

## IR35221 Digital Multi-phase Controller

### 8-phase Dual Loop PWM Voltage Regulator

#### Quality Requirement Category: Industrial

#### Features

- Low Quiescent Power PWM Controller with dual loop configurations
- Compliant to PMBus Rev 1.3 with AVSBus
- Flexible Phasing for both loops (8+0, 7+1,...4+4)
- Switching frequency from 194 kHz to 2 MHz per phase
- IR Efficiency Shaping Features including Dynamic Phase Control and Automatic Power State Switching
- Programmable 1- or 2-phase operation for Light Loads & Active Diode Emulation for Very Light Loads
- Digitally programmable load line - no external components needed to set load line.
- IR Adaptive Transient Algorithm (ATA) on both loops minimizes output bulk capacitors and system cost
- Auto-Phase Detection with PID Coefficient auto-scaling
- Fault Protection: OVP, UVP, OCP, OTP, CFP, cycle-by-cycle current limit
- I2C/SMBus/PMBus system interface for reporting of Temperature, Voltage, Current & Power telemetry for both loops
- Multiple Time Programming (MTP) with up to 29 writes for the USER section
- Compatible with 3.3 V tri-state drivers
- +3.3 V supply voltage; -40 °C to 85 °C ambient operation
- Pb-Free, RoHS, 5x5 mm 40-pin, 0.4 mm pitch QFN

#### Applications

- AVSBus based systems
- Server VR
- Memory VR

#### Description

The IR35221 is a dual loop, digital, multi-phase buck controller designed for CPU voltage regulation. It can support up to 8 phases and allows flexible phase assignment between the two loops.

The IR35221 includes IR's Efficiency Shaping Technology to deliver exceptional efficiency at minimum cost across the entire load range. IR's Dynamic Phase Control adds/drops phases based upon load current. The IR35221 can be configured to enter 1- or 2-phase operation and active diode emulation mode automatically or by command.

The IR35221 offers a digitally programmable load line thereby eliminating the need for any external load line setting component. The controller is designed to work with RDSO and DCR current sense PowIRstages and provides accurate input and output current reporting.

IR's unique Adaptive Transient Algorithm (ATA), based on proprietary non-linear control algorithms provides excellent transient response with reduced output capacitance. The controller also supports programmable cycle-by-cycle current limit per phase for superior dynamic current limiting.

The device configuration can be easily defined using the IR PowIRCenter GUI and is stored in the on-chip memory.

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### Description

The IR35221 provides extensive OVP, UVP, OCP, OTP & CFP fault protection. The controller requires the fewest possible external components and supports a clean interface with the power stages resulting in a simplified Bill Of Materials (BOM).

*Note: “Infineon strongly recommends pairing Infineon’s OptiMOS™ 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.”*

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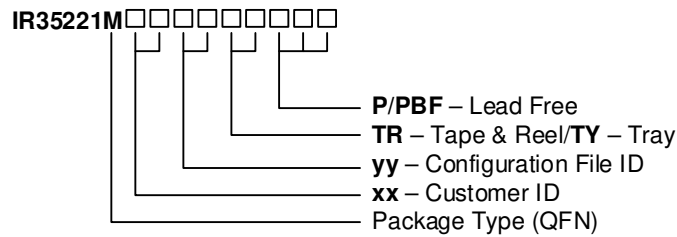


**Description**

**1 Ordering Information**

Base Part Number	Package Type	Standard Pack		Orderable Part Number
		Form	Qty	
IR35221	QFN 5 mm x 5 mm	Tape and Reel	3000	IR35221MxxyyTRP <sup>1</sup>
IR35221	QFN 5 mm x 5 mm	Tape and Reel	3000	IR35221MTRPBF

Note: 1) Customer Specific Configuration File, where xx = Customer ID and yy = Configuration File (Codes assigned by IFX Marketing).



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### Description

## 2 Typical Application Diagram

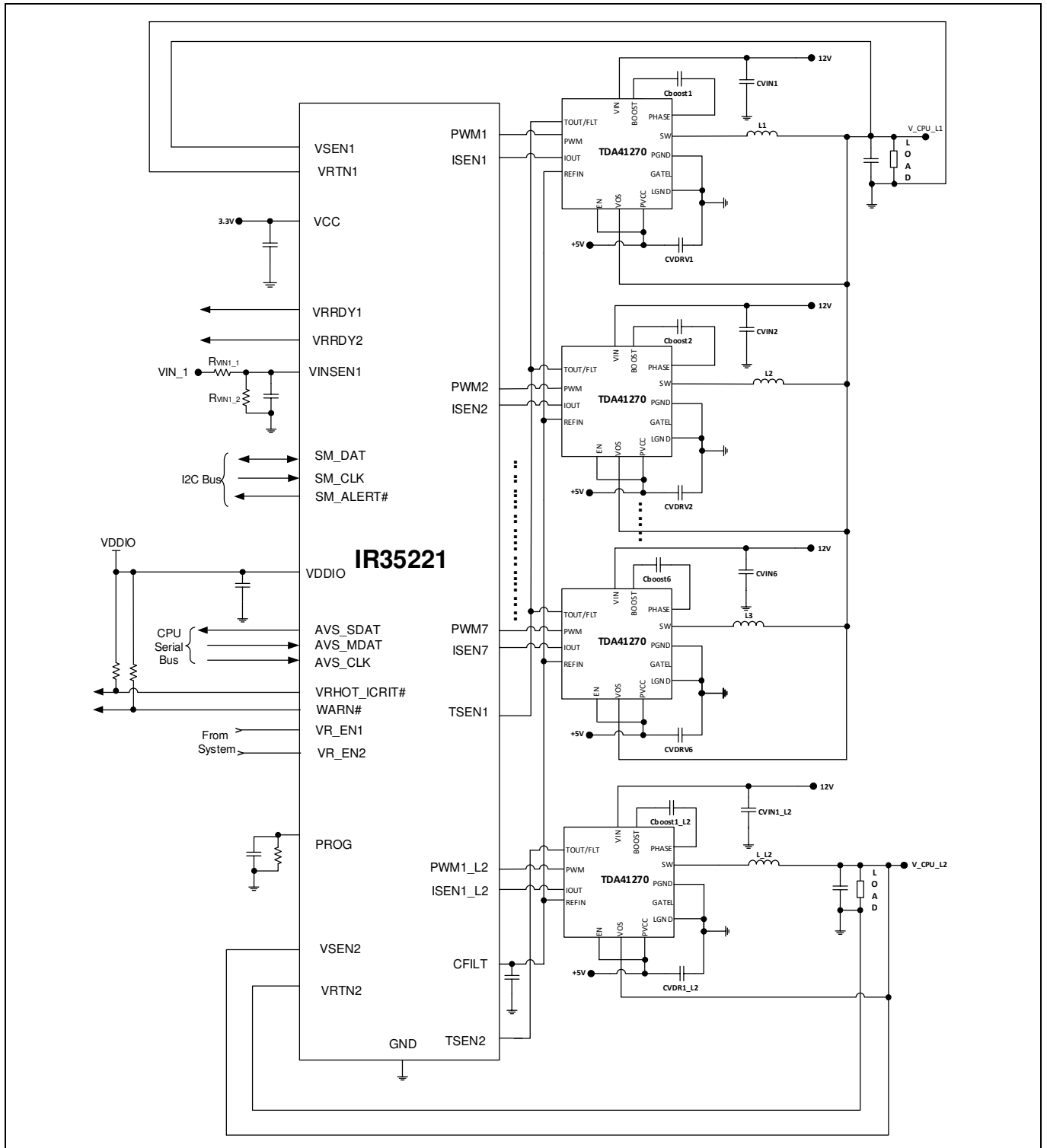


Figure 1 VR using IR35221 Controller and IR354xx PowIRstage in 7+1 configuration

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**Email: [erratum@infineon.com](mailto:erratum@infineon.com)**

**Document reference**

**IR35221**

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