SLVSAT6A – JUNE 2011 – REVISED JUNE 2012

Advanced Power Management Unit

Check for Samples: TPS658629-Q1

1 INTRODUCTION

1.1 MAIN FEATURES

- Qualified for Automotive Applications
- AEC-Q100 Test Guidance With the Following Results:
  - Device Temperature Grade 3: –40°C to 85°C Ambient Operating Temperature Range
  - Device HBM ESD Classification Level H1C
  - Device CDM ESD Classification Level C2
- INTEGRATED POWER SUPPLIES
  - 3 Programmable Step-Down Converters
    - Software Controlled Enable/Forced PWM Mode
    - Automatic Power Saving Mode
    - Maximum 1.5 A Outputs (SM0 and SM2)
    - Maximum 1.3 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 Configurable)
    - 1 “Always On” With Output Voltages of 1.25V to 3.3V
    - 1 With Output Voltage of 1.7V–2.475V
- DISPLAY SUPPORT FUNCTIONS
  - 4 PWM Outputs With Programmable Frequency and Duty Cycle
  - Dual RGB LED Drivers
  - Constant Current WLED Driver
    - 26.5V (max) at 25mA
    - Over-Voltage Protection
    - Programmable Current Level and Brightness Control
- HOST INTERFACE
  - Interrupt Controller With Maskable Interrupts
  - External ADC Triggering and Step-Down Converter Mode Control
- SYSTEM MANAGEMENT
  - Dual Input Power Path
    - USB Current Limiting
    - Max 18V Over-Voltage Protection
  - Power Good Monitoring on all Supply Outputs
  - Software Reset Function
  - Hardware On/Off and Reboot Control
  - AUTOBOOT Support
  - 11 Channel ADC With 3 Operating Modes
    - Single Conversion
    - Peak Detection
    - Averaging

1.2 APPLICATIONS

- Portable Navigation Devices
- Portable Media Players

1.3 DESCRIPTION

The TPS658629-Q1 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.

To request a full datasheet, please send an e-mail to msapmu_contact@list.ti.com

1.4 ORDERING INFORMATION(1)

T_A	PART NUMBER(2) (3)	PACKAGE(4)	PACKAGE DESIGNATOR	ORDERING(2)	PACKAGE MARKING
–40°C to 85°C	TPS658629	169 Pin nFBGA	ZWS	TPS658629IZWSRQ1	TPS658629I

(1) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI website at www.ti.com.
(2) The TPS658629 is only available taped and reeled. Quantities are 1,000 devices per reel.
(3) Devices with distinct part numbers have unique factory configurations for supply defaults, sequencing and other functions. Consult the factor for configuration information for each part number.
(4) This product is RoHS compatible, including a lead concentration that does not exceed 0.1% of total product weight, and is suitable for use in specified lead-free soldering processes. In addition, this product uses package materials that do not contain halogens, including bromine (Br) or antimony (Sb) above 0.1% of total product weight.

11-Apr-2013

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Op Temp (°C)	Top-Side Markings (4)	Samples
TPS658629IZWSRQ1	ACTIVE	NFBGA	ZWS	169	1000	Green (RoHS & no Sb/Br)	SNAGCU	Level-3-260C-168 HR	-40 to 85	TPS658629I	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.

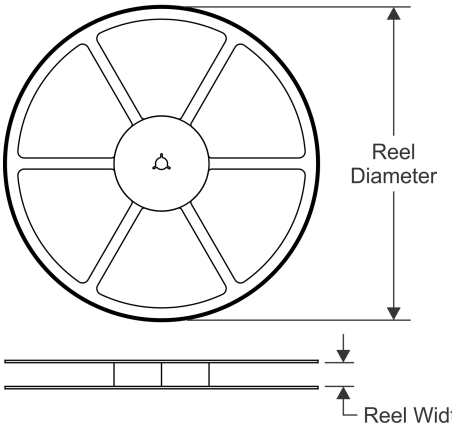
(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been 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.

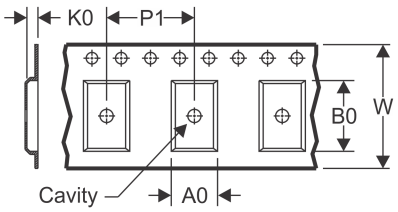
(4) Multiple Top-Side Markings will be inside parentheses. Only one Top-Side Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Top-Side Marking for that device.

TAPE AND REEL INFORMATION

REEL DIMENSIONS

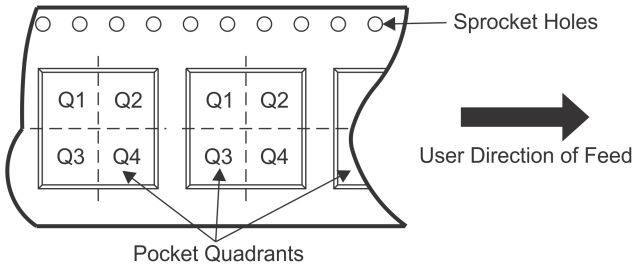


TAPE DIMENSIONS



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



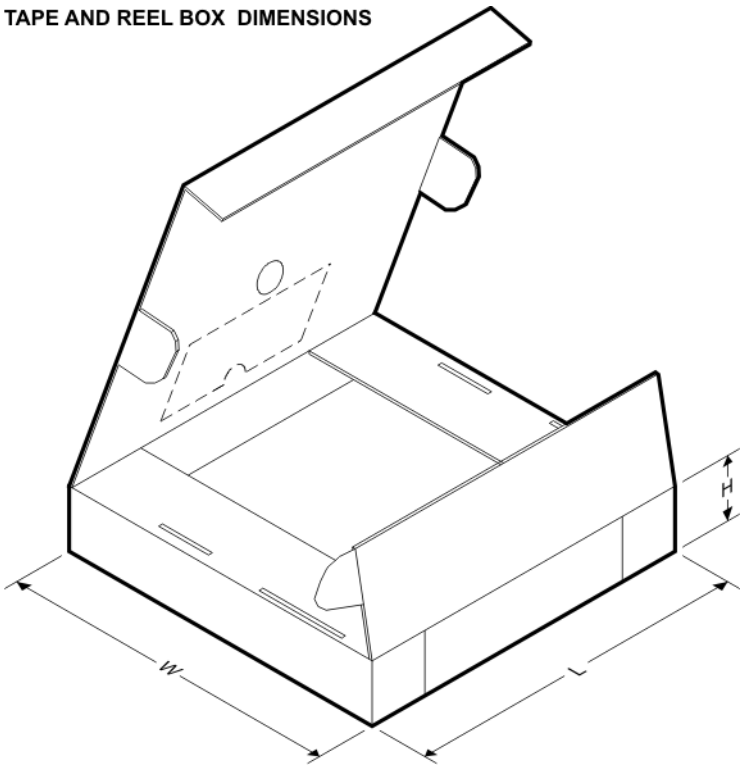
*All dimensions are nominal

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
TPS658629IZWSRQ1	NFBGA	ZWS	169	1000	330.0	24.4	12.35	12.35	2.3	16.0	24.0	Q1

PACKAGE MATERIALS INFORMATION

1-Oct-2012

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

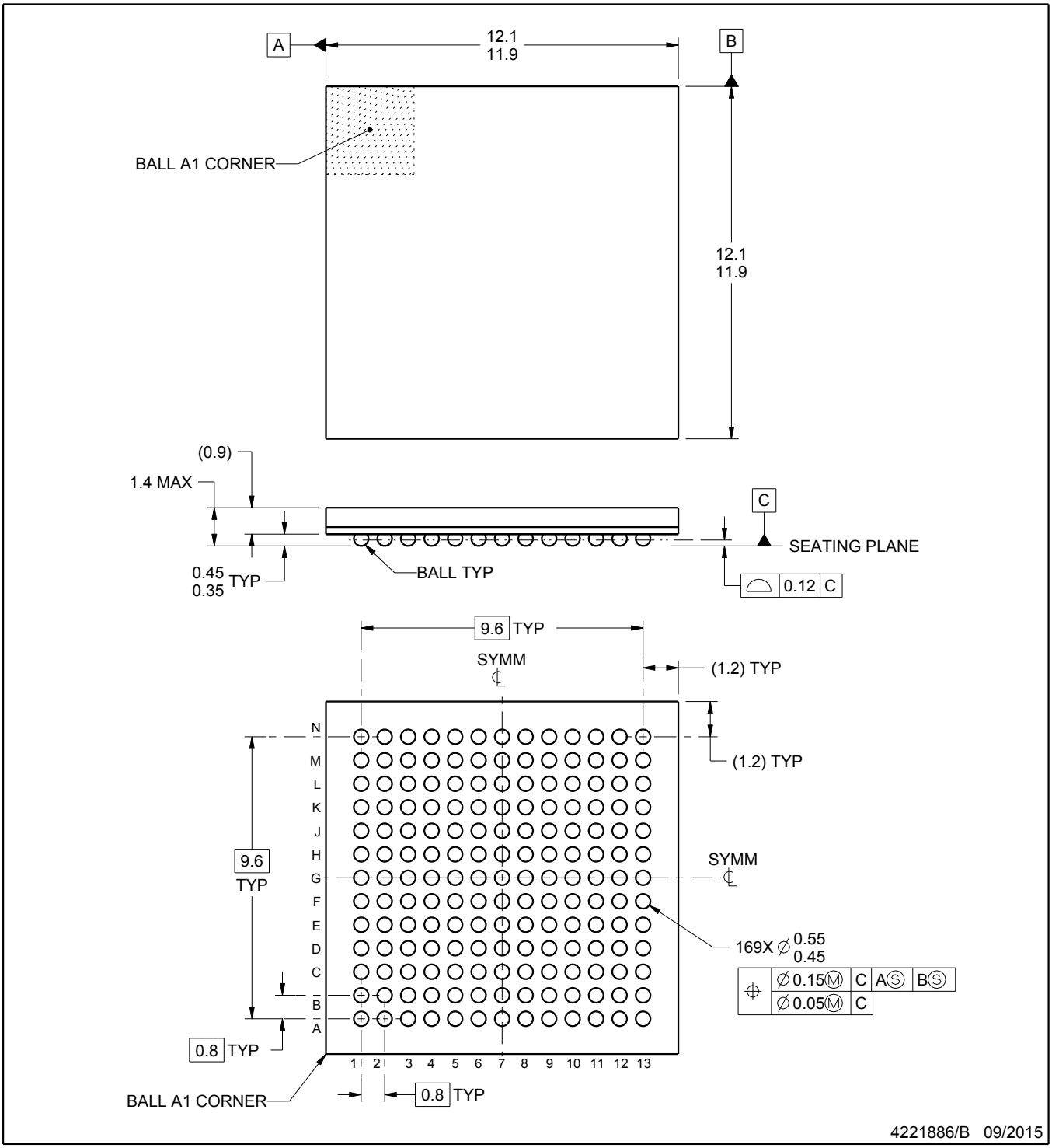
Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TPS658629IZWSRQ1	NFBGA	ZWS	169	1000	336.6	336.6	41.3

PACKAGE OUTLINE

ZWS0169A

PBGA - 1.4 mm max height

PLASTIC BALL GRID ARRAY



NOTES:

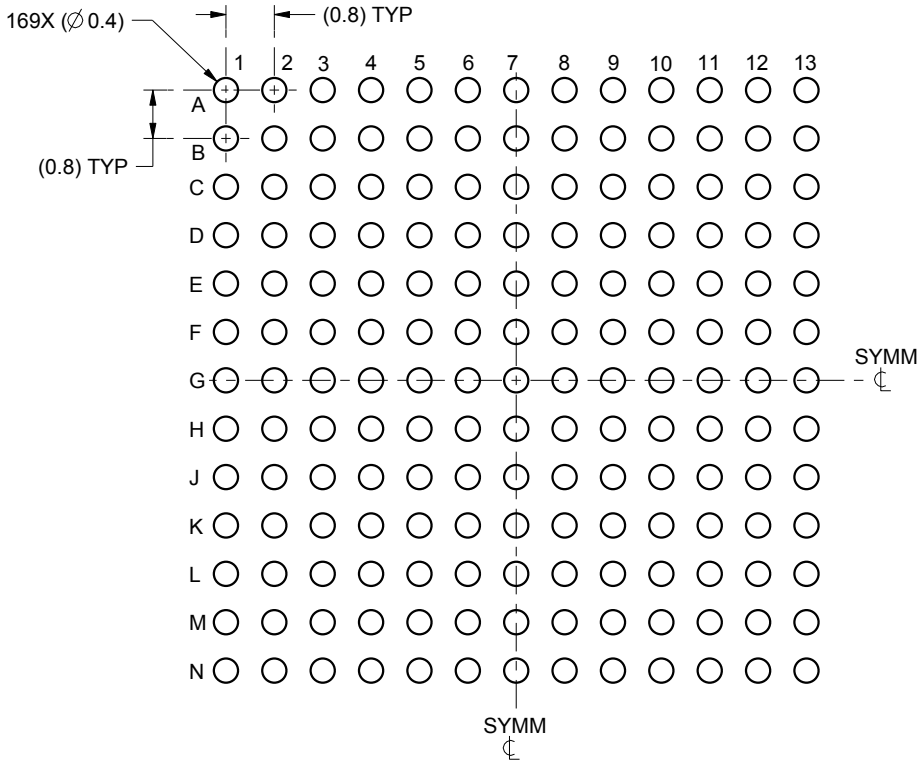
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.

EXAMPLE BOARD LAYOUT

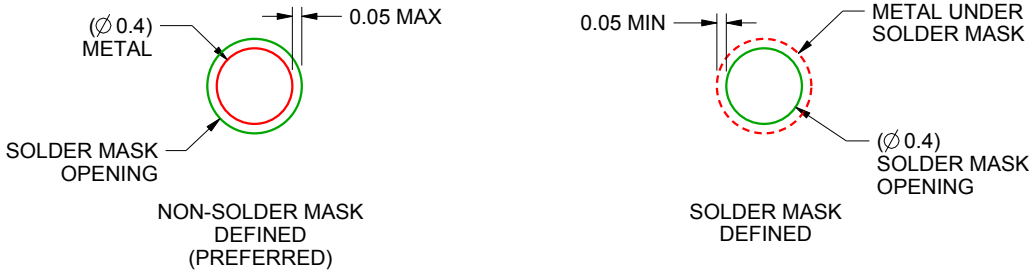
ZWS0169A

PBGA - 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)

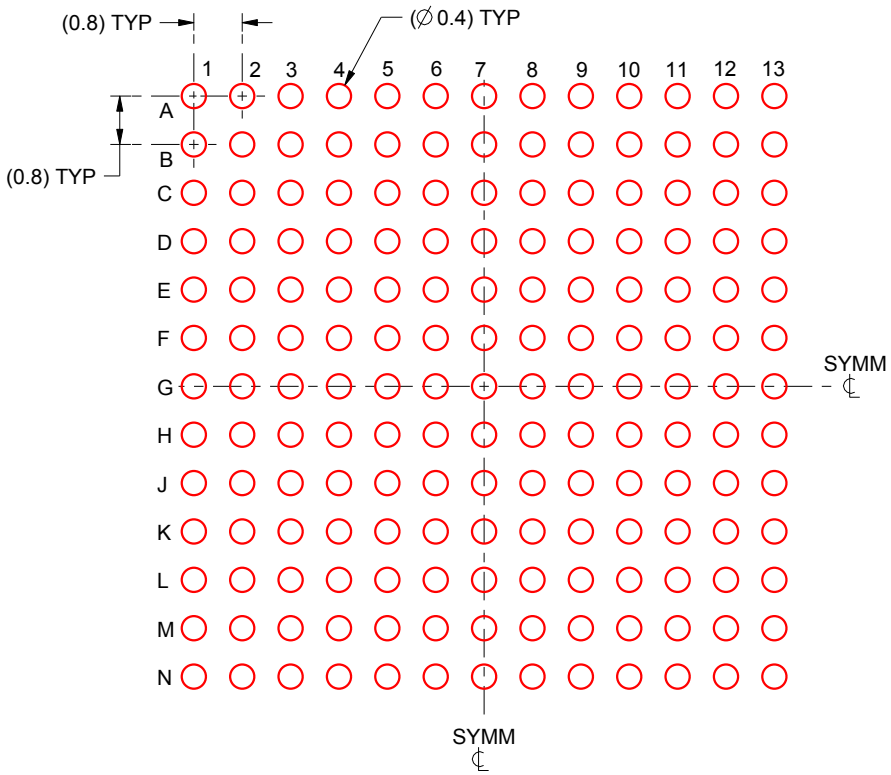
3. Final dimensions may vary due to manufacturing tolerance considerations and also routing constraints. For information, see Texas Instruments literature number SSZA002 (www.ti.com/lit/ssza002).

EXAMPLE STENCIL DESIGN

ZWS0169A

PBGA - 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.