

## ISL69138

Digital, Dual Output, 7-Phase Configurable, VR13/IMVP8 PWM Controller

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The [ISL69138](#) is a digital, dual output, flexible, multiphase ( $X+Y \leq 7$ ) PWM controller designed to be compliant with Intel VR13 and IMVP8 specifications. The controller can be configured to support any desired phase assignments up to a maximum of seven phases across the two outputs (X and Y). For example, 6+1, 5+2, 4+2, 3+3, 3+2, or even single output operation as a 7+0 configuration. The ISL69138, with a flexible  $X+Y \leq 7$  phase assignment, supports the SVID interface along with PMBus 1.3, making it ideal for controlling the microprocessor core, memory, and system rails for Intel VR13 or IMVP8 platforms.

The ISL69138 uses the Renesas proprietary digital, linear, synthetic, current modulation scheme to achieve the industry's best combination of transient response and ease of tuning while addressing the challenges of powering the latest generation of Intel microprocessors. Device configuration and monitoring are accomplished using the intuitive PowerNavigator™ software. Diode emulation and automatic phase add/drop features allow the user to extract maximum efficiency from the converter regardless of load conditions.

The ISL69138 supports a comprehensive fault management system to enable the design of highly reliable systems. From a multi-tiered overcurrent protection scheme to the configurable power-good and catastrophic fault protection flags, almost any need is accommodated.

With minimal external components, easy configuration, robust fault management, and highly accurate regulation capability, implementing a high-performance, multiphase regulator has never been easier.

### Applications

- Core, memory, and system rails for Intel VR13 and IMVP8 based processors
  - High performance servers core or memory rail
  - High performance graphics rail
  - High-end desktop with over-clocking option
- Networking, data center, storage, and general purpose

### Related Literature

For a full list of related documents, visit our website

- [ISL69138](#) product page

### Features

- Advanced linear digital modulation scheme
  - Zero latency synthetic current control for excellent HF current balance
  - Auto phase add/drop with a boot refresh function for excellent load vs efficiency profile
  - Dual edge modulation for faster transient response
  - Excellent Dynamic Voltage Identification (DVID) performance
- Flexible phase assignment from 0 to 7 phases per output
- Up to 1MHz switching frequency operation for high density designs
- Diode braking for overshoot reduction
- Diode emulation for enhanced light-load efficiency
- Differential remote voltage sensing supports  $\pm 0.5\%$  closed-loop system accuracy over load, line, and temperature
- Highly accurate current sensing for excellent load line regulation and accurate OCP
  - Supports ISL99227 60A smart power stage
  - Supports DCR sense with integrated temperature compensation
- Supports phase doubler (ISL6617A) for up to 14-phase operation
- Comprehensive fault management enables high reliability systems
  - Pulse-by-pulse phase current limiting
  - Total output current protection
  - Output and input OV/UV protection
  - Open voltage sense detect
  - Black box recording capability for faults
  - Configurable Catastrophic Failure Protection (CFP) flag output
- Intuitive configuration using [PowerNavigator](#)
- SMBus/PMBus V1.3 compatible
  - Up to 2MHz bus interface
  - NVM to store up to eight configurations
- Pb-free (RoHS compliant)

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#### **Renesas Electronics America Inc.**

1001 Murphy Ranch Road, Milpitas, CA 95035, U.S.A.  
Tel: +1-408-432-8888, Fax: +1-408-434-5351

#### **Renesas Electronics Canada Limited**

9251 Yonge Street, Suite 8309 Richmond Hill, Ontario Canada L4C 9T3  
Tel: +1-905-237-2004

#### **Renesas Electronics Europe Limited**

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K  
Tel: +44-1628-651-700, Fax: +44-1628-651-804

#### **Renesas Electronics Europe GmbH**

Arcadiastrasse 10, 40472 Düsseldorf, Germany  
Tel: +49-211-6503-0, Fax: +49-211-6503-1327

#### **Renesas Electronics (China) Co., Ltd.**

Room 1709 Quantum Plaza, No.27 ZhichunLu, Haidian District, Beijing, 100191 P. R. China  
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

#### **Renesas Electronics (Shanghai) Co., Ltd.**

Unit 301, Tower A, Central Towers, 555 Langao Road, Putuo District, Shanghai, 200333 P. R. China  
Tel: +86-21-2226-0888, Fax: +86-21-2226-0999

#### **Renesas Electronics Hong Kong Limited**

Unit 1601-1611, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong  
Tel: +852-2265-6688, Fax: +852 2886-9022

#### **Renesas Electronics Taiwan Co., Ltd.**

13F, No. 363, Fu Shing North Road, Taipei 10543, Taiwan  
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

#### **Renesas Electronics Singapore Pte. Ltd.**

80 Bendemeer Road, Unit #06-02 Hyflux Innovation Centre, Singapore 339949  
Tel: +65-6213-0200, Fax: +65-6213-0300

#### **Renesas Electronics Malaysia Sdn.Bhd.**

Unit 1207, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia  
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

#### **Renesas Electronics India Pvt. Ltd.**

No.777C, 100 Feet Road, HAL 2nd Stage, Indiranagar, Bangalore 560 038, India  
Tel: +91-80-67208700, Fax: +91-80-67208777

#### **Renesas Electronics Korea Co., Ltd.**

17F, KAMCO Yangjae Tower, 262, Gangnam-daero, Gangnam-gu, Seoul, 06265 Korea  
Tel: +82-2-558-3737, Fax: +82-2-558-5338