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Evaluates: MAX32625, MAX14750, MAX20336

MAX32625PICO2 Application Platform

General Description

The MAX32625PICO2 board is a rapid development platform designed to help engineers quickly implement designs with the MAX32625 Arm® Cortex®-M4 microcontroller with FPU. The board breaks out bootloader-specific serial interfaces through a 0.1in pitch, 2x7-pin header to allow easier connection to target boards. The board also includes the MAX14750 PMIC to provide all of the necessary voltages. A 10-pin Cortex debug connector allows usage as a DAPLink adapter. Additionally, on board are an RGB indicator LED and pushbutton. This provides a power-optimized flexible platform for quick proofs-of-concept and early software development to improve time to market.

The MAX32625PICO2 board ships with a customized DAPLink image loaded that provides the standard DAPLink features of the USB Mass Storage Device (MSD) drag-and-drop programming, USB Communications Device Class (CDC) virtual serial port, and Human Interface Device (HID) CMSIS-DAP interface. This allows the board to be connected to another target platform to enable debugging. Additionally, it acts as a USB-to-I2C/SPI/UART bridge to provide required interfaces with the target bootloaders. The microcontroller is also programmed with a bootloader, allowing the DAPLink image to be updated or replaced with your own application code.

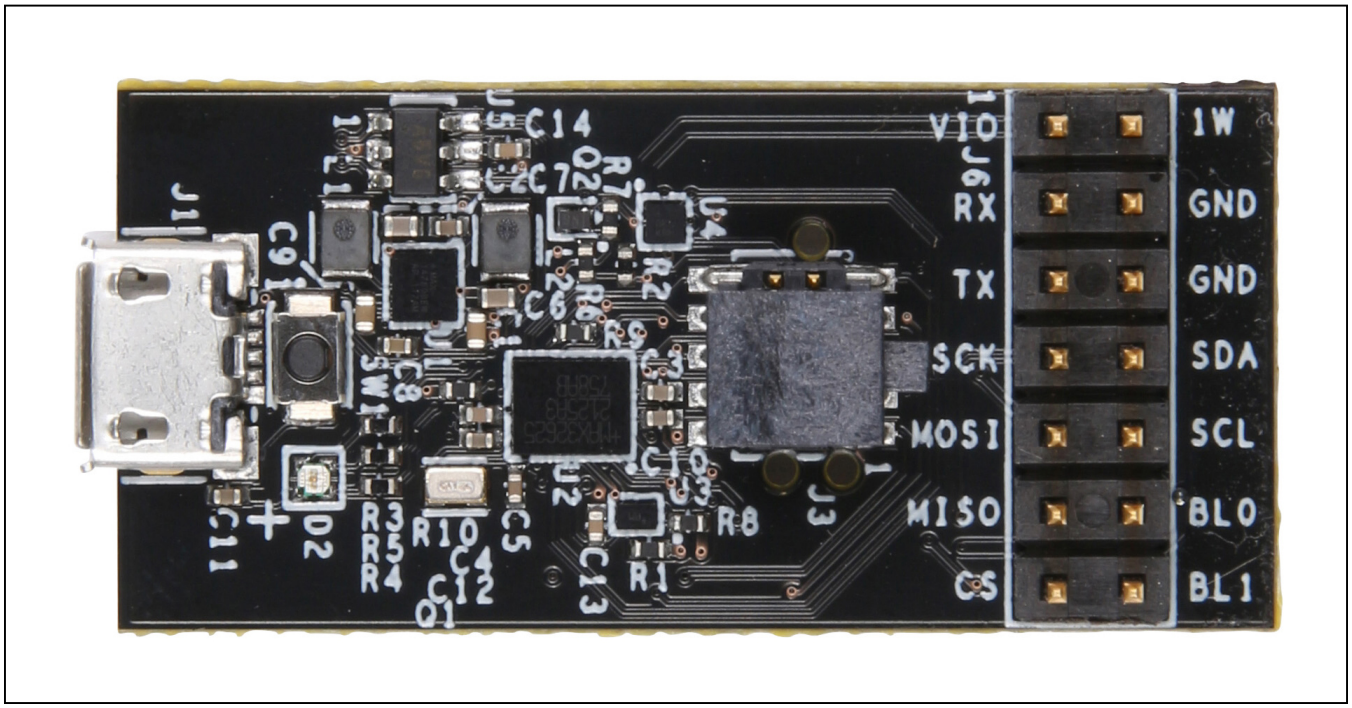
***Ordering Information* appears at end of data sheet.**

Benefits and Features

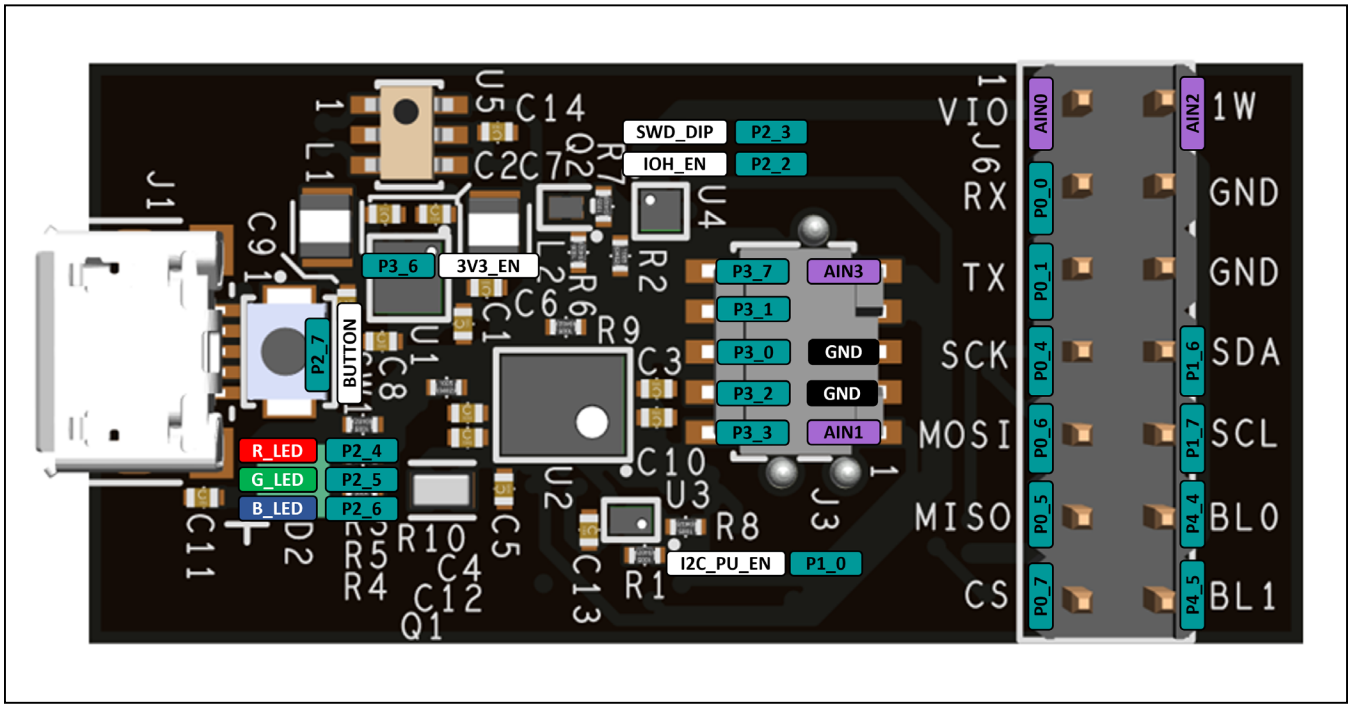
- Ultra-Compact Development Platform
  - Small Footprint (0.72in x 1.52in)
  - 3.3V and 1.8V Supplies
- MAX32625 Microcontroller Features
  - 96MHz Arm Cortex-M4 with FPU
  - 512KB Flash Memory
  - 160KB SRAM
  - 8KB Instruction Cache
  - Full-Speed USB 2.0
  - SPI, I2C, UART, 1-Wire® Master, 10-Bit ADC Peripherals
- MAX14750 PMIC
  - Micro-I_Q 3.3V Buck-Boost Regulator
  - Micro-I_Q 1.8V Buck Regulators
  - Micro-I_Q 1.2V Linear Regulators
  - High-Side Load Switch
  - Configurable through I2C
- Expansion Connections
  - 0.1in, 2x7-Pin Bootloader Specific Header
  - 10-Pin Arm Cortex Debug Header
  - Micro USB Connector
- Integrated Peripherals
  - RGB Indicator LED
  - User Pushbutton
- MAXDAP Programming Adapter
  - DAPLink over Cortex Debug Cable
  - Drag-and-Drop Programming
  - CMSIS-DAP SWD Debugger
  - USB Virtual UART
- Target Bootloader Interface
  - USB-to-I2C/SPI/UART/GPIO Bridge
  - Two GPIOs for Target Reset and MFIO Pins
  - Configuration and Programming Capability

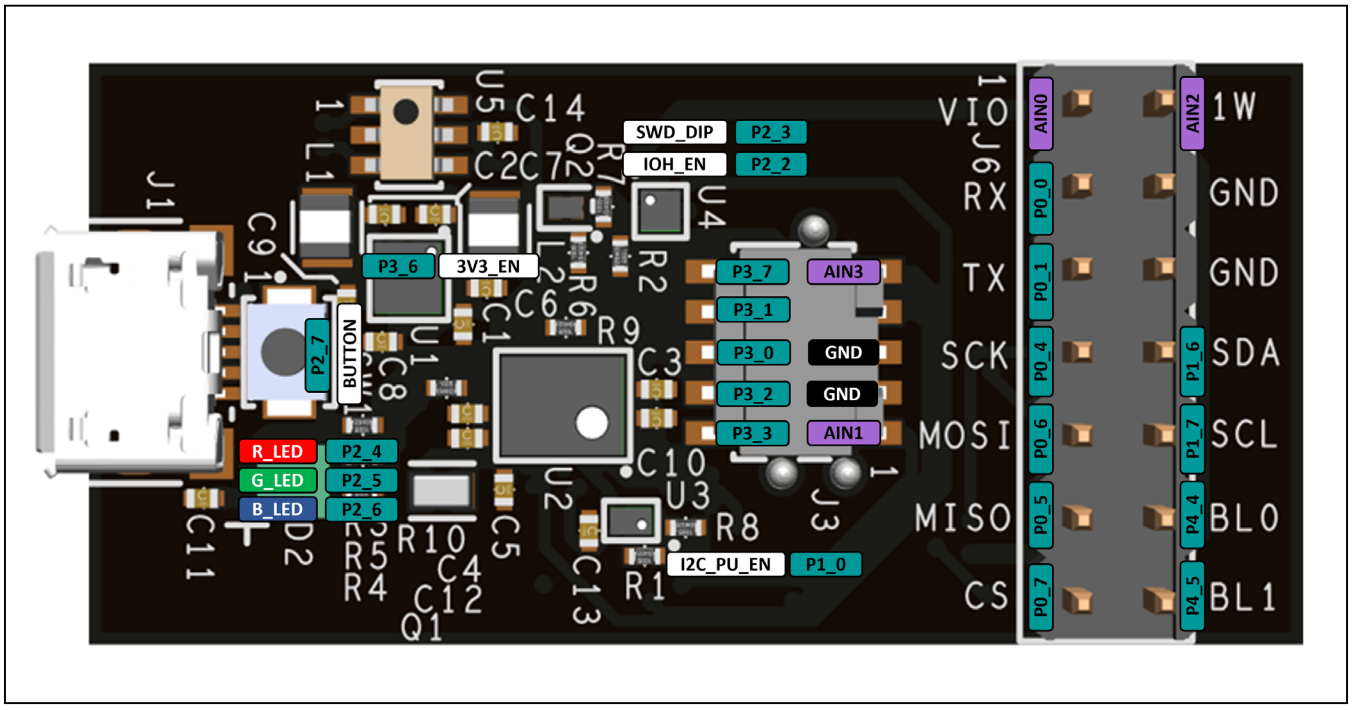
319-100904; Rev 0; 4/22

MAX32625PICO2 Board Photo



MAX32625PICO2 Board





Detailed Description

The MAX32625PICO2 board is a compact, rapid development platform. Its dense design packs many features into a tight, but accessible package. It includes everything needed to run the MAX32625 from a single USB cable and provides easy access to many of the peripherals on board. In addition to a 0.1in pitch, 14-pin dual-row header that breaks out the bootloader specific interfaces, it also includes a fine-pitch, 10-pin, dual-row header so that it can be cabled directly to another target with the standard 10-pin SWD header to act as a programming/debug adapter. The board also includes an analog switch to enable/disable the I^2C pull-up resistors using the microcontroller GPIO. The backside of the board has no components except for the surface pads for the SWD interface of the MAX32625. The resources available on the MAX32625PICO2 board allow for the addition of a USB interface to even the most space-constrained projects.

Power Architecture

The power architecture of the MAX32625PICO2 board is designed to be simple and flexible. The on-board MAX14750 PMIC provides 3.3V, 1.8V, and 1.2V for the MAX32625 from a single +5V supply that is provided through the USB connector.

The MAX32625 has dual-I/O supply rails, and all the general-purpose digital I/O ports can be set individually to use either rail. The primary VDDIO rail is supplied from the 1.8V supply, and the VDDIOH rail is connected to several analog switches so that the application can configure it to use the 3.3V supply, bootloader header (J6) pin 1, or SWD header (J3) pin 1. This allows the board to adapt its I/O voltage to a supply provided externally.

Loading and Debugging Applications

The MAX32625 is programmed at the factory with a bootloader and customized DAPLink application firmware loaded so that it can be used out of the box as programming/debug adapter for other boards. The included bootloader can be enabled by holding the pushbutton while powering on the board.

The customized version of the DAPLink firmware includes all of the standard DAPLink features, and it also provides the ability to interface with the target bootloaders easily. All of the signals needed for the bootloader interface are available at the header J6. The pinout of the header is provided in Table 2. The bootloader programmer protocol added inside the DAPLink firmware enables the board to work as a bridge for I^2C/SPI/UART interfaces and to drive the predefined GPIO pins. More information about the customized firmware and related tool can be found in the **Bootloader Tools User Guide**.

In addition to the preinstalled bootloader, the SWD signals are available at surface pads on the back side of the board, allowing the board to be programmed or debugged with the TC2050 series of cable adapters from Tag-Connect (such as the TC2050-IDC-NL-050-ALL).

Implementing DAPLink

The MAX32625 contains all of the resources needed to implement the DAPLink interface. All of the signals needed are available at the SWD header. A dedicated port is provided for the SWD, UART, and reset signals at each connector. The board provides the ability to feed the target I/O supply to the VDDIOH supply input, enabling support for any I/O voltage from 1.8V up to 3.6V. The VDDIOH connection is enabled and multiplexed through a MAX14689 DPDT analog switch so that the firmware can control when it is connected and which connector is selected.

Additionally, the 1-Wire master is multiplexed through the MAX14689 so that a 1-Wire serial EPROM can be used to identify the target through either connector. The connectivity allows implementation of the standard Cortex Debug Connector defined by Arm, as well as the additional features of the MAXDAP interface. The MAXDAP interface adds a UART and board identification capabilities to the same 10-pin Cortex SWD header while maintaining backward compatibility. The UART signals are located in place of the TDI/TDO signals, and board identification is performed through the GND detect pin. A list of the SWD connections is provided in Table 1.

Table 1. SWD Header (J3) DAPLink Signals

NUMBER	NAME	DESCRIPTION
1	VIO	Analog Input 1. Can also be enabled as VDDIOH input/output for target VCC.
2	P3_3	PORT 3 Pin 3, Target SWDIO
3	GND	Ground
4	P3_2	Port 3 Pin 2, Target SWDCLK
5	GND	Ground
6	P3_0	Port 3 Pin 0, UART2 Rx/Target Tx for Debug Console
7	NC	Key
8	P3_1	Port 3 Pin 0, UART2 Tx/Target Rx for Debug Console
9	P4_0	Analog Input 3. Can be enabled as a 1-Wire master for board ID/ground detect.
10	P3_7	Port 3 Pin 7, Target $\overline{\text{RESET}}$

Table 2. Bootloader Header (J6) Pinout

PIN	NAME	DESCRIPTION
1	AIN_0	Analog Input 0. Can also be enabled as VDDIOH I/O.
2	AIN_2	Analog Input 2. Can also be enabled as 1-Wire master (P4_0).
3	P0_0	Port 0 Pin 0, UART0 Rx
4	GND	Ground
5	P0_1	Port 0 Pin 1, UART0 Tx
6	GND	Ground
7	P0_4	Port 0 Pin 4, SPI Master 0 SCK
8	P1_6	Port 1 Pin 6, I^2C Master 0 SDA
9	P0_5	Port 0 Pin 5, SPI Master 0 MOSI
10	P1_7	Port 1 Pin 7, I^2C Master 0 SCL
11	P0_6	Port 0 Pin 5, SPI Master 0 MISO
12	P4_4	Port 4 Pin 4, GPIO
13	P0_7	Port 0 Pin 7, SPI Master 0 SS
14	P4_5	Port 4 Pin 5, GPIO

Table 3. VDDIOH/1-Wire Configuration

P3_6	P2_2	P2_3	BOOTLOADER (J6, PINS 1/2)	SWD (J3, PINS 1/9)	VDDIOH	DESCRIPTION
0	**0**	**X**	AIN0/AIN2	AIN1/AIN3	Off	No VDDIOH
0	**1**	**0**	VDDIOH/1W	AIN1/AIN3	External	VDDIOH from BL pin 1
0	**1**	**1**	AIN0/AIN2	VDDIOH/1W	External	VDDIOH from SWD pin 1
1	**0**	**X**	AIN0/AIN2	AIN1/AIN3	+3.3V	Onboard +3.3V
1	**1**	**0**	+3.3V/1W	AIN1/AIN3	+3.3V	+3.3V out DIP pin 1
1	**1**	**1**	AIN0/AIN2	+3.3V/1W	+3.3V	+3.3V out SWD pin 1

Table 4. SWD Surface Pads (J5-DNI) Pinout

PIN	NAME	DESCRIPTION
1	1V8	1.8V I/O Voltage
2	SWD	Serial Wire Debug I/O
3	GND	Ground
4	SWC	Serial Wire Debug Clock
5	N.C.	—
6	DBG_TX	Port 2 Pin 1, UART1 Tx
7	N.C.	—
8	DBG_RX	Port 2 Pin 0, UART1 Rx
9	N.C.	—
10	SRSTN	Software Reset, Active-Low I/O

Table 5. On-Board Resources

PORT	NAME	DESCRIPTION
P1_0	I2C_PU_EN	I^2C Pull-Up Enable
P2_0	DBG_RX	Debug Console Rx
P2_1	DBG_TX	Debug Console Tx
P2_2	IOH_1W_EN	IOH/1-Wire Mux Enable
P2_3	SWD_BL_SEL	Selects IOH/1-Wire between the SWD header (0) or BL header (1).
P2_4	LED1	Red LED
P2_5	LED2	Green LED
P2_6	LED3	Blue LED
P2_7	BUTTON	Button Input. Requires internal pullup to be enabled.
P3_6	3V3_IOH_EN	Enables power switch connecting +3.3V supply to VDDIOH. Enables +3.3V I/O option and turns IOH into a +3.3V output if mux is enabled (IOH_1W_EN = 1).
P4_0	OWM_IO	1-Wire Master I/O
P4_1	OWM_PUPEN	1-Wire Master Pullup Enable

Ordering Information

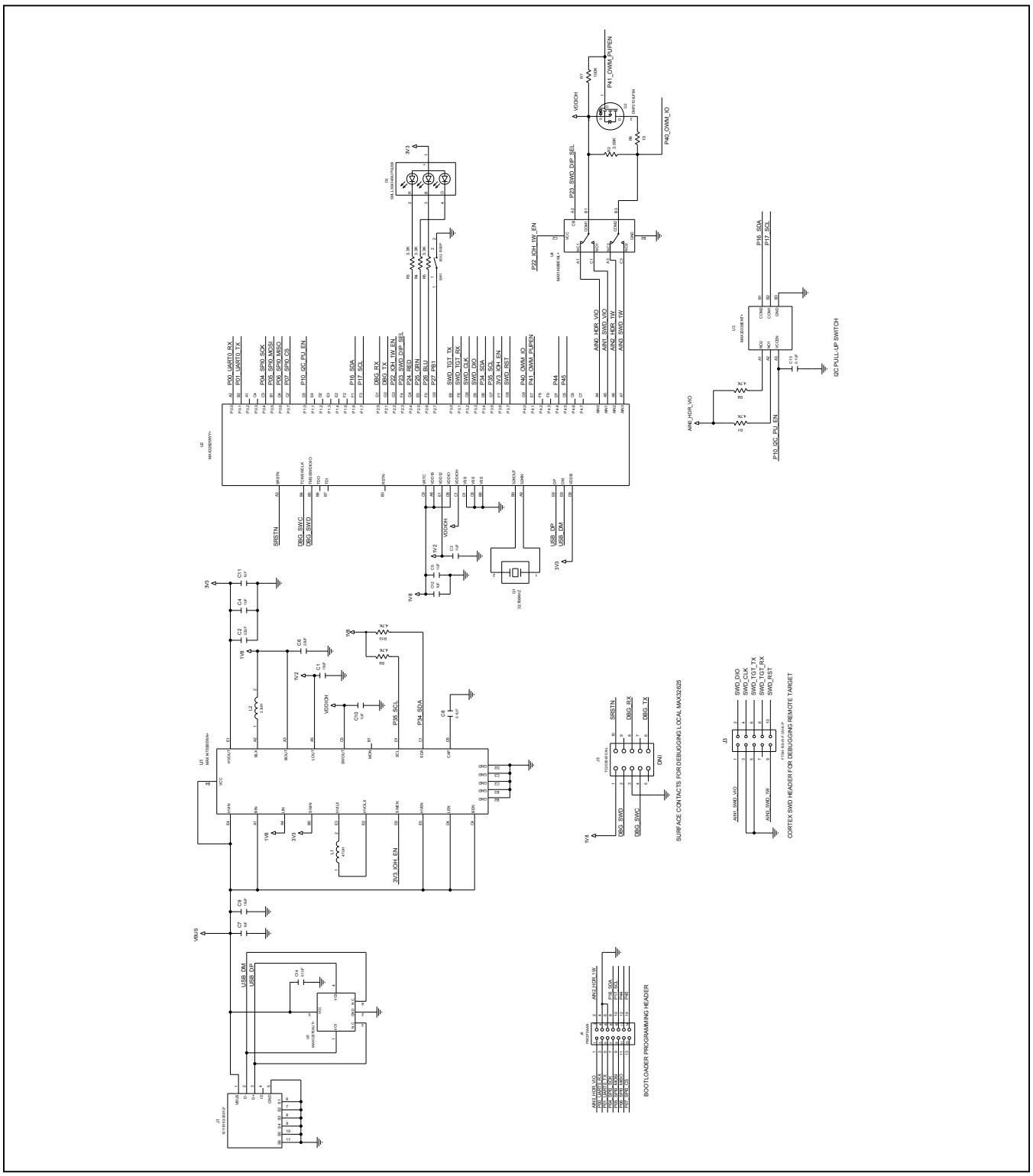
PART	TYPE
MAX32625PICO2#	Adapter Platform

#Denotes RoHS compliant.

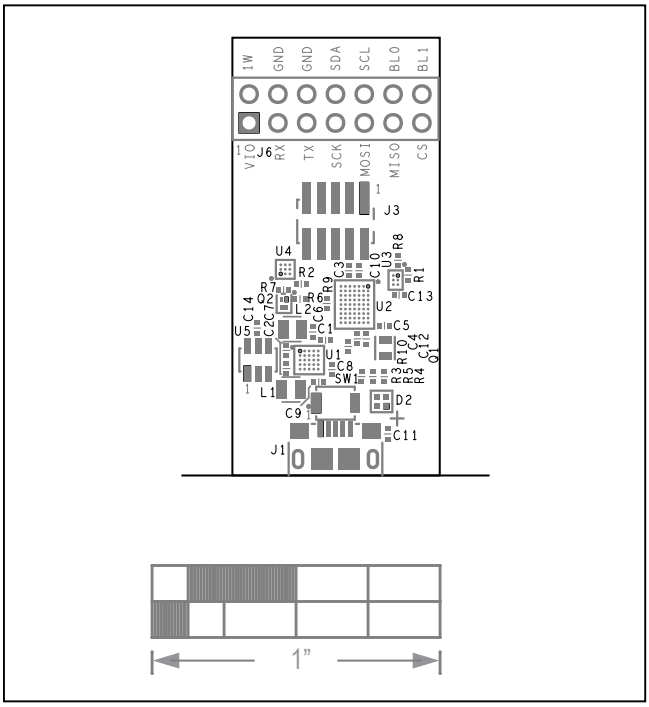
MAX32625PICO2 Bill of Materials

QTY	SCHEMATIC REFERENCE	DESCRIPTION	MANUFACTURER	MPN
2	C1, C9	Capacitors, 0402, X5R, 10V, 10µF	Samsung	CL05A106MP5NUNC
2	C2, C6	Capacitors, 0402, X5R, 6.3V, 22µF	AVX	04026D226MAT2A
7	C3, C4, C5, C7, C10, C11, C12	Capacitors, 0402, X5R, 6.3V, 1µF	Murata	GRM155R61A105K
1	C8, C13, C14	Capacitors, 0402, X5R, 10V, 0.1µF	TDK	C1005X5R1A104K050BA
1	D2	RGB LED, common anode	Lumex	SML-LX0404SIUPGUSB
1	J1	CONN USB MICRO B RECPT SMT R/A	FCI	10118193-0001LF
1	J3	Cortex debug connector	Samtec	FTSH-105-01-F-DV-K- P-TR
1	J6	Connector, 0.1”, 14-pin, dual row, through hole	Sullins	PBC07DAAN
1	L1	Inductor, 2016, 4.7µH	TDK	VLS201612CX-4R7M-1
1	L2	Inductor, 2016, 2.2µH	TDK	VLS201612CX-2R2M
1	Q1	32.768kHz crystal	ECS International	ECS-.327-6-12-TR
1	Q2	MOSFET, P-CH, DFN1006, 0.5Ω	Diodes Inc.	DMP21D0UFB4-7B
4	R1, R8, R9, R10	Resistors, thick film, 0402, 0.063W, 1%, 4.7kΩ	Vishay	CRCW04024K70FK
2	R2	Resistors, thick film, 0402, 0.063W, 1%, 3.09kΩ	Vishay	CRCW04023K09FK
3	R3, R4, R5	Resistors, thick film, 0402, 0.063W, 1%, 3.3kΩ	Vishay	CRCW04023K30FK
1	R6	Resistor, thick film, 0402, 0.063W, 1%, 10Ω	YAGEO	9C04021A10R0FL
1	R7	Resistor, thick film, 0402, 0.063W, 1%, 100kΩ	YAGEO	CRCW0402100KFK
1	SW1	SWITCH TACTILE SPST-NO 0.05A 12V	OMRON	B3U-1000P
1	U1	PMIC, MAX14750B	Analog Devices	MAX14750BEWA+
1	U2	Arm Cortex-M4 microcontroller with FPU, MAX32625	Analog Devices	MAX32625IWY+
1	U3	Analog switch, DPST	Analog Devices	MAX20336ENT+
1	U4	Analog switch, DPDT	Analog Devices	MAX14689EWL+T
1	U5	ESD-protection IC	Analog Devices	MAX3207EAUT+

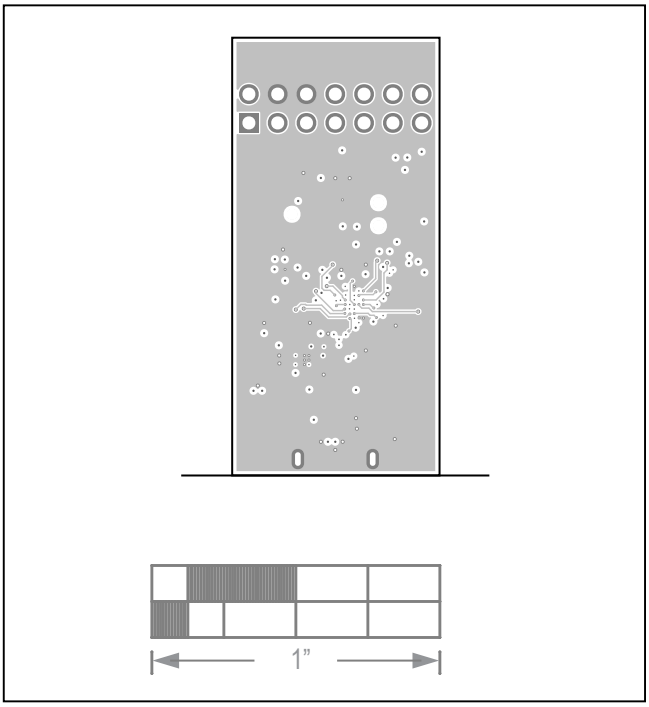
MAX32625PICO2 Schematic Diagram



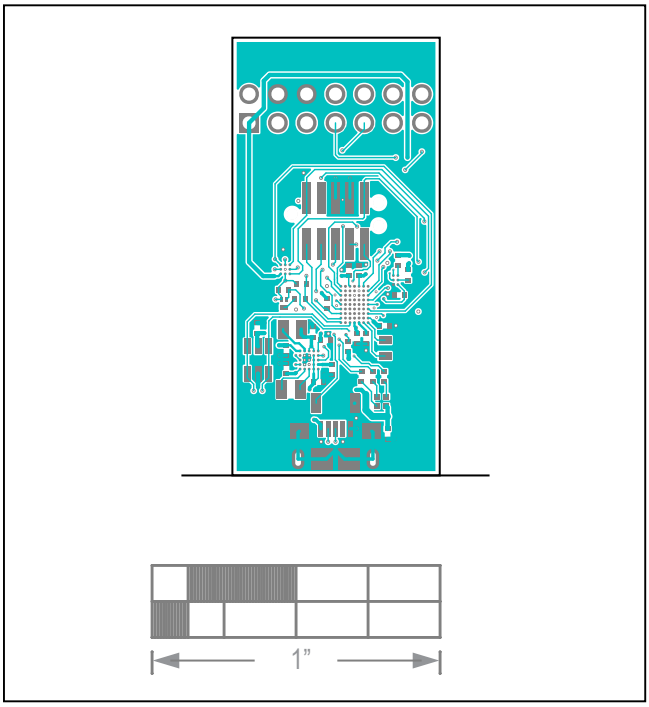
MAX32625PICO2 PCB Layout Diagrams



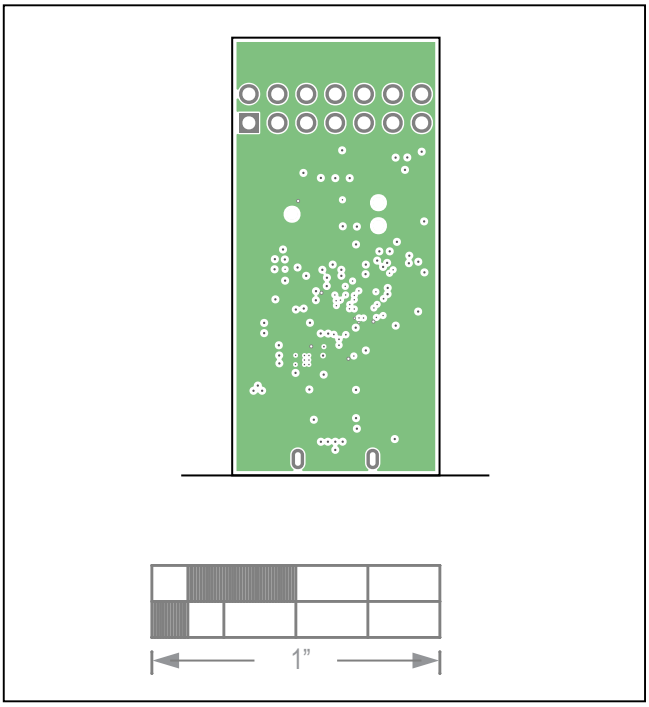
MAX32625PICO2 EV—Silk Top



MAX32625PICO2 EV—L2_GND

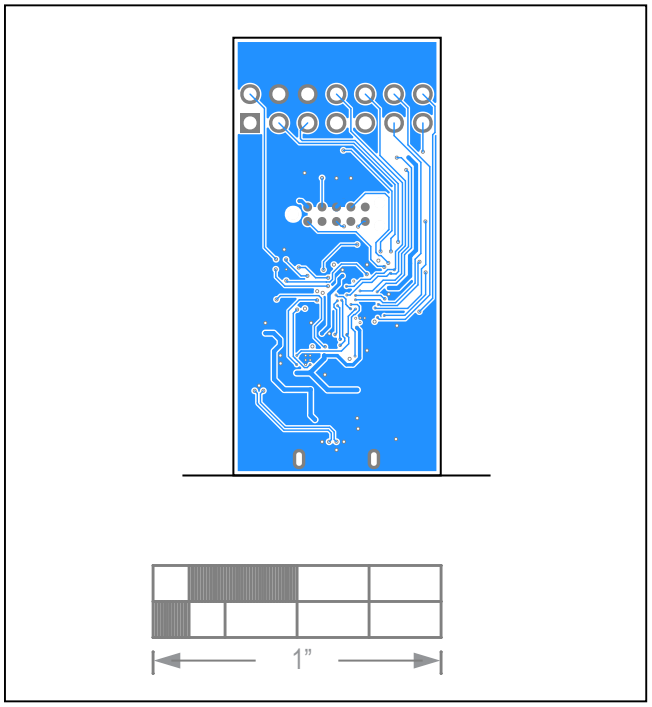


MAX32625PICO2 EV—Top

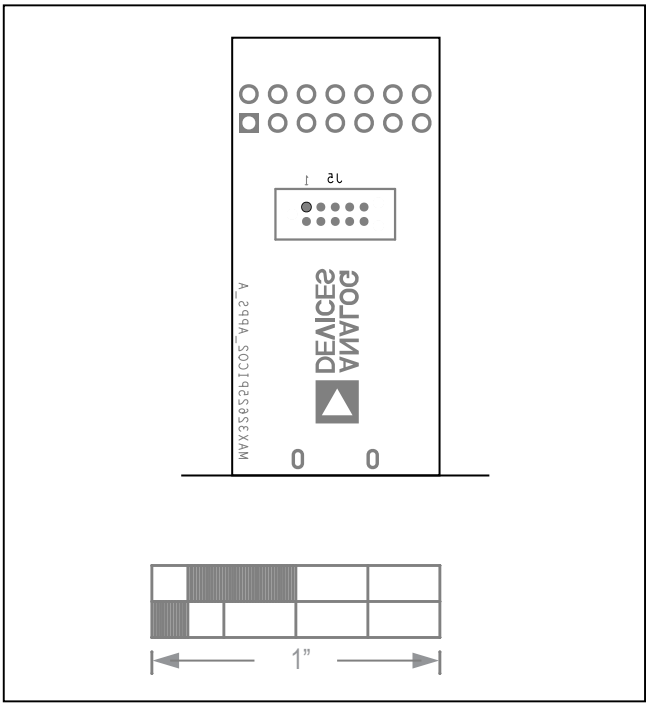


MAX32625PICO2 EV—L3_POWER

MAX32625PICO2 PCB Layout Diagrams (continued)



MAX32625PICO2 EV—Bottom



MAX32625PICO2 EV—Silk Bottom

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	4/22	Initial release	—