

XDPE14283A Digital Multi-phase Controller

8-phase Dual Loop Voltage Regulator

Features

- Compliant with AMD™ SVI2, rev 1.10 February 2020 protocol
- 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: 0.2 V to 1.55 V (6.25 mV/step)
- Flexible phase assignment between the two loops: 8+0, 7+1, 6+2, ... ,4+4 phases
- Configurable autonomous phase add/drop
- Automatic phase detection at start-up
- Start-up into pre-bias voltage at the output
- Integrated power stage current sense
- Differential output voltage sense
- Digital current balancing
- Digitally programmable PID (Proportional, Integral, Differential) loop compensation
- Non-linear control for superior transient response
- Digitally programmable loadline
- Digital temperature compensation
- Input (+12 V) voltage and current sense
- Extensive fault detection and protection capabilities:
 - Input/output under voltage protection (IUVP/OUVP), Output over voltage protection (OOVP)
 - OCP instantaneous & averaged (total current)
 - Multiple OTP thresholds
 - Peak phase current pulse limiting
 - Negative current limit protection
 - Output voltage sense protection
- Internal non-volatile memory (NVM) to store multiple custom configurations
- RoHS compliant and Halogen free 40-lead QFN plastic package

Potential applications

- Core & memory power regulation for AMD™ SVI2 and nVidia™ PWMVID based Microprocessors, GPUs, and ASICs
 - Servers
 - Workstations
 - High-end desktops
 - Graphic cards

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Product validation

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

Description

The XDPE14283 is a digital dual rail 8 phase controller that provides power for AMD™ SVI2 and nVidia™ PWMVID server, workstation, and high-end desktop applications. The controller offers flexible phase assignment between the two loops and can be configured in any of the following ways: 8+0, 7+1, 6+2, ... , 4+4. Command and monitor functions are controlled through the SVI2 or PWMVID interface which supports voltage identification on-the-fly (VOTF) with 6.25 mV/step in AMD™ mode or PWMVID based on duty cycle change, power states (PS), VR Data and Operating Registers requirements.

The XDPE14283 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 slew rate load transients.

Programmable temperature compensation to current sense allows the designer to tailor the response for best loadline accuracy over temperature. XDPE14283 also supports integrated power stages that provides integrated current sense and integrated temperature sense information.

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 |
|-------------|---------------------------------------|
| XDPE14283 | 40-lead 5 mm x 5 mm QFN PG-VQFN-40 |

Ordering information

1 Ordering information

Table 2 Ordering information

| Base Part Number | Package Type | Standard Pack Form and Quantity | | Orderable Part Number |
|------------------|-----------------|---------------------------------|------|------------------------|
| | | | | |
| XDPE14283A-xyxy | QFN 5 mm x 5 mm | Tape and Reel | 4000 | Note 1 |
| | | | | |

Note:

- Customer Specific Configuration File, where xx = Customer ID and yy = Configuration File (Codes assigned by IFX 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 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 also be ordered with a customer specific custom configuration pre-programmed at the factory. The generic part numbering format is shown below:

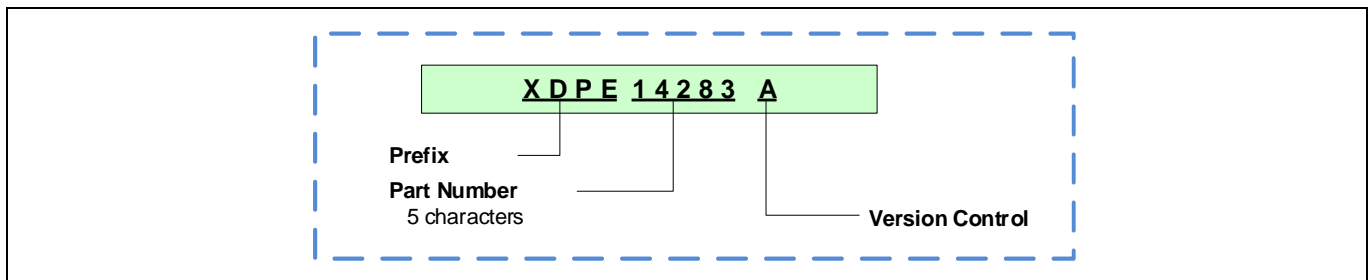


Figure 1 Part number decoding

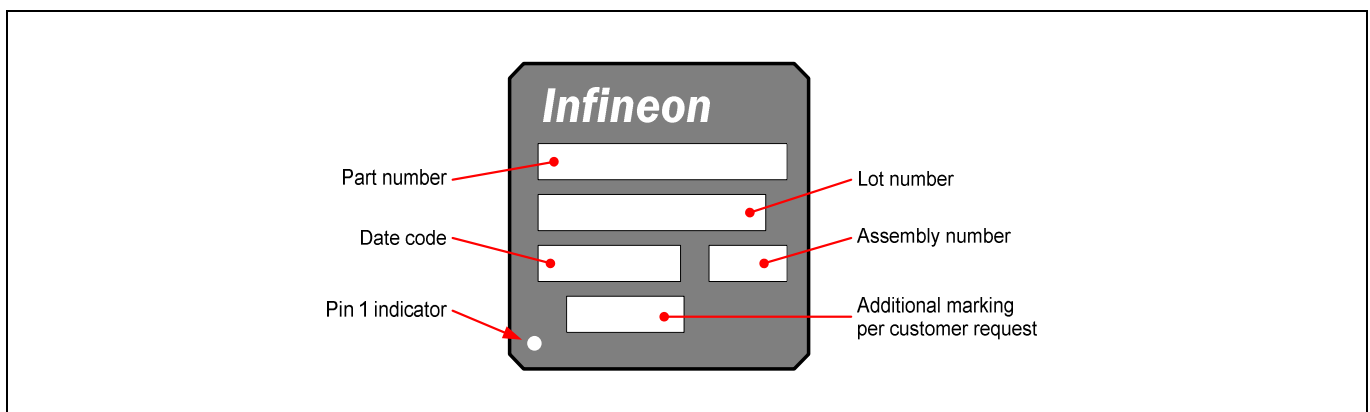


Figure 2 Generic example of package marking

2 Typical application diagram

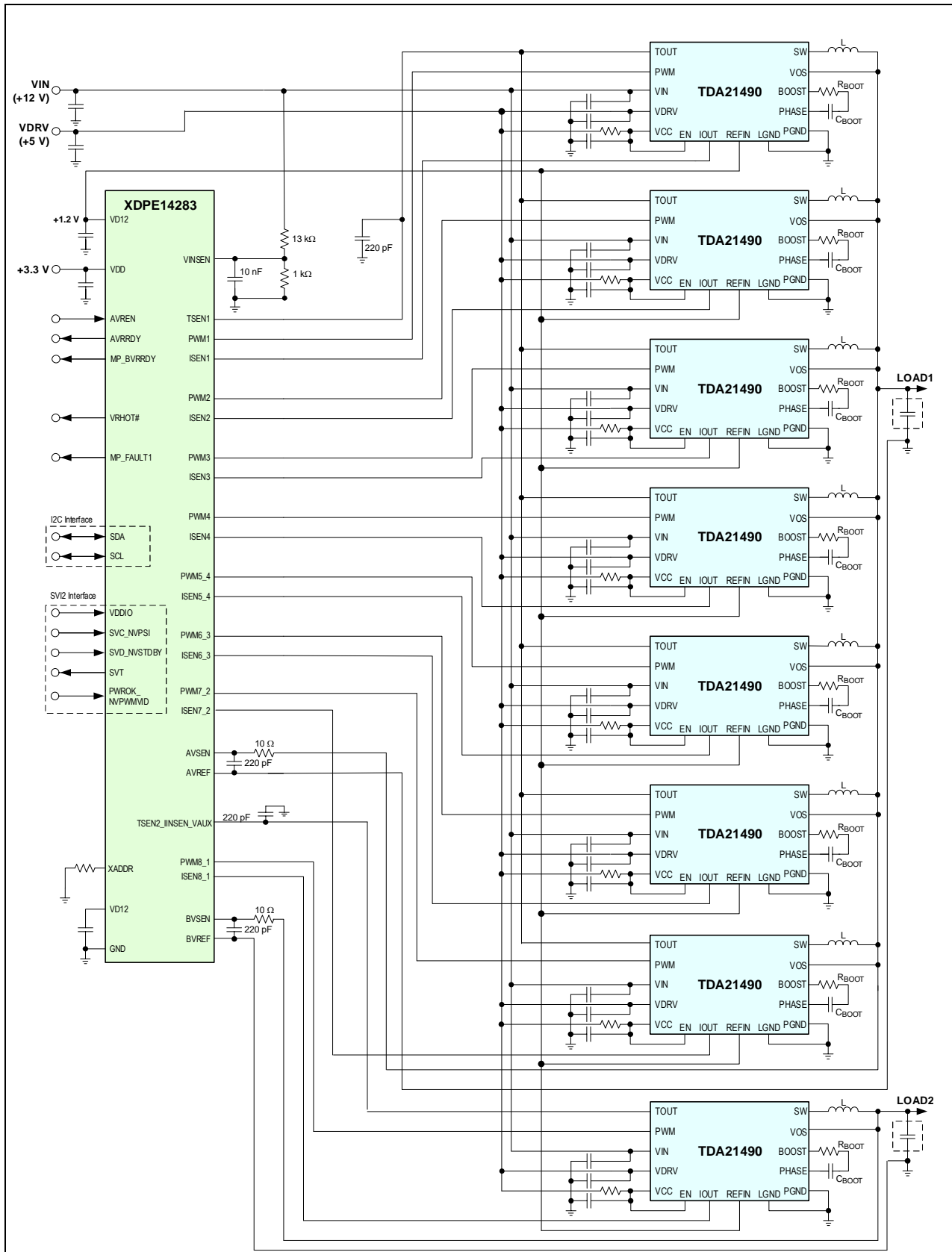


Figure 3 Dual Loop VR using XDPE14283 Controller and TDA21490 Power Stage in 7+1 Phase Configuration

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