bq20z90/bq20z95 to bq20z60-R1/bq20z65-R1 Change List

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ABSTRACT

This document describes the differences between a bq20z90/bq20z95 design and a bq20z60-R1/bq20z65-R1 solution. Find the latest ordering information and data sheet on the World Wide Web at: http://power.ti.com.

Introduction

The bq20z60-R1/bq20z65-R1 firmware has been released to enable several feature additions and improvements over the bq20z90/bq20z95. The bq20z60-R1/bq20z65-R1 devices are pin and footprint compatible with the bq20z90/bq20z95 devices for easy hardware upgrade.

Orderable part numbers for new devices are:

- bq20z60DBT-R1
- bq20z60DBTR-R1
- bq20z65DBT-R1
- bq20z65DBTR-R1

The latest version of the TI evaluation software is required to be able to read and write all the data flash configuration locations. The updated evaluation software can be obtained at http://power.ti.com.

Change Details

#	CHANGE	bq20z60-R1/bq20z65-R1	bq20z90/bq20z95	COMMENTS
1	Added enhanced charging algorithm (satisfies JEITA specification) temperature ranges	Satisfies JEITA temperature range guidelines.	Does not satisfy JEITA temperature range guidelines.	Increased temperature safety
2	Charging voltage and charging current vary with enhanced charging algorithm (satisfies JEITA specification) temperature range	Can specify different charging voltages and charging currents for each temperature range.	Charging voltage is the same, except for the data flash name; charging current is different in pre-charge mode and during temp. throttling.	Improves safety and potential for increased cell life
3	Cell overvoltage thresholds vary with temperature range.	Can specify different cell overvoltage thresholds (1st - level and permanent failure) for each temperature range (this is part of the enhanced charging algorithm).	Only one cell overvoltage threshold. Only one PF overvoltage threshold, which is pack based rather than cell based.	Allows for enhanced customization and improves safety
4	Safety undervoltage 2nd level protection	Monitors the individual cell voltages for extreme undervoltage values (this is part of the enhanced charging algorithm).	Feature is not supported.	Improves safety
5	Added a discharge inhibit mode	If the temperature of the battery is too high, then the battery will not be allowed to start discharging.	Feature is not supported.	Improves safety

#	CHANGE	bq20z60-R1/bq20z65-R1	bq20z90/bq20z95	COMMENTS
6	Cell deterioration capacity limits and flags	Can specify warning and fault limits for reduced cell capacity as well as a cell life limit with flags to indicate each condition (this is part of the enhanced charging algorithm).	Feature is not supported.	Improves safety and provides more detailed battery information
7	Relative State of Charge (RSOC) improvements	Implements Impedance Track™ changes to improve RSOC performance. Added Load Select 7 (see SLUU386 for a description) which helps to improve Impedance Track™ accuracy.	Feature is not supported.	Improves gauging accuracy
8	Lifetime Data	Allows access to lifetime data through extended SBS command.	Only allows access of lifetime data through data flash.	Data access convenience
9	Lifetime OT(over temperature) and OV(over voltage) event duration and count	Added lifetime voltage and temperature counters for tracking the number of times a certain voltage or temperature threshold is reached. Duration of the last voltage and temperature event is also recorded.	Feature is not supported.	Improves data logging and troubleshooting capability
10	Manufacturer Data	Added 4 additional 19 byte data flash locations for storing manufacturing data (*DF:Manuf. Block 1..4*). *Manuf. Info 0* is still 31 bytes long. There is now a total of 107 bytes of Manufacturing Info storage.	Only has 31 byte *Manuf. Info 0*.	Provides enhanced customization and data storage
11	Permanent Fail status	Because of the addition of new permanent failure modes one status and two status logging registers were added. **SBS.PF Status 2** was added for status. *DF:Saved PF Flags 2* and *DF:Saved 1st PF Flags 2* were added for logging.	Only has 1 PF Status failure register and 2 logging registers.	Added to support new safety features (see change 4, 14, and 15)
12	Pack over voltage, under voltage, and PF over voltage	Pack voltage based over voltage, under voltage, and PF over voltage have been removed. Only cell based detection is supported.	Supports pack voltage based over voltage, under voltage, and PF over voltage.	Removed due to JEITA implementation
13	Pulse charging	Pulse charging has been removed due to JEITA implementation.	Pulse charging is supported.	Removed due to JEITA implementation
14	Cell imbalance detection methods	Supports 2 mechanisms for cell imbalance detection: Active and at Rest with independent flags	Supports cell imbalance detection at Rest only	Improves safety
15	Independent temperature alarms for 2nd thermistor	Separate OTC, OTD, SOTC, and SOTD alarms and thresholds for TS1 and TS2	Only one set of alarms and thresholds	Improves safety and design customization
16	Ability to go to sleep without calibration	Enters sleep mode immediately when sleep command is received without performing calibration first (improves efficiency during manufacturing)	Calibration is always performed upon entry to sleep.	Improves efficiency during manufacturing

#	CHANGE	bq20z60-R1/bq20z65-R1	bq20z90/bq20z95	COMMENTS
17	PF Fuse Blow features	New PF Fuse Blow features added. *DF:PF SOV Fuse Blow Delay* determines the length of time after a PF SOV event occurs before the fuse is blown. *DF:PF Min Fuse Blow Voltage* requires the battery be above this threshold before the fuse is blown.	Features are not supported.	Improves safety
18	Seal delay option added after sealing gauge	The *DF:Sealed Ship Delay* timer introduces a programmable delay before shutting off the FETs for ship mode after the seal commands are sent to the gauge.	Feature is not supported.	Adds convenience during production

Summary

The following is a list of new data flash and SBS parameters added to bq20z60-R1/bq20z65-R1, sorted by table item. Descriptions can be found in the technical reference user's guide (SLUU386):

1. Added enhanced charging algorithm temperature ranges
- *DF:JT1*
- *DF:JT2*
- *DF:JT2a*
- *DF:JT3*
- *DF:JT4*
- **SBS:TempRange (0x72)**

2. Charging voltage and charging current vary with enhanced charging algorithm temperature range
- *DF:LT Chg Voltage*
- *DF:LT Chg Current1*
- *DF:LT Chg Current2*
- *DF:LT Chg Current3*
- *DF:ST1 Chg Voltage*
- *DF:ST1 Chg Current1*
- *DF:ST1 Chg Current2*
- *DF:ST1 Chg Current3*
- *DF:ST2 Chg Voltage*
- *DF:ST2 Chg Current1*
- *D F:ST2 Chg Current2*
- *DF:ST2 Chg Current3*
- *DF:HT Chg Voltage*
- *DF:HT Chg Current1*
- *DF:HT Chg Current2*
- *DF:HT Chg Current3*
- *DF:Cell Voltage Threshold1*
- *DF:Cell Voltage Threshold2*
- *DF:Cell Voltage Thresh Hys*

3. Cell overvoltage thresholds vary with temperature range
- *DF:LT COV Threshold*
- *DF:LT COV Recovery*
- *DF:ST COV Threshold*

- *DF:ST COV Recovery*
- *DF:HT COV Threshold*
- *DF:HT COV Recovery*
- *DF:LT SOV Threshold*
- *DF:ST SOV Threshold*
- *DF:HT SOV Threshold*

4. Safety undervoltage 2nd level protection

- *DF:SUV Threshold*
- *DF:SUV Time*

5. Added a discharge inhibit mode

- *DF:Hi Dsg Start Temp*

6. Cell deterioration capacity limits and flags

- *DF:Deterioration Warn Limit*
- *DF:Deterioration Fault Limit*
- *DF:Cell Life Limit*

7. Relative State of Charge (RSOC) improvements

- *[OCV_WGHT]* in *DF:Operation Cfg C*
- Option 7 in *DF:Load Select*

8. Lifetime Data

- **SBS:LifetimeData1 (0x73)**
- **SBS:LifetimeData2 (0x74)**

9. Lifetime OT(over temperature) and OV(over voltage) event duration and count

- *DF:Life OT Count*
- *DF:Life OT Duration*
- *DF:Life OV Count*
- *DF:Life OV Duration*

10. Manufacturer Data

- *DF:Manuf. Block 1*
- *DF:Manuf. Block 2*
- *DF:Manuf. Block 3*
- *DF:Manuf. Block 4*
- **SBS:ManufBlock1..4 (0x6c..0x6f)**

11. Permanent Fail status

- *DF:Permanent Fail Cfg 2*
- *DF:Saved PF Flags 2*
- *DF:Saved 1st PF Flags 2*
- **SBS:PFStatus2 (0x6b)**

14. Cell imbalance detection methods

- *DF:Rest CIM Current*
- *DF:Rest CIM Fail Voltage*
- *DF:Rest CIM Time*
- *DF:CIM Battery Rest Time*
- *DF:Rest CIM Check Voltage*
- *DF:Active CIM Fail Voltage*
- *DF:Active CIM Time*
- *DF:Active CIM Check Voltage*

15. Independent temperature alarms for 2nd thermistor

- *DF:OT2 Chg Threshold*
- *DF:OT2 Chg Time*
- *DF:OT2 Chg Recovery*
- *DF:OT2 Dsg Threshold*
- *DF:OT2 Dsg Time*
- *DF:OT2 Dsg Recovery*
- *DF:SOT2 Chg Threshold*
- *DF:SOT2 Chg Time*
- *DF:SOT2 Dsg Threshold*
- *DF:SOT2 Dsg Time*
- **SBS:TS1Temperature (0x5e)**
- **SBS:TS2Temperature (0x5f)**
- **SBS:SafetyStatus2 (0x69)**

17. PF Fuse Blow features

- *DF:PF SOV Fuse Blow Delay*
- *DF:PF Min Fuse Blow Voltage*

18. Seal delay option added after sealing gauge

- *DF:Sealed Ship Delay*

IMPORTANT NOTICE