CC330xMOD SimpleLink™ Wi-Fi 6 and Bluetooth® Low Energy Companion Module

1 Features

Key Features

- Wi-Fi 6 (802.11ax)
- Bluetooth®Low Energy 5.4 in CC33x1MOD
- Companion module to any processor or MCU host capable of running a TCP/IP stack
- Integrated 2.4GHz PA for complete wireless system with up to +18dBm output power
- Operating temperature: –40°C to +85°C
- Application throughput up to 50Mbps
- Regulatory Certification (in progress)
  - FCC
  - IC/ISED
  - ETSI/CE
  - TELEC
- QuickTrack Qualified
- Bluetooth Controller Subsystem Qualified

Extended Features

- Wi-Fi 6
  - 2.4GHz, 20MHz, single spatial stream
  - MAC, baseband, and RF transceiver with support for IEEE 802.11 b/g/n/ax
  - Target wake time (TWT), OFDMA, MU-MIMO (downlink), Basic Service Set Coloring, and trigger frame for improved efficiency
  - Hardware-based encryption and decryption supporting WPA2 and WPA3
  - Excellent interoperability
  - Support for 4-bit SDIO or SPI host interfaces
- Bluetooth Low Energy 5.4
  - LE Coded PHYs (long range), LE 2M PHY (high speed) and Advertising Extension
  - Host controller interface (HCI) transport with option for UART or shared SDIO
  - Internal coexistence mechanism with Wi-Fi to share same antenna
- Enhanced Security
  - Secured host interface
  - Firmware authentication
  - Anti-rollback protection
- Multirole support (for example, concurrent STA and AP) to connect with Wi-Fi devices on different RF channels (Wi-Fi networks)
- Optional antenna diversity or selection
- 3-wire or 1-wire PTA for external coexistence with additional 2.4GHz radios (for example, Thread or Zigbee)
- Clock sources
  - 40MHz XTAL fast clock (Integrated in the module)
  - Internal slow clock or external 32.768kHz slow clock
- Small package size
  - Easy to design with 65-pin, 11mm × 11mm LGA package, 0.65mm pitch

2 Applications

- Grid infrastructure
  - Electricity meter
  - String inverter
  - Microinverter
  - Energy storage power conversion system (PCS)
  - EV charging infrastructure
- Building and home automation
  - HVAC controller
  - HVAC gateway
  - Thermostat
  - Building security gateway
  - Garage door system
  - IP network camera and video doorbell
  - Wireless security camera
- Appliances
  - Refrigerator and freezer
  - Oven
  - Washer and dryer
  - Residential water heater and heating system
  - Air purifier and humidifier
  - Coffee machine
  - Air conditioner indoor unit
  - Vacuum robot
  - Robotic lawn mower
- Medical
  - Infusion pump
  - Electronic hospital bed and bed control
  - Multiparameter patient monitor
  - Blood pressure monitor
  - CPAP machine
  - Telehealth systems
  - Ultrasound scanner
  - Ultrasound smart probe
  - Electric toothbrush
- Retail Automation and Payment
- Printers

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3 Description

The SimpleLink™ Wi-Fi CC33xx family of devices is where affordability meets reliability, enabling engineers to connect more applications with confidence. CC330xMOD are certified modules designed to simplify hardware design and reduce time-to-market.

- CC3300MOD: A 2.4GHz Wi-Fi 6 companion module
- CC3301MOD: A 2.4GHz Wi-Fi 6 and Bluetooth Low Energy 5.4 companion module

The CC330xMOD offers the latest standards from Wi-Fi and BLE while maintaining compatibility with Wi-Fi 4 (802.11 b/g/n) and Wi-Fi 5 (802.11ac). These CC330xMOD are based on the 10th-generation connectivity combo chip from Texas Instruments. As such, the CC330xMOD is based on proven technology. These modules are an excellent choice to use in cost-sensitive embedded applications with a Linux or RTOS host running TCP/IP. CC330xMOD brings the efficiency of Wi-Fi 6 to embedded device applications for the Internet of Things (IoT).

Device Information

PART NUMBER	Wi-Fi 2.4GHz SISO	Bluetooth Low Energy
CC3300MODENIAMOZR	✓	
CC3301MODENIAMOZR	✓	✓

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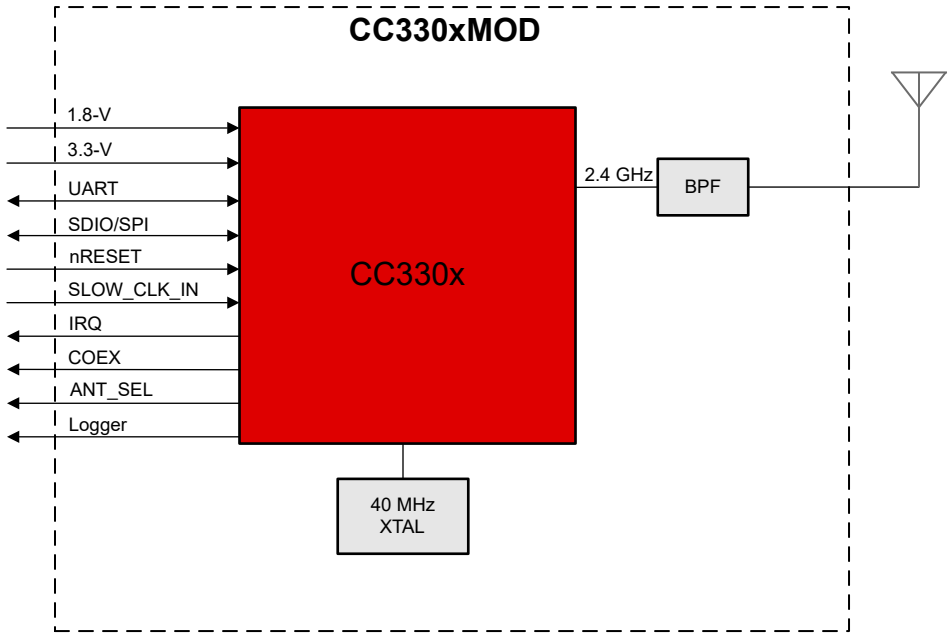
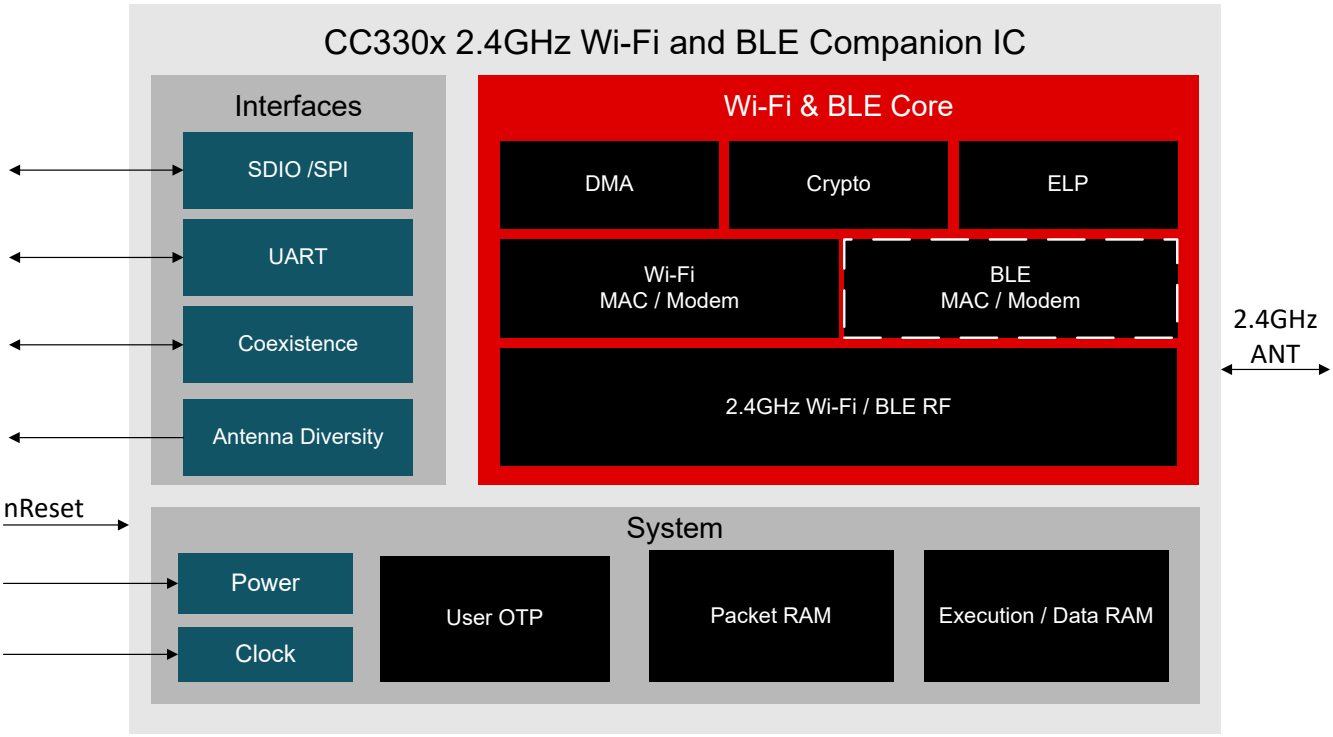
4 Functional Block Diagrams

The below diagram shows the functional block diagram of the CC330xMOD module.



CC330xMOD Block Diagram

The below diagram shows a hardware overview of the CC330x IC used inside the CC330xMOD.



CC330x Hardware Overview

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5 Device and Documentation Support

TI offers an extensive line of development tools. Tools and software to evaluate the performance of the device, generate code, and develop solutions are listed below.

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5.2 Device Nomenclature Boilerplate

Device development evolutionary flow:

X Experimental device that is not necessarily representative of the final device's electrical specifications and may not use production assembly flow.

P Prototype device that is not necessarily the final silicon die and may not necessarily meet final electrical specifications.

null Production version of the silicon die that is fully qualified.

Support tool development evolutionary flow:

TMDX Development-support product that has not yet completed Texas Instruments internal qualification testing.

TMDS Fully-qualified development-support product.

X and P devices and TMDX development-support tools are shipped against the following disclaimer:

Device development evolutionary flow:

TMX Experimental device that is not necessarily representative of the final device's electrical specifications and may not use production assembly flow.

TMP Prototype device that is not necessarily the final silicon die and may not necessarily meet final electrical specifications.

TMS Production version of the silicon die that is fully qualified.

Support tool development evolutionary flow:

TMDX Development-support product that has not yet completed Texas Instruments internal qualification testing.

TMDS Fully-qualified development-support product.

TMX and TMP devices and TMDX development-support tools are shipped against the following disclaimer:

"Developmental product is intended for internal evaluation purposes."

Production devices and TMDS development-support tools have been characterized fully, and the quality and reliability of the device have been demonstrated fully. TI's standard warranty applies.

Predictions show that prototype devices (X or P) have a greater failure rate than the standard production devices. Texas Instruments recommends that these devices not be used in any production system because their expected end-use failure rate still is undefined. Only qualified production devices are to be used.

5.3 Tools and Software

Design Kits and Evaluation Modules

CC3301MOD BoosterPack plug-in module	The CC3301MOD BoosterPack™ plug-in module (BP-CC3301MOD) is a test and development board that can be easily connected to TI LaunchPad™ development kits or processor boards; thus enabling rapid software development.

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Software

SimpleLink Wi-Fi Toolbox	SimpleLink Wi-Fi Toolbox is a collection of tools to help development and testing of the CC33xx. The Wi-Fi toolbox package provides all the capabilities required to debug and monitor WLAN/Bluetooth® Low Energy firmware with a host, perform RF validation tests, run pretest for regulatory certification testing, and debug hardware and software platform integration issues.
CC33xx device drivers	The CC33XX are single-chip Wi-Fi 6 and Bluetooth Low Energy 5.4 companion devices for both Linux- and RTOS-based systems. CC33XX-SOFTWARE is a collection of software development sources aimed to facilitate quick setup, out-of-box experience, and accelerate development in Linux or RTOS environments.

5.4 Documentation Support

To receive notification of documentation updates, navigate to the device product folder on ti.com. Click on *Notifications* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

Application Reports

CC33xx Production Line Guide	Texas Instruments™ provides many resources to assist users in quickly examining the functionality and performance of the TI devices. This document provides the necessary information to guide the user in production line testing for CC33xx. The devices' functions can be checked using tools and software provided by Texas Instruments. Performance testing is more involved as external equipment is required for thorough examination.
SimpleLink CC33xx Security Features	This document describes the CC33xx security related features, which are made available to vendors through an ecosystem that incorporates simple and concise APIs, tools, and documentation
SimpleLink CC33xx Host Interfaces	This document describes the host interface between the host processor and CC33xx companion IC and provide the system designeer with all the required technical information for easy integration

User's Guides

CC33xx WLAN Features User's Guide	This document provides information about CC330xMOD family of devices and Wi-Fi® features, as well as TI proprietary enhancements. The document does not provide the complete application programming interface (API) set, but a high-level overview of the features.
CC33xx Hardware Integration	This document describes how to integrate the CC330xMOD into any system and the hardware requirements for this device. Layout and schematic considerations are listed here as well, which TI highly recommends following in order to achieve the device performance listed in this data sheet.
WFA QuickTrack Control Application with CC33xx User's Guide	This document provides information about utilizing the QuickTrack Control App to certify CC33xx devices according to Wi-Fi® standards. The document provides a high-level overview of the certification process.

5.5 Support Resources

TI E2E™ support forums are an engineer's go-to source for fast, verified answers and design help — straight from the experts. Search existing answers or ask your own question to get the quick design help you need.

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5.7 Electrostatic Discharge Caution

This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

5.8 Glossary

TI Glossary This glossary lists and explains terms, acronyms, and definitions.

6 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

DATE	REVISION	NOTES
September 2024	*	Initial Release

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7 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

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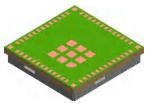
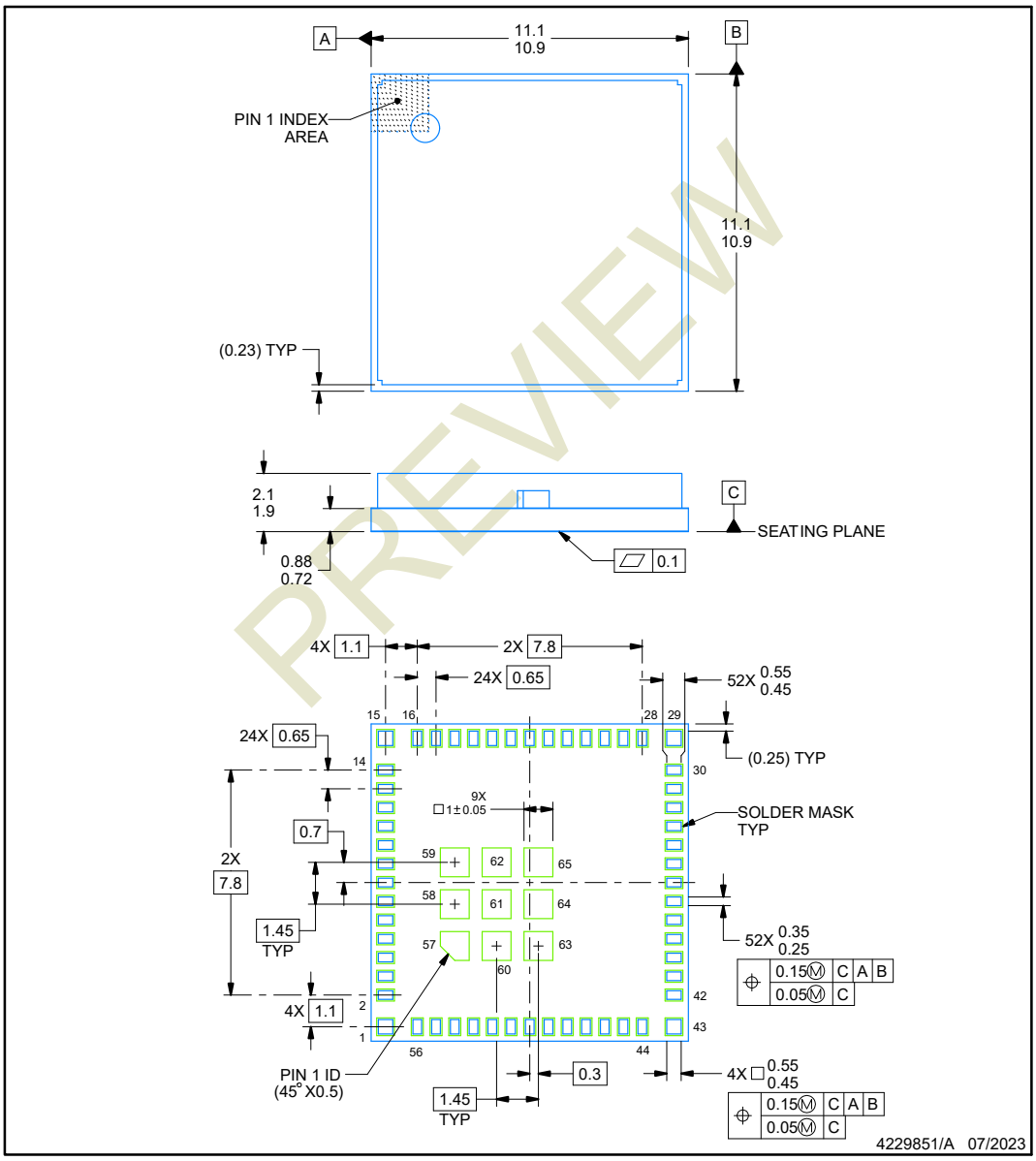


PACKAGE OUTLINE

MOZ0065A

QFM - 2.1 mm max height

QUAD FLAT MODULE



NOTES:

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.

PREVIEW

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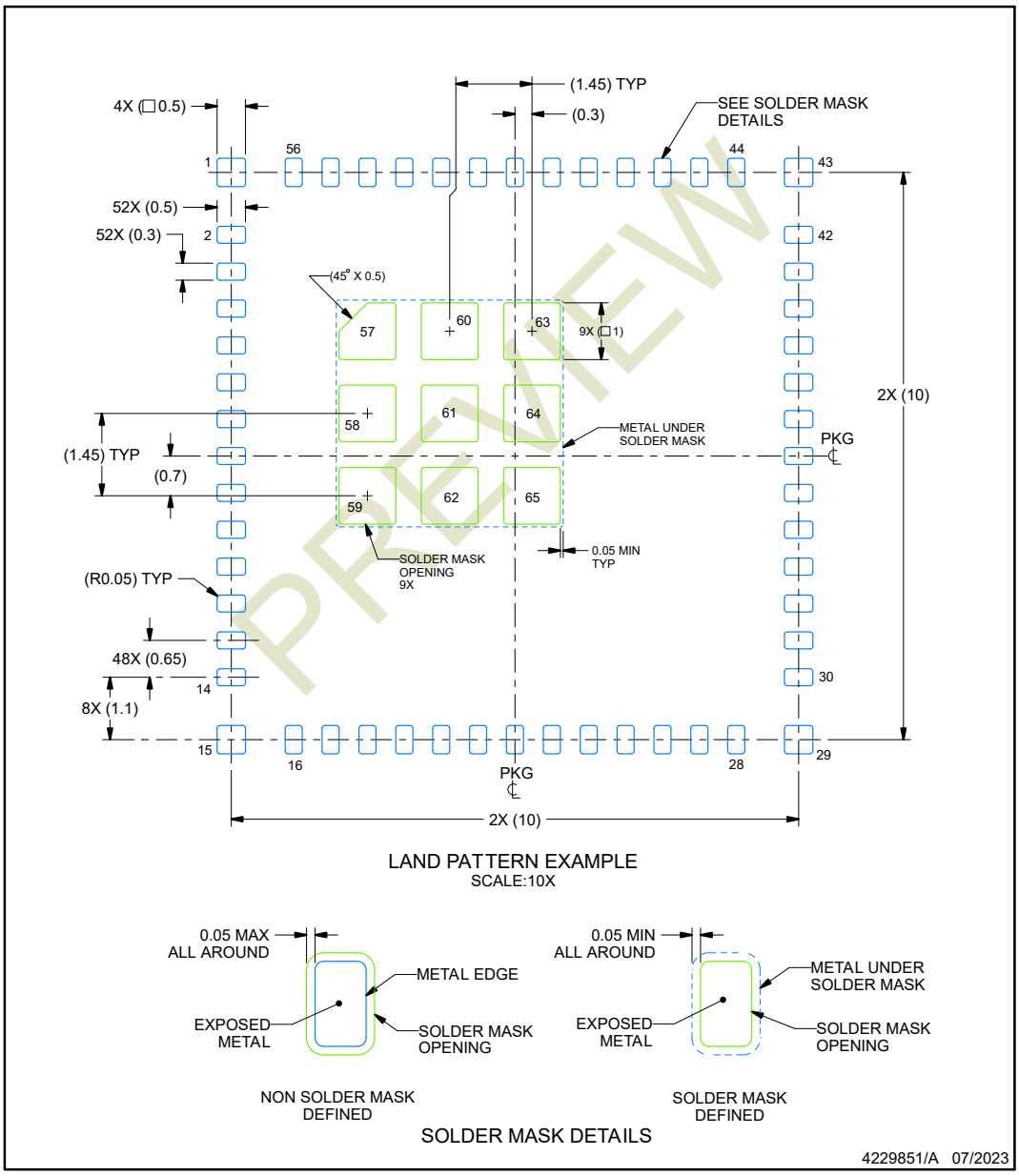
EXAMPLE BOARD LAYOUT

MOZ0065A — **QFM - 2.1 mm max height**

QUAD FLAT MODULE



PREVIEW

NOTES: (continued)

3. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/slua271).

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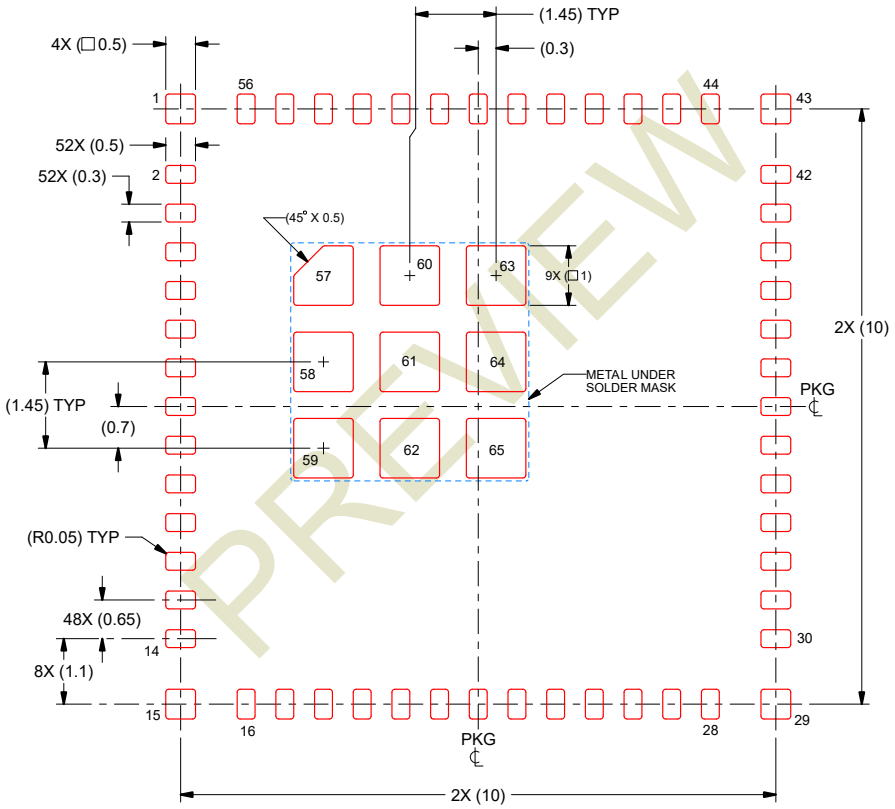
EXAMPLE STENCIL DESIGN

MOZ0065A — **QFM - 2.1 mm max height**

QUAD FLAT MODULE



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:10X

4229851/A 07/2023

NOTES: (continued)

4. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

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PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
XCC3301MODENIAMOZR	ACTIVE	QFM	MOZ	65	1500	TBD	Call TI	Call TI	-40 to 85		Samples

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".
RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.
Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

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