

### Description

Silicon Laboratories' Si4432/31/30 highly-integrated, single chip wireless ISM transceiver is part of the EZRadioPRO™ family. The EZRadioPRO family includes a complete line of transmitters, receivers, and transceivers allowing the RF system designer to choose the optimal wireless part for their application.

The Si4432/31 offers advanced radio features, including continuous frequency coverage from 240–930 MHz and adjustable output power of up to +20 dBm with the Si4432. The Si4430 offers frequency coverage from 900 to 960 MHz to support the Japanese frequency bands. The Si4432/31/30's high level of integration offers reduced BOM cost while simplifying overall system design. The extremely low receive sensitivity (–118 dBm) coupled with the Si4432's industry-leading +20 dBm output power ensures extended range and improved link performance. Built-in antenna diversity and support for frequency hopping can be used to further extend range and enhance performance. Antenna diversity is completely integrated into the Si443x and can improve the system link budget by 8–10 dB, resulting in substantial range increases under adverse environmental conditions.

Additional system features, such as an automatic wake-up timer, low battery detector, 64 byte TX/RX FIFOs, automatic packet handling, and preamble detection, reduce overall current consumption and allow the use of lower-cost system MCUs. An integrated temperature sensor, general-purpose ADC, power-on-reset (POR), and GPIOs further reduce overall system cost and size.

The Si4432/31/30 receiver uses a single-conversion architecture to convert the 2-level FSK/GFSK/OOK modulated receive signal to a low IF frequency. Following a programmable gain amplifier (PGA) the signal is converted to the digital domain by a high-performance delta-sigma ADC allowing filtering, demodulation, slicing, error correction, and packet handling to be performed in the built-in DSP, increasing the receiver's performance and flexibility versus analog based architectures.

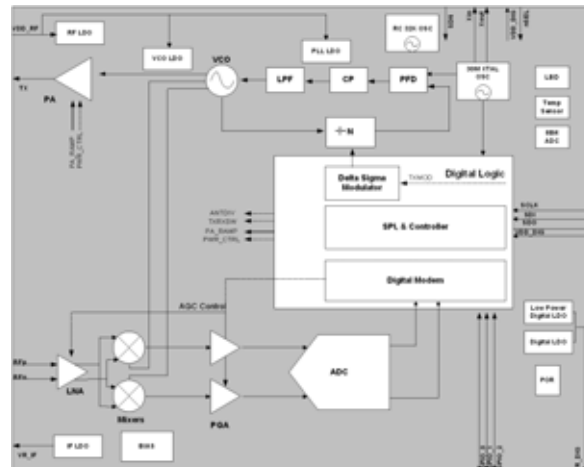
The PA is single-ended to allow for easy antenna matching and low BOM cost. The digital transmit modulation and automatic PA power ramping ensure precise transmit modulation and reduced spectral splatter, ensuring compliance with FCC and ETSI regulations. The Si4430 is designed to ensure compliance with ARIB regulations. The Si4432/31/30 is designed to work with an MCU, crystal, and a few passives to create a very low-cost system. Voltage regulators are integrated on-chip, which allows for a wide range of operating supply voltage conditions from +1.8 to +3.6 V.

### Features

- Frequency Range = 240–930 MHz (Si4432/31)  
900–960 MHz (Si4430)
- Sensitivity = –118 dBm
- FSK, GFSK, and OOK modulation
- Max Output Power = +20 dBm (Si4432)  
+13 dBm (Si4431/30)
- Low Power Consumption
  - 18.5 mA receive
  - 27 mA @ +11 dBm transmit
- Data Rate = 1 to 128 kbps
- Power Supply = 1.8 to 3.6 V
- Ultra low power shutdown mode
- Wake-up timer
- Auto-frequency calibration (AFC)
- Antenna diversity and TR switch control
- Programmable packet handler
- TX and RX 64 byte FIFOs
- Low battery detector
- Temperature sensor and 8-bit ADC
- Frequency hopping capability
- On-chip crystal tuning
- 20-Pin QFN package
- Low BOM

### Applications

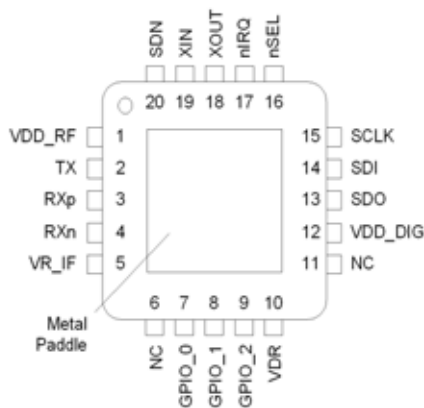
- Remote control
- Home security and alarm
- Telemetry
- Toy control
- Remote meter reading
- Remote keyless entry
- Home automation
- Industrial control
- Sensor networks
- Health monitors
- Tag readers



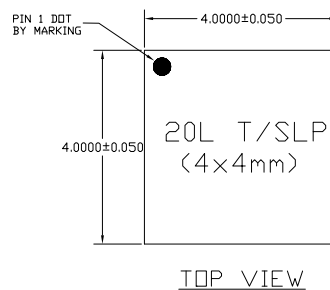
### Selected Electrical Specifications

| Parameter                               | Symbol                | Test Condition                                                             | Min | Typ    | Max | Unit |
|-----------------------------------------|-----------------------|----------------------------------------------------------------------------|-----|--------|-----|------|
| Supply Voltage Range                    | V <sub>DD</sub>       |                                                                            | 1.8 | 3.0    | 3.6 | V    |
| Power Saving Modes                      | I <sub>Shutdown</sub> | RC Oscillator, Main Digital Regulator, and Low Power Digital Regulator OFF | —   | 10     | —   | nA   |
|                                         | I <sub>Standby</sub>  | Register values retained, Main Digital Regulator and RC Oscillator OFF     | —   | 400    | —   | nA   |
|                                         | I <sub>Sleep</sub>    | RC Oscillator ON, Register values retained, Main Digital Regulator OFF     | —   | 800    | —   | nA   |
| RX Mode Current                         | I <sub>RX</sub>       |                                                                            | —   | 18.5   | —   | mA   |
| TX Mode Current (Si4432)                | I <sub>TX_+20</sub>   | txpow[2:0] = 011 (+20 dBm), VDD = 3.3 V                                    | —   | 80     | —   | mA   |
|                                         | I <sub>TX_+11</sub>   | txpow[2:0] = 000 (+11 dBm), VDD = 3.3 V                                    | —   | 27     | —   | mA   |
| TX Mode Current (Si4430/31)             | I <sub>TX_+13</sub>   | txpow[2:0] = 111 (+13 dBm), VDD = 3.3 V                                    | —   | 28     | —   | mA   |
|                                         | I <sub>TX_+1</sub>    | txpow[2:0] = 100 (+1 dBm), VDD = 3.3 V                                     | —   | 16     | —   | mA   |
| Synthesizer Frequency Range (Si4432/31) | F <sub>SYNTH-LB</sub> | Low Band                                                                   | 240 | —      | 480 | MHz  |
|                                         | F <sub>SYNTH-HB</sub> | High Band                                                                  | 480 | —      | 930 | MHz  |
| Synthesizer Frequency Range (Si4430)    | F <sub>SYNTH-HB</sub> | High Band                                                                  | 900 | —      | 960 | MHz  |
| Synthesizer Frequency Resolution        | F <sub>RES-LB</sub>   | Low Band                                                                   | —   | 156.25 | —   | Hz   |
|                                         | F <sub>RES-HB</sub>   | High Band                                                                  | —   | 312.5  | —   | Hz   |
| RX Sensitivity                          | P <sub>RX_2</sub>     | (BER < 0.1%)<br>(2 kbps, GFSK, BT = 0.5, Δf = ±5 kHz) <sup>2</sup>         | —   | -118   | —   | dBm  |
| RX Bandwidth                            | BW                    |                                                                            | 2.6 | —      | 620 | kHz  |
| Output Power Range (Si4432)             | P <sub>TX</sub>       | Power control by txpow[2:0] Register                                       | 11  | —      | 20  | dBm  |
| Output Power Range (Si4431/30)          | P <sub>TX</sub>       | Power control by txpow[2:0] Register                                       | -8  | —      | 13  | dBm  |
| TX RF Output Steps                      | ΔP <sub>RF_OUT</sub>  | Controlled by txpow[2:0] Register                                          | —   | 3      | —   | dB   |
| Operating Ambient Temperature Range     | T <sub>A</sub>        |                                                                            | -40 |        | 85  | °C   |

### Pin Assignments

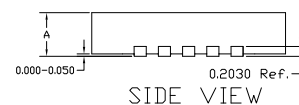
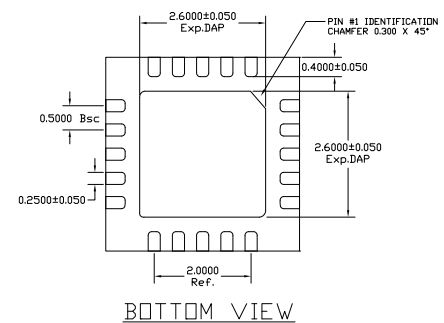


### 20-pin QFN Package Information



NOTE:  
1) TSLP and SLP SHARE THE SAME EXPOSE OUTLINE BUT WITH DIFFERENT THICKNESS:

|      | TSLP  | SLP   |
|------|-------|-------|
| MAX. | 0.800 | 0.900 |
| NOM. | 0.750 | 0.850 |
| MIN. | 0.700 | 0.800 |





Smart.  
Connected.  
Energy-Friendly



**Products**

[www.silabs.com/products](http://www.silabs.com/products)



**Quality**

[www.silabs.com/quality](http://www.silabs.com/quality)



**Support and Community**

[community.silabs.com](http://community.silabs.com)

#### Disclaimer

Silicon Laboratories intends to provide customers with the latest, accurate, and in-depth documentation of all peripherals and modules available for system and software implementers using or intending to use the Silicon Laboratories products. Characterization data, available modules and peripherals, memory sizes and memory addresses refer to each specific device, and "Typical" parameters provided can and do vary in different applications. Application examples described herein are for illustrative purposes only. Silicon Laboratories reserves the right to make changes without further notice and limitation to product information, specifications, and descriptions herein, and does not give warranties as to the accuracy or completeness of the included information. Silicon Laboratories shall have no liability for the consequences of use of the information supplied herein. This document does not imply or express copyright licenses granted hereunder to design or fabricate any integrated circuits. The products must not be used within any Life Support System without the specific written consent of Silicon Laboratories. A "Life Support System" is any product or system intended to support or sustain life and/or health, which, if it fails, can be reasonably expected to result in significant personal injury or death. Silicon Laboratories products are generally not intended for military applications. Silicon Laboratories products shall under no circumstances be used in weapons of mass destruction including (but not limited to) nuclear, biological or chemical weapons, or missiles capable of delivering such weapons.

#### Trademark Information

Silicon Laboratories Inc., Silicon Laboratories, Silicon Labs, SiLabs and the Silicon Labs logo, CMEMS®, EFM, EFM32, EFR, Energy Micro, Energy Micro logo and combinations thereof, "the world's most energy friendly microcontrollers", Ember®, EZLink®, EZMac®, EZRadio®, EZRadioPRO®, DSPLL®, ISOmodem®, Precision32®, ProSLIC®, SiPHY®, USBXpress® and others are trademarks or registered trademarks of Silicon Laboratories Inc. ARM, CORTEX, Cortex-M3 and THUMB are trademarks or registered trademarks of ARM Holdings. Keil is a registered trademark of ARM Limited. All other products or brand names mentioned herein are trademarks of their respective holders.



Silicon Laboratories Inc.  
400 West Cesar Chavez  
Austin, TX 78701  
USA

<http://www.silabs.com>