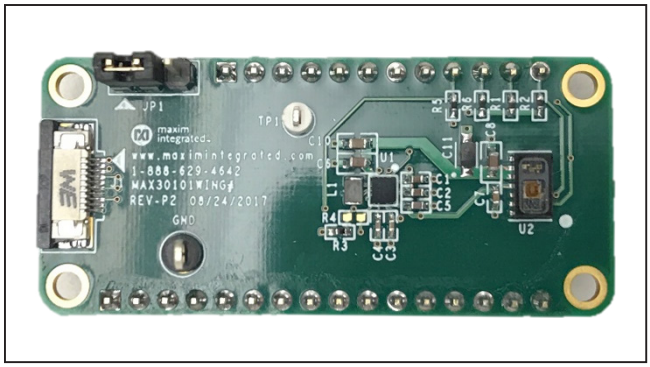
General Description

The MAX30101WING board is a rapid development board designed to quickly develop application firmware for the MAX30101 pulse oximetry sensor. The MAX30101WING contains the MAX14750A power management IC (PMIC) that supplies a +1.8V power rail (1V8) to the MAX30101 along with a programmable +2.5V to +5V rail (VLED) to drive the MAX30101 internal LEDs. The board is compatible with +1.8V and +3.3V logic (VIO), selectable through jumper JP1. The ZIF Flat Flexible Cable Connector allows integration of the MAX30205EVSYS, which features the MAX30205 silicon-based human body temperature sensor. The board seamlessly integrates with the MAX32630FTHR to enable rapid prototyping and development.

MAX30101WING Board



Ordering Information **appears at end of data sheet.**

Features

- Convenient Expansion Board
  - 0.9in x 2.0in DIP Form Factor
    - Breadboard Compatible
    - Feather Compatible
  - Integrated PMIC to Supply LED Drive Voltage
  - +1.8V and +3.3V Logic VIO Compatibility
  - ZIF Flat Flex Cable Connector
    - Compatible with the MAX30205EVSYS
- MAX30101 High-Sensitivity Pulse Oximeter and Heart-Rate Sensor Features
  - Noninvasive Reflective LED Solution
  - 5.6mm x 3.3mm x 1.55mm 14-Pin Optical Module
    - Integrated Cover Glass for Optimal, Robust Performance
  - Ultra-Low Power Operation for Mobile Devices
    - Programmable Sample Rate and LED Current for Power Savings
    - Low-Power Heart-Rate Monitor (< 1mW)
    - Ultra-Low Shutdown Current (0.7µA, typ)
  - Fast Data Output Capability
    - Sample Rates up to 3200sps
  - Robust Motion Artifact Resilience
  - -40˚C to +85˚C Operating Temperature Range
- MAX14750A PMIC Features
  - Micro-I_Q 250mW Buck-Boost Regulator
    - Supplies VLED to the MAX30101
    - Output Voltage Programmable from 2.5V to 5V
    - 1.1µA Quiescent Current
    - Programmable Current Limit
    - Input Voltage from 1.8V to 5.5V
  - Micro-I_Q 100mA LDO
    - Supplies 1V8 Rail for the MAX30101
    - Input Voltage From 1.71V to 5.5V
    - Output Programmable from 0.09V to 4.0V
    - 0.9µA Quiescent Current
    - Configurable as a Load Switch
    - Individual Enable Pins
    - I^2C Control Interface

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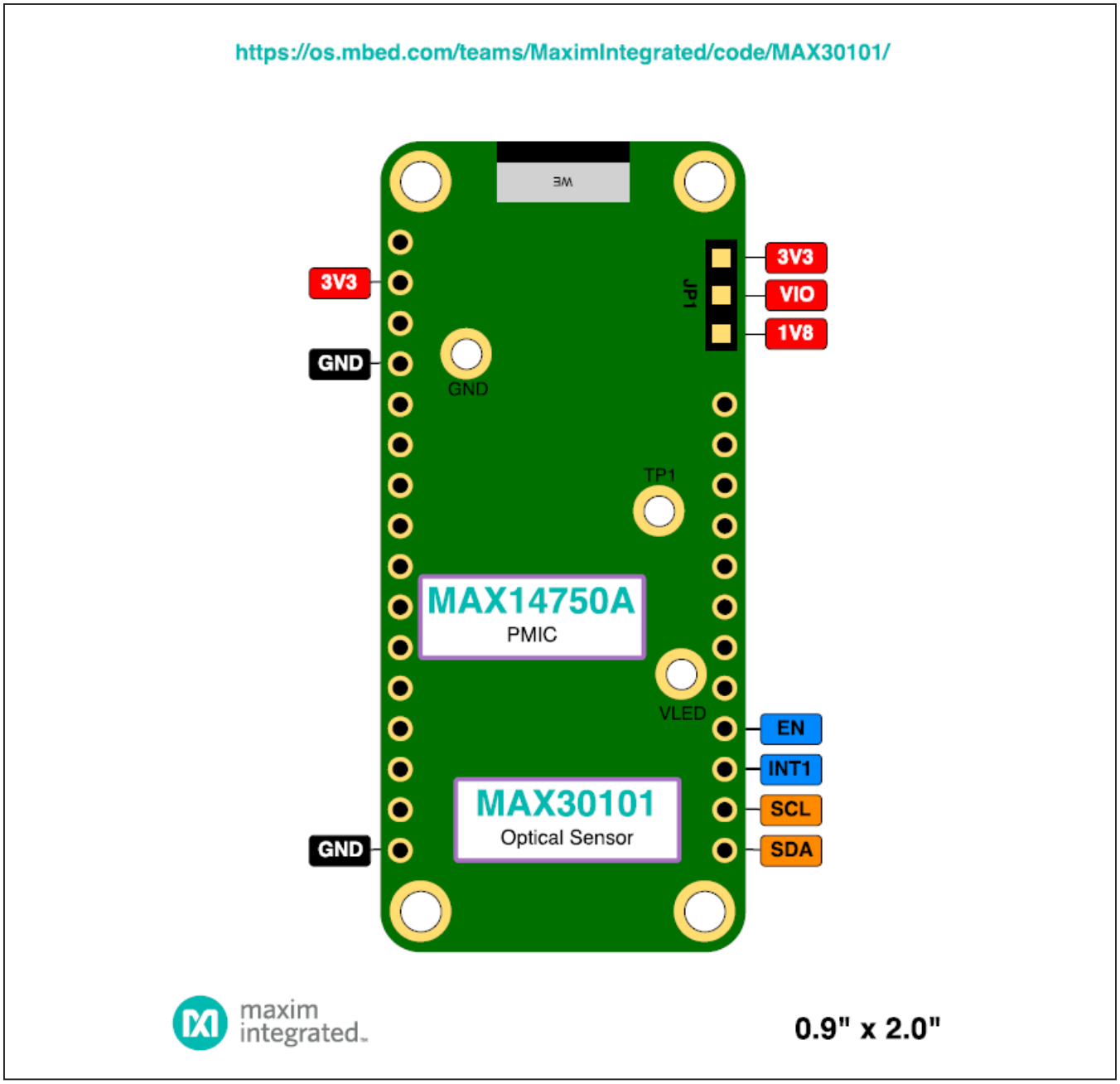


Figure 1. DIP Pinout

Detailed Description

The MAX30101WING is designed to enable engineers to rapidly prototype and test functionality of the MAX30101 optical sensor. The on-board MAX14750A PMIC sets the LED drive voltage of the optical sensor and is programmable through the I2C interface. The PMIC supplies the 1V8 rail that is used to power the optical sensor along with the communication lines when 1V8 logic is selected. Test point TP1 connects to the monitor multiplexer output of the MAX14750A that allows input and output voltage monitoring through software configuration. Jumper JP1 changes the logic level between 3V3 and 1V8. The ZIF Flat Flex Cable Connector provides a terminal to integrate the MAX30205EVSYS.

The dual inline pinout and form factor for this board is based on the Adafruit® feather series of boards. It is designed for implementation with the MAX32630FTHR and is intended to be compatible with many of the Adafruit peripheral wings, but is not guaranteed to work with all feathers/wings.

Firmware Development

The simplest way to develop firmware for the MAX30101WING board is through the Mbed™ development environment. On the Mbed website, users can import examples into their online IDE, then edit, compile, and load binaries into the board without installing any software. Go to **https://os.mbed.com/platforms/MAX32630FTHR/** to start programming with Mbed.

To support software development, an example library for the MAX30101 and the MAX30205 are found at the following links:

- **https://os.mbed.com/teams/MaximIntegrated/code/MAX30101/**
- **https://os.mbed.com/teams/MaximIntegrated/code/MAX30205/**

In addition, demo programs for the MAX30101WING and MAX30105EVSYS have been developed to expedite prototyping. Visit the links below for access to the source code. Refer to Application Note 6557: *How to Interface the MAX30101WING Pulse Oximeter with the MAX32630FTHR* and Application Note 6558: *How to Interface the MAX30205EVSYS with the MAX32630FTHR* for additional instructions on getting started.

- **https://os.mbed.com/teams/Maxim-Integrated/code/MAX30101WING_HR_SPO2/**
- **https://os.mbed.com/teams/Maxim-Integrated/code/MAX30205_Demo/**

Expansion Connectors

The MAX30101WING includes a ZIF Flat Flex Cable Connector to integrate the MAX30205EVSYS. The exposed metallic side of the ribbon cable should face down, blue side up, when inserted. Insert the ribbon cable into ZIF Flat Flex Cable Connector on the MAX30101WING and MAX30205EVSYS to integrate the MAX30205. See the *Firmware Development* section for links to development firmware for the MAX30205.

Table 1. DIP 16-Pin Header

PIN	PORT	DESCRIPTION
1, 3, 5–15	N.C.	Not Connected
2	+3V3	+3V3 Voltage Supply Rail
4, 16	GND	Ground

Table 2. DIP 12-Pin Header

PIN	PORT	DESCRIPTION
1–8	N.C.	Not Connected
9	EN	Active-High Enable for VLED Referenced to the Microcontroller's Logic
10	INT	Interrupt for the MAX30101 and MAX30205 Referenced to VIO
11	SCL	I2C SCL Reference to VIO
12	SDA	I2C SDA Referenced to VIO

Table 3. ZIF Flat Flex Cable Connector

PIN	PORT	DESCRIPTION
1	+3V3	+3V3 Voltage Supply Rail
2, 9	N.C.	Not Connected
3, 5, 7, 10	GND	Ground
4	SCL	I^2C SCL
6	SDA	I^2C SDA
8	INT	Interrupt for the MAX30101 and MAX30205

Table 4. Jumpers

PIN	PORT	DESCRIPTION
JP1	1-2*	Sets the logic level to +3V3
	2-3	Sets the logic level to +1V8
R3	Installed*	Connects +3V3 rail to LEN to enable the +1V8 rail
	Not installed	Permits user supplied logic for LEN
R4	Installed	Shorts HVEN and LEN together
	Not installed*	Disconnects HVEN from LEN

**Denotes default positions.*

Table 5. Test Point

PIN	DESCRIPTION
GND	Ground test point
VLED	LED drive voltage test point
TP1	Monitor multiplex output test point

Ordering Information

PART	TYPE
MAX30101WING#	Development Board

#Denotes RoHS compliant.

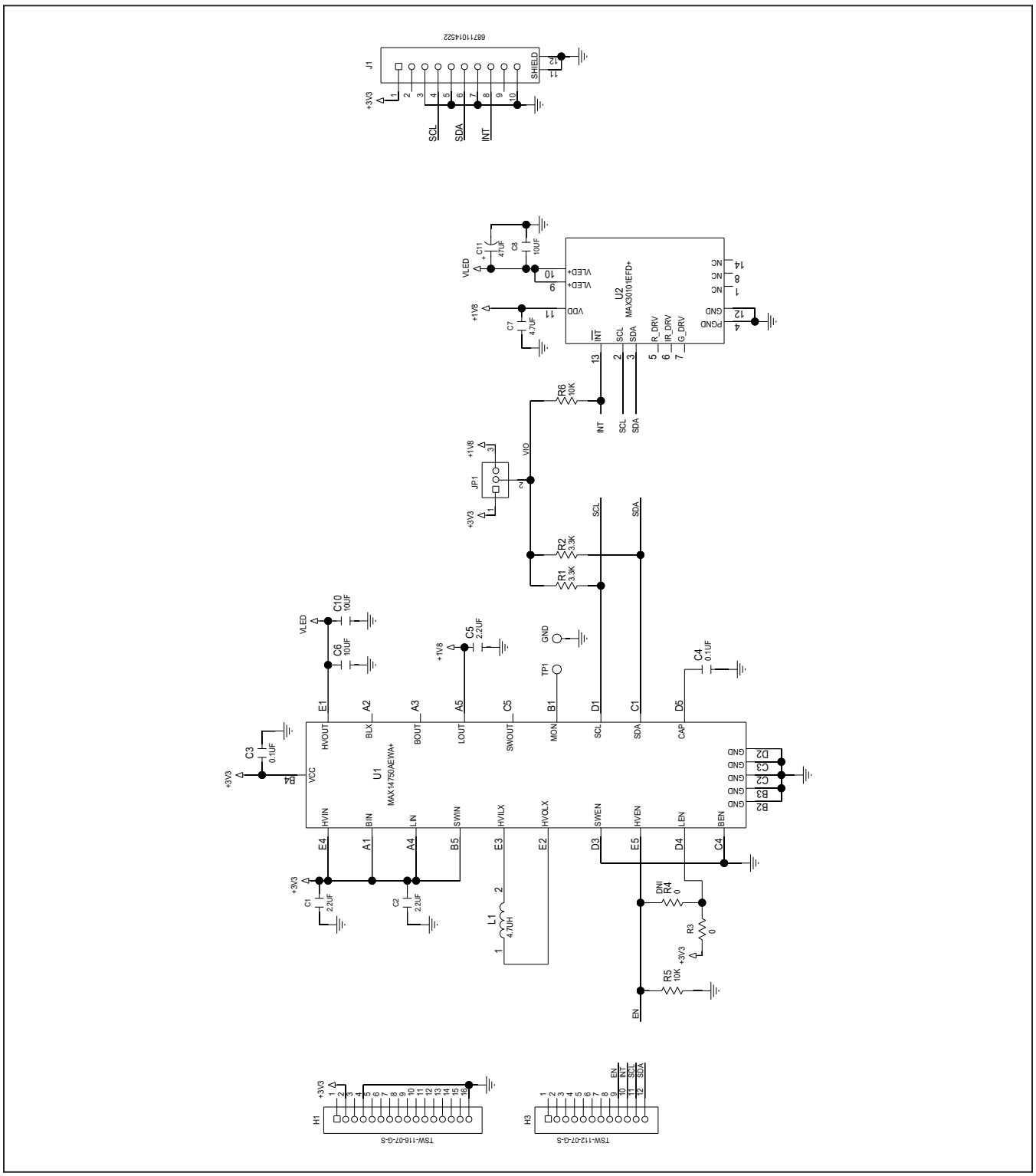
MAX30101WING EV Bill of Materials

ITEM	REF_DES	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
1	C1, C2, C5	3	GRM155R61C225KE44	MURATA	2.2UF	CAPACITOR; SMT (0402); CERAMIC CHIP; 2.2UF; 16V; TOL=10%; TG=-55 DEGC TO +85 DEGC; TC=X5R
2	C3, C4	2	GRM155R70J104KA01	MURATA	0.1UF	CAPACITOR; SMT (0402); CERAMIC CHIP; 0.1UF; 6.3V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R
3	C6, C8, C10	3	GRM188R61C106KAAL	MURATA	10UF	CAPACITOR; SMT (0603); CERAMIC CHIP; 10UF; 16V; TOL=10%; TG=-55 DEGC TO +85 DEGC; TC=X5R
4	C7	1	GRM155R61A475MEAA	MURATA	4.7UF	CAPACITOR; SMT (0402); CERAMIC CHIP; 4.7UF; 10V; TOL=20%; TG=-55 DEGC TO +85 DEGC; TC=X5R
5	C11	1	F380J476MSAAH1	AVX	47UF	CAPACITOR; SMT (0805); TANTALUM CHIP; 47UF; 6.3V; TOL=20%
6	GND	1	5011	KEYSTONE	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;
7	H1	1	TSW-116-07-G-S	SAMTEC	TSW-116-07-G-S	CONNECTOR; MALE; SMT; 0.25INCH SQ POST HEADER; STRAIGHT; 16PINS
8	H3	1	TSW-112-07-G-S	SAMTEC	TSW-112-07-G-S	CONNECTOR; MALE; THROUGH-HOLE .025INCH SQ POST HEADER; STRAIGHT; 12PINS

MAX30101WING EV Bill of Materials (continued)

ITEM	REF_DES	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
9	J1	1	6.87E+10	WURTH ELECTRONICS INC.	6.87E+10	CONNECTOR; FEMALE; SMT; 0.5MM ZIF HORIZONTAL BOTTOM CONTACT WR-FPC; RIGHT ANGLE; 10PINS
10	JP1	1	TSW-103-07-T-S	SAMTEC	TSW-103-07-T-S	CONNECTOR; THROUGH HOLE; TSW SERIES; SINGLE ROW; STRAIGHT; 3PINS
11	L1	1	VLS201610CX-4R7M	TDK	4.7UH	INDUCTOR; SMT (2016); FERRITE CORE; 4.7UH; TOL=+/-20%; 0.92A
12	R1, R2	2	ERJ2GEJ332	PANASONIC	3.3K	RESISTOR; 0402; 3.3K OHM; 5%; 200PPM; 0.10W; THICK FILM
13	R3	1	CRCW04020000Z0EDHP; RCS04020000Z0	VISHAY DRALORIC; VISHAY DALE	0	RESISTOR; 0402; 0 OHM; 0%; JUMPER; 0.2W; THICK FILM
14	R5, R6	2	ERJ-2RKF1002	PANASONIC	10K	RESISTOR; 0402; 10K OHM; 1%; 100PPM; 0.10W; THICK FILM
15	TP1	1	5002	KEYSTONE	N/A	TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; WHITE; PHOSPHOR BRONZE WIRE SILVER;
16	U1	1	MAX14750AEWA+	MAXIM	MAX14750AEWA+	IC; PWRM; POWER-MANAGEMENT SOLUTI0N; WLP25
17	U2	1	MAX30101EFD+	MAXIM	MAX30101EFD+	IC; SNSR; HIGH-SENSITIVITY PULSE OXIMETER AND HEART-RATE SENSOR IC FOR WEARABLE HEALTH; OLGA14 3.3X5.6
18	PCB	1	MAX	MAXIM	PCB	PCB:MAX

MAX30101WING EV Schematic



Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	3/18	Initial release	—