bq27541-v200 to bq27541-G1 CHANGE LIST

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ABSTRACT

This document describes the changes made from bq27541-V200 to bq27541-G1 v2.24. The latest ordering information and data sheet is available on the TI Web site.

NOTE: bq27541-V200 uses FW version 2.00 and the bq27541-G1 uses FW version 2.24

1 Introduction

The bq27541-G1 firmware version 2.24 has been released to enable several feature additions. The following new orderable part numbers have been released which ship preprogrammed with the new version of firmware:

- BQ27541DRZR-G1
- BQ27541DRZT-G1

The latest version of the evaluation software is required to be able to read and write all the data flash configuration locations. The necessary evaluation software and the corresponding v2.24 SENC file can be downloaded from the bq27541-G1 product folder on the TI Web site at www.ti.com. Existing bq27541 or bq27541-V200 (including EVMs) can be upgraded to the latest firmware version by following the instructions in application report SLUA453.

NOTE: If a golden image created for another version of bq27541 is loaded into an integrated circuit (IC) running firmware version 2.24, the IC will become nonfunctional and must be replaced. Ensure that all instructions in application report Updating Firmware With the bq2750x and EVM (SLUA453) are followed if upgrading ICs or converting your production line to bq27541-G1. The best practice is to generate a new golden image (DFI file) for bq27541-G1.

2 Change Details

Table 1. Change Details

CHANGE	bq27541-V200	bq27541-G1	COMMENTS
Fast Resistance Scaling	Fast Resistance Scaling feature not present.	Add Fast Convergence feature to algorithm to improve accuracy of the RemainingCapacity() calculations during corner cases. This improvement is most noticeable for high discharge rates (> C/2) and low temperatures as 0% is approached. Also known as “Fast Resistance Scaling”. Added Register Bit(s) • FConvEn in Pack Configuration B Register	New feature
Voltage Consistency	Voltage Consistency feature not present.	Add Voltage Consistency feature to algorithm to improve accuracy of calculations during corner cases. This improvement is most noticeable for low temperatures as 0 % is approached. Added Register Bit(s) • VconsEN in Pack Configuration B Register	New feature
Hibernate Mode in HDQ	Hibernate Mode in HDQ not supported.	Hibernate Mode in HDQ not supported.	To be implemented on next revision

Table 1. Change Details (continued)

CHANGE	bq27541-V200	bq27541-G1	COMMENTS
Static Chemistry Checksum	Static Chemistry Checksum not present.	Added MAC command in order to allow the user to verify that the chemistry information in the DF is correct. Added Control Status Command(s) • STATIC_CHEM_CHKSUM	New feature
Improved LiFePO4 Support	LiFePO4 chemistries can be used, but with lower performance.	Added to improve accuracy with LiFePO4 chemistry. This feature also incorporates an improvement for long relaxation times after charge. Added Register Bit(s) • DoDWT in Pack Configuration B Register • LFPRelax in Pack Configuration B Register	New feature
Interrupt Mode	Interrupt mode not supported.	System can be interrupted based on specified fault conditions. The interrupt features can be used with either the SE or HDQ pin. Added Register Bit(s) • INTSEL in Pack Configuration Register	New feature
Over Temperature Charge/Discharge Interrupt Capability	Over Temperature charge/discharge flags not able to act as fault condition for interrupt. Interrupt mode not supported.	Over Temperature Charge/Discharge conditions able to act as fault condition for interrupts.	New feature
Charge Suspend	When Battery temperature falls below a specified threshold a bit in the Flags() register will set to indicate this condition has occurred.	Indication removed due to lack of utility.	Feature removal
Internal Short Detection	Internal Short Detection feature not present.	When functionality enabled, the device will calculate the self-discharge current. The self discharge current value can be used as a fault condition for interrupts. Added Standard Commands: • SelfDischargeCurrent() Added Register Bit(s) • ISD in Flags() Register • SE_ISD in Pack Configuration B Register	New feature
Tab Disconnection Detection	Tab Disconnection Detection feature not present.	The device can indicate tab disconnection in cells with multiple parallel cell configurations by detecting change in StateOfHealth(). The current StateOfHealth() divided by the previous StateOfHealth() can be used as a fault condition for interrupts. Added Register Bit(s) • TDD in Flags() Register • SE_TDD in Pack Configuration B Register	New feature
Battery Low/High Interrupt Capability	Battery Low/High Interrupt functionality not present.	Device can indicate when battery voltage has fallen below or risen above certain threshold. Thresholds for Battery Low and Battery High can be used as conditions for interrupts.	New feature
State of Charge Detection Interrupt Capability	SOC1 Interrupt functionality not present.	SOC1 can be used as condition for interrupts.	New feature
Calibration Mode Changed.	Calibration algorithm performed by gauge.	Calibration restructured so that bq27541-G1 Evaluation Software now performs most computations for data flash Calibration class parameters. This change was needed in order to free up firmware code space for the other algorithm improvements. For more information concerning the updated calibration method please refer to the Host System Calibration Method (SLUA640) application note. Control() Subcommands Added: • BOARD_OFFSET • CC_OFFSET • CC_OFFSET_SAVE • EXIT_CAL • ENTER_CAL • OFFSET_CAL	Feature change
Device Name Change	Data Flash Device Name supports 8 ASCII characters.	Data Flash Device Name field supports 10 ASCII characters.	Feature change
Design Energy Scale	Support battery capacity up to 8 Ah.	Support battery capacity up to 32 Ah using Design Energy Scale.	New Feature

Table 1. Change Details (continued)

CHANGE	bq27541-V200	bq27541-G1	COMMENTS
SOC Smoothing	SOC Smoothing feature not present.	SOC Smoothing added to facilitate smooth transition of reported SOC during charge and discharge. Added Register Bit(s) • SmoothEN in Pack Configuration C Register • RelaxRCJumpOK in Operation Configuration C Register	New Feature
HIBERNATE Mode in I2C	Upon exiting HIBERNATE mode, incorrect ADC measurements could briefly be taken and stored in Lifetime Data flash locations.	ADC timer synchronized upon exiting from Hibernate to allow for stable measurements immediately upon exit from Hibernate. OCV measurement process begins immediately after exiting HIBERNATE mode.	Feature improvement
Wake from HIBERNATE	Can possibly wake from HIBERNATE upon rising edge of I2C bus.	Device will only wake from HIBERNATE if I^2C traffic is addressed to the fuel gauge.	Feature improvement
DF Checksum	DF_CHECKSUM MAC command available.	DF_CHECKSUM MAC command removed due to lack of utility.	Feature removal
SOC1 Set Threshold, SOC1 Clear Threshold, SOCF Set Threshold, SOCF Clear Threshold	SOC1 Set Threshold, SOC1 Clear Threshold, SOCF Set Threshold, SOCF Clear Threshold are 1 byte in size.	SOC1 Set Threshold, SOC1 Clear Threshold, SOCF Set Threshold, SOCF Clear Threshold are 2 bytes in size to support needs of larger capacity battery packs.	Feature improvement
Pack Configuration B Register	Pack Configuration B Register not present.	Added Pack Configuration B register for additional options.	New feature
Pack Configuration C Register	Pack Configuration C Register not present.	Added Pack Configuration C register for additional options.	New feature
Standard Command Updates	TimeToFull(), AvailableEnergy(), StandbyTTE(), MaxLoadTTE(), AtRateTTE(), ConstantPowerTTE() commands present. Filtered and unfiltered RemainingCapacity(), FullChargeCapacity() and StateOfCharge() not present.	TimeToFull, AvailableEnergy, Standby TTE, MaxLoadTTE, AtRateTTE, ConstantPowerTTE commands removed to allow for SOC smoothing commands. RemainingCapacity(), FullChargeCapacity() and StateOfCharge() will be filtered if SOC smoothing is enabled and will be unfiltered if disabled. UnfilteredSOC(), FilteredFCC(), UnfilteredFCC(), UnfilteredRM() and FilteredRM() commands added.	New feature (feature removal)
Reserve Cap-mWh	Reserve Cap-mWh label used.	Reserve Cap-mWh changed to Reserve Energy	Feature Change
User Rate – mW	User Rate – mW label used.	User Rate – mW changed to User Rate – Pwr	Feature change
100 Second Averaging	100 Second Averaging feature not present. Possibility to have an unrelaxed OCV measurement.	Feature added to improve voltage measurements in order to more accurately calculate DOD0().	New Feature
Improved Overcharge Handling	Possibility to get into overcharge condition due to change in temperature after charge termination or more accumulated charge after charge termination.	DODatEOC is updated after charge termination and not updated if a significant temperature change occurs after charge termination. Charge accumulation after charge termination is tracked for a more accurate calculation of DOD0(). Added Register Bit(s) • ChgDoDEoC in Pack Configuration B Register	Feature improvement
Passed Charge Compensation During SLEEP Mode	Passed Charge Compensation feature not present.	Featured added to improve passed charge compensation during SLEEP mode. Added Register Bit(s) • SleepWkChg in Pack Configuration C Register	New Feature

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