

## bq2510x 250-mA Single-Input, Single Cell Li-Ion Battery Chargers

### 1 Features

- Charging
  - 1% Charge Voltage Accuracy
  - 10% Charge Current Accuracy
  - Supports Applications for Very Low Charge Currents - 10 mA to 250 mA
  - Supports 1mA Charge Termination Currents with 25% Accuracy
  - Adjustable Termination and Precharge Threshold
  - High voltage Chemistry Support: 4.35 V with bq25100H/01H, 4.30 V with bq25100A
- Protection
  - 30-V Input Rating; with 6.5-V Input Overvoltage Protection
  - Input Voltage Dynamic Power Management
  - 125°C Thermal Regulation; 150°C Thermal Shutdown Protection
  - OUT Short-Circuit Protection and ISET Short Detection
  - Operation over JEITA Range via Battery NTC – 1/2 Fast-Charge-Current at Cold, 4.06 V (bq25100/01) or 4.2 V (bq25100H/01H) at Hot
  - Fixed 10 Hour Safety Timer
- System
  - Automatic Termination and Timer Disable Mode (TTDM) for Absent Battery Pack with Thermistor
  - Available in Small 1.20 mm x 0.80 mm DSBGA Package

### 2 Applications

- Fitness Accessories
- Smart Watches
- Bluetooth® Headsets
- Low-Power Handheld Devices

### 3 Description

The bq2510x series of devices are highly integrated Li-Ion and Li-Pol linear chargers targeted at space-limited portable applications. The high input voltage range with input overvoltage protection supports low-cost unregulated adapters.

The bq2510x has a single power output that charges the battery. A system load can be placed in parallel with the battery as long as the average system load does not keep the battery from charging fully during the 10 hour safety timer.

The battery is charged in three phases: conditioning, constant current and constant voltage. In all charge phases, an internal control loop monitors the IC junction temperature and reduces the charge current if an internal temperature threshold is exceeded.

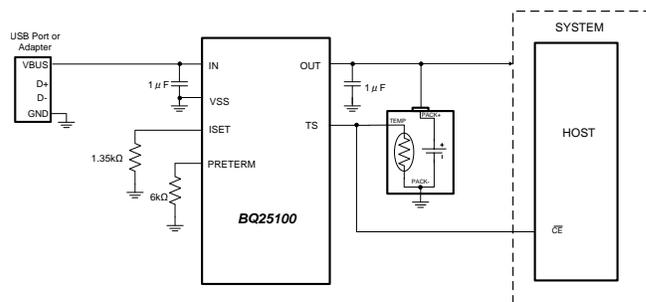
The charger power stage and charge current sense functions are fully integrated. The charger function has high accuracy current and voltage regulation loops and charge termination. The pre-charge current and termination current threshold are programmed via an external resistor on the bq2510x. The fast charge current value is also programmable via an external resistor.

#### Device Information(1)

PART NUMBER	PACKAGE	BODY SIZE (NOM)
bq25100(2)	DSBGA (6)	1.20 mm x 0.80 mm
bq25101(2)	DSBGA (6)	1.20 mm x 0.80 mm
bq25100A(2)	DSBGA (6)	1.20 mm x 0.80 mm
bq25100H(2)	DSBGA (6)	1.20 mm x 0.80 mm
bq25101H(2)	DSBGA (6)	1.20 mm x 0.80 mm
bq25100L(2)	DSBGA (6)	1.20 mm x 0.80 mm

(1) For all available packages, see the orderable addendum at the end of the datasheet.

(2) Product preview. Contact the local TI representative for device details.



## 4 Device and Documentation Support

### 4.1 Device Support

#### 4.1.1 Third-Party Products Disclaimer

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### 4.2 Related Links

The table below lists quick access links. Categories include technical documents, support and community resources, tools and software, and quick access to sample or buy.

**Table 1. Related Links**

PARTS	PRODUCT FOLDER	SAMPLE & BUY	TECHNICAL DOCUMENTS	TOOLS & SOFTWARE	SUPPORT & COMMUNITY
bq25100	<a href="#">Click here</a>				
bq25101	<a href="#">Click here</a>				
bq25100A	<a href="#">Click here</a>				
bq25100H	<a href="#">Click here</a>				
bq25101H	<a href="#">Click here</a>				
bq25100L	<a href="#">Click here</a>				

### 4.3 Trademarks

Bluetooth is a registered trademark of Bluetooth SIG, Inc..

### 4.4 Electrostatic Discharge Caution



These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

### 4.5 Glossary

[SLYZ022](#) — *TI Glossary*.

This glossary lists and explains terms, acronyms, and definitions.

## 5 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.

**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)	Samples
BQ25100AYFPR	PREVIEW	DSBGA	YFP	6	3000	Green (RoHS & no Sb/Br)	SNAGCU	Level-1-260C-UNLIM	-40 to 85	25100A	
BQ25100AYFPT	PREVIEW	DSBGA	YFP	6	250	Green (RoHS & no Sb/Br)	SNAGCU	Level-1-260C-UNLIM	-40 to 85	25100A	
BQ25100HYFPR	PREVIEW	DSBGA	YFP	6	3000	TBD	Call TI	Call TI	0 to 125		
BQ25100HYFPT	PREVIEW	DSBGA	YFP	6	250	TBD	Call TI	Call TI	0 to 125		
BQ25100YFPR	PREVIEW	DSBGA	YFP	6	3000	Green (RoHS & no Sb/Br)	SNAGCU	Level-1-260C-UNLIM	-40 to 85	25100	
BQ25100YFPT	PREVIEW	DSBGA	YFP	6	250	Green (RoHS & no Sb/Br)	SNAGCU	Level-1-260C-UNLIM	-40 to 85	25100	
BQ251010YFFR	PREVIEW	DSBGA	YFF	28		TBD	Call TI	Call TI	0 to 125		

(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) 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.

<sup>(6)</sup> 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.

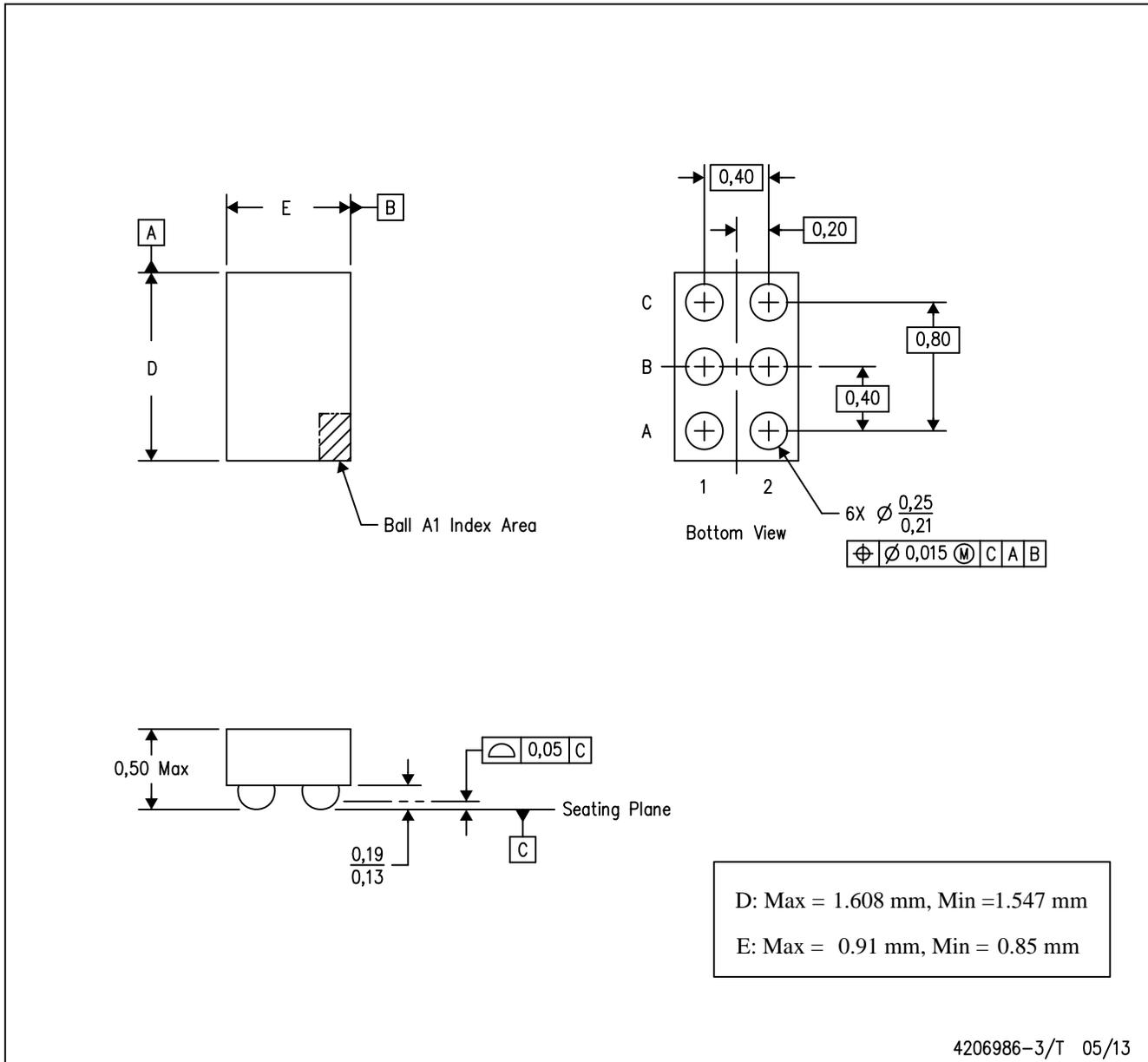
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# MECHANICAL DATA

YFP (R-XBGA-N6)

DIE-SIZE BALL GRID ARRAY

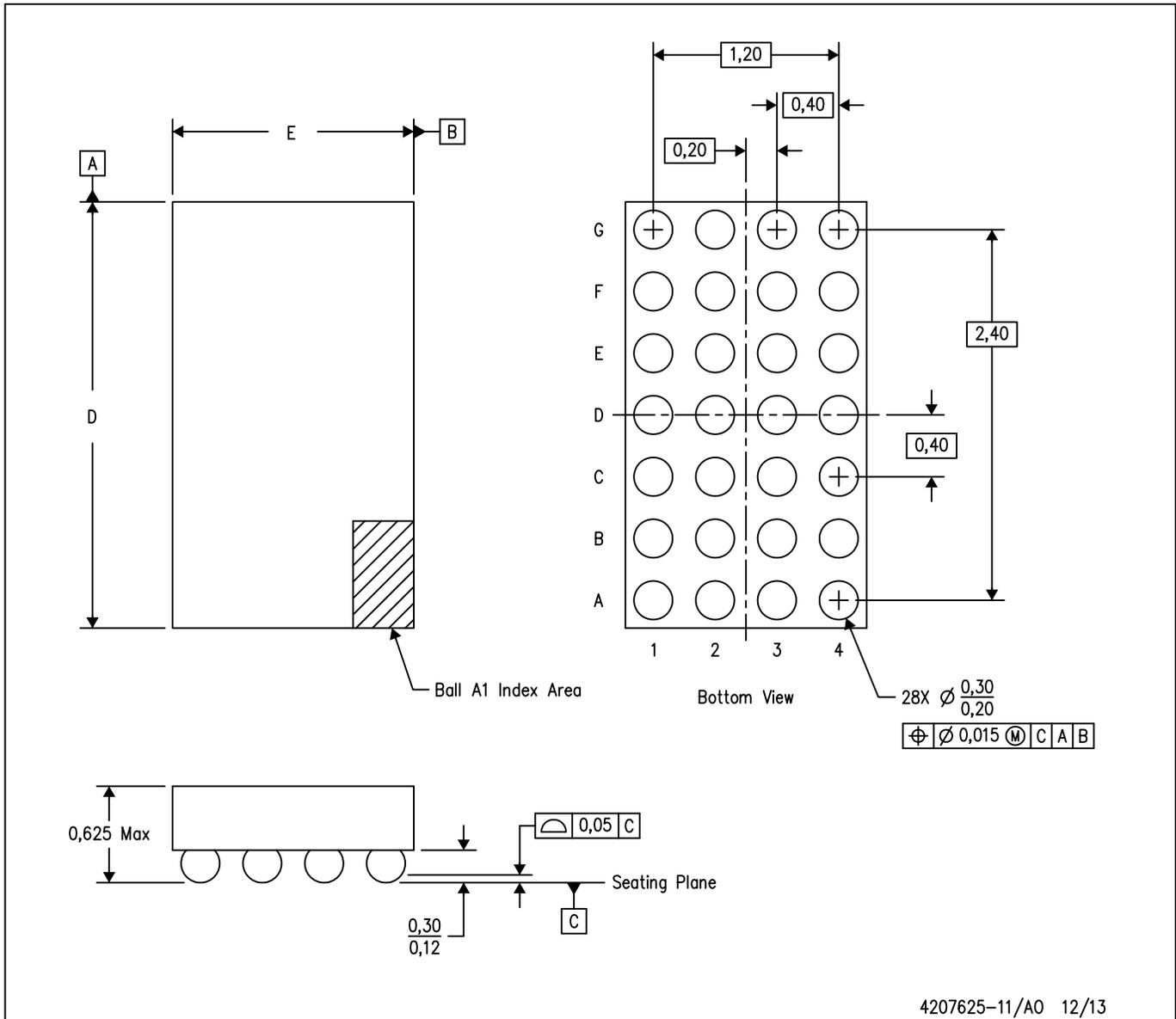


- NOTES:
- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
  - B. This drawing is subject to change without notice.
  - C. NanoFree™ package configuration.

NanoFree is a trademark of Texas Instruments

YFF (R-XBGA-N28)

DIE-SIZE BALL GRID ARRAY



- NOTES:
- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
  - B. This drawing is subject to change without notice.
  - C. NanoFree™ package configuration.

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### Applications

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Computers and Peripherals	<a href="http://www.ti.com/computers">www.ti.com/computers</a>
Consumer Electronics	<a href="http://www.ti.com/consumer-apps">www.ti.com/consumer-apps</a>
Energy and Lighting	<a href="http://www.ti.com/energy">www.ti.com/energy</a>
Industrial	<a href="http://www.ti.com/industrial">www.ti.com/industrial</a>
Medical	<a href="http://www.ti.com/medical">www.ti.com/medical</a>
Security	<a href="http://www.ti.com/security">www.ti.com/security</a>
Space, Avionics and Defense	<a href="http://www.ti.com/space-avionics-defense">www.ti.com/space-avionics-defense</a>
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