Advanced Power Management Unit

Check for Samples: TPS658621D

## 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 1.5 A Outputs (SM0 and SM2)**
    - **Maximum 2.0 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 1.70V–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**
- **Momentary Power Loss (MPL) support**
- **AUTOBOOT support**
- **11 Channel ADC With 3 Operating Modes**
  - **Single Conversion**
  - **Peak Detection**
  - **Averaging**

1.2 APPLICATIONS

- **Netbooks**
- **Portable Navigation Devices**
- **Portable Media Players**

MicroStar BGA ™
Chip Scale Tape BGA
(u•BGA)
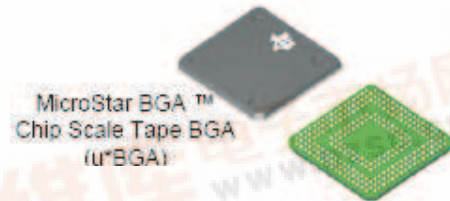
1.3 DESCRIPTION

The TPS658621D provides an easy to use, fully integrated solution for handheld devices, integrating charge management, multiple regulated power supplies, system management and display functions in a small package. The I²C™ 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.

⚠ Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

I²C is a trademark of NXP B. V Corporation.

"TPS658621D"

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

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PACKAG

PACKAGING INFORMATION

Orderable Device	Status [1]	Package Type	Package Drawing	Pins	Package Qty	Eco Plan [2]	Lead/ Ball Finish	MSL Pea
TPS658621DZGUR	ACTIVE	BGA MICROSTAR	ZGU	169	1000	Green (RoHS & no Sb/Br)	SNAGCU	Level-3-2600
TPS658621DZGUT	ACTIVE	BGA MICROSTAR	ZGU	169	250	Green (RoHS & no Sb/Br)	SNAGCU	Level-3-2600
TPS658621DZQZR	ACTIVE	BGA MICROSTAR JUNIOR	ZQZ	120	2500	Green (RoHS & no Sb/Br)	SNAGCU	Level-3-2600
TPS658621DZQZT	ACTIVE	BGA MICROSTAR JUNIOR	ZQZ	120	250	Green (RoHS & no Sb/Br)	SNAGCU	Level-3-2600

[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

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.T 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 lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable fo

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, the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
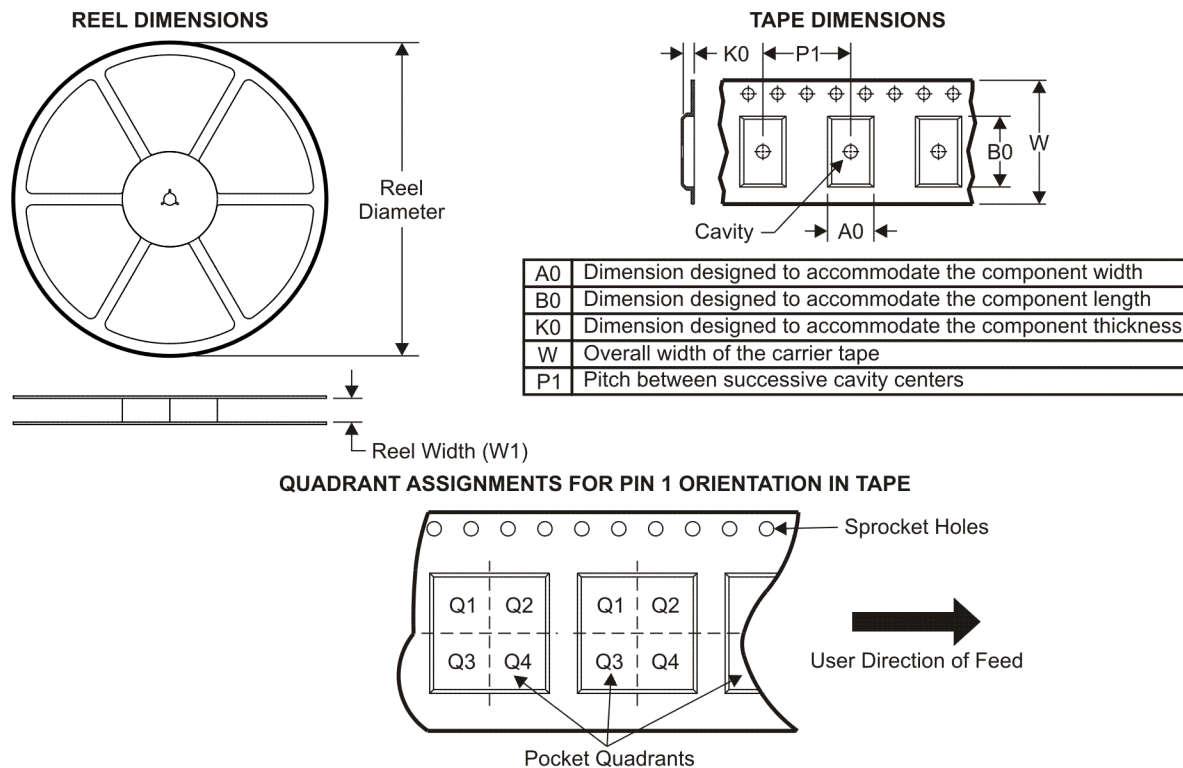
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retard in homogeneous material)

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

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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
TPS658621DZGUR	BGA MICROSTAR	ZGU	169	1000	330.0	24.4	12.3	12.3	2.3	16.0	24.0	Q1
TPS658621DZGUT	BGA MICROSTAR	ZGU	169	250	330.0	24.4	12.3	12.3	2.3	16.0	24.0	Q1
TPS658621DZQZR	BGA MICROSTAR JUNIOR	ZQZ	120	2500	330.0	16.4	6.3	6.3	1.5	12.0	16.0	Q1
TPS658621DZQZT	BGA MICROSTAR JUNIOR	ZQZ	120	250	330.0	16.4	6.3	6.3	1.5	12.0	16.0	Q1

TAPE AND REEL BOX DIMENSIONS
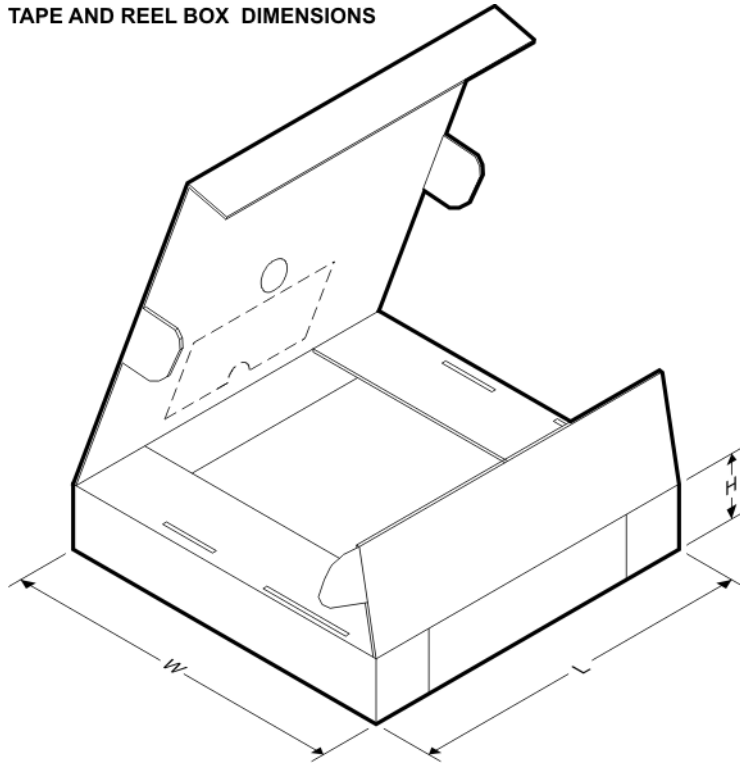
*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TPS658621DZGUR	BGA MICROSTAR	ZGU	169	1000	333.2	345.9	31.8
TPS658621DZGUT	BGA MICROSTAR	ZGU	169	250	333.2	345.9	31.8
TPS658621DZQZR	BGA MICROSTAR JUNIOR	ZQZ	120	2500	333.2	345.9	28.6
TPS658621DZQZT	BGA MICROSTAR JUNIOR	ZQZ	120	250	333.2	345.9	28.6

"TPS658621D"

ZQZ (S−PBGA−N120)   PLASTIC BALL GRID ARRAY
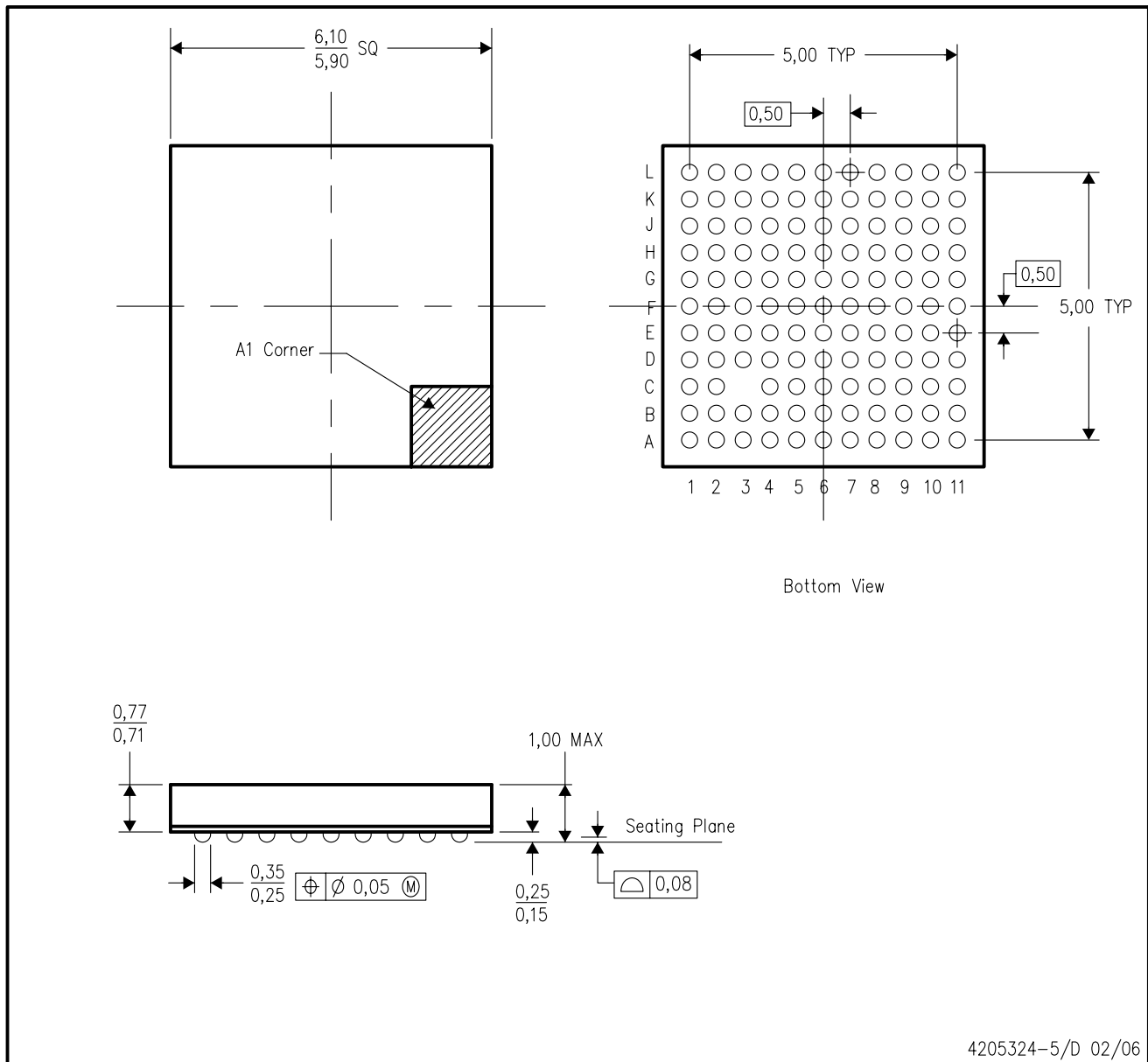
6,10 / 5,90 SQ

5,00 TYP

0,50

A1 Corner

L K J H G F E D C B A

1 2 3 4 5 6 7 8 9 10 11

0,50

5,00 TYP

Bottom View

0,77 / 0,71

1,00 MAX

Seating Plane

0,35 / 0,25   ⊕ Ø 0,05 Ⓜ

0,25 / 0,15

⌂ 0,08

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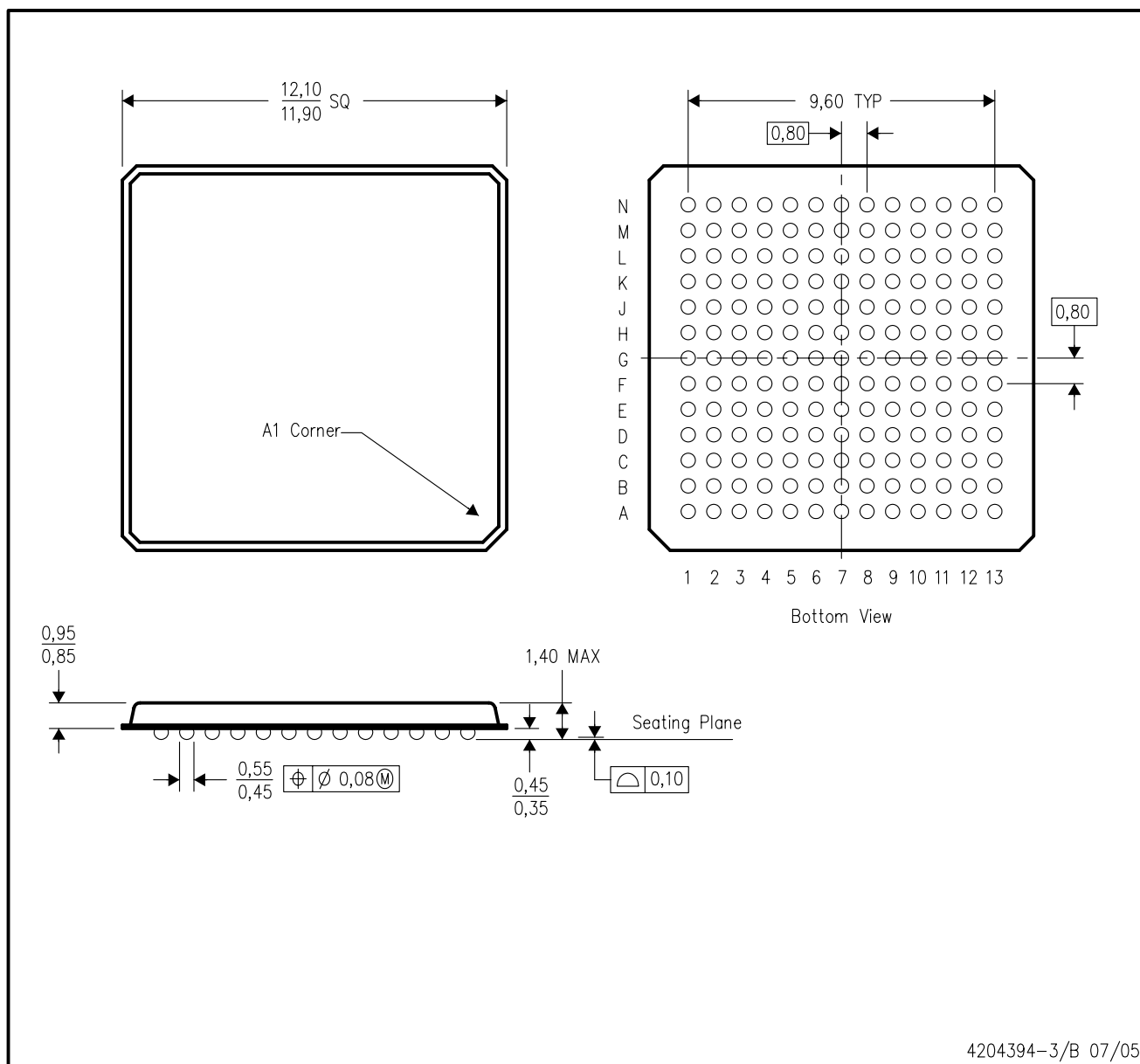
NOTES: A.   All linear dimensions are in millimeters.
         B.   This drawing is subject to change without notice.
         C.   Falls within JEDEC MO−225
         D.   This package is lead−free.

"TPS658621D"

ZGU (S–PBGA–N169)   PLASTIC BALL GRID ARRAY

12,10 / 11,90 SQ

0,80

9,60 TYP

0,80

A1 Corner

N M L K J H G F E D C B A

1 2 3 4 5 6 7 8 9 10 11 12 13

Bottom View

0,95 / 0,85

1,40 MAX

Seating Plane

0,55 / 0,45

⊕ ⌀ 0,08 Ⓜ

0,45 / 0,35

0,10

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NOTES: A.   All linear dimensions are in millimeters.
         B.   This drawing is subject to change without notice.
         C.   Micro Star BGA configuration
         D.   This is a lead–free solder ball design.

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