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ZHX1820

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

Product Specification

PS016007-0910



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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 μ A.

Features

- Compliant to IrDA Data Specification SIR
- Wide power supply voltage range, 2.4 to 5.5 V
- Low-power, listening current, 90 μ 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.

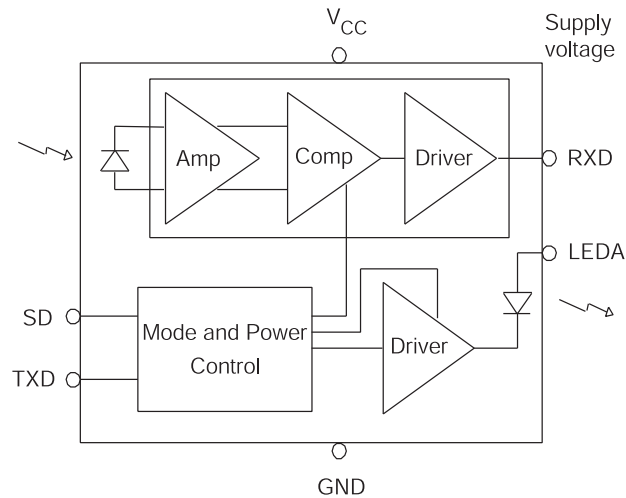


Figure 1. Slim SIR Transceiver Block Diagram

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 _{CC}	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- μ 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.

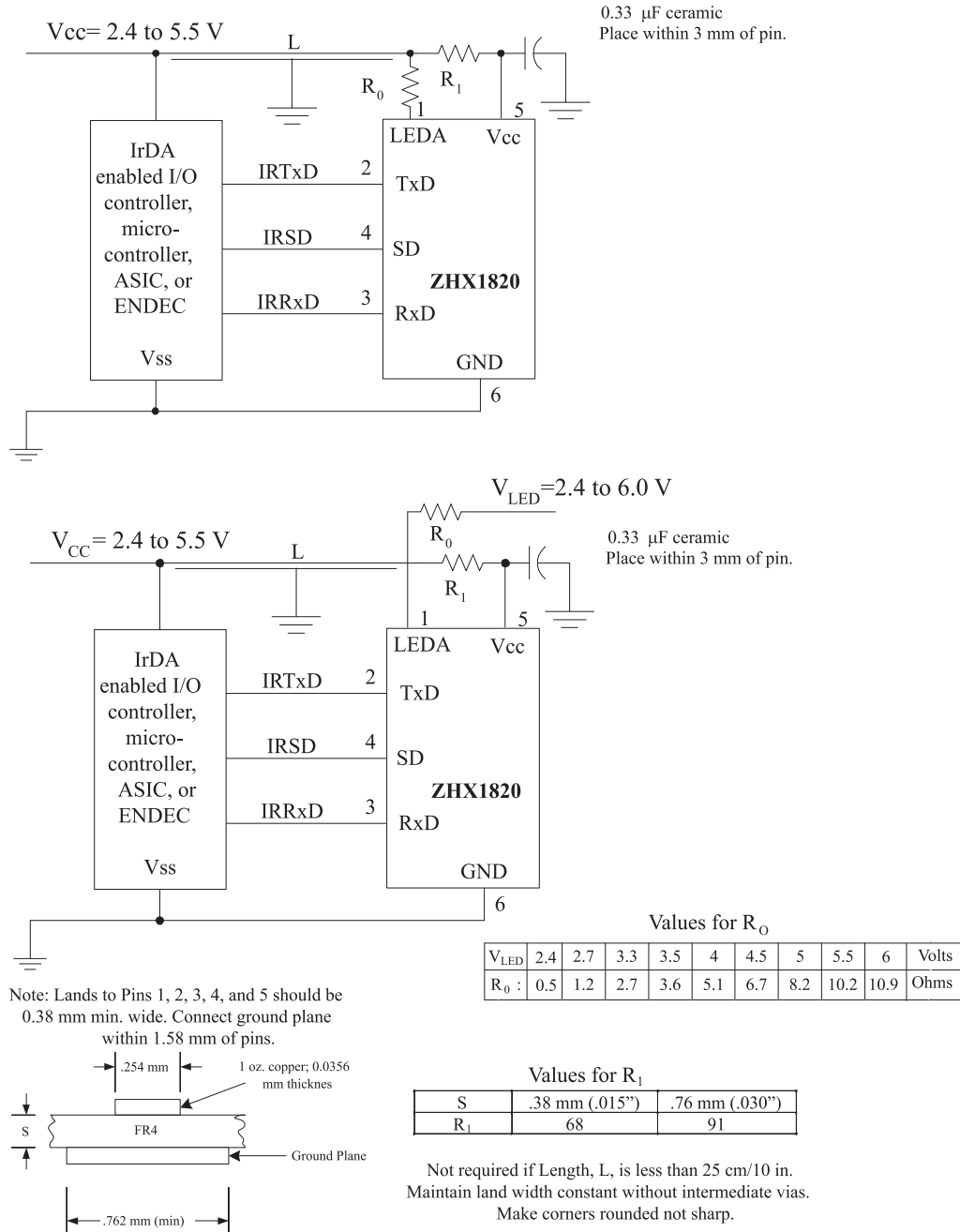


Figure 2. Application Block Diagrams

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	μA	
Receive Current	I_{CC}			90	150	μA	

Table 4. Electrical Characteristics (Continued)

Parameter	Symbol	Condition	Min	Typical	Max	Unit	Remarks
Standby Current	I_{STB}				1	μA	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	μS	
Power Shutdown Time	T_{SD}				1	μS	
Startup Time	T_{STU}				200	μS	
Receiver Latency	T_L			100		μS	
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	θ			20		$^\circ$	Hor. and Vert.
Light Pulse Rise, Fall Time	t_{Or}, t_{Of}			40		nS	
Optical Pulse Width	t_{OPW}			20		μS	TxD="H"
Optical Overshoot	t_{OPO}				3	%	
Peak Wavelength	λ_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.

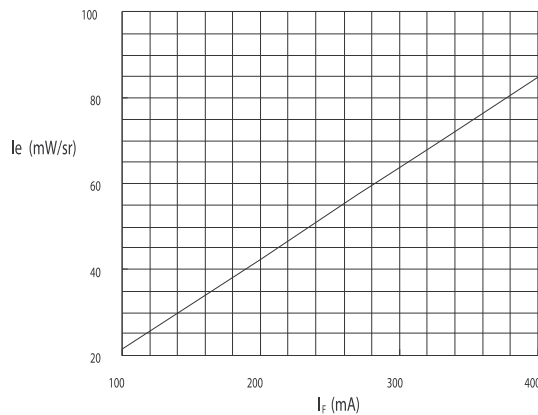


Figure 3. I_f - I_e Characteristics (0°)

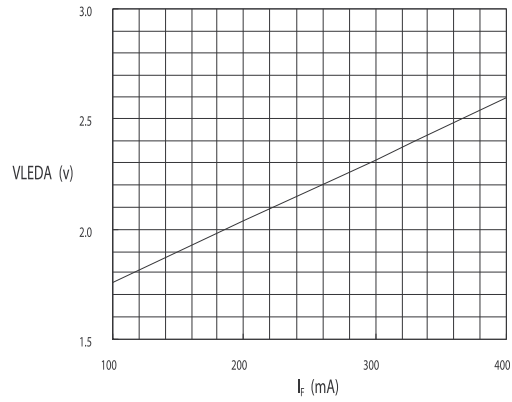


Figure 4. I_F -LEDA Characteristics (0°)

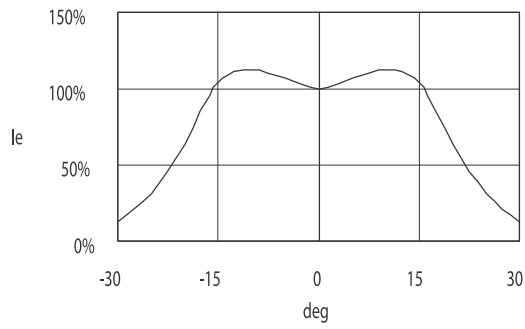


Figure 5. Directive Characteristics (Emitting)

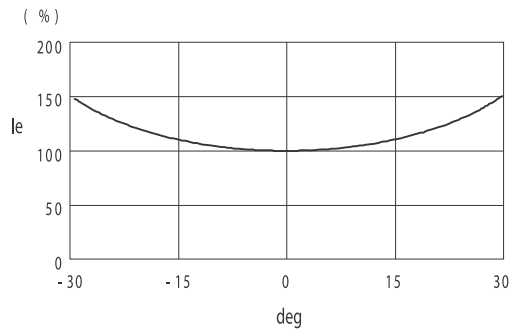
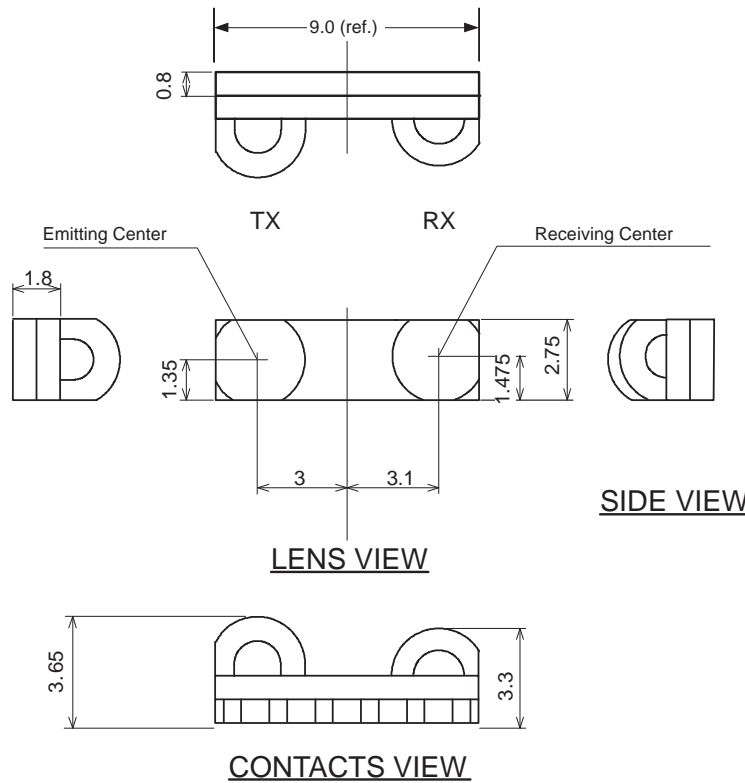


Figure 6. Directive Characteristics (Receiving)

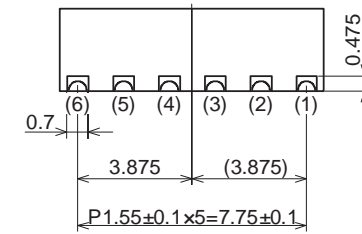
Mechanical Drawings

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



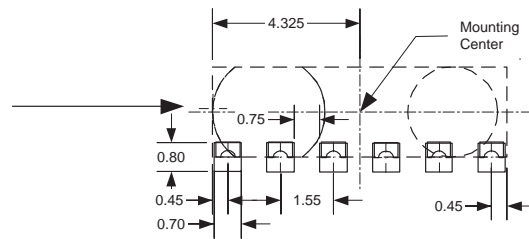
Units: mm
Tolerance: +/- 0.2

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.

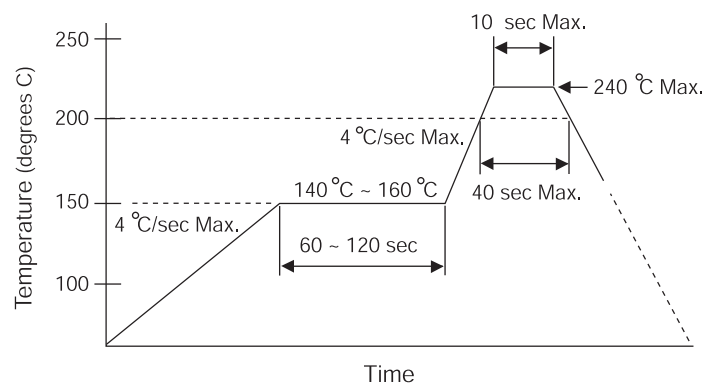


Figure 8. Temperature Profile at the Top Surface of ZHX1820

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.

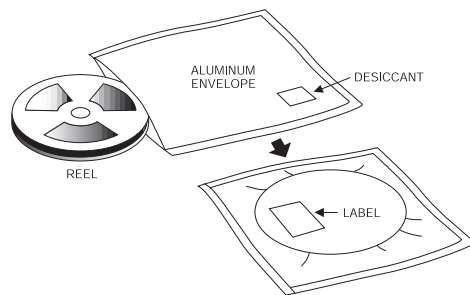
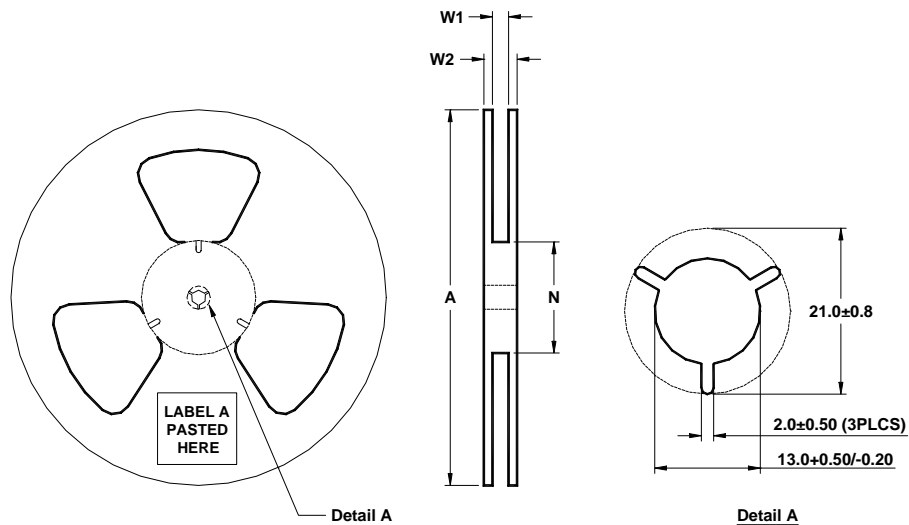


Figure 9. ZHX1820 Packaging

Taping Specifications

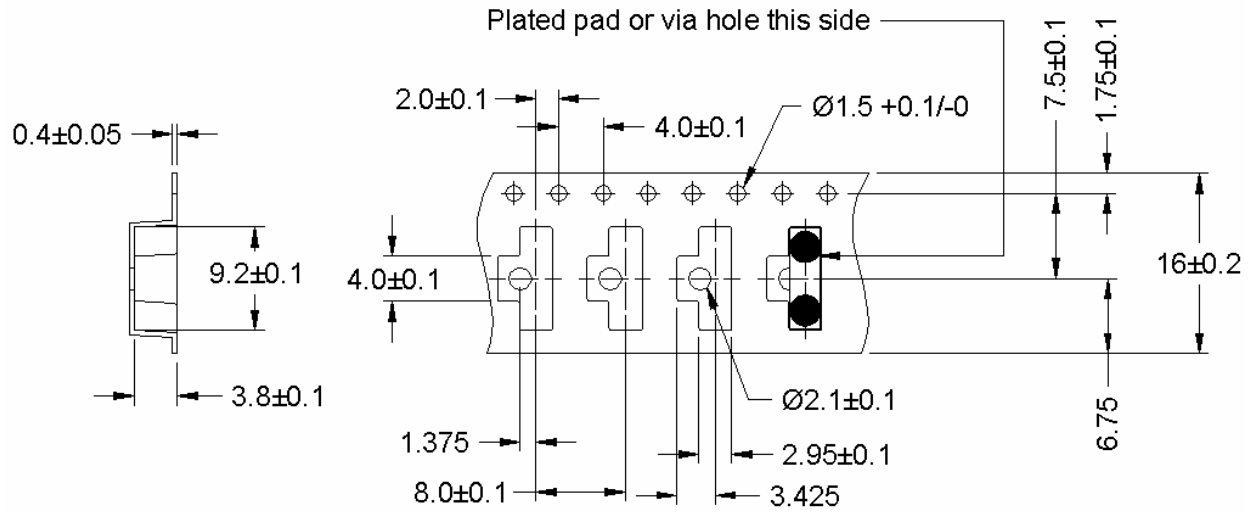
Figure 10 shows the reel dimensions for the ZHX1820, and Figure 11 shows the tape dimensions and configuration for the ZHX1820.



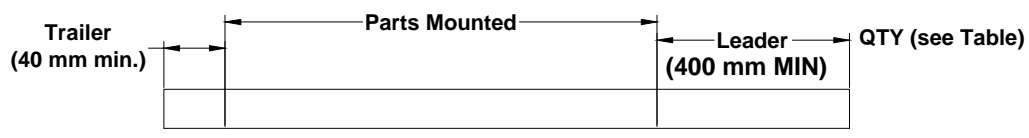
- Note :
1. Material : Anti-Static Polyesterene.
 2. Surface Resistivity : 10E8 to 10E10 Ohms/SQ.
 3. Unless specified, Tol : ± 0.1

DEVICE	Carrier Tape Size	A	W1	W2 (max)	N (Hub Dia.)	Reel Qty
		± 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>.