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ZHX1201

SIR UltraSlim™
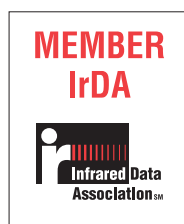*Transceiver (IrMC)*

Preliminary Product Specification

PS015207-0104

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Description

The ZILOG ZHX1201 for mobile phones, pagers, and PDAs is a small, low power, and high functionality transceiver.

ZiLOG's low-power CMOS technology allows the transceiver to receive an IrDA communication at a typical current of 100 µA.

The UltraSlim form factor (8 mm long x 3 mm wide x 2.5 mm high) allows placement in many small devices (see Figure 1). Application circuit space is also minimized because only one external component is required.

Figure 1. UltraSlim Form

The ZHX1201 is designed to support IrDA-Data SIR mode, which at 115 Kbits/s provides the capability for the user to share phone numbers, addresses, and notes as well as linking a PC to the internet via a mobile telephone.

The transceiver combines an IRED emitter, a PIN photodiode, and a unique driver/control ASIC in a single package, as shown in Figure 2.
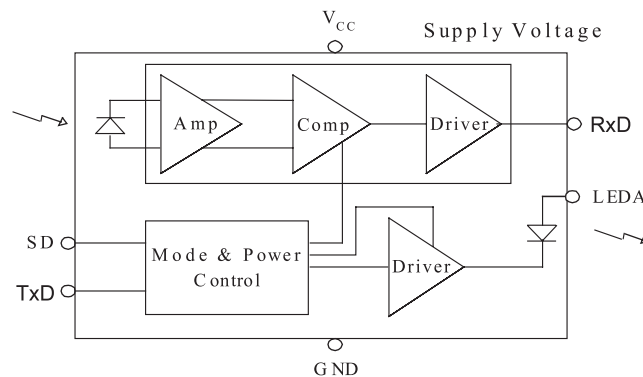
Figure 2.   ZHX1201 Block Diagram

The ZILOG ZHX1201 also features a shutdown control that minimizes current draw to 0.1 µA typical.

Features

- Compliant to IrDA Data Specification 1.4 Low Power SIR (link range: low power to low power—0 to 20 cm; standard power to low power—0 to 30 cm)

- Low-power supply voltage range: 2.4 to 3.6 V

- Receiving current: only 100 μA (typically) at 3.0 V

- UltraSlim package: 8 mm long x 3 mm wide x 2.5 mm high

- Extended operating temperature range: –30 ºC to +85 ºC

- Internal current source eliminates current limiting resistor

- Meets IEC 825-1 Class 1 eye safety specifications

Pin Description

Table 1 lists the pin out for the ZHX1201 transceiver. The pins are described in this section.

Table 1. ZHX1201 Transceiver Pin Out

Pin	Name	Function	I/O
1	GND	Ground	—
2	NC	NC	
3	V_{CC}	Supply voltage	—
4	GND	Ground	—
5	SD	Shutdown	I
6	RxD	Receiver output	O
7	TxD	Transmitter input	I
8	LEDA	IRED anode	—
—	TAB	Shield connection	—

V_{CC} Positive Supply

(Power)

Connect to positive power supply (2.4–3.6 V). Filter with a 1.0 μF 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.

SD Shutdown

(Input, active high)

This input is used to place the IC into a shutdown mode.

TxD needs to be driven low to achieve low shutdown current and held low during the transition from shutdown to active to ensure that the circuitry is properly set to communicate.

RxD Receive Data

(Output, active low)

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

TxD Transmit Data

(Input, active high)

This CMOS input is used to transmit serial data and has an internal pull-down resistor that is disabled (open-circuited) during shutdown. With integrated digital AC coupling, no external components are required for input signals between GND and V_{CC}.

LEDA LED Driver

(Power)

This output is internally connected to the LED anode and contains an internal current source. The voltage range on this pad is 2.4–4.2 volts.

TAB Shield Connection

The shield tab must be soldered to ground for proper operation.

Application Block Diagrams

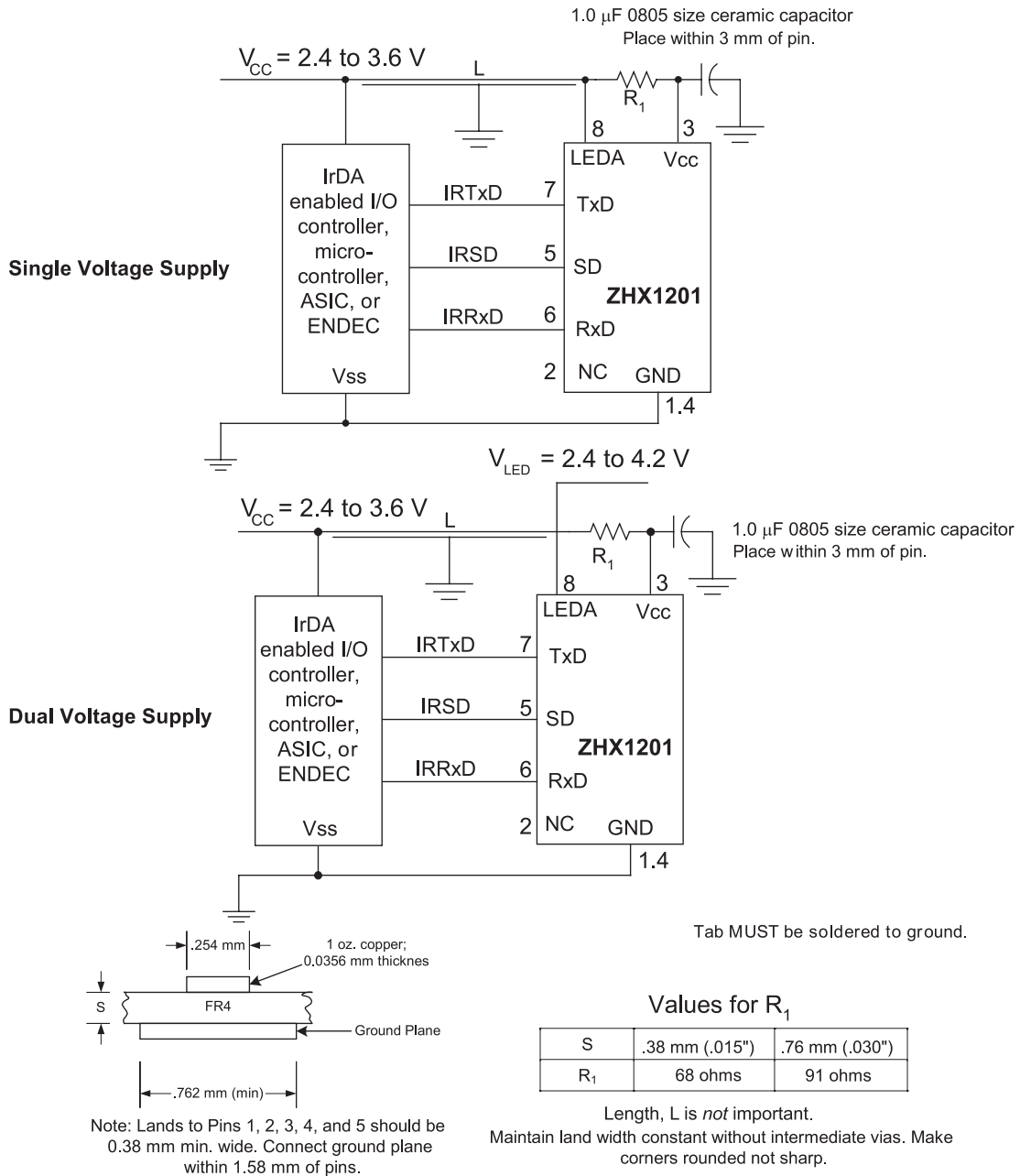Figure 3 shows the application block diagrams for the ZHX1201 transceiver.

Figure 3.   ZHX1201 Application Block Diagrams

Electrical and Timing Specifications

Table 2, Table 3, and Table 4 list the electrical and timing specifications.

Table 2. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Comment
Supply voltage	V_{CC}	–0.3	3.6	V	V_{CC}, GND
Supply voltage	V_{LED}	–0.3	4.4	V	
Input voltage	V_{IN}	GND–0.3	V_{CC}+0.3	V	TxD, SD
Output (Ext.) voltage	V_{OUT}	GND–0.3	V_{CC}+0.3	V	RxD
Storage temperature	T_{ST}	–40	100	°C	
Solder temperature	T_{SOL}		230	°C	See page 8.
ESD			400	V	

Table 3. Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Supply voltage	V_{CC}	2.4	3.6	V
Supply voltage, LEDA	V_{LED}	2.4	4.2	V
Ambient operating temperature	T_{OP}	–30	85	°C

Table 4. Electrical Characteristics

Parameter	Symbol	Condition	Min	Typical	Max	Unit	Remarks
High-level input voltage	V_{IH}		$0.75V_{CC}$			V	TxD, SD
Low-level input voltage	V_{IL}				$0.25V_{CC}$	V	TxD, SD
High-level output voltage	V_{OH}	I_{OH}=100 µA	V_{CC}–0.4			V	RxD
Low-level output voltage	V_{OL}	I_{OL}=–100 µA			$0.1V_{CC}$	V	RxD
Transmitter current	I_{LED}			40	55	mA	
Receive current	I_{CC}			100	300	µA	Idle
Shutdown current	I_{STB}				1	µA	SD=V_{CC}, TxD=0 V

Table 4. Electrical Characteristics (Continued)

Parameter	Symbol	Condition	Min	Typical	Max	Unit	Remarks
RxD rise/fall time	T_R, T_F	Cload=25 pF	40		100	ns	10% and 90%
RxD pulse width	t_{PWA}	SIR≤115.2 Kbps	1.0		5	µs	Input pulse=1.6 µs; rise/fall time<600 ns
RxD pulse width, alternate 3/16th of pulse duration. See IrDA Physical Layer specs.	t_{PWA}	SIR≤115.2 Kbps	1.2		90	µs	Input pulse=78 µs (3/16*(1/2400))
Power shutdown time	T_{SD}			0.1	200	µs	
Startup time	T_{STU}			200		µs	
Latency	T_{RRT}			150		µs	
LED protection timeout			105	180	270	µs	Protects LED when TxD is left high
Trans. radiant intensity	I_E	I_{LED}=40 mA	3.6		72	mW/sr	θh, θv≤(±15°)
Threshold irradiance	E_{emin}	V_{CC}=3.3 V			9	µW/cm^2	θh, θv≤(±15°)
Input irradiance	E_{emax}	V_{CC}=3.3 V			500	mW/cm^2	θh, θv≤(±15°)
Angle of half intensity	θ			20		°	Hor. and vert.
Peak wavelength	λρ			870		nm	
Unless otherwise noted: V_{CC}=3.3 V, GND=0 V, TA=25 °C							

Caution: This component is susceptible to damage from electrostatic discharge (ESD). To prevent damage and/or degradation that might be induced by ESD, use normal static precautions in handling and assembly of this component.

Note: TxD *must* be held low during the transition from shutdown to active to ensure that the circuitry is properly set to communicate.

ZHX1201 Tape and Reel Specifications

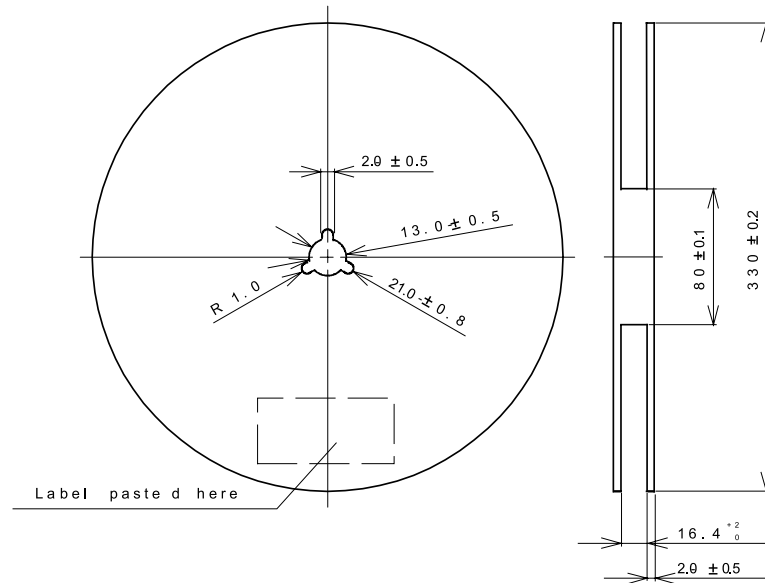Figure 4 shows the ZHX1201 reel specifications, and Figure 5 shows the ZHX1201 tape specifications.

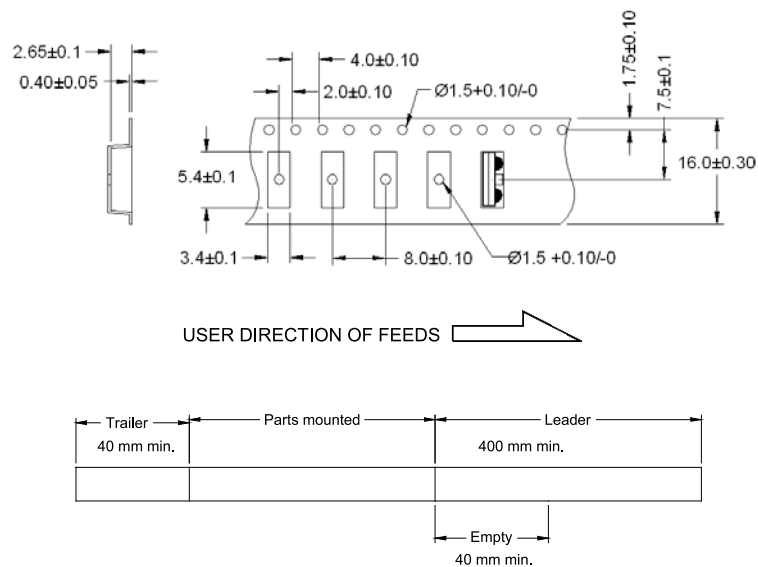**Figure 4.   ZHX1201 Reel Specifications**

Figure 5.   ZHX1201 Tape Specifications

ZHX1201 Soldering and Cleaning Recommendations

Follow these recommendations to maintain the performance of the ZHX1201 transceiver.

Reflow Soldering

- Reflow soldering paste is recommended.

- Preheat: 120~150 °C, 60 to 120 seconds

- Heating up and cooling down: 5 °C/second

- Maximum number of reflows: 2

- The temperature profile at the top surface of the ZHX1201 transceiver, shown in Figure 6, is recommended.
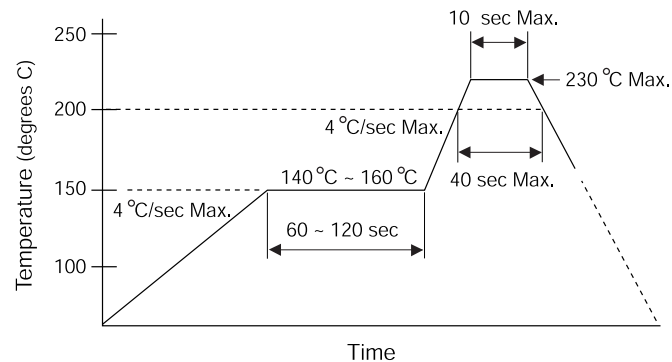
Figure 6.   Temperature Profile for the Top Surface

Manual Soldering

- Use 63/37 or silver solder.

- Temperature at solder iron tip: no more than 280 °C

- Finish soldering within 3 seconds.

- Handle only after ZHX1201 has cooled off.

Cleaning

Perform cleaning 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

Moisture Prevention Guidelines

To avoid moisture absorption during transportation and storage, ZHX1201 reels are packed in aluminum envelopes (see Figure 7) 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 must store these parts in a controlled environment to prevent moisture entry. Please read the label on the aluminum bag for indicator instructions.
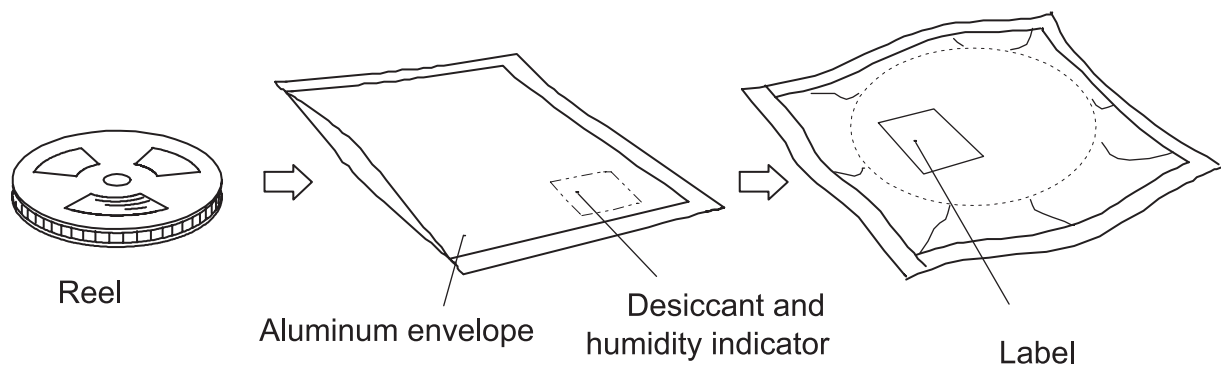

Reel

Aluminum envelope

Desiccant and humidity indicator

Label

Figure 7.   ZHX1201 Packaging

Baking

It is recommended that parts that have been stored over 12 months or unpacked over 72 hours 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

Mechanical Drawing

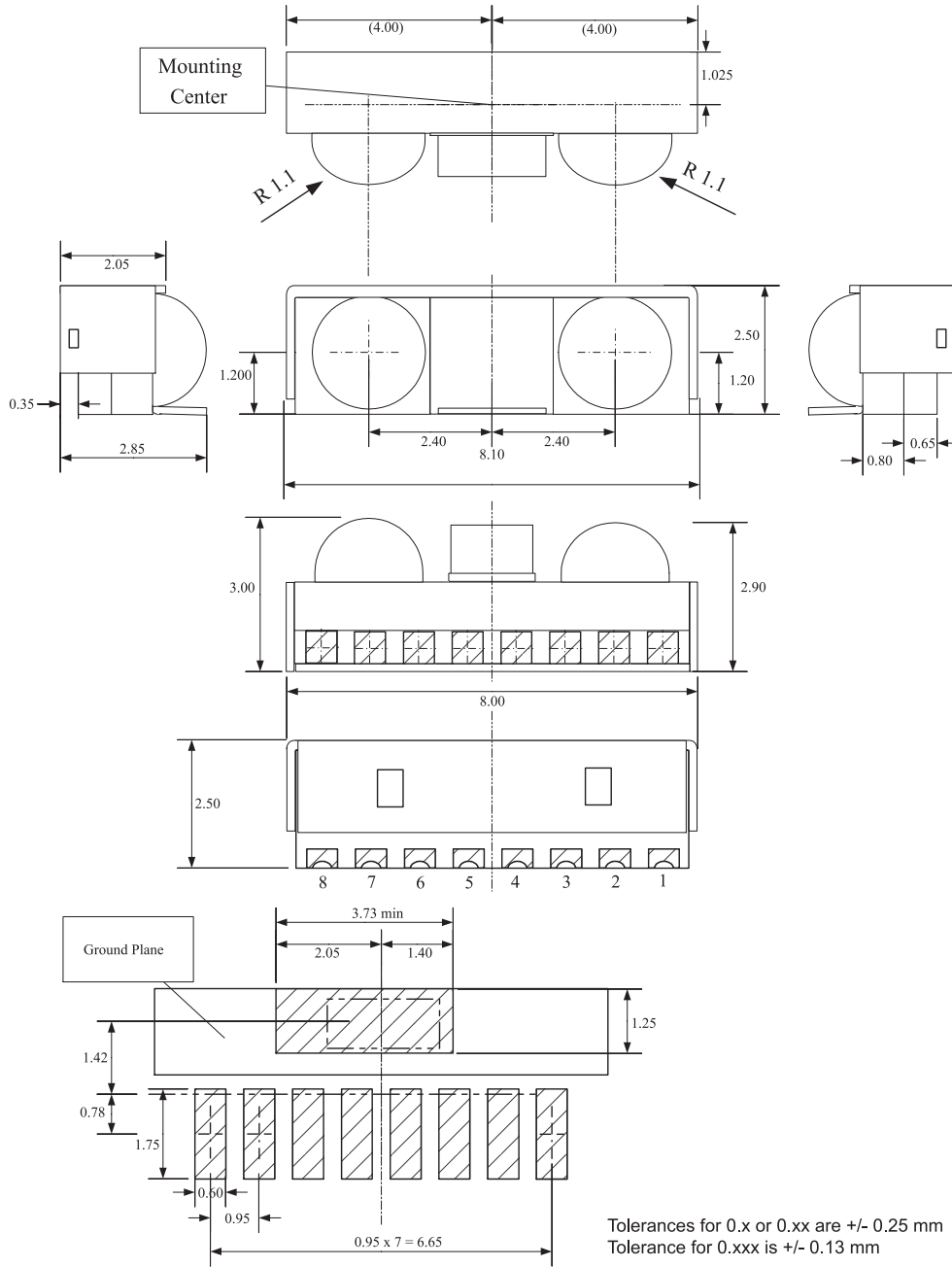Figure 8 shows the mechanical specification for the ZHX1201 transceiver.

Figure 8.   ZHX1201 Mechanical Drawing

Ordering Information

Use the following information to order the ZHX1201 transceiver:

ZHX1201MB115THTR   2500 per reel

Customer Feedback Form

If you experience any problems while operating this product, 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
Customer Service: 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.