TLF35584

Multi Voltage Safety Micro Processor Supply

TLF35584QVVS1
TLF35584QVVS2
TLF35584QKVS1
TLF35584QKVS2

Errata Sheet

Rev. 3.0, 2017-03-17

Automotive Power

Table of Contents

Errata Sheet

Rev. 3.0, 2017-03-17

Abstract

The C14-step silicon target functionality is described by the Data Sheet Rev 2.0.

This document lists the deviation of the C14-step silicon in relation to the Data Sheet Rev 2.0. The deviations are errors in C14-step silicon.

The C14-step silicon can be identified by the marking on the IC according to the table below. The marking can be found on the topside of the IC package.

Type	Package	Marking
TLF35584QVVS1	PG-VQFN-48	35584 / VS1
TLF35584QVVS2	PG-VQFN-48	35584 / VS2

TLF35584QKVS1	PG-LQFP-64	TLF35584 / QK VS1
TLF35584QKVS2	PG-LQFP-64	TLF35584 / QK VS2

1 Overview

The description in this chapter of the TLF35584 Data Sheet Rev 2.0 is valid for C14-step silicon.

2 Block Diagram

The description in this chapter of the TLF35584 Data Sheet Rev 2.0 is valid for C14-step silicon.

3 Pin Configuration

The description in this chapter of the TLF35584 Data Sheet Rev 2.0 is valid for C14-step silicon.

4 General Product Characteristics

4.1 Absolute Maximum Ratings

The description in this chapter of the TLF35584 Data Sheet Rev 2.0 is valid for C14-step silicon.

4.2 Functional Range

The description in this chapter of the TLF35584 Data Sheet Rev 2.0 is valid for C14-step silicon.

4.3 Thermal Resistance

The description in this chapter of the TLF35584 Data Sheet Rev 2.0 is valid for C14-step silicon.

4.4 Quiescent Current Consumption

There are differences in the quiescent current consumption between TLF35584 Data Sheet Rev 2.0 and C14-step silicon. These deviations are mentioned in the following tables:

Table 1 Quiescent current consumption only valid for C14-step silicon[1)]

V_{VS} =6.0 V to 40 V; T_j = -40°C to +150°C, all voltages with respect to ground, positive current flowing into pin (unless otherwise specified)

Parameter	Symbol	Values			Unit	Note / Test Condition	Number
		Min.	Typ.	Max.			
SLEEP state	I_q	–	–	500	µA	T_j ≤ 85°C ; only if PFM of step down regulator reached(see below)	

1) All quiescent current parameters are measured at $T_j \leq 85°C$ and $10\ V \leq V_{VS} \leq 28\ V$ with zero load and all selectable options (Outputs, Watchdog, Timers, Step-Up converter) switched off.

Furthermore there are additional deviations of the C14-step silicon in respect to the SLEEP state, that might trigger the step down regulator to change from PFM regulation to PWM regulation, which will lead to an increased current consumtion similar to INIT, NORMAL and WAKE state due to the activation of internal oscillators and additional blocks for PWM switching of the step down regulator. For details please refer to the description of the deviations related to SLEEP state in **Chapter 6.2**.

5 Wake Function

The description in this chapter of the TLF35584 Data Sheet Rev 2.0 is valid for C14-step silicon.

6 Pre Regulators

6.1 Step Up Regulator

The description in this chapter of the TLF35584 Data Sheet Rev 2.0 is valid for C14-step silicon.

6.2 Step Down Regulator

There are differences in the step down regulator between TLF35584 Data Sheet Rev 2.0 and C14-step silicon. These deviations are mentioned in the following tables:

Table 2 Deviations in step down regulator function

Number	Function	Description
1	Step down regulator behavior in SLEEP state	• The PFM to PWM (and vice versa) switch-over might not happen at the expected current thresholds. It may influence additionally the current consumption and switching behavior of the TLF35584 being in SLEEP. The TLF35884 might change continously between PWM and PFM. Switching in PWM is activating internal oscillators and other blocks leading to a current consumption similar to INIT, NORMAL and WAKE state. • It is recommended to ensure currents significantly lower than 5 mA consumed from V_{PreReg} in case SLEEP state is used in the application. Nevertheless there might be some devices which cannot ensure PFM mode entry even without load current as the threshold might be influenced by noise on the current monitor for the step-down preregulator. • Please mind, that current thresholds defined for the C14-step silicon in **Table 3** are only given as reference values and not subject to production test.

2	Step down regulator behavior in SLEEP state (f_{SW} = 400 kHz)	• In case the step down converter is configured for 400 kHz switching frequency (FRE-pin connected to GND) and operated in SLEEP mode with disabled step up regulator (STU-pin connected to GND), the C14-step silicon might get stuck in 100% duty cycle mode (step down regulator dropout condition). This might happen in case of a supply voltage transient leading to dropout condition. • Being stuck in 100% duty cycle mode the step down regulator output voltage might follow the rising supply voltage until the OV-threshold $V_{RT,FB1,high}$ is reached, triggering the movement to FAILSAFE and reset in the system. • According to the described missbehavior it is not recommended to use SLEEP state in case of low frequency switching of step down regulator without a activated step up regulator at the input.
3	Move-to-POWERDOWN triggered in SLEEP	• In a particular situation (sinking ~10 mA from the step-down pre regulator and applying battery voltage transients) the C14-step silicon might behave in a way that the step down pre regulator (being in PFM) influences the internal supplies by internal load transients in a way that the internal supply monitoring is detecting a UV and the TLF35584 moves to POWERDOWN state. Shortly after the internal supply will recover and the TLF35584 restarts in INIT state. This deviation from the expected behavior might prevent the device to stay surely in SLEEP state and keep the application continously supplied.

Table 3 Electrical characteristics: Step down regulator only valid for C14-step silicon V_{VS} =6.0 V to 40 V; T_j = -40°C to +150°C, all voltages with respect to ground (unless otherwise specified)

Parameter	Symbol	Values			Unit	Note / Test Condition	Number
		Min.	Typ.	Max.			
Current threshold for transition from PWM to PFM	$I_{PWM/PFM}$	0	57	110	mA	1)	P_6.3.2.12
Current threshold for transition from PFM to PWM	$I_{PFM/PWM}$	0	145	190	mA	1)	P_6.3.2.13

1) Reference data from evaluation, not subject to production test.

6.3 Frequency Setting

The description in this chapter of the TLF35584 Data Sheet Rev 2.0 is valid for C14-step silicon.

7 Post Regulators

7.1 Introduction

The description in this chapter of the TLF35584 Data Sheet Rev 2.0 is valid for C14-step silicon.

7.2 µ-Processor Supply

The description in this chapter of the TLF35584 Data Sheet Rev 2.0 is valid for C14-step silicon.

7.3 Communication

The description in this chapter of the TLF35584 Data Sheet Rev 2.0 is valid for C14-step silicon.

7.4 Voltage Reference

The description in this chapter of the TLF35584 Data Sheet Rev 2.0 is valid for C14-step silicon.

7.5 Tracker 1 & 2

The description in this chapter of the TLF35584 Data Sheet Rev 2.0 is valid for C14-step silicon.

7.6 External Post Regulator for Core Supply (optional)

There are differences in the behavior for the external post regulator control between TLF35584 Data Sheet Rev 2.0 and C14-step silicon. These deviations are mentioned in the following table:

Table 4 Deviations in external post regulator control

Number	Function	Description
1	Synchronization output signal with active spread spectrum	• There is a weakness of the C14-step silicon for the synchronization output signal for the optional core voltage regulator during activated spread spectrum. • In case the synchronization output SYN is being used and connected to an external switched mode power supply, it should be taken into consideration that the SYN-output signal might be interrupted unintentionally in a randomic way for activated spread spectrum. • In **Figure 1** and **Figure 2** it is shown how the signal of SYN might look like. The figures have been generated using the synchronization without phase shift (DEVCFG2.ESYNPHA = 0). For this configuration the SYN output signal will stuck to low signal temporarily. For configuration with 180° phase shift (DEVCFG2.ESYNPHA = 1) the stuck signal would be high level.

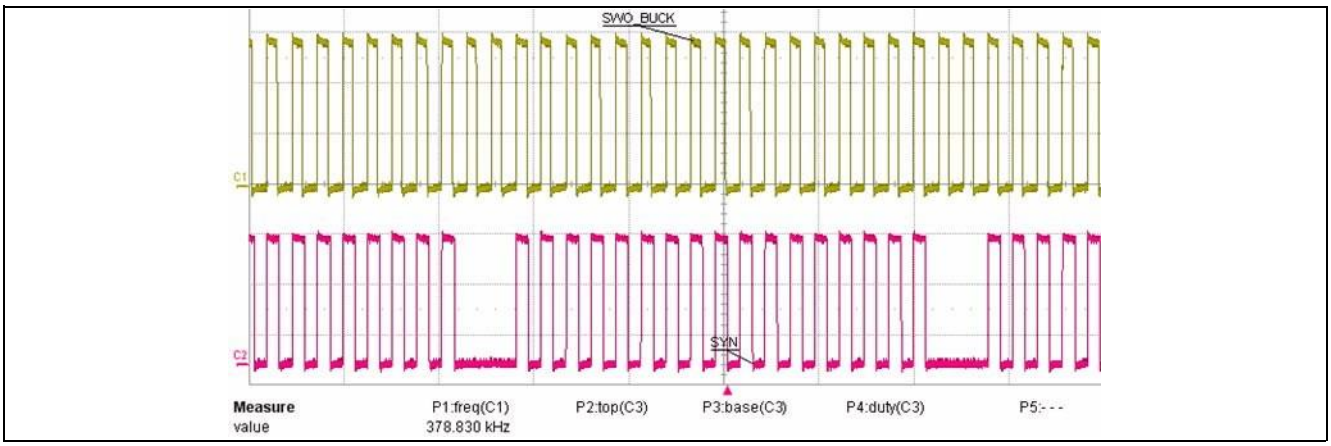

Figure1 Interrupted SYN output for activated spread spectrum (FRE pin to GND - LF)

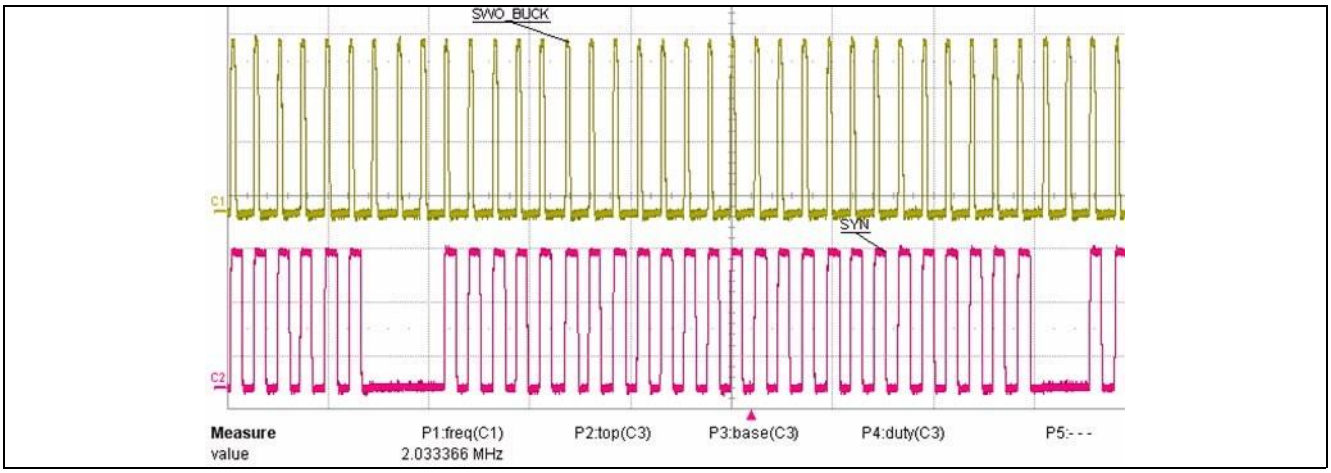

Figure 2 Interrupted SYN output for activated spread spectrum (FRE pin open - HF)

7.7 Power Sequencing

The description in this chapter of the TLF35584 Data Sheet Rev 2.0 is valid for C14-step silicon.

8 Monitoring Function

There are differences in the voltage monitoring function between TLF35584 Data Sheet Rev 2.0 and C14-step silicon. These deviations are mentioned in the following tables:

Table 5 Deviations in reset function

Number	Function	Description
1	Reset output ROT behavior in Move-toFAILSAFE conditions	• There is a weakness of the C14-step silicon related to the reset output pin ROT, in case the TLF35584 moves to FAILSAFE state. In a safety context the reset function and the reset output ROT is considered to be QM, accordingly safety is not affected. • The output driver of the open drain transistor in the reset output ROT is disabled together with the microcontroller supply ldo (QUC). According to the fact that the QUC is disabled/switched off in case of a Move-toFAILSAFE event, the reset output is not longer pulled to low signal and is pulled up to QUC. As the QUC is disabled and the output cap is discharged by the load and an internal active pull-down of ~80 Ω, this is reflected in a transient behavior which is shown in the figures below. The observation and relevance strongly depends on the failure case and its boundary conditions. These conditions are elaborated in the following list. – QUC shorted to GND: The voltage monitoring detects the UV and pulls down ROT. SS1/2 are going low and application is in safe state. QUC is shorted to GND and has 0V accordingly, but provides current (still enabled). After typ. 3ms TLF35584 moves to FAILSAFE state and disables the ldo and resets the output driver of ROT. Due to the short to GND ROT stays low as it is pulled to QUC. (no problem) Please refer to **Figure 3**. – QUC overloaded by current. The voltage monitoring detects the UV due to the decreased output voltage by current limitation or dropout voltage (only without boost) and pulls down ROT. SS1/2 are going low and application is in safe state. Due to the assertion of ROT the microcontroller is switched off and decreases its current consumption dramatically. The output voltage of QUC might recover into valid voltage range and the TLF35584 restarts in INIT state. (no problem) – Continous UV or short to GND on QST or VCI: The voltage monitoring detects the UV on the respective rail and pulls down ROT. SS1/2 are going low and application is in safe state. QUC continous to regulate to its nominal output voltage. After typ. 3ms TLF35584 moves to FAILSAFE state and disables all ldo and resets the output driver of ROT. The reset output might be pulled up to the discharging QUC (by the attached load and an active pull-down of ~80 Ω). This might result into a temporary high level at ROT during the shutdown transition. A undervoltage monitoring of the microcontroller could prevent undesired start of the microcontroller operation. Please refer to **Figure 4**. – Continued on the next page.

Table 5 Deviations in reset function

Number	Function	Description
1 (cont'd)	Reset output ROT behavior in Move-toFAILSAFE conditions (cont'd)	• Continued: – QUC shorted to an higher voltage rail: The voltage monitoring detects the OV on the QUC rail and SS1/2 are going low and application is in safe state. TLF35584 will move to FAILSAFE which is disabling QUC as well as all other regulators and activates the active pull-down of ~80 Ω on QUC output, trying to discharge the rail. The FAILSAFE state disables also the output driver of ROT. The reset output might be pulled up to QUC. This might result into a high level at ROT during presence of the external overvoltage. Still the application will be safely shutted down during in this case by SS1/2. Please refer to **Figure 5**.
2	Reset output ROT behavior for Move-toSTANDBY transitions	• There is a weakness of the C14-step silicon related to the reset output pin ROT, in case the TLF35584 moves to STANDBY state. In a safety context the reset function and the reset output ROT is considered to be QM, accordingly safety is not affected. • The output driver of the open drain transistor in the reset output ROT is disabled shortly after the microcontroller supply ldo (QUC). According to the fact that the QUC is disabled/switched off at the point in time when the device enters into STANDBY state (transition delay time expired or in case of QUC current monitoring usage after a decrease below the current threshold), the reset output shortly pulled to low, but pulled up to the output voltage of QUC right after. Nevertheless the output of QUC is actively discharged by the load and an internal active pull-down of ~80 Ω, this is reflected in a transient behavior which is shown in **Figure 6** below.

The figures **Figure 3** to **Figure 6** are oscilloscope screenshots. The analog channels on the top are showing the following signals:

- Blue: Output Voltage of QUC with vertical scale of 2V/Div
- Green: Output Voltage of QST with vertical scale of 2V/Div
- Red: Reset output ROT with vertical scale of 2V/Div

The digital channels on the bottom are labeled at the left hand side.

For horizontal scale (time), please refer to the information given in the respective figure.

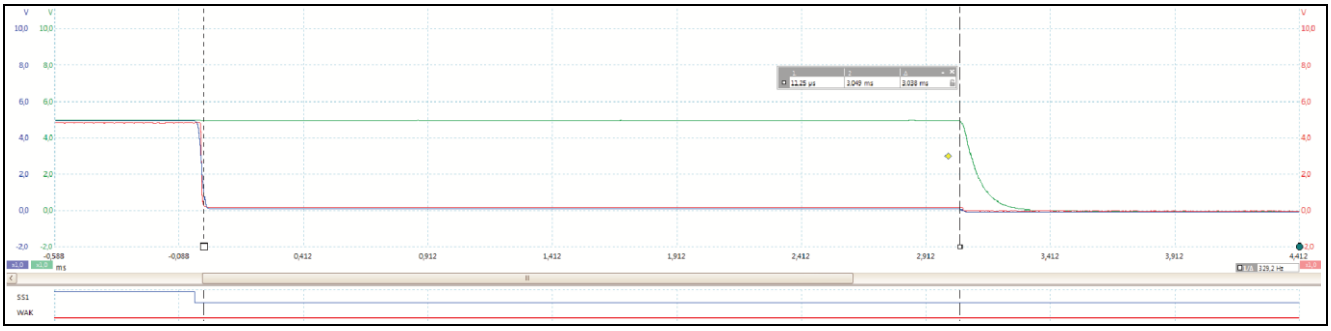

Figure 3 Reset Output (ROT) weakness - Example: Short to GND detection of QUC

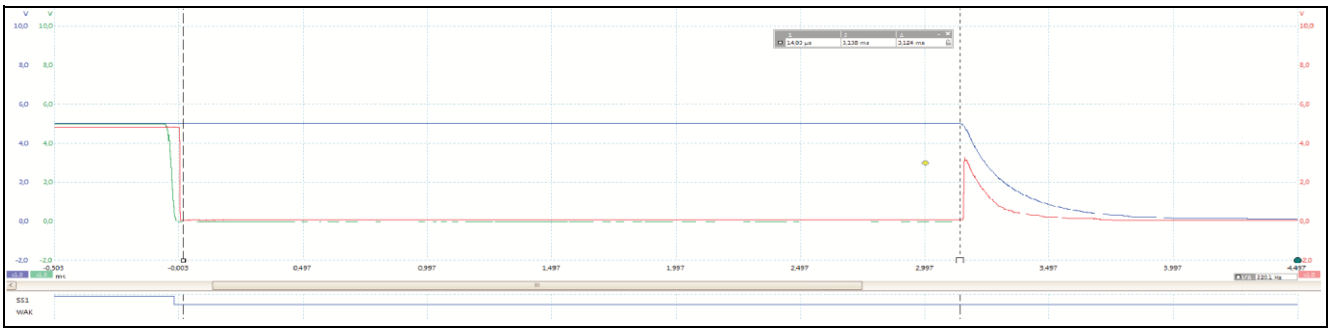

Figure4 Reset Output (ROT) weakness - Example: Short to GND detection of QST (or VCI)

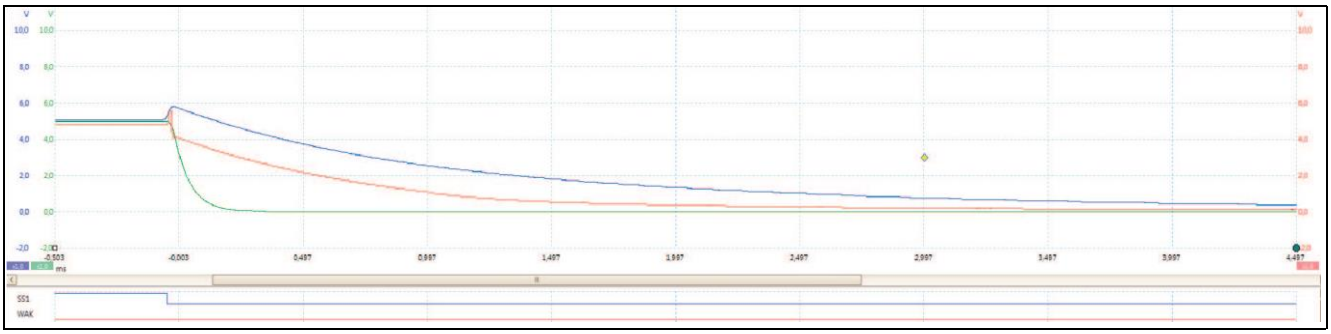

Figure5 Reset Output (ROT) weakness - Example: Overvoltage at output QUC

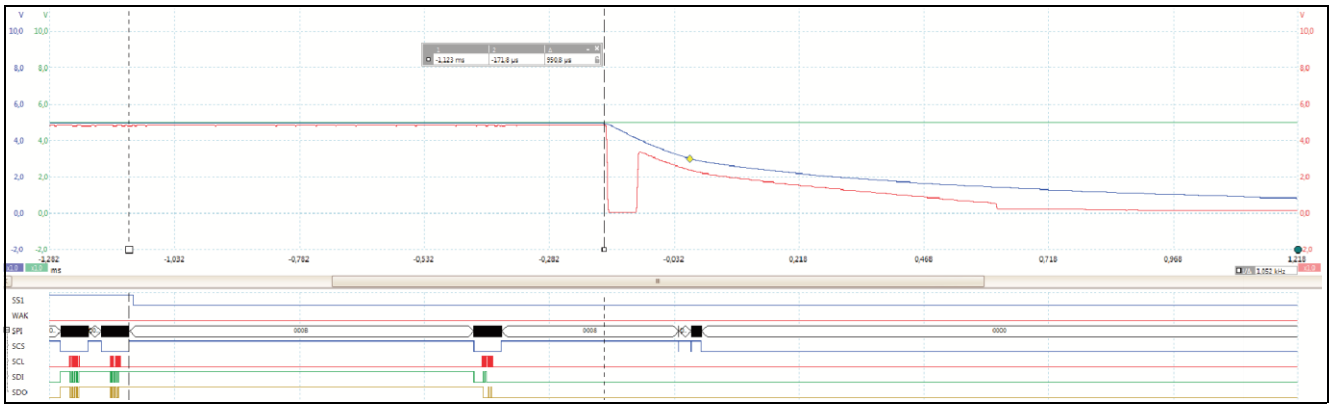

Figure 6 Reset Output (ROT) weakness - Example: STANDBY transition

9 Standby LDO and internal Supplies

The description in this chapter of the TLF35584 Data Sheet Rev 2.0 is valid for C14-step silicon.

10 Wake Up Timer

The description in this chapter of the TLF35584 Data Sheet Rev 2.0 is valid for C14-step silicon.

11 State Machine

There are differences in the state machine function between TLF35584 Data Sheet Rev 2.0 and C14-step silicon. These deviations are mentioned in the following tables:

Table 6 Deviations in state machine function

Number	Function	Description
1	“Hard reset” for second intitialization timeout	• For the 5V variant of the TLF35584 (TLF35584xxVS1) there might be a difference in the behavior for the second expiry of the initialization timer triggering a “hard reset” according to the description in chapter 11.4.2.1.2. in the data sheet. This event is disabling the regulator outputs for the hard reset time t_{SDT} (typ. 10ms) and restarts the power sequence afterwards. • The behavioral difference depends on the choosen output capacitance for PreReg, the step-down converter frequency selection and the present input voltage. The condition only appears in case of the not responding microcontroller (Initialization timeout). • The TLF35584 C14-step silicon discharges the output cap of PreReg only with a very low active pull-down (roughly 100 kΩ). Considerig the hard reset time t_{SDT} (typ. 10ms), this might lead to a condition of an output capacitor C_{PreReg} still charged with a voltage close or higher than the UVthreshold of pre regulator output. This condition accelerates the powersequencing, leading to a fast start of QUC regulator with the step down preregulator still in the early phase of its softstart (low duty cycle). This early load step (QUC output charging) might lead to a bigger undershoot on the step down preregulator output close to 5V, influencing the QUC regulator it self. • It might lead to an UV detection on the QUC rail(Move-to-INIT event) reseting the initialization timeout counter, that decides to move the device to FAILSAFE after the third initialization failure. This might lead to unexpected number of soft and hard reset cycles in case of a not responding microcontroller.
2	SS2 low in WAKE state	• In a particular condition the microcontroller is able to trigger a behavior of the TLF35584 that is pulling SS2 temporarily to high for the SS2 delay time, where it is not supposed to be pulled high. The microcontroller shall prevent the condition explained in the following bullet point. • The undesired behavior is triggered by the micocontroller in case he is changing the configuration of the SS2DEL in the register SYSPCFG1 from “no delay” to any delay different to “no delay” being in WAKE state of the TLF35584. Configuration in the INIT state of the TLF35584 is not affected. Accordingly it is highly recommended to not change the safety related configuration of the TLF35584 in WAKE state or to make sure that the SS2DEL is always kept enabled (anything different to “no delay”) or disabled (“no delay“). This ensures to not trigger the SS2 high for the SS2 delay time after a reconfiguration in WAKE state.

Table 6 Deviations in state machine function

Number	Function	Description
3	Prerequisite for transition WAKE to NORMAL (ERR-monitoring)	• A minor deviation from the specification is the different prerequisite for the transition from WAKE to NORMAL state in terms of ERR-pin monitoring. • The Data Sheet Rev 2.0 describes that the transition from WAKE to NORMAL requires 3 valid periods of the ERR signal before it is accepted. Whereas the C14-step silicon is accepting also a single period before the GoToNormal request. • This deviation is not affecting safety or general functionality, it just differs from the behavior of the device for a transition from INIT to NORMAL where 3 periods of ERR signal are required.
4	Transition WAKE to SLEEP	• The transition from WAKE to SLEEP state is showing differences to the expected behavior in case the window and/or functional watchdog are deactivated for SLEEP mode (WDCFG1.WDSLPEN = 0) and activated globally (WDCFG0.WWDEN = 1 and/or WDCFG0.WWDEN = 1). • In this condition the Watchdogs are restarted entering into SLEEP state from WAKE instead of being switched off. This will lead to interrupts (INT) and finally to reset (ROT), in case the microcontroller is not reacting (providing service again) on the notification by interrupt. According to this missbehavior of the C14-step silicon the transition from WAKE to SLEEP state shall not be used in the condition mentioned above. • Workarounds: – Transition from WAKE to SLEEP state via NORMAL state in a two step appropach. – Disable the watchdog(s) globally being in WAKE state before proceeding with the transition from WAKE to SLEEP directly. Please ensure proper global reactivation of watchdog(s) after wakeup from SLEEP.
5	Pre-regulator pull-down in STANDBY	• There is a active pull-down at the pre-regulator output which is supposed to discharge the output rail in case the device is being disabled. In case of a STANDBY transition this pull-down is supposed to be activated after entering into STANDBY state, but the in the C14-step silicon this pulldown is disabled again 50 µs after the device has entered STANDBY state. • This deviation of the C14-step silicon might result in a slower discharge time of the pre-regulator output, as in this case the pregulator rail is discharged by leakage currents, resistor dividers and optionally attached loads only.
6	SLEEP state	• Due to some deviations of the C14-step silicon is not recommended to use the SLEEP state of the TLF35584. Nevertheless it can be used with special attention to the described misbehavior of the C14-step silicon in respect to SLEEP state described by **Table 1**, **Table 2** and item 6 of **Table 6**.

Table 6 Deviations in state machine function

7	Stay in Current State (being in SLEEP state)	• In case of high silicon junction temperature of more than 130°C being in SLEEP state, there might be a multiple triggering of the interrupt line indicating a thermal prewarning of the step-down preregulator by the flag registers (IF.OTW and OTWRNSF.PREG) due to the activation and deactivation of the thermal sensor during PWM-PFM switching described in **Table 2** Item **1**.
Number	**Function**	**Description**
8	LDO_µC current monitoring for low power states	• The LDO_µC current monitoring for low power states of the C14-step silicon has a worse accuracy than specified in Data Sheet Rev 2.0. The acchievable values for the C14-step silicon are defined in **Table 7** for different conditions and settings. • Use cases: – According to the shown discrepancy for lower current thresholds, like 30 mA for output capacitors greater than 10 µF and 10 mA in general, it is not allowed to use the TLF35584's LDO_µC current monitoring (DEVCFG2.CMOMEN = 1) for transitions into SLEEP and STANDBY in this configuration and condition as proper transition based on the monitoring cannot be ensured. – For SLEEP state itself, it is not recommended at al to select the configurations for lower current thresholds, like 30 mA for output capacitors greater than 10 µF and 10 mA in general, as it cannot be ensured that the device stays in SLEEP state properly without transitioning to WAKE state. • For others configurations and conditions the decreased accuracy according to **Table 7** shall be considered. • Please mind, that those current thresholds are currently only given as reference values and not subject to production test.

Table 6 Deviations in state machine function

Number	Function	Description
9	Microcontroller programming support (MPS) influence to state transition NORMAL/WAKE to STANDBY	• The chapter 11.7 in the Data Sheet Rev 2.0 describes influences to the overall device behavior of the TLF35584. Beside the described differences there is a unintended influences to the device behavior in case of microcontroller programming support being active (MPS-Pin high) for the movement NORMAL/WAKE to STANDBY. – For the particular case of an interrupted state transition from NORMAL/WAKE to STANDBY due to a wake-up event by WAK (level) or ENA(edge) during the transition, the TLF35584 is not triggering ROT to low when moving to INIT state. Accordingly the behavior with and without MPS being activated can be compared by **Figure 7** and **Figure 8**. Nevertheless the interrupted transition is triggering in both cases an interrupt event and reports the interrupted state transition by the interrupt register IF.SYS and the subsequent diagnostic register SYSSF.TRFAIL.

Number	Function	Description

Table 6 Deviations in state machine function

10	Microcontroller programming support (MPS) influence to state transition Move-to-INIT	• The chapter 11.7 in the Data Sheet Rev 2.0 describes influences to the overall device behavior of the TLF35584. Beside the described differences there is an unintended influences to the device behavior in case of microcontroller programming support being active (MPS-Pin high) for the part of the Move-to-INIT events triggered by Window Watchdog, Functional Watchdog or Error Monitoring. – Error Monitoring failure moving the device into INIT state: Following registers will keep their configuration data instead of beeing reset to their default according to reset class *R3): - RSYSPCFG1 (Configuration of Error Monitoring is kept) - RWDCFG0, RWDCFG1, RFWDCFG, RWWDCFG0 & RWWDCFG1 (Configuration of Window and Functional Watchdog is kept) - WWDSTAT (Error Counter status of Window Watchdog) - FWDSTAT0 and FWDSTAT1 (Status of Functional Watchdog) The Error Monitoring itself will wait after movement to INIT state for the next edge of the ERR signal until it gets active again. – Window Watchdog failure moving the device into INIT state: Following registers will keep their configuration data instead of beeing reset to their default according to reset class *R3): - RSYSPCFG1 (Configuration of Error Monitoring is kept) - RWDCFG0, RWDCFG1, RFWDCFG, RWWDCFG0 & RWWDCFG1 (Configuration of Window and Functional Watchdog is kept) - FWDSTAT0 and FWDSTAT1 (Status of Functional Watchdog) The Window Watchdog status (WWDSTAT) itself is reset properly. Note that according to the configuration of the Window Watchdog being kept, the first open window after INIT state entry will be either 60 ms (600x 100 µs) or 600 ms (600 x 1 ms) depending on the previous configuration of RWDCFG0.WDCYC. The windows after the first proper service will be considered as configured before. – Functional Watchdog failure moving the device into INIT state: Following registers will keep their configuration data instead of beeing reset to their default according to reset class *R3): - RSYSPCFG1 (Configuration of Error Monitoring is kept) - RWDCFG0, RWDCFG1, RFWDCFG, RWWDCFG0 & RWWDCFG1 (Configuration of Window and Functional Watchdog is kept) - WWDSTAT (Status of Window Watchdog) The Functional Watchdog status (FWDSTAT0 and FWDSTAT1) itself is reset to its default properly. Only in the particular case of a heartbeat timeout during a FWD service sequence (in between the 4 responses), the FWD response counter (FWDSTAT0.FWDRSPC) will be kept. • Looking to the 3 supervision functions independently, they will continue their operation (ERR signal monitoring, window- and heartbeat timer state) in parallel to the state movement.

Table 6 Deviations in state machine function

		• In case the configuration to the protected registers is rewritten after the movement to INIT state, the requested configuration will be applied after valid LOCK sequence as usual.

Table 7 Electrical characteristics: State machine

V_{VS} =6.0 V to 40 V; T_j = -40°C to +150°C, all voltages with respect to ground, positive current flowing into pin (unless otherwise specified)

Parameter	Symbol	Values			Unit	Note / Test Condition	Number
		Min.	Typ.	Max.			
LDO_µC current monitoring for low power states	$I_{LDO\_µC,att}$	-40	–	+40	%	1) DEVCFG2.CTHR: set to 2 (60 mA) or 3 (100mA) ; $V_{PREREG} > V_{QUC} + V_{dr,QUC}$	
LDO_µC current monitoring for low power states	$I_{LDO\_µC,att}$	-50	–	+40	%	1) $C_{QUC} \leq 10$ µF ; DEVCFG2.CTHR: set to 1 (30mA) ; $V_{PREREG} > V_{QUC} + V_{dr,QUC}$	
LDO_µC current monitoring for low power states	$I_{LDO\_µC,att}$	-100	–	+40	%	1) $C_{QUC} \leq 47$ µF ; DEVCFG2.CTHR: set to 0 (10 mA) or 1(30mA) ; $V_{PREREG} > V_{QUC} + V_{dr,QUC}$	

1) Reference data from evaluation, not subject to production test.

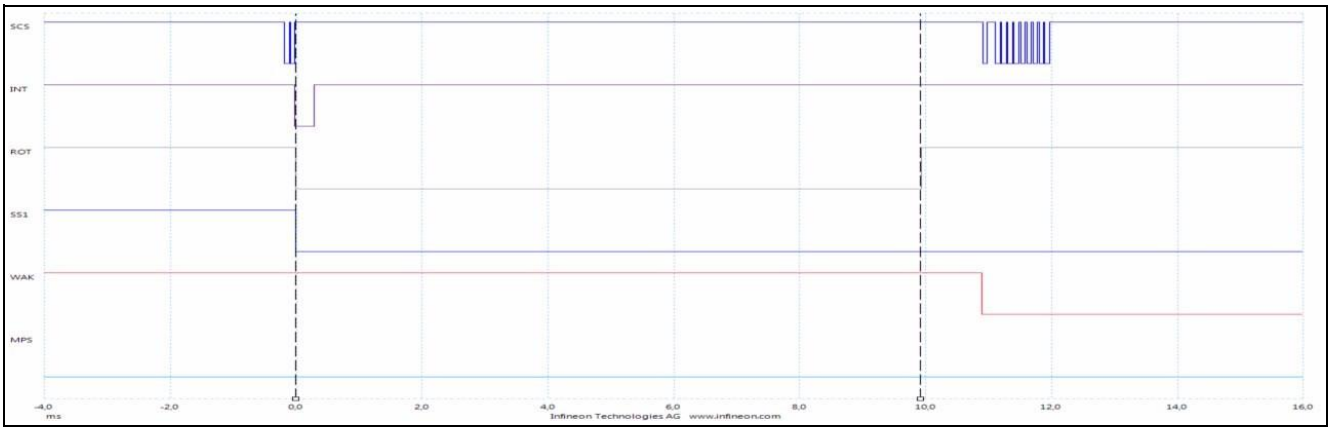

Figure7 Interrupted state transition NORMAL-STANDBY (MPS pin set low)

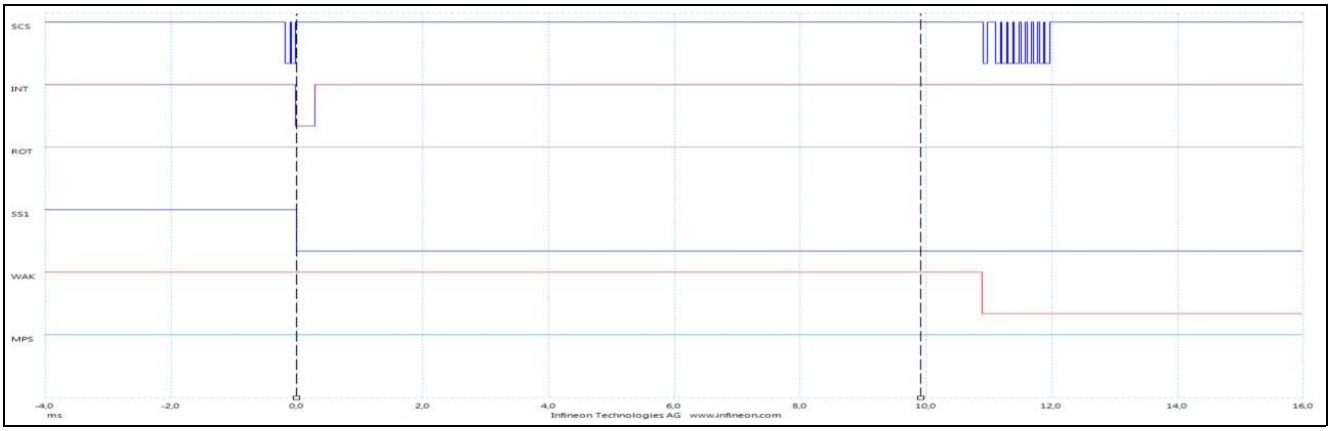

Figure 8 Interrupted state transition NORMAL-STANDBY with active programming support (MPS pin set high)

12 Safe State Control Function

The description in this chapter of the TLF35584 Data Sheet Rev 2.0 is valid for C14-step silicon.

13 SPI - Serial Peripheral Interface

There are differences in the function between TLF35584 Data Sheet Rev 2.0 and C14-step silicon in respect of SPI and registers. These deviations are mentioned in the following tables:

Table 8 Deviations in SPI / register function

Number	Function	Description
1	VMONSTAT register function	• The function of the register VMONSTAT differs from the behavior described in the Data Sheet Rev 2.0. The bits in the register are not indicating the out of range condition of the respective regulator. The register is only indicating whether the regulator is enabled or disabled.

14 Interrupt Generation

The description in this chapter of the TLF35584 Data Sheet Rev 2.0 is valid for C14-step silicon.

15 Window Watchdog And Functional Watchdog

The description in this chapter of the TLF35584 Data Sheet Rev 2.0 is valid for C14-step silicon.

16 Application Information

The description in this chapter of the TLF35584 Data Sheet Rev 2.0 is valid for C14-step silicon.

17 Package Outlines

The description in this chapter of the TLF35584 Data Sheet Rev 2.0 is valid for C14-step silicon.

18 Revision History

Revision	Date	Changes
3.0	2017-03-17	- Errata Sheet update for “C14-step” . - **Page 20 Table 8** Item 2: Removed errata about default value of registers after startup from STANDBY or POWERDOWN state. (fixed)
2.3	2016-12-14	- All pages: “C-step silicon” renamed to “C13-step silicon” . - **Page 8 Table 4** Item 1: Misbehavior of synchronization output for activated spread spectrum. - **Page 13 Table 6** Item 9: MPS pin high influence to interrupted state transition NORMAL/WAKE->STANDBY. - **Page 13 Table 6** Item 10: MPS pin high influence to Move-to-INIT events due to WWD, FWD and ERR Monitoring.
2.1	2016-04-01	Initial Errata Sheet for C-step silicon based on the Data Sheet Rev 1.0.

Edition 2017-03-17

Published by
Infineon Technologies AG
81726 Munich, Germany

Legal Disclaimer

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of intellectual property rights of any third party.

Information

For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office (**www.infineon.com**).

Warnings

Due to technical requirements, components may contain dangerous substances. For information on the types in question, please contact the nearest Infineon Technologies Office.

Infineon Technologies components may be used in life-support devices or systems only with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.