

MAX3232PMB1 Peripheral Module

General Description

The MAX3232PMB1 peripheral module provides the necessary hardware to interface the MAX3232E true RS-232 transceiver to any system that utilizes Pmod™-compatible expansion ports configurable for UART communication. The IC has two receivers and two transmitters that are used to implement RS-232 data transmit and receive channels along with optional CTS and RTS handshaking. The RS-232 side input and output levels are true RS-232, achieved by incorporation of a dual internal charge pump.

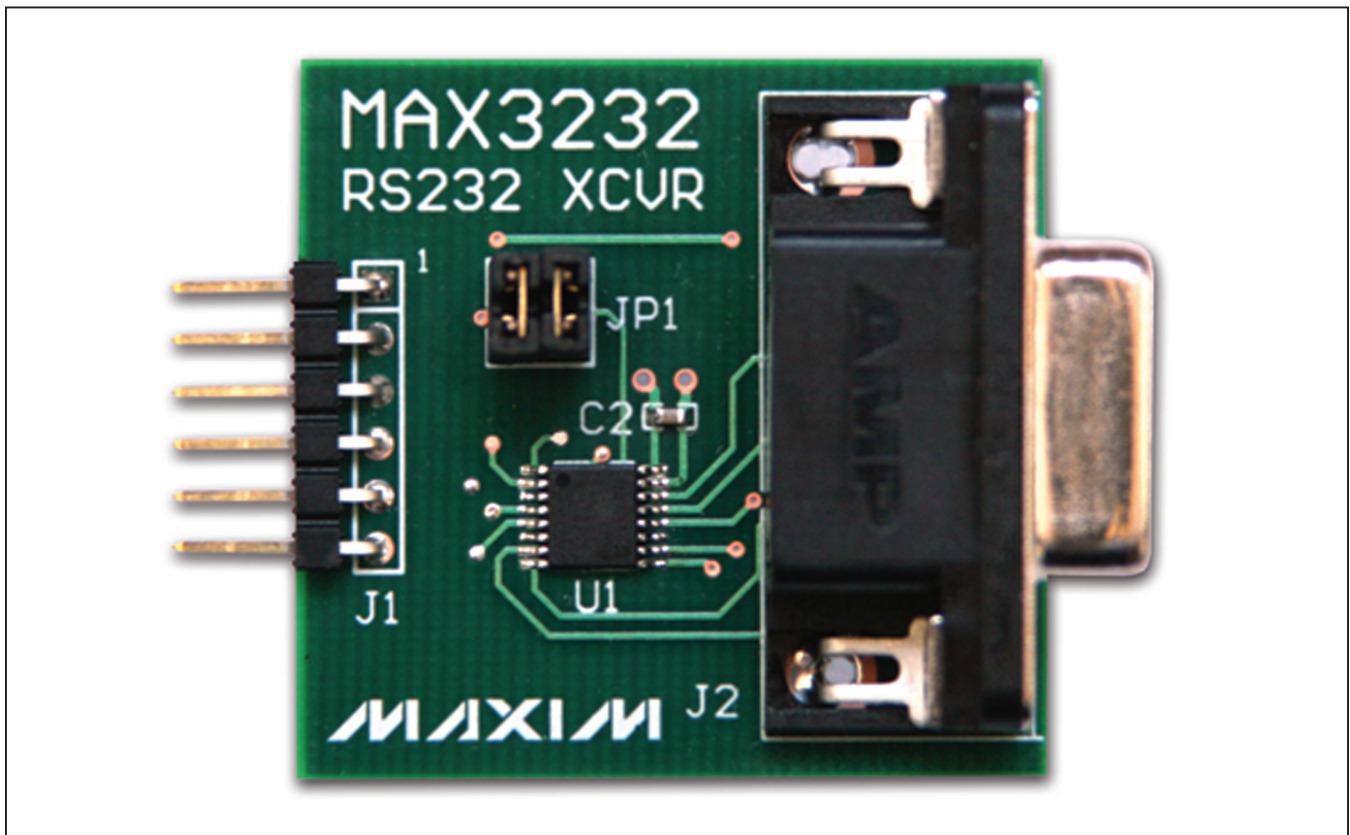
Refer to the MAX3232E IC data sheet for detailed information regarding operation of the IC.

Features

- ◆ Transmitter Output and Receiver Inputs Protected to $\pm 15\text{kV}$
- ◆ Implements RS-232 DCE
- ◆ True RS-232 Levels from Single 3.3V Supply
- ◆ 6-Pin Pmod-Compatible Connector (Pmod Interface Type 4 UART)
- ◆ RoHS Compliant
- ◆ Proven PCB Layout
- ◆ Fully Assembled and Tested

[Ordering Information](#) appears at end of data sheet.

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Component List

DESIGNATION	QTY	DESCRIPTION
C1	1	2.2 μ F \pm 10%, 10V X5R ceramic capacitor (0603) TDK C1608X5R1A225K/0.80
C2–C6	5	0.1 μ F \pm 10%, 16V X7R ceramic capacitors (0603) Murata GRM188R71C104KA01D
J1	1	6-pin right-angle male header
J2	1	Right-angle DB9 female connector

DESIGNATION	QTY	DESCRIPTION
JP1	1	4-pin (2 x 2) straight male header
R1–R4	4	150 Ω \pm 5% resistors (0603)
U1	1	3.0V to 5.5V RS-232 transceiver (16 TSSOP) Maxim MAX3232EEUE+
—	2	Shorting jumper
—	1	PCB: EPCB3232PM1

Component Suppliers

SUPPLIER	PHONE	WEBSITE
Murata Electronics North America, Inc.	770-436-1300	www.murata-northamerica.com
TDK Corp.	847-803-6100	www.component.tdk.com

Note: Indicate that you are using the MAX3232PMB1 when contacting these component suppliers.

Detailed Description

UART Interface

The MAX3232PMB1 peripheral module can interface to the host by plugging directly into a Pmod-compatible port (configured for UART) through connector J1.

J1 provides connection of the module to the Pmod host. The pin functions and pin assignments adhere to the Pmod UART Type 4 standard recommended by Digilent. See Table 1.

This J2 connector is meant to interface to a data terminal (DTE) through a standard RS-232 cable or a DCE device through a null-modem RS-232 cable. See Table 2.

Jumper JP1 (CTS/RTS)

This jumper port allows CTS and RTS to be passed through, looped back, or disconnected from the local and remote system. In most applications, these jumpers should be set in pass-through mode with pins 1-2 and 3-4 shorted.

Table 1. Connector J1 (UART Communication)

PIN	SIGNAL	DESCRIPTION
1	CTS-H	Clear to send. This pin carries the clear-to-send signal from the connected DTE to the Pmod system.
2	TXD-H	Host transmit. This pin carries the transmit data from the Pmod system UART transmitter to a connected DTE receiver.
3	RXD-H	Host receive. This pin carries the receive data from the connected DTE transmitter to the Pmod system's UART receiver.
4	RTS-H	Ready to send. This pin carries the ready to send signal from the Pmod system to a connected DTE.
5	GND	Ground
6	VCC	Power supply

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Table 2. Connector J2 (Female DB9)

PIN	SIGNAL	DESCRIPTION
1	DCD	Carrier detect. Carrier detect is shorted to pins 1, 4, and 6.
2	TXD	RS-232 transmit from Pmod system to the DTE
3	RXD	RS-232 receive from the DTE to the Pmod system
4	DTR	Data terminal ready. Shorted to pins 1, 4, and 6.
5	GND	RS-232 signal and shield ground
6	DSR	Data set ready. Shorted to pins 1, 4, and 6.
7	CTS	Clear to send. CTS from DTE to the Pmod system.
8	RTS	Ready to send. RTS from Pmod system to the DTE.
9	RI	Ring indicator. Not connected.

Software and FPGA Code

Example software and drivers are available that execute directly without modification on several FPGA development boards that support an integrated or synthesized microprocessor. These boards include the Digilent Nexys 3, Avnet LX9, and Avnet ZEDBoard, although other platforms can be added over time. Maxim provides complete Xilinx ISE projects containing HDL, Platform Studio, and SDK Projects. In addition, a synthesized bit stream, ready for FPGA download, is provided for the demonstration application.

The software project (for the SDK) contains several source files intended to accelerate customer evaluation and design. These include a base application (`maximModules.c`) that demonstrates module functionality and uses an API interface (`maximDeviceSpecificUtilities.c`) to set and access Maxim device functions within a specific module.

The source code is written in standard ANSI C format, and all API documentation including theory/operation, register description, and function prototypes are documented in the API interface file (`maximDeviceSpecificUtilities.h & .c`).

The complete software kit is available for download at www.maxim-ic.com. Quick start instructions are also available as a separate document.

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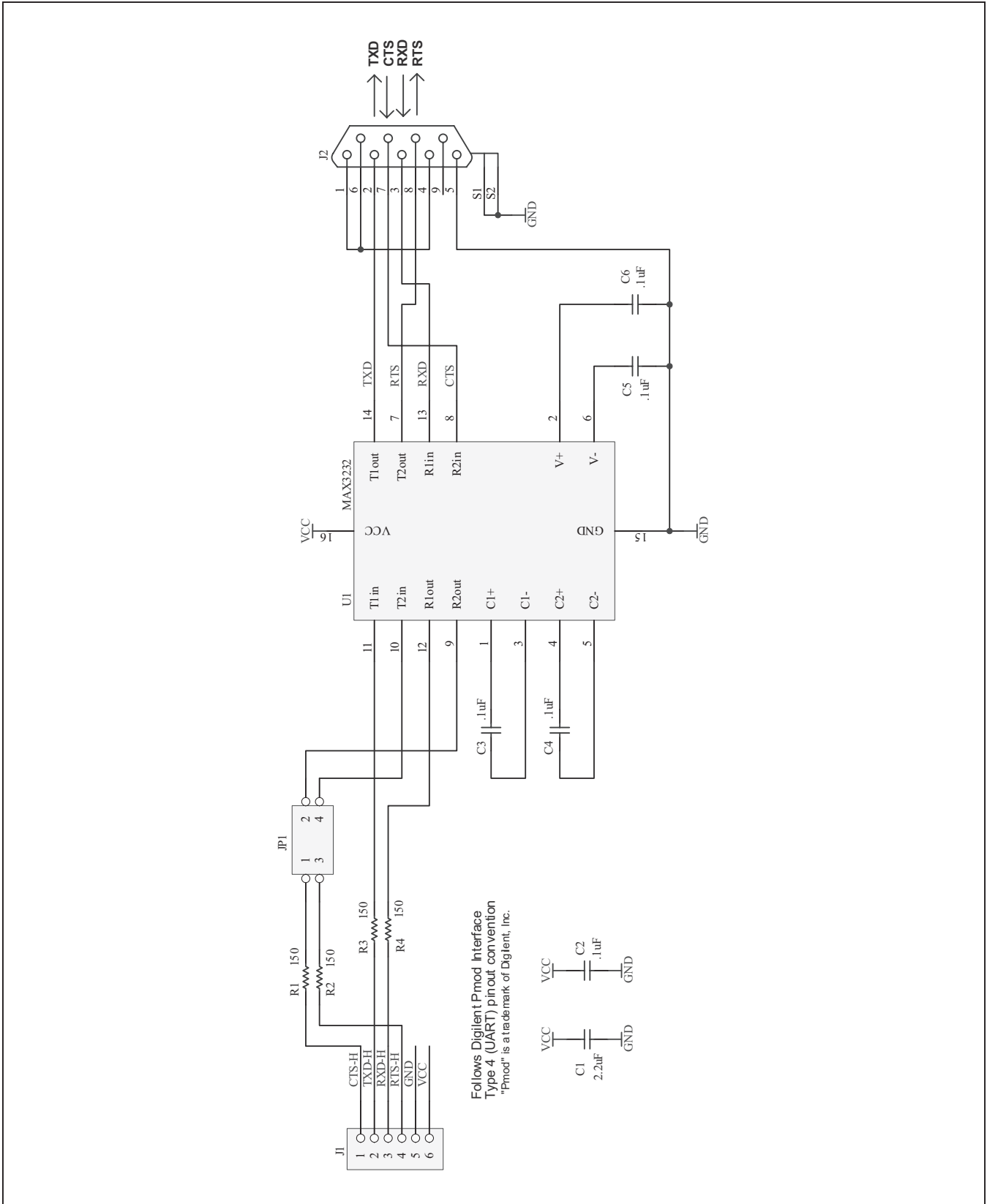


Figure 1. MAX3232PMB1 Peripheral Module Schematic

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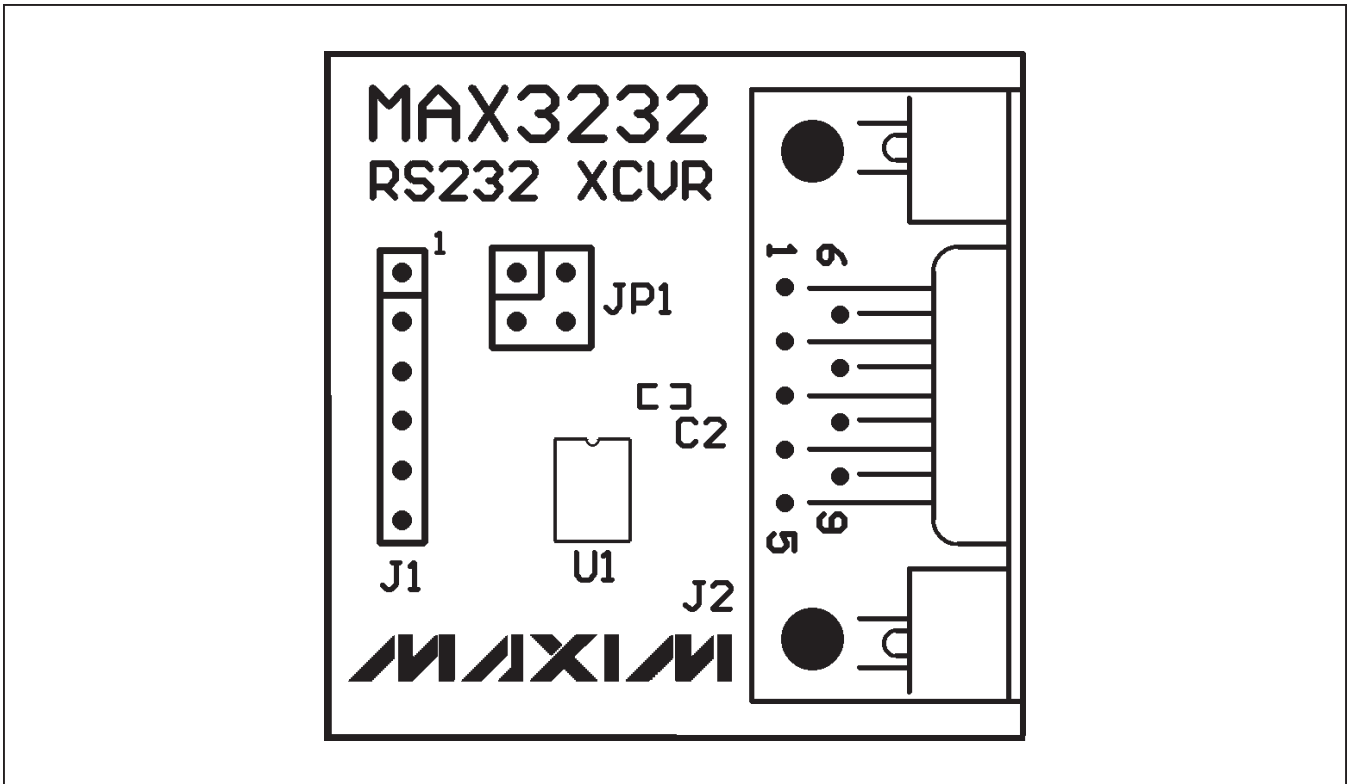


Figure 2. MAX3232PMB1 Peripheral Module Component Placement Guide—Component Side

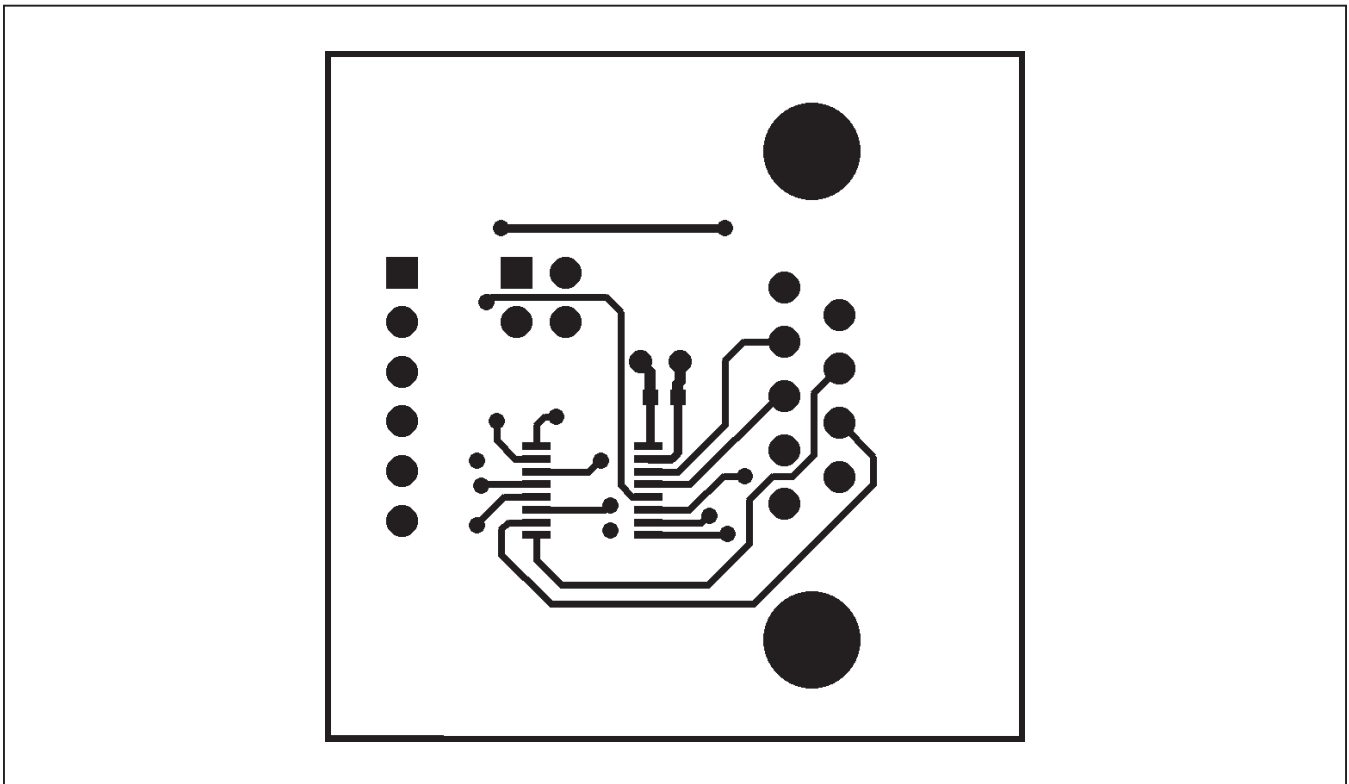


Figure 3. MAX3232PMB1 Peripheral Module PCB Layout—Component Side

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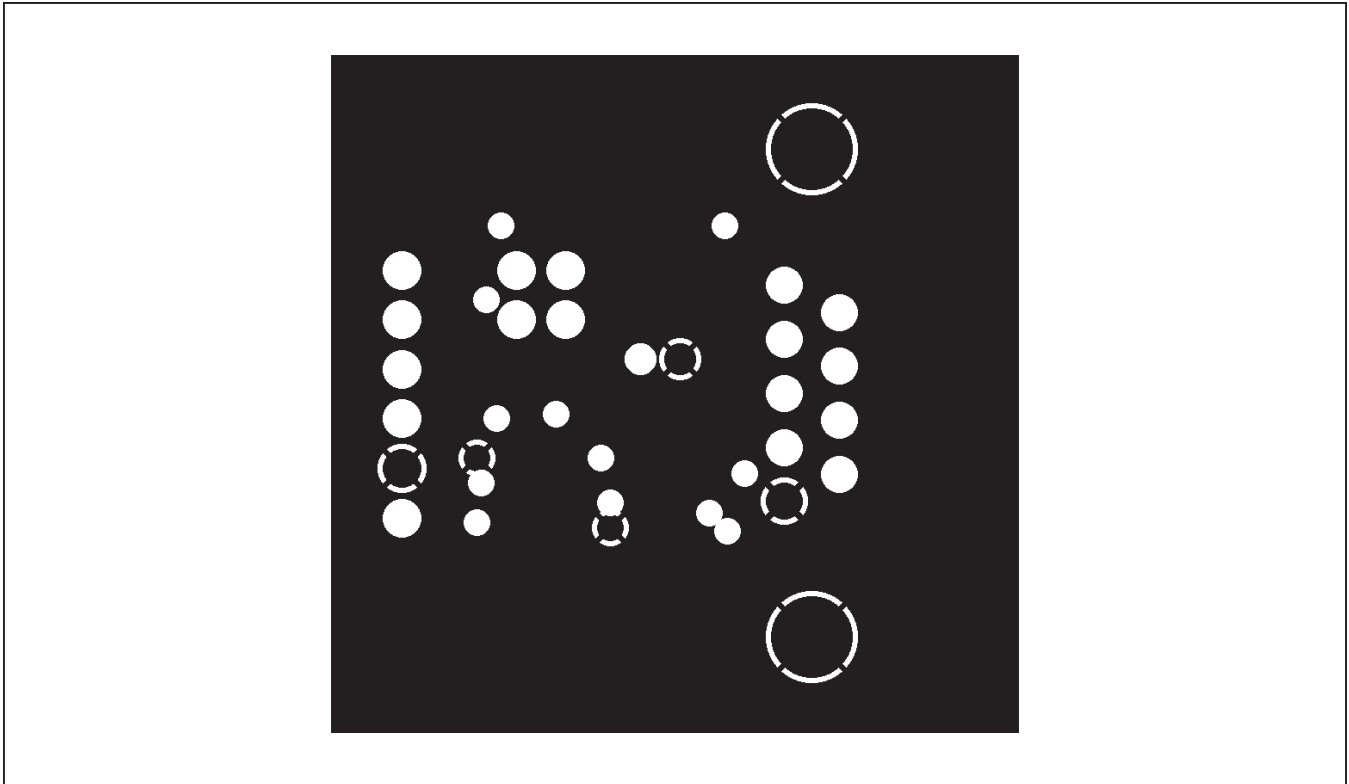


Figure 4. MAX3232PMB1 Peripheral Module PCB Layout—Inner Layer 1 (Power)

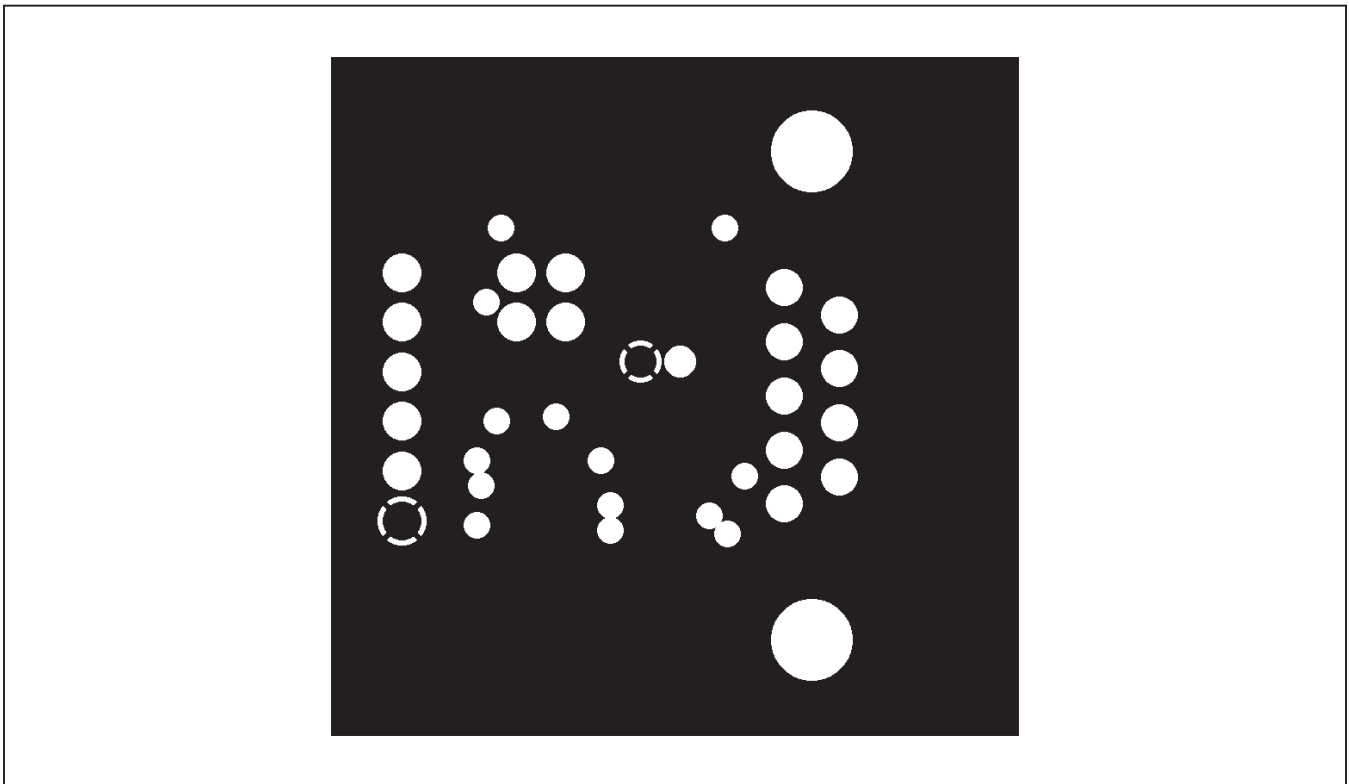


Figure 5. MAX3232PMB1 Peripheral Module PCB Layout—Inner Layer 2 (Ground)

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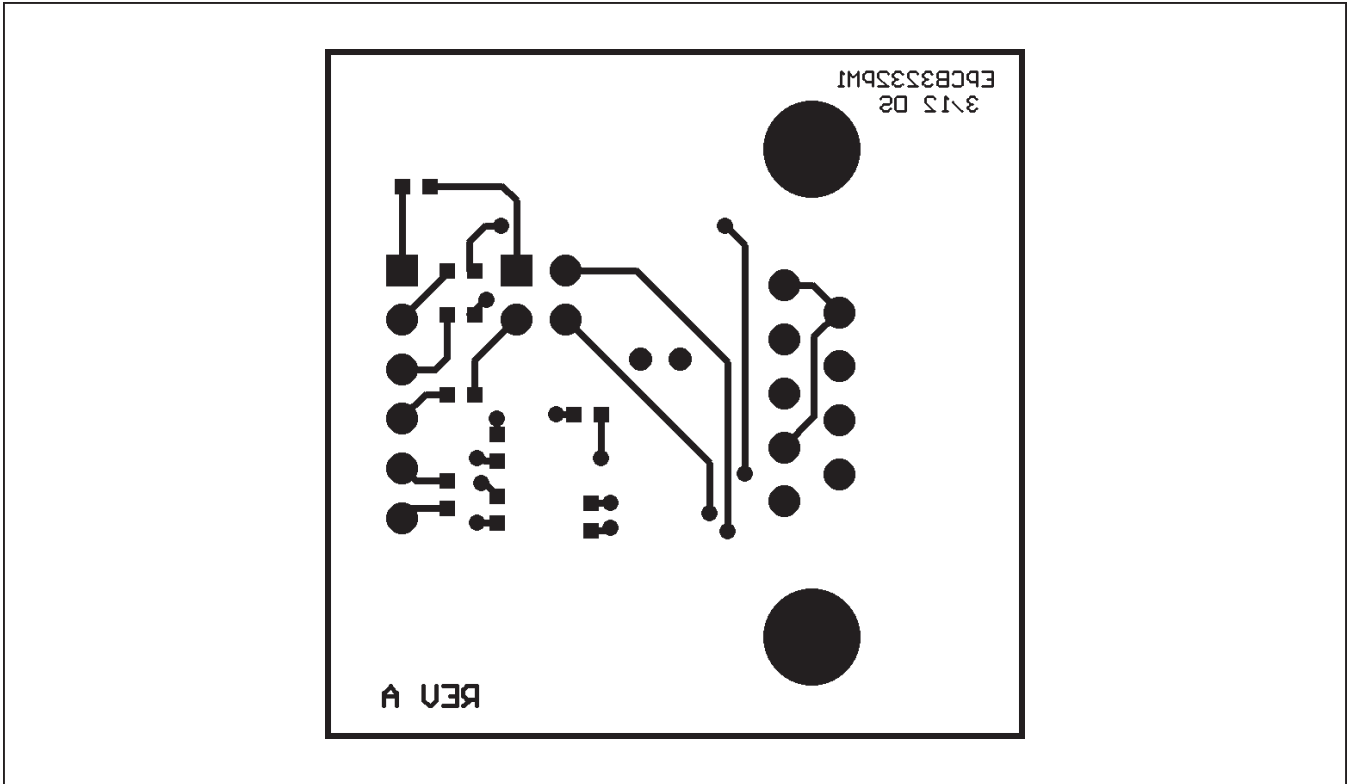


Figure 6. MAX3232PMB1 Peripheral Module PCB Layout—Solder Side

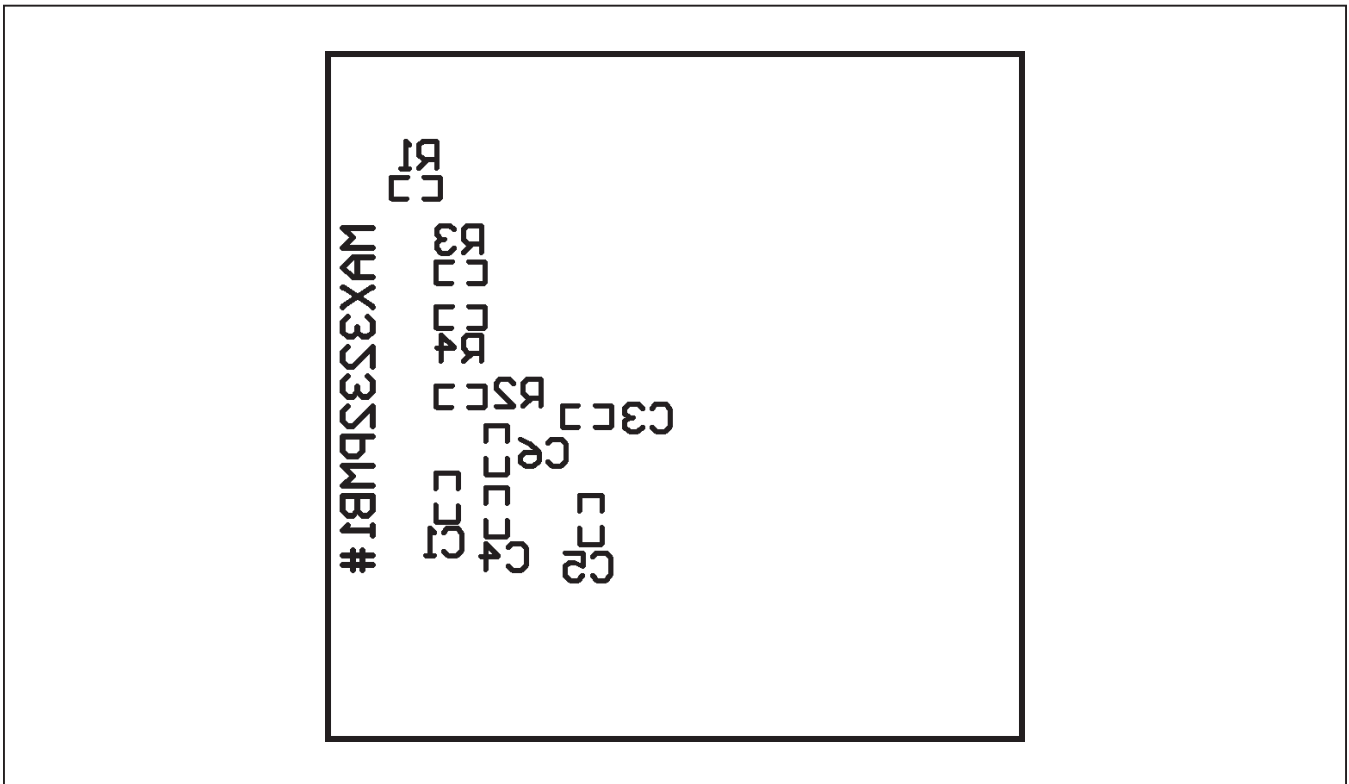


Figure 7. MAX3232PMB1 Peripheral Module Component Placement Guide—Solder Side

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Ordering Information

PART	TYPE
MAX3232PMB1#	Peripheral Module

#Denotes RoHS compliant.