TEXAS INSTRUMENTS

bq24257
bq24258

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2A Single Input I²C, Standalone Switch-Mode Li-Ion Battery Charger with Integrated Current Sense Resistor

Check for Samples: bq24257, bq24258

FEATURES

- High-efficiency Switch-mode Charger with Integrated Current Sense Resistor
- USB Charging Compliant
  - Selectable Input Current Limit of 100 mA and 500 mA
- In Host Mode (after I²C™ Communication and Before Watchdog Timer Times Out)
  - Programmable Battery Charge Voltage (V_{BATREG})
  - Programmable Battery Charge Current (I_{CHG})
  - Programmable Input Current Limit (I_{LIM})
  - Programmable Input Voltage Based Dynamic Power Management Threshold (V_{IN_DPM})
  - Programmable Input Overvoltage Protection Threshold (V_{OVP})
- In Standalone Mode (before I²C™ Communication and After Watchdog Timer Times Out)
  - Resistor Programmable I_{CHG} up to 2 A With Current Monitoring Output (I_{SET})
  - Resistor Programmable I_{LIM} up to 2 A With Current Monitoring Output (I_{LIM})
  - Resistor Programmable (V_{IN_DPM})
- Watchdog Timer with Disable Bit
- Integrated 4.9 V, 50 mA LDO
- Complete System Level Protection
  - Input UVLO, Input Overvoltage Protection (OVP), Battery OVP, Sleep Mode, V_{IN_DPM}
  - Input Current Limit
  - Charge Current Limit
  - Thermal Regulation and Thermal Shutdown
  - Voltage Based, JEITA Compatible NTC Monitoring Input
  - Safety Timer
- 20 V Maximum Input Voltage Rating
- 10.5 V Maximum Operating Input Voltage
- Low $R_{DS(on)}$ Integrated Sense Resistor (25 mΩ Typical) for up to 2 A Charging Rate
- Open Drain Status Outputs
- Synchronous Fixed-frequency PWM Controller Operating at 3 MHz for Small Inductor Support
- *AnyBoot* Robust Battery Detection Algorithm
- Charge Time Optimizer for Improved Charge Times at any Given Charge Current

APPLICATIONS

- Mobile Phones, Smart Phones
- MP3 Players
- Handheld Devices

AVAILABLE OPTIONS

Device	Default OVP	D+/D- or EN1/EN2	Default VOREG	VLOWV	TS or DBP	Termination (1)	Chem	i2c	Addr	Default USB ILIM
bq24257	6.5 V	D+/D-	3.6 V	3 V	TS	10%	Li / LiPo	Yes	0x6A	100mA
bq24258 (2)	10.5 V	EN1/EN2	4. 2 V	3 V	TS	10%	LiFePO4	No	0x6A	N/A (3)

(1) Default behavior unless changed via i2C.
(2) 4.35 V option available
(3) Selectable via the EN1, EN2, EN3 pins.

Visit ti.com/batterymanagement for product details and design resources

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.

DESCRIPTION

The bq24257 is a highly integrated single-cell Li-Ion battery charger with integrated current sense resistor targeted for space-limited, portable applications with high capacity batteries. The single cell charger has a single input that operates from either a USB port or AC wall adapter for a versatile solution. BC1.2 compliant D+/D- detection allows for recognition of CDP, DCP, SDP, and non-standard USB adapters. The use of an accessory dead battery provision (DBP) pin allows for the system to sync a dead battery state in order to enable/disable the BC1.2 detection in the case of an external USB-PHI.

The bq24257 has two modes of operation: 1) I2C mode, and 2) Standalone mode. In I2C mode, the host can adjust the charge parameters and monitor the status of the charger operation. In Standalone mode, the external resistor sets the input current limit, charge current limit, and the input DPM level. This mode also serves as the default settings when a DCP adapter is present. The bq24257 enters host mode while the I2C registers are accessed and the watchdog timer has not expired (if enabled).

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

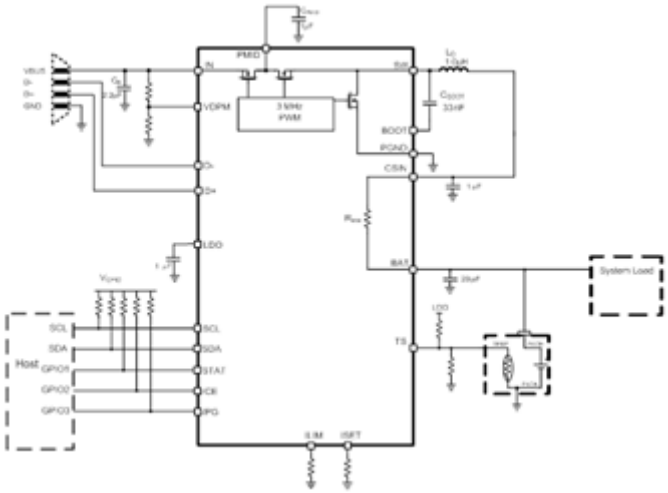


Figure 1. Typical Application Circuit

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
BQ24257YFFR	PREVIEW	DSBGA	YFF	30	3000	TBD	Call TI	Call TI			
BQ24257YFFT	PREVIEW	DSBGA	YFF	30	250	TBD	Call TI	Call TI			

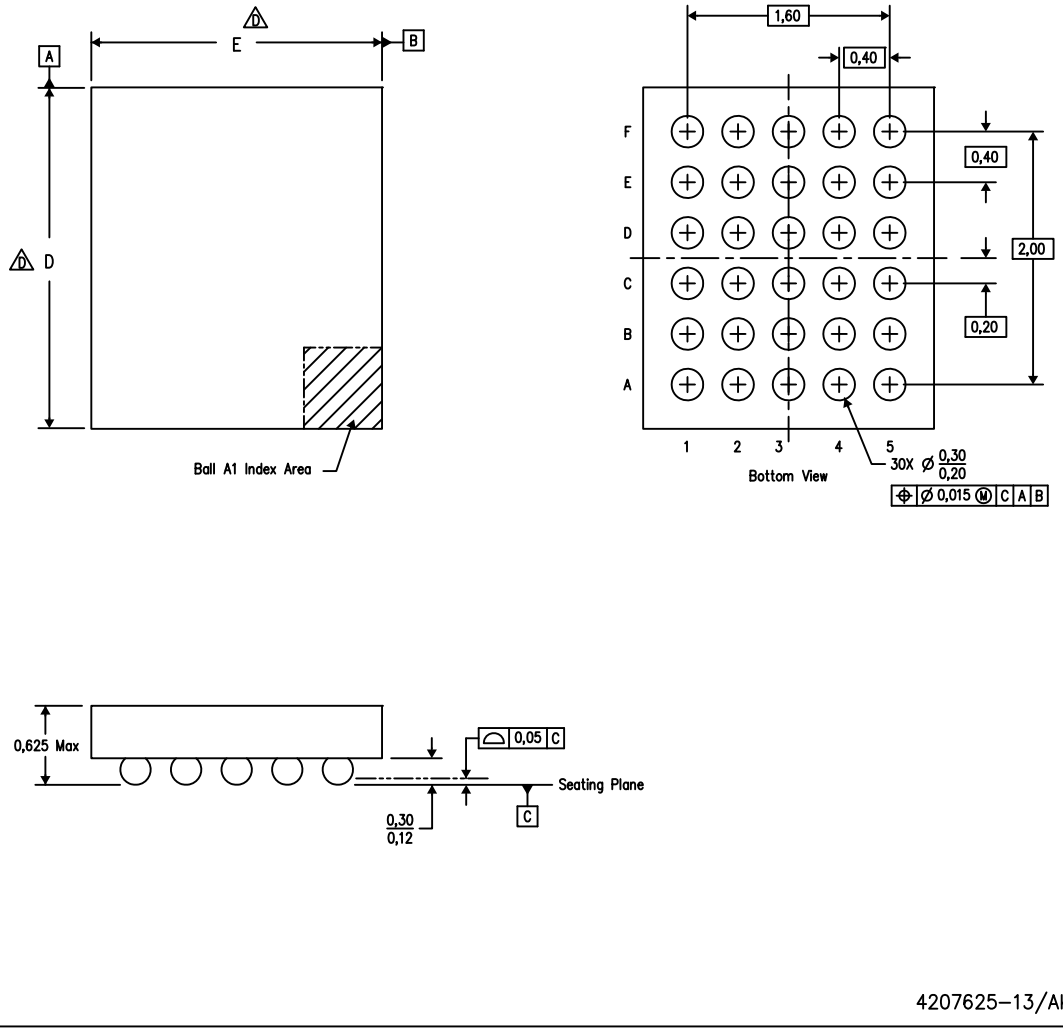
(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, 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) Only one of markings shown within the brackets will appear on the physical device.

YFF (R–XBGA–N30) DIE–SIZE BALL GRID ARRAY



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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.
D. The package size (Dimension D and E) of a particular device is specified in the device Product Data Sheet version of this drawing, in case it cannot be found in the product data sheet please contact a local TI representative.
E. Reference Product Data Sheet for array population.
6 x 5 matrix pattern is shown for illustration only.
F. This package contains Pb–free balls.

NanoFree is a trademark of Texas Instruments

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