# Industry's most efficient boost charger for nano power energy harvesting applications

Optimal efficiency increases harvested energy by 30% to 70%

The bq25504 is a highly efficient boost charger IC for nano (ultra-low) power energy harvesting and management applications. The device manages microwatts ( $\mu$ W) to mill watts (mW) of power generated from a variety of sources such as solar, thermoelectric, electromagnetic and vibration energy.

Its low quiescent current, high conversion efficiency, and flexibility in interfacing to a variety of energy sources and energy storage elements makes the IC unique to the market. The device's unique properties can be best illustrated in a solar panel example. Under certain operating conditions, with comparable light intensity, the bq25504 can increase the usable harvested energy by 30% to 70%, which allows for the reduction in the solar panel collection area, the number of solar panels required and the charging time; all of which help to reduce the cost of end equipment solutions.



RUMENTS

# Key benefits and features

- Low quiescent current (330nA typ) and high energy efficiency maximizes the energy extracted from the energy harvester.
- Maximum power point tracking (MPPT) optimizes energy extracted from DC harvesters such as solar panels and thermoelectric generators under varying light and thermal conditions respectively.
- User programmable settings allows the IC to be used with a variety of energy sources and energy storage elements (different battery chemistries or super capacitors)
- Low cold start voltage (330mV typ) allows the device to startup from single-cell solar panels (under low light), TEG with low temperature differences and other low voltage sources.
- Battery OK indicator allows conditional enabling of external loads and protects the storage element.

# **Applications**

- Consumer electronics
- Computer peripherals
- Industrial
- Medical
- High reliability

## Wireless sensor networks (WSN) applications

- Agriculture (gravity feed systems, water tank levels, pump levels)
- Air pollution
- Area monitoring
- Forrest fire detection
- · Greenhouse monitoring
- · Home and building automation
- Industrial monitoring
- Landslide detection
- Machine health monitoring (machinery condition-based systems)
- Structural monitoring (monitor movement within buildings and infrastructure, monitor assets, retrieve daily data)
- Waste/water monitoring

### ORDERING INFORMATION

PART NO.	PACKAGE	ORDERING NUMBER (TAPE AND REEL) <sup>(1)</sup>	PACKAGE MARKING	QUANTITY
bq25504	QFN 16 pin 3 mm x 3 mm	BQ25504RGTR	B5504	3000
		BQ25504RGTT	B5504	250

(1) The RGW package is available in tape on reel. Add R suffix to order quantities of 3000 parts per reel, T suffix for 250 parts per reel.

### ABSOLUTE MAXIMUM RATINGS<sup>(1)</sup>

over operating free-air temperature range (unless otherwise noted)

		VALUE		UNIT
		MIN	MAX	UNIT
Input voltage	VIN DC, VOC SAMP, VREF SAMP, VBAT OV, VBAT UV, VRDIV,	-0.3	5.5	V
Peak Input Power, PIN_PK	OK_HYST, OK_PROG, VBAT_OK, VBAT, VSTOR, LBST <sup>(2)</sup>		400	mW
Operating junction temperature range, T <sub>J</sub>		-40	125	°C
Storage temperature range,	orage temperature range, T <sub>STG</sub> -65 150		150	°C

(1) Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(2) All voltage values are with respect to V<sub>SS</sub>/ground terminal.

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