IS917

USB3.0 Flash Disk Controller

Specification

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1. Description

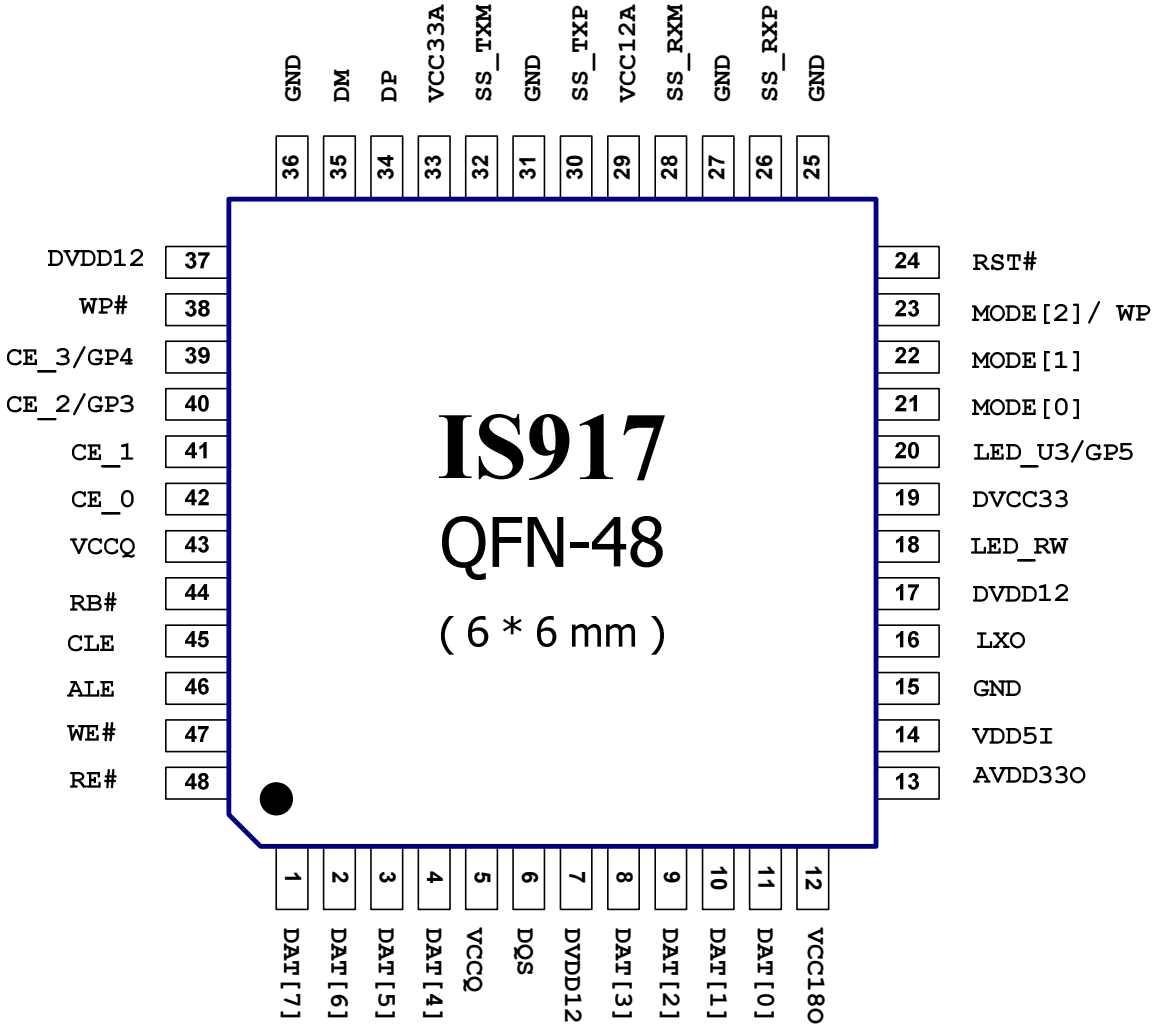
IS917 is the latest USB-3.0 interface Nand Flash Controller. With flexible firmware code supporting, IS917 can support various flash technology including 8k / 16k page TLC / MLC / SLC by different 2xnm / 2ynm / 1xnm / 1ynm process for major flash vendors.

2. Features

- One Channel data bus by small footprint package
- Up to 8 CEs supported(Die form)
- ECC protect up to 70 bit (configurable) by 1K bytes
- 2xnm, 2ynm, 1xnm, 1ynm : SLC / MLC / TLC types NAND Flash supported
- ONFI 2.1 spec. interface supported
- Toggle DDR interface supported
- Compliant with USB 3.0 spec. version 1.0
- Compliant with USB 2.0 spec. backward compatible with USB1.1
- Compliant with USB Mass Storage Class spec. version 1.0
- High performance 8051 with hardware acceleration DMA
- F/W off-load engine embedded
- 1.2V low power consumption design
- LED indicator to show link status and r/w traffic
- Customized VID/ PID with serial number
- Built-in LDO regulator

3. Pin Assignment

3.1 QFN-48 Pin Assignment



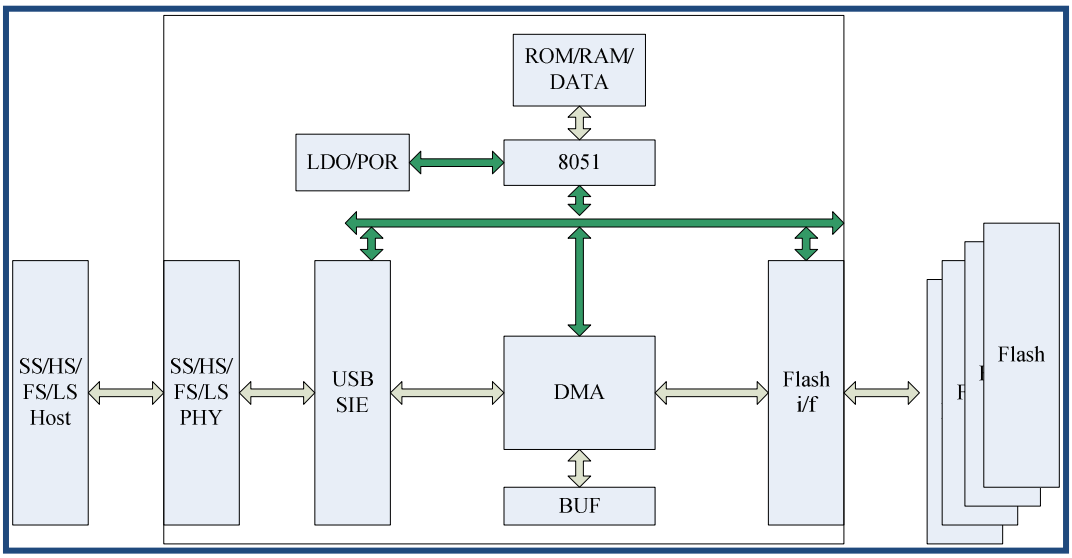
3.2 Pin Descriptions

Pin Name	Pin #	Pull up/Down	Attribute	Description
DAT[7]	1	Down	I/O	Flash data bit [7]
DAT[6]	2	Down	I/O	Flash data bit [6]
DAT[5]	3	Down	I/O	Flash data bit [5]
DAT[4]	4	Down	I/O	Flash data bit [4]
VCCQ	5		PWR	3.3V/1.8V IO Power input
DQS	6	Down	I/O	Flash DQS
DVDD12	7		PWR	1.2V Core power input
DAT[3]	8	Down	I/O	Flash data bit [3]
DAT[2]	9	Down	I/O	Flash data bit [2]
DAT[1]	10	Down	I/O	Flash data bit [1]
DAT[0]	11	Down	I/O	Flash data bit [0]
VCC18O	12		PWR	Regulator 1.8V output
AVDD33O	13		PWR	Regulator 3.3V output
VDD5I	14		PWR	Regulator 5V input
GND	15		GND	GND
LXO	16		PWR	LXO
DVDD12	17		PWR	1.2V Core power input
LED_RW	18		I/O	R/W Access LED
DVCC33	19		PWR	3.3V IO Power input
LED_U3	20		I/O	USB Mode LED, tie to GND
MODE[0]	21	Down	I	Test mode pin, tie to GND
MODE[1]	22	Down	I	Test mode pin, tie to GND
MODE[2]	23	Down	I	Test mode pin, tie to GND
RST#	24	Up	I	Reset
GND	25		GND	GND
SS_RXP	26		I/O	USB 3.0 differential receive pin positive

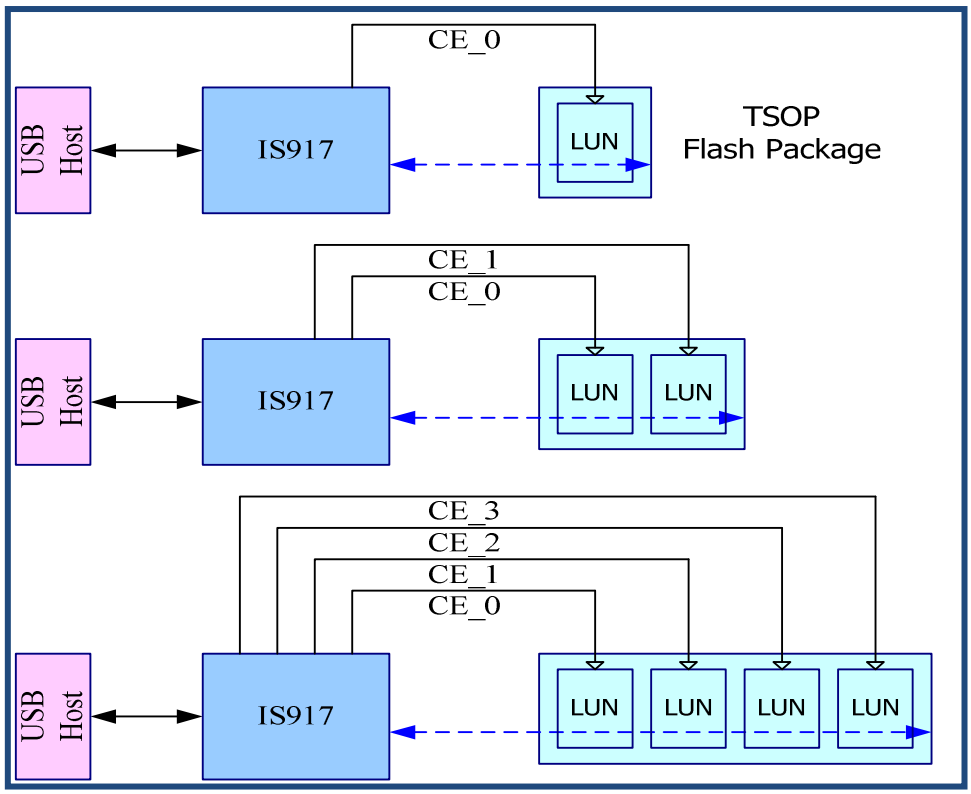
GND	27		GND	GND
SS_RXM	28		I/O	USB 3.0 differential receive pin negative
VCC12A	29		PWR	1.2V analog power input
SS_TXP	30		I/O	USB 3.0 differential transmit pin positive
GND	31		GND	GND
SS_TXM	32		I/O	USB 3.0 differential transmit pin negative
VCC33A	33		PWR	3.3V analog power input
DP	34		I/O	USB 2.0 differential pin plus
DM	35		I/O	USB 2.0 differential pin minus
GND	36		GND	GND
DVDD12	37		PWR	1.2 core power input
WP#	38		O	Flash write protection
CE_3	39		O	Flash chip enable 3
CE_2	40		O	Flash chip enable 2
CE_1	41		O	Flash chip enable 1
CE_0	42		O	Flash chip enable 0
VCCQ	43		PWR	3.3/1.8V IO power
RB#	44	Up	I	Flash Ready / Busy Status
CLE	45		O	Flash Channel Command latch
ALE	46		O	Flash Channel Address latch
WE#	47		O	Flash Channel WE#
RE#	48		O	Flash Channel RE#

4. System Application Configurations

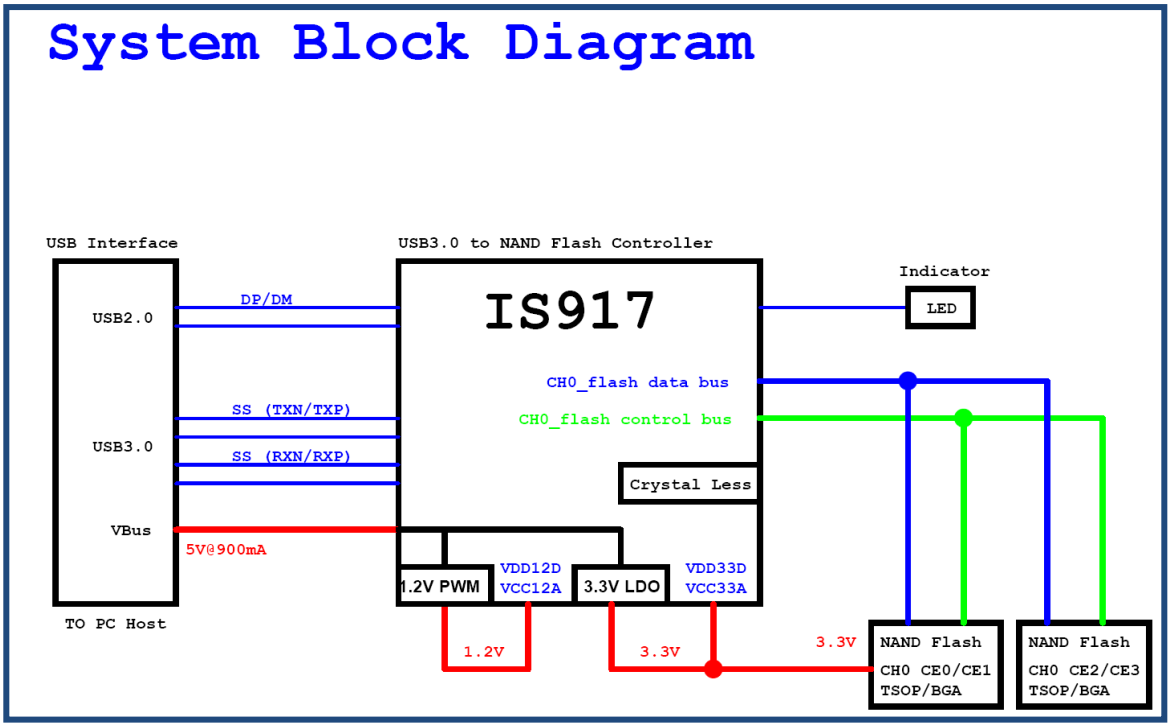
4.1 Controller Block Diagram



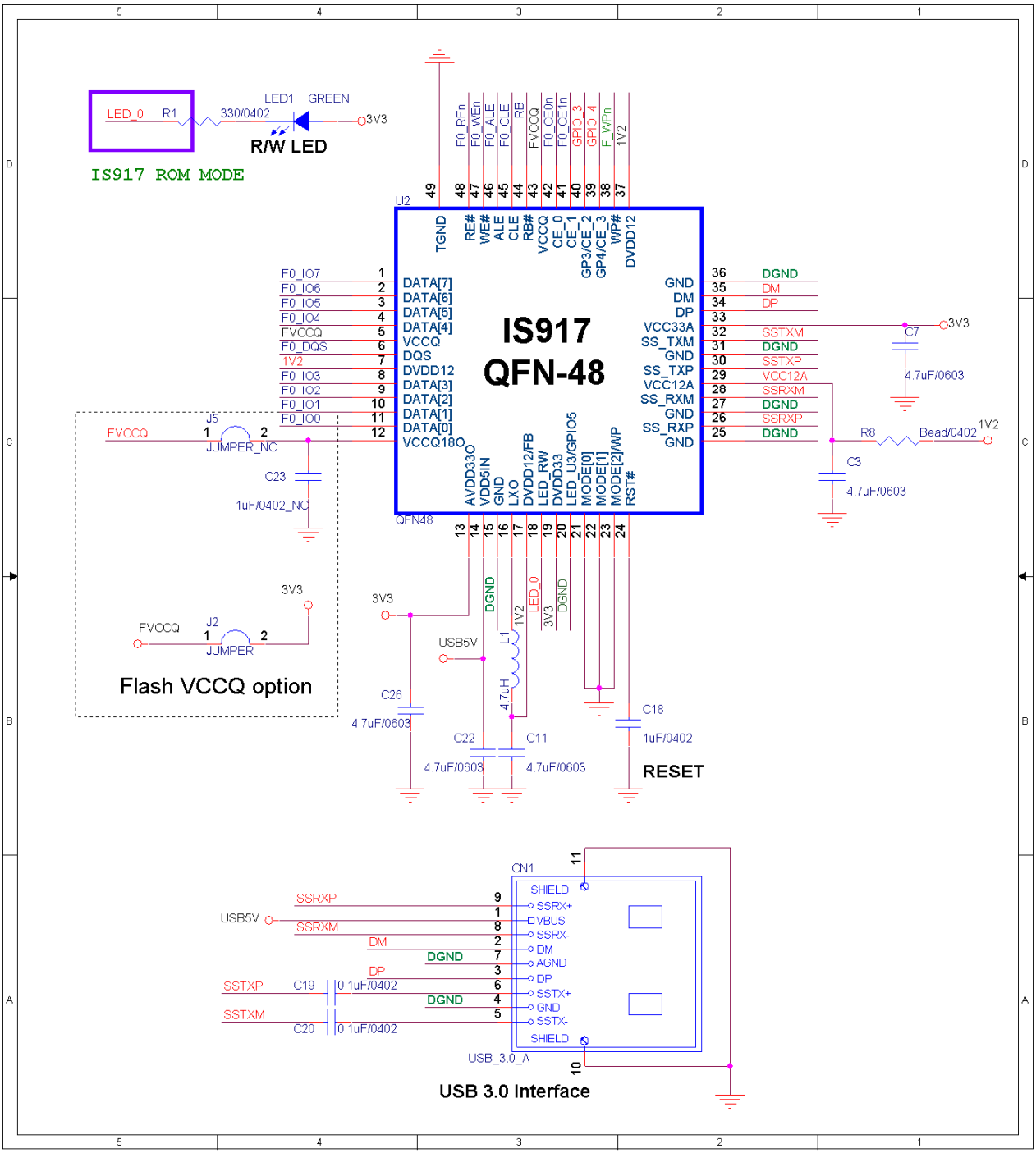
4.2 QFN-48 configuration examples



4.3 System Block Diagram



4.4 Reference Controller Circuit



5. Electrical Characteristics

5.1 Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	Tstorage	-40	150	C
5.0V supply power	Vin50	-0.3	5.5*	V
3.3V supply power	Vin33	-0.3	3.63	V
1.2V supply power	Vin12	-0.3	1.32	V
1.8V supply power	Vin18	-0.3	1.98	V

*: Vbus spec maximum is 5.5V , 5.5V~6V also can pass internal test criterion for spike case.

5.2 Operating Conditions

Parameter	Symbol	Min.	Max.	Unit
Operating Temperature	Toperating	0	70	C
USB VBUS	VBUS	4.5	5.5*	V
Regulator 5V IN	V5IN	4.5	5.5*	V
Regulator 3.3V IN	V33I	3.0	3.6	V
Analog 3.3V power	VCC33A	3.15	3.45	V
Analog 1.2V power	VCC12A	1.14	1.26	V
Digital 3.3V power	DVDD33	2.97	3.63	V
Digital 1.2V power	DVDD12	1.08	1.32	V

*: Vbus spec maximum is 5.5V , 5.5V~6V also pass internal test criterion for spike case.

5.3 DC Characteristics

DC Characteristics of 3.3V IO

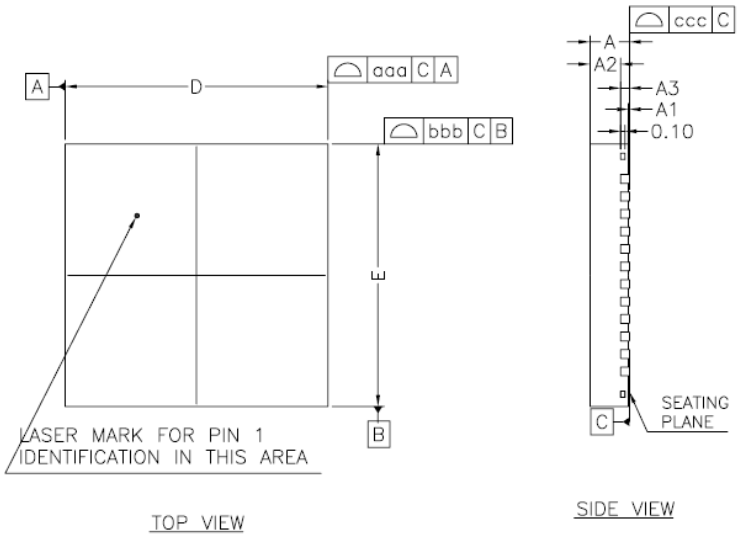
Parameter	Symbol	Min.	Typ.	Max.	Unit
Digital 3.3V power	DVCC33/VCCQ	2.97	3.3	3.63	V
Input low voltage	Vil	-0.3		0.8	V
Input high voltage	Vih	2.0		DVCC33+0.3	V
Output low voltage	Vol			0.4	V
Output high voltage	Voh	2.4			V
Pull-up resistance	Rpu	59	78	123	KΩ
Pull-down resistance	Rpd	49	72	150	KΩ

DC Characteristics of 1.8V IO

Parameter	Symbol	Min.	Typ.	Max.	Unit
Digital 3.3V power	VCCQ	1.62	1.8	1.98	V
Input low voltage	Vil	-0.3		0.35*VCCQ	V
Input high voltage	Vih	0.65*VCCQ		VCCQ+0.3	V
Output low voltage	Vol			0.45	V
Output high voltage	Voh	VCCQ-0.45			V
Pull-up resistance	Rpu	112	176	320	KΩ
Pull-down resistance	Rpd	104	181	421	KΩ

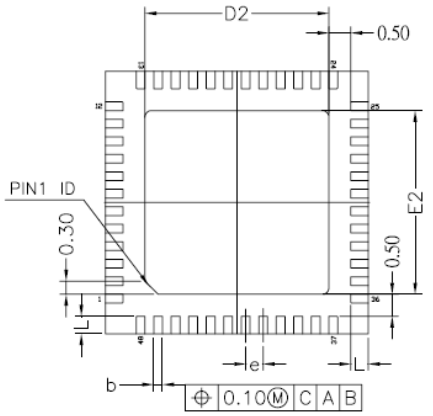
6. Package Information

6.1 QFN-48 package outline dimension



* CONTROLLING DIMENSION : MM

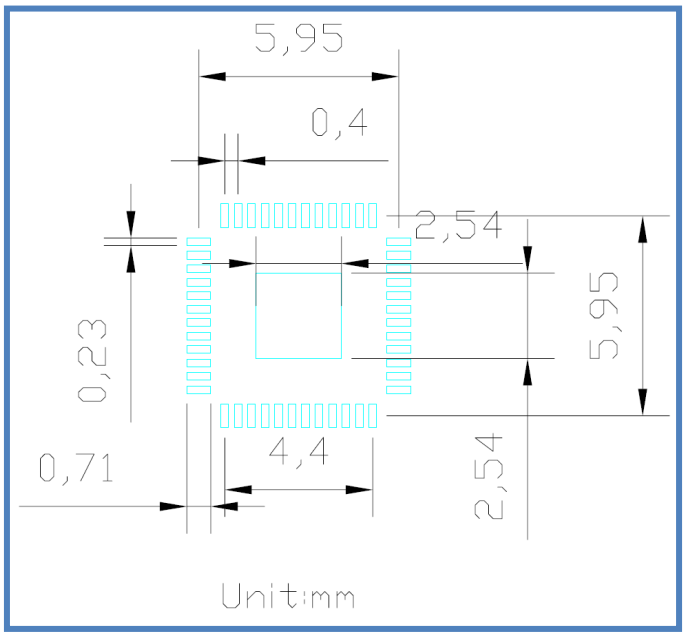
SYMBOL	MILLIMETER			INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.80	0.85	0.90	0.031	0.033	0.035
A1	0.00	0.035	0.05	0.000	0.001	0.002
A2	---	0.65	0.70	---	0.026	0.028
A3	0.203 REF.			0.008 REF.		
b	0.15	0.20	0.25	0.006	0.008	0.010
D	6.00 bsc			0.236 bsc		
D2	4.10	4.20	4.30	0.161	0.165	0.169
E	6.00 bsc			0.236 bsc		
E2	4.10	4.20	4.30	0.161	0.165	0.169
L	0.35	0.40	0.45	0.014	0.016	0.018
e	0.40 bsc			0.016 bsc		
TOLERANCES OF FORM AND POSITION						
aaa	0.10			0.004		
bbb	0.10			0.004		
ccc	0.08			0.003		



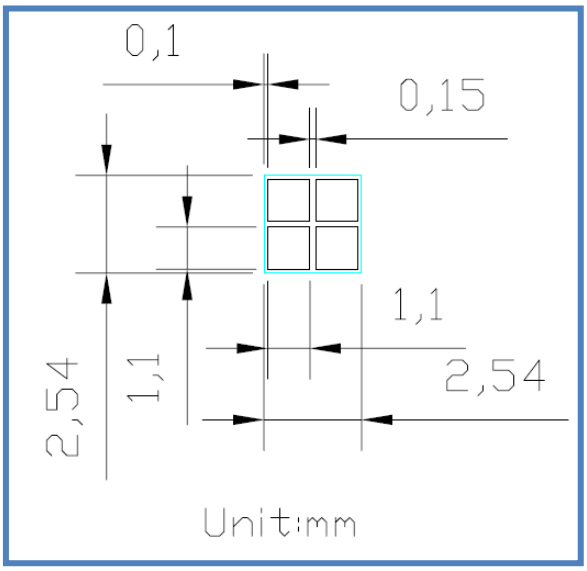
NOTES :
1.ALL DIMENSIONS ARE IN MILLIMETERS.
2.DIE THICKNESS ALLOWABLE IS 0.305 mm MAXIMUM(.012 INCHES MAXIMUM)
3.DIMENSIONING & TOLERANCES CONFORM TO ASME Y14.5M. −1994.
4.THE PIN #1 IDENTIFIER MUST BE PLACED ON THE TOP SURFACE OF THE PACKAGE BY USING INDENTATION MARK OR OTHER FEATURE OF PACKAGE BODY.
5.EXACT SHAPE AND SIZE OF THIS FEATURE IS OPTIONAL.
6.PACKAGE WARPAGE MAX 0.08 mm.
7.APPLIED FOR EXPOSED PAD AND TERMINALS. EXCLUDE EMBEDDING PART OF EXPOSED PAD FROM MEASURING.
8.APPLIED ONLY TO TERMINALS.

TITLE: PACKAGE OUTLINE 48L SAWN QFN 6.0x6.0x0.9 mm		SCALE:	PROJ.
		AAA07075	A
			SIZE: A4
UNIT: INCH / MM	TOLERANCE: DIMENSION / ANGLE		REFERENCE DOCUMENT

6.2 QFN-48 package reference layout/stencil pad dimension



Suggestion Layout Pad



Suggestion Exposed Pad Stencil opening