



**ZHX1423**

***SIR UltraSlim™  
Transceivers***

**Product Specification**

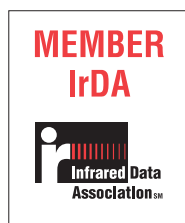
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## Description

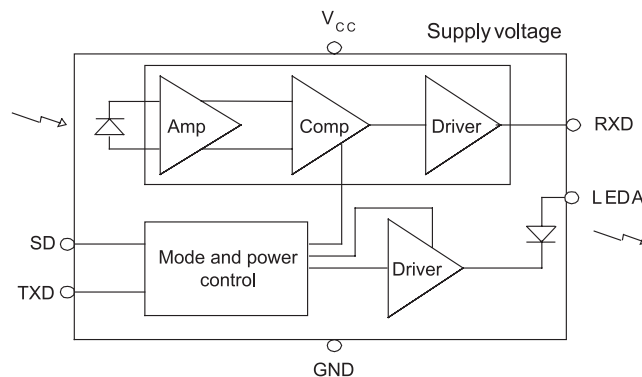
The ZILOG ZHX1423 for PDAs, internet appliances, medical electronics, and general-purpose interactive handheld devices is the smallest, lowest power, and highest functional standard-power (0–1 meter minimum range) transceiver available.

The ZILOG ZHX1423 features exclusive AlwaysOn™ technology that allows the transceiver to “listen” for an IrDA communication at a typical current of 6  $\mu$ A, allowing the default mode to be left on with negligible effect on the battery life.

The UltraSlim form factor (7.3 mm long x 2.8 mm wide x 1.9 mm high) allows placement in virtually any small device. Application circuit space is also minimized because only two external components are required.

The ZHX1423 is designed to support IrDA-Data SIR mode (115.2 Kbits/s) and provides typical data links with other standard-power IrDA transceivers up to 1.0 meter away.

The transceiver combines an IRED emitter, a PIN photodiode, and a unique driver/control ASIC in a single package, as shown in Figure 1.



**Figure 1. ZHX1423 Block Diagram**

The ZILOG ZHX1423 also features a shutdown control that minimizes current draw to 0.1  $\mu$ A typical.



## Features

- Compliant to IrDA Data Specification 1.4 Standard Power SIR
- Low-power supply voltage range: 2.4 to 3.6 V
- ZHX1423 listening current: only 6  $\mu$ A (typically) at 3.0 V (ZiLOG exclusive)
- UltraSlim package: 7.3 mm long x 2.8 mm high x 1.9 mm wide
- Extended operating temperature range:  $-30^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Internal current source eliminates need for a current-limiting resistor for IR LED
- Meets IEC 825-1 Class 1 eye safety specifications

## Pin Description

Table 1 lists the pin out for the ZHX1423 transceivers. The pins are described in this section.

**Table 1. ZHX1423 Transceiver Pin Out**

| Pin | Name            | Function          | I/O |
|-----|-----------------|-------------------|-----|
| 1   | NC              | NC (future use)   | —   |
| 2   | V <sub>CC</sub> | Supply voltage    | —   |
| 3   | GND             | Ground            | —   |
| 4   | SD              | Shutdown          | I   |
| 5   | RXD             | Receiver output   | O   |
| 6   | TXD             | Transmitter input | I   |
| 7   | LEDA            | IRED anode        | —   |

### V<sub>CC</sub> Positive Supply

(Power)

Connect to positive power supply (2.4–3.6 V). Filter with a 1.0- $\mu$ F ceramic bypass capacitor and terminating resistor as close as possible to the V<sub>CC</sub> 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 transceiver into a shutdown mode.

### **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 enabled during shutdown.

### **LEDA LED Driver**

(Output, active low)

This output is internally connected to the LED anode and contains an internal current source. The voltage range on this pad is 2.2–4.2 volts.



Application Block Diagrams

Figure 2 shows the application block diagrams for the ZHX1423 transceivers.

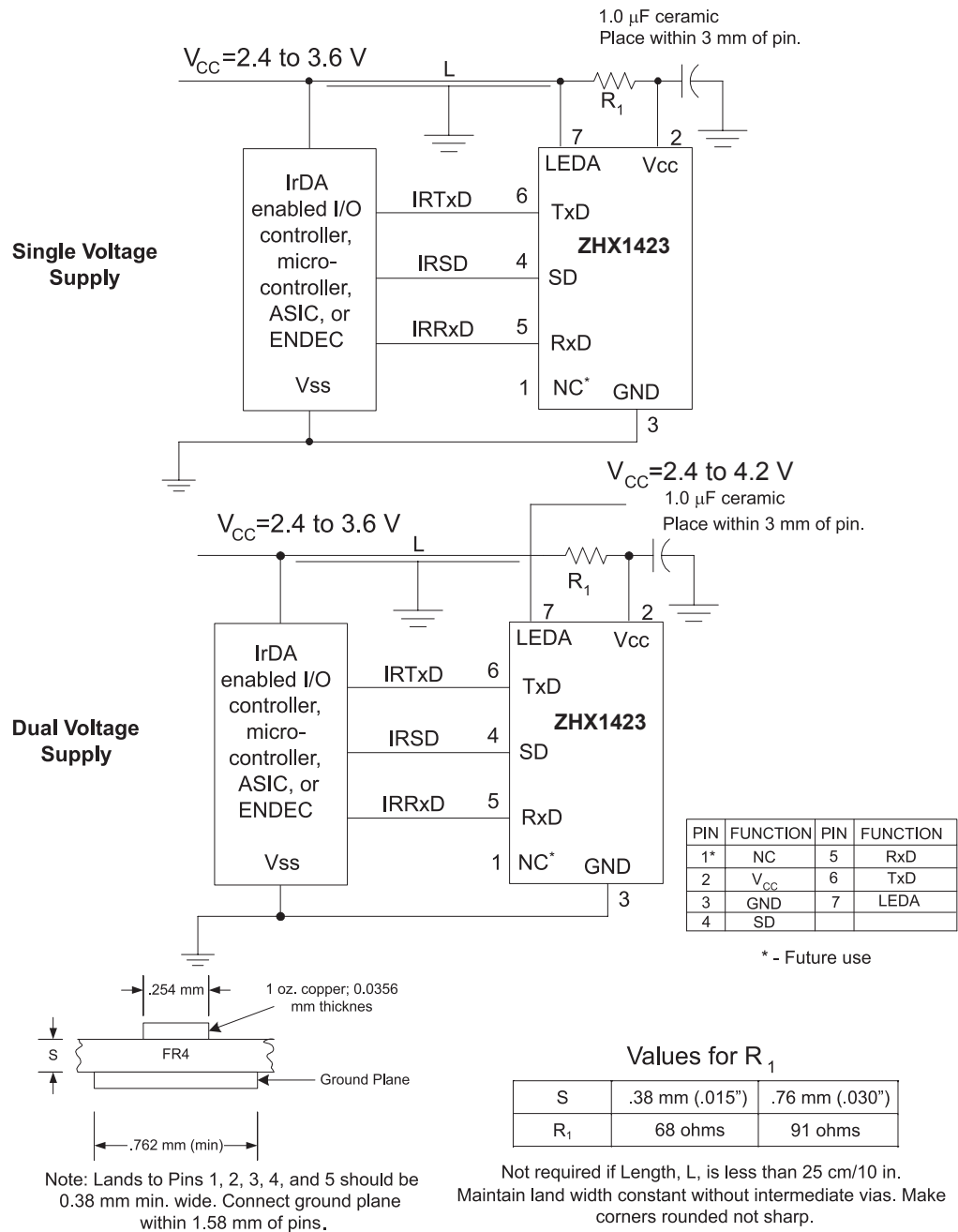


Figure 2. ZHX1423 Application Block Diagrams



## 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   |                |
| 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   | $V_{IL}$  |                      |              |         | 0.4 | V       | TXD, SD |
| High-level output voltage | $V_{OH}$  | $I_{OH}=-100\ \mu A$ | $V_{CC}-0.4$ |         |     | V       | RXD     |
| Low-level output voltage  | $V_{OL}$  | $I_{OL}=100\ \mu A$  |              |         | 0.4 | V       | RXD     |
| Transmitter current       | $I_{LED}$ |                      |              | 260     | 320 | mA      |         |
| Listening current         | $I_{CC}$  |                      |              | 6       |     | $\mu A$ |         |



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

| Parameter                    | Symbol      | Condition             | Min | Typical | Max | Unit         | Remarks                                            |
|------------------------------|-------------|-----------------------|-----|---------|-----|--------------|----------------------------------------------------|
| Receive current              | $I_{CC}$    |                       |     | 100     | 125 | $\mu A$      | Idle                                               |
| Standby current              | $I_{STB}$   |                       |     | 0.1     | 1.0 | $\mu A$      | $SD=V_{CC}$ , $TXD=0 V$                            |
| RXD pulse width              | $t_{PWA}$   | $SIR \leq 115.2 Kbps$ | 1.0 |         | 5   | $\mu s$      | Input pulse=1.6 $\mu s$ ;<br>rise/fall time<600 ns |
| Power shutdown time          | $T_{SD}$    |                       |     | 1       |     | $\mu s$      |                                                    |
| Startup time                 | $T_{STU}$   |                       |     | 200     |     | $\mu s$      |                                                    |
| Latency                      | $T_{RRT}$   |                       |     | 150     |     | $\mu s$      |                                                    |
| Transmitter LED timeout      |             |                       |     | 130     | 270 | $\mu s$      | Protects LED when<br>TXD is left high              |
| Rise/fall time               | $T_r, T_f$  | $C_{load}=25 pF$      | 10  |         | 40  | ns           |                                                    |
| Trans. radiant intensity     | $I_E$       | $I_{LED}=260 mA$      | 40  |         | 100 | mW/sr        | On-axis                                            |
| Minimum threshold irradiance | $E_{emin}$  | $V_{CC}=3.3 V$        |     |         | 4   | $\mu W/cm^2$ | $\theta_h, \theta_v \leq (\pm 15^\circ)$           |
| Maximum input irradiance     | $E_{emax}$  | $V_{CC}=3.3 V$        | 500 |         |     | $mW/cm^2$    | $\theta_h, \theta_v \leq (\pm 15^\circ)$           |
| Peak wavelength              | $\lambda_p$ |                       |     | 870     |     | nm           |                                                    |

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

Note: To minimize power dissipation, the part has been designed for optimal operation in 1.6  $\mu s$  mode. If used in the 3/16<sup>th</sup> pulse duration mode, some devices will exhibit a phantom Rx pulse at 9.6 Kbits/s.

## ZHX1423 Tape and Reel Specifications

Figure 3 shows the ZHX1423 reel specifications, and Figure 4 shows the ZHX1423 tape specifications.

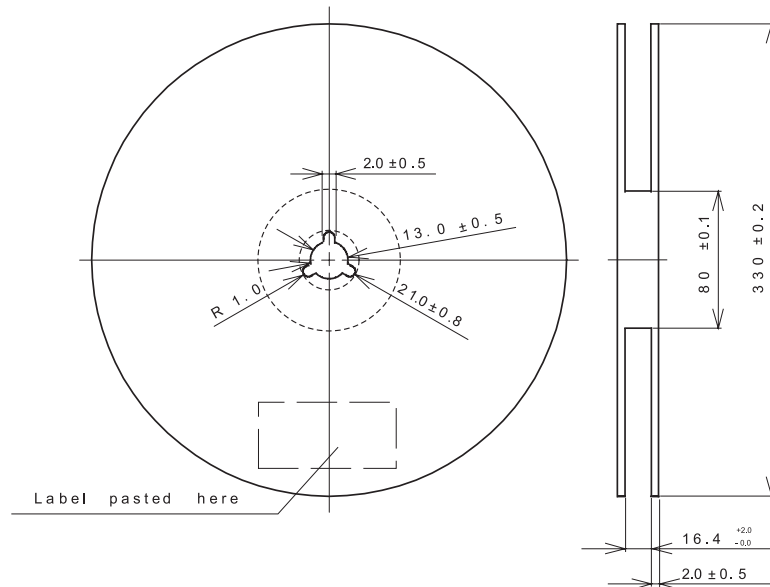


Figure 3. ZHX1423 Reel Specifications

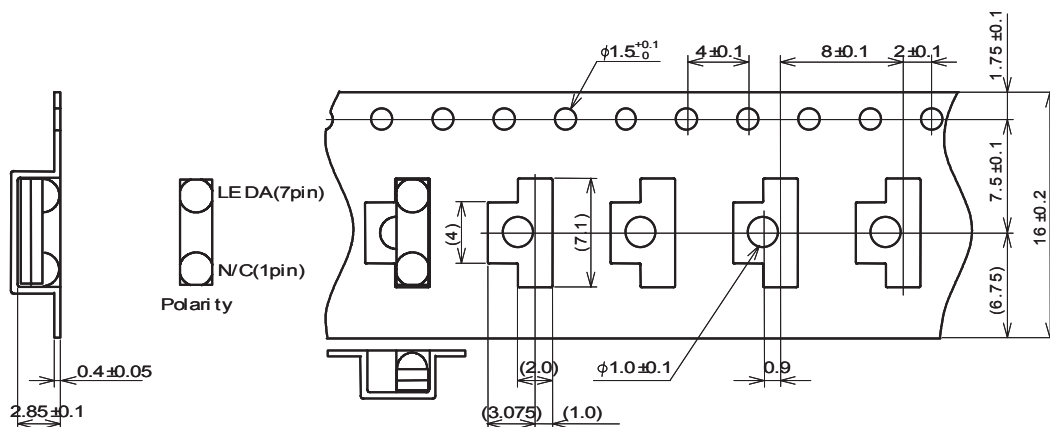


Figure 4. ZHX1423 Tape Specifications



## **ZHX1423 Soldering and Cleaning Recommendations**

Follow these recommendations to maintain the performance of the ZHX1423 transceivers.

### **Reflow Soldering**

- **Note:** Please refer to ZiLOG's Lead-Free Solder Reflow: Packaging Application Note (AN0161, <http://www.zilog.com/docstools.asp>) for more information about the solder profile.

### **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 the ZHX1423 transceivers have cooled off.

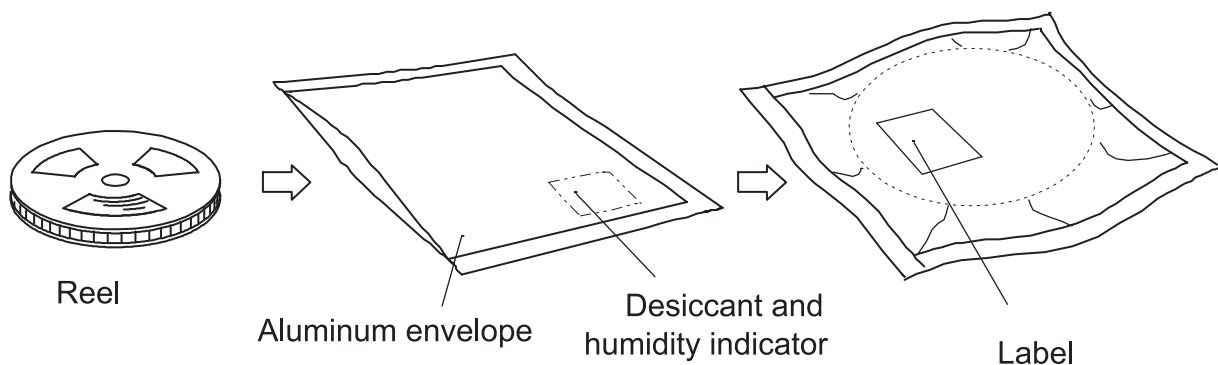
### **Cleaning**

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, ZHX1423 reels are packed in aluminum envelopes (see Figure 5) 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.



**Figure 5. ZHX1423 Packaging**

## Baking

Parts that have been stored over 12 months or unpacked over 72 hours should 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 Specification

Figure 6 shows the mechanical specification for the ZHX1423 transceivers.

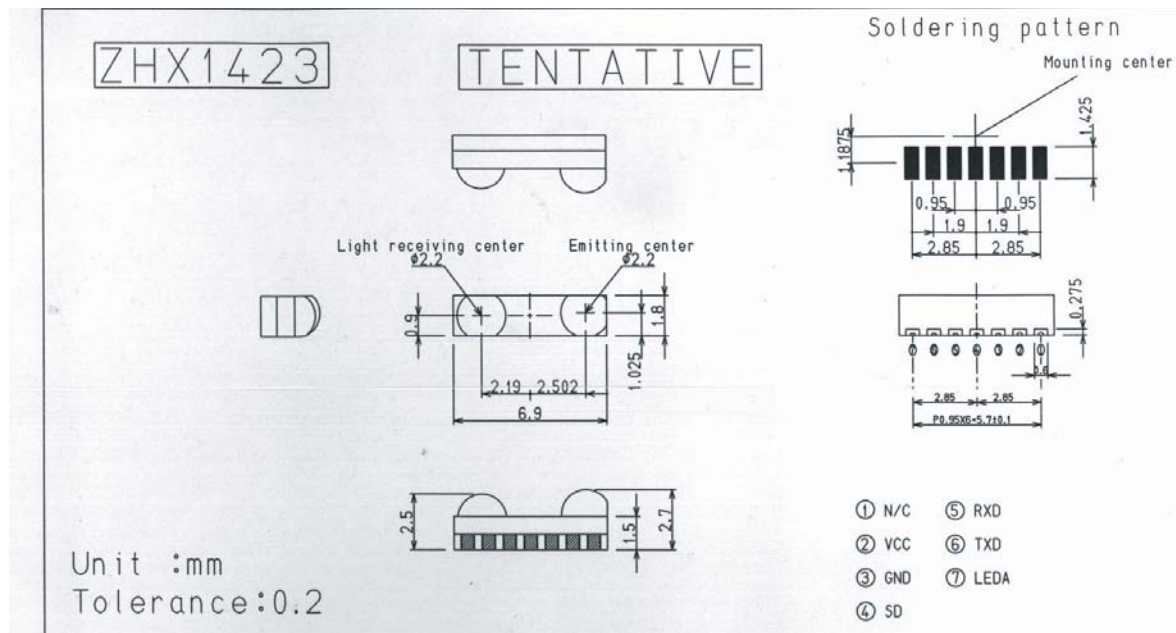


Figure 6. ZHX1423 Mechanical Specification

## Ordering Information

Use the following information to order the ZHX1423 transceivers:

ZHX1423TA115THTR      with AlwaysOn Listen      2,500 per reel

- **Note:** All ZiLOG devices are available lead free. ZHX1423 has always been lead free. These devices meet or exceed RoHS Directive 2002/95/EC. For additional information, please see the ZiLOG Quality and Reliability web page at <http://www.zilog.com/quality/index.asp>.



## 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  
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.