



**ZHX1820**

***Slim Series SIR  
Top Look Transceiver***

**Product Specification**

PS016005-0204



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## Description

The ZILOG ZHX1820 is a low-profile version of ZiLOG's popular ZHX1010 1-meter transceiver. Packaged in the "top-look" configuration (that is, the lens axis is perpendicular to the mounting surface), the transceiver is mechanically enhanced for ultra compact, power-conscious portable products, such as portable printers, handheld computers, and personal data assistants (PDAs). Designed to operate using the IrDA-Data mode, the transceiver combines an infrared emitting diode (IRED) emitter, a PIN photodiode detector, a digital AC coupled LED driver, and a receiver/decoder in a single package.

The ZILOG ZHX1820 provides an efficient implementation of the SIR standard in a small-outline footprint format. Application circuit space is also minimized, as only three components are required.

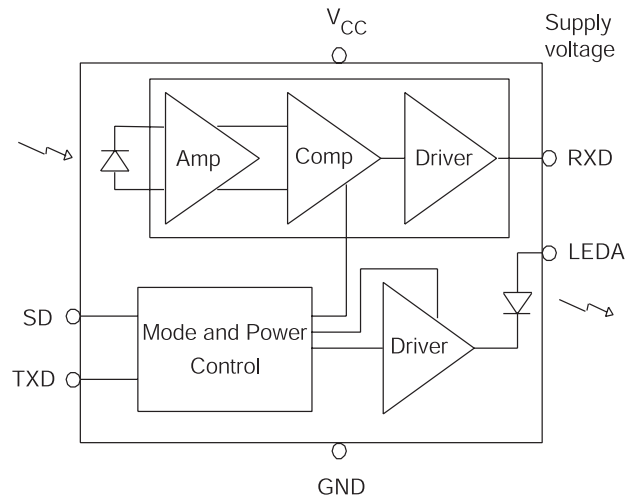
ZHX1820 also features an independently controlled shutdown that minimizes current draw to a maximum of 1  $\mu$ A.

## Features

- Compliant to IrDA Data Specification SIR
- Wide power supply voltage range, 2.4 to 5.5 V
- Low-power, listening current, 90  $\mu$ A (typical) at 3.0 V
- Slim form factor (9.0 mm long x 3.65 mm wide x 2.75 mm high)
- Only two external components required
- Telecom operating temperature range ( $-30$   $^{\circ}$ C to  $+85$   $^{\circ}$ C) with the ZHX1820TV115THTR
- Extended operating temperature range ( $-40$   $^{\circ}$ C to  $+85$   $^{\circ}$ C) with the ZHX1820TV115XHTR
- 0 to 1 meter minimum link distance; 0 to 1.5 meters typical ( $-30$   $^{\circ}$ C to  $+85$   $^{\circ}$ C)
  - 0 to 80 cm minimum link distance; 0 to 1.2 meters typical (below 30  $^{\circ}$ C)
- Meets IEC 825-1 Class 1 Eye Safety Specifications

## Block Diagram

Figure 1 is the block diagram for the Slim SIR transceiver.



**Figure 1. Slim SIR Transceiver Block Diagram**

## Pin Descriptions

The ZHX1820 transceiver uses the pins listed in Table 1. The pins are described in this section.

**Table 1. Pin Out for the ZHX1820 Transceiver**

Pin	Name	Function	I/O
1	LEDA	IREDA anode	—
2	TXD	Transmitter input	I
3	RXD	Receiver output	O
4	SD	Enables shutdown mode	I
5	V <sub>CC</sub>	Supply voltage	—
6	GND	Ground	—

## LEDA LED Driver Anode

(Power)

This output is connected to the LED anode. Current to the LED is sourced through an external resistor.

## TXD Transmit Data

(Input, active high)

This CMOS input is used to transmit serial data. This input has an internal pull-down resistor that is disabled (open-circuited) during shutdown.

## RXD/Receive Data

(Output, active low)

This output indicates received serial data. It is a tri-state, slew rate controlled CMOS output (tri-stated during shutdown) driver capable of driving a standard CMOS load. No external resistor is required.

## SD Shutdown

(Input, active high)

This input is used to place the integrated circuit into shutdown mode. Module shutdown current is influenced by the choice of capacitor used from  $V_{CC}$  to ground.

## $V_{CC}$ Positive Supply

(Power)

Connect to positive power supply (2.4–5.5 V). Filter with a 0.33- $\mu$ F ceramic bypass capacitor and terminating resistor as close as possible to the  $V_{CC}$  pin.

## GND Ground

(Power)

Connect to ground of the power supply. A solid ground plane is recommended for proper operation.

## Recommended Application Circuits

Figure 2 shows application block diagrams for the ZHX1820 transceiver.

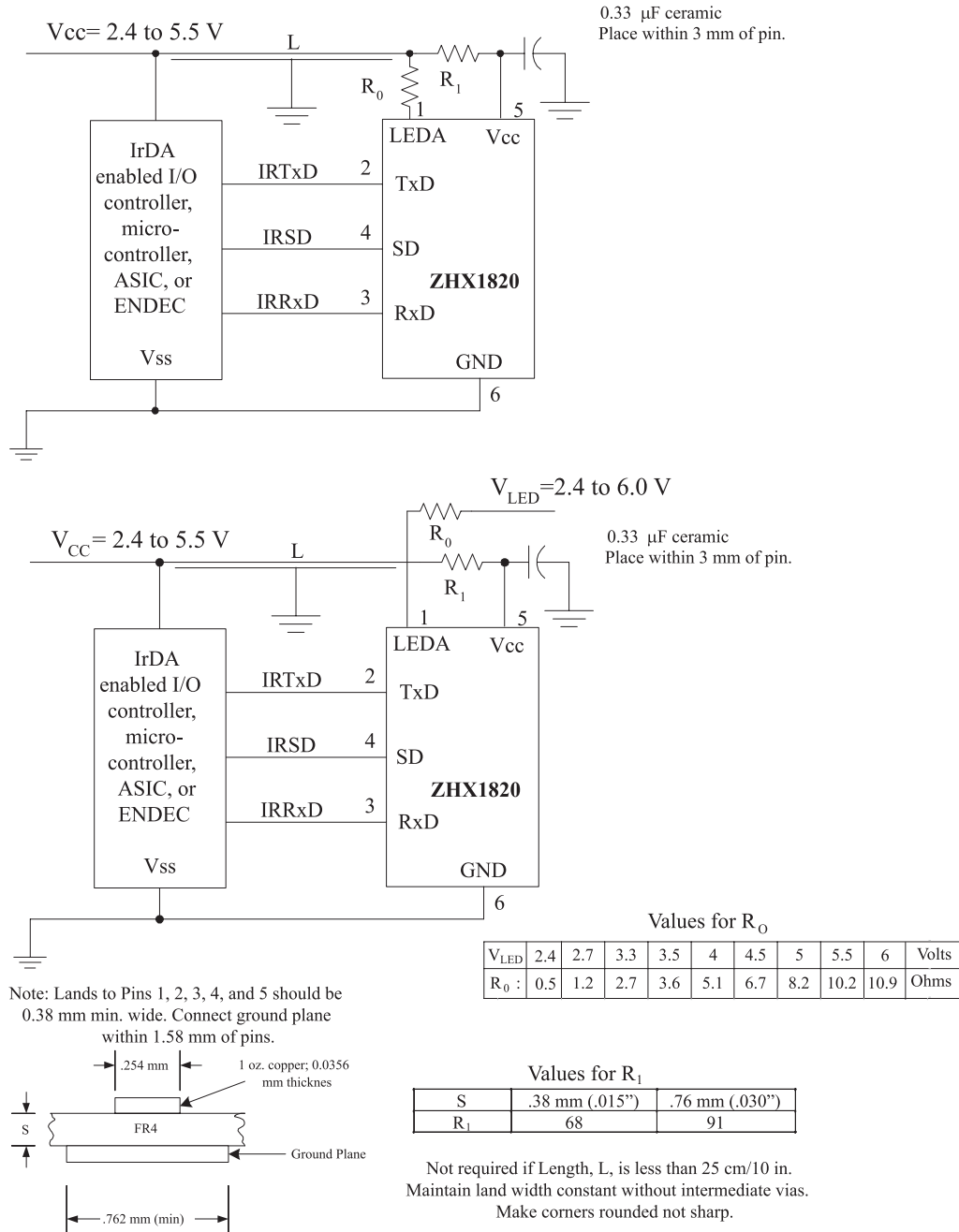


Figure 2. Application Block Diagrams



## Electrical and Timing Specifications

Table 2 through Table 4 present the electrical and timing specifications for the ZHX1820 transceiver.

**Table 2. Absolute Maximum Ratings**

Parameter	Symbol	Minimum	Maximum	Unit	Comment
Supply Voltage	$V_{CC}$	-0.3	6.0	V	$V_{CC}$ , GND
Input Voltage	$V_{IN}$	GND-0.3	$V_{CC}+0.3$	V	TxD, SD
Output (External) Voltage	$V_{OUT}$	GND-0.3	$V_{CC}+0.3$	V	RxD
LED Current	$I_{LED}$		700	mA	20% duty cycle, $T_a=25\text{ }^\circ\text{C}$ , $t_{ON}\leq 90\text{ }\mu\text{S}$
Storage Temperature	$T_{ST}$	-40	100	$^\circ\text{C}$	
Solder Temperature	$T_{SOL}$		240	$^\circ\text{C}$	

**Table 3. Recommended Operating Conditions**

Parameter	Symbol	Minimum	Maximum	Unit
Supply Voltage	$V_{CC}$	2.4	5.5	V
LED Voltage	$V_{LED}$	2.4	6.0	V
Ambient Operating Temperature	$T_{OP}$	-30	85	$^\circ\text{C}$
Ambient Operating Temperature *	$T_{OP}$	-40	85	$^\circ\text{C}$

Note: \* ZHX1820TV115XHTR only

**Table 4. Electrical Characteristics**

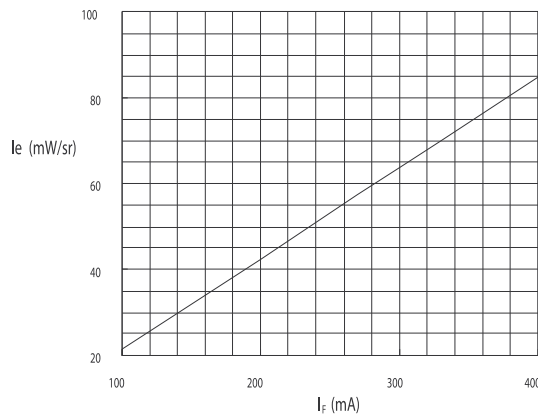
Parameter	Symbol	Condition	Min	Typical	Max	Unit	Remarks
High-Level Input Voltage	$V_{IH}$		$0.6 V_{CC}$		$V_{CC}+0.5$	V	TXD, SD
Low-Level Input Voltage	$V_{IL}$		-0.5		$0.2 V_{CC}$	V	TXD, SD
High-Level Output Voltage	$V_{OH}$		2.2			V	RxD
Low-Level Output Voltage	$V_{OL}$				0.4	V	RxD
Transmitter Current	$I_{LED}$			300		mA	
Listening Current	$I_{CC}$			90	150	$\mu\text{A}$	
Receive Current	$I_{CC}$			90	150	$\mu\text{A}$	

**Table 4. Electrical Characteristics (Continued)**

Parameter	Symbol	Condition	Min	Typical	Max	Unit	Remarks
Standby Current	$I_{STB}$				1	$\mu A$	SD= $V_{CC}$ , TxD=0 V
Optical Rise/Fall Time	$t_{Rr}, t_{Rf}$			100		nS	
RxD Pulse Width	$t_{PWA}$	SIR=115.2 Kbps	1.1	1.6	3.9	$\mu S$	
Power Shutdown Time	$T_{SD}$				1	$\mu S$	
Startup Time	$T_{STU}$				200	$\mu S$	
Receiver Latency	$T_L$			100		$\mu S$	
Trans. Radiant Intensity	$I_E$	$I_{LED}=260\text{ mA}$	40		100	mW/sr	$\theta_h,$ $\theta_v \leq (\pm 15^\circ)$
Min. Threshold Irradiance	$E_{emin}$	$V_{CC}=3.3\text{ V}$		2	3	$\mu W/cm^2$	$\theta_h,$ $\theta_v \leq (\pm 15^\circ)$
Angle of Half Intensity	$\theta$			20		$^\circ$	Hor. and Vert.
Light Pulse Rise, Fall Time	$t_{Or}, t_{Of}$			40		nS	
Optical Pulse Width	$t_{OPW}$			20		$\mu S$	TxD="H"
Optical Overshoot	$t_{OPO}$				3	%	
Peak Wavelength	$\lambda_P$			870		nm	

Unless otherwise noted:  $V_{CC}=3.3\text{ V}$ , GND= 0 V,  $T_A= 25\text{ }^\circ\text{C}$

Figure 3 through Figure 6 show various electrical characteristics.



**Figure 3.  $I_f$ - $I_e$  Characteristics ( $0^\circ$ )**

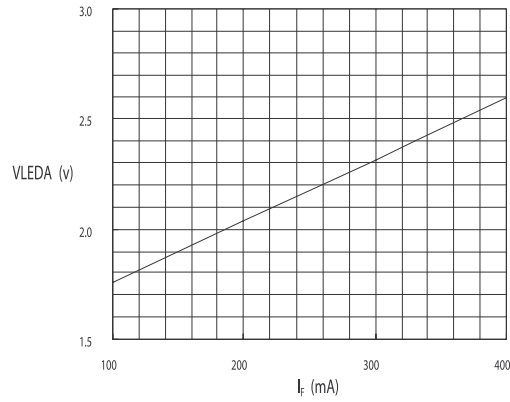


Figure 4.  $I_F$ -LEDA Characteristics ( $0^\circ$ )

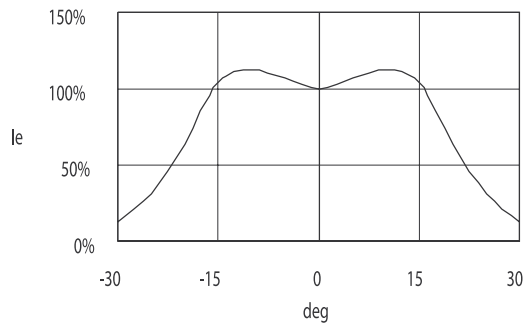


Figure 5. Directive Characteristics (Emitting)

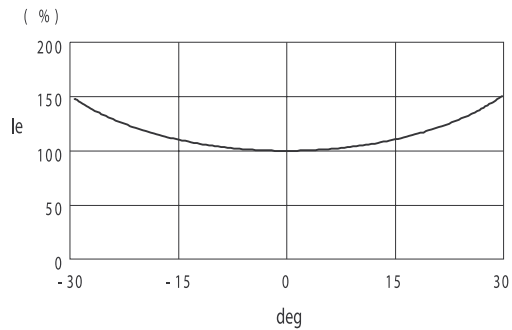


Figure 6. Directive Characteristics (Receiving)

## Mechanical Drawings

In order to achieve the lowest possible lead times, ZiLOG maintains two assembly facilities. The mechanical drawings for these transceivers are shown in Figure 7 and Figure 8. These devices, which show minor mechanical differences, are functionally equivalent in every way and meet all ZiLOG and IrDA standards and specifications. Although reels are never mixed, ZiLOG reserves the right to ship from either facility in order to meet delivery requirements.

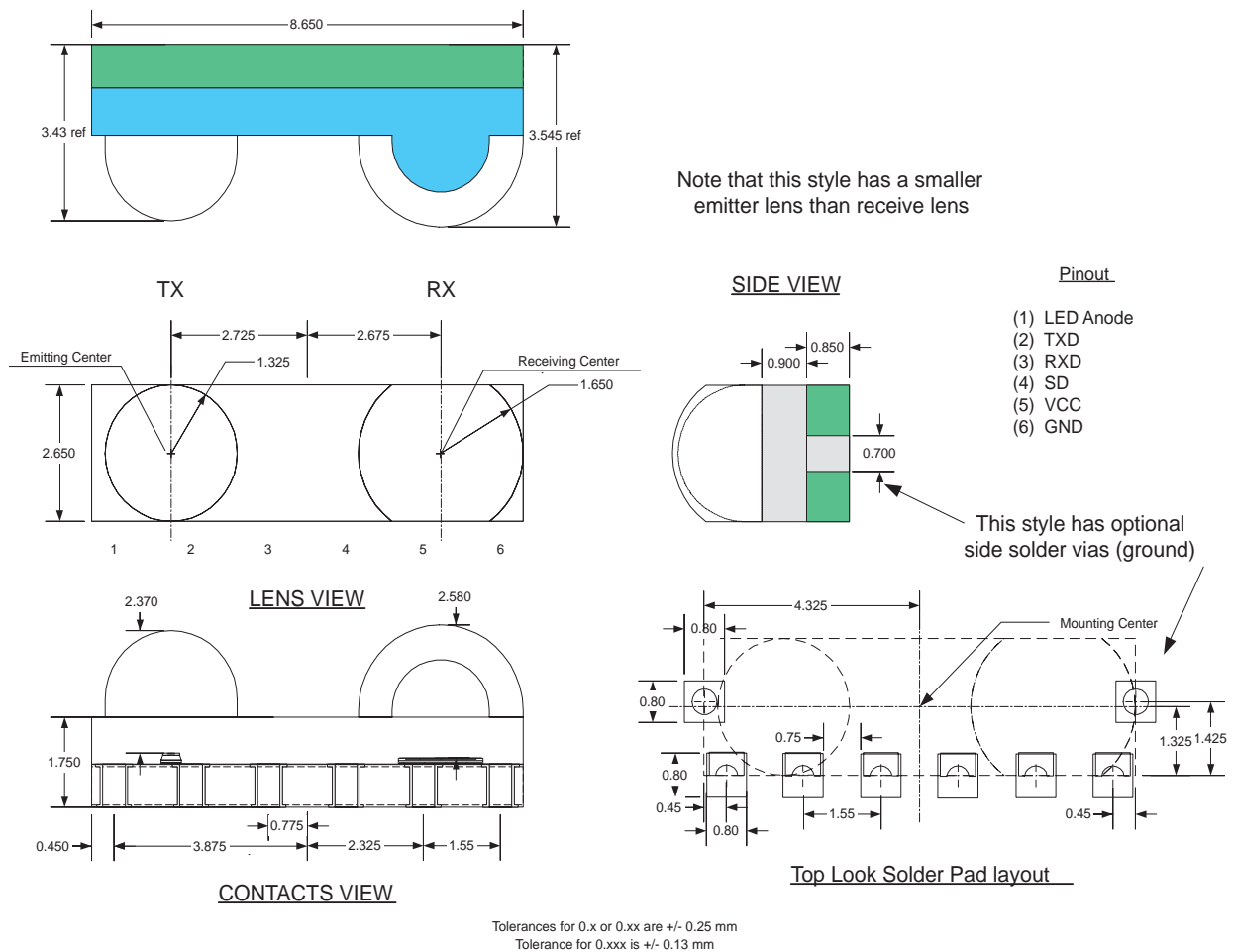
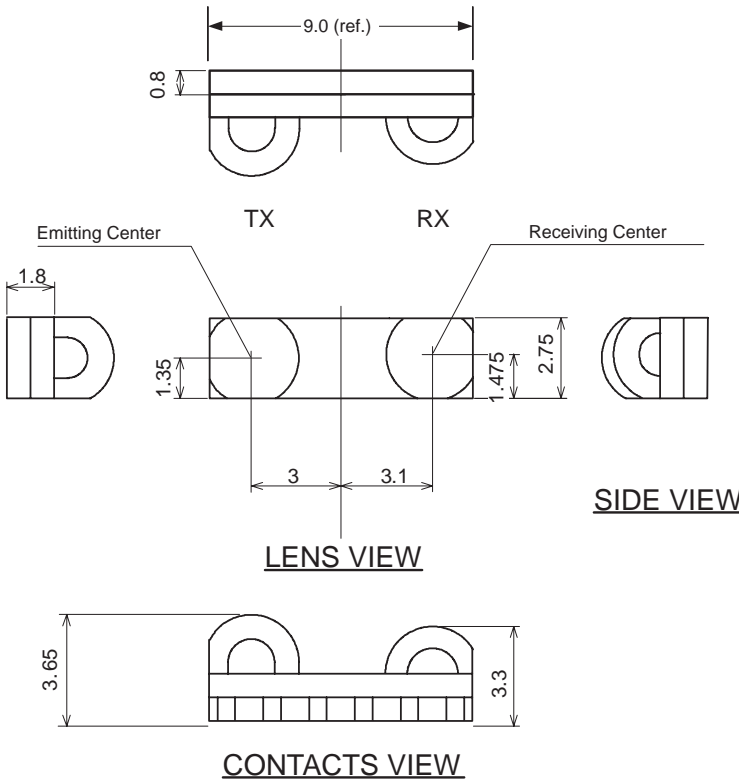
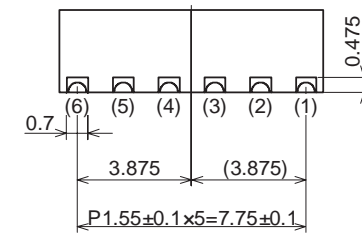


Figure 7. ZHX1820 Mechanical Drawing



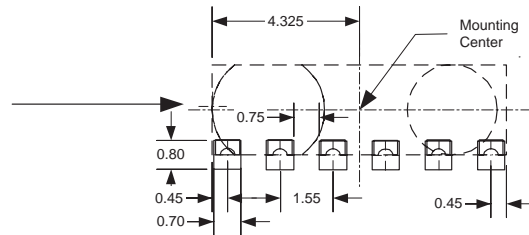
Units: mm  
Tolerance: +/- 0.2

Note that this style has a larger emitter lens than receive lens



PIN	FUNCTION	PIN	FUNCTION
1	LEDA	4	SD
2	TXD	5	VCC
3	RXD	6	GND

This style does not have side solder vias



Top Look Solder Pad layout

**Figure 8. Alternate ZHX1820 Mechanical Drawing**

## Soldering and Cleaning Recommendations

Follow these recommendations to maintain the performance of the ZHX1820 transceiver.

### Reflow Soldering

- Reflow soldering paste is recommended:  
Melting temperature: 178 °C ~ 192 °C  
Composition: Sn 63%, Pb 37%
- The recommended thickness of the metal mask is between 0.2 mm and 0.25 mm for screen printing.
- Number of soldering times: 2 times *maximum*
- The temperature profile at the top surface of ZHX1820, shown in Figure 9, is recommended.

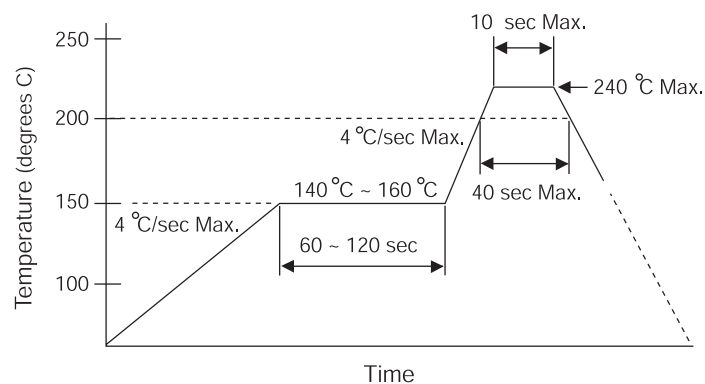


Figure 9. Temperature Profile at the Top Surface of ZHX1820

### Manual Soldering

- Use 63/37 or silver solder.
- Use a soldering iron of 25 W or smaller. Adjust the temperature of the soldering iron below 300 °C.
- Finish soldering within 3 seconds.
- Handle only after ZHX1820 has cooled off.



## Cleaning

Perform cleaning after soldering under the following conditions:

- Cleaning agent: Alcohol
- Temperature and time: 30 seconds below 50 °C or 3 minutes below 30 °C
- Ultrasonic cleaning: Below 20 W

## Packing, Storage, and Baking Recommendations

Follow these recommendations to maintain the performance of the ZHX1820 transceiver.

### Storage

To avoid moisture absorption, ZHX1820 reels must remain in the original, unopened moisture-proof packing. Parts must be soldered within 72 hours after unpacking. Reels that have been unpacked, but will not be soldered within 72 hours, must be stored in a desiccator.

### Baking

Parts that have been stored over 12 months or unpacked over 72 hours must be baked under the following guidelines.

#### Reels

60 °C for 48 hours or more

#### Loose Parts

- 100 °C for 4 hours or more  
or
- 125 °C for 2 hours or more  
or
- 150 °C for 1 hour or more

## Moisture-Proof Packing

In order to avoid moisture absorption during transportation and storage, ZHX1820 reels are packed in aluminum envelopes (see Figure 10) that contain a desiccant with a humidity indicator. While this packaging is an impediment to moisture absorption, it is by no means absolute, and no warranty is implied. The user should store these parts in a controlled environment to prevent moisture entry. Please read the label on the aluminum bag for indicator instructions.

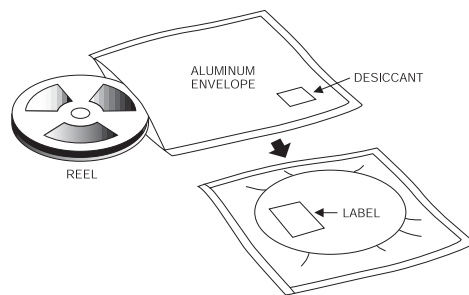


Figure 10. ZHX1820 Packaging



## Taping Specifications

Figure 11 shows the reel dimensions for the ZHX1820; Figure 12 show the alternate reel dimensions. Figure 13 shows the tape dimensions and configuration for the ZHX1820; Figure 14 shows the alternate tape dimensions and configuration.

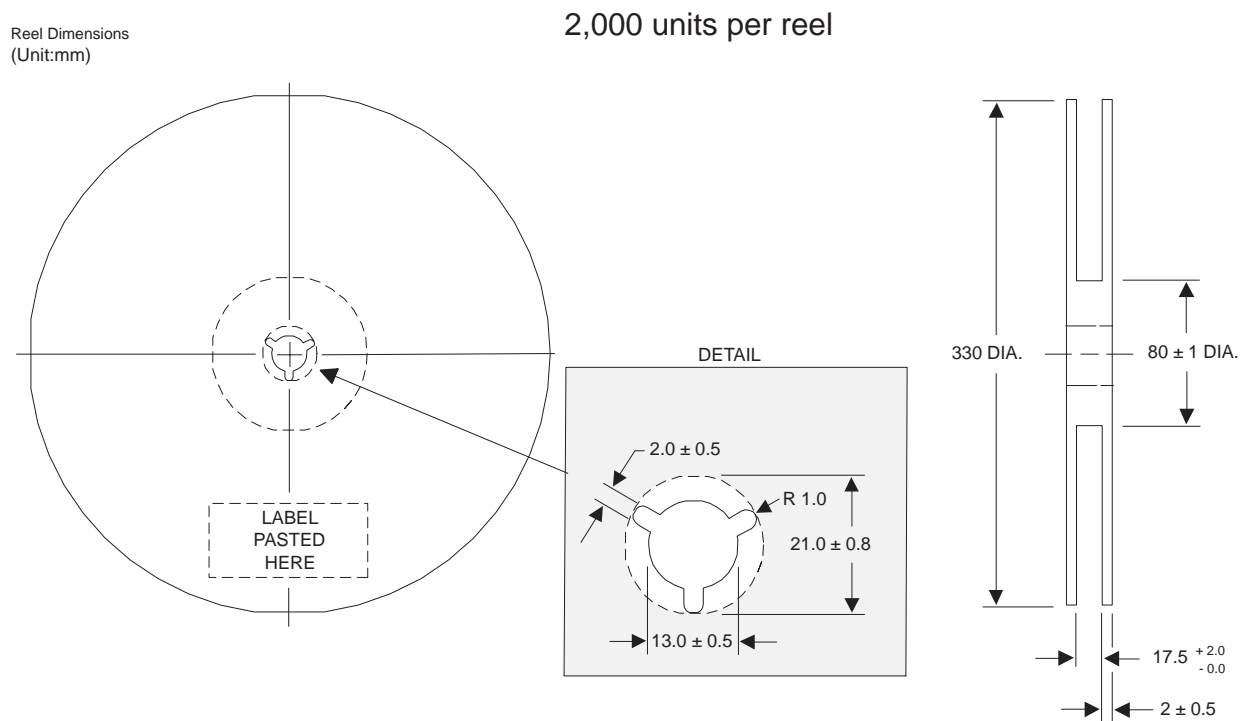


Figure 11. ZHX1820 Reel Dimensions (Unit: mm)

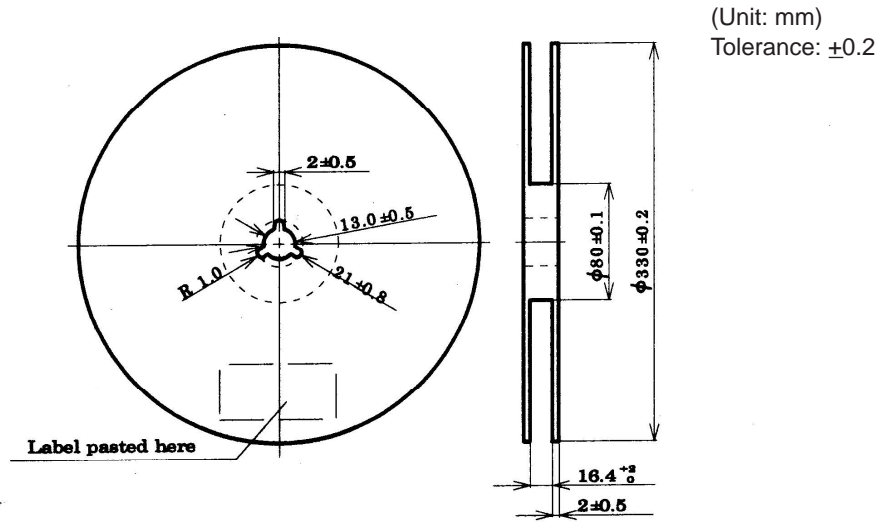


Figure 12. Alternate ZHX1820 Reel Dimensions (Unit: mm)

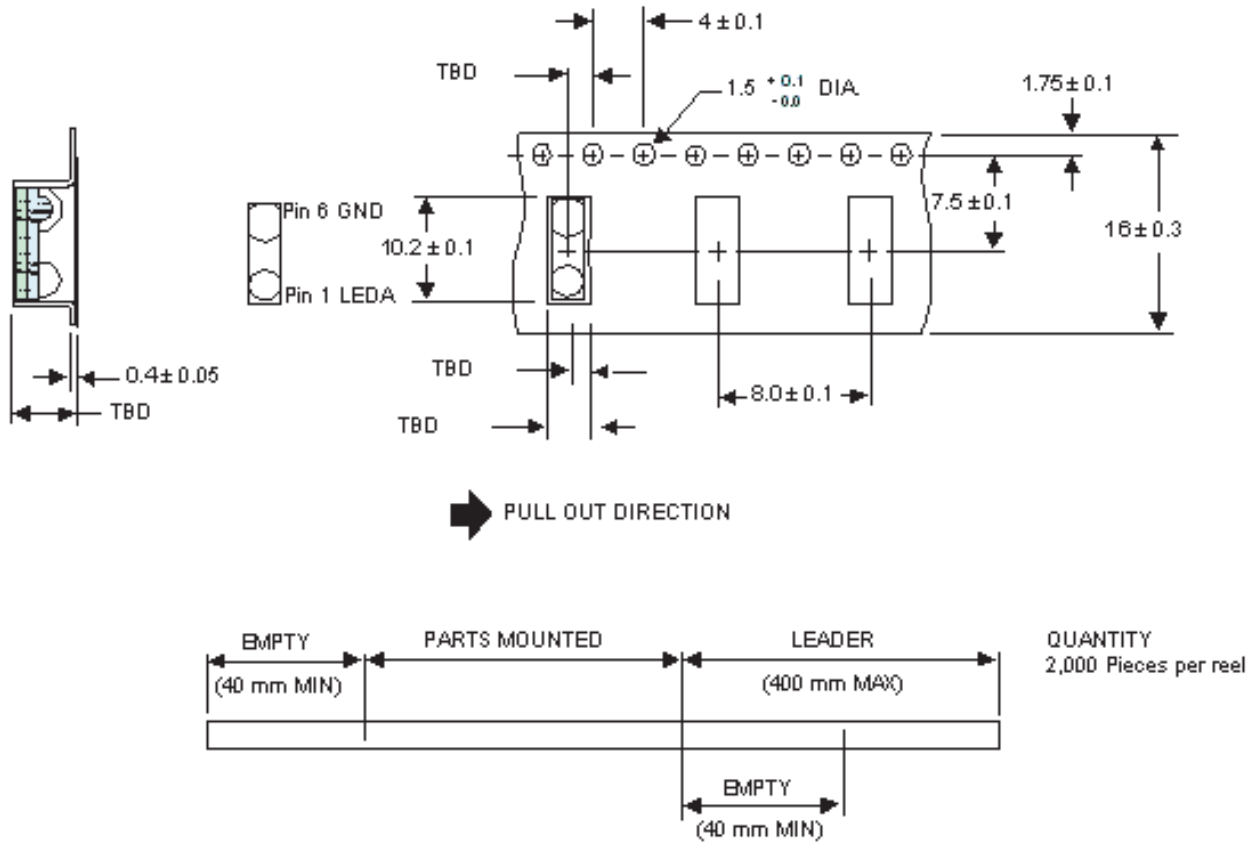
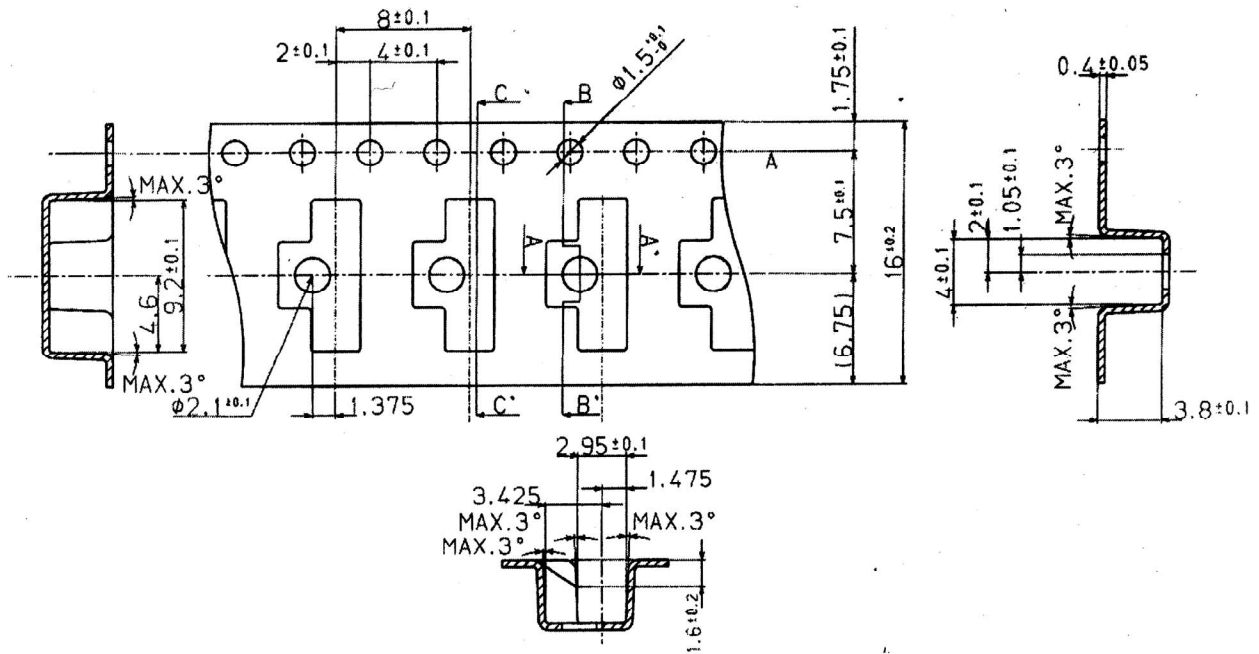


Figure 13. ZHX1820 Tape Dimensions and Configuration (Unit: mm)



ZHX1820 (alternate) orientation in the pocket of carrier tape.

Plated pad on the right side of the module.

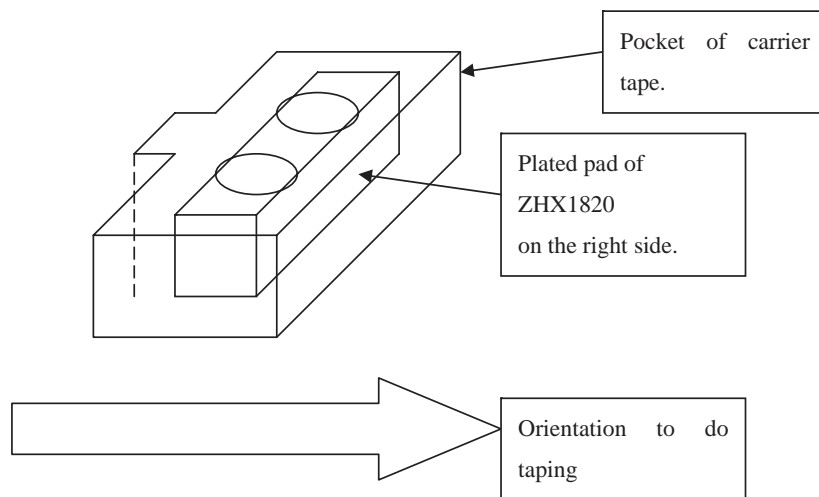


Figure 14. Alternate ZHX1820 Tape Dimensions and Configuration (Unit: mm)



## Ordering Information

To order Top Look ZHX1820, use ZiLOG part number ZHX1820TV115THTR (–30 °C to +85 °C) or ZHX1820TV115XHTR (–40 °C to +85 °C).

- ▶ **Note:** In order to ensure the lowest possible lead times, ZiLOG uses two different fab sources for the transceiver IC and two different packaging facilities for module assembly. Both of these ICs and packaging facilities have been extensively tested and qualified to meet the ZHX1820 transceiver specifications.



## Customer Feedback Form

If you experience any problems while operating the ZHX1820 transceiver, or if you note any inaccuracies while reading this product specification, please copy and complete this form, then mail or fax it to ZiLOG (see "Return Information," below). We also welcome your suggestions!

### Customer Information

Name	Country
Company	Phone
Address	Fax
City/State/Zip	email

### Product Information

Serial # or Board Fab #/Rev #
Software Version
Document Number
Host Computer Description/Type

### Return Information

ZiLOG  
System Test/Customer Support  
532 Race Street  
San Jose, CA 95126-3432  
Fax: (408) 558-8300  
Web: [www.zilog.com](http://www.zilog.com)

### Problem Description or Suggestion

Provide a complete description of the problem or your suggestion. If you are reporting a specific problem, include all steps leading up to the occurrence of the problem. Attach additional pages as necessary.

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