

## RAA221340

## 40A Smart Power Stage (SPS) with Integrated High Accuracy Current and Temperature Monitors

The [RAA221340](#) Smart Power Stage (SPS) is compatible with the ISL68xxx/69xxx Digital Multiphase (DMP) controllers. The SPS has integrated high-accuracy current and temperature monitors that are fed back to the controller to complete a multiphase DC/DC system. The SPS simplifies design and increases performance by eliminating the DCR sensing network and associated thermal compensation. An industry leading thermally enhanced 4x5 PQFN package allows minimal overall PCB real estate.

The SPS features a 3.3V compatible tri-state PWM input that works with the Renesas multiphase PWM controllers to provide a robust solution in abnormal operating conditions. The SPS also improves system performance and reliability with integrated fault protection of UVLO, shorted HFET, over-temperature, and overcurrent. An open-drain fault reporting pin simplifies the handshake between the SPS and controllers and can disable the controller during start-up and fault conditions.

## Features

- Input range: +3.0V to +16V
- Supports 40A DC current
- 3.3V compatible tri-state PWM input
- Downslope current sensing
- $\pm 3\%$  accuracy current monitor (IMON) with REFIN input
- 8mV/ $^{\circ}$ C temperature monitor with OT flag
- Comprehensive fault protection for high system reliability
  - Shorted HFET and overcurrent protection
  - Over-temperature protection
  - V<sub>CC</sub> Undervoltage Lockout (UVLO)
- Fault reporting outputs (TMON, FAULT#, and IMON)
- Up to 1.5MHz switching frequency
- Pb-free (RoHS compliant), 25 Ld 4x5 PQFN

## Applications

- High frequency and high efficiency VRM and VRD
- Core, graphic, and memory regulators for microprocessors
- High density VR for server, networking, and cloud computing
- POL DC/DC converters and video gaming consoles

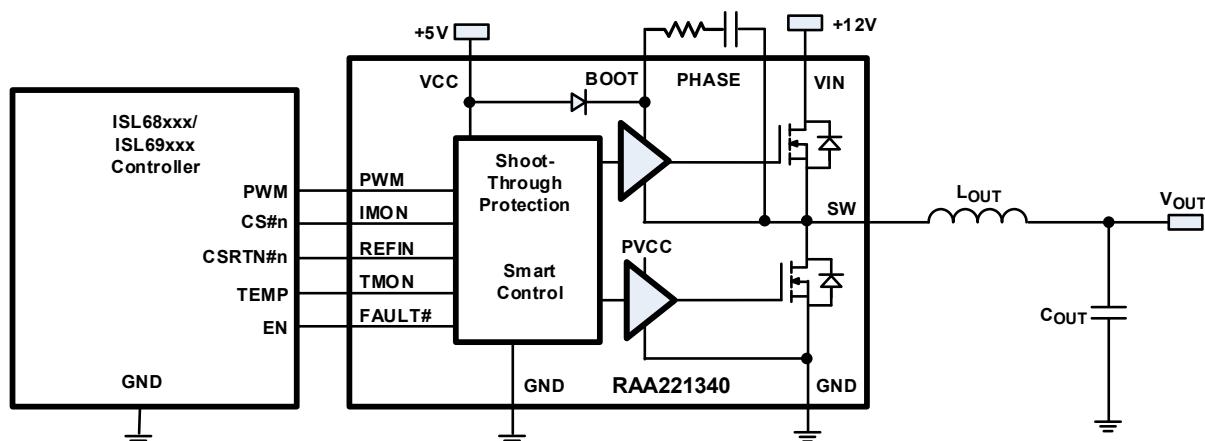


Figure 1. RAA221340 Simplified Application Block Diagram

## 1. Revision History

Rev.	Date	Description
1.1	Apr 1, 2021	Added Revision History and updated file number with Short-Form Datasheet file numbering scheme.
1.0	Oct 6, 2020	Initial release

## IMPORTANT NOTICE AND DISCLAIMER

RENESAS ELECTRONICS CORPORATION AND ITS SUBSIDIARIES ("RENESAS") PROVIDES TECHNICAL SPECIFICATIONS AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT OF THIRD-PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for developers who are designing with Renesas products. You are solely responsible for (1) selecting the appropriate products for your application, (2) designing, validating, and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements. These resources are subject to change without notice. Renesas grants you permission to use these resources only to develop an application that uses Renesas products. Other reproduction or use of these resources is strictly prohibited. No license is granted to any other Renesas intellectual property or to any third-party intellectual property. Renesas disclaims responsibility for, and you will fully indemnify Renesas and its representatives against, any claims, damages, costs, losses, or liabilities arising from your use of these resources. Renesas' products are provided only subject to Renesas' Terms and Conditions of Sale or other applicable terms agreed to in writing. No use of any Renesas resources expands or otherwise alters any applicable warranties or warranty disclaimers for these products.

(Disclaimer Rev.1.01)

### Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu,  
Koto-ku, Tokyo 135-0061, Japan  
[www.renesas.com](http://www.renesas.com)

### Trademarks

Renesas and the Renesas logo are trademarks of Renesas Electronics Corporation. All trademarks and registered trademarks are the property of their respective owners.

### Contact Information

For further information on a product, technology, the most up-to-date version of a document, or your nearest sales office, please visit [www.renesas.com/contact-us/](http://www.renesas.com/contact-us/).