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## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



**zilog**

An  IXYS Company

**ZHX1820**

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

**Product Specification**

PS016007-0910



**Warning:** DO NOT USE IN LIFE SUPPORT

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# Table of Contents

Description . . . . .	1
Features . . . . .	1
Block Diagram . . . . .	2
Pin Descriptions . . . . .	2
LEDA LED Driver Anode . . . . .	3
TXD Transmit Data . . . . .	3
RXD/Receive Data . . . . .	3
SD Shutdown . . . . .	3
VCC Positive Supply . . . . .	3
GND Ground . . . . .	3
Recommended Application Circuits . . . . .	4
Electrical and Timing Specifications . . . . .	5
Mechanical Drawings . . . . .	8
Soldering and Cleaning Recommendations . . . . .	9
Reflow Soldering . . . . .	9
Manual Soldering . . . . .	9
Cleaning . . . . .	10
Packing, Storage, and Baking Recommendations . . . . .	11
Storage . . . . .	11
Baking . . . . .	11
Moisture-Proof Packing . . . . .	12
Taping Specifications . . . . .	13
Ordering Information . . . . .	15
Customer Support . . . . .	16

## 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 ( $-30$  °C to  $+85$  °C) with the ZHX1820TV115THTR
- Extended operating temperature range ( $-40$  °C to  $+85$  °C) with the ZHX1820TV115XHTR
- 0 to 1 meter minimum link distance; 0 to 1.5 meters typical ( $-30$  °C to  $+85$  °C)
  - 0 to 80 cm minimum link distance; 0 to 1.2 meters typical (below 30 °C)
- Meets IEC 825-1 Class 1 Eye Safety Specifications



## Block Diagram

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

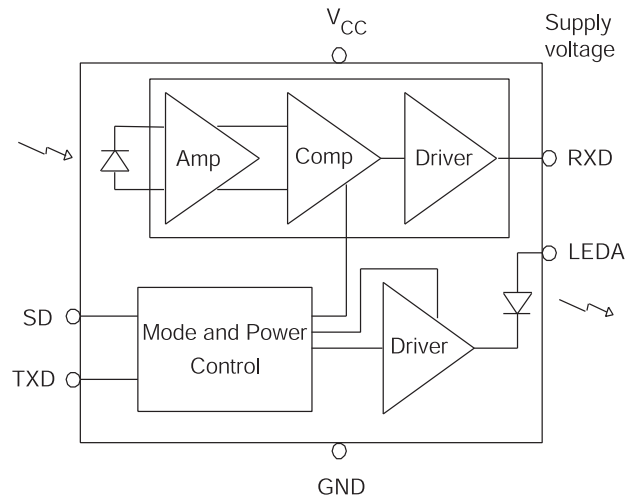


Figure 1. Slim SIR Transceiver Block Diagram

## 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.

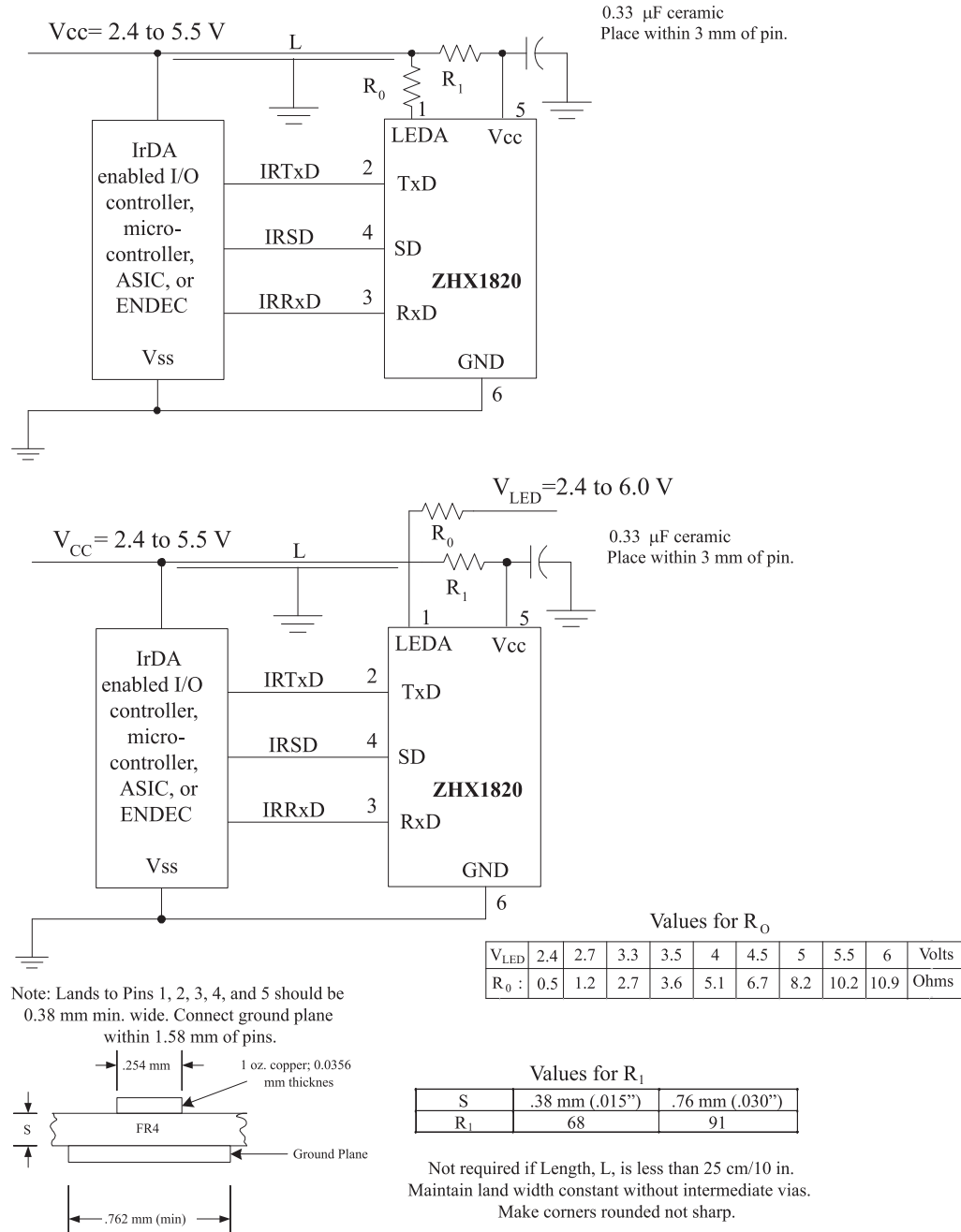


Figure 2. Application Block Diagrams



## 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**

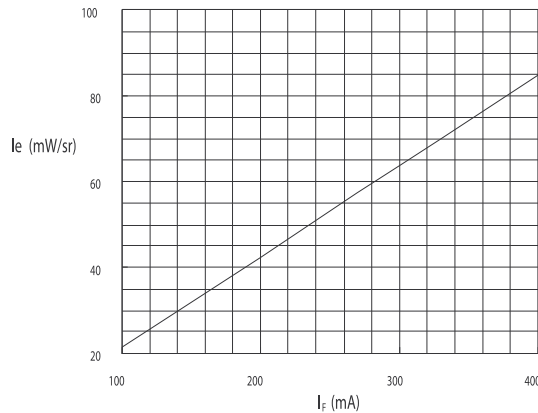
Parameter	Symbol	Condition	Min	Typical	Max	Unit	Remarks
High-Level Input Voltage	$V_{IH}$		$0.6 V_{CC}$		$V_{CC}+0.5$	V	TXD, SD
Low-Level Input Voltage	$V_{IL}$		-0.5		$0.2 V_{CC}$	V	TXD, SD
High-Level Output Voltage	$V_{OH}$		2.2			V	RxD
Low-Level Output Voltage	$V_{OL}$				0.4	V	RxD
Transmitter Current	$I_{LED}$			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	$I_E$	$I_{LED}=260$ mA	40		100	mW/sr	$\theta_h,$ $\theta_v \leq (\pm 15^\circ)$
Min. Threshold Irradiance	$E_{emin}$	$V_{CC}=3.3$ 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:  $V_{CC}=3.3$  V, GND= 0 V,  $T_A= 25$  °C

Figure 3 through Figure 6 show various electrical characteristics.



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

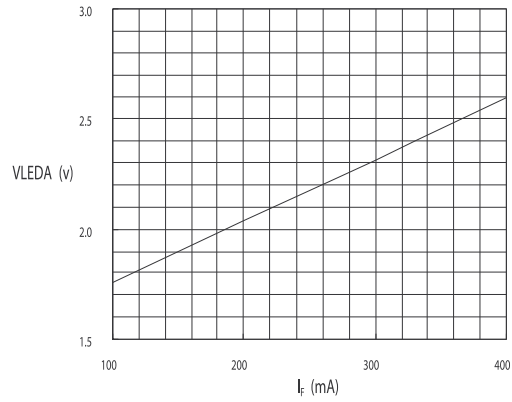


Figure 4. If-LEDA Characteristics (0°)

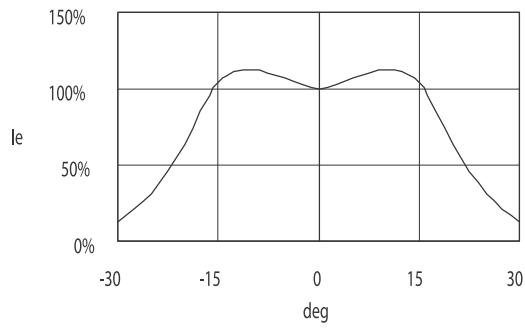


Figure 5. Directive Characteristics (Emitting)

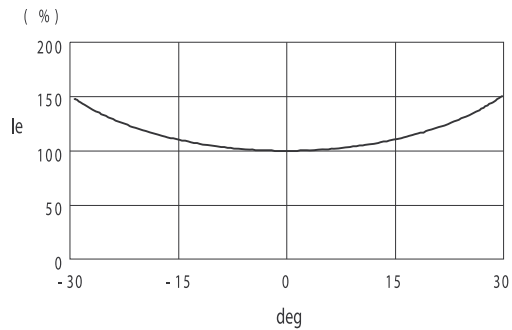
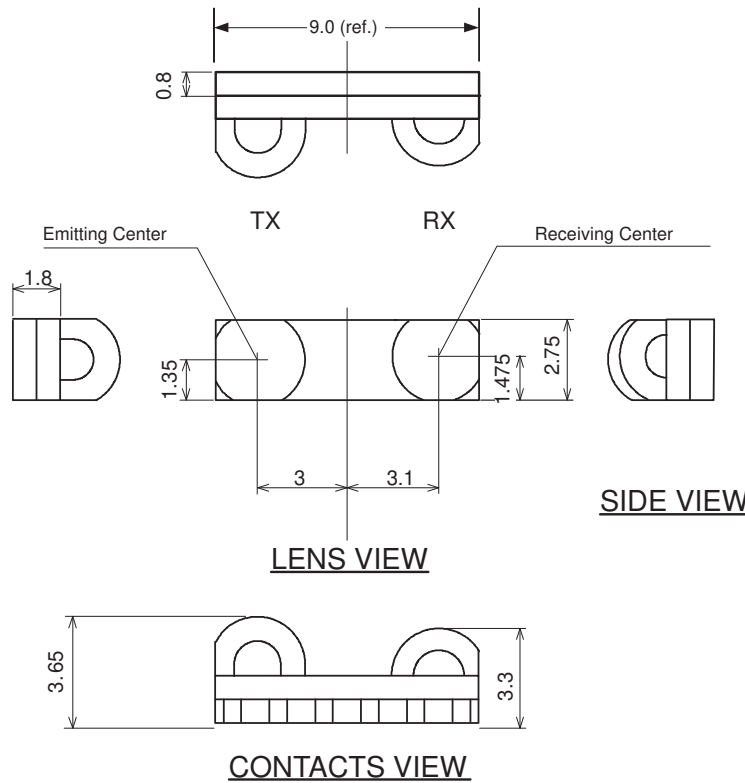


Figure 6. Directive Characteristics (Receiving)

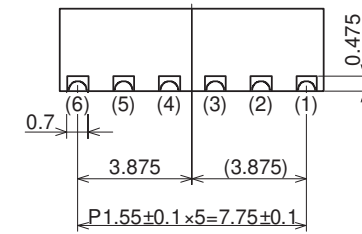
## Mechanical Drawings

The mechanical drawings for these transceivers are shown in Figure 7.



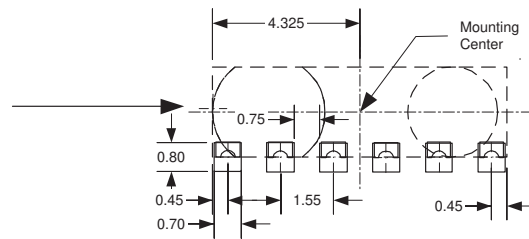
Units: mm  
Tolerance: +/- 0.2

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 7. 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 8, is recommended.

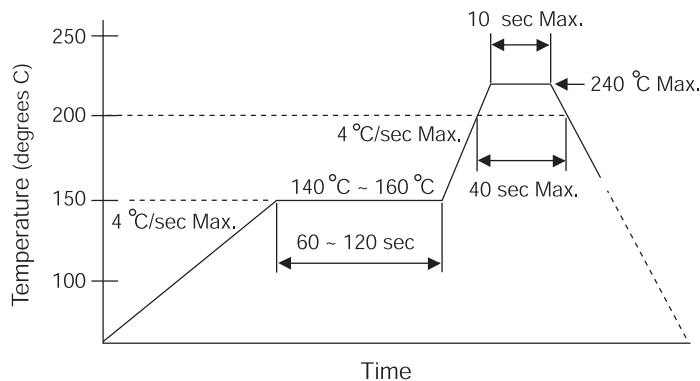


Figure 8. Temperature Profile at the Top Surface of ZHX1820

### 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 9) 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.

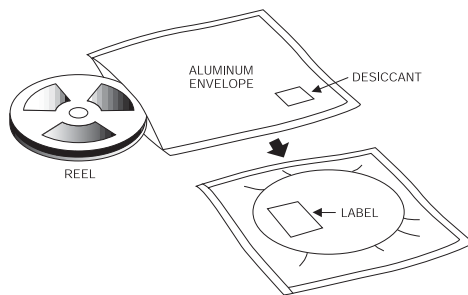
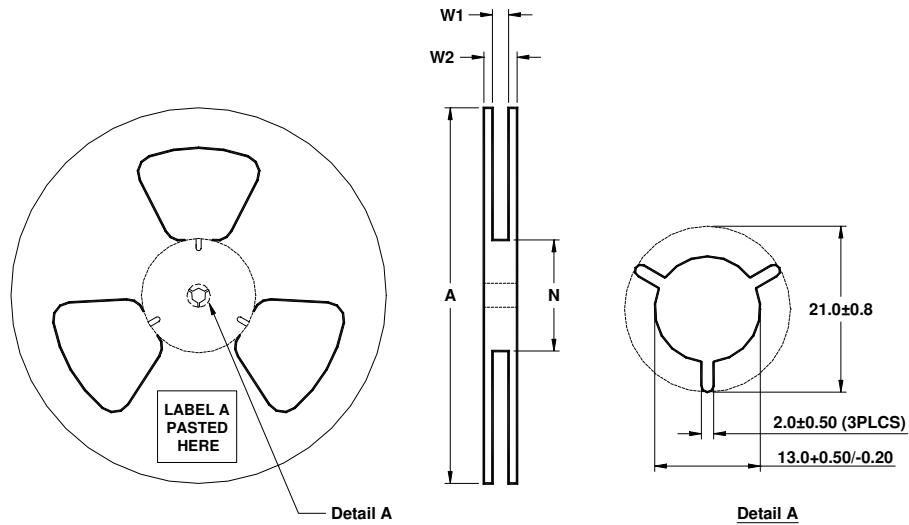


Figure 9. ZHX1820 Packaging

## Taping Specifications

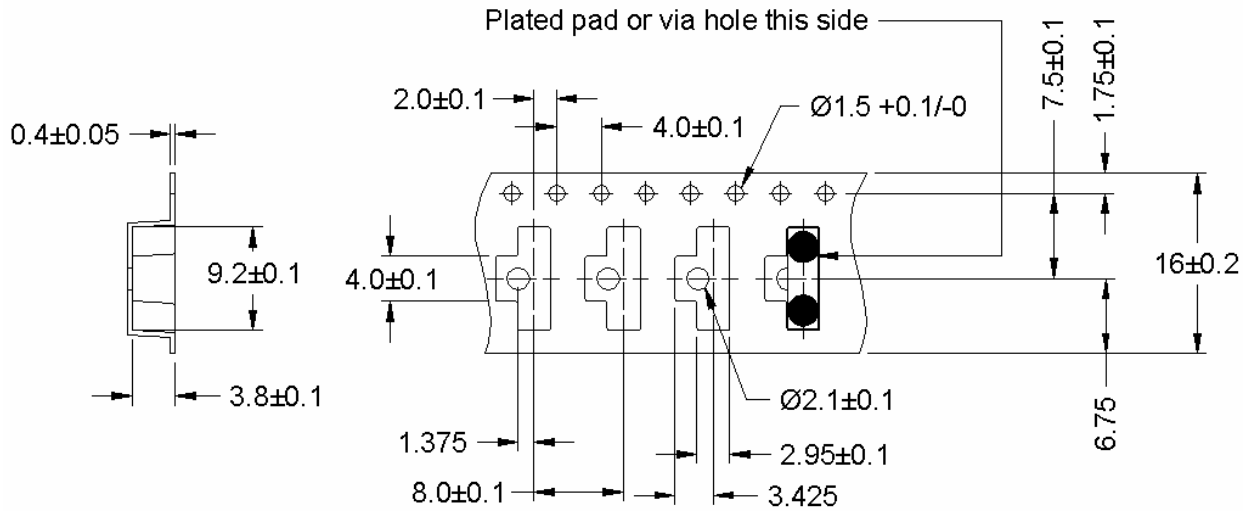
Figure 10 shows the reel dimensions for the ZHX1820, and Figure 11 shows the tape dimensions and configuration for the ZHX1820.



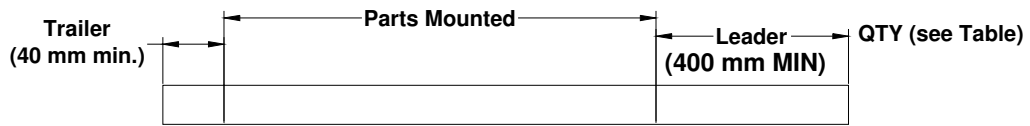
- Note :
1. Material : Anti-Static Polyesterene.
  2. Surface Resistivity : 10E8 to 10E10 Ohms/SQ.
  3. Unless specified, Tol :  $\pm 0.1$

DEVICE	Carrier Tape Size	A	W1	W2 (max)	N (Hub Dia.)	Reel Qty
		$\pm 0.25$	+2/-0			
ZHX1820	16 mm	330	16.4	21.6	80 mm	2,000

Figure 10. ZHX1820 Reel Dimensions (Unit: mm)



USER DIRECTION FEEDS



USER DIRECTION OF FEEDS

Figure 11. 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).

## Customer Support

For answers to technical questions about the product, documentation, or any other issues with Zilog's offerings, please visit Zilog's Knowledge Base at <http://www.zilog.com/kb>.

For any comments, detail technical questions, or reporting problems, please visit Zilog's Technical Support at <http://support.zilog.com>.