ES_BMI7018 Errata sheet for BMI7018

Rev. 2.0 — 31 January 2025

Errata

Document information

Information	Content
Keywords	BMI7018, problems, deviations, workarounds
Abstract	This errata sheet describes the functional problems and deviations of the BMI7018 from the characteristics known at the release date of this document.



1 Product identification

This errata document applies to the BMI7018.

Table '	1.	Orderable	part	number	identification
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Part number	Data sheet	Package
MBMI7018TA1AE	BMIZ018	SOT1510-2
MBMI7018SA1AE		0011010-2

1.1 Definition of errata severity

Table 2 provides the general definitions of the errata severity in this document.

Errata severity level	Description
High	Failure that severely inhibits the use of the device for all or most of the intended applications.
Medium	Failure that might restrict or limit the use of the device for all or most of the intended applications.
Low	Unexpected behavior that does not cause significant problems for the intended applications of the device.
Improvement	Information on improvements made on the device for better performances.

Table 2. Definition of errata severity

2 Errata overview

This section describes all BMI7018 functional errata. For each erratum, a workaround is suggested to continue developing the application with the current silicon.

Table 3. Functional problem table

Functional problem	Short description	Severity level	Solution	Detailed description
ER1	Cell balancing switch fault monitoring	Medium	—	Section 3.1
ER2	Incorrect secondary measurements during SYNC period	Medium	—	Section 3.2
ER3	Incorrect FEH_CFG_CRC register calculation	Low	—	Section 3.3

3 Functional problem detail

3.1 ER1: Cell balancing switch fault monitoring

3.1.1 Severity level

Medium

3.1.2 Introduction

The balancing of the cells is executed following the odd and even phases. In each phase, the odd or even cells are balanced under the conditions requested by the customer. The cell-balancing switches can be continuously monitored during both phases if requested by the customer.

The balancing switch-fault monitoring registers BAL_SWITCH_MON_CFG0 and BAL_SWITCH_MON_CFG1 enable the CB MOSFET balancing. If a mismatch occurs between the analog state of the CB MOSFET (Vds monitoring) and the logic signal command, the fault event is reflected in the fault registers BAL_SWITCH_FLT_STAT0 and BAL_SWITCH_FLT_STAT1 and the corresponding channels are disabled (BAL_CH_CFGx are reset).

3.1.3 Description of problem

A balancing switch fault may be reported under the condition that the cell balancing stays activated or deactivated with a duration of typically 200 μ s (min 190 μ s, max 200 μ s).

A 200 μs pulse may be caused by software access when changing configuration ...

- PWM reconfiguration
- Individual CB channel enabled/disabled
- Activation of emergency discharge
- ... and under specific IC conditions:
- Cell balancing stopped because of Voltage-control mode: cell voltage-based balancing
- Cell balancing stopped because of the temperature: temperature-modulated balancing and junction temperature balancing protection
- Constant current balancing because of PWM reconfiguration
- Autopause for SYNC/APP and cyclic measurements

The following events will not lead to false-switch fault reported:

- · Cell balancing stopped because of global balancing timeout
- Cell balancing stopped because of global cell undervoltage
- · Cell balancing stopped because end of individual timer-based balancing

3.1.4 Workaround and diagnostic

Two complementary workarounds are proposed to avoid a false-balancing switch fault monitoring by deactivating the balancing switch-fault monitoring (BAL_SWITCH_MON_CFG0 and BAL_SWITCH_MON_CFG1), or deactivating the cell balancing, prior to any configuration changes or autopause.

If a switch fault is reported, the customer must execute a diagnostic of the CB MOS for confirming the real stuck on or off. If the fault is not confirmed, the balancing will continue as expected.

The proposed workarounds are optional. In the event a switch fault is reported, a CB MOS switch diagnostic is proposed to confirm the CB MOS switch failure.

Note: In Cyclic mode, the recommendation is to program the event handling to wake up in case of fault.

3.1.4.1 Workaround 1

Workaround 1: To be applied each time the balancing configuration is changed by software access.



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3.1.4.2 Workaround 2

Workaround 2: To be applied each time the cell balancing is stopped for a new measurement.

Prior to running the application or synchronous measurement, the switch-fault monitor can be disabled.



3.1.4.3 Diagnostic

Diagnostic: CB MOS switch diagnostic

If a fault is reported, the customer must execute the procedure described to confirm the result.



3.1.4.4 Fix plan

No fix planned.

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3.2 ER2: Incorrect secondary measurements during SYNC period

3.2.1 Severity level

Medium

3.2.2 Specification - expected behavior

All measurements, Periodic (PER) Application (APP) and synchronous (SYNC) can run in parallel with each other.

3.2.3 Erratum

The reference voltage for the primary measurement chain PRMVREF, the battery supply VBAT and the analog inputs AIN4 to AIN7 should be measured outside of synchronous (SYNC) acquisition periods. Otherwise incorrect false values may be reported infringing limits specified in the datasheet. Other secondary signal measurements are not affected and can be captured during SYNC periods.

3.2.4 Workaround and diagnostic

The previously named signal values should be read outside the synchronous (SYNC) periods.

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3.3 ER3: Incorrect FEH_CFG_CRC register calculation

3.3.1 Severity level

Low

3.3.2 Specification - expected behavior

The BMI7018 is calculating a CRC across the content of the FEH configuration registers. The result of this calculation is stored in the FEH_CFG_CRC register. The MCU can use this CRC value to validate the integrity of the configuration. The CRC is recalculated whenever a register covered by the CRC is written or the CRC value is read.

3.3.3 Erratum

For the CRC calculation, a reserved register should be added to the configuration registers list table 87 (FEH_CFG_CRC register description). This reserved register is read only at adress 42Ah and reports 0.

The event handling CRC covers the FEH_ALARM_CFG, FEH_ALARM_OUT_CFG0, FEH_ALARM_OUT_CFG1, FEH_WAKEUP_CFG0, FEH_WAKEUP_CFG1, FEH_SUPPLY_FLT_POR_CFG0, FEH_SUPPLY_FLT_POR_CFG1, reserved register = 0h, FEH_COM_FLT_POR_CFG, FEH_SUPPLY_FLT_EVT_CFG0, FEH_SUPPLY_FLT_EVT_CFG1, FEH_ANA_FLT_EVT_CFG, FEH_COM_FLT_EVT_CFG, and FEH_MEAS_FLT_EVT_CFG register.

3.3.4 Workaround and diagnostic

Include the register at address 42Ah in the calculation of the FEH configuration registers CRC.

4 Revision history

Table 4. Revision history			
Document ID	Release date	Description	
ES_BMI7018 v.2.0	31 January 2025	 CIN 202501033I <u>Table 3</u>: Added rows for "ER2" and "ER3". Added <u>Section 3.2</u> and <u>Section 3.3</u> Updated <u>Legal information</u> 	
ES_BMI7018 v.1.0	19 September 2024	Initial version	

Table 4. Revision history

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Date of release: 31 January 2025 Document identifier: ES_BMI7018