RTS5306E

USB 3.0 SD/MMC Card Reader Controller

DATASHEET

TRADEMARKS

Revision History

Revision	Description	Page	Date
1.00	Correct the package type for ordering information	9	2012/10/12
0.90	First release		2012/7/17

Table of Contents

1. General Description

The Realtek RTS5306E USB3.0 Card Reader controller is based upon Universal Serial Bus 3.0 Specification, which integrates USB 3.0 and USB2.0 Transceivers, MCU, SIE, regulators and memory card access units into a single chip. It can be linked in Super Speed, High Speed or Full Speed operation and supports USB2.0/USB3.0 power saving mode. It provides 1LUN (Logic Unit Number) for Secure Digital ^{TM} and MultiMediaCard ^{TM}.

The Realtek USB3.0 Card Reader supports both the internal MCU program ROM and external Serial Flash interface. With the external Serial flash interface, the control firmware could be easily re-configured through USB link. This could ease the software developing works and squeeze the prototyping schedule.

The Realtek RTS5306E USB3.0 Card Reader integrates all regulators, clock generation circuitry and MOSFET components for switching card power, and could dramatically reduce the system BOM cost.

2. Features

- Compliant with Universal Serial Bus 3.0 Specification Revision 1.0

- Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0

- Compliant with SD Part 1 Physical Layer Specification Version 3.01

- Compliant with MultiMediaCard System Specification version 4.4 with 4-bit data bus

- Support Super-Speed(5Gpbs), High-speed (480Mbps) and Full-speed (12Mbps) Data Transfer

- USB bus power operation

- Support USB2.0 LPM / USB3.0 U1/U2/U3 power saving mode

- Support Control, Bulk IN / OUT data pipes

- Support the following memory card interfaces:

  -Secure Digital ^{TM} (SD), MultiMediaCard ^{TM} (MMC), Mini-SD, Micro-SD (T-flash), SDHC, SDXC, RS-MMC, Mobile-MMC, MMCPlus and MMC-micro

- Support SD card clock 208MHz (max.) for SDR104 mode.

- Support SD card clock 100MHz (max.) for SDR50 mode and 50MHz (max.) for DDR50 mode.

- Support SD Lock/Unlock Function

- Support SD Jukebox application (CPRM function)

- Support hardware CRC (Cyclic Redundancy Check) function

- Programmable clock rate for flash memory card interfaces

- Integrated Fast 8051 microprocessor

■ External Serial Flash memory interface

■ On chip 3.3V and 1.2V regulators

■ On chip MOSFET components for direct power control of all types memory cards

■ Support Spread Spectrum Clock for SD/MMC to reduce EMI effect

■ 32-pin QFN (5x5 mm) package for 1LUN solution

3. Block Diagram
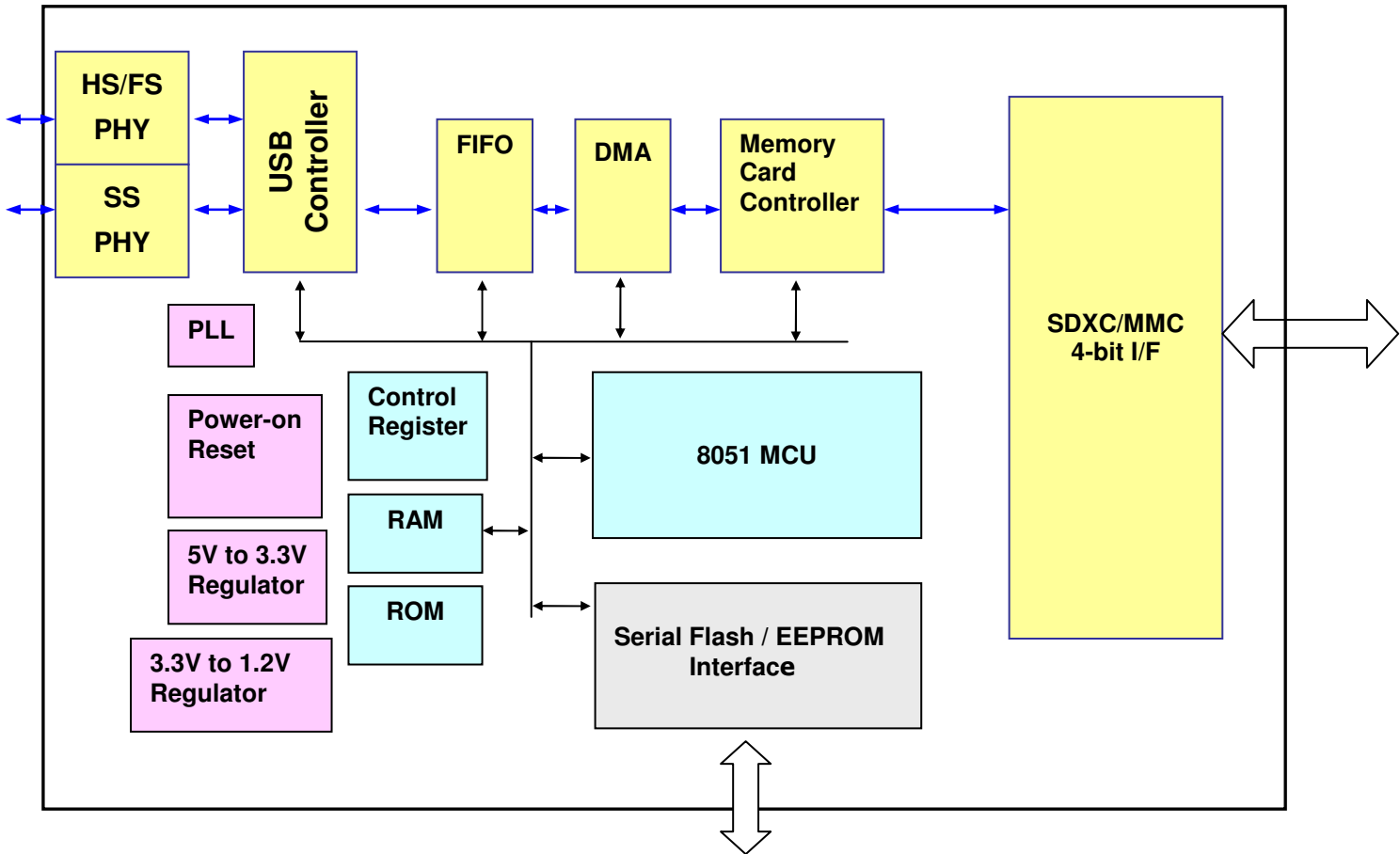
4. Pin Description

Pin#	Name	I/O Type	Description
1	SS_RX+	I	USB3.0 SuperSpeed RX D+
2	SS_RX-	I	USB3.0 SuperSpeed RX D-
3	SS_TX+	O	USB3.0 SuperSpeed TX D+
4	SS_TX-	O	USB3.0 SuperSpeed TX D+
5	USB3_AV12	Power	Analog 1.2V for USB3.0
6	RREF	I	Connect an external resistor (6.2K ± 1%) to the Reference GND
7	AV33	Power	Analog 3.3V power
8	VBUS	I	VBUS 5V power input
9	XTLI	I	12Mhz Crystal oscillator input
10	XTLO	O	12Mhz Crystal oscillator output
11	USB2_AV12	Power	Analog 1.2V power
12	DM	I/O	USB2.0 D- signal
13	DP	I/O	USB2.0 D+ signal
14	VBUS	I	VBUS 5V power input
15	D3V3	Power	Digital 3.3V power
16	CARD_3V3	O	Power output to SD/MMC Card
17	SDREG	O	Internal regulator for the SD card control signals. An external capacitor should be connected.
18	SD_D1	I/O	SD/MMC Card Data 1
19	SD_D0	I/O	SD/MMC Card Data 0
20	SD_CLK	O	SD/MMC Card Clock Signal
21	SD_CMD	I/O	SD/MMC Card Command Signal
22	SD_D3	I/O	SD/MMC Card Data 3
23	SD_D2	I/O	SD/MMC Card Data 2
24	SD_WP	I	SD Card Write Protection pin
25	DV12S	Power	Digital 1.2V power
26	EEDO/MOSI	I/O	Serial Data Output to EEPROM or Serial Flash
27	EESK/SCK	I/O	Clock Signal to EEPROM or Serial Flash
28	EECS/CS#	I/O	Chip Select to EEPROM or Serial Flash
29	EEDI/MISO	I/O	Serial Data Input from EEPROM or Serial Flash
30	GPIO0	I/O	General purpose input/output
31	SD_CD#	I	SD/MMC Card Detection pin
32	VDD_RX	Power	1.2V Power for USB3.0 RX

5. Pin Assignment
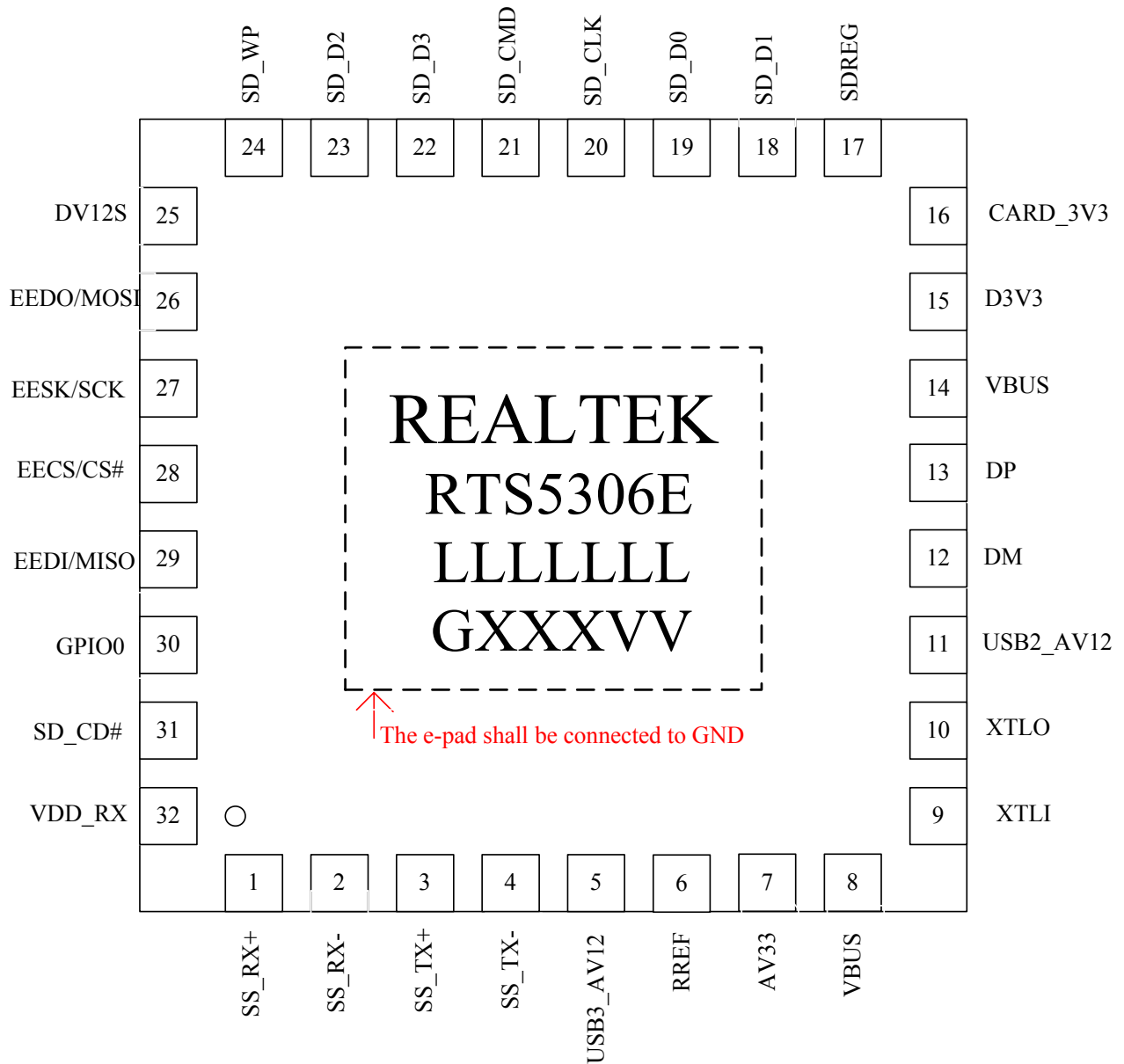
The version number is shown in the location marked 'VV' and G means Green Package

6. Electrical Characteristics

6.1 Absolute Maximum Ratings

Supply Voltage ……………………………………………………………… −0.5V to +5.5V

Operating Temperature Range …………………………………………….. 0°C to +70°C

Latch up Current ……………………………………………………………… mA

Electrostatic Discharge Voltage (HBM)……………………………………… KV

6.2 DC Characteristics

Symbol	Description	Conditions	Min.	Typ.	Max.	Unit
V_{DD}	Supply Voltage		4.5	5	5.5	V
V_{IH}	Input Voltage High		2.0			V
V_{IL}	Input Voltage Low				0.8	V
V_{OH}	Output Voltage High		3.0			V
V_{OL}	Output Voltage Low				0.4	V
C_{in}	Input Pin Capacitance				10	pF
I_{DD}	Supply Current	8051 is running @ 6MHz (Without memory card)		TBD		mA
I_{SUS}	Suspend Current	D+ 1.5KΩ resistor is included		TBD		uA

7. Package Dimensions

Plastic Quad Flat No-Lead Package 32 Leads 5x5mm^2 Outline

TOP VIEW

BOTTOM VIEW
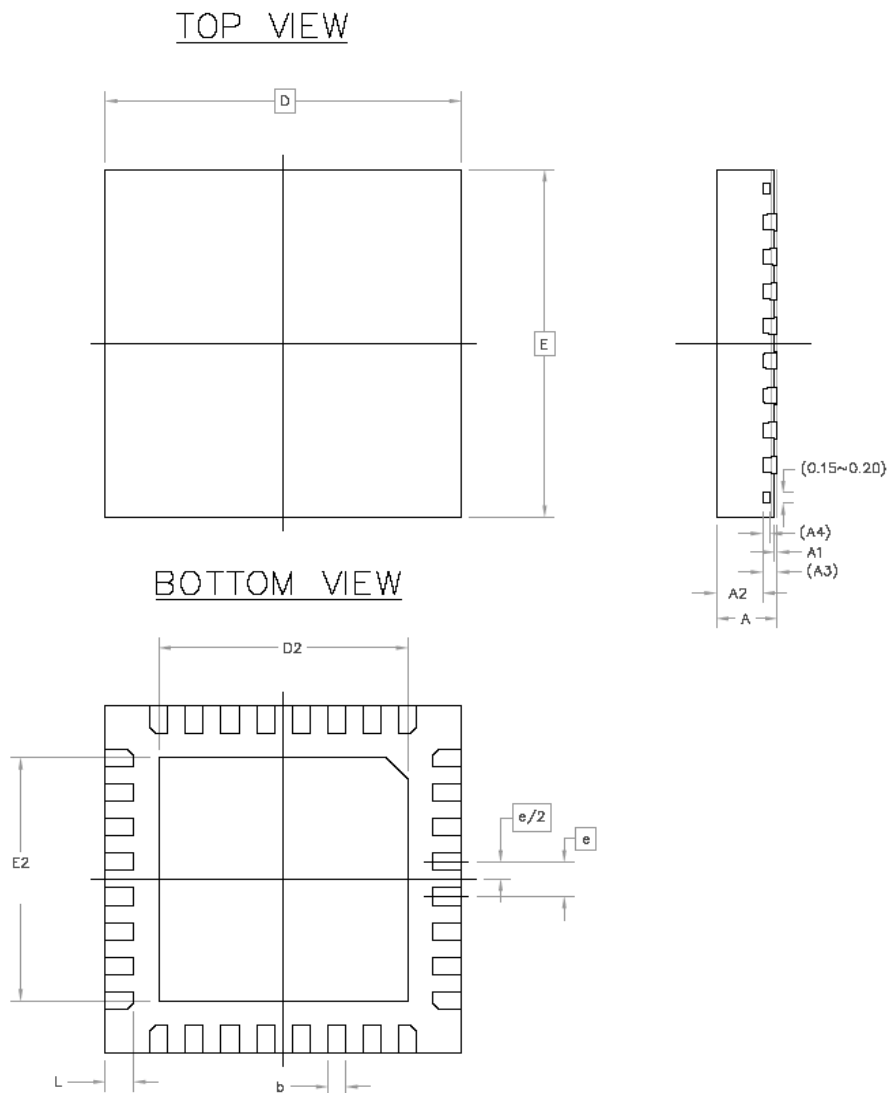
Symbol	Dimension in mm			Dimension in inch		
	Min	Nom	Max	Min	Nom	Max
A	0.80	0.85	0.90	0.031	0.033	0.035
A1	0.00	0.02	0.05	0.000	0.001	0.002
A3	0.20 REF			0.008 REF		
A4	0.10 REF			0.004 REF		
b	0.18	0.25	0.30	0.007	0.010	0.012
D/E	5.00 BSC			0.020 BSC		
D2/E2	3.25	3.50	3.75	0.128	0.138	0.148
e	0.50 BSC			0.020 BSC		
L	0.30	0.40	0.50	0.012	0.016	0.020

Notes：

1. CONTROLLING DIMENSION：MILLIMETER(mm).
2. REFERENCE DOCUMENTL：JEDEC MO-220.

8. Ordering Information

Part Number	Package	Status
RTS5306E-GR	QFN-32 Green package	Available