



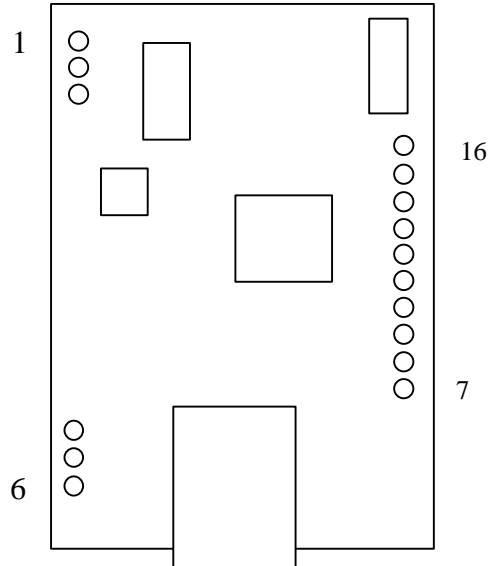
## **Application Notes**

USB devices transfer data in packets. If data is to be sent from the PC, a packet is built up by the application program and is sent via the device driver to the USB scheduler. This scheduler puts a request onto the list of tasks for the USB host controller to perform. This will typically take at least 1 millisecond to execute because it will not pick up the new request until the next 'USB Frame' (the frame period is 1 millisecond).

There is therefore a sizeable overhead (depending on your required throughput) associated with moving the data from the application to the USB device. If data is sent 'byte at a time' by an application, this will severely limit the overall throughput of the system as a whole.

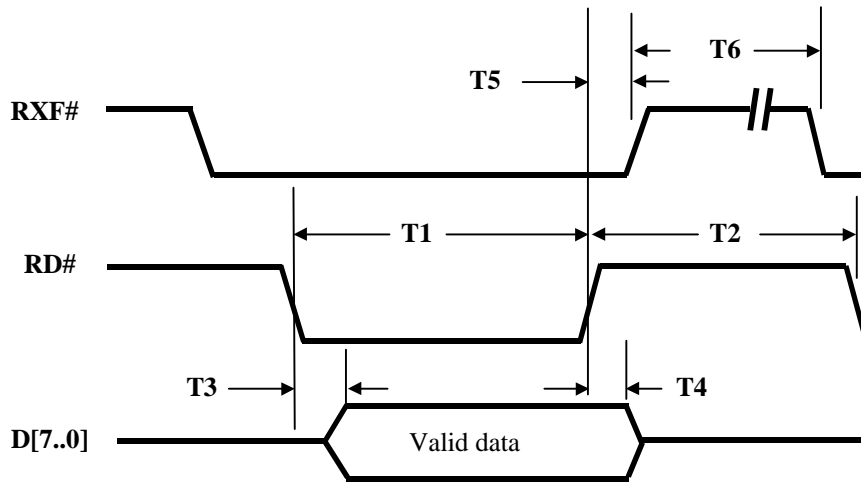
It must be stressed that in order to achieve maximum throughput, application programs should send or receive data using buffers and not individual characters.

**Table 1 - DLP-USB1 PINOUT DESCRIPTION**



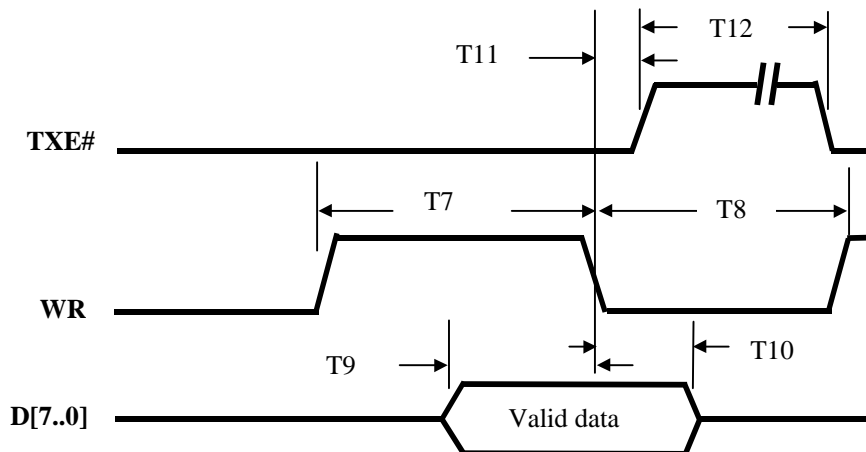
Pin#	Description
1	<b>EXTRST#</b> (IN) Take low to reset the entire device
2	<b>SLEEP#</b> (Out) Goes low when module enters the suspend mode
3	<b>TXE#</b> (Out) When high, the FIFO's 384-byte transmit buffer is full or busy storing the last byte written. Do not attempt to write data to the transmit buffer when TXE# is high.
4	<b>RXF#</b> (Out) When low, at least 1 byte is present in the FIFO's 128-byte receive buffer and is ready to be read with RD#. RXF# goes high when the receive buffer is empty.
5	<b>WR</b> (In) When taken from a high to a low state, WR reads the 8 data lines and writes the byte into the FIFO's transmit buffer. Data written to the transmit buffer is immediately sent to the host PC and placed in the RS-232 buffer opened by the application program.
6	<b>RD#</b> (In) When pulled low, RD# takes the 8 data lines from a high impedance state to the current byte in the FIFO's receive buffer. Taking RD# high returns the data pins to a high impedance state and prepares the next byte (if available) in the FIFO to be read.
7	<b>VCC</b> Provides power for target electronics. Up to 500mA available when USB is active.
8	<b>GND</b> Ground Supply Pin for target electronics.
16	D0 I/O Bi-directional Data Bus Bit # 0
15	D1 I/O Bi-directional Data Bus Bit # 1
14	D2 I/O Bi-directional Data Bus Bit # 2
13	D3 I/O Bi-directional Data Bus Bit # 3
12	D4 I/O Bi-directional Data Bus Bit # 4
11	D5 I/O Bi-directional Data Bus Bit # 5
10	D6 I/O Bi-directional Data Bus Bit # 6
9	D7 I/O Bi-directional Data Bus Bit # 7

### DLP-USB1 TIMING DIAGRAM – FIFO READ CYCLE



Time	Description	Min	Max	Unit
T1	RD Active Pulse Width	50		ns
T2	RD to RD Pre-Charge Time	50		ns
T3	RD Active to Valid Data		30	ns
T4	Valid Data Hold Time from RD Inactive	10		ns
T5	RD Inactive to RXF#	5	25	ns
T6	RXF# inactive after RD cycle	80		ns

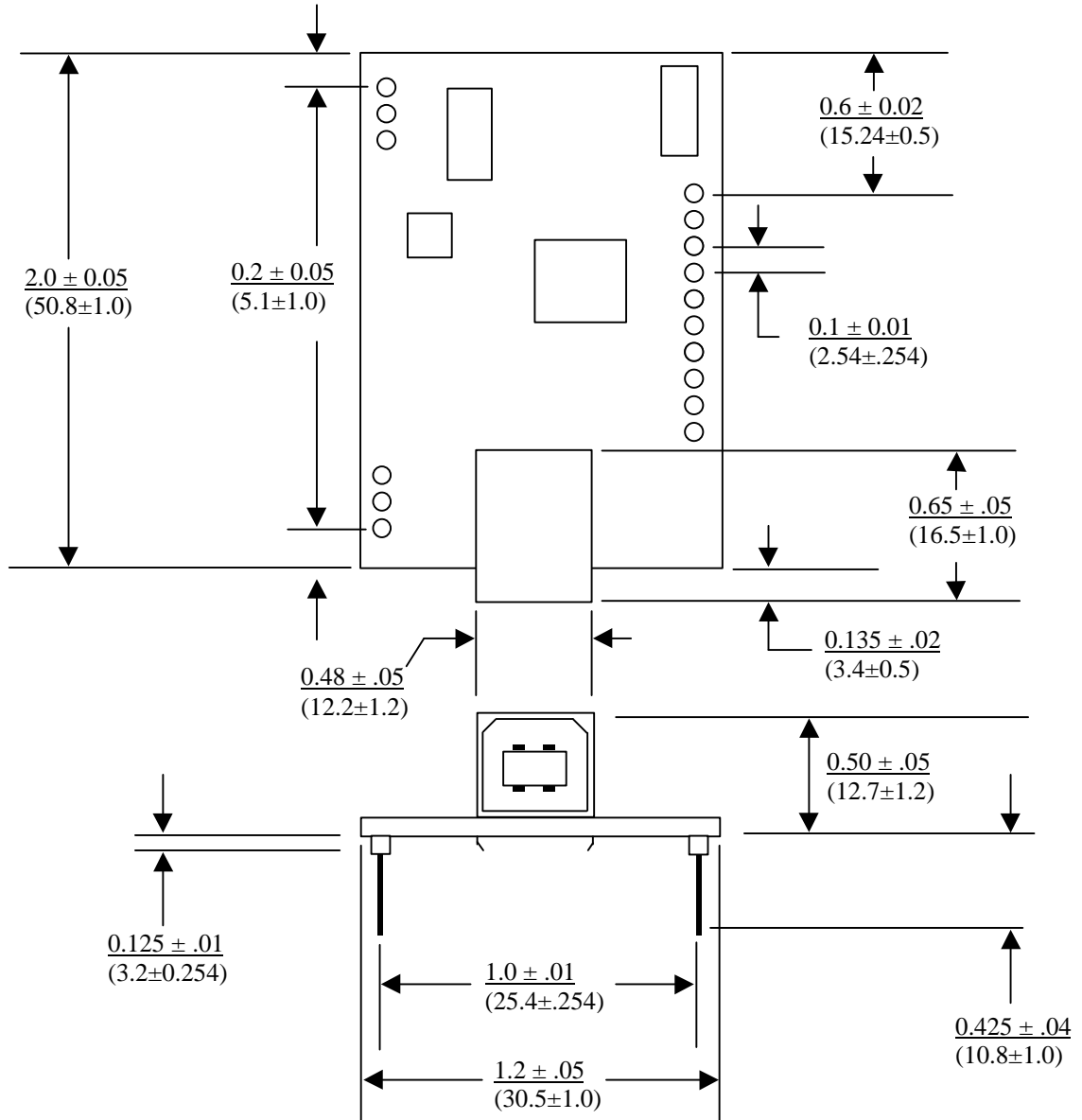
### DLP-USB1 TIMING DIAGRAM – FIFO WRITE CYCLE



Time	Description	Min	Max	Unit
T7	WR Active Pulse Width	50		ns
T8	WR to WR Pre-Charge Time	50		ns
T9	Data Setup Time before WR inactive		20	ns
T10	Data Hold Time from WR inactive	10		ns
T11	WR Inactive to TXE#	5	25	ns
T12	TXE# inactive after RD cycle	80		Ns

# Mechanical Drawings (PRELIMINARY)

Inches(millimeters) unless otherwise noted



## Absolute Maximum Ratings

Storage Temperature	-65°C to + 150°C
Ambient Temperature ( Power Applied )	0°C to + 70°C
VCC Supply Voltage	-0.5v to +6.00v
DC Input Voltage - Inputs	-0.5v to VCC + 0.5v
DC Input Voltage - High Impedance Bidirectionals	-0.5v to VCC + 0.5v
DC Output Current – Outputs	24mA
DC Output Current – Low Impedance Bidirectionals	24mA

## DC Characteristics ( Ambient Temperature = 0 - 70 Degrees C )

	Description	Min	Max	Units	Condition
<b>VCC</b>	Operating Supply Voltage	4.5	5.25	V	
<b>Icc1</b>	Operating Supply Current		50	mA	Normal Operation
<b>Icc2</b>	Operating Supply Current		250 **	uA	USB Suspend
<b>Ioh1</b>	Digital IO Pins Source Current	4		mA	Voh = VCC – 0.5V
<b>Iol1</b>	Digital IO Pins Sink Current	4		mA	Vol = + 0.5v
<b>Voh1</b>	Input Voltage Threshold ( Low )		0.6	V	
<b>Vol1</b>	Input Voltage Threshold ( High )	2.7		V	
<b>VDif</b>	USB Differential Input Sensitivity	0.2		V	
<b>VCom</b>	USB Differential Common Mode	0.8	2.5	V	
<b>URxt</b>	USB Single Ended Rx Threshold	0.8	2.0	V	
<b>UVh</b>	USB IO Pins Static Output ( Low )		0.3	V	RI = 1.5k to 3.6v
<b>UVl</b>	USB IO Pins Static Output ( High )	2.8			RI = 15k to GND

\*\* Some early samples may exhibit a slightly higher current.

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