

# 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<sup>2</sup>C 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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**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
TPS658643ZWSR	ACTIVE	NFBGA	ZWS	169	1000	RoHS & Green	SNAGCU	Level-3-260C-168 HR	-40 to 85	658643ZWS	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.

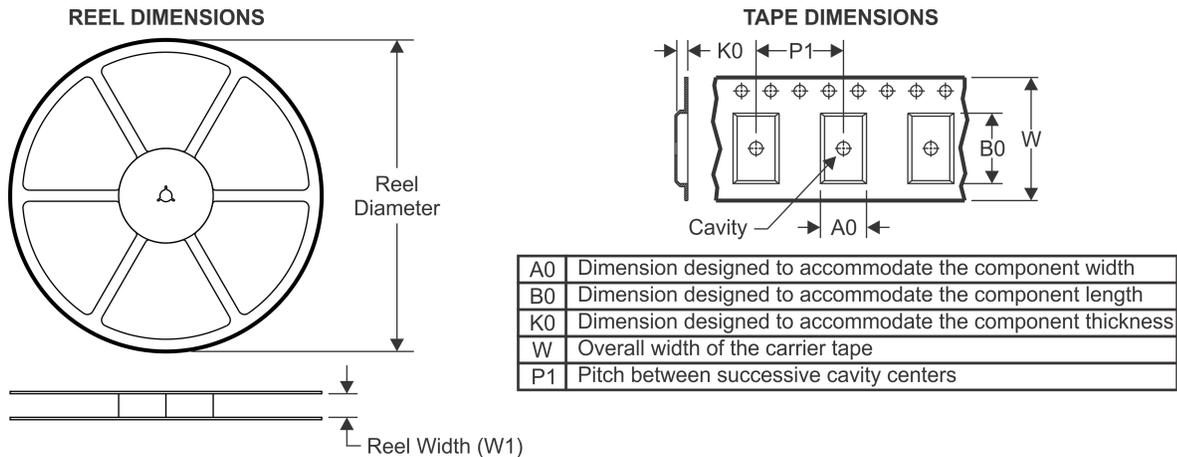
(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "-" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(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.

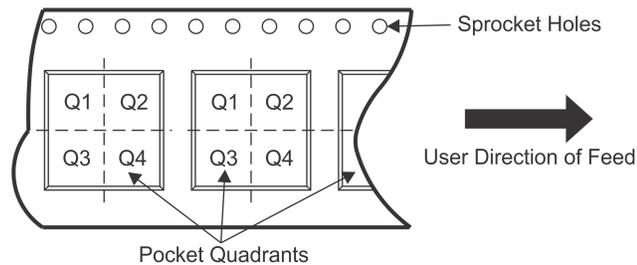
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## TAPE AND REEL INFORMATION



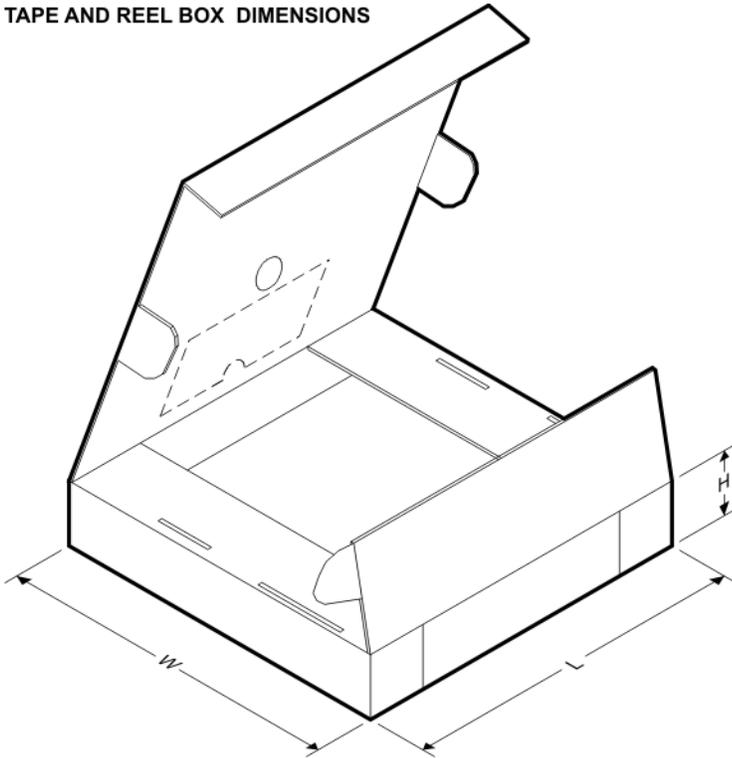
### QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



\*All dimensions are nominal

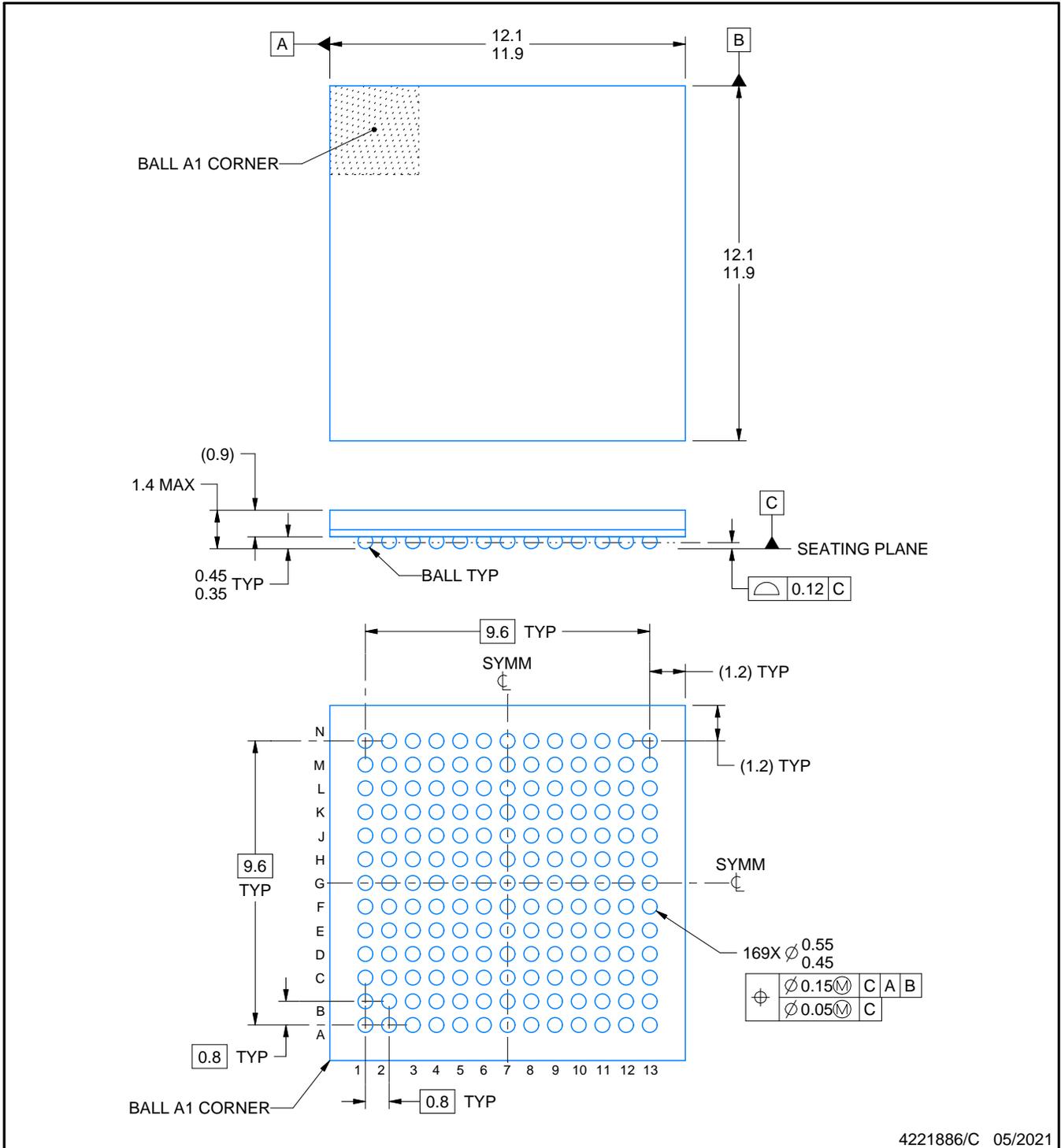
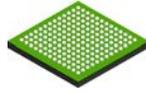
Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
TPS658643ZWSR	NFBGA	ZWS	169	1000	330.0	24.4	12.35	12.35	2.3	16.0	24.0	Q1

**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



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NOTES:

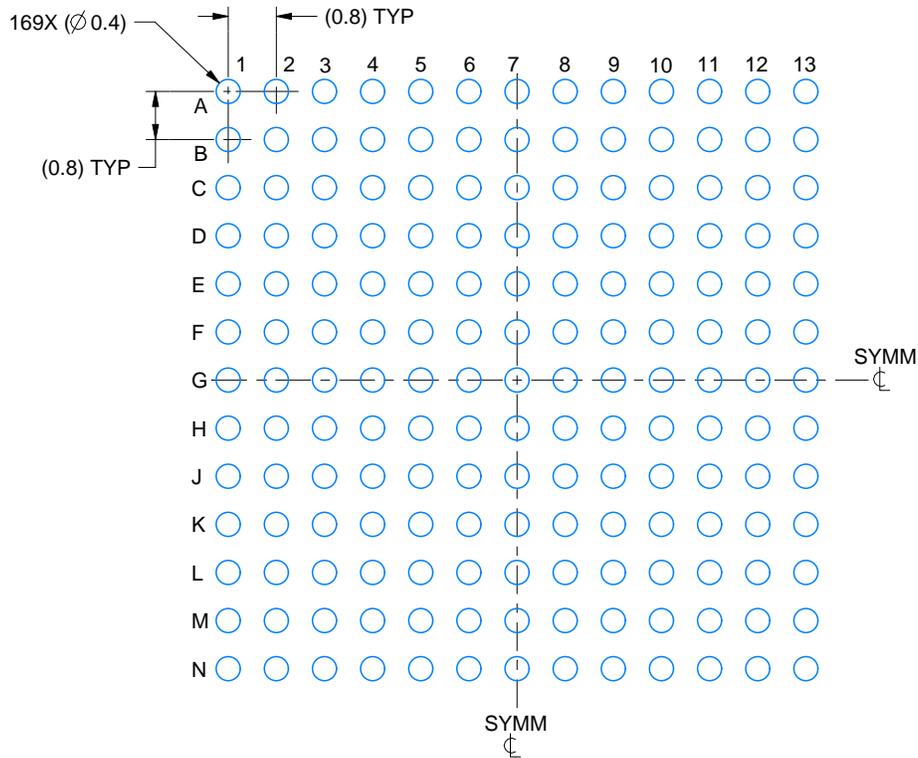
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.

# EXAMPLE BOARD LAYOUT

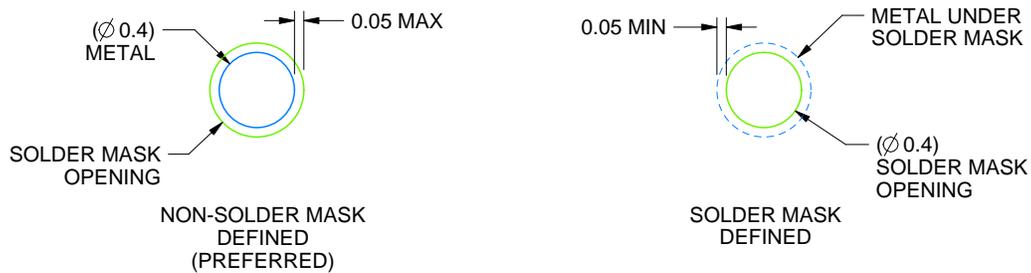
ZWS0169A

NFBGA - 1.4 mm max height

PLASTIC BALL GRID ARRAY



LAND PATTERN EXAMPLE  
SCALE:8X



SOLDER MASK DETAILS  
NOT TO SCALE

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NOTES: (continued)

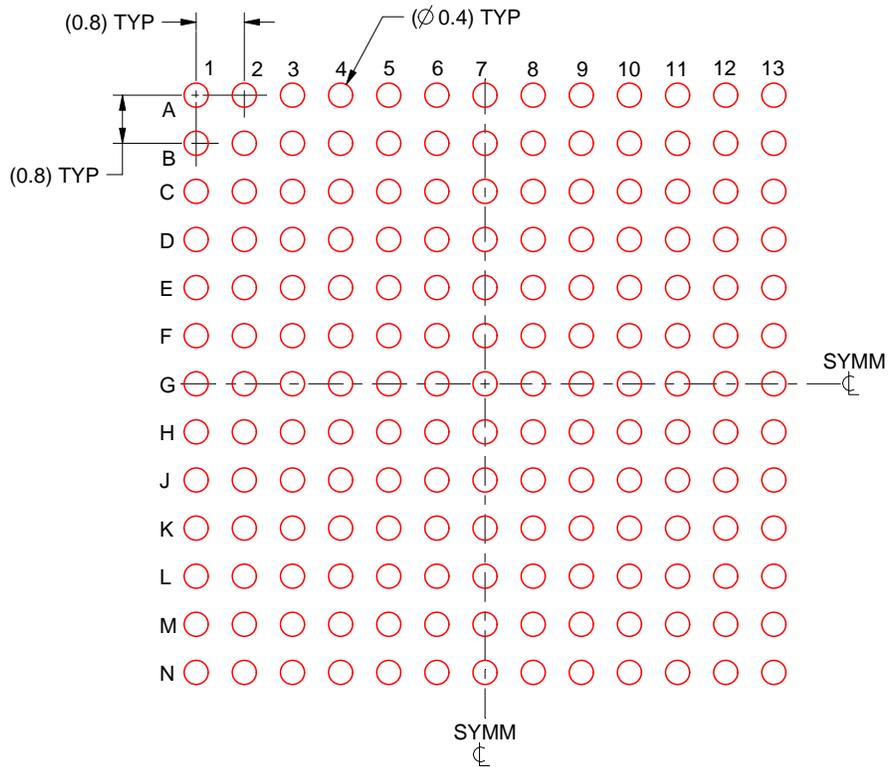
- Final dimensions may vary due to manufacturing tolerance considerations and also routing constraints. For information, see Texas Instruments literature number SSZA002 ([www.ti.com/lit/ssza002](http://www.ti.com/lit/ssza002)).

# EXAMPLE STENCIL DESIGN

ZWS0169A

NFBGA - 1.4 mm max height

PLASTIC BALL GRID ARRAY



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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