

OPTIREG™ PMIC TLF35584

Functional Safety PMIC



RoHS



ISO26262
compliant

Features

- High efficient power management integrated circuit (PMIC)
- Serial step up and step down pre regulator for wide input voltage range from 3.0 to 40 V with full performance and low over all power loss
- Low drop post regulator 5.0 V/200 mA for communication supply (QCO)
- Low drop post regulator 5.0 V/600 mA (TLF35584QxVS1) or 3.3 V/600 mA (TLF35584QxVS2) for μ C supply (QUC)
- Voltage reference 5.0 V \pm 1% for ADC supply, 150 mA current capability (QVR)
- Two trackers for sensor supply following voltage reference 150 mA current capability each (QT1 and QT2)
- Standby regulator 5.0 V/10 mA (TLF35584QxVS1) or 3.3 V/10 mA (TLF35584QxVS2) (QST)
- Provides enable, sync out signal and voltage monitoring for an optional external post regulator for core supply
- Independent voltage monitoring block and error pin monitoring
- Configurable window and functional watchdog
- Safe State Control with two safe state signals with programmable delay
- 16-bit SPI, interrupt and reset function
- PRO-SIL™ Features:
 - ISO 26262 compliant supporting up to ASIL-D
 - Safety Documentation (Safety Manual & Safety Analysis Summary Report)
- Green Product (RoHS compliant)



Potential applications

- Electric Power Steering
- Battery Management
- Inverter
- Transmission
- Engine Management
- Domain Control

Product validation

Qualified for Automotive Applications.

Product validation according to AEC-Q100/101.

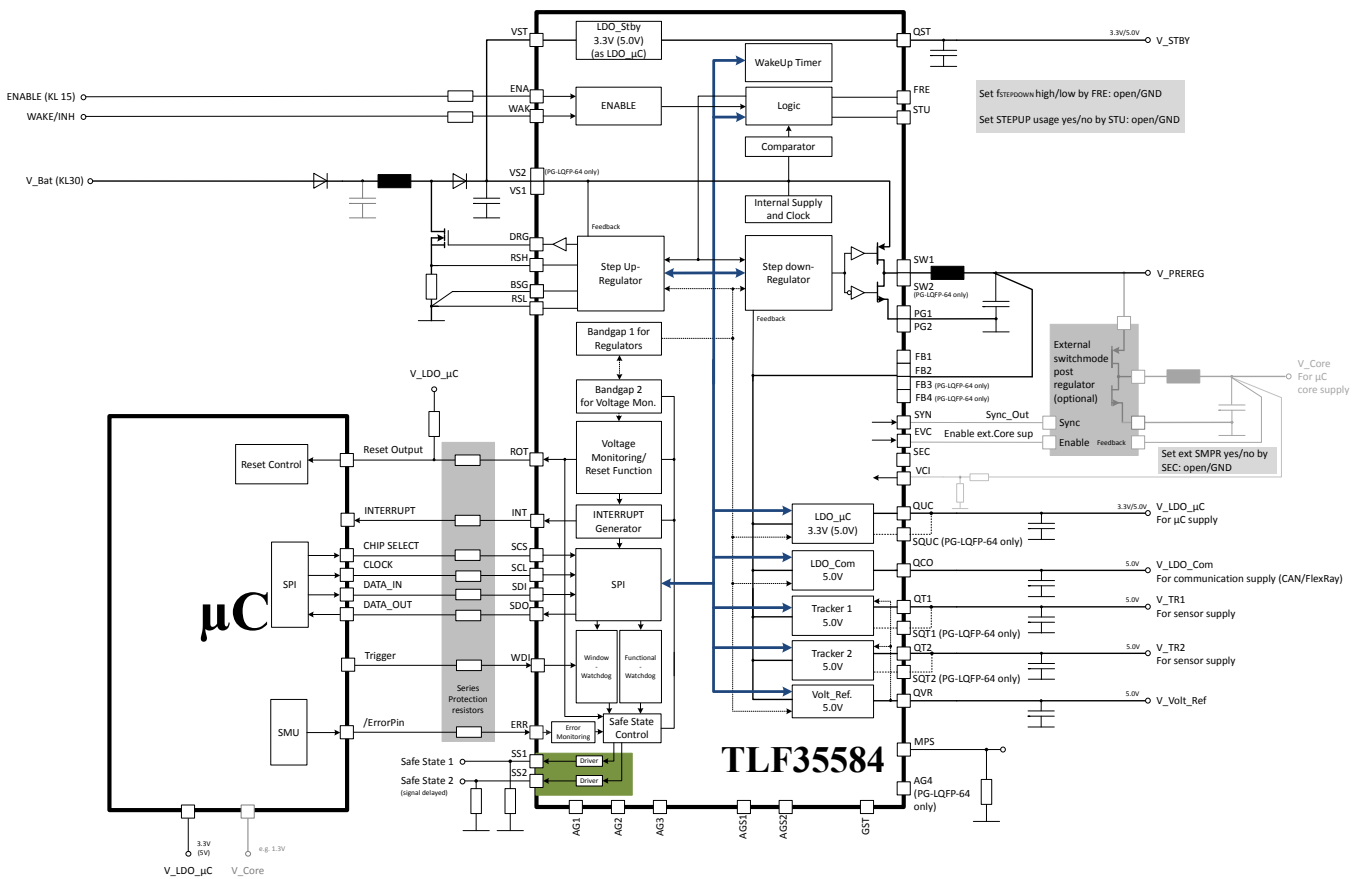
Description

Description

The OPTIREG™ PMIC TLF35584 is a high efficient Functional Safety PMIC (Power Management Integrated Circuit).

Type	Package
TLF35584QVWS1 (5.0 V Variant)	PG-VQFN-48
TLF35584QVWS2 (3.3 V Variant)	PG-VQFN-48
TLF35584QKVS1 (5.0 V Variant)	PG-LQFP-64
TLF35584QKVS2 (3.3 V Variant)	PG-LQFP-64

Application Example



Note: The following information is given as an example for the implementation of the device only and shall not be regarded as a description or warranty of a certain functionality, condition or quality of the device.

- Please contact us for additional supportive documentation.
- For further information you may contact <http://www.infineon.com/OPTIREG-PMIC>

Note: This figure is a very simplified example on an application circuit. The function must be verified in the real application.

1 Absolute maximum ratings

1 Absolute maximum ratings

Table 1 Absolute maximum ratings²⁾

$T_j = -40^\circ\text{C}$ to 150°C , all voltages with respect to ground, positive current flowing into pin (unless otherwise specified)

Parameter	Symbol	Values			Unit	Note or condition
		Min.	Typ.	Max.		
Voltages						
Boost driver ground	V_{BSG}	-0.3	–	0.3	V	–
Input standby LDO	V_{VST}	-0.3	–	40	V	3)4)
Input voltage pin 1 (pre regulator)	V_{VS1}	-0.3	–	40	V	–
Input voltage pin 2 (pre regulator)	V_{VS2}	-0.3	–	40	V	PG-LQFP-64 only
External step up power stage, gate	V_{DRG}	-0.3	–	40	V	–
External power stage, sense resistor high	V_{RSH}	-0.3	–	40	V	–
External power stage, sense resistor low	V_{RSL}	-0.3	–	6.0	V	–
Enable input	V_{ENA}	-0.3	–	40	V	–
Enable input	I_{ENA}	-5	–	–	mA	5)
Wake input	V_{WAK}	-0.3	–	40	V	–
Wake input	I_{WAK}	-5	–	–	mA	–
Reset output	V_{ROT}	-0.3	–	6.0	V	–
SPI chip select input	V_{SCS}	-0.3	–	6.0	V	–
SPI clock input	V_{SCL}	-0.3	–	6.0	V	–
SPI data in (MOSI) input	V_{SDI}	-0.3	–	6.0	V	–
SPI data out (MISO output)	V_{SDO}	-0.3	–	6.0	V	–
Interrupt output	V_{INT}	-0.3	–	6.0	V	–
Window watchdog trigger input	V_{WDI}	-0.3	–	6.0	V	–
Error pin input	V_{ERR}	-0.3	–	6.0	V	–
Safe state 1 output	V_{SS1}	-0.3	–	6.0	V	–
Safe state 2 output	V_{SS2}	-0.3	–	6.0	V	–
Output voltage reference LDO	V_{QVR}	-0.3	–	6.0	V	–
Output tracker 2	V_{QT2}	-1.0	–	40	V	–

²⁾ Not subject to production test, specified by design.

³⁾ Maximum rating is 60 V, if rise time from 0 to 60 V is longer than 10 ms

⁴⁾ Maximum rating is 49 V, for an overall time of 10 s (in the range of 40 V to 49 V) during the lifetime of the product independent from the rise time.

⁵⁾ Consider external series resistor for negative voltages < -0.3 V to ensure maximum rating of current

1 Absolute maximum ratings

Table 1 Absolute maximum ratings²⁾ (continued)

$T_j = -40^\circ\text{C}$ to 150°C , all voltages with respect to ground, positive current flowing into pin (unless otherwise specified)

Parameter	Symbol	Values			Unit	Note or condition
		Min.	Typ.	Max.		
Sense Pin for tracker 2	V_{SQT2}	-0.3	–	40	V	PG-LQFP-64 only
Output tracker 1	V_{QT1}	-1.0	–	40	V	–
Sense Pin for tracker 1	V_{SQT1}	-0.3	–	40	V	PG-LQFP-64 only
Output communication LDO	V_{QCO}	-0.3	–	6.0	V	–
Output microcontroller LDO	V_{QUC}	-0.3	–	6.0	V	–
Sense Pin for microcontroller LDO	V_{SQUC}	-0.3	–	6.0	V	PG-LQFP-64 only
External core voltage monitor input	V_{VCI}	-0.3	–	6.0	V	–
HW config: ext. core voltage monitor	V_{SEC}	-0.3	–	6.0	V	–
Synchronization output	V_{SYN}	-0.3	–	6.0	V	–
Enable output for ext. core supply	V_{EVC}	-0.3	–	6.0	V	–
Step down feedback input 4	V_{FB4}	-0.3	–	7.0	V	PG-LQFP-64 only
Step down feedback input 3	V_{FB3}	-0.3	–	7.0	V	PG-LQFP-64 only
Step down feedback input 2	V_{FB2}	-0.3	–	7.0	V	–
Step down feedback input 1	V_{FB1}	-0.3	–	7.0	V	–
Step down power ground 2	V_{PG2}	-0.3	–	0.3	V	–
Step down power ground 1	V_{PG1}	-0.3	–	0.3	V	–
Step down switching node 2	V_{SW2}	-0.3	–	40	V	PG-LQFP-64 only
Step down switching node 1	V_{SW1}	-0.3	–	40	V	–
HW config: step up pre regulator	V_{STU}	-0.3	–	6.0	V	–
HW config: step down frequency	V_{FRE}	-0.3	–	6.0	V	–
Output standby LDO	V_{QST}	-0.3	–	6.0	V	–
Input MPS	V_{MPS}	-0.3	–	6.0	V	–

Temperatures

Junction temperature	T_j	-40	–	150	$^\circ\text{C}$	–
Storage temperature	T_{stg}	-55	–	150	$^\circ\text{C}$	–

ESD susceptibility

ESD susceptibility to GND	V_{ESD}	-2	–	2	kV	HBM ⁶⁾
---------------------------	-----------	----	---	---	----	-------------------

²⁾ Not subject to production test, specified by design.

⁶⁾ ESD susceptibility, HBM according to JEDEC HBM Human Body Model ANSI/ESDA/JEDEC JS001 (1.5 k Ω , 100 pF)

1 Absolute maximum ratings

Table 1 Absolute maximum ratings²⁾ (continued)

$T_j = -40^\circ\text{C}$ to 150°C , all voltages with respect to ground, positive current flowing into pin (unless otherwise specified)

Parameter	Symbol	Values			Unit	Note or condition
		Min.	Typ.	Max.		
ESD susceptibility to GND	V_{ESD}	-500	–	500	V	CDM ⁷⁾
ESD susceptibility (corner pins) to GND	$V_{\text{ESD,Corner}}$	-750	–	750	V	CDM

²⁾ Not subject to production test, specified by design.

⁷⁾ ESD susceptibility, Charged Device Model “CDM” ESDA STM5.3.1 or ANSI/ESD S.5.3.1

2 Package information ⁸⁾

⁸⁾ Dimensions in mm

2 Package information ⁸⁾

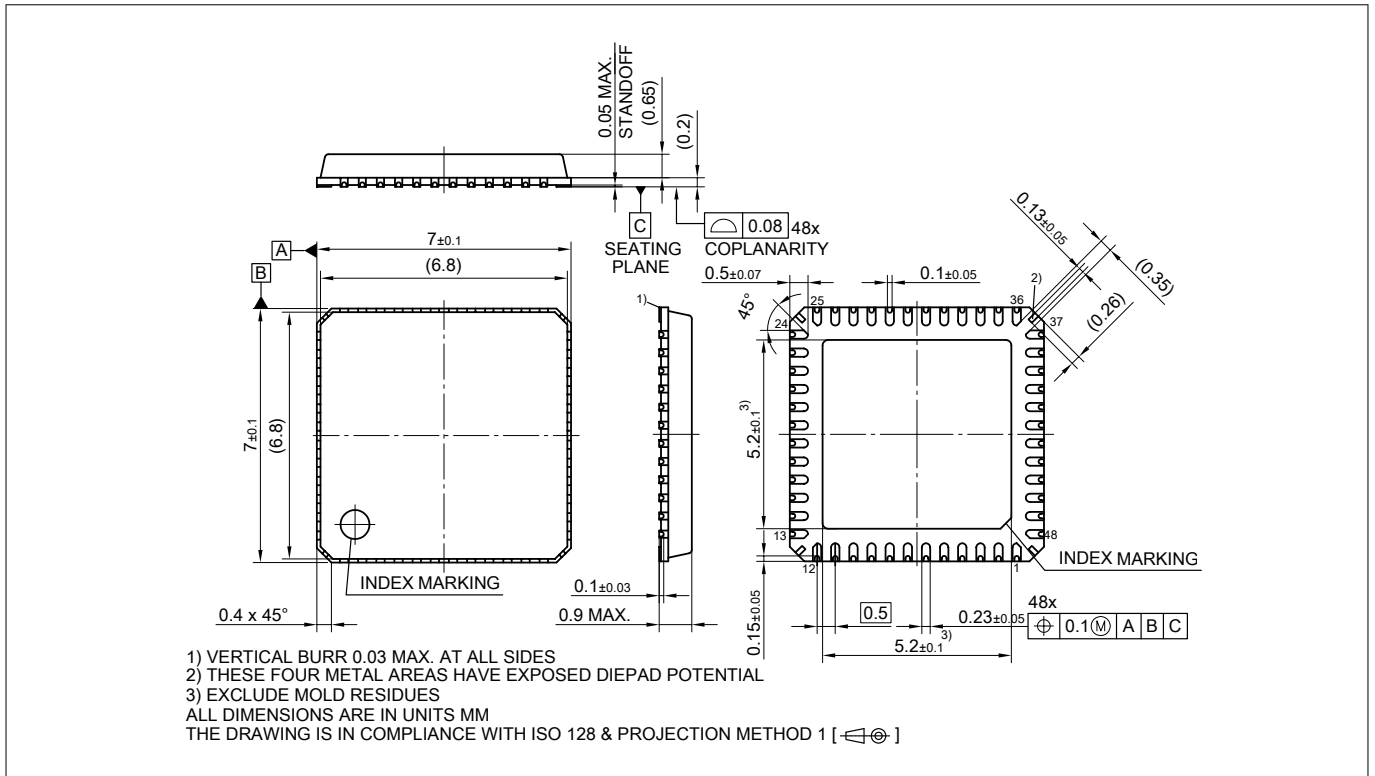


Figure 1 PG-VQFN-48 package outline

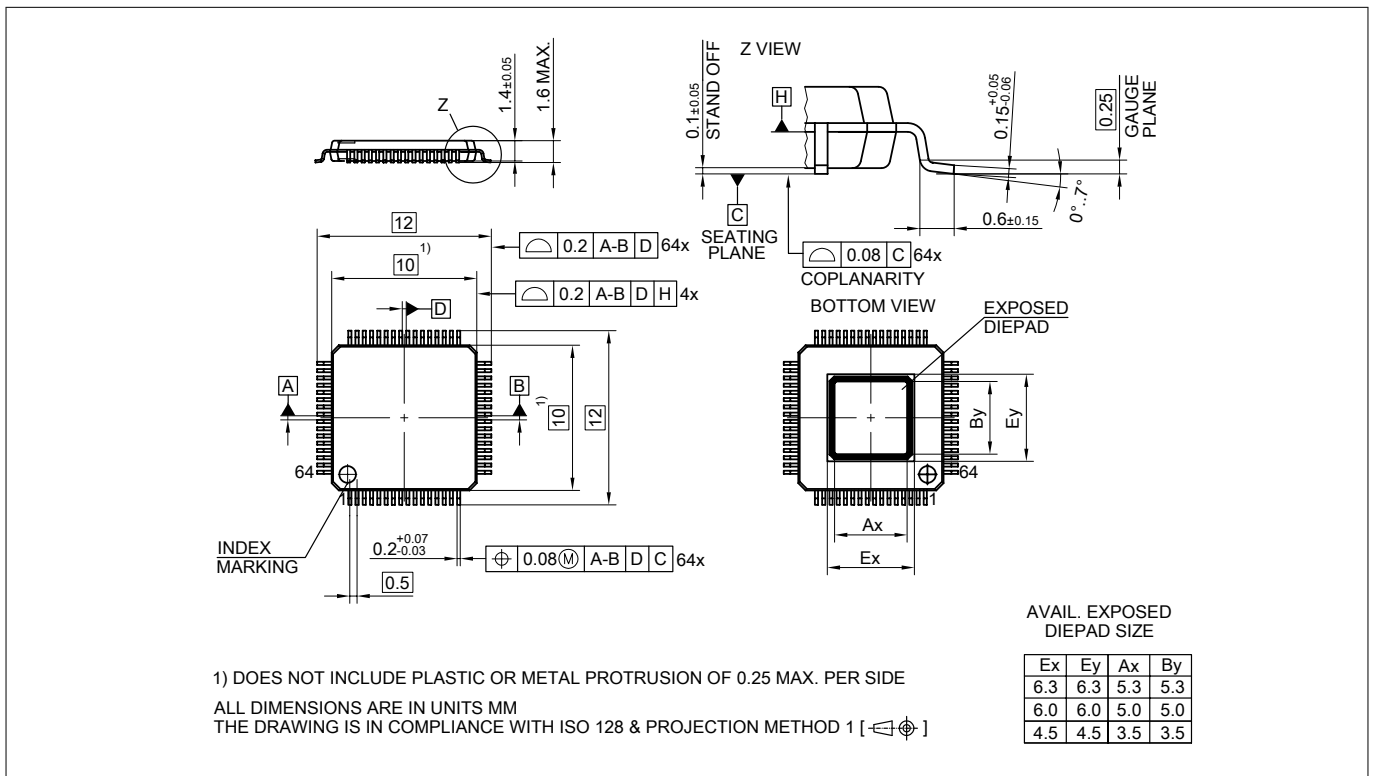


Figure 2 PG-LQFP-64 package outline

⁸⁾ Dimensions in mm

Trademarks

All referenced product or service names and trademarks are the property of their respective owners.

Edition 2019-03-25

Published by

Infineon Technologies AG

81726 Munich, Germany

© 2019 Infineon Technologies AG

All Rights Reserved.

Do you have a question about any aspect of this document?

Email: erratum@infineon.com

Document reference

IFX-jmv1546509847065

IMPORTANT NOTICE

The information contained in this application note is given as a hint for the implementation of the product only and shall in no event be regarded as a description or warranty of a certain functionality, condition or quality of the product. Before implementation of the product, the recipient of this application note must verify any function and other technical information given herein in the real application. 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) with respect to any and all information given in this application note.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer's technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

WARNINGS

Due to technical requirements products may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by Infineon Technologies in a written document signed by authorized representatives of Infineon Technologies, Infineon Technologies' products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury