The XDPP1100 FAQ

For product web page

About this document

Scope and purpose

This document lists the frequency asked questions and answers of the XDPP1100 digital controller.

Intended audience

Infineon customers

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1 Hardware related questions

1.1 What is the resolution of VOUT setpoint?

The LSB of Vout setpoint is determined by the larger value of the two:

1) LSB per VOUT_MODE

2) 156.25 µV/VOUT_SCALE_LOOP

1.2 How frequent the ADC updates? Does it require PWM trigger?

The voltage sense ADC (AFE1) sample rate is 50 Msps. The current sense ADC (AFE2) sample rate is 25 Msps. Both are independent to the PWM edge or phase.

1.3 What is the maximum output current capability?

The XDPP1100 supports IOUT telemetry up to 128A. User could write FW patch to modify the resolution of output current and increase the range of maximum IOUT.

1.4 How many parallel loops can you implement?

A single IC (XDPP1100-Q040) supports up to two loops.

For multiple XDPP1100 in parallel, it supports up to 16 units.

1.5 Can dual-loop share current?

The dual-loop configuration has two independent loops and they don’t have internal current sharing.

1.6 Vout OVP fault delay time

The Vout fault comparator operates at 50 Mhz. Customer could configure the number of fault count. The fastest response could made within 50ns.

1.7 Input feed-forward mechanism

The XDPP1100 feed-forward is implemented by computing duty-cycle based on Vin and Vout voltage. The feed-forward is implemented by hardware.

1.8 How fast is the feed-forward response?

By default the feed-forward is updated every switching cycle. User could also configure the high speed feed-forward by enabling the same cycle mode (vrs_same_cycle_en) for 20ns response.

1.9 Can I use VRSEN to sense DC input voltage?

Yes. The VRSEN can be configured to DC mode. Set vsp1_vrs_sel = 0 to configure VRSEN ADC to be the general ADC mode (DC mode).

1.10 What type of PID compensation does the XDPP1100 have?

One pole, two zeros, with two additional poles by pre and post filter.

1.11 How fast does IC calculate PID?

The PID is calculated at 50 MHz clock.

1.12 What is the status of PWM during power up and FW reset?

The PWM is in Hi-Z (high impedance) mode during initial boot and during FW reset. After initialization, register configuration would be downloaded from OTP to RAM and the status of PWM would change depend on configuration (open-Drain or push-pull). Default config has all the PWM pins configured as PWM output with push-pull (CMOS) output.

1.13 What is the maximum duty-cycle limit?

The maximum hardware limit is 99.6%. User could use MAX_DUTY command to set the duty-cycle limit to be lower than the hardware limit.

2 Firmware related questions

2.1 FW develop environment

XDPP1100 Integrated Development Environment (IDE) is equipped with both GCC compiler and ARM-CC compiler. However, GCC is set to be the default compiler.

2.1.1 Is ARM compiler license included with the device?

No. Customers need to buy their licenses for code development.

2.2 Is there Flash available in this device?

No. The XDPP1100 offers OTP for user data and firmware patch storage.

2.3 How many times can OTP be programmed?

OTP is One Time Programming memory. The XDPP1100 has 64kB OTP for user to store configuration and FW patch. User could change the OTP partition for data config and FW patch code.

The data partition can be set up to 31kB. If the configuration doesn't have extra user defined MFR PMBus commands, the size is about 2kB for 2-loops. The 31kB OTP could be programmed up to 15 times.

If there is FW patch to be stored into OTP, the number of re-write depends on the size of the patch code. The old patch must be invalidate before storing new patch to the same partition.

During debugging, user should use RAM to verify the FW patch code and configuration. Customer can change the configuration as many times as needed. However, the configuration will be lost after power down 3.3V. Please save the configuration to a design file before power cycle the 3.3V VDD.

Once the configuration is finalized, user could store the config to OTP for production.

2.4 Does the code run faster in RAM than in OTP?

Yes. RAM runs at 100 MHz clock and OTP is 25 MHz. Thus be aware that the patch code performs better in RAM. Make sure to verify the patch in OTP if timing is critical.

2.5 What RAM size is available for customer to use?

The XDPP1100 has 32 kB RAM. 22 kB is used for ROM code running. User can use 10 kB for customized FW patch and patch data. By default, the RAM is configured 8 kB for patch code and 2 kB for patch data.

2.6 Can I store more than one FW patch into OTP?

XDPP1100 allows storing multiple FW patches at different partitions in the OTP. Each partition can have one active patch.

2.7 Can I2C recover from lockup

Yes. The XDPP1100 has timeout mechanism implemented. 30ms bus timeout and 5us clock stretch timeout.

3 Peripheral

3.1 Can I use PTC or BJT to sense temperature?

Yes, the XDPP1100 supports user defined temperature lookup table. It can be implemented in FW patch.

4 GUI related questions

4.1 Where can I download GUI?

User needs to register MyInfineon account and asks Infineon support team (sales/FAE) to give access to MyInfineon Collaboration Platform (myICP) sites.

4.2 What addresses need to be skipped when scanning addresses?

We scan between addresses 0x08 to 0x78 and skip the address (0x00 to 0x07, 0x0C, and 0x78 to 0x7F), using the skip radio button provided in the GUI.

5 Nomenclature

Table 1 Definitions of acronyms, symbols, and terms

Symbol, Acronym, or Term	Definition
ACF	Active Clamp Forward
CRC	Cyclical Redundancy Checking
FBFB	Full-Bridge topology with full-bridge rectifier
FW	Firmware
GUI	Graphical User Interface
HBCT	Half-Bridge Center-Tap topology
HW	Hardware
LPF	Low Pass Filter
LSB	The Least Significant Bit
NTC	Negative Temperature Coefficient
OCP	Over current protection
OSP	Open Sense Protection
OTP	Over temperature protection
OTP	One Time Programmable memory
OVP	Over voltage protection
PCL	Peak Current Limit
PID	Proportional Integral Derivative
PTC	Positive Temperature Coefficient
PWM	Pulse width modulation
SCP	Short Circuit Protection
UCP	Under current protection
UTP	Under temperature protection
UVP	Under voltage protection
Vin	Input voltage
Vout	Output voltage
Vrect	Transformer secondary rectified voltage

6 List of application note

[1] XDPP1100 datasheet

[2] XDPP1100 GUI installation and user guide

[3] XDPP1100 application note

[4] XDPP1100 technical reference manual

Revision history

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