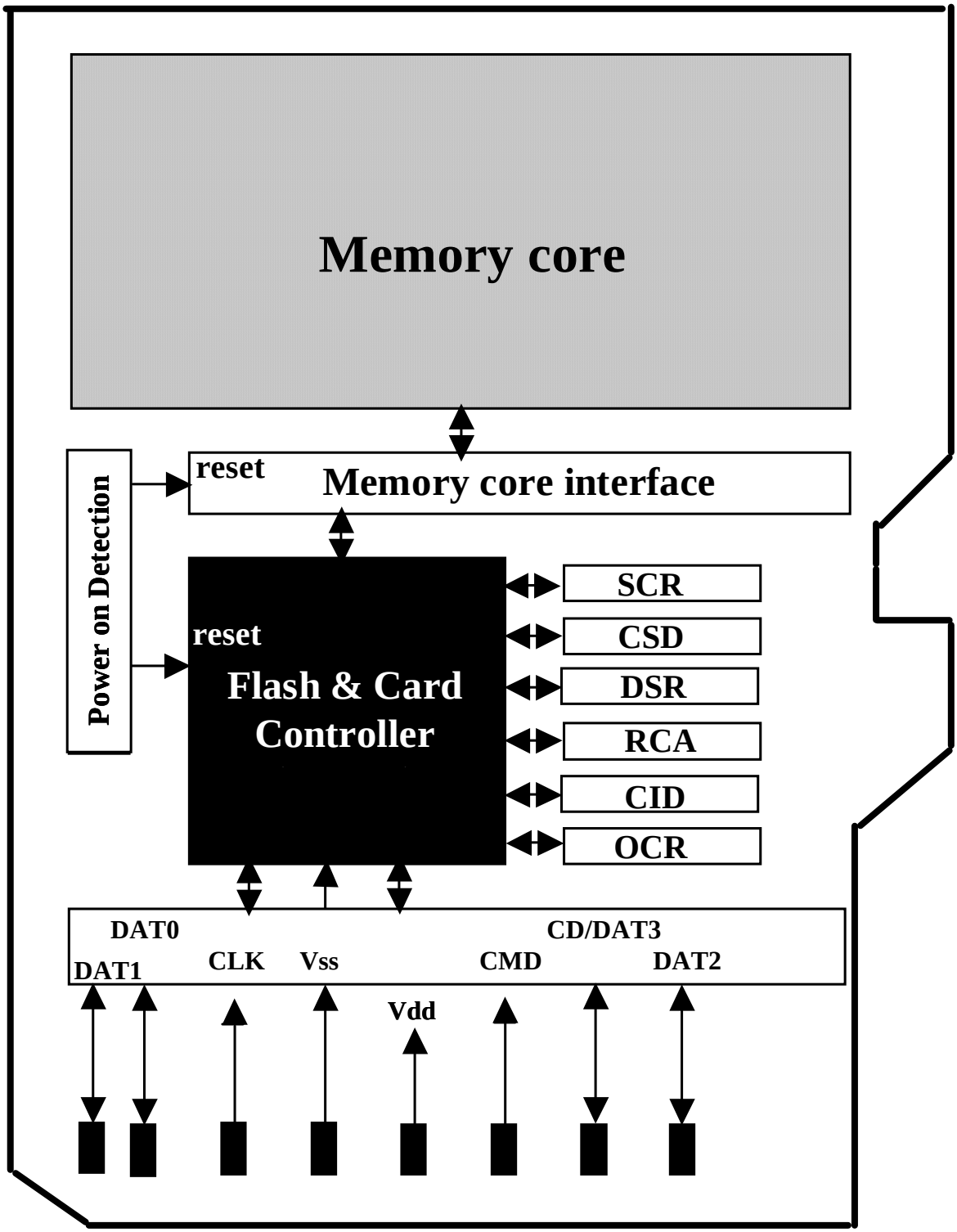
A. Product outline

The **TwinMOS Micro SD Memory Card** is functionally compatible with the SD Memory card but is smaller in dimensions. It can be inserted into a passive SD or miniSD memory Card Adapter and operate as an SD Memory Card. **TwinMOS Micro SD Card** ™ is ideal for digital devices designed to use Micro SD Card. It is fully compatible to a new consumer standard, called the Micro SD system standard and meets SDC Physical Layer specification V1.10, and provides error correcting code (ECC) reliability to detect and correct errors automatically.

B. Features

- Support SD memory card specification V1.1 (50Mhz 4bits bus)
- Fully compatible with SD specification V1.01
- Form Factor : 8 Pads MicroSD (Secure Digital) Memory Cards
- High performance with lower power consumption
- Powerful support for SD common command , Class 0,2,4,5,6,7,8
- Targeted for portable and stationary applications
- Designed for read-only and read / write cards
- Card Detection (Insertion /Removal)
- Card removal during read operation will never harm the content
- Forward compatibility to MultiMedia Card
- Supports firmware ISP (in system programming)
- Single Channel with high performance
- Operating Voltage range：2.7 – 3.6V
- Correction of memory field errors
- Comfortable erase mechanism
- Total memory capacity up to 256MBytes
- High-speed Flash Controller inside
- Flash Memory Support
  - Samsung/ST-Micro/Hynix SLC NAND type Flash

C. Block Diagram



D. Pin Assignments

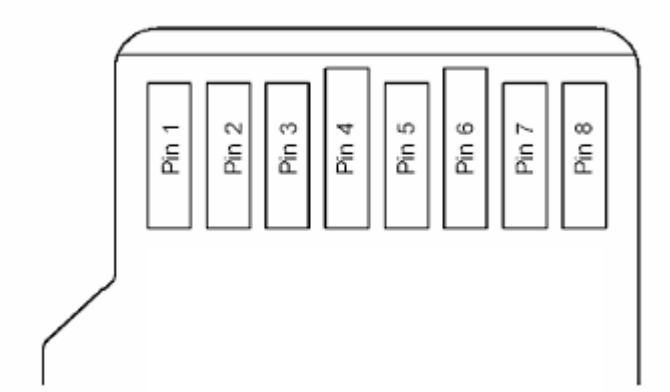


Figure ：Contact Area

Pin#	SD Mode			SPI Mode		
	Name	Type[1]	Description	Name	Type	Description
1	DAT2	I/O/PP	Data Line [Bit 2]	RSV		Reserved
2	CD/DAT3[2]	I/O/PP[3]	Card Detect / Data Line [Bit 3]	CS	I[3]	Chip Select (neg true)
3	CMD	PP	Command/Response	DI	I	Data In
4	V_{DD}	S	Supply voltage	V_{DD}	S	Supply voltage
5	CLK	I	Clock	SCLK	I	Clock
6	V_{SS}	S	Supply voltage ground	V_{SS}	S	Supply voltage ground
7	DAT0	I/O/PP	Data Line [Bit 0]	DO	O/PP	Data Out
8	DAT1	I/O/PP	Data Line [Bit 1]	RSV		Reserved

Table ：microSD Contact Pad Assignment

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 MultiMediaCards.
3) After power up this line is input with 50KOhm pull-up (can be used for card detection or SPI mode selection). The pull-up should be disconnected by the user, during regular data transfer, with SET_CLR_CARD_DETECT (ACMD42) command

Function / Electrical Characteristics / Registers

Refer to the SD Memory Card Specifications Part 1 Physical Layer Specification Version 1.10.

E. Physicial Specifications

E-1. Mechanical Form Factor

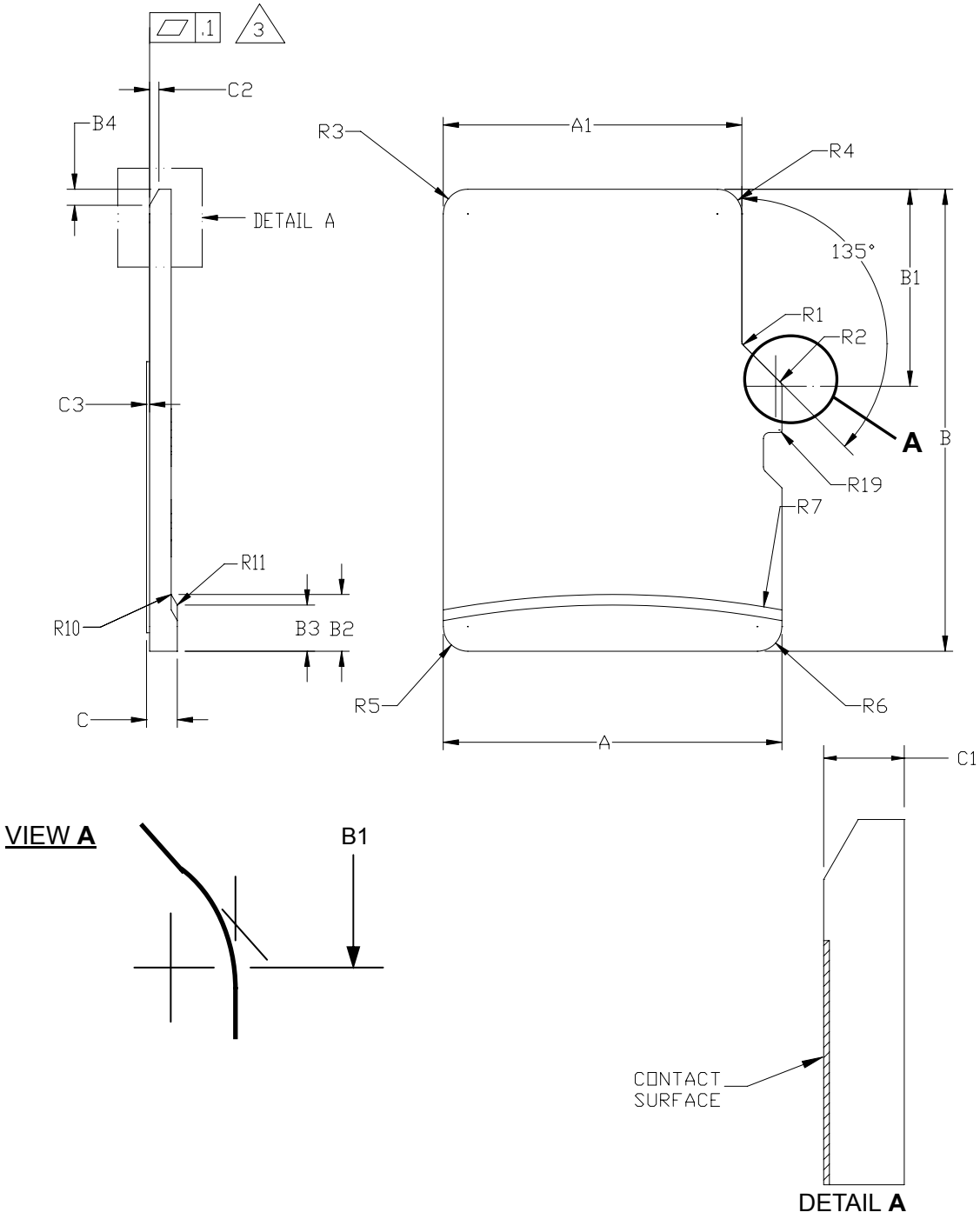


Figure E-1 : Mechanical Description: Top View

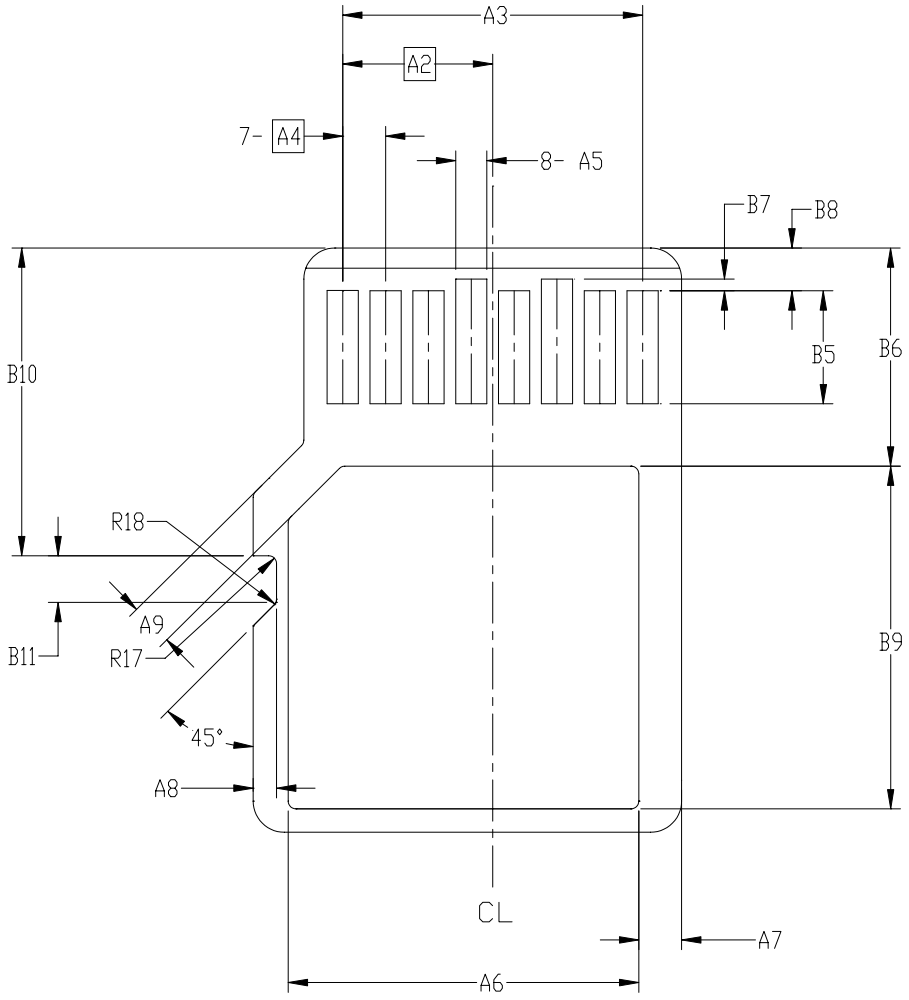


Figure E-2 : Mechanical Description: Bottom View

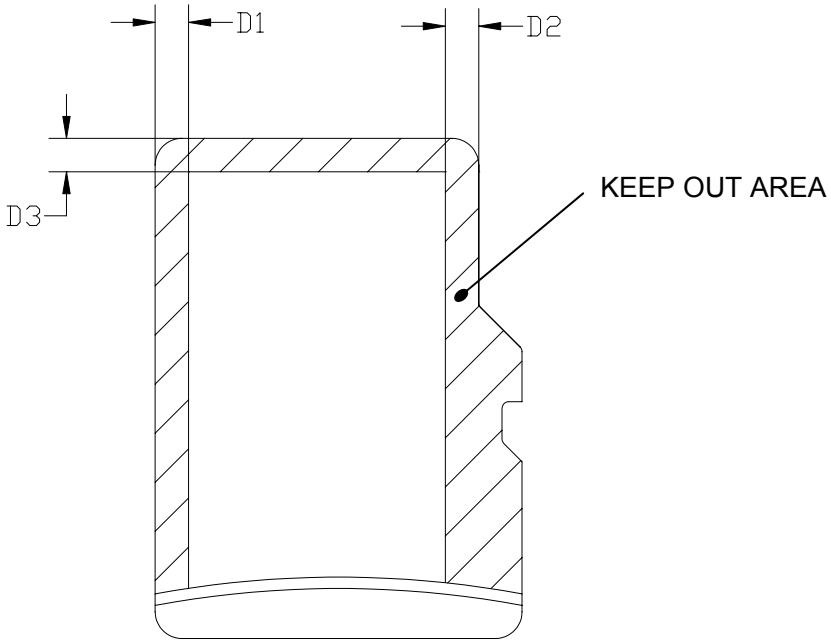


Figure E-4 : Mechanical Description: Keep Out Area

	COMMON DIMENSIONS			
SYMBOL	MIN	NOM	MAX	NOTE
A	10.90	11.00	11.10	
A1	9.60	9.70	9.80	
A2	-	3.85	-	BASIC
A3	7.60	7.70	7.80	
A4	-	1.10	-	BASIC
A5	0.75	0.80	0.85	
A6	-	-	8.50	
A7	0.90	-	-	
A8	0.60	0.70	0.80	
A9	0.80	-	-	
B	14.90	15.00	15.10	
B1	6.30	6.40	6.50	
B2	1.64	1.84	2.04	
B3	1.30	1.50	1.70	
B4	0.42	0.52	0.62	
B5	2.80	2.90	3.00	
B6	5.50	-	-	
B7	0.20	0.30	0.40	
B8	1.00	1.10	1.20	
B9	-	-	9.00	
B10	7.80	7.90	8.00	
B11	1.10	1.20	1.30	
C	0.90	1.00	1.10	
C1	0.60	0.70	0.80	
C2	0.20	0.30	0.40	
C3	0.00	-	0.15	
D1	1.00	-	-	
D2	1.00	-	-	
D3	1.00	-	-	
R1	0.20	0.40	0.60	
R2	0.20	0.40	0.60	
R3	0.70	0.80	0.90	
R4	0.70	0.80	0.90	
R5	0.70	0.80	0.90	
R6	0.70	0.80	0.90	
R7	29.50	30.00	30.50	
R10	-	0.20	-	
R11	-	0.20	-	
R17	0.10	0.20	0.30	
R18	0.20	0.40	0.60	
R19	0.05	-	0.20	

Notes:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.

2. DIMENSIONS ARE IN MILLIMETERS.

3. COPLANARITY IS ADDITIVE TO C1 MAX THICKNESS.

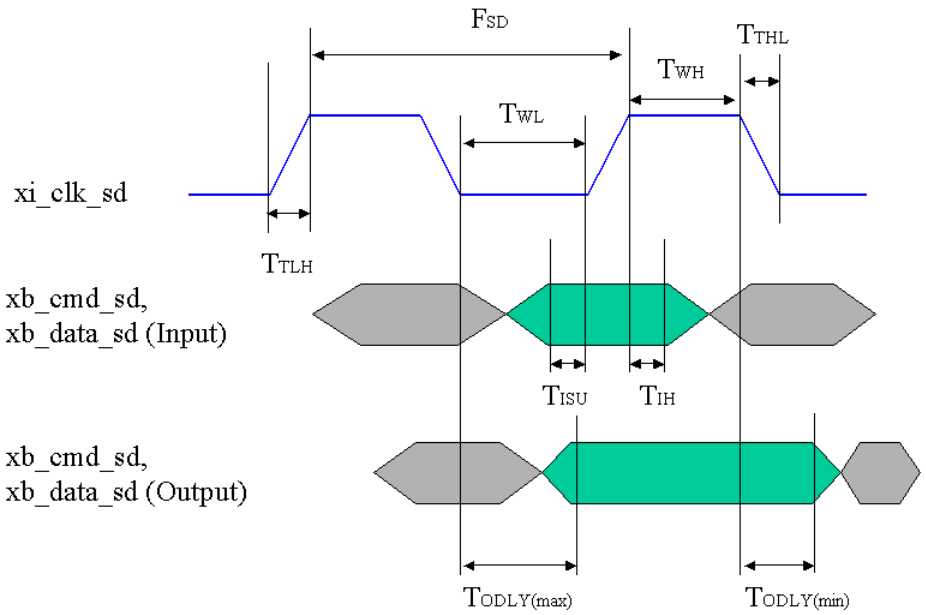
Table : microSD Package: Dimensions

F. DC Characteristics

Symbol	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{IL}	Input low voltage		V_{SS} – 0.3		$0.25V_{CC}$	V
V_{IH}	Input high voltage		$0.625V_{CC}$		V_{CC} + 0.3	V
V_{OL}	Output low voltage	I_{OL} = 100 μ A @ V_{CC}_min			$0.125V_{CC}$	V
V_{OH}	Output high voltage	I_{OH} = -100 μ A @ V_{CC}_min	$0.75V_{CC}$			V
I_{IN}	Input leakage current	V_{IN} = V_{CC} or 0	-10	+/- 1	10	μ A
I_{OUT}	Tri-state output leakage current		-10	+/- 1	10	μ A
I_{STBY}	Standby current	3.3V@clock stop		0.3	0.6	mA
I_{OP}	Operation current	3.3V@25MHz (Write)		15	25	mA
		3.3V@25MHz (Read)		15	25	mA
I_{OP}	Operation current	3.3V@50MHz (Write)		30	45	mA
		3.3V@50MHz (Read)		30	45	mA

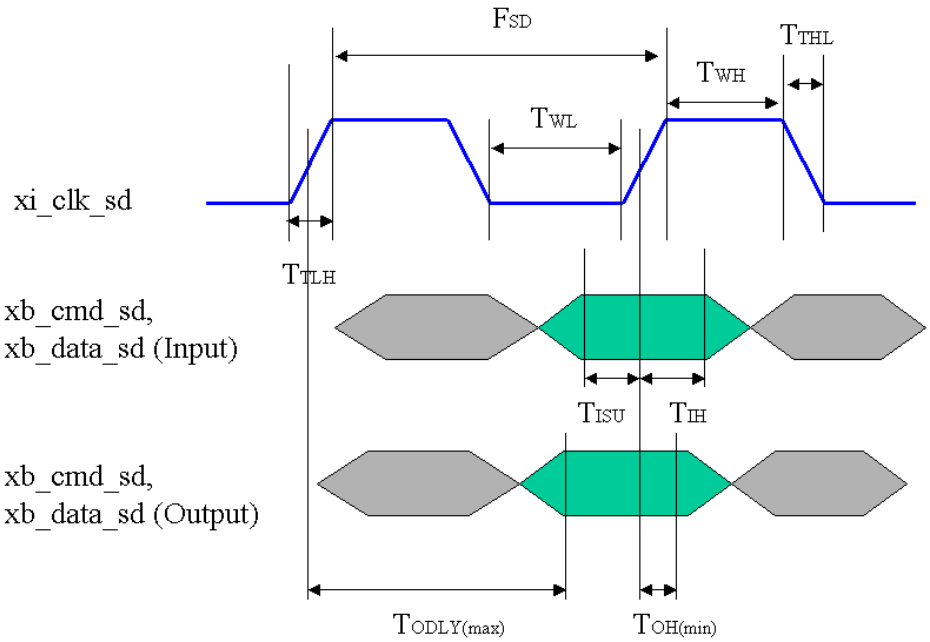
G. AC Characteristics

G -1 Bus Timing (Default Mode)



SYMBOL	PARAMETER	MIN	MAX	UNIT	Note
F_{SD}	SD clock frequency	0	25	MHz	
t_{WL}	Clock low time	10		ns	
t_{WH}	Clock high time	10		ns	
t_{TLH}	Clock rise time		10	ns	
t_{THL}	Clock fall time		10	ns	
t_{ISU}	Input setup time	5		ns	
t_{IH}	Input hold time	5		ns	
t_{ODLY}	Output delay time	0	14	ns	

G -2 Bus Timing (High-speed Mode)



SYMBOL	PARAMETER	MIN	MAX	UNIT	Note
F_{SD}	SD clock frequency	0	25	MHz	
t_{WL}	Clock low time	10		ns	
t_{WH}	Clock high time	10		ns	
t_{TLH}	Clock rise time		10	ns	
t_{THL}	Clock fall time		10	ns	
t_{ISU}	Input setup time	5		ns	
t_{IH}	Input hold time	5		ns	
t_{ODLY}	Output delay time	0	14	ns	
t_{OH}	Output hold time	2.5		ns	