



1 Function Declaration

High Performance 8-bit RISC CPU

- 8-bit RISC MCU running at up to 48MIPS
- 8051 instruction set compatibility

Secure Digital (SD), MultiMediaCard (MMC) and Memory Stick (MS)

- Support SD specification v1.0, v1.1, v2.0, v3.0UHS-1
- Support MMC specification v3.x, v4.0, v4.2
- Support MS specification v1.43
- x1, x4 data transmission
- Support clock rate up to 48MHz

Universal Serial Bus (USB)

- USB specification v2.0 compliant
- USB Mass Storage Class specification v1.0 compliant

Other Peripherals

- One LED driver IO
- Power-on reset
- Low voltage detector
- On-chip regulator for 5V to 3.3V conversion
- On-chip power switch for output 3.3V

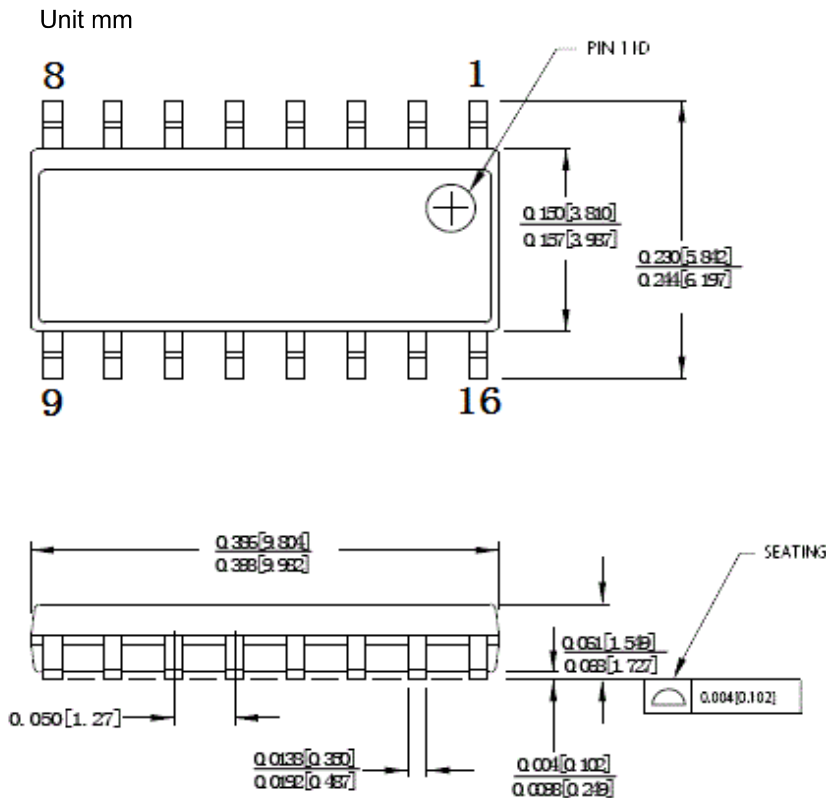
Packages

- SOP16

Application

- SD/MMC/MS Card Reader
- Support system
Operating system support USB2.0 protocol

1.1 Package SOP16

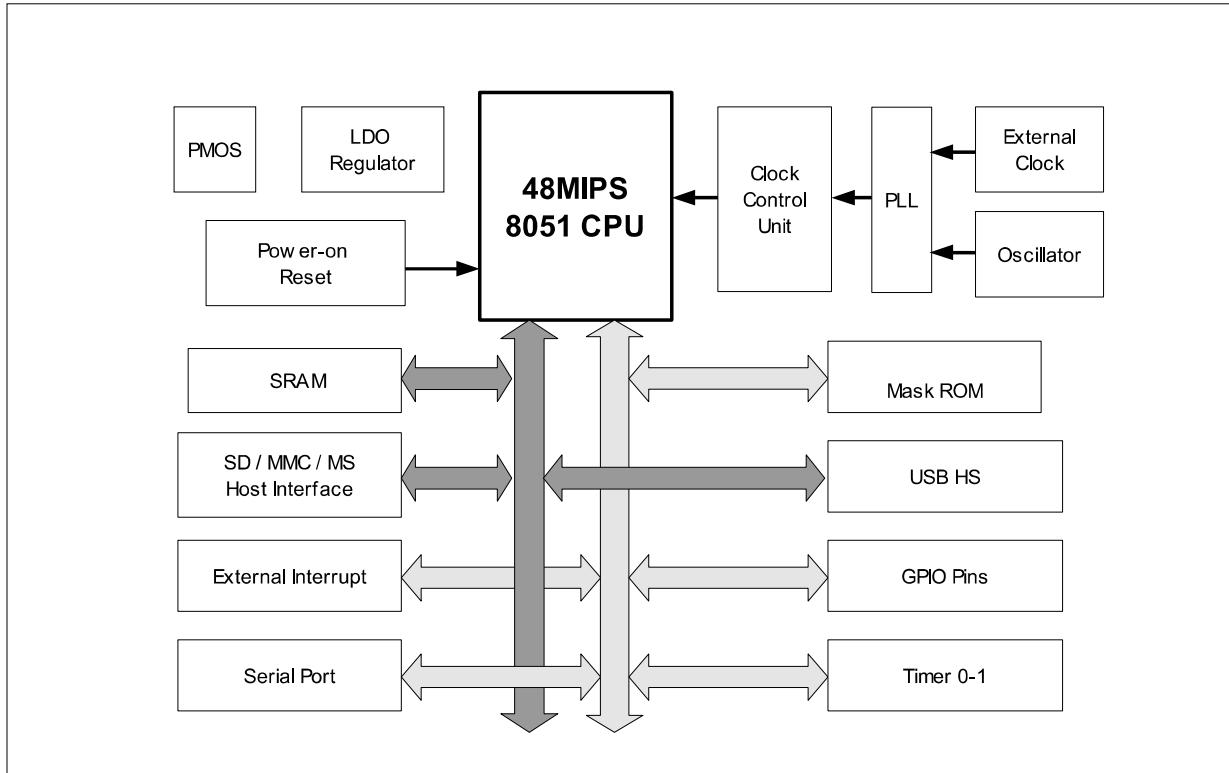




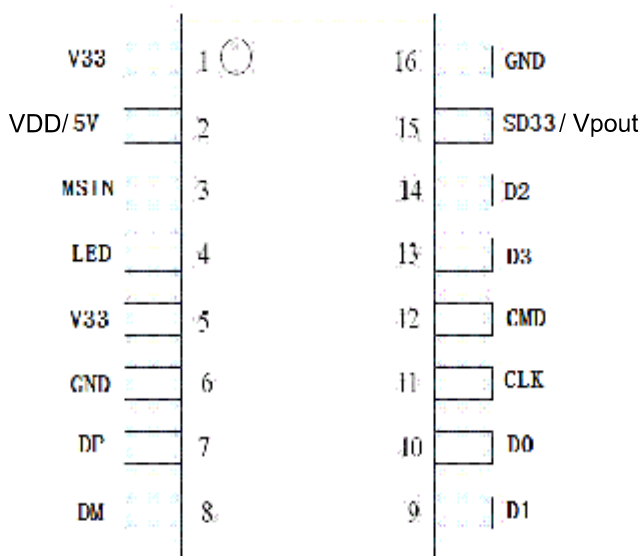
2 Architecture Overview

2.1 System architecture

Figure 1-1: hardware architecture



2.2 System PIN

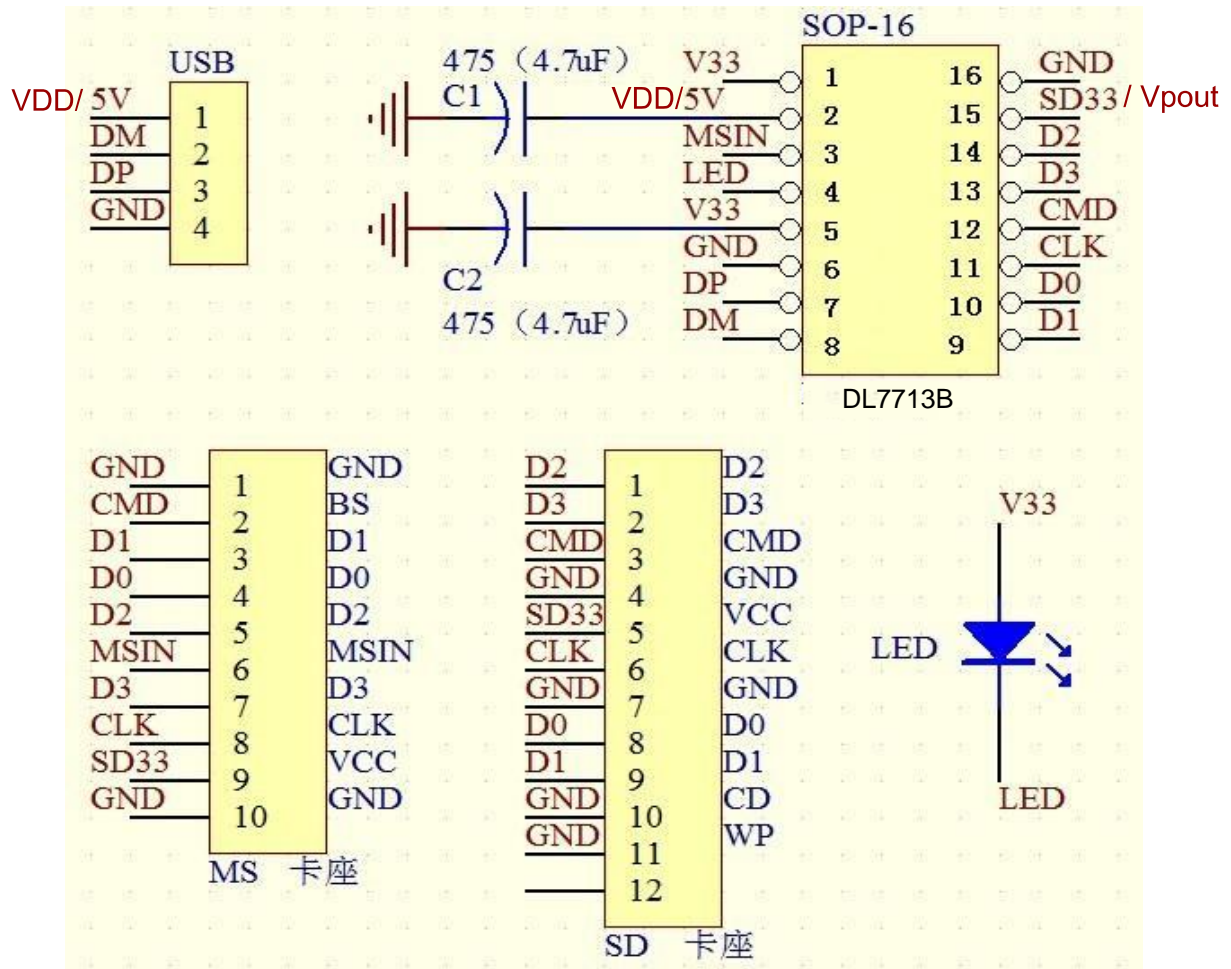




3 DIE SCHEMATICS

3.1 SD/MMC/MS 4-bit Mode

Figure 3-1: Schematic Diagram for SD/MMC/MS 4-bit mode



Note:

1. C1 and C2 are optional capacitors.
2. Routing for 3.3V should be as short as possible.
3. C2 As close as possible to the Pin5
4. C1 As close as possible to the Pin2



3.2 Electrical Characteristics

Table 3-1: Absolute Maximum Ratings

Symbol	Descriptions	Min	Typical	Max	Units	Conditions
V _{ESD}	Electrical Discharge Voltage	-	Passed 8k	-	V	
T _{STOR}	Storage Temperature	-40	-	125	°C	

(Standard testing condition at 25°C)

Table 3-2: Recommended Operating Conditions

Symbol	Descriptions	Min	Typical	Max	Units	Conditions
V _{DD}	USB supply voltage	4.5	5.0	5.5	V	
T _{AMB}	Ambient Temperature	0	-	70	°C	

(Standard testing condition at 25°C)

Table 3-3: DC Characteristics

Symbol	Descriptions	Min	Typical	Max	Units	Conditions
I _{DD}	Operating current (Internal)	-	26.4	-	mA	No cards inserted
I _{SUP}	Operating current at suspend mode	-	TBD	-	mA	No cards inserted
I _{SDIDLE}	Operating current with SD card inserted	-	28.0	-	mA	No read/write operation
I _{SDRD}	Operating current with SD card inserted during read operation	-	78.4	-	mA	HS mode read operation
I _{SDWR}	Operating current with SD card inserted during write operation	-	79.8	-	mA	HS mode write operation
I _{MSIDLE}	Operating current with MS card inserted	-	39.1	-	mA	No read/write operation
I _{MSRD}	Operating current with MS card inserted during read operation	-	55.4	-	mA	HS mode read operation
I _{MSWR}	Operating current with MS card inserted during write operation	-	74.1	-	mA	HS mode write operation
V ₃₃	Regulator 3.3V power output	-	3.28	-	V	
V _{REG12}	Regulator power output	-	TBD	-	V	
V _{POR}	Power-on reset Voltage	-	TBD	-	V	
V _{POUT}	Card Output Power Voltage	-	3.27	-	V	SD33 / Vpout

(Standard testing condition at 25°C)



Table 3-4: I/O DC Characteristics

Symbol	Descriptions	Min	Typical	Max	Units	Conditions
V _{IH}	Input high voltage	-	1.84	-	V	
V _{IL}	Input low voltage	-	1.43	-	V	
I _{OH}	Output high current	-	7.16	-	mA	V _{OH} = 3V, VDDIO = VREG33
I _{OL}	Output low current	-	10.72	-	mA	V _{OL} = 0.3V, VDDIO = VREG33

(Standard testing condition at 25°C)

Table 3-5: Oscillator Characteristics

Symbol	Descriptions	Conditions	Min	Typical	Max	Units
F _{SdT}	MCLK frequency	SD data transaction	-	-	48	MHz
F _{MMC4T}		MMC v4.x data transaction	-	-	48	MHz
F _{MMC3T}		MMC v3.x data transaction	-	-	20	MHz
F _{MS1T}		MS 1-bit data transaction	-	-	12	MHz
F _{MS4T}		MS 4-bit data transaction	-	-	24	MHz
F _{SDI}		SD initialization	-	375	-	kHz
F _{MMCI}		MMC identification	-	375	-	kHz

(Standard testing condition at 25°C)



SO16 (Narrow) MECHANICAL DATA

DIM	mm			inch		
	MIN	TYP	MAX	MIN	TYP	MAX
A			1.75			0.068
a1	0.1		0.2	0.004		0.007
a2			1.65			0.064
b	0.35		0.46	0.013		0.018
b1	0.19		0.25	0.007		0.010
C		0.5			0.019	
c1	45° (typ.)					
D	9.8		10			0.393
E	5.8		6.2			0.244
e		1.27				
e3		8.89				
F	3.8		4.0			0.157
G	5.8		5.3			0.208
L	0.5		1.27			0.005
M			0.62			0.024
S	8° (max.)					

