Description:

TMM10XXX MMC (MultiMediaCard) is an universal low cost data storage and communication media for most of MMC standard define in the MMC card System specification devices. It is design for high mobility and high performance at a low cost price for cover a wild area of applications such as cameras, PDAs, smart phones, organizers, digital recorders, MP3 players, toys, pagers, etc.

Features:

- **Capacity: 128MB / 256MB / 512MB / 1GB**
- **Form Factor: 24mm x 32mm x 1.4mm**
- **Voltage range : 2.7 - 3.6V**
- **Operating Temperature: -25 ~ 85°C**
- **Maximum Data Transfer Rate: Read:2MB/sec,Write:2MB/sec**
- **Fully compatible with MMC spec. v3.2**
- **Embedded with data error correction**
- **Low power consumption**
- **No external programming voltage required.**

1. Functional Descriptions and pin definition

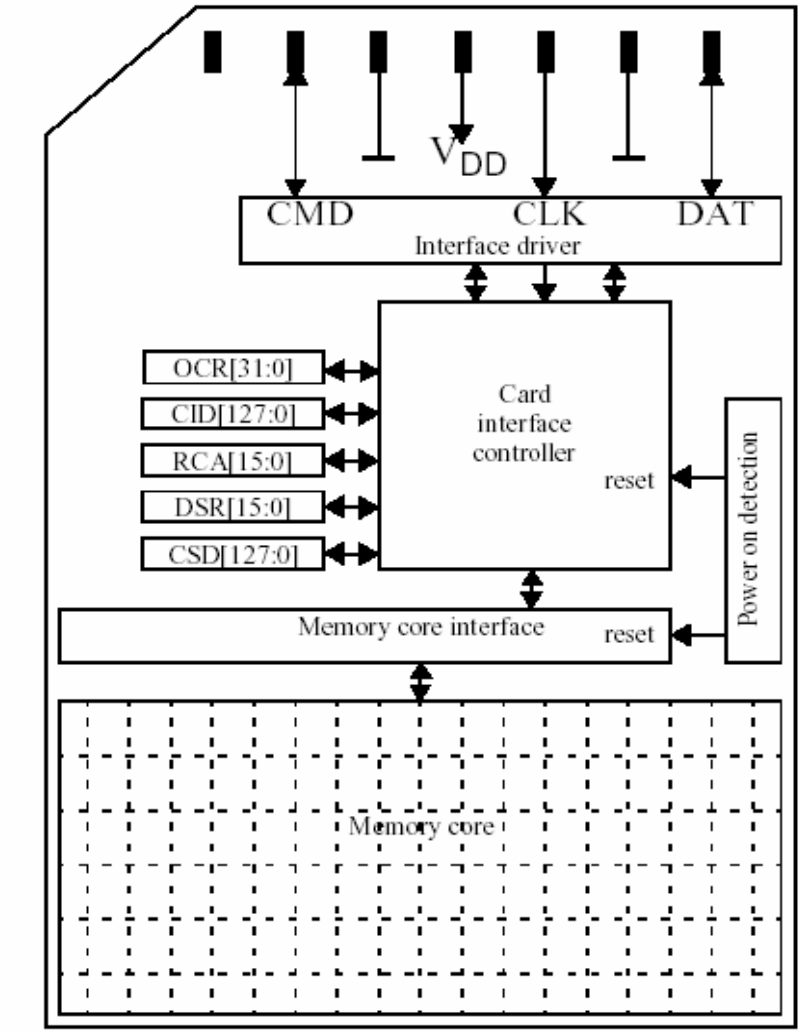

Figure 1: MultiMediaCard Architecture

Pin #	MMC Mode			SPI Mode		
	Name	Type	Description	Name	Type	Description
1	RSV	NC	Reserved for future use	CS	I	Chip Select
2	CMD	I/O/PP/OD	Command/Response	DI	I/PP	Data In
3	VSS	S	Supply voltage ground	VSS	S	Supply voltage ground
4	VDD	S	Supply voltage	VDD	S	Supply voltage
5	CLK	I	Clock	CLK	I	Clock
6	VSS	S	Supply voltage ground	VSS	S	Supply voltage ground
7	DAT	I/O/pp	Data	DAT	I/O/pp	Data Out

Figure 2: MultiMediaCard pad definition

2. Characteristic

2.1 DC Characteristic

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Output Low Voltage (OD)	VODOL			0.3	V	IOL = 2mA
Output High Voltage (PP)	VOH	0.75*VDDH			V	IOH = -100uA
Output Low Voltage (PP)	VOL			0.125*VDDH	V	IOL = 100uA
Input High Voltage	VIH	0.625*VDDH		VDDH+0.3	V	
Input Low Voltage	VIL	-0.3		0.25*VDDH	V	
Operating Current	ICC			20 (TBD)	mA	IVCCF = 0mA
Stand-by Current	ISB			400 (TBD)	uA	
Input Leakage Current	ILI			±10	uA	VIN = 0 to VDDH
Output Leakage Current	ILO			±10	uA	VOUT = 0 to VDDH
Pin Capacitance	CP			7	pF	
Power Output Voltage	VF	1.50	1.8	1.95	V	IF <= 240mA
						(Ta = -25 to 85 , VDDH = 2.7V to 3.6V)

2.2 Temperature Characteristic

Parameter	Min	Max	Unit
Storage Temperature	-25	85	℃
Operating Temperature	-25	85	℃

3. Bus Timing (Default)

(Ta = -25℃ to 85℃, V_{DD} = 2.7V to 3.6V)

Parameter	Symbol	Min	Typ	Max	Unit	Notes
CLK Input						
Clock Frequency (Data Transfer Mode)	f_{PP}	0		25	MHz	
Clock Frequency (Identification Mode)	f_{OD}	0		400	kHz	
Clock Low Time	t_{WL}	10			ns	
Clock High Time	t_{WH}	10				
Clock Rise Time	t_{TLH}			10	ns	
Clock Fall Time	t_{THL}			10	ns	
CMD, DAT Inputs						
Input Set-up Time	t_{ISU}	5			ns	
Input Hold Time	t_{IH}	5			ns	
CMD, DAT Outputs						
Output Delay Time	t_{DLY}	0		14	ns	C_L <= 30pF

(*1) All timing values are measured relative to 50% of voltage level.

(*2) Rise and fall times are measured from 1-%-90% of voltage level.