PL-2305 USB to Printer Bridge Controller (Chip Rev I)

Product Datasheet

Document Revision 1.0
Document Release: April 12, 2011

Prolific Technology Inc.

7F, No. 48, Sec. 3, Nan Kang Rd.

Nan Kang, Taipei 115, Taiwan, R.O.C.

Tel: 886-2-2654-6363

Fax: 886-2-2654-6161

Email: sales@prolific.com.tw

URL: http://www.prolific.com.tw

Disclaimer

All the information in this document is subject to change without prior notice. Prolific Technology Inc. does not make any representations or any warranties (implied or otherwise) regarding the accuracy and completeness of this document and shall in no event be liable for any loss of profit or any other commercial damage, including but not limited to special, incidental, consequential, or other damages.

Trademarks

The Prolific logo is a registered trademark of Prolific Technology Inc. All brand names and product names used in this document are trademarks or registered trademarks of their respective holders.

Copyrights

Document Revision History

Revision	Description	Date
1.0	➢ Formal Release (Chip Rev I)	April 12, 2011

Table of Contents

List of Figures

List of Tables

1.0 Features

- Full compliance with the Universal Serial Bus Specification Version 1.1.

- Full compliance with the Universal Serial Bus Device Class Definition for Printing Devices Version 1.0.

- Full compliance with Nibble mode and Compatible mode defined in the IEEE std 1284-1994 – "IEEE Standard Signaling Method for a Bi-directional Parallel Peripheral Interface for Personal Computers"

- On chip transceivers and regulator for USB interface

- Fully automatic high speed bi-directional communication over parallel port

- 512 Bytes unified data buffer dynamically allocated for upstream and downstream data transfer

- Pin-to-Pin compatible with PL-2305H

- Works as USB Printing device under Windows 2000, Windows XP, Windows Vista, Windows 7, Mac OS and Linux OS with built-in USB printer class device driver. Connecting printer devices may require additional printer driver installation.

- USB-IF Logo Compliant: TID 40001165

- Small footprint 48-pin SSOP
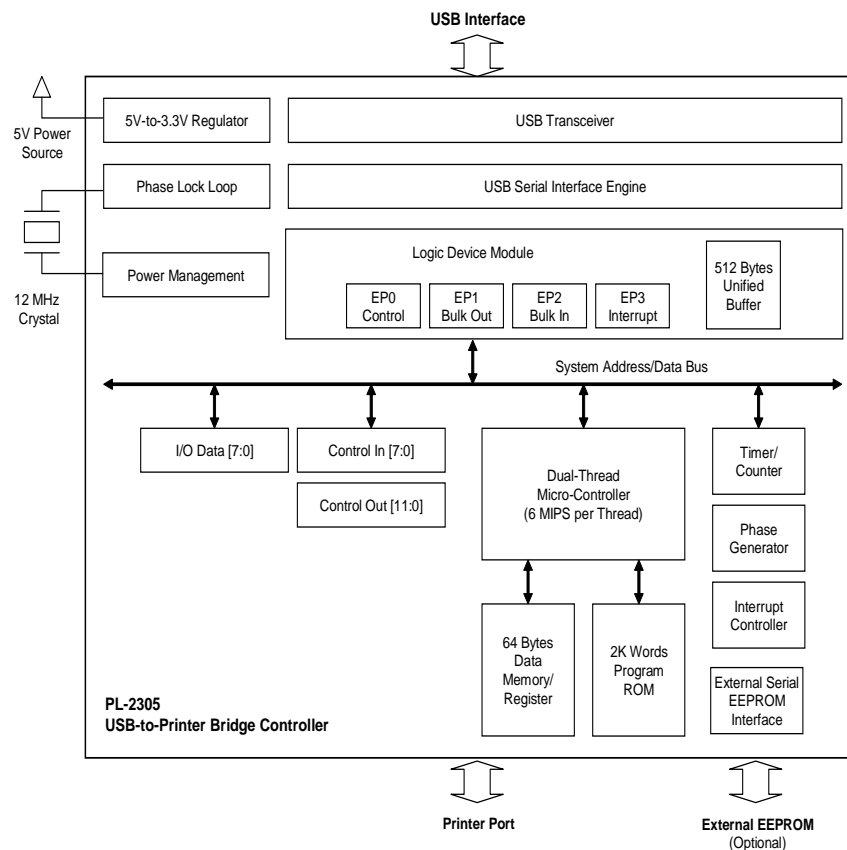
Figure 1-1 PL-2305 Block Diagram

2.0   Overview

The PL-2305 integrated circuit provides a bi-directional bridge between the Universal Serial Bus (USB) system and IEEE-1284 parallel port printers. It is designed to be a flexible, high performance, and low-cost single-chip solution for USB cable as well as USB ready peripheral manufacturers.

The PL-2305 controller is designed according to the USB Printer Class specification so that default inbox driver is embedded in most of the popular operating systems such as Windows, Mac, and Linux. No separate driver is needed to install. The PL-2305 is default to negotiate with the printer into Nibble mode for upstream data and Compatible mode for downstream data transfer.

The external serial EEPROM support gives the user of PL-2305 options to customize this chip to show their identity. The user could modify the Vendor ID, Product ID, Language ID, manufacturer string, and product string of the final product. They could also use this EEPROM to store authorization/security codes. For large quantity orders, it is also possible to modify the Maskable ROM (Read Only Memory) of PL-2305 to better represent the final product manufacturer and thus eliminate the need for external EEPROM.

3.0   Pin Description

```
                    ┌─────────────────┐
         GND  ─┤ 1  │ O               │ 48 ├─  XPLH
     Reserved ─┤ 2  │                 │ 47 ├─  XATFJ
     Reserved ─┤ 3  │                 │ 46 ├─  XSEL
        XTEST ─┤ 4  │                 │ 45 ├─  XPERR
          XIN ─┤ 5  │                 │ 44 ├─  XBUSY
         XOUT ─┤ 6  │                 │ 43 ├─  XACKJ
       PLLVCC ─┤ 7  │                 │ 42 ├─  PD7
      PLLTEST ─┤ 8  │                 │ 41 ├─  VCC
       PLLGND ─┤ 9  │                 │ 40 ├─  NC
      SUSPEND ─┤ 10 │                 │ 39 ├─  PD6
       USBGND ─┤ 11 │                 │ 38 ├─  PD5
       DMINUS ─┤ 12 │   SSOP 48       │ 37 ├─  NC
        DPLUS ─┤ 13 │   (300 mil)     │ 36 ├─  PD4
       USBVCC ─┤ 14 │                 │ 35 ├─  NC
      ZREGVCC ─┤ 15 │                 │ 34 ├─  PD3
          VCC ─┤ 16 │                 │ 33 ├─  PD2
       RESETJ ─┤ 17 │                 │ 32 ├─  GND
           NC ─┤ 18 │                 │ 31 ├─  NC
     RWAKEUPJ ─┤ 19 │                 │ 30 ├─  PD1
           NC ─┤ 20 │                 │ 29 ├─  PD0
          SCL ─┤ 21 │                 │ 28 ├─  XSTBJ
          SDA ─┤ 22 │                 │ 27 ├─  XINIJ
           NC ─┤ 23 │                 │ 26 ├─  XFLTJ
          VCC ─┤ 24 │                 │ 25 ├─  XSLIJ
                    └─────────────────┘
```
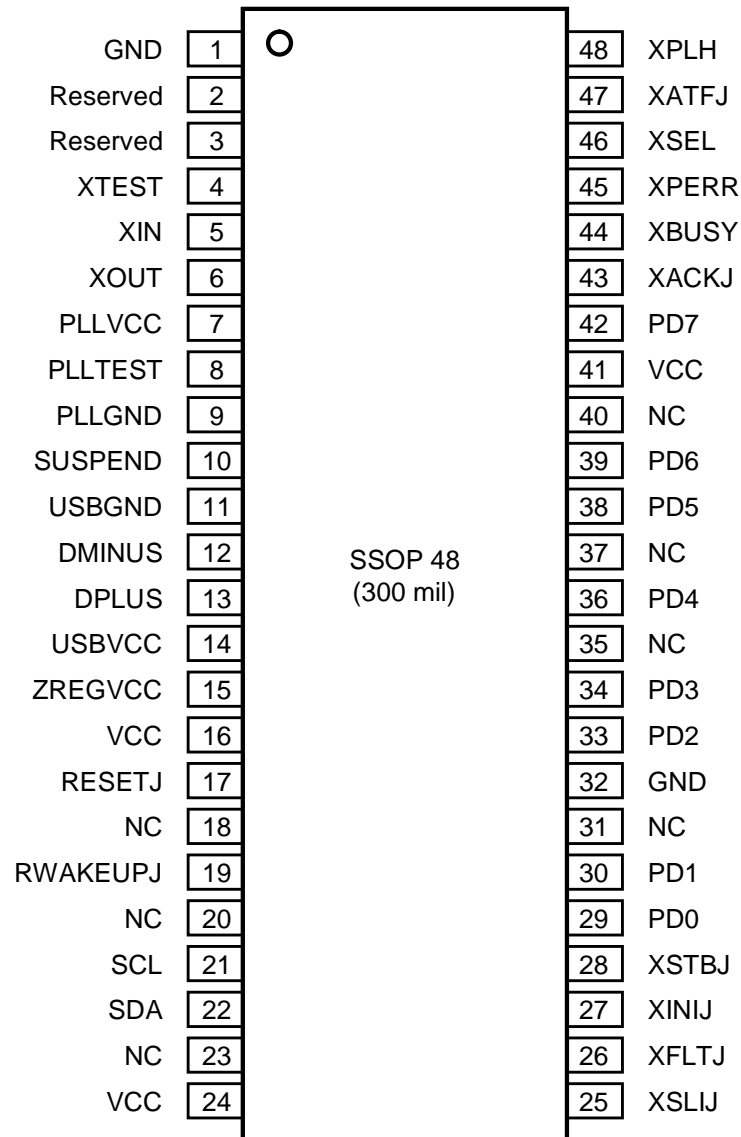
Figure 3-1 PL-2305 Pin Diagram

Table 3-1 Pin Assignment Descriptions

Type:	I – Input signal	O – Output signal	I/O – Bi-directional signal	P – Power/Ground

Pin	Symbol	Type	Description
1	GND	P	Ground.
2	Reserved	–	Reserved, must be tied to ground.
3	Reserved	–	Reserved, must be tied to ground.
4	XTEST	I	Core test pin must be tied to ground for normal operation.
5	XIN	I	Crystal in or CMOS oscillator input.
6	XOUT	O	Crystal out or no connection.
7	PLLVCC	P	5V Analog Power Supply for on-chip PLL.
8	PLLTEST	I	PLL test pin must be tied to ground for normal operation.
9	PLLGND	P	Analog Ground for on-chip PLL.
10	SUSPEND	O	Indication of device suspend status.
11	USBGND	P	Ground for on-chip USB transceiver.
12	DMINUS	I/O	USB D- signal.
13	DPLUS	I/O	USB D+ signal.
14	USBVCC	P	3.3V Power Supply for on-chip USB transceiver.
15	ZREGVCC	P	3.3V output from on-chip 5V-to-3.3V regulator.
16	VCC	P	5V Power Supply for on-chip 5V-to-3.3V regulator.
17	RESETJ	I	Optional external Power-On-Reset signal.
18	NC	–	No connection.
19	RWAKEUPJ	I	Remote Wakeup Pin. (Default Disable) To enable this function, need to enable in EEPROM.
20	NC	–	No connection.
21	SCL	I/O	Clock for external Serial EEPROM.
22	SDA	I/O	Data/Address for external Serial EEPROM.
23	NC	–	No connection.
24	VCC	P	5V Power Supply.
25	XSLIJ	O	nSelectIn signal for Parallel port.
26	XFLTJ	I	nFault signal for Parallel port.
27	XINIJ	O	nInit signal for Parallel port.
28	XSTBJ	O	nStrobe signal for Parallel port.
29	PD0	I/O	Data bit 0 for Parallel port.
30	PD1	I/O	Data bit 1 for Parallel port.
31	NC	–	No connection.
32	GND	P	Ground.
33	PD2	I/O	Data bit 2 for Parallel port.
34	PD3	I/O	Data bit 3 for Parallel port.
35	NC	–	No connection.

Pin	Symbol	Type	Description
36	PD4	I/O	Data bit 4 for Parallel port.
37	NC	–	No connection.
38	PD5	I/O	Data bit 5 for Parallel port.
39	PD6	I/O	Data bit 6 for Parallel port.
40	NC	–	No connection.
41	VCC	P	5V Power Supply.
42	PD7	I/O	Data bit 7 for Parallel port.
43	XACKJ	I	nAck signal for Parallel port.
44	XBUSY	I	Busy signal for Parallel port.
45	XPERR	I	PError signal for Parallel port.
46	XSEL	I	Select signal for Parallel port.
47	XATFJ	O	nAutoFd signal for Parallel port.
48	XPLH	I	PLH signal for Parallel port.

4.0 USB Port Descriptor

PL-2305 supports the following standard USB descriptors:

- Device – PL-2305 has one device descriptor.

- Configuration – PL-2305 has one default configuration descriptor that supports one interface.

- Interface – PL-2305 has a single data interface with three possible alternates.

- Endpoint – PL-2305 supports the following endpoints:

  ❖ Bulk Out endpoint for PDL/PCP data.

  ❖ Optional Bulk In endpoint for status and other return/upstream information.

  ❖ Optional Interrupt endpoint for asynchronous event handling.

- String

4.1 Device Descriptor

Table 4-1 Device Descriptor

Offset	Field	Size	Value	Description
0	bLength	Byte	12h	Size of this descriptor in bytes.
1	bDescriptorType	Byte	01h	DEVICE descriptor type.
2	bcdUSB	Word	0100h	USB Specification version 1.0
4	bDeviceClass	Byte	00h	Interface Specific.
5	bDeviceSubclass	Byte	00h	Interface Specific.
6	bDeviceProtocol	Byte	00h	Interface Specific.
7	wMaxPacketSize0	Byte	08h	Maximum packet size for endpoint 0 is 8.
8	idVendor	Word	067Bh	Vendor ID for Prolific Technologies.[1]
10	idProduct	Word	2305h	Product ID for PL-2305. [1]
12	bcdDevice	Word	0202h	Device Release 1.0. [1]
14	iManufacturer	Byte	01h	String index 1 describes manufacturer. [2]
15	iProduct	Byte	02h	String index 2 describes product. [3]
16	iSerialNumber	Byte	00h/03h	Serial number string descriptor index.
17	bNumConfigurations	Byte	01h	One possible configuration.

Notes:

(1) These default values shown here could be modified by external EEPROM;

(2) The default string is "Prolific Technology Inc." in UNICODE format and could be replaced by the contents of external EEPROM;

(3) The default string is "IEEE-1284 Controller" in UNICODE format and could be replaced by the contents of external EEPROM

(4) The serial number string descriptor index can be defined by external EEPROM. If serial number is specified, the index will be 3 instead of 0.

4.2 Configuration Descriptor

Table 4-2 Configuration Descriptor

Offset	Field	Size	Value	Description
0	bLength	Byte	09h	Size of this descriptor in bytes.
1	bDescriptorType	Byte	02h	CONFIGURATION descriptor type.
2	bTotalLength	Word	004Eh	78 bytes of all INTERFACE & ENDPOINT.
4	bNumInterfaces	Byte	01h	The PL-2305 has one interface.
5	bConfigurationValue	Byte	01h	Value to write to the Device Configuration Register (DCR) to select this configuration.
6	iConfiguration	Byte	00h	No string description for this.
7	bmAttributes	Byte	A0h	Configuration characteristics: Bus Powered & Remote Wakeup.
8	MaxPower	Byte	32h	Maximum power consumption is 100 mA.

4.3 Interface Descriptors

The PL-2305 supports a single data interface with three alternate settings. Alternate 0 and 1 are "USB Device Class Definition for Printing Devices" compliant. Alternate 3 is vendor specific to support more complicate IEEE-1284 device operations.

4.3.1 Interface 0, Alternate Setting 0 (I0:A0)

This is a Unidirectional Interface, which supports sending the data to the printer via a Bulk Out endpoint. Status data that is compatible with Centronic parallel port is retrieved via the Class-Specific command GET_PORT_STATUS over the default control pipe.

Table 4-3 Interface Descriptor (I0:A0)

Offset	Field	Size	Value	Description
0	bLength	Byte	09h	Size of this descriptor in bytes.
1	bDescriptorType	Byte	04h	INTERFACE descriptor type.
2	bInterfaceNumber	Byte	00h	Interface 0.
3	bAlternateSetting	Byte	00h	Alternate 0.
4	bNumEndpoints	Byte	01h	Supports endpoint 0 and 1.
5	bInterfaceClass	Byte	07h	Printer Class.
6	iInterfaceSubClass	Byte	01h	Printer Subclass.
7	bInterfaceProtocol	Byte	01h	Unidirectional Interface.
8	iInterface	Byte	00h	No String descriptor for this interface.

Table 4-4 Bulk Out Endpoint Descriptor (I0:A0:E1)

Offset	Field	Size	Value	Description
0	bLength	Byte	07h	Size of this descriptor in bytes.
1	bDescriptorType	Byte	05h	ENDPOINT descriptor type.
2	bEndpointAddress	Byte	01h	Out Endpoint 1.
3	bmAttributes	Byte	02h	BULK Endpoint
4	wMaxPacketSize	Word	0040h	Maximum packet size is 64.
6	bInterval	Byte	00h	N/A

4.3.2 Interface 0, Alternate Setting 1 (I0:A1)

This is a Bi-directional Interface, which supports sending the data to the printer via a Bulk Out endpoint, and receiving status and other information from the printer via a Bulk In endpoint. Status data that is compatible with Centronic Parallel port is also available via the GET_PORT_STATUS class-specific request.

Table 4-5 Interface Descriptor (I0:A1)

Offset	Field	Size	Value	Description
0	bLength	Byte	09h	Size of this descriptor in bytes.
1	bDescriptorType	Byte	04h	INTERFACE descriptor type.
2	bInterfaceNumber	Byte	00h	Interface 0.
3	bAlternateSetting	Byte	01h	Alternate 1.
4	bNumEndpoints	Byte	02h	Supports endpoint 0, 1, and 2.
5	bInterfaceClass	Byte	07h	Printer Class.
6	iInterfaceSubClass	Byte	01h	Printer Subclass.
7	bInterfaceProtocol	Byte	02h	Bi-directional Interface.
8	iInterface	Byte	00h	No String descriptor for this interface.

Table 4-6 Bulk Out Endpoint Descriptor (I0:A1:E1)

Offset	Field	Size	Value	Description
0	bLength	Byte	07h	Size of this descriptor in bytes.
1	bDescriptorType	Byte	05h	ENDPOINT descriptor type.
2	bEndpointAddress	Byte	01h	Out Endpoint 1.
3	bmAttributes	Byte	02h	BULK Endpoint
4	wMaxPacketSize	Word	0040h	Maximum packet size is 64.
6	bInterval	Byte	00h	N/A

Table 4-7 Bulk In Endpoint Descriptor (I0:A1:E2)

Offset	Field	Size	Value	Description
0	bLength	Byte	07h	Size of this descriptor in bytes.
1	bDescriptorType	Byte	05h	ENDPOINT descriptor type.
2	bEndpointAddress	Byte	82h	In Endpoint 2.
3	bmAttributes	Byte	02h	BULK Endpoint
4	wMaxPacketSize	Word	0040h	Maximum packet size is 64.
6	bInterval	Byte	00h	N/A

4.3.3 Interface 0, Alternate Setting 2 (I0:A2)

Table 4-8 Interface Descriptor (I0:A2)

Offset	Field	Size	Value	Description
0	bLength	Byte	09h	Size of this descriptor in bytes.
1	bDescriptorType	Byte	04h	INTERFACE descriptor type.
2	bInterfaceNumber	Byte	00h	Interface 0.
3	bAlternateSetting	Byte	02h	Alternate 2.
4	bNumEndpoints	Byte	03h	Supports endpoint 0, 1, 2, and 3.
5	bInterfaceClass	Byte	FFh	Vendor specific.
6	iInterfaceSubClass	Byte	00h	–
7	bInterfaceProtocol	Byte	FFh	Vendor specific.
8	iInterface	Byte	00h	No String descriptor for this interface.

Table 4-9 Bulk Out Endpoint Descriptor (I0:A2:E1)

Offset	Field	Size	Value	Description
0	bLength	Byte	07h	Size of this descriptor in bytes.
1	bDescriptorType	Byte	05h	ENDPOINT descriptor type.
2	bEndpointAddress	Byte	01h	Out Endpoint 1.
3	bmAttributes	Byte	02h	BULK Endpoint
4	wMaxPacketSize	Word	0040h	Maximum packet size is 64.
6	bInterval	Byte	00h	N/A

Table 4-10 Bulk In Endpoint Descriptor (I0:A2:E2)

Offset	Field	Size	Value	Description
0	bLength	Byte	07h	Size of this descriptor in bytes.
1	bDescriptorType	Byte	05h	ENDPOINT descriptor type.
2	bEndpointAddress	Byte	82h	In Endpoint 2.
3	bmAttributes	Byte	02h	BULK Endpoint
4	wMaxPacketSize	Word	0040h	Maximum packet size is 64.
6	bInterval	Byte	00h	N/A

Table 4-11 Bulk In Endpoint Descriptor (I0:A2:E3)

Offset	Field	Size	Value	Description
0	bLength	Byte	07h	Size of this descriptor in bytes.
1	bDescriptorType	Byte	05h	ENDPOINT descriptor type.
2	bEndpointAddress	Byte	83h	In Endpoint 3.
3	bmAttributes	Byte	03h	INTERRUPT Endpoint
4	wMaxPacketSize	Word	0004h	Maximum packet size is 4.
6	bInterval	Byte	01h	This pipe should be pulled every frame.

5.0   Data Format Defined in EEPROM

The EEPROM is organized as following:

Table 5-1 EEPROM Contents

Address	Content	Note
1:0	Check Word (Predefined constant)	
3:2	Vendor ID (idVendor field of Device Descriptor)	
5:4	Product ID (idProduct field of Device Descriptor)	
7:6	Device Release Number (bdcDevice field of Device Descriptor)	
8	Configuration Attribute	
9	Configuration MaxPower	
255:8	String Descriptor Table	

The String Descriptor table is a linked data structure that holds all string descriptors recognized by this chip in the order of its index. The first entry, String 0, represents the Language ID, as defined by the USB specification. The second entry, String 1, is the Manufacturer Descriptor, as defined by the Device Descriptor of PL-2305. The third and forth entries, String 2 and 3, are the Product Descriptor and Serial Number, respective, also defined by the Device Descriptor. The user has the option to define String 4, 5, and 6 for their own private use. Each of the these String Descriptor Entries is of the following data structure:

Table 5-2 String Descriptor Entries Data Structure

Offset	Field	Size	Value	Note
0	bLength	1	Length of the string plus 2, i.e. (N + 2).	
1	bDescriptorType	1	03h – STRING Descriptor type.	
2	bString	N	UNICODE encoded string.	

The last entry of this table must have bLength of 0 to indicate the end of this table. If the host tries to access to the string descriptor beyond the last one, a zero-length data will be returned. The following table shows one example of valid EEPROM contents.

Table 5-3 EEPROM Contents Example

Offset	Content	Note
0:1	Check Word – 0x067B	Constant
2:3	Vendor ID – 0x067B	
4:5	Product ID – 0x2305	
6:7	Device Release Number – 0x0100	

Offset	Content	Note
8	Attributes - 0xA0	D7 Bus Powered D6 Self Powered D5 Remote Wakeup D4:D0 reserved For devices that use power from the bus and a local source sets both D7 and D6.
9	MaxPower – 0x32	Expressed in 2mA units (i.e.,50=100mA)
10:15	must be "0x00"	Reserved for future use
8	0x04	String Index 0
9	0x03	
11:10	0x0409	Language ID for English (United States).
12	0x32	String Index 1
13	0x03	
61:14	'P', 0x00, 'r', 0x00, 'o', 0x00, 'l', 0x00, 'i', 0x00, 'f', 0x00, 'i', 0x00, 'c', 0x00, ' ', 0x00, 'T', 0x00, 'e', 0x00, 'c', 0x00, 'h', 0x00, 'n', 0x00, 'o', 0x00, 'l', 0x00, 'o', 0x00, 'g', 0x00, 'y', 0x00, ' ', 0x00, 'I', 0x00, 'n', 0x00, 'c', 0x00, '.' , 0x00	"Prolific Technology Inc." – manufacturer description. 0x00 is padded for UNICODE.
62	0x2A	String Index 2
63	0x03	
103:64	'I', 0x00, 'E', 0x00, 'E', 0x00, 'E', 0x00, '-', 0x00, '1', 0x00, '2', 0x00, '8', 0x00, '4', 0x00, ' ', 0x00, 'C', 0x00, 'o', 0x00, 'n', 0x00, 't', 0x00, 'r', 0x00, 'o', 0x00, 'l', 0x00, 'l', 0x00, 'e', 0x00, 'r' , 0x00	"IEEE-1284 Controller" – device description. 0x00 is padded for UNICODE.
104	0x0A	String Index 3
105	0x03	
113:106	'0', 0x00, '1', 0x00, '2', 0x00, '3', 0x00	
114	0x00	End of String Descriptor Table.

The user could also define other strings, 4 to 6, to hold useful information for the drivers and/or applications, such as software authorization codes, public key for password encryption, symbolic names, just to name a few. However, the total length of this table must not exceed 256 bytes, the supported maximum size of external EEPROM.

6.0 DC Characteristics

6.1 Absolute Maximum Ratings

Table 6-1 Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
Vcc	Power Supply	-0.3 to 6.0	V
Vin	Input Voltage	-0.3 to Vcc+0.3	V
Vout	Output Voltage	-0.3 to Vcc+0.3	V
Tstg	Storage Temperature	-55 to 150	^{o}C

6.2 Recommended Operation Conditions

Table 6-2 Recommended Operation Conditions

Symbol	Parameter	Min	Typ	Max	Units
Vcc	Commercial Power Supply	4.75	5.0	5.25	V
Vin	Input Voltage	0		Vcc	V
Tj	Commercial Junction Operation Temperature	0	25	115	^{o}C

6.3 Operating Voltage and Suspend Current

Table 6-3 Operating Voltage and Suspend Current

Parameter	Symbol	Min	Typ	Max	Unit
Operating Voltage Range	VDD_5	4.5	5	5.5	V
Operating Current[1] (Power Consumption)	I_{DD}	-	18	-	mA
Suspend Current	I_{SUS}	-	-	450	μA

Note: (1) – No device connected.

6.4 General DC Characteristics

Table 6-4 General DC Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Iil	Input leakage current	No pull-up or pull-down	-1		1	μA
Ioz	Tri-state leakage current		-10		10	μA
Cin	Input capacitance			3		pF
Cout	Output capacitance			3		pF
Cbid3	Bi-directional buffer capacitance			3		pF

Note: The Capacitance listed above does not include PAD capacitance and package capacitance.

6.5 DC Electrical Characteristics for 5V Operation

Table 6-5 DC Electrical Characteristics for 5V Operation

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Vil	Input low voltage	CMOS			0.3*Vcc	V
Vih	Input high voltage	CMOS	0.7*Vcc			V
Vt-	Schmitt trigger negative going threshold voltage	CMOS		1.84		V
Vt+	Schmitt trigger positive going threshold voltage	CMOS		3.22		V
Vol	Output low voltage	Iol=12mA and Pin=PD7~PD0, XSLIJ, XINIJ, XSTBJ, or XATFJ			0.4	V
Voh	Output high voltage	Ioh=12mA and Pin=PD7~PD0	3.5			V
Ri	Input pull-up/pull-down resistance	Vil=0 V or Vih = Vcc and Pin=PD7~PD0		50		KΩ

6.6 USB Transceiver Characteristics

Table 6-6 USB Transceiver Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Rise and Fall Times:					
(10%—90%)	TR	4	8	15	ns
(90%—10%)	TF	4	8	15	ns
Cross Point	Vcr	1.3	--	2.0	V
Output Impedance	RD	23	28	33	ohm
High Level Output	VoH	2.8	--	--	V
Low Level Output	VoL	--	--	0.7	V

Note: CL = 50pf

7.0 Outline Diagram (48-pin SSOP)

Table 7-1 Outline Diagram (48-pin SSOP)

Symbol	Dimension in inch			Dimension in mm		
	Min	Nom	Max	Min	Nom	Max
A	0.095	0.102	0.110	2.41	2.59	2.79
A1	0.008	0.012	0.016	0.20	0.30	0.41
A2	0.085	0.090	0.095	2.16	2.29	2.41
b	0.008	0.010	0.013	0.20	0.25	0.33
c	0.006	0.008	0.010	0.15	0.20	0.25
D	--	0.625	0.637	--	15.88	16.18
E	0.291	0.295	0.299	7.39	7.49	7.59
e	--	0.025	--	--	0.64	--
HE	0.395	0.408	0.420	10.03	10.36	10.67
L	0.025	0.030	0.040	0.64	0.76	1.02
L1	0.049	0.057	0.063	1.24	1.45	1.60
S	--	--	0.035	--	--	0.69
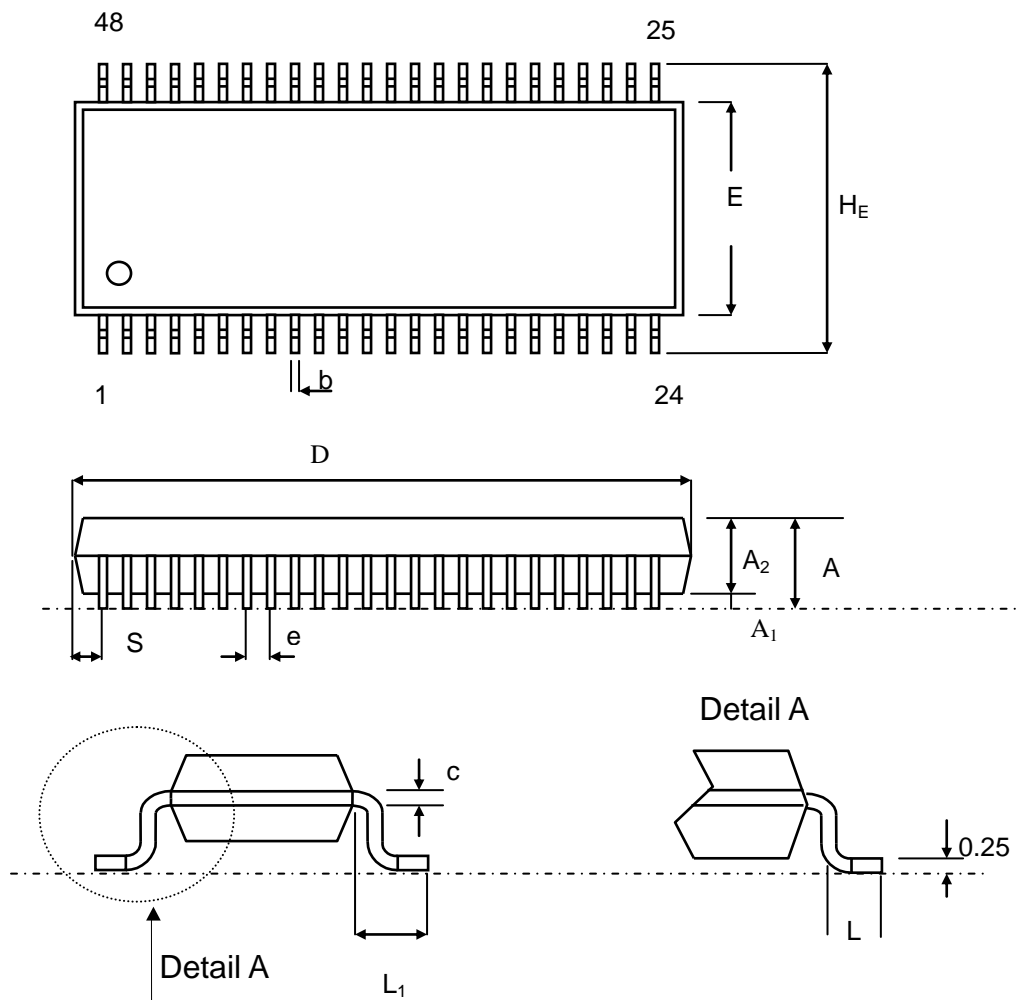
Figure 7-1 PL-2305 Outline Diagram

8.0   Ordering Information

Table 8-1 Ordering Information

Part Number	Package Type
PL-2305I LF	48-pin SSOP (Lead Free or Pb-Free)

9.0   Chip Revision History

Revision E2:
➢ Add additional mode selection options defined in MSM register to cooperate with diverse printers.

Revision F:
➢ Add additional option to enable fast upstream data transfer in ECP mode.
➢ Modified the EPP mode related requests and the control settings of upstream flow.
➢ Definition of pin 10 and pin 19 are different also.
➢ The iSerialNumber field in device descriptor is changed to 00h.

Revision H:
➢ Newly added request GET_CHIP_VERSION
➢ Reserved range of EEPROM is expended from 8 to 16 bytes to host more user-defined variables.
➢ SIE circuit modified.

Revision I:
➢ Pin to Pin compatible with Chip H Version
➢ Change Process from 0.5um to 0.18um.
➢ Lower power consumption including suspend current.
➢ Fixed USB Serial Number descriptor value. The iSerialNumber field in device descriptor will respond correct value (03h) instead of null value (00h) when external Flash and contents are valid. This allows the USB serial number in external Flash to be detected by OS.
➢ Disable Remote Wakeup Function in ROM. Need EEPROM to enable using EEPROM software tool.