XDPE1D2G3C Digital Multi-phase Controller

16-phase Dual Loop Voltage Regulator

Features

- Digital controller with high performance analog front ends and a fully programmable ARM® Cortex™ –M0 Processor
- Compliant with AMD™ SVI3 Rev 3.12 dc-dc converter specification
- Compliant with PMBus rev 1.4 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 3.1 V (5 mV/step)
- Programmable to support either one or two fully digitally controlled voltage rails in different phase configurations: 16+0, 15+1, 14+2, 8+8, …0+16 phases
- Flexible PWM phase order and Phase Mapping
- Configurable autonomous phase add/drop
- Automatic phase detection at start-up
- TLVR open and short fault detection
- 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 load line 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, OUVP, OOVP (fixed and tracking)
  - OCP instantaneous & averaged (total current)
  - Multiple OTP thresholds
  - Peak phase current pulse limiting
  - Negative current limit protection
- Blackbox data recording for fault shutdown events
- Internal non-volatile memory (NVM) to store multiple custom configurations
- RoHS compliant and Halogen free 56-lead QFN plastic package

Potential applications

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

Product validation

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

Description

The XDPE1D2G3C digital dual rail 16 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 the XDPE1D2G3C that can be configured in one of the following phase combinations between the two loops: 16+0, 15+1, 14+2, 8+8 …0+16. 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 XDPE1D2G3C 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 load line accuracy over temperature. XDPE1D2G3C 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 power stages 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

Base Part Number	Package
XDPE1D2G3C	56-lead 7 mm x 7 mm QFN PG-VQFN-56

Table of contents

1 Ordering information

Table 2 Ordering information

Sales Part Number	Package Type	Standard Pack Form and Quantity		Orderable Part Number
XDPE1D2G3C-0000	QFN 7 mm x 7 mm	Tape and Reel	3000	XDPE1D2G3C0000XUMA1 Note **1**
				XDPE1D2G3CxyzzXUMA1 Note **2**

Note:

1. *Standard Part Number with default configuration*
2. *Customer Specific Part Number, where x = Firmware ID, and yzz = Custom Config File ID (Codes assigned by Product Marketing).*

Prototype Samples

The customer can program the parts to their specific system requirements using software/hardware available from Infineon or through other controller programming 3rd Parties (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 configuration pre-programmed at the factory, but lead times for these types of samples are significantly longer than for standard default configuration samples. The generic part numbering format is shown below:

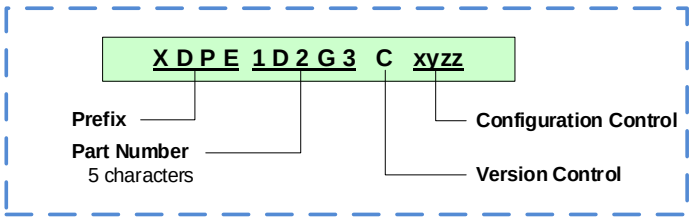

Figure 1 Part number decoding

2 Package

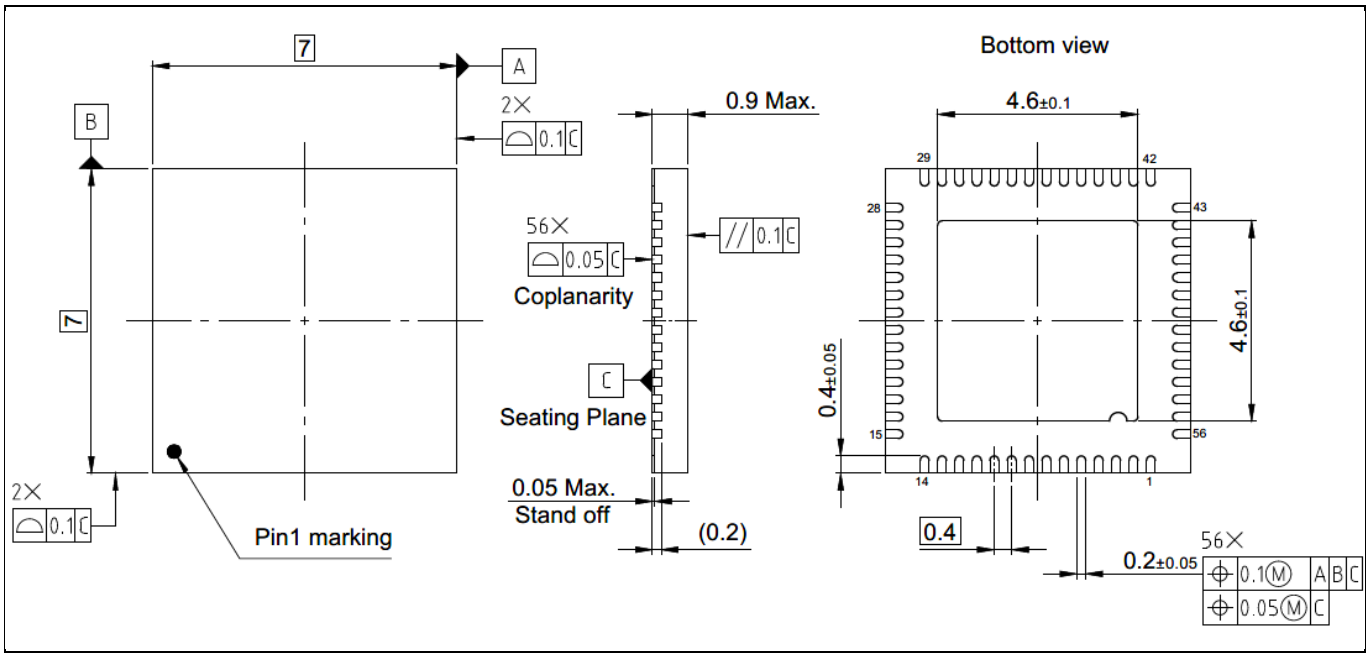

Figure 2 Package

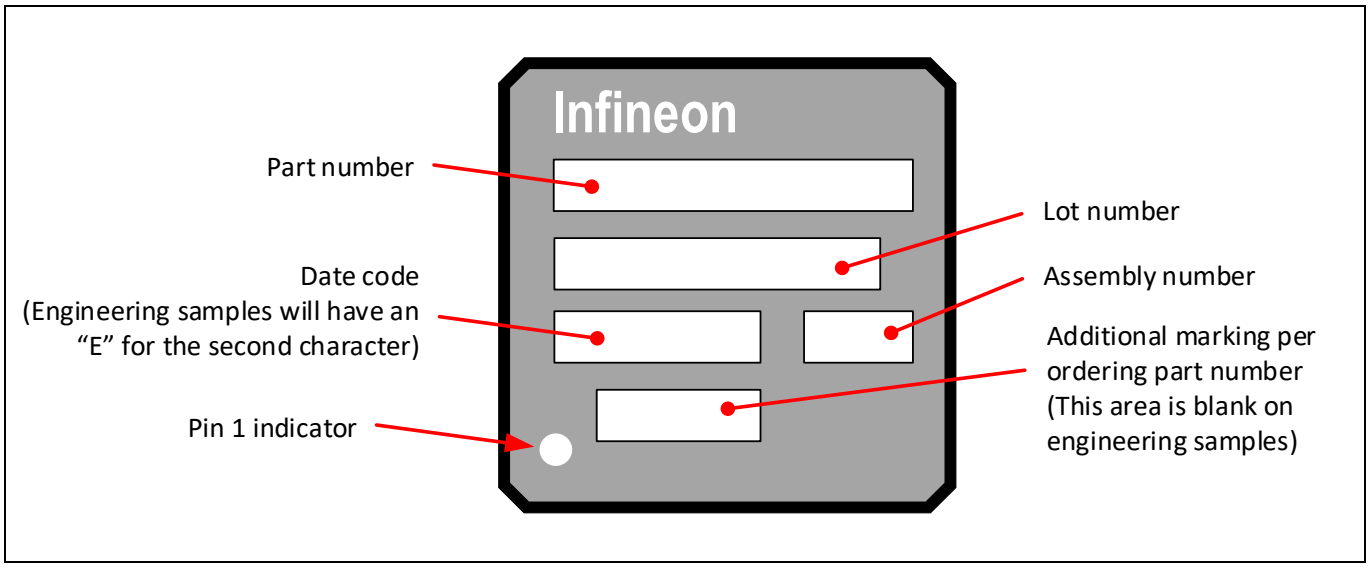

Figure 3 Package marking

3 Environmental Qualifications

Table 3

Qualification Level		Industrial	
Moisture Sensitivity		QFN Package	MSL3
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

XDPE1D2G3C-short

Revision 2026-03-09, Rev. 1.1

Previous revisions

Revision	Date	Subjects (major changes since last revision)
1.0	2026-02-26	Release of final version
1.1	2026-03-09	Remove 'Restricted' marking

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