



ZHX1403 Family

SIR UltraSlim™ Transceivers

Preliminary Product Specification

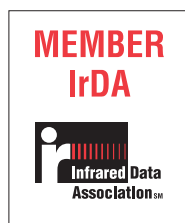
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Description

The ZILOG ZHX1403 family series 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 ZHX1403MA features exclusive AlwaysOn™ technology that allows the transceiver to “listen” for an IrDA communication at a typical current of 6 μ A, allowing the default mode to be left on with negligible effect on the battery life. Once another IrDA device has been discovered, communication takes place at the low receive current consumption of 100 μ A (typically). The ZHX1403MB features *only* the low receive current consumption of 100 μ A (typical).

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 (see Figure 1). Application circuit space is also minimized because only two external components are required.



Figure 1. UltraSlim Form

The ZHX1403 family 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 1.5 meters away.

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

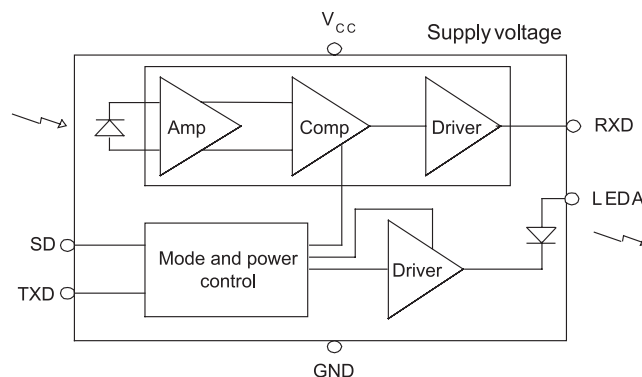


Figure 2. ZHX1403 Block Diagram

The ZILOG ZHX1403 family also features a shutdown control that minimizes current draw to 0.1 μ A.

Features

- Compliant to IrDA Data Specification 1.4 Standard Power SIR (minimum link distance: 1 m)
- Low-power supply voltage range: 1.8 to 3.6 V
- ZHX1403MA listening current: only 6 μ A (typically) at 3.0 V (ZiLOG exclusive)
- UltraSlim package: 7.3 mm long x 2.8 mm wide x 1.9 mm high
- Only one external component
- Extended operating temperature range: -30°C to $+85^{\circ}\text{C}$
- 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 ZHX1403 family transceivers. The pins are described in this section.

Table 1. ZHX1403 Family Transceiver Pin Out

Pin	Name	Function	I/O
1	NC	NC (future use)	—
2	V _{CC}	Supply voltage	—
3	GND	Ground	—
4	SD	Shutdown	I
5	RXD	Receiver output	O
6	TXD	Transmitter input	I
7	LEDA	IRED anode	—
—	TAB	Shield connection	—

V_{CC} Positive Supply

(Power)

Connect to positive power supply (1.8–3.6 V). Filter with a 0.33-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 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 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

(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.

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 ZHX1403 family transceivers.

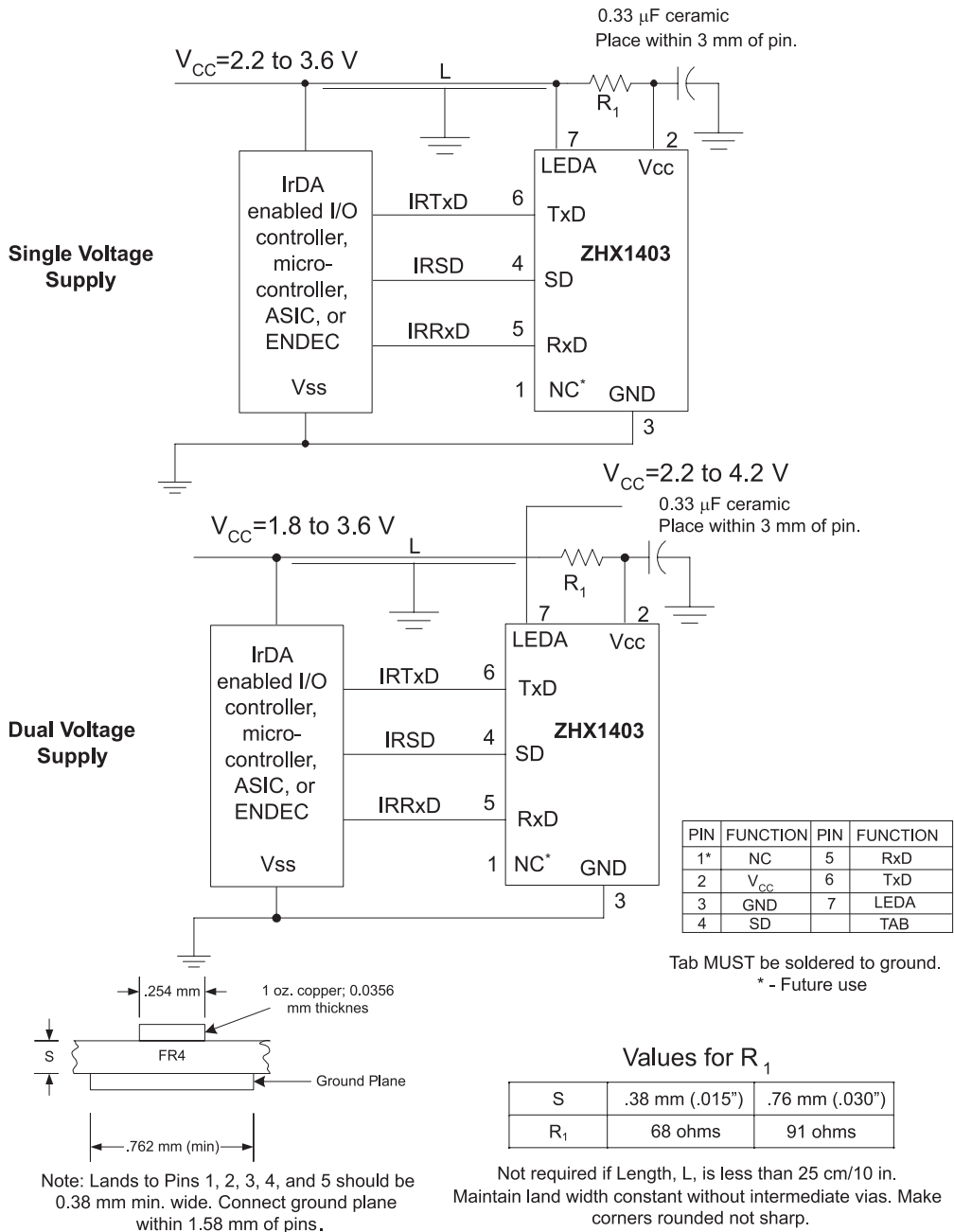


Figure 3. ZHX1403 Family Application Block Diagrams

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}	-0.5	3.6	V	V_{CC} , GND
Supply voltage	V_{LED}	-0.5	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
LED current (pulse)	I_{LED}		380	mA	20% duty cycle, $T_a=25^\circ\text{C}$, $t_{ON}\leq 90\ \mu\text{s}$
Storage temperature	T_{ST}	-40	100	$^\circ\text{C}$	
Solder temperature	T_{SOL}		240	$^\circ\text{C}$	

Table 3. Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Supply voltage	V_{CC}	1.8	3.6	V
Supply voltage, LEDA	V_{LED}	2.2	4.2	V
Ambient operating temperature	T_{OP}	-30	85	$^\circ\text{C}$

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}	$I_{OH}=20\ \mu\text{A}$	$V_{CC}-0.3$			V	RXD
Low-level output voltage	V_{OL}	$I_{OL}=-400\ \mu\text{A}$			0.3	V	RXD
Transmitter current	I_{LED}			260	320	mA	

Table 4. Electrical Characteristics (Continued)

Parameter	Symbol	Condition	Min	Typical	Max	Unit	Remarks
Listening current*	I_{CC}			6	10	μA	
Receive current	I_{CC}			100	125	μA	
Standby current	I_{STB}			0.1		μA	SD= V_{CC} , TXD=0 V
RXD pulse width	t_{PWA}	$SIR \leq 115.2$ Kbps	1.0		5	μs	Input pulse=1.6 μs ; rise/fall time<600 ns
RXD pulse width, alternate 3/16 th of pulse duration. See IrDA Physical Layer specs.	t_{PWA}	$9.6 \leq SIR \leq 115.2$ Kbps	1.2		90	μs	Input pulse=78 μs (3/16*(1/2400))
Power shutdown time	T_{SD}			1		μs	
Startup time	T_{STU}			200		μs	
Latency	T_{RRT}			150		μs	
Transmitter LED timeout			105	180	270	μs	Protects LED when TXD is left high
Rise/fall time	T_r, T_f	Cload=25 pF	10		40	ns	
Trans. radiant intensity	I_E	$I_{LED}=260$ mA	40		100	mW/sr	$\theta_h, \theta_v \leq (\pm 15^\circ)$
Minimum threshold irradiance	E_{emin}	$V_{CC}=3.3$ V		2.5	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	$\theta_h, \theta_v \leq (\pm 15^\circ)$
Angle of half intensity	θ			20		°	Hor. and vert.
Optical overshoot	t_{OPO}				25	%	
Peak wavelength	λ_p			870		nm	

Unless otherwise noted: $V_{CC}=3.3$ V, GND=0 V, TA=25 °C

* ZHX1403MA only

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

ZHX1403 Family Soldering and Cleaning Recommendations

Follow these recommendations to maintain the performance of the ZHX1403 family of transceivers.

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 ZHX1403 family transceivers, shown in Figure 6, is recommended.

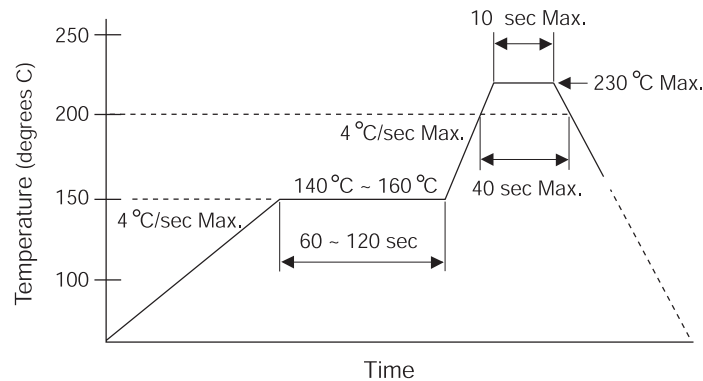


Figure 6. Temperature Profile for the Top Surface

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 the ZHX1403 family 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, ZHX1403 family 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.

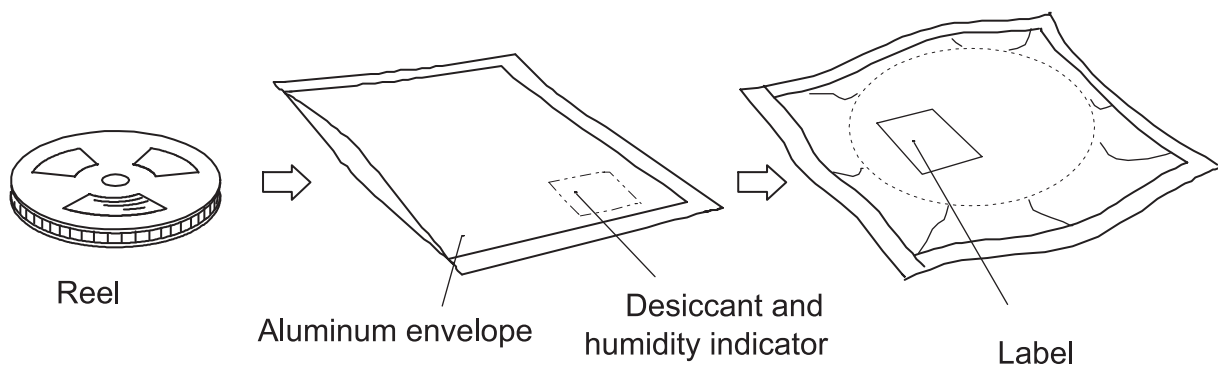


Figure 7. ZHX1403 Family Packaging

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 8 shows the mechanical specification for the ZHX1403 family of transceivers.



Note: The ZHX1403 family of transceivers will be marked as follows:

ZHX1403MA = Z1403A

ZHX1403MB = Z1403B

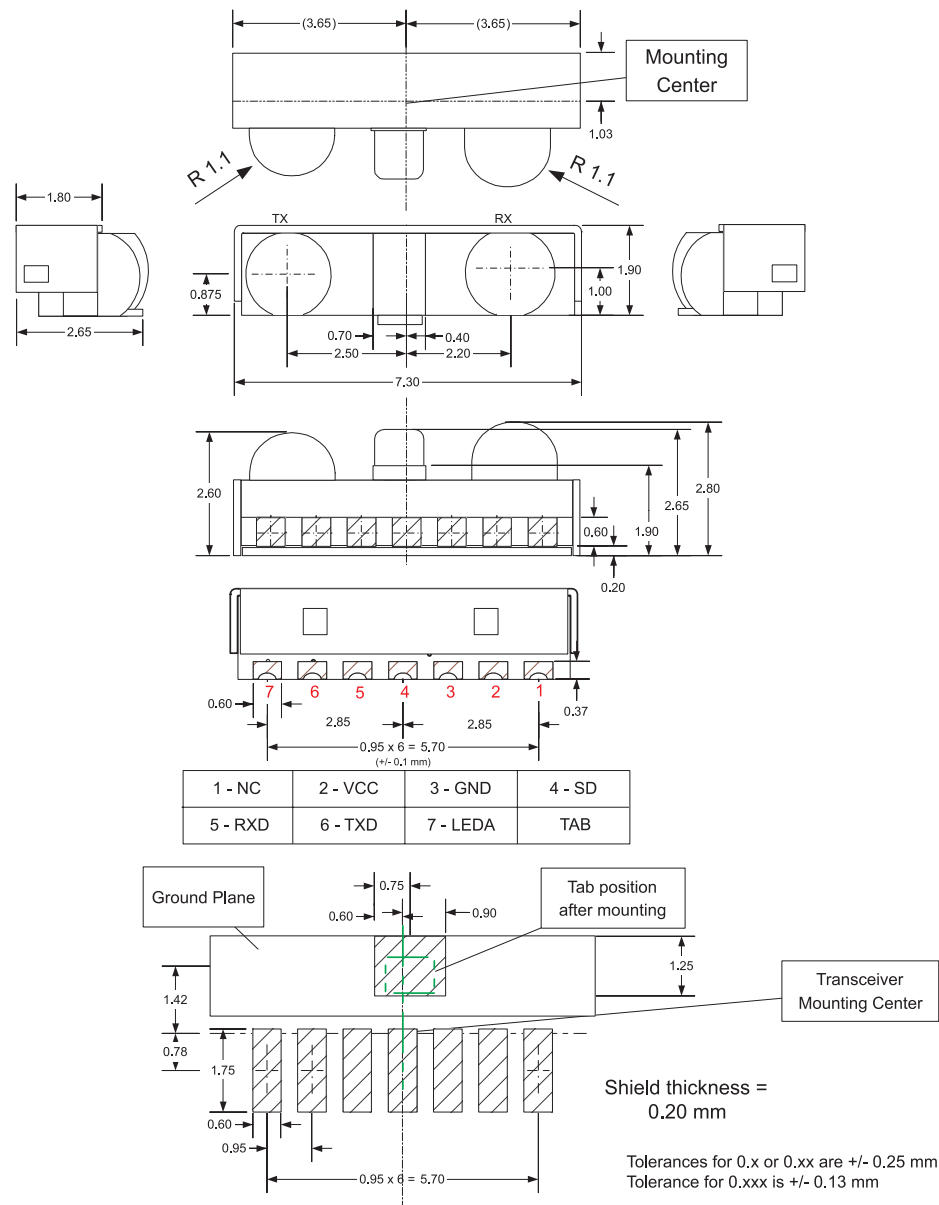


Figure 8. ZHX1403 Mechanical Specification



Ordering Information

Use the following information to order the ZHX1403 family of transceivers:

ZHX1403MA115THTR	with AlwaysOn Listen	3500 per reel
ZHX1403MB115THTR	without AlwaysOn Listen	3500 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
Email: tools@zillog.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.