

XDPE192C3D Digital Multi-phase Controller

12-phase Dual Loop Voltage Regulator

Features

- Digital controller assisted high performance analog front ends with a fully programmable ARM® Cortex™ – M0 Processor
- Compliant with AMD™ SVI3 Rev 2.0 dc-dc converter specification
- Compliant with PMBus rev 1.3 compliant serial interface
 - Query voltage, current, temperature faults
 - Fault Response
 - Maximum supported bus speed 1 MHz
 - Support 1.8/3.3 V operation
- Output voltage regulation range
 - 0.25 V to 2.8 V (5 mV/step)
- Programmable to support either one or two fully digitally controlled voltage loops in different phase configurations: 12+0, 11+1, 10+2, ... ,6+6 phases
- Flexible PWM phase order and Phase Mapping
- Configurable autonomous phase add/drop
- Automatic phase detection at start-up
- Supports start-up into pre-bias voltage
- Integrated power stage current sense
- Differential output voltage sense
- Digital current balancing
- Digitally programmable PID (Proportional, Integral, Differential) loop compensation
- Digitally programmable loadline slope and offset
- Digital temperature compensation
- Input (+12 V) voltage and current sense
- Extensive fault detection and protection capability
 - Intelligent fault detection with Infineon Power Stages
 - IUVP, OUV, OOV (fixed and tracking)
 - OCP instantaneous & averaged (total current)
 - Multiple OTP thresholds
 - Peak phase current pulse limiting
 - Negative current limit protection
- Internal non-volatile memory (NVM) to store multiple custom configurations
- RoHS compliant and Halogen free 48-lead QFN plastic package

XDPE192C3D Digital Multi-Phase Controller

12-phase Dual Loop Voltage Regulator



Potential applications

Potential applications

- Vcore power regulation for AMD™ SVI3 based Microprocessors
 - Servers
 - Workstations
 - High-end desktops

Product validation

Qualified for industrial applications according to the relevant tests of JEDEC47/20/22

Description

The XDPE192C3D digital dual loop 12 phase controller provides power for AMD™ SVI3 server, workstation, and high-end desktop applications. Core voltage is provided by a multi-phase buck regulator controlled by XDPE192C3 that can be configured in one of the following phase combinations between the two loops: 12+0, 11+1, 10+2, ... 6+6. Command and monitor functions are controlled through the SVI3 interface which supports dynamic voltage changes (VOTF), power states (PS), and VR Telemetry and Status requirements.

The XDPE192C3D controller utilizes digital technology to implement all control functions, providing the ultimate system solution in terms of flexibility and stability. Advanced control loop features, such as Active Transient Response (ATR) modulation and fast DVID response enable optimal response to high di/dt load transients.

Programmable temperature compensation to current sense allows the designer to tailor the response for best loadline accuracy over temperature. XDPE192C3D also supports integrated power stages which include integrated current sense and integrated temperature sense.

Protection features include a set of sophisticated over-voltage, under-voltage, over-temperature, and over-current protections. These attributes provide a complete and advanced protection feature set for microprocessor and power systems.

Infineon strongly recommends pairing Infineon's powerstages with our Digital XDP™ family of controllers to ensure correct interoperability. Interoperability when pairing with other vendor power stages/ discrete power components cannot be guaranteed by Infineon and requires thorough evaluation and characterization by the power stage/ discrete power component vendor.

Table 1 Part number and package summary

Part Number	Package
XDPE192C3D	48-lead 6 mm x 6 mm QFN PG-VQFN-48

Table of contents

Features 1

Potential applications 2

Product validation 2

Description 2

Table of contents 3

1 Ordering information 4

2 Package marking 5

3 Enviromental Qualifications 6

1 Ordering information

Table 2 Ordering information

Base Part Number	Package Type	Standard Pack Form and Quantity		Orderable Part Number
XDPE192C3D	QFN 6 mm x 6 mm	Tape and Reel	4000	XDPE192C3D0000XTMA1 Note 1
				XDPE192C3DxyzzXTMA1 Note 2

Note:

1. Standard Part Number with default configuration, where xyzz = 0000
2. Customer Specific part number, where x = Firmware ID and yzz = Configuration File ID (Codes assigned by Product Marketing).

Sample Programming

The customer can program the parts to their specific system requirements using software/hardware available from Infineon or through other controller programming facilities (contact Infineon for recommendations). Infineon Field Application Engineers are available to assist with system and configuration file optimization and programming of the controllers. Alternatively, samples can be ordered with a customer specific custom configuration pre-programmed at the factory, but lead times for these types of samples are significantly longer than for non-configured samples. The generic part numbering format is shown below:

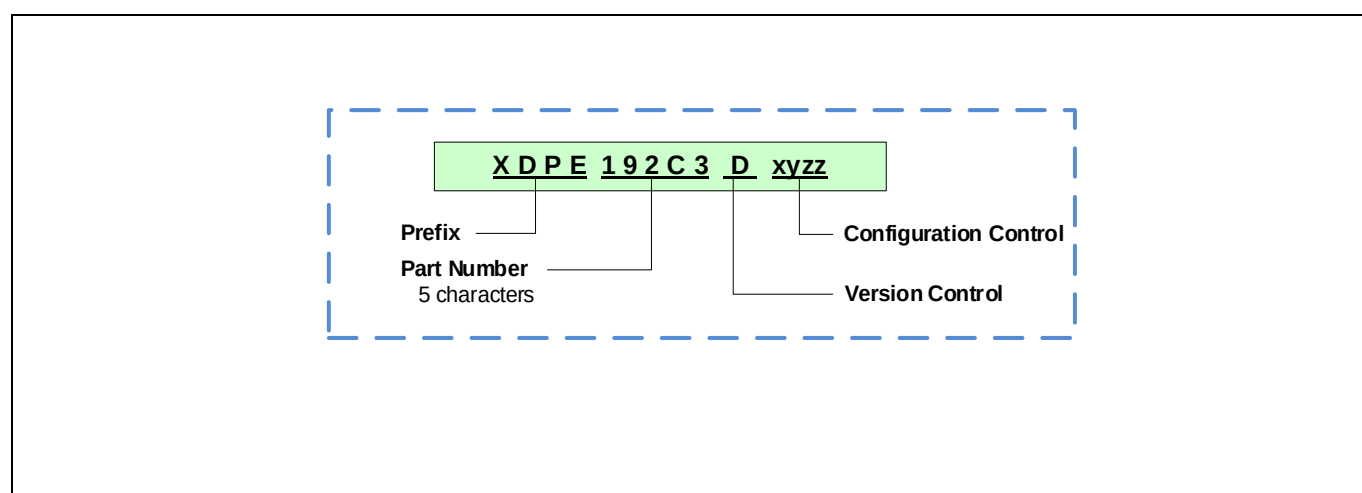


Figure 1 Part number decoding

2 Package marking

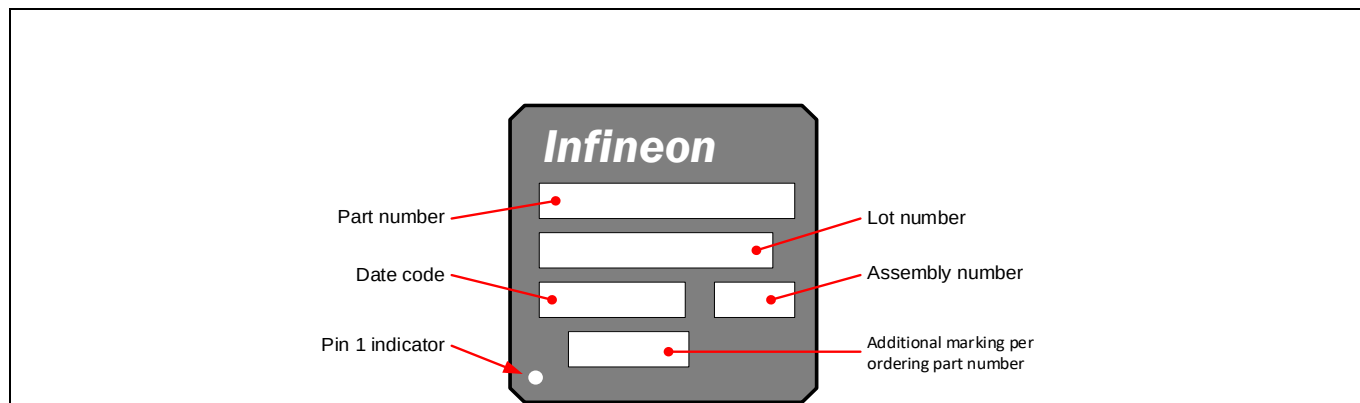


Figure 2 Package marking

3 Environmental Qualifications

Table 3

Qualification Level		Industrial	
Moisture Sensitivity		QFN Package	MSL1
ESD	Human Body Model	JS-001, Class 2	
	Charged Device Model	JS-002, Class C3	
	Latch-up	JESD78, Class 2	
RoHS Compliant		Yes	

Revision history

XDPE192C3D Short Form

Revision 2025-01-23, Rev. 1.0

Previous revisions

Revision	Date	Subjects (major changes since last revision)
1.0	2025-01-23	Release of final version

Trademarks

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

Disclaimer

We Listen to Your Comments Any information within this document that you feel is wrong, unclear or missing at all? Your feedback will help us to continuously improve the quality of this document. Please send your proposal (including a reference to this document) to: erratum@infineon.com

Published by Infineon Technologies AG

81726 München, Germany

© 2025 Infineon Technologies AG

All Rights Reserved.

Legal Disclaimer The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffenheitsgarantie").

With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, 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.

In addition, any information given in this document is subject to customer's compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer's products and any use of the product of Infineon Technologies in customer's applications. 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.

Information For further information on technology, delivery terms and conditions and prices please contact your 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. The Infineon Technologies component described in this Data Sheet may be used in life-support devices or systems and/or automotive, aviation and aerospace applications 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, automotive, aviation and aerospace 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.