

bq246xx Device Comparison

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Battery Management Products

ABSTRACT

This application report presents an overview of the differences among the bq24600, bq24610, bq24616, bq24617, bq24620, bq24630, bq24640, and bq24650 battery charge devices. This document can assist design engineers with selecting the most suitable IC for their respective applications.

1 bq246xx Family Comparison

The bq246xx family of battery charge devices consists of a range of individual ICs. [Table 1](#) compares the parameters of the different family members.

Table 1. bq246xx Device Comparison⁽¹⁾

Device	Battery	SW Freq	Input (ACOV)	Pre-charge Current	Pre-charge Voltage	Charge Voltage	Recharge Voltage	I _{IN} DPM & PPM	Safety Timer	Temp Qual Profile	Package
bq24600	Li-Ion Li-polymer	1.2 MHz	5 V to 28 V (32 V)	I _{SET} /10	V _{FB} = 1.55 V	2.1 V to 26 V	V _{FB} – 50 mV	No	Fixed five hours	Li-Ion 0 to +45°C	16-pin, 3.5x3.5 QFN
bq24610	Li-Ion Li-polymer	600 kHz	5 V to 28 V (32 V)	R PROG (125 mA min)	V _{FB} = 1.55 V	2.1 V to 26 V	V _{FB} – 50 mV	Yes	C PROG TTC	Li-Ion 0 to +45°C	24-pin, 4x4 QFN
bq24616	Li-Ion Li-polymer	600 kHz	5 V to 28 V (32 V)	R PROG (125 mA min)	V _{FB} = 1.55 V	2.1 V to 26 V	V _{FB} – 50 mV	Yes	C PROG TTC	Li-Ion JEITA	24-pin, 4x4 QFN
bq24617	Li-Ion Li-polymer	600 kHz	5 V to 24 V (26 V)	R PROG (125 mA min)	V _{FB} = 1.55 V	2.1 V to 22 V	V _{FB} – 50 mV	Yes	C PROG TTC	Li-Ion 0 to +45°C	24-pin, 4x4 QFN
bq24620	LiFePO4	300 kHz	5 V to 28 V (32 V)	125 mA	V _{FB} = 0.35 V	1.8 V to 26 V	V _{FB} – 125 mV	No	Fixed five hours	LiFePO4	16-pin, 3.5x3.5 QFN
bq24630	LiFePO4	300 kHz	5 V to 28 V (32 V)	125 mA	V _{FB} = 0.35 V	1.8 V to 26 V	V _{FB} – 125 mV	Yes	C PROG TTC	LiFePO4	24-pin, 4x4 QFN
bq24640	Super cap	600 kHz	5 V to 28 V (32 V)	n/a	n/a	2.1 V to 26 V	n/a	No	n/a	0 to +45°C Or wide range	16-pin, 3.5x3.5 QFN
bq24650	Solar panel charge Li-Ion Li-polymer	600 kHz	5 V to 28 V (32 V)	I _{SET} /10 (4 mV on R _{SNS})	V _{FB} = 1.55 V	2.1 V to 26 V	V _{FB} – 50 mV	Input voltage (V _{IN}) DPM	Only keep 30 min Pre-charge time	Li-Ion 0 to +45°C	16-pin, 3.5x3.5 QFN

⁽¹⁾ Shaded cells indicate key differences of each device.

2 bq246xx Feature Descriptions

The bq24600/61x is highly-integrated Li-ion or Li-polymer switch-mode battery charge controller. The bq24620/3x is highly-integrated switch-mode battery charge controller designed specifically to charge lithium-phosphate battery chemistries.

The bq2460x/61x/62x/63x offer a constant-frequency synchronous PWM controller with high accuracy charge current and voltage regulation, adapter current regulation, termination, charge preconditioning, and charge status monitoring,

The bq2460x/61x/62x/63x charge the battery in three phases: preconditioning, constant current, and constant voltage. Charge is terminated when the current reaches a minimum user-selectable level. A programmable charge timer provides a safety backup for charge termination.

The bq2460x/61x/62x/63x automatically restart the charge cycle if the battery voltage falls below an internal threshold, and enters a low quiescent current sleep mode when the input voltage falls below the battery voltage.

The bq2461x/bq2463x offer a dynamic power management (DPM) function that modifies the charge current depending on system load conditions, avoiding ac adapter overload. High accuracy current sense amplifiers enable accurate measurement of the ac adapter current, allowing monitoring of overall system power. The bq2461x/bq2463x also offer power path management (PPM) or system power selection that controls external switches to prevent battery discharge back to the input, connects the adapter to the system, and connects the battery to the system using 6-V gate drives for better system efficiency.

The bq24640 charges super capacitor in two phases: constant current and constant voltage. The charge starts from down to 0 V with current set on ISET pin. The charge current starts tapering down, when the voltage on V_{FB} reaches an internal reference.

The bq24650 is a highly-integrated switch-mode battery charge controller. It provides input voltage regulation, which reduces charge current when input voltage falls below a programmed level. When the input is powered by a solar panel, the input regulation loop lowers the charge current so that the solar panel can provide maximum power output.

3 References

Unless otherwise noted, all documents are available for download at www.ti.com.

1. [bq24600](#) product data sheet from Texas Instruments ([SLUS891](#)).
2. [bq24610](#) and [bq24617](#) product data sheet from Texas Instruments ([SLUS892](#)).
3. [bq24620](#) product data sheet from Texas Instruments ([SLUS893](#)).
4. [bq24630](#) product data sheet from Texas Instruments ([SLUS894](#)).
5. [bq24616](#) product data sheet from Texas Instruments ([SLUSA49](#)).
6. [bq24640](#) product data sheet from Texas Instruments ([SLUSA44](#)).
7. [bq24650](#) product data sheet from Texas Instruments ([SLUSA75](#)).

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