

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.

1 Absolute maximum ratings

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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⁾
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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

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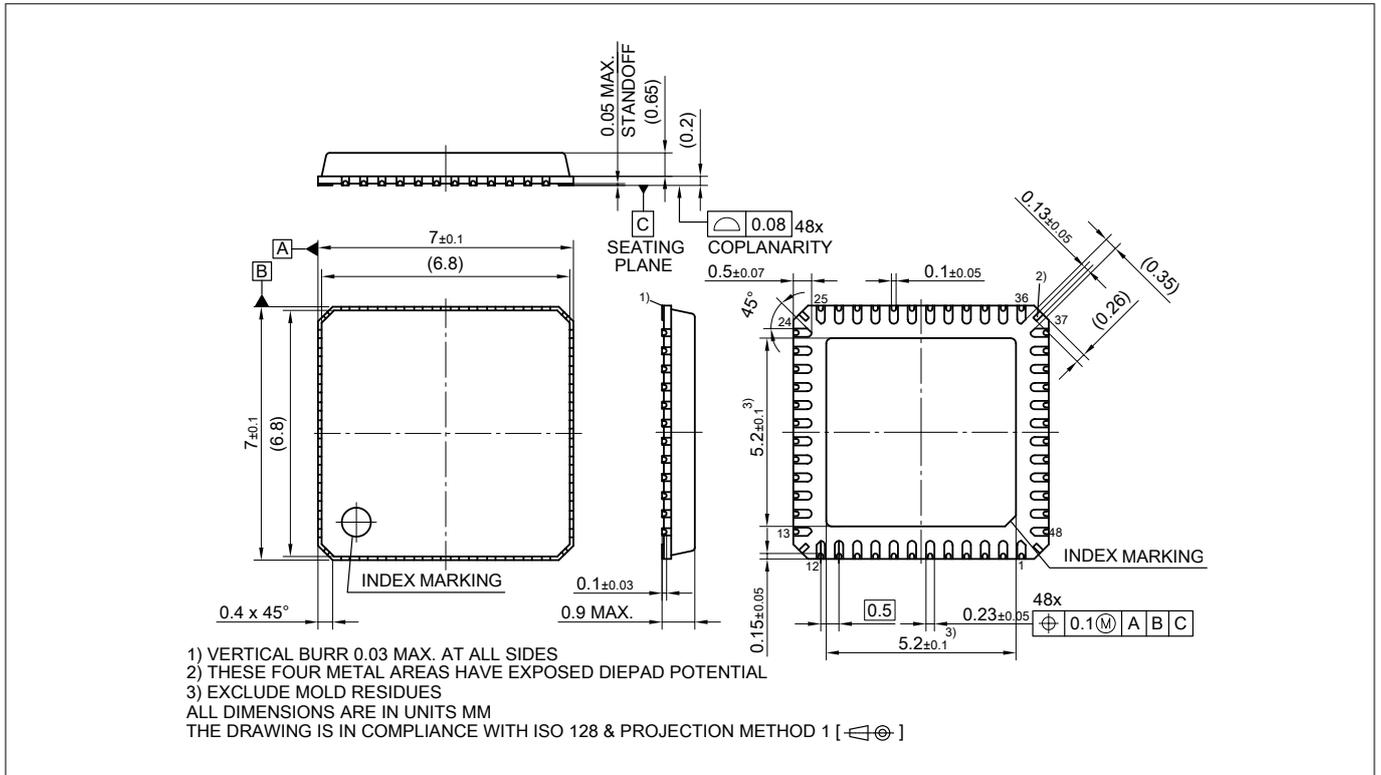


Figure 1 PG-VQFN-48 package outline

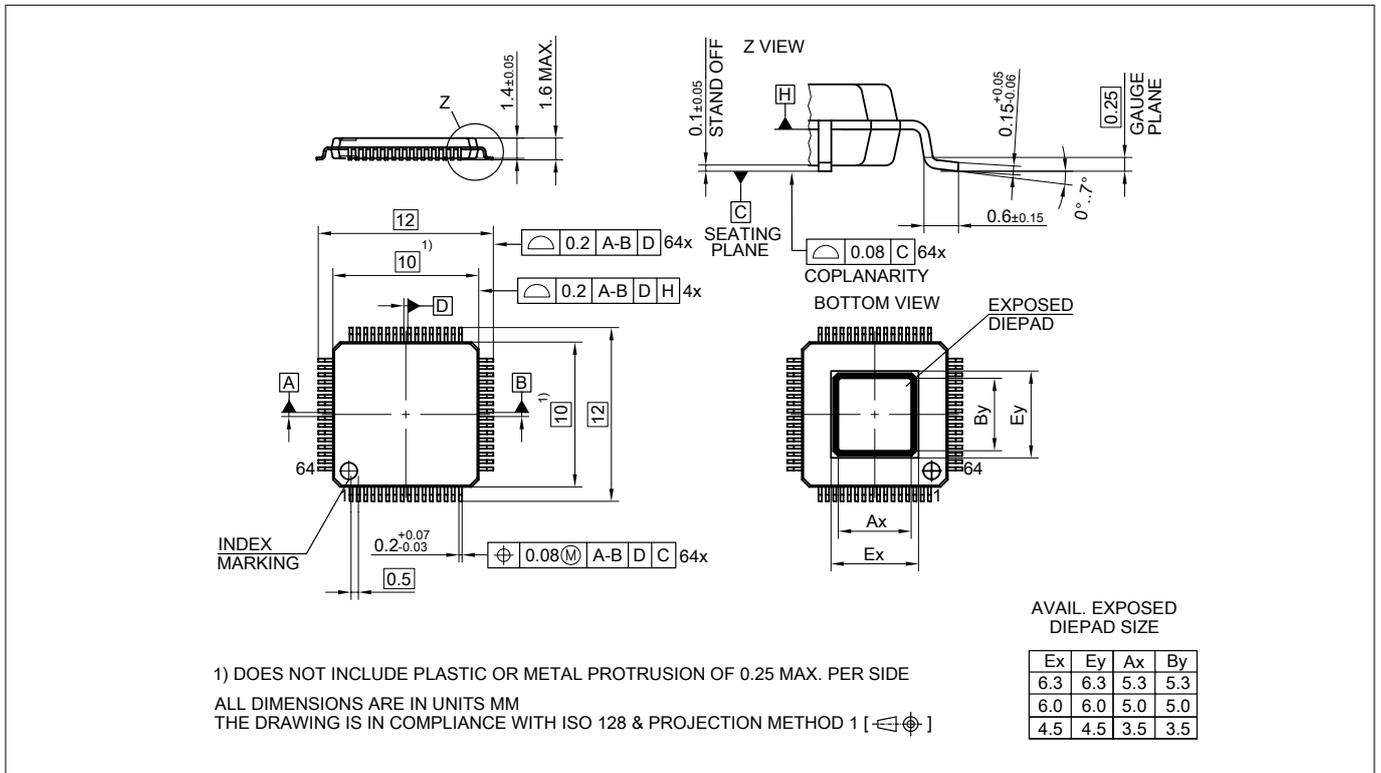


Figure 2 PG-LQFP-64 package outline

⁸⁾ Dimensions in mm

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