

**Innstor Technology Corporation**

*IS903 USB3.0 Flash Disk Controller*

# **IS903**

# **Datasheet**

Version 1.02

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Version 1.02  
2012/08/23

# Innostor Technology Corporation

IS903 USB3.0 Flash Disk Controller

## Revision History

Revision	Date	Author	Comments
0.10	2011/09/15	Jeff Chan	Initiation
0.90	2011/11/30	Jeff Chan	Add aQFN-88 package
0.99	2012/04/20	Young Yang	Update aQFN-88, QFN64 8x8
1.00	2012/06/11	Young Yang	Update QFN64 8x8, remove aQFN-88
1.01	2012/08/03	Young Yang	Remove aQFN-62 package
1.02	2012/08/23	Young Yang	Update DC characteristics

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## **1. Description**

**IS903 is the USB-3.0 interface Nand Flash Controller. With flexible firmware code supporting, IS903 can support various flash technology including 8k / 16k page SLC / MLC by different 2xnm / 2ynm / 1xnm process for major flash vendors.**

## **2. Features**

### **Flash support**

**2xnm, 2ynm, 1xnm process Flash from various vendors**

**One Channel / two channel data bus by small footprint package**

**Up to 4 CEs per channel to support max. 8 Flash CEs**

**SLC / MLC types Nand Flash supported**

**ONFI 2.1 spec. interface supported**

**Toggle DDR interface supported**

### **USB interface**

**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**

**ECC protect 43 bit by 1K bytes**

**High performance 1T 8051 with hardware acceleration DMA**

**F/W off-load engine embedded**

**1.2V low power consumption design**

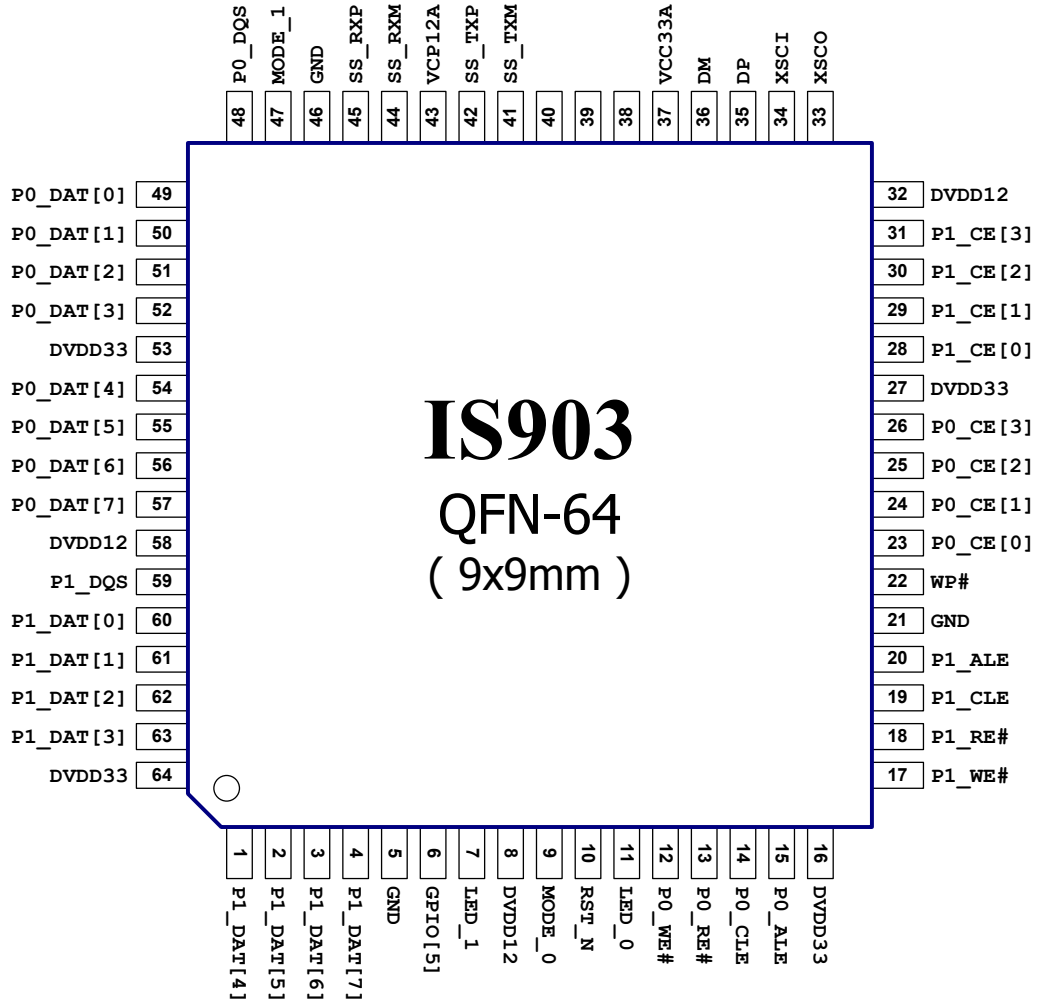
**LED indicator to show link status and r/w traffic**

**Customized VID/ PID with serial number**

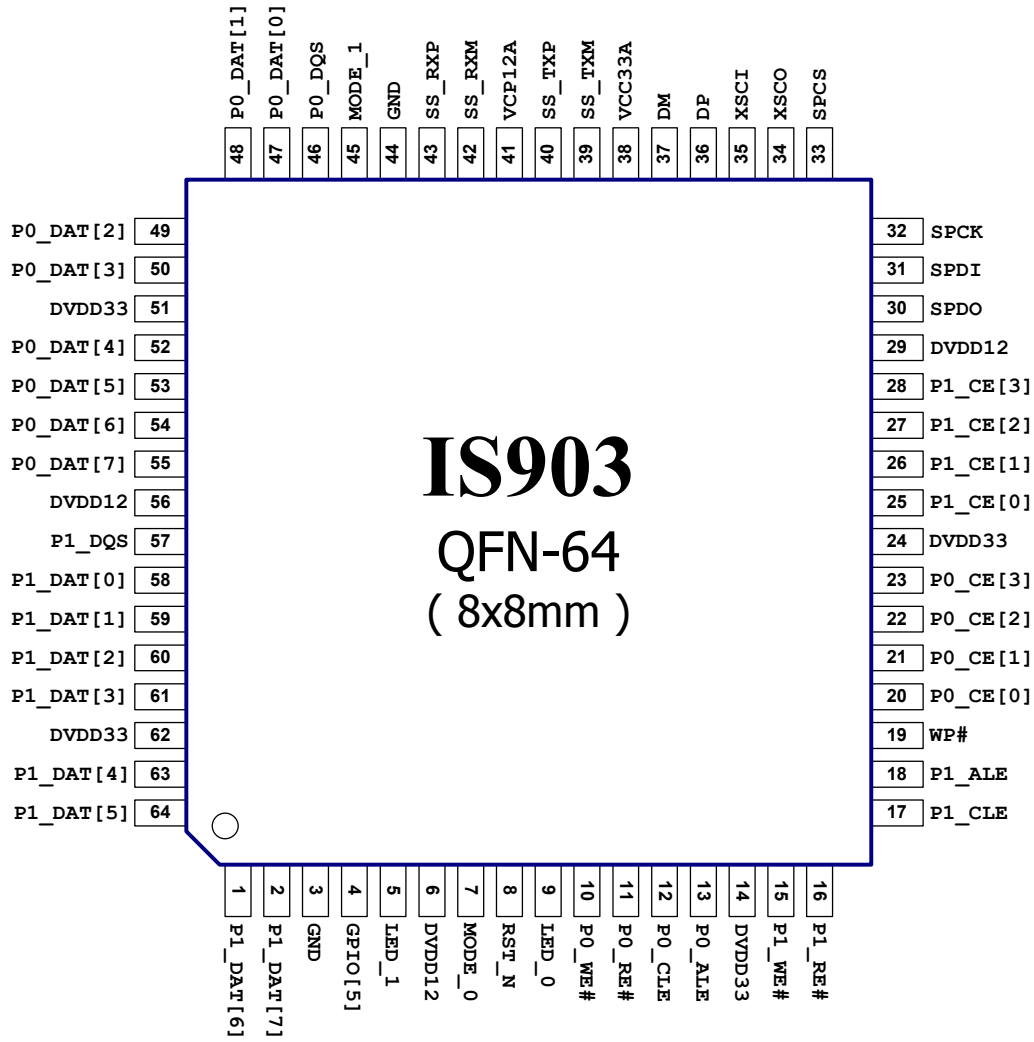
**30Mhz Crystal**

### 3. Pin Assignment

#### 3.1 QFN-64 9x9 Pin Assignment



### 3.2 QFN-64 8x8 Pin Assignment



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## 3.3 Pin Descriptions ( QFN-64 9x9 & 8x8 )

Pin Name	Pin# (64) 9x9	Pin# (64) 8x8	Pull up/down	Attribute	Description
C1_DAT[4]	1	63	down*1	I/O	Flash Channel-1 data
C1_DAT[5]	2	64	down*1	I/O	Flash Channel-1 data
C1_DAT[6]	3	1	down*1	I/O	Flash Channel-1 data
C1_DAT[7]	4	2	down*1	I/O	Flash Channel-1 data
GND	5	3		GND	GND
GPIO	6	4	None	O	reserved
LED_1	7	5	None	O	LED to show link status and r/w traffic
DVDD12	8	6		PWR	1.2V core power supply
MODE0	9	7	down	I	Test mode pin, tie to GND
RST_N	10	8	up	I	Chip reset, low active
LED_0	11	9	None	O	LED to show link status and r/w traffic
C0_WE#	12	10	None	O	Flash Channel-0 WE#
C0_RE#	13	11	None	O	Flash Channel-0 RE#
C0_CLE	14	12	None	O	Flash Channel-0 Command latch
C0_ALE	15	13	None	O	Flash Channel-0 Address latch
DVDD33	16	14		PWR	3.3V IO power supply
C1_WE#	17	15	None	O	Flash Channel-1 WE#
C1_RE#	18	16	None	O	Flash Channel-1 RE#
C1_CLE	19	17	None	O	Flash Channel-1 Command latch
C1_ALE	20	18	None	O	Flash Channel-1 Address latch
GND	21	-		GND	GND
WP#	22	19	None	O	Flash write protection
C0_CE0	23	20	None	O	Flash Channel-0 chip enable 0
C0_CE1	24	21	None	O	Flash Channel-0 chip enable 1
C0_CE2	25	22	None	O	Flash Channel-0 chip enable 2

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Pin Name	Pin# (64) 9x9	Pin# (64) 8x8	Pull up/down	Attribute	Description
C0_CE3	26	23	None	O	Flash Channel-0 chip enable 3
DVDD33	27	24		PWR	3.3V IO power supply
C1_CE0	28	25	None	O	Flash Channel-1 chip enable 0
C1_CE1	29	26	None	O	Flash Channel-1 chip enable 1
C1_CE2	30	27	None	O	Flash Channel-1 chip enable 2
C1_CE3	31	28	None	O	Flash Channel-1 chip enable 3
DVDD12	32	29		PWR	1.2V core power supply
SPI_MOSI	-	30		O	SPI interface, MOSI
SPI_MISO	-	31		I	SPI interface, MISO
SPI_CLK	-	32		O	SPI interface, clock
SPI_CS	-	33		O	SPI interface, chip enable
XSCO	33	34		O	Crystal 30Mhz output
XSCI	34	35		I	Crystal 30Mhz input
DP	35	36		I/O	USB 2.0 differential pin plus
DM	36	37		I/O	USB 2.0 differential pin minus
VCC33A	37	38		PWR	3.3V analog power supply
NC	38	-			
NC	39	-			
NC	40	-			
SS_TXM	41	39		O	USB 3.0 differential transmit pin negative
SS_TXP	42	40		O	USB 3.0 differential transmit pin positive
VCC12A	43	41		PWR	1.2V analog power supply
SS_RXM	44	42		I	USB 3.0 differential receive pin negative
SS_RXP	45	43		I	USB 3.0 differential receive pin positive
GND	46	44		GND	GND
MODE1	47	45	down	I	Test mode pin, tie to GND

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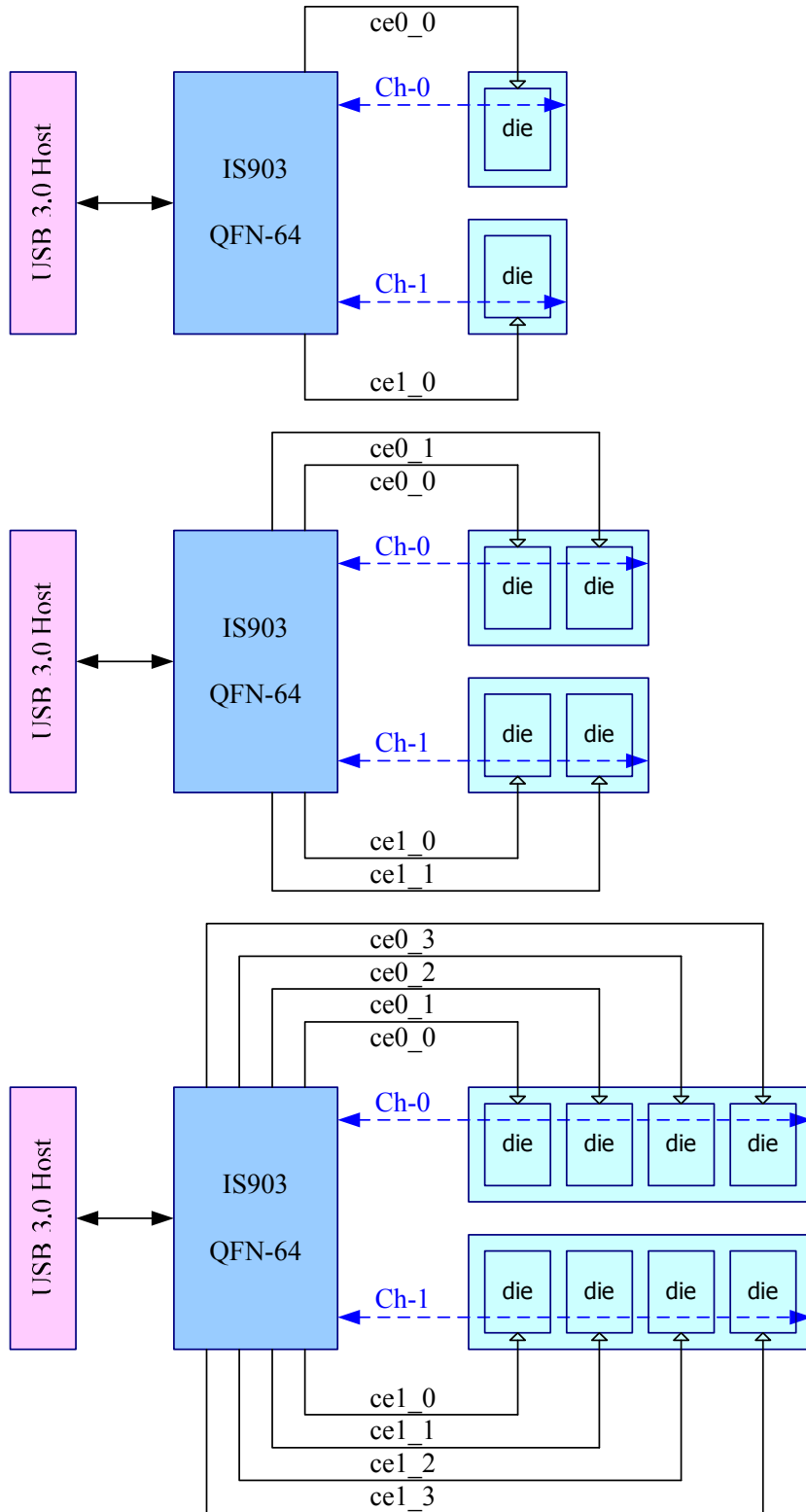
<b>Pin Name</b>	<b>Pin# (64) 9x9</b>	<b>Pin# (64) 8x8</b>	<b>Pull up/down</b>	<b>Attribute</b>	<b>Description</b>
C0_DQS	48	46	down*1	I/O	Flash Channel-0 strobe data
C0_DAT[0]	49	47	down*1	I/O	Flash Channel-0 data
C0_DAT[1]	50	58	down*1	I/O	Flash Channel-0 data
C0_DAT[2]	51	59	down*1	I/O	Flash Channel-0 data
C0_DAT[3]	52	50	down*1	I/O	Flash Channel-0 data
DVDD33	53	51		PWR	3.3V IO power supply
C0_DAT[4]	54	52	down*1	I/O	Flash Channel-0 data
C0_DAT[5]	55	53	down*1	I/O	Flash Channel-0 data
C0_DAT[6]	56	54	down*1	I/O	Flash Channel-0 data
C0_DAT[7]	57	55	down*1	I/O	Flash Channel-0 data
DVDD12	58	56		PWR	1.2V core power supply
C1_DQS	59	57	down*1	I/O	Flash Channel-1 strobe data
C1_DAT[0]	60	58	down*1	I/O	Flash Channel-1 data
C1_DAT[1]	61	59	down*1	I/O	Flash Channel-1 data
C1_DAT[2]	62	60	down*1	I/O	Flash Channel-1 data
C1_DAT[3]	63	61	down*1	I/O	Flash Channel-1 data
DVDD33	64	62		PWR	3.3V IO power supply

Note - \*1 : Default as pull-down , but it is released when R/W operating .

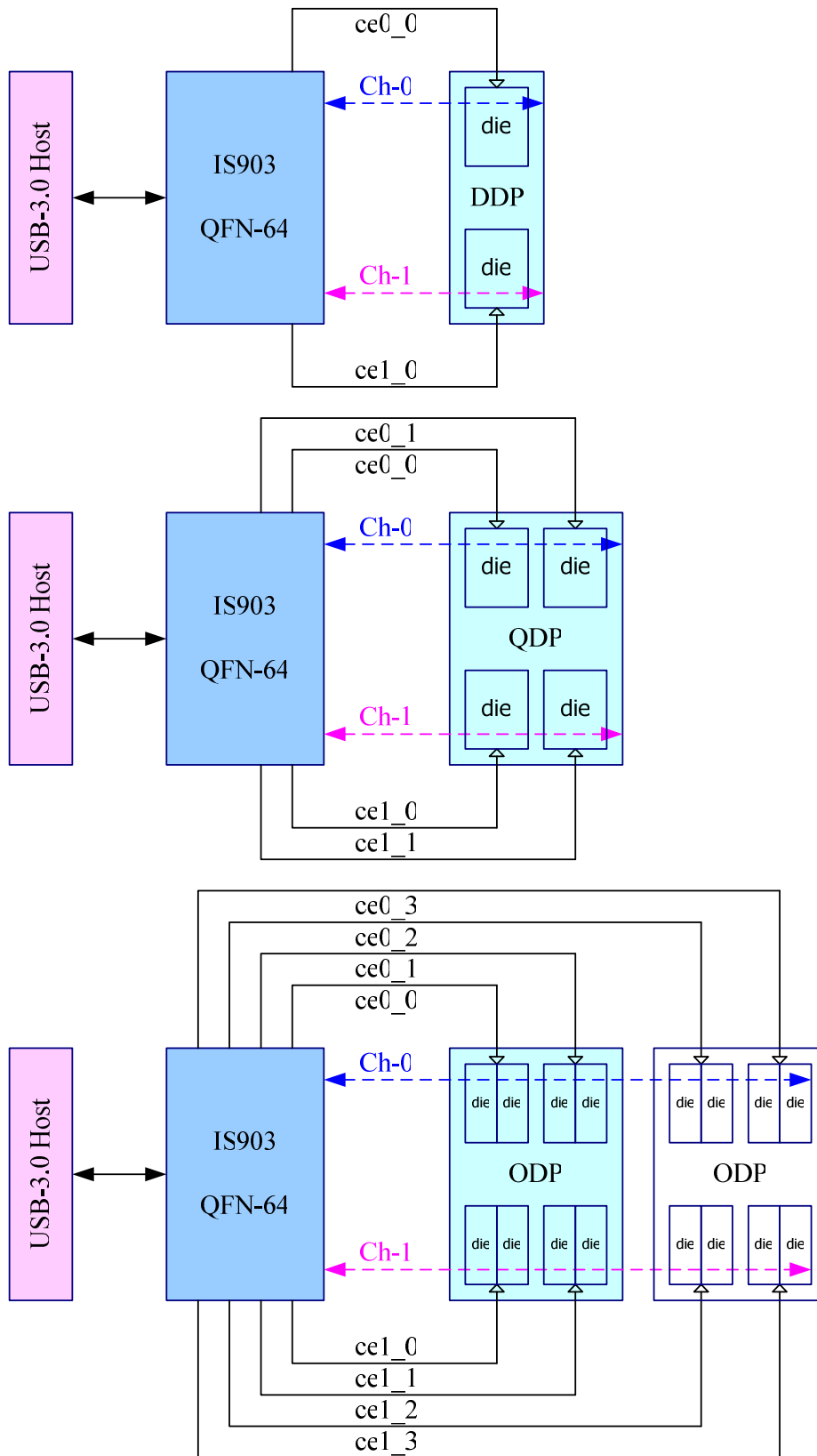


## 4. System Application Configurations

### 4.1 QFN-64 configuration examples



## 4.2 QFN-64 configuration examples



## 5. Electrical Characteristics

### 5.1 Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T <sub>storage</sub>	-40	150	C
3.3V supply power	V <sub>in33</sub>	-0.3	3.63	V
1.2V supply power	V <sub>in12</sub>	-0.3	1.32	V

### 5.2 Operating Conditions

Parameter	Symbol	Min.	Max.	Unit
Operating Temperature	T <sub>operating</sub>	0	70	C
USB VBUS	VBUS	4.5	5.5	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

### 5.3 Reference Clock Source and Crystal Specification

Parameter	Symbol	Min.	Typ.	Max.	Unit
Reference clock	XSCI		30		Mhz
Crystal freq. tolerance		-50		+50	ppm

## 5.4 DC Characteristics

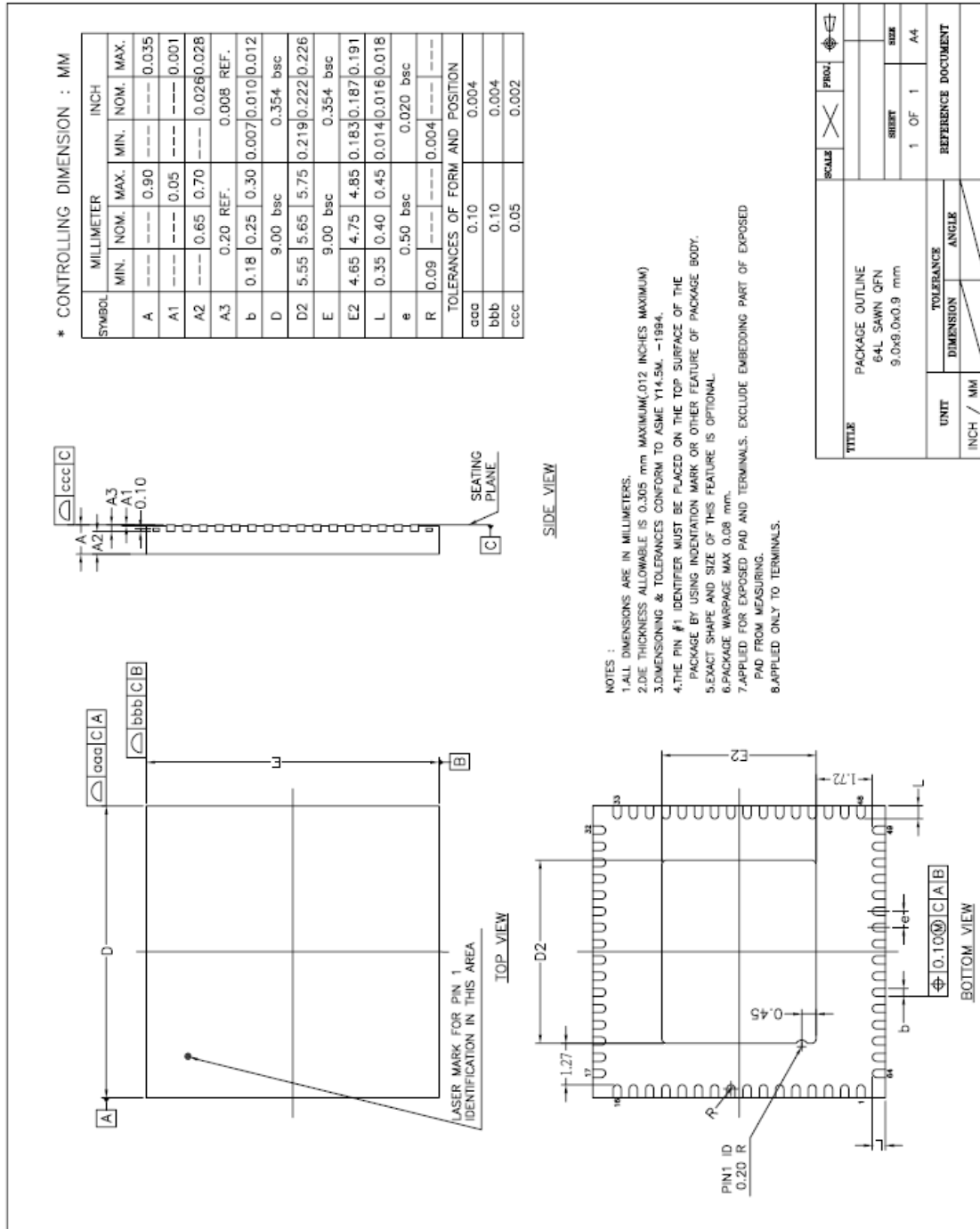
Parameter	Symbol	Min.	Typ.	Max.	Unit
USB bus power	VBUScurrent			900	mA
Analog 3.3V power U3	V33A_cur_u3		15.38		mA
Analog 1.2V power U3	V12A_cur_u3		88		mA
Analog 3.3V power U2	V33A_cur_u3		23.6		mA
Analog 1.2V power U2	V12A_cur_u3		1.26		mA
Analog 3.3V Suspend	V33A_cur_sus		0.35		mA
Analog 1.2V Suspend	V12A_cur_sus		0.76		mA
Digital 3.3V power	DVDD33_cur		42.4		mA
Digital 1.2V power	DVDD12_cur		62		mA

## 5.5 DC Characteristics of 3.3V IO

Parameter	Symbol	Min.	Typ.	Max.	Unit
Digital 3.3V power	DVDD33	2.97	3.3	3.63	V
Input low voltage	Vil			0.8	V
Input high voltage	Vih	2.0			V
Output low voltage	Vol			0.4	V
Output high voltage	Voh	2.4			V
Pull-up resistance	Rpu	40	75	190	KΩ
Pull-down resistance	Rpd	30	75	190	KΩ

## 7. Package Information

### 7.1 QFN-64 9x9 package outline dimension



## 7.2 QFN-64 8x8 package outline dimension

