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MA8121F

USB 2.0 SD/MMC Card Reader

Datasheet

Rev.1.00

Aug 02, 2011

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Revision History

Revision	Release date	Description
V.1.0	2011.08.02	Preliminary release
V.1.1		

Ordering Information

Product Name	Type
MA8121F	Good Die
MA8121F	CP Wafer
MA8121F	28SSOP

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2.1 General Description

The MA8121F is an USB 2.0 Card Reader controller by a highly integrated single chip solution designed to deliver high-speed data transmission between USB2.0 and SD, SDHC, miniSD, Micro SD(T-Flash), MMC, RC-MMC, MMC Micro, MMC Mobile flash interfaces specification. The MA8121F is offered with COB (Chip On Board) Bounding and 28SSOP package.

MA8121F complies with USB specification Rev. 2.0 and USB Mass Storage Class specification Rev. 1.0 to support Windows ME/2000/XP/Vista/Win7, Mac OS 10.x above, and Linux Kernel 2.4 above. MA8121F integrates an on-chip clock source which provides stable clock source which can be used to replace the external 12Mhz crystal oscillator. Manufacturers can effectively reduce the BOM and labor cost on PCBA. MA8121F is the SD card reader with the best C/P value.

2.2 Features

- **USB**
  - ✧ Fully compatible with USB 2.0/1.1 specification
  - ✧ Support USB 2.0 specification for 480Mbit/sec and 12Mbit/sec operation
  - ✧ USB Device Class Definition for Mass Storage , Bulk-Transport v1.0
  - ✧ USB 2.0 Bus Power device spec. compliance
  - ✧ Endpoint:
    - Endpoint 0: 64 bytes control transfer.
    - Endpoint 1: 512 bytes bulk transfer for IN transaction.
    - Endpoint 2: 512 bytes bulk transfer for OUT transaction.
- **Single Slot support for MMC/SD/MS card**
- **MMC/SD card support**
  - ✧ Support MMC 4.0/4.1/4.2 (4 bit & 8bit), RS-MMC, MMC-Mobile
  - ✧ Support SD 1.1/2.0/SDHC, Micro SD 1.1/2.0/SDHC, Mimi SD card
  - ✧ Support SD/MMC High Speed Mode
- Work with the default driver from windows 2000/XP/ME/Vista/Win7, Mac9.2, Mac OS X, Linux RedHat, Linux Fedora
- Integrated 5V to 3.3V/1.8V Voltage Regulator
- Support SSOP 28 package with 4bit SD and 8bit MMC
- COB (Chip On Board) with excellent bounding yield
- On-Chip Clock Source to replace external 12Mhz external crystal

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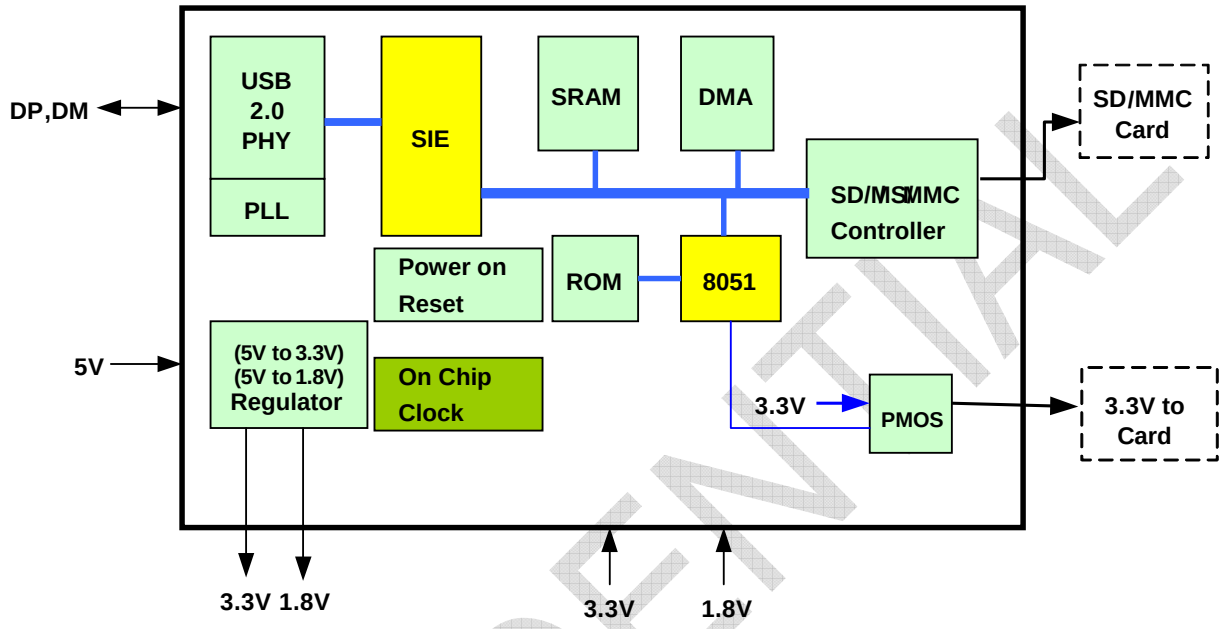
3. Block Diagram



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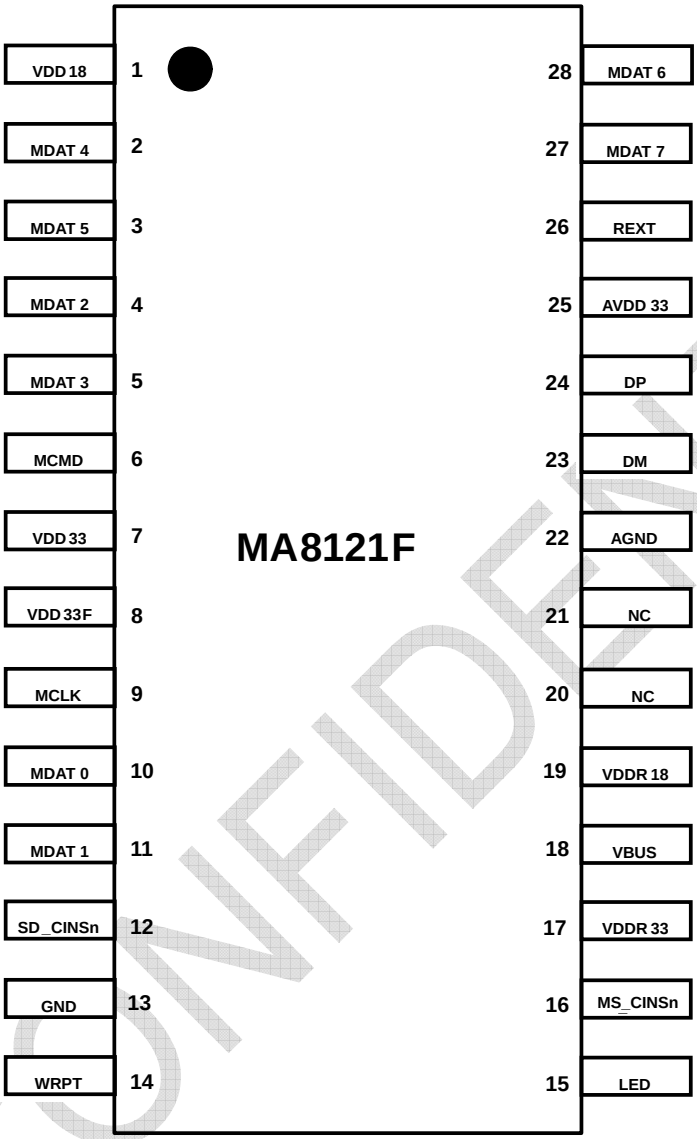
4.1 Pin Assignment Diagram

- SSOP28 pin out



- COB Bounding Guideline

  Please reference the COB AP Note

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4.2 Pin Description

- SSOP 28 Pin Out Description

Power Pins

Symbol	Pin No.	Type	Description
VBUS	18	P	5V Bus Power Input to Internal Regulator
VDDR18	19	P	Output 1.8V from Internal Regulator
VDDR33	17	P	Output 3.3V from Internal Regulator
AVDD33	25	P	PHY 3.3V Power Input
VDD18	1	P	Logical Power 1.8V Input
VDD33	7	P	Logical Power 3.3V Input
VDD33F	8	P	Output 3.3V Power Source for SD/MMC Card
GND,AGND	13, 22	P	Logical ground pin USB PHY ground pin

Analog and Others Pins

Symbol	Pin No.	Type	Description
DM	23	A	USB D- for high/full speed
DP	24	A	USB D+ for high/full speed
NC	21	A	For backward compatible pin XI
NC	20	A	For backward compatible pin XO
REXT	26	I	For backward compatible pin
LED	15	O	LED for operation status indicator

SD/MMC/MS Interface

Symbol	Pin No.	Type	Description
MDAT [0:3]	10,11,4,5	I/O	SD/MMC data pin
MDAT [4:7]	2,3,27,28	I/O	MMC data pin
MCMD	6	O	SD/MMC command response pin
MCLK	9	O	SD/MMC clock output
WRPT	14	I	SD/MMC card write protect High= write protect, Low=normal Internal with pull high resistor
SD_CINSn	12	I	SD/MMC card insert detect Low= card insert with pull up resistor
SRSTn	16	I	System Reset Pin

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5. Electrical Characteristics

- Regulator

Parameter	Value
VBUS (5 volts input)	Min.=4.5 volts , Max.=5.5 volts
VDDR33 (3.3 volts output)	3.3 volts ± 10 %
VDDR18 (1.8 volts output)	1.8 volts ± 10 %
Maximum current	350 mA

- DC Characteristics and Operating Conditions

Symbol.	Parameter	Rating			Unit
		Min.	Typ.	Max.	
VDD	5V Power Supply Voltage	**4.5**		**5.5**	V
VDDR33	3.3V Power Supply Voltage	**3.0**		**3.6**	V
VDDR18	1.8V Power Supply Voltage	**1.62**		**1.98**	V
V_{IH}	High level input voltage	**0.7VDDR33**			V
V_{IL}	Low level input voltage			**0.3VDDR33**	V
V_{OH}	High level output voltage	**0.8VDDR33**			V
V_{OL}	Low level output voltage			**0.2VDDR33**	V
I_{OH}	High level output current	**6**			mA
I_{OL}	Low level output current (**V_{OL}** =0.4V)	**6**			mA

- Analog and Digital power

Parameter	Value
AVDD33 (analog supply voltage)	3.3 volts ± 10 %
VDD33 (Digital supply voltage)	3.3 volts ± 10 %
VDD33F (Card power supply)	3.3 volts ± 10 % ; Max. current=150mA
VDD18 (Digital supply voltage)	1.8 volts ± 10 %

- Power consumption

Parameter	Value	Note
Operation current	Max. =120mA	With Sandisk 8G class 10 SD card
Suspend current	Max.= 350 uA	With Sandisk 8G class 10 SD card
Chip idle with card current	Max = 65mA	With Sandisk 8G class 10 SD card
Chip idle without card current	Max = 49mA	With Sandisk 8G class 10 SD card

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6. Package Information

- SSOP 28 (150mil) package Information