

BQ79826Z-Q1 Automotive 26S Battery Monitor with Smart EIS Engine

1 Features

- 26 Cell Voltage Measurement Channels
 - 26s – 0V to 5.5V range for cell, -2V to 2V range for busbar
 - 143V Absolute Maximum Rating, 12V minimum
 - Busbar support on every channel, except first channel
 - Stackable up to 128 devices per chain
- Cell Voltage ADCs
 - < 1.7mV accuracy, -40 to 125C, Cell: 0V to 4.5V
 - Dedicated ADC per channel. Synchronized redundant measurement.
- Current Sense ADC
 - Input range = $\pm 275\text{mV}$ differential
 - 0.1% accuracy, 10mA (50 $\mu\Omega$ R_{SHUNT})
- Smart EIS Engine
 - Integrated Electrochemical Impedance Spectroscopy measurement engine
 - Impedance Accuracy: 1% (with 1A excitation and 200 $\mu\Omega$ impedance)
 - Measurement frequency: 0.01Hz to 3.5kHz
 - Precise device-to-device I/V synchronization
 - Support for pack and module excitation
- Passive Cell Balancing with integrated FETs up to 300mA @ 85C odd/even balancing with programmable PWM control
- GPIOs and Sensors
 - 20 GPIOs: Temp Sensor (NTC/PTC), ADC, voltage measurement, interrupt
 - SPI / I²C Hub Interface
 - Temperature Threshold for OTUT and cell balancing PCB temp
 - Pressure Threshold / Peak Detector (Active / Sleep)
- Ultra-low Power Monitoring
 - Cell over-voltage, under-voltage (OVUV)
 - Cell over-temperature, under-temperature (OTUT)
 - Configurable monitoring period 0.5s to 64s
 - Reverse Wake Up based on selectable faults
- Diagnostics & Protection
 - Redundant ADCs for cell voltage and temperature
 - Automatic diagnostics during cell balancing in active mode
 - Automatic open wire detection

- On-chip memory for one-time customer programming
- Upgraded Isolated Daisy Chain Interface
 - 2Mbps bus speed, Up to 4Mbps with dual SPI
 - Robust to BCI injections
 - Isolation: Transformer or capacitor only
 - FDTI Time: <100ms for 800V packs or 250 cells
 - Support for stack, ring, multidrop and split-ring
- Low Power Consumption
 - Integrated DC-DC Converter
 - Shutdown: <10 μA
 - Ultra-low power monitoring (Deep Sleep): <20 μA
 - Active Mode: <5mA
- Functional Safety-Compliant
 - Developed for functional safety applications
 - Documentation to aid ISO 26262 system design
 - Systematic capability and hardware integrity up to ASIL-D
- AEC-Q100 Qualified Grade 1
- Compatible with the BQ79881-Q1 pack monitor.
- System-level hardware and software development platform with complex device drivers (CDD).
- 100pin QFP, 0.4mm pitch, PowerPAD on bottom

2 Applications

- Electric Vehicles (EV)
- Hybrid Electric Vehicles (HEV)
- Battery Backup Units (BBU)
- Energy Storage Systems (ESS)

3 Description

The BQ79826Z-Q1 is a high-cell count 26S stackable battery monitor with an integrated electrochemical impedance spectroscopy (EIS) engine. The EIS engine provides a new way to detect impedance changes in the cell that allows for monitoring of aging, temperature, SoC, thermal runaway and many other internal cell parameters. The device integrates dedicated ADCs per channel with cell balancing up to 300mA peak. The peripheral features enable an intelligent sensor controller for temperature, pressure, gas and other sensors to meet demanding safety requirements.

Package Information

PART NUMBER	PACKAGE ⁽¹⁾	BODY SIZE (NOM)
BQ79826Z-Q1	HTQFP (100)	12mm x 12mm

(1) For all available packages, see the package option addendum at the end of the data sheet.



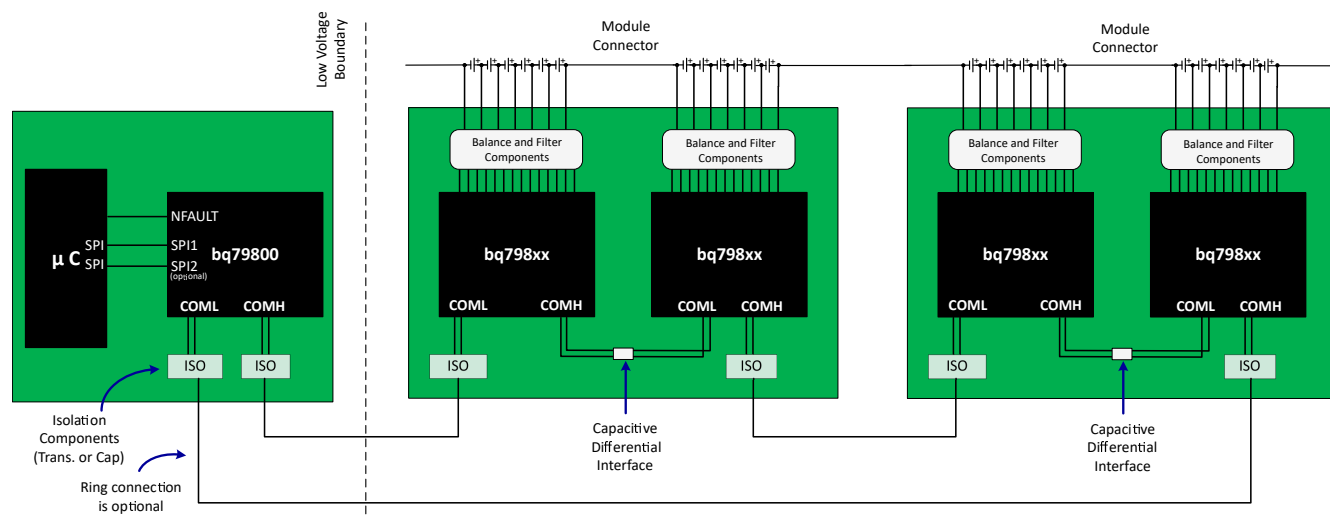


Figure 3-1. Battery Management System

4 Device Comparison Table

DEVICE	DESCRIPTION	MAX CELL CHANNELS	Current Sense	EIS
BQ79826Z-Q1	26S Cell Monitor, 20 GPIOs, Smart EIS Engine	26	Yes	Yes
BQ79881-Q1	Battery Pack Monitor with Smart EIS Engine	-	Yes	Yes
BQ79800-Q1	Communications Bridge with Dual SPI Ports, Supports VIF2	-	No	Yes

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.

5.1 Documentation Support

5.2 Receiving Notification of Documentation Updates

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.

5.3 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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5.4 Trademarks

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5.5 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.

5.6 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.

Changes from Revision * (September 2025) to Revision A (September 2026)	Page
• Updated datasheet status from <i>Advanced Information</i> to <i>Production Data</i>	1

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.

7.1 Package Option Addendum

Packaging Information

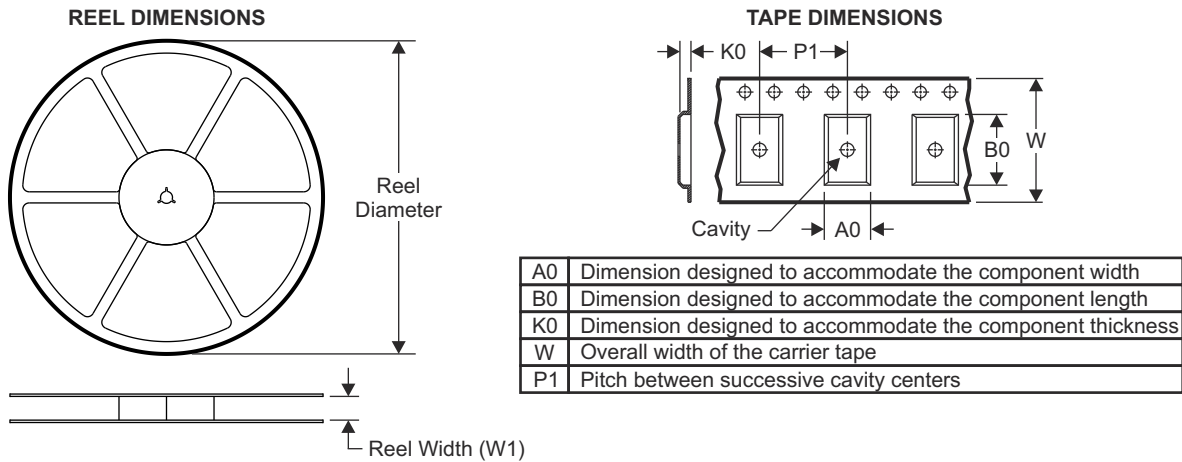
Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish ⁽⁶⁾	MSL Peak Temp ⁽³⁾	Op Temp (°C)	Device Marking ^{(4) (5)}
BQ79826ZQPZSRQ1	PROD	HTQFP	PZS	100	1000	Call TI	Call TI	Call TI	-40 to 125C	BQ79826ZQ

- (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.
PRE_PROD Unannounced device, not in production, not available for mass market, nor on the web, samples not available.
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) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material).
- (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/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

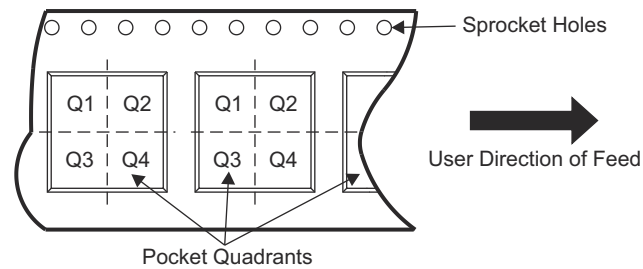
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7.2 Tape and Reel Information

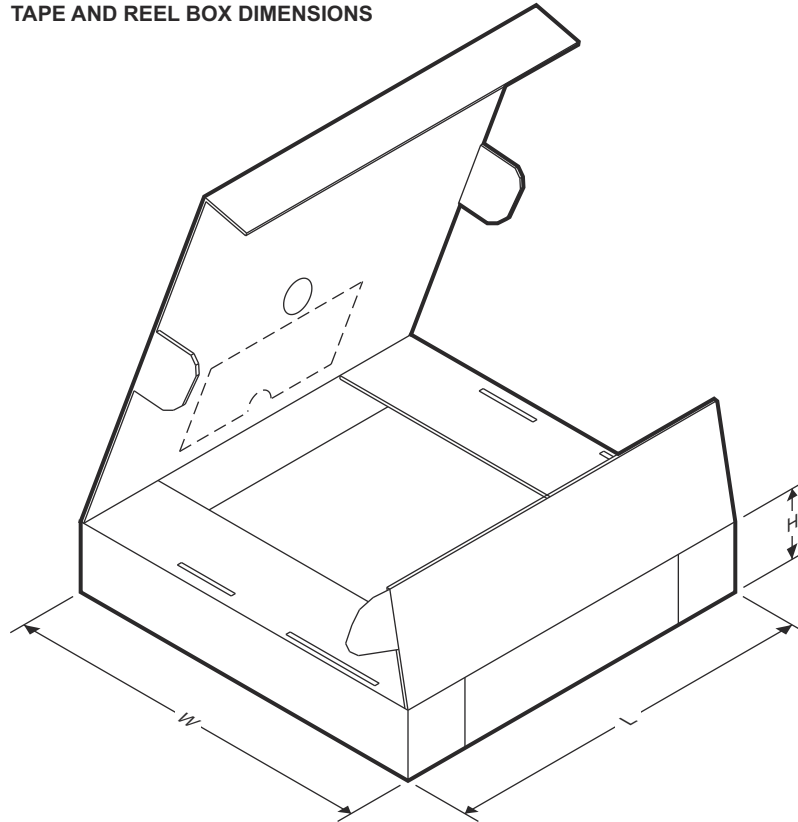


QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



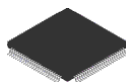
Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
BQ79826ZQPZSRQ 1	HTQFP	PZS	100	2000	330	24.4	15	15	1.5	20	24	2

TAPE AND REEL BOX DIMENSIONS



Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
BQ79826ZQPZSRQ1	HTQFP	PZS	100	2000	367	367	55

7.3 Mechanical Data

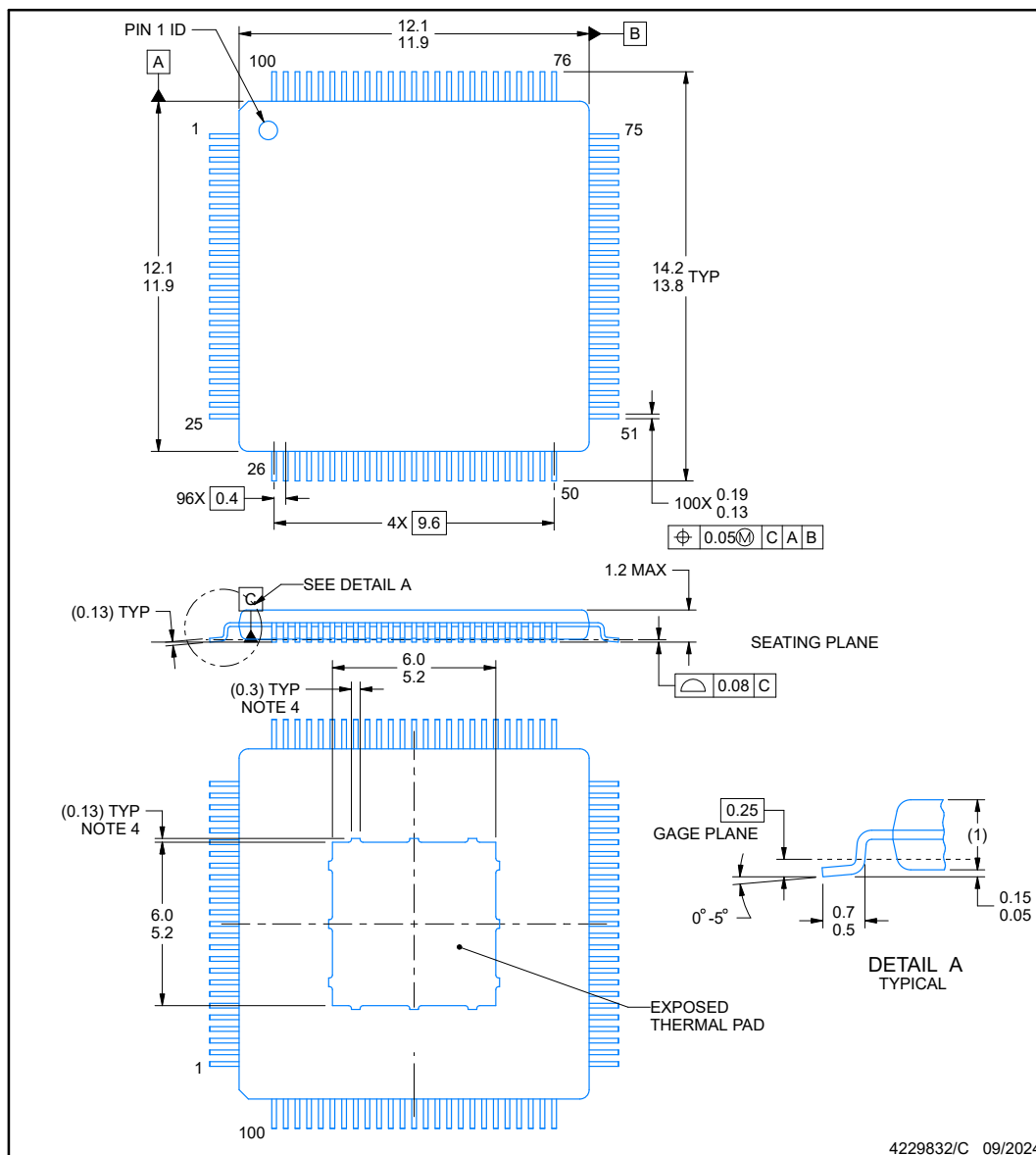


PACKAGE OUTLINE

PZS0100A

PowerPAD™ HTQFP - 1.2 mm max height

PLASTIC QUAD FLATPACK



NOTES:

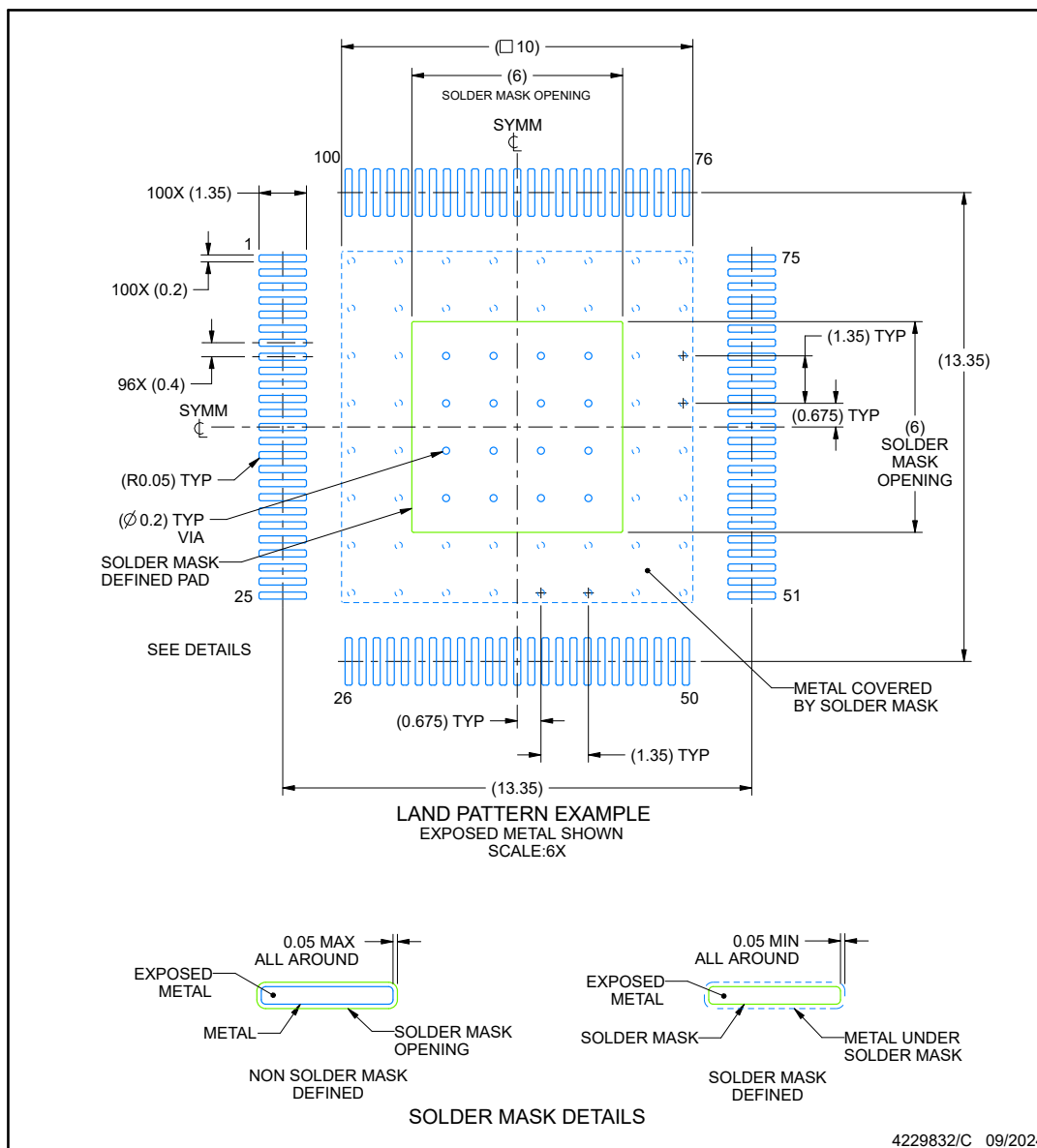
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Reference JEDEC registration MS-026.
4. Strap features may not be present,

EXAMPLE BOARD LAYOUT

PZS0100A

PowerPAD™ HTQFP - 1.2 mm max height

PLASTIC QUAD FLATPACK



NOTES: (continued)

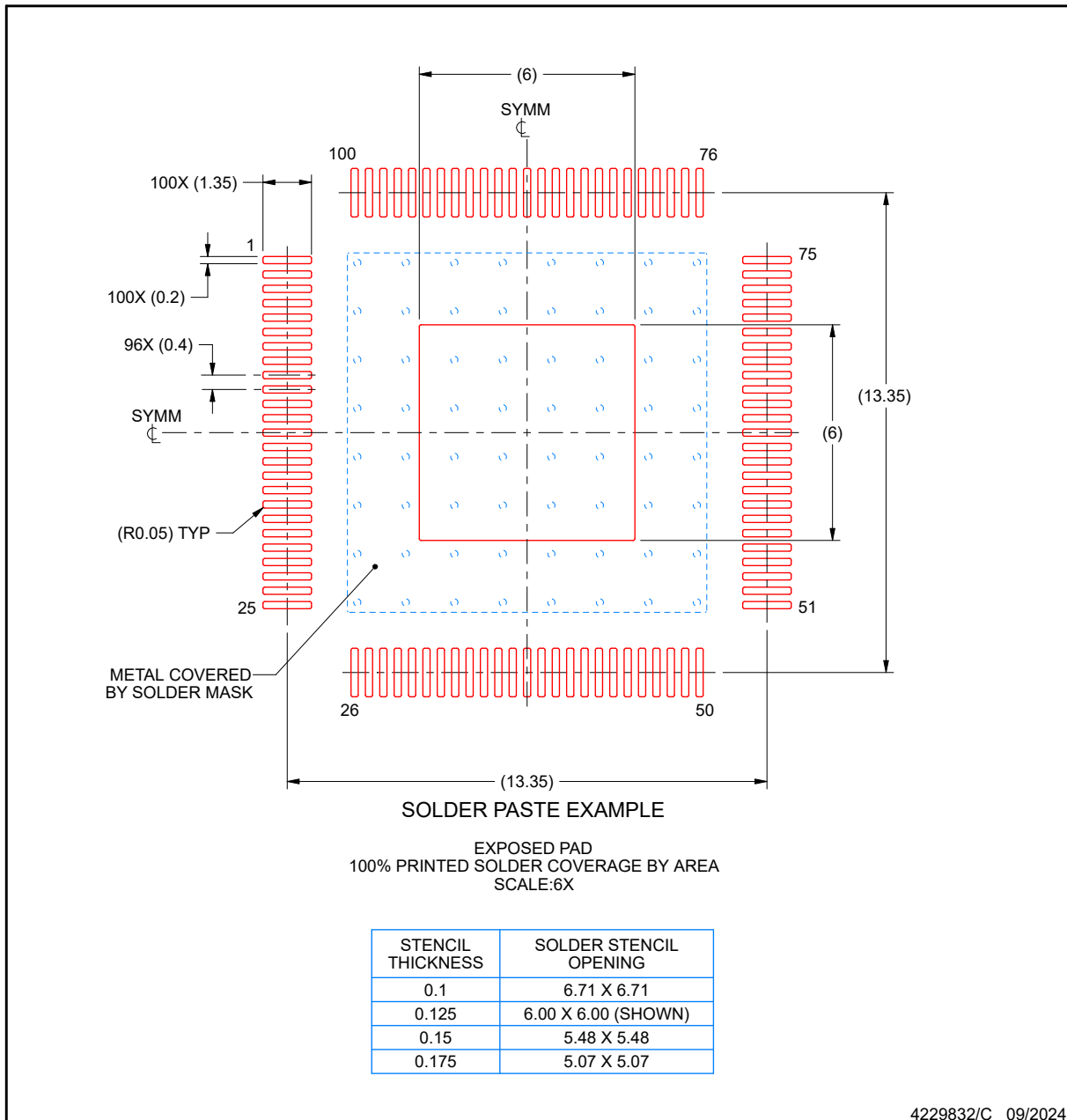
5. Publication IPC-7351 may have alternate designs.
6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.
7. Vias are optional depending on application, refer to device data sheet. If some or all are implemented, recommended via locations are shown.
8. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature numbers SLMA002 (www.ti.com/lit/slma002) and SLMA004 (www.ti.com/lit/slma004).

EXAMPLE STENCIL DESIGN

PZS0100A

PowerPAD™ HTQFP - 1.2 mm max height

PLASTIC QUAD FLATPACK



NOTES: (continued)

9. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
10. Board assembly site may have different recommendations for stencil design.

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Last updated 10/2025