SINGLE-CHIP, LI-ION AND LI-POL CHARGER IC WITH AUTONOMOUS USB-PORT AND AC-ADAPTER SUPPLY MANAGEMENT (bqTINY™-II)

FEATURES

- **Small 3 mm × 3 mm MLP Package**
- **Charges and powers Systems from Either AC Adapter or USB With Autonomous power-Source Selection**
- **Integrated USB Control With Selectable 100 mA and 500 mA Charge Rates**
- **Ideal for Low-Dropout Charger Designs for Single-Cell Li-Ion or Li-pol Packs in Space Limited portable applications**
- **Integrated power FET and Current Sensor for Up to 1-A Charge applications From AC Adapter**
- **Precharge Conditioning With Safety Timer**
- **power Good (AC Adapter Present) Status Output**
- **Optional Battery Temperature Monitoring Before and During Charge**
- **Automatic Sleep Mode for Low-power Consumption**

APPLICATIONS

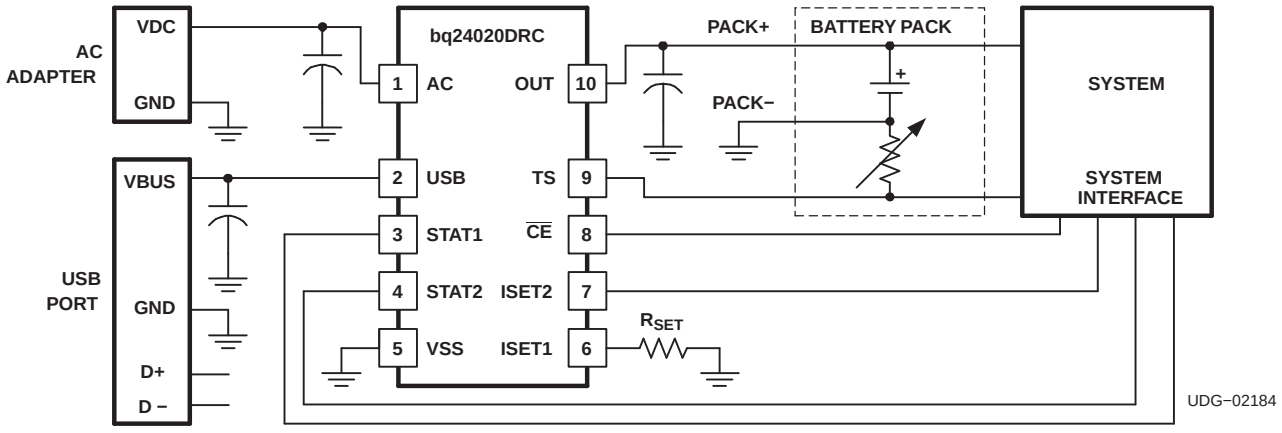
- **PDAs, MP3 Players**
- **Digital Cameras**
- **Internet appliances**
- **Smartphones**

DESCRIPTION

The bqTINY-II series are highly-integrated, flexible Li-Ion linear charge and system power management devices for space-limited charger applications. In a single monolithic device, the bqTINY-II offers integrated USB-port and ac-adapter supply management with autonomous power-source selection, power-FET and current-sensor interfaces, high-accuracy current and voltage regulation, charge status, and charge termination.

The bqTINY-II automatically selects the USB-port or the ac-adapter as the power source for the system. In the USB configuration, the host can select from two preset charge rates of 100 mA or 500 mA. In the ac-adapter configuration, an external resistor sets the system or charge current.

The bqTINY-II charges the battery in three phases: conditioning, constant current, and constant voltage. Charge is terminated based on minimum current. An internal charge timer provides a backup safety for charge termination. The bqTINY-II automatically restarts the charge if the battery voltage falls below an internal threshold. The bqTINY-II automatically enters sleep mode when both supplies are removed.



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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 CONTINUED

Different versions of the bqTINY-II offer many additional features. These include a temperature-sensor input for detecting hot or cold battery packs, a power-good output ($\overline{PG}$) indicating the presence of input power, a TTL-level charge-enable input ($\overline{CE}$) used to disable or enable the charge process, and a TTL-level timer and taper-detect enable input ($\overline{TTE}$) used to disable or enable the fast-charge timer and charge termination.

ORDERING INFORMATION

T_J	CHARGE REGULATION	OPTIONAL FUNCTIONS(1)	FAST-CHARGE TIMER (Hours)	TAPER TIMER	USB TAPER THRESHOLD	PART	MARKINGS

Dissipation Ratings

ABSOLUTE MAXIMUM RATINGS(1)

RECOMMENDED OPERATING CONDITIONS

ELECTRICAL CHARACTERISTICS

ELECTRICAL CHARACTERISTICS (continued)

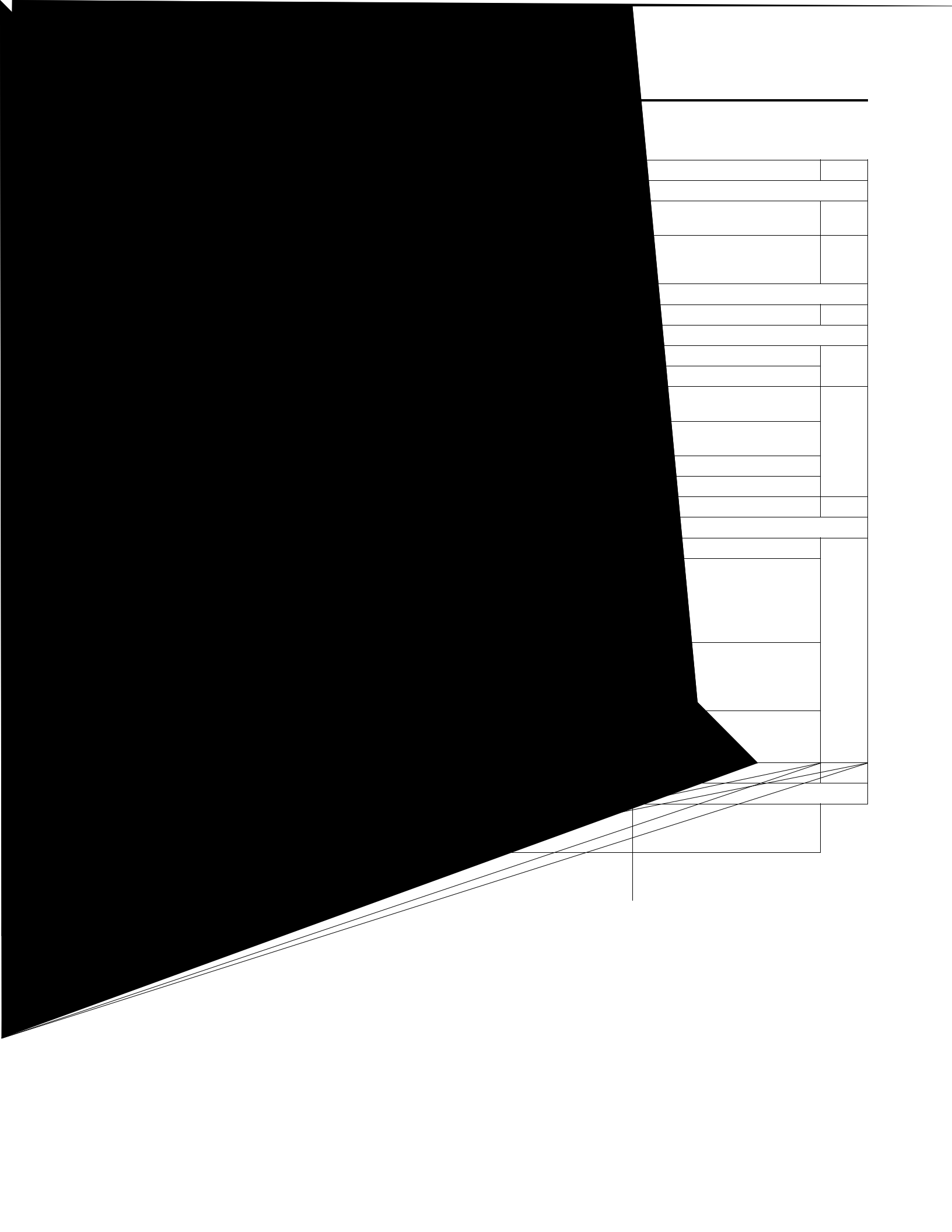
over 0°C T_J 125°C and recommended supply voltage, unless otherwise noted

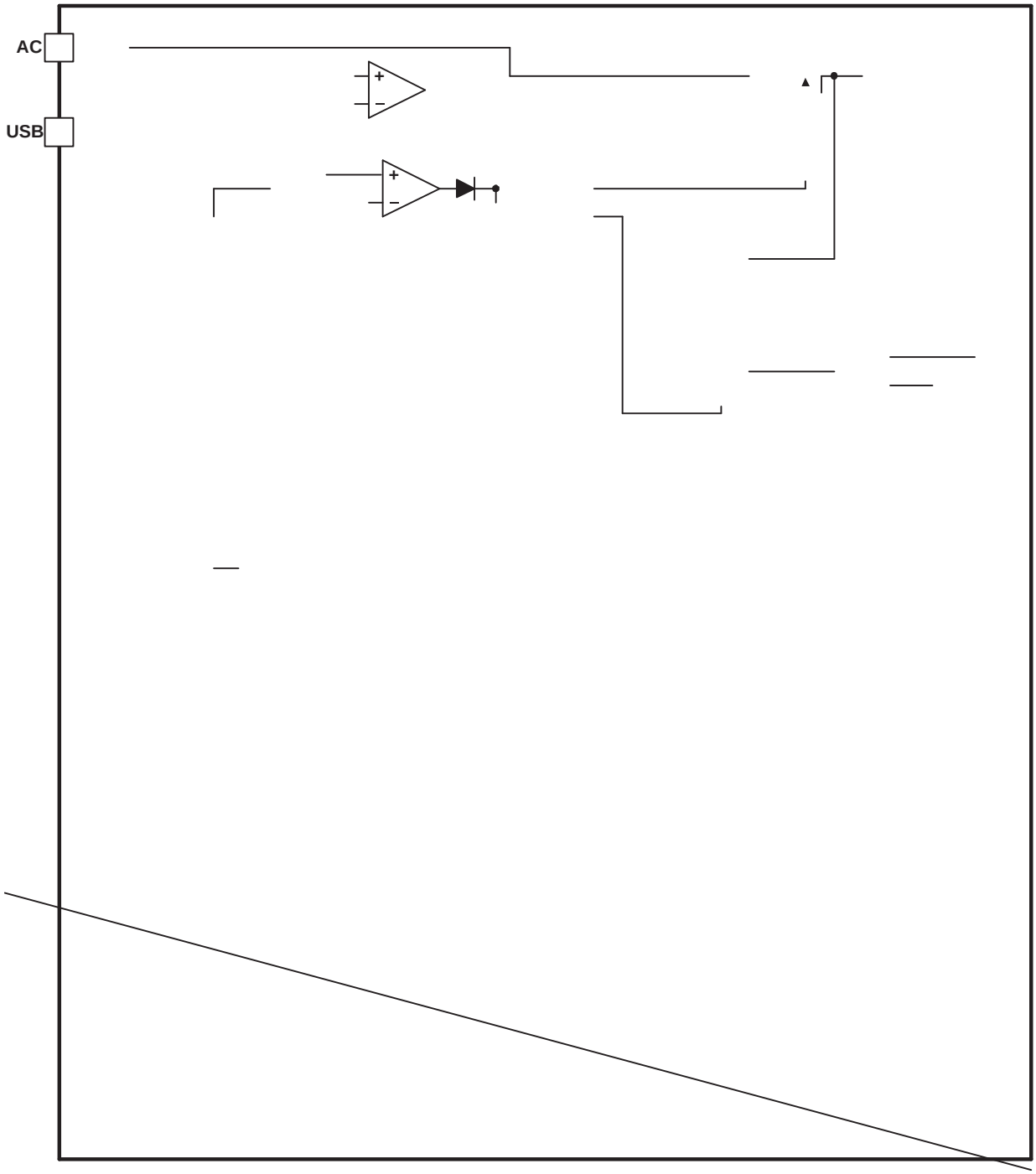
PARAMETER				

$$I_{O(PRECHG)} = \frac{\left(K_{(SET)} \times V_{(PRECHG)}\right)}{R_{SET}}$$

$$I_{O(TAPER)} = \frac{\left(K_{(SET)} \times V_{(TAPER)}\right)}{R_{SET}} \quad (3)$$

$$I_{O(TERM)} = \frac{\left(K_{(SET)} \times V_{(TERM)}\right)}{R_{SET}} \quad (4)$$




AC
USB

TYPICAL CHARACTERISTICS

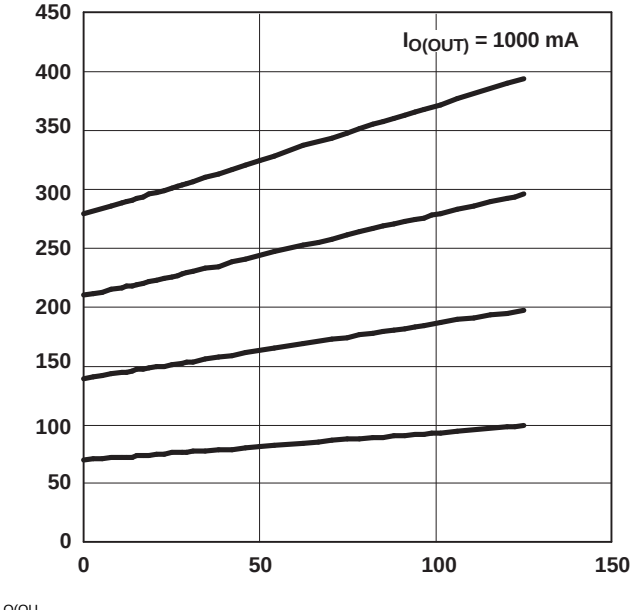


Figure 1.

The bqTINY-II supports a precision Li-Ion, Li-pol charging system suitable for single-cell packs. Figure 3 shows a typical charge profile, application circuit and Figure 4 shows an operational flow chart.

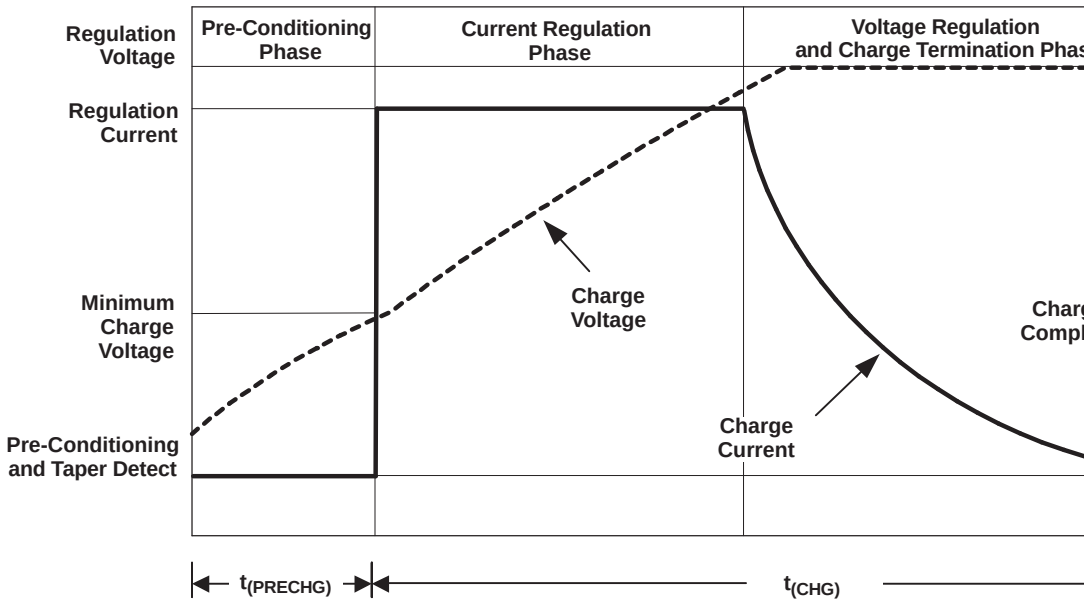


Figure 2. Typical Charging Profile

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FUNCTIONAL DESCRIPTION

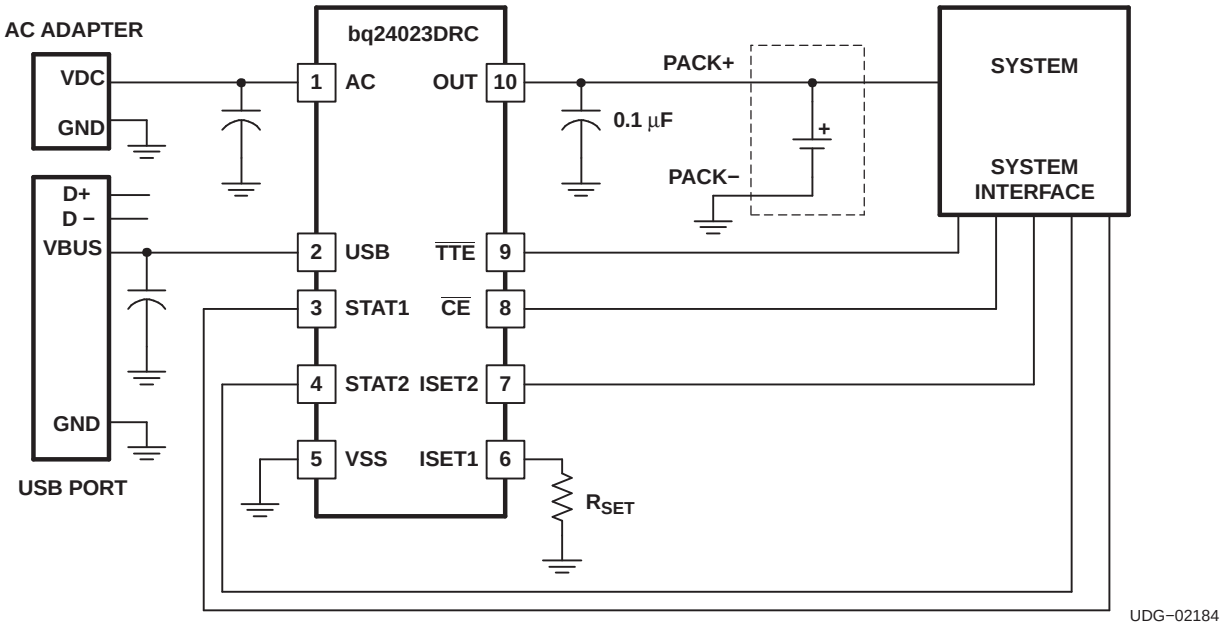

Figure 3. Typical Application Circuit

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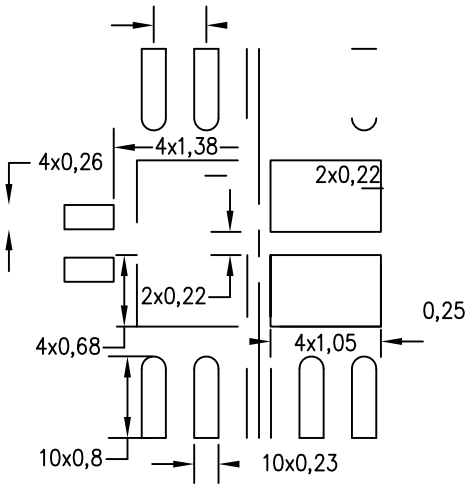
NOTES:

B. This drawing is subject to change without notice.

kage configuration.

D. The package thermal pad must be soldered to the board for thermal and mechanical performance, if present.

ıls regarding the exposed thermal pad features and dimensions, if present



Exposed Pad Geometry

Pad Geometry

Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should
ıl design considerations.

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