

PCA9485

13 A 4:1, 1:4, 2:1, 1:2, and 1:1 mode switched capacitor direct charger

Rev. 1.1 — 6 August 2024

Objective short data sheet

1 General description

The PCA9485 is a highly integrated switched-capacitor converter with an embedded OVPFET and dual external FET controls, targeted to provide the quadruple output current for the fast charging applications with a 1-cell battery. The device works in 4:1 switching operation with an extremely high efficiency (around 96.8 %, at $V_{OUT} = 4.5\text{ V}$, $I_{OUT} = 8\text{ A}$), in 1:4, 2:1 and 1:2 switching operation or in 1:1 mode with forward and reverse direction.

Absolute maximum voltage for each VUSB, VWPC, VIN, VOUT, and VUSB/VWPC input is designed to support up to 35 V. VIN input supports up to 27 V with the pre-bias enabled for USB VBUS/wireless receiver output. VOUT input is designed to support up to 7 V with the pre-bias enabled for a 1-cell battery application.

The device provides multiple safety schemes such as OC (overcurrent), RC (Reverse-Current), OV (overvoltage), UV (Under-Voltage), switching pin short, thermal shutdown, and others.

The PCA9485 also has leader-follower function built in that allows two PCA9485 devices to be used seamlessly in handheld applications.

The device features all the functions with an I2C interface, with up to 1 MHz speed.



2 Features

- Dual-phase switched-capacitor to optimize efficiency
- Integrated 4:1, 2:1 switched capacitor charger for single cell battery including 1:1 bypass
- Reverse operation mode, such as 1:4, 1:2 and reverse bypass from VOUT to VIN
- 96.8 % efficiency at VOUT = 4.5 V and IVOOUT = 8 A
- Wide range of input voltage
 - From 6 V to 10.5 V in 2:1 switching operation mode
 - From 12 V to 21 V in 4:1 switching operation mode
- An OVPFET with IVIN and VBAT regulation loop
- External FET gate control for GaN and CMOS
 - Support dual input via USB and wireless power receiver
- Multiple Safety Schemes
 - Over/undervoltage protection
 - Overcurrent protection (OCP)
 - Fast OCP for short protection during operation (Fast OCP)
 - Overtemperature protection (OTP)
 - Input/output or flying capacitor short detection in startup
 - Reverse current protection (RCP)
 - Watchdog timers
- Leader and follower function for parallel charging
- 1 Mbit/s I2C-bus target interface
- 4.06 x 4.46 mm, 10 x 11, 110 WLCSP with 0.4 mm pitch

3 Applications

Smart phone, tablet, and other portable electronic devices with large capacity battery.

4 Ordering information

Table 1. Ordering information

Type number	Topside marking	Package		
		Name	Description	Version
PCA9485UK	PCA9485UK	WLCSP110	Wafer level chip scale package. 110 terminal, 0.4mm pitch, 4.06 x 4.46 x 0.525 mm body (backside coating included)	SOT2189-1

4.1 Ordering options

Table 2. Ordering options

Type number	Orderable part number	Package	Packing method	Minimum order quantity	Temperature
PCA9485UK	PCA9485UKZ	WLCSP110	REEL 13" Q1 DP CHIPS	6000	-40 °C to +85 °C

5 Block diagram

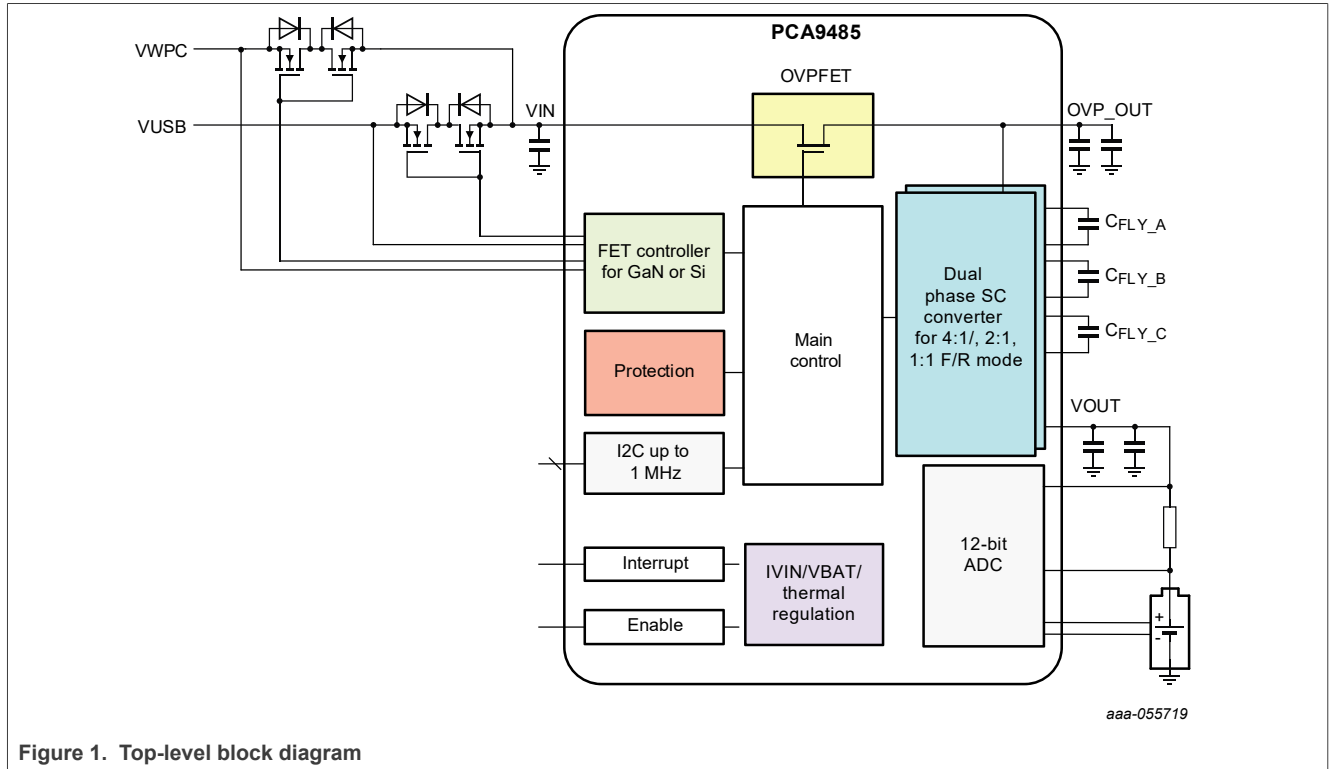


Figure 1. Top-level block diagram

6 Revision history

Table 3. Revision history

Document ID	Release date	Description
PCA9485_SDS v.1.1	6 August 2024	• Updated Figure 1
PCA9485_SDS v.1.0	26 June 2024	• Initial version

Legal information

Data sheet status

Document status ^{[1][2]}	Product status ^[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
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