Advanced Power Management Unit

Check for Samples: TPS658643

1 INTRODUCTION

1.1 MAIN FEATURES

- **INTEGRATED POWER SUPPLIES**
  - **3 Programmable Step-Down converters**
    - **Software Controlled Enable/Forced PWM Mode**
    - **Automatic Power Saving Mode**
    - **Maximum 1.5A Outputs (SM0 and SM2)**
    - **Maximum 2.A Output (SM1)**
  - **11 Programmable General Purpose LDOs**
    - **7 With Output Voltages of 1.25V to 3.3V**
    - **2 With Output Voltages of 0.725V to 1.5V or 1.25V to 2.586V (factory programmable)**
    - **1 "Always On" With Output Voltages of 1.25V to 3.3V**
    - **1 With Output Voltage of 1.7V–2.475V**
- **DISPLAY SUPPORT FUNCTIONS**
  - **3 PWM Outputs With Programmable Frequency and Duty Cycle**
  - **Dual RGB LED Drivers**
- **HOST INTERFACE**
  - **I2C Bus**
  - **Interrupt Controller With Maskable Interrupts**
  - **GPIO Control (4)**
- **SYSTEM MANAGEMENT**
  - **Power Good Monitoring on all Supply Outputs**
  - **Software Reset Function**
  - **Hardware On/Off and Reboot Control**
  - **Real Time Counter**
  - **11 Channel ADC With 3 Operating Modes**
    - **Single Conversion**
    - **Peak Detection**
    - **Averaging**

1.2 APPLICATIONS

- **Tablet PCs**
- **Netbooks**
- **SmartPhones**
- **Portable Navigation Devices**
- **Portable Media Players**



1.3 DESCRIPTION

The TPS658643 provides an easy to use, fully integrated solution for handheld devices, integrating multiple regulated power supplies, system management and display functions in a small package. The I^2C interface enables control of a wide range of subsystem parameters. Internal registers have a complete set of status information, enabling easy diagnostics and host-controlled handling of fault conditions.

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To request a full data sheet, please send an email to:
nvidia_contact@list.ti.com.

PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package | Pins	Package qty | Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
TPS658643ZWSR	Active	Production	NFBGA (ZWS) | 169	1000 | LARGE T&R	Yes	SNAGCU	Level-3-260C-168 HR	-40 to 85	658643ZWS
TPS658643ZWSR.B	Active	Production	NFBGA (ZWS) | 169	1000 | LARGE T&R	Yes	SNAGCU	Level-3-260C-168 HR	-40 to 85	658643ZWS

(1) **Status:** For more details on status, see our product life cycle.

(2) **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

(3) **RoHS values:** Yes, No, RoHS Exempt. See the TI RoHS Statement for additional information and value definition.

(4) **Lead finish/Ball material:** Parts 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.

(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

(6) **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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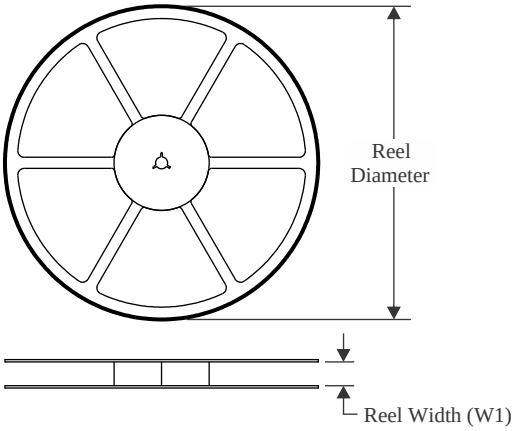
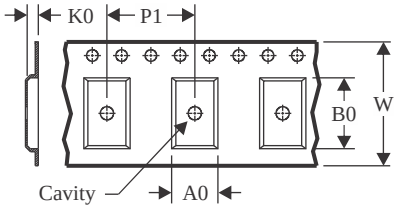
TAPE AND REEL INFORMATION

REEL DIMENSIONS

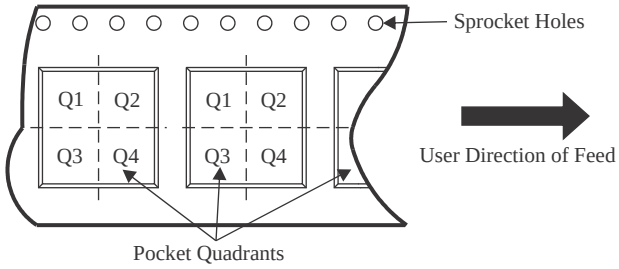


TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

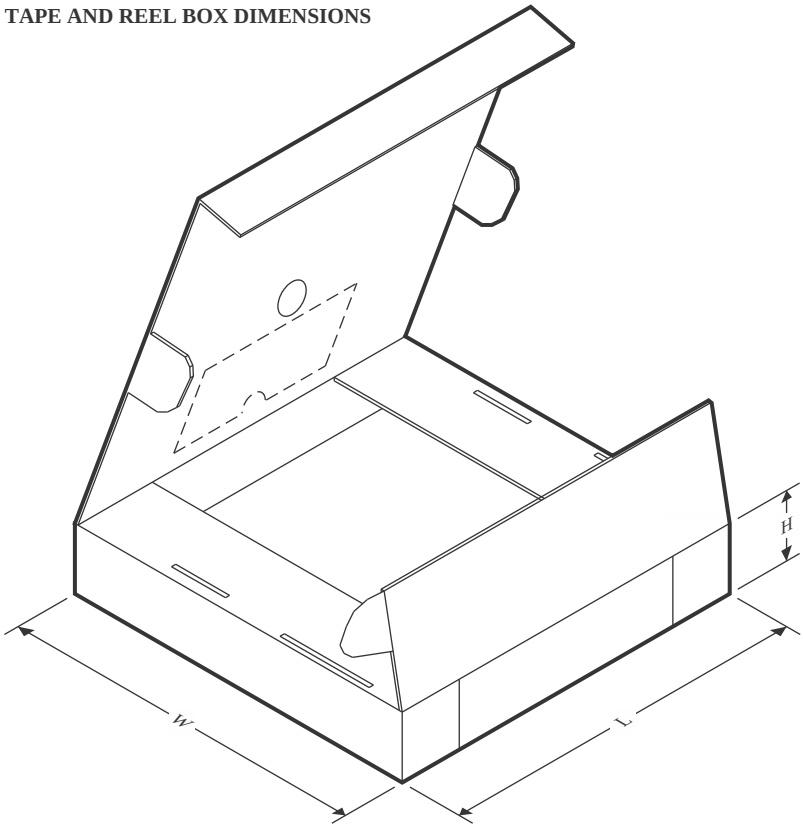
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

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
TPS658643ZWSR	NFBGA	ZWS	169	1000	330.0	24.4	12.35	12.35	2.3	16.0	24.0	Q1

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

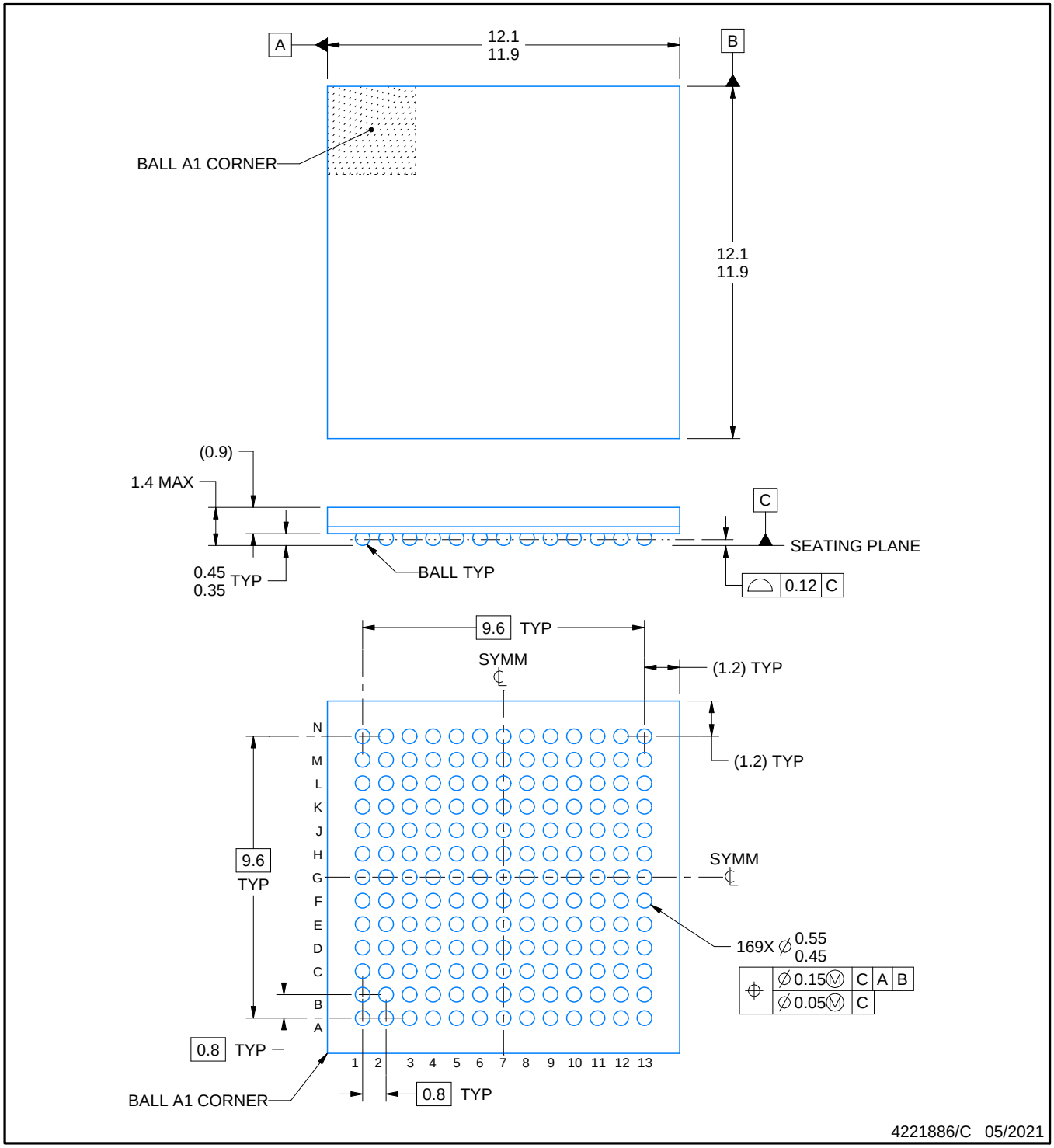
Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TPS658643ZWSR	NFBGA	ZWS	169	1000	336.6	336.6	41.3

PACKAGE OUTLINE

ZWS0169A

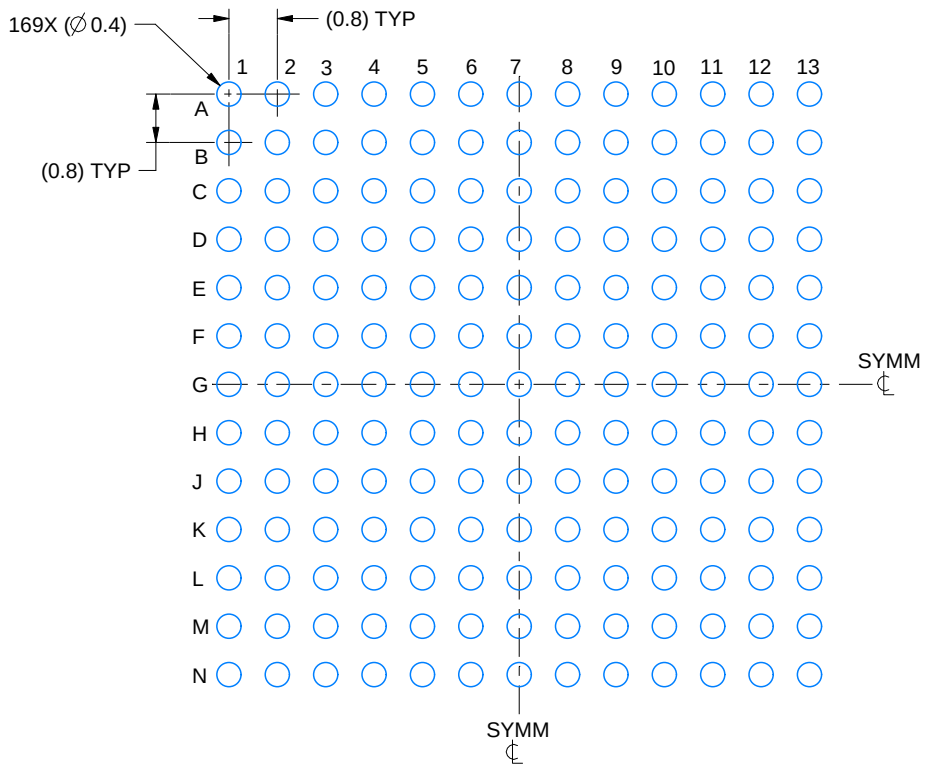
NFBGA - 1.4 mm max height

PLASTIC BALL GRID ARRAY

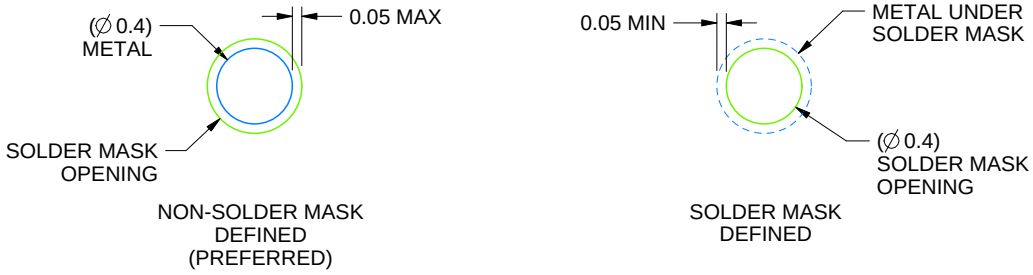


NOTES:

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.



LAND PATTERN EXAMPLE
SCALE:8X



SOLDER MASK DETAILS
NOT TO SCALE

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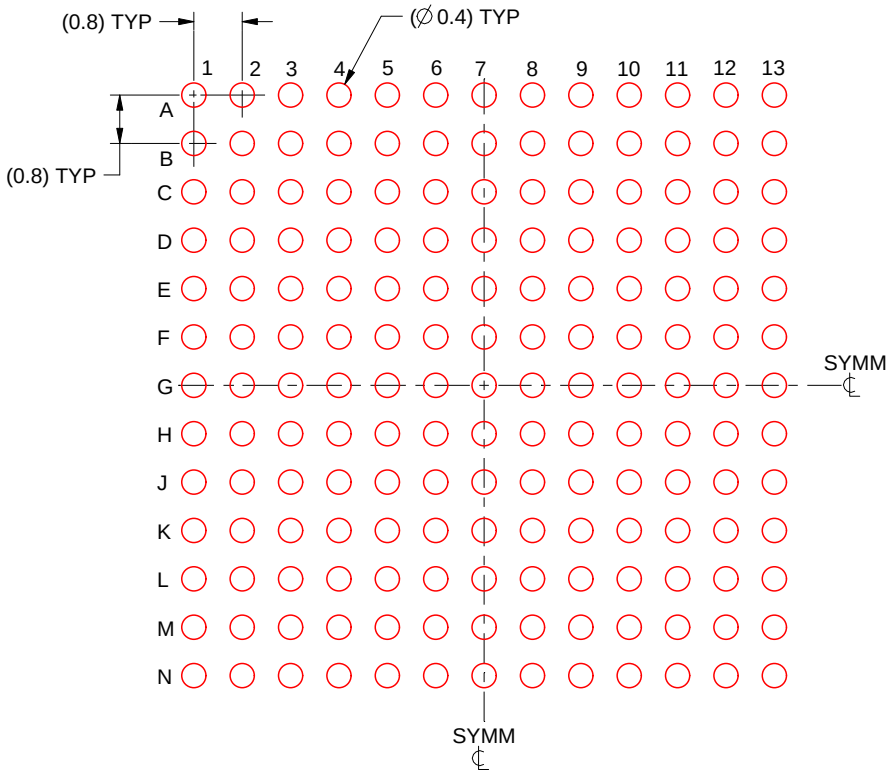
NOTES: (continued)

3. Final dimensions may vary due to manufacturing tolerance considerations and also routing constraints. For information, see Texas Instruments literature number SSZA002 (www.ti.com/lit/ssza002).



SOLDER PASTE EXAMPLE
BASED ON 0.15 mm THICK STENCIL
SCALE:8X

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NOTES: (continued)

4. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release.

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