

XILINX VIRTEX® ULTRASCALE+™ HBM VU37P POWER AND TIMING: OVERVIEW

One of Xilinx's latest families of FPGAs is the Virtex® UltraScale+™ HBM. This family is targeted for very high performance applications in computing, storage and networking. It features Xilinx's highest on-chip memory density, with total on-chip integrated memory up to 500Mb, and high-bandwidth memory (HBM) up to 16GB. It also supports PCIe® Gen4 and transceivers up to 32.75Gb/s.

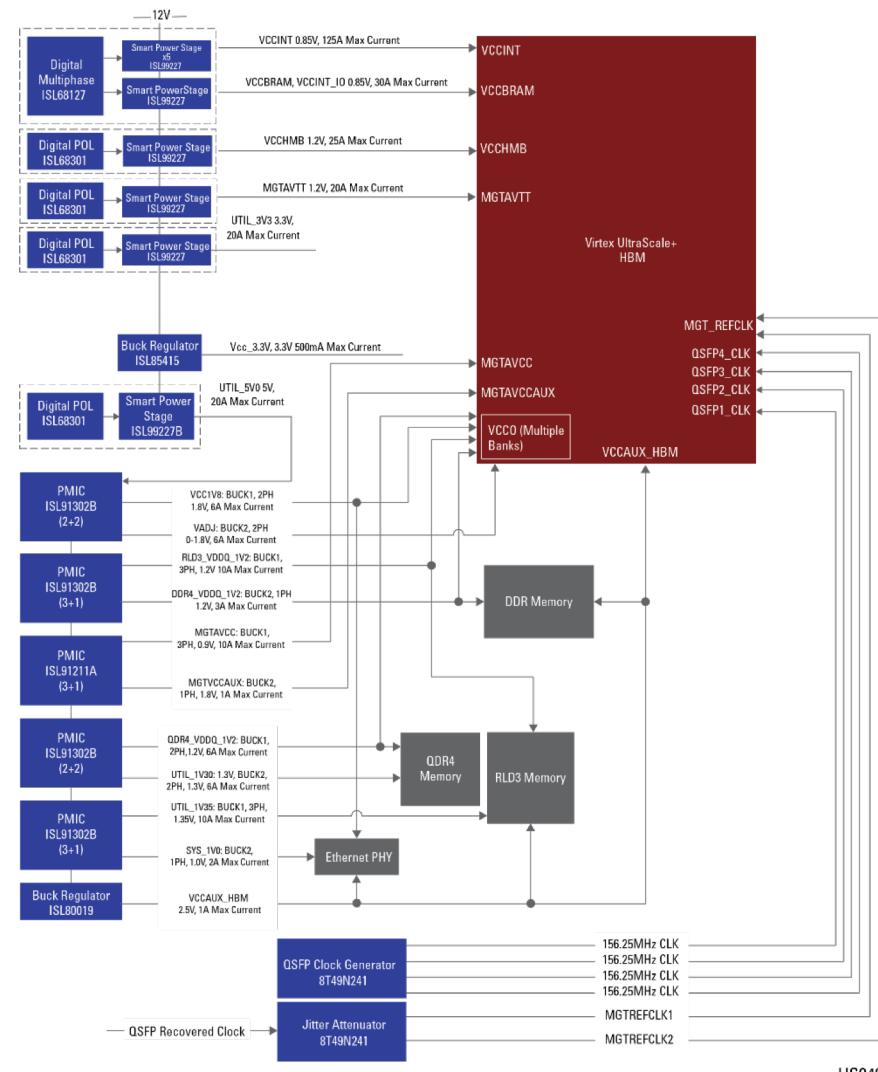
An FPGA with this level of performance demands a high-current power supply with tight regulation and extremely low jitter clock sources. This winning combination highlights the power devices that Xilinx chose for their reference design called the VCU128 and recommends two clocking devices that would be an excellent fit for many designs.

Visit the [page](#) to learn more.

Key Features:

- Digital multi-phase power to deliver up to 125A at 0.85V while meeting the strict specs set forth by the Xilinx® VU37P
- Pre-programmed PMICs specifically designed to meet this use case
- FemtoClock®NG Universal Translator capable of 1GHz outputs with jitter specs in compliance with Ethernet standards up to 25G

XILINX VIRTEX® ULTRASCALE+™ HBM VU37P POWER AND TIMING: BLOCK DIAGRAM



US046

XILINX VIRTEX® ULTRASCALE+™ HBM VU37P POWER AND TIMING: SUMMARY

▪ System benefits

- High currents at tight tolerances to meet Xilinx requirements
- Multiple output PMICs to reduce board space
- High performance clocking to meet 25G Ethernet, PCIe® specs and up

Device Category	P/N	Key Features
Power	ISL68127	Digital Dual Output, 7-Phase Configurable, PWM Controller with PMBus
Power	ISL68301	Scalable Single Output Digital PWM Controller with PMBus
Power	ISL99227	Smart Power Stage (SPS) Module with Integrated High Accuracy Current and Temperature Monitors
Power	ISL85415	36V, 500mA Buck Switching Regulator with Integrated FETs
Power	ISL99227B	Smart Power Stage (SPS) Module with Integrated High Accuracy Current and Temperature Monitors
Power	ISL91302B	High Efficiency Configurable Dual/Single Output Power Management IC
Power	ISL91211A	Configurable Triple Output Power Management IC
Timing	ISL80019	5.5V, 2A Buck Switching Regulator with Integrated FETs
Timing	8T49N241	FemtoClock®NG Universal Frequency Translator(4-output)

ISL68127 – HIGH PERFORMANCE, COMPACT

Digital Dual Output, 7-Phase Configurable, PWM Controller with PMBus

Flexible Outputs

- Supports any desired phase assignments up to a maximum of seven phases across the two output
- 7+0, 6+1, 5+2, and 4+3 phase operations
- Operation using fewer than seven phases between two outputs is also supported

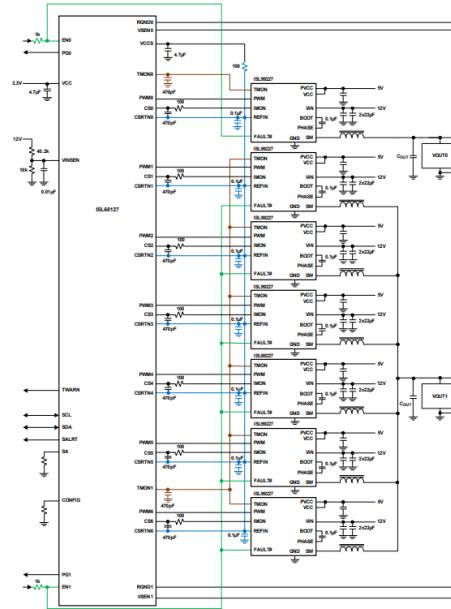
PMBus 1.3 Support

- Telemetry - V_{IN} , V_{OUT} , I_{OUT} , power IN/OUT, temperature, and various fault status registers
- Up to 1MHz bus interface

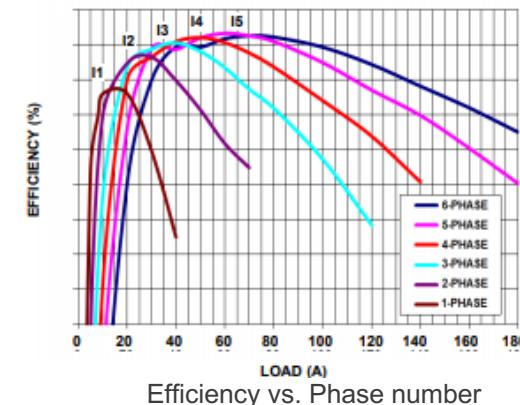
Advanced linear digital modulation

- Zero latency synthetic current control for excellent HF current balance
- Dual edge modulation for fastest transient response

Part #	Package
ISL68127IRAZ-T7A	48L 6x6mm QFN (T&R 250)
ISL68127IRAZ	48L 6x6mm QFN (T&R 500)
ISL68127IRAZ-T	48L 6x6mm QFN (T&R 4000)



Typical Application: 6+1 Configuration w/ISL99227 SPS



ISL68301 – Scalable Digital PWM Controller with PMBus

Industrial control, Medical, Portable instrumentation and Cloud infrastructure

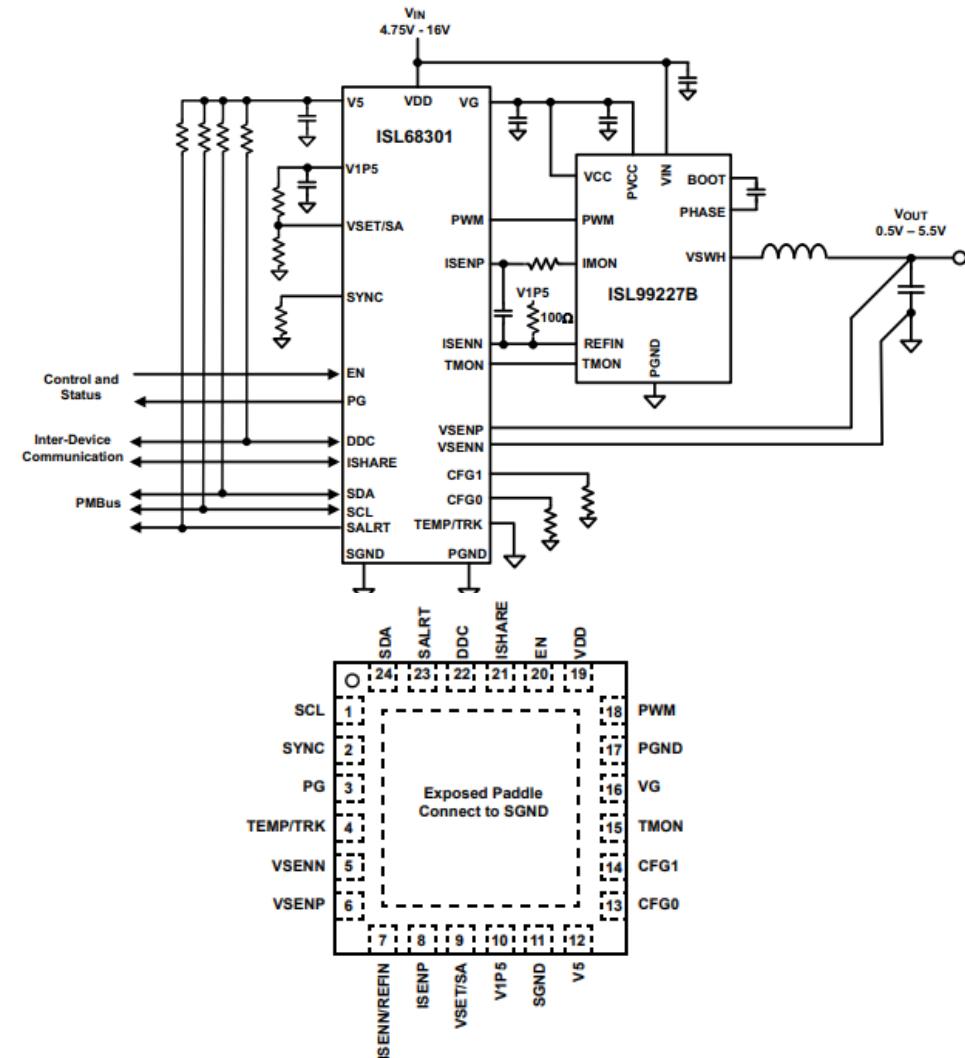
Key Features

- Unique compensation-free design, which is always stable
- Output voltage range: 0.45V to 5.5V
- Input voltage range: 4.75V to 16V or 4.5V to 5.5V
- Single-channel output, can be paralleled with up to eight devices in a single droop-less current sharing output

Flexibility and Accuracy

- 0.5% output voltage accuracy over line, load, and temperature
- ChargeMode control achieves fast transient response, requires minimal output capacitance, and provides output stability without compensation
- PMBus compliant. Supports 113 PMBus commands
- Compatible with Smart Power Stage (SPS) devices

Part #	Package
ISL68301IRAZ	24L 4x4mm QFN



ISL99227/B – Smart Power Stage (SPS) Module

Core, graphic, and memory regulators for microprocessors, POL DC/DC converters

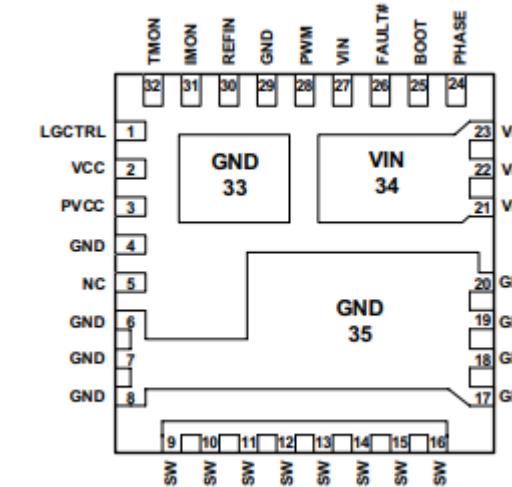
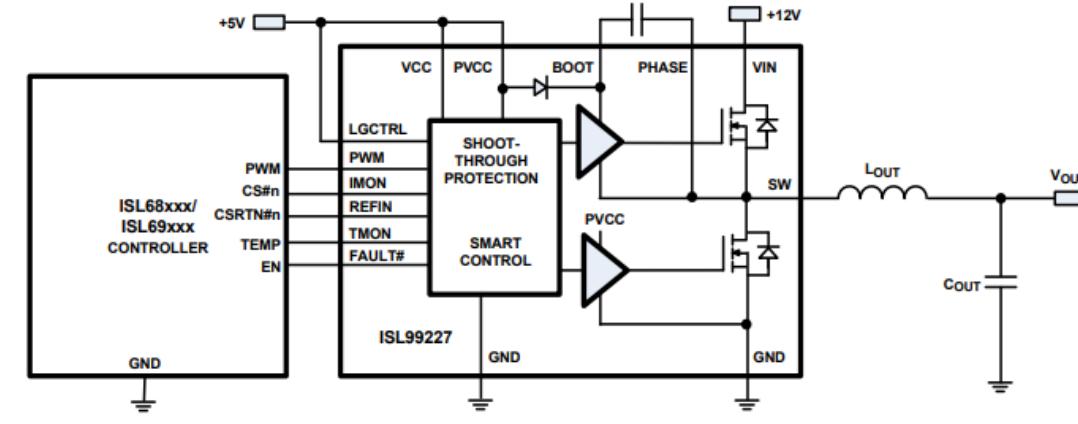
Key Features

- Compatible with ISL68xxx/69xxx Digital Multiphase (DMP) controllers and phase doubler (ISL6617A), 2.5V to 5.5V supply voltage
- ISL99227 with 3.3V compatible tri-state PWM input
- ISL99227B with 5.0V compatible tri-state PWM input

Robust Solution

- Supports 60A DC current
- Input range: +4.5V to +18V
- $\pm 3\%$ accuracy current monitor (IMON) with REFIN input
- 8mV/ $^{\circ}\text{C}$ temperature monitor with OT flag

Part #	Package
ISL99227IRZ-T7A	32L 5x5mm QFN
ISL99227HRZ-T7A	32L 5x5mm QFN
ISL99227FRZ-T7A	32L 5x5mm QFN



ISL85415 – Wide VIN 500mA Synchronous Buck Regulator

Industrial control, Medical, Portable instrumentation and Cloud infrastructure

Flexible Power

- Wide input voltage range: 3V to 36V
- Continuous output current up to 500mA
- Internal or external soft-start

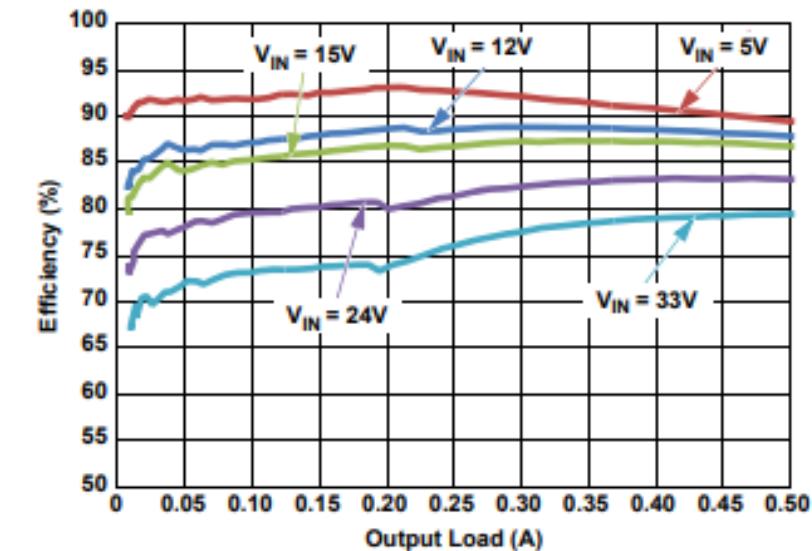
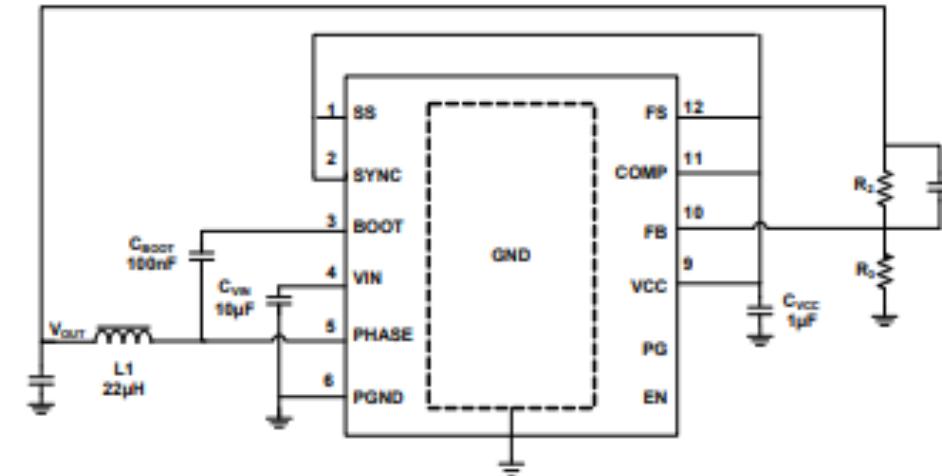
High Efficiency and Accuracy

- No compensation required
- Synchronous operation for high efficiency

Fast Design in

- Minimal external components required
- Integrated high-side and low-side NMOS devices

Part #	Package
ISL85415FRZ	12L 3x4mm DFN
ISL85415FRZ-T7A	15L 3.5x3.5 QFN (T&R 250)



ISL91302B – Dual/Single Output Power Management IC

HMI, FPGA and ASIC, Industrial MPU power, custom power

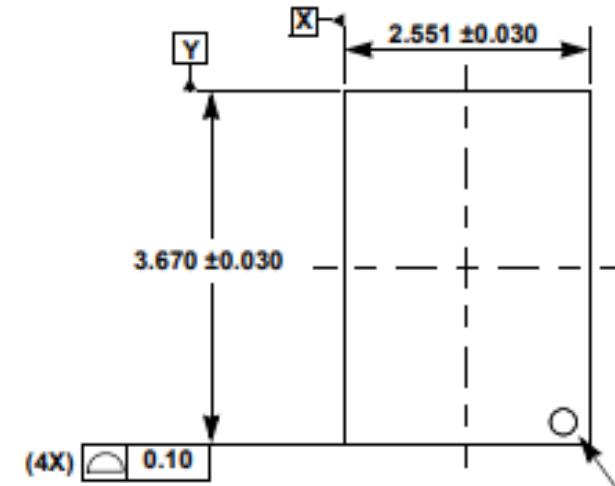
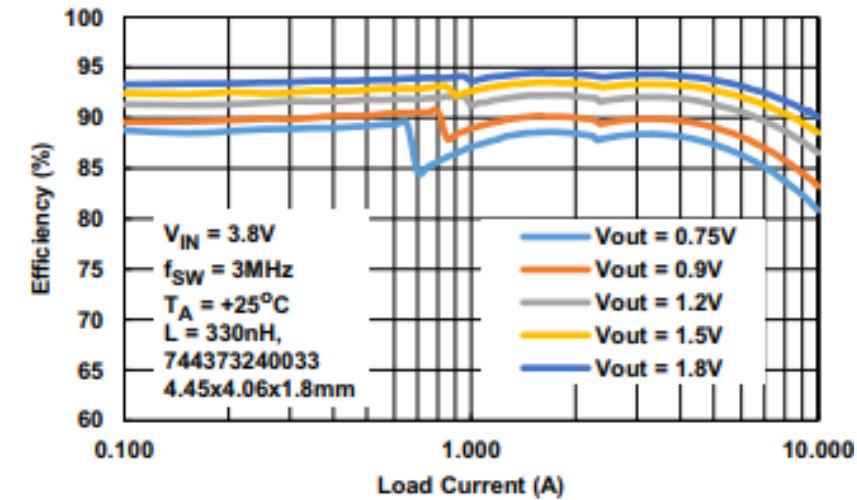
Custom Power

- Dual output 3+1 or 2+2, or single output 4-phase
- 2.5V to 5.5V supply voltage
- 5A per phase output current capability
- 4 phase design requires only 12 components

High Efficiency and Accuracy

- Low IQ in low power mode
- High efficiency (94% peak)
- $\pm 0.7\%$ system accuracy, remote voltage sensing
- Small solution size

Part #	Package
ISL91302BIIZ-T	54L 3.67x2.55mm WLCSP



ISL91211A/B – Triple/Quad Output Power Management IC

Client/Enterprise/Data Center SSD, NAS, Optical Transceiver Modules, custom power

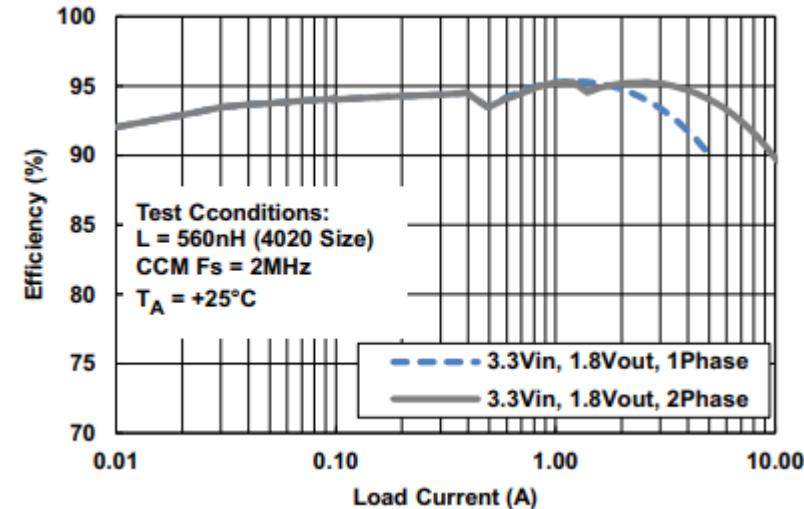
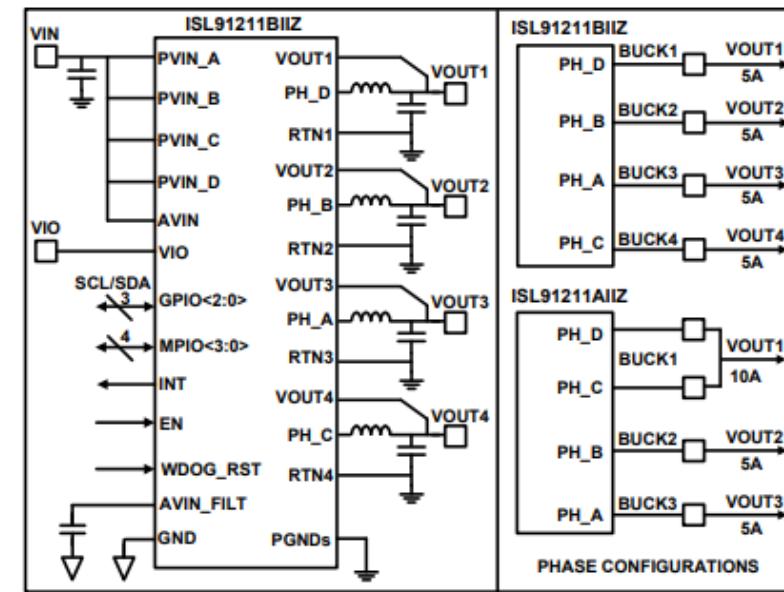
Custom Power

- Triple output 2+1+1 phases (ISL91211A) or quad output single phase (ISL91211B)
- I²C programmable output from 0.3V to 2V
- 5V to 5.5V supply voltage
- 5A per phase output current capability

High Efficiency and Accuracy

- Low IQ in low power mode
- High efficiency (94.7% for 3.8VIN/1.8VOUT)
- ±0.7% system accuracy, remote voltage sensing
- Small solution size

Part #	Package
ISL91211AIIZ-T	54L 3.67x2.55mm WLCSP
ISL91211BIIZ-T	54L 3.67x2.55mm WLCSP



ISL80019/A – Compact Synchronous Buck Regulator

General purpose POL DC/DC, FPGA Power, Cost Effective DC/DC Regulators

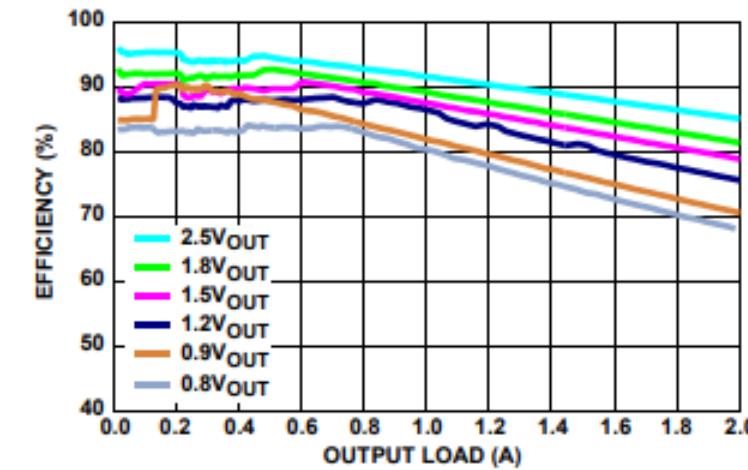
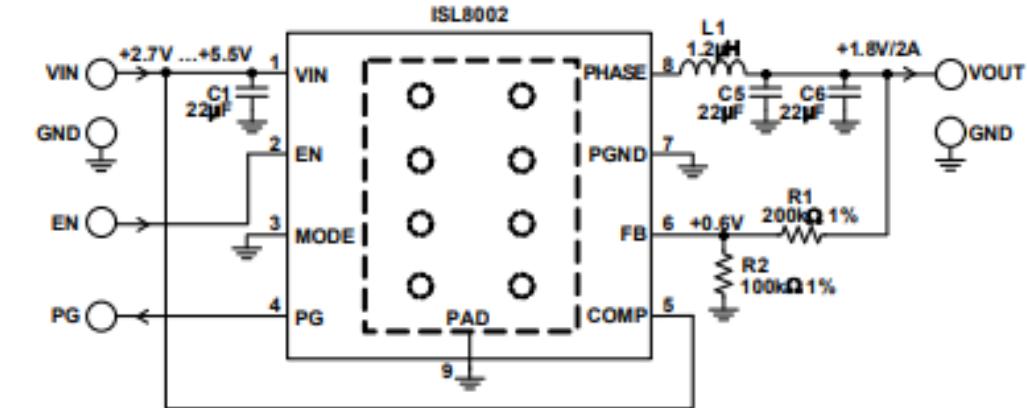
Flexible Power

- Input voltage range: 2.7V to 5.5V
- Output voltage range: 0.6V to VIN
- Current out max: 1.5A
- Switching frequency is 1MHz (80019) or 2MHz (80019A)

Fast Design in

- Internal or external compensation option
- Selectable PFM or PWM operation option
- Overcurrent and short circuit protection
- Over-temperature/thermal protection

Part #	Package
ISL80019IRZ-T7A	8L 2x2mm TDFN
ISL80019AIRZ-T7A	8L 2x2mm TDFN
ISL80019FRZ-T7A	8L 2x2mm TDFN
ISL80019AFRZ-T7A	8L 2x2mm TDFN



8T49N241 – JITTER ATTENUATION, HIGH-PERFORMANCE FemtoClock® NG Universal Frequency Translator

High Performance Clock

- Four different output frequencies, ranging from 8kHz to 1GHz.
- All are completely independent of each other
- Outputs may select among LVPECL, LVDS, HCSL or LVC MOS output levels

Wide Input Frequency

- Operates from a 10MHz to 50MHz fundamental-mode crystal or a 10MHz to 125MHz external oscillator
- Accepts up to 2 LVPECL, LVDS, LVHSTL or LVC MOS input clocks, frequencies ranging from 8kHz to 875MHz

Jitter Attenuation

- 0.35ps RMS Typical Jitter (including spurs): 12kHz to 20MHz

Part #	Package
8T49N241-998NLGI	40L 6x6mm VFQFPN
8T49N241-999NLGI	40L 6x6mm VFQFPN

