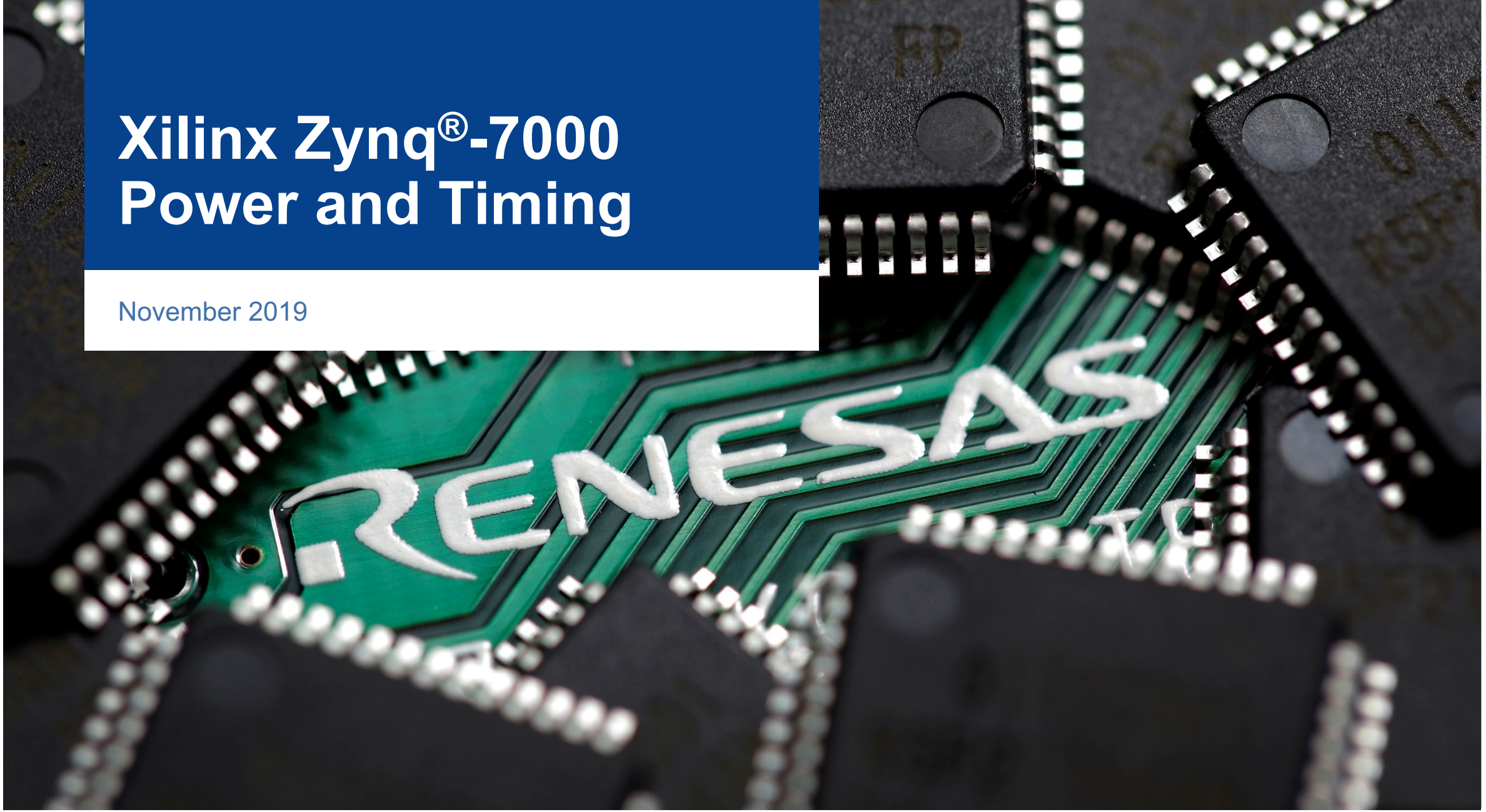
Xilinx Zynq®-7000 Power and Timing

November 2019



Xilinx® Zynq®-7000 Power and Timing

Overview

Zynq®-7000 devices are equipped with dual-core Arm® Cortex® -A9 processors integrated with Xilinx's 28nm Artix®-7 or Kintex®-7 based programmable logic for excellent performance-per-watt and maximum design flexibility. With up to 6.6M logic cells and transceivers ranging from 6.25Gb/s to 12.5Gb/s, Zynq®-7000 devices enable highly differentiated designs for a wide range of embedded applications, including multi-camera drivers assistance systems and 4K2K Ultra-HDTV.

This winning combination highlights the power devices on the reference board for the Xilinx® Zynq®-7000 family and suggested timing solutions from Renesas.

Visit the Zynq-7000 power solutions (https://www.renesas.com/us/en/solutions/key-technology/fpga-power-solutions/zynq-7000.html) page to learn more.

System Benefits

- Pre-programmed PMICs specifically designed to meet this use case
- Flexible power solutions
- VersaClock® clocks capable of 350MHz outputs and low jitter attenuation
- The ISL21010 provides precise and stable voltage reference for Zynq®-7000 SoCs

US055

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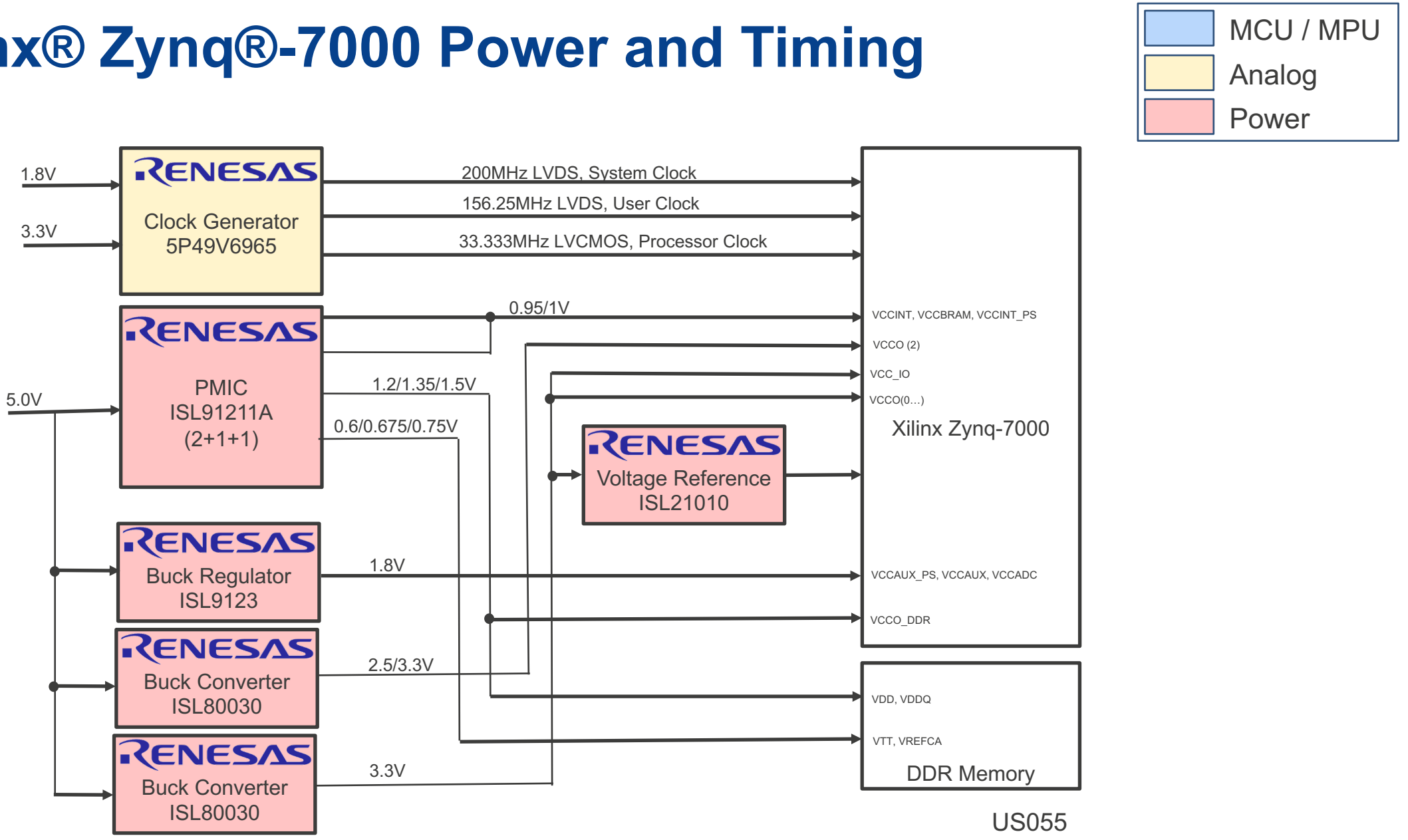


Xilinx® Zynq®-7000 Power and Timing

Device Category	P/N	Key Features
Power	ISL91211A	Configurable quad output power management IC
	ISL80030	4.5V to 18V input, 5A high efficiency synchronous buck regulator
	ISL21010	Precision, low dropout micropower bandgap voltage reference
	ISL9123	Ultra-low Iq DC/DC converter 600mA output
Analog	5P49V6965	VersaClock® 6E programmable clock generator

US055

ISL91211A/B – Triple/Quad Output PMIC with SPI/I²C

4-phase, 4 output Programmable PMIC, up to 5A per Phase

Input/Output Configurations

- Multiple output configuration
  3 output: 2+1+1 (ISL91211A/12A)
  4 outputs: 1+1+1+1+1 (ISL91211B/12B)
- V_{IN} range: 2.5V to 5.5V
- V_{OUT} range: 0.3V to 2.0V
- I_{OUT} up to 5A per phase (total= 20A)

High Efficiency

- Low IQ: 75uA in DCM (no switching)
- 95% peak efficiency @ V_{IN} = 3.8V, V_{OUT} = 1.8V
- Automatic DCM/CCM transition and automatic Diode Emulation Mode for highest efficiency

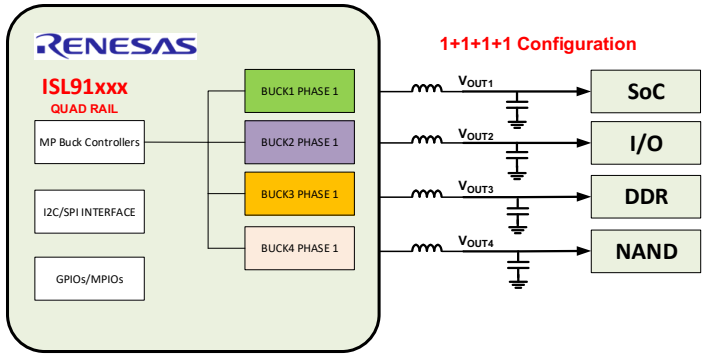
High V_{OUT} Accuracy, Fast Transient Response

- < ±0.5% system accuracy
- Remote V_{OUT} sensing
- Independent dynamic voltage scaling (DVS) for each output
- Programmable frequency from 2MHz to 6MHz

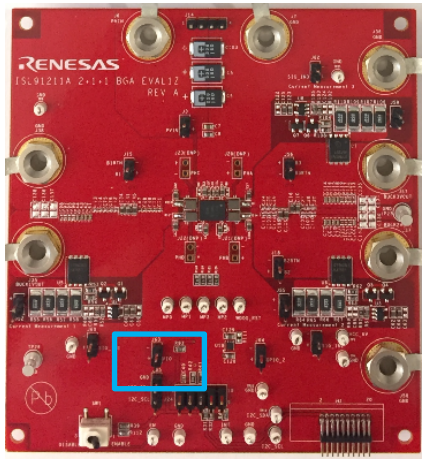
Reliable Solution

- SCP, OCP, UVP, OVP, OTP protections with fault detection

Part #	Phase Configuration	Max DC I_{OUT}/Phase	Package
ISL91211AIIZ-T	2+1+1	5A	2.55 x 3.67mm WLCSP
ISL91211BIIZ-T	1+1+1+1	5A	2.55 x 3.67mm WLCSP
ISL91211A-BGA	2+1+1	5A	4.7 x 6.30mm BGA
ISL91211B-BGA	1+1+1+1	5A	4.7 x 6.30mm BGA



Typical Application Circuit



BGA Package Solution Size:
10mm x 13mm (all components on PCB top side)

ISL80030/A – 3A Synchronous Buck Converter

General purpose POL DC/DC, FPGA Power, Industrial/Medical Equipment

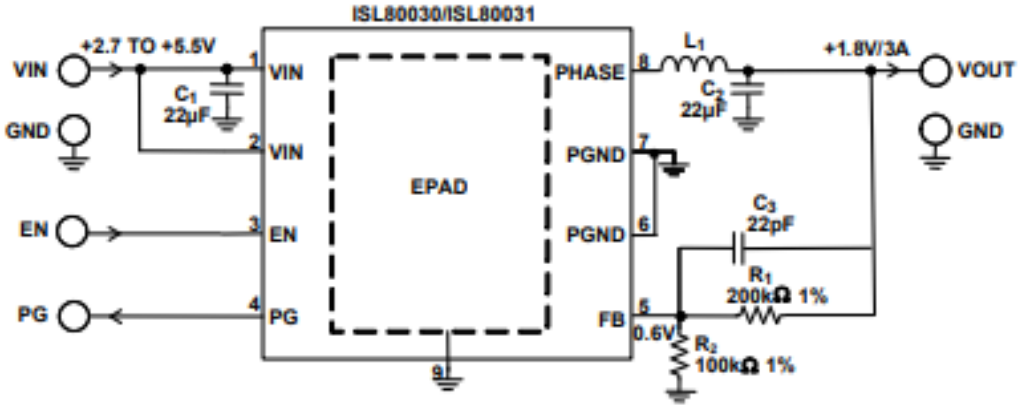
Flexible Power in a Small Package

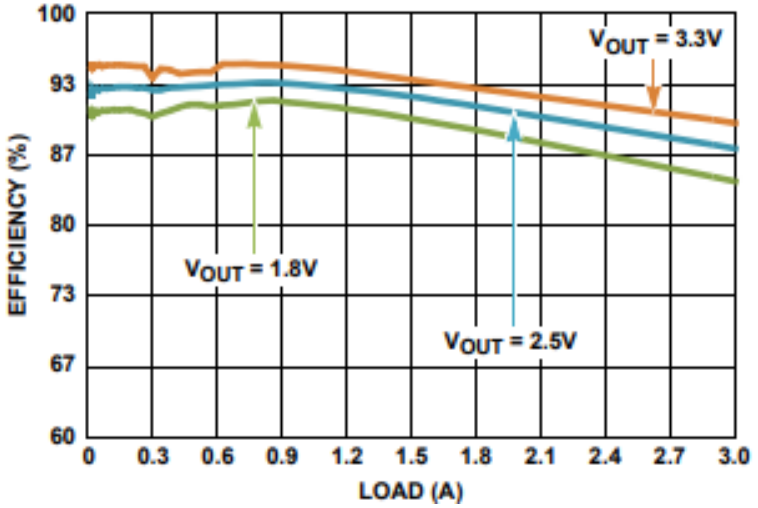
- Input voltage range: 2.7V to 5.5V
- Current out max: 3A
- Switching frequency is 1MHz (80030) or 2MHz (80030A)
- Very low r_{DS}(ON) MOSFETs to maximize efficiency

Robust Design

- Negative current protection
- Operates at 100% duty cycle
- Overcurrent and short circuit protection
- Over-temperature/thermal protection

Part #	Package
ISL80030FRZ-T7A	8L 2x2mm DFN
ISL80030AFRZ-T7A	8L 2x2mm DFN





ISL21010 – Precision, Small Package

Micropower Voltage Reference

Wide Output Voltages

- Reference output voltages: 1.024V, 1.25V, 1.5V, 2.048V, 2.5V, 3.0V, 3.3V, 4.096V

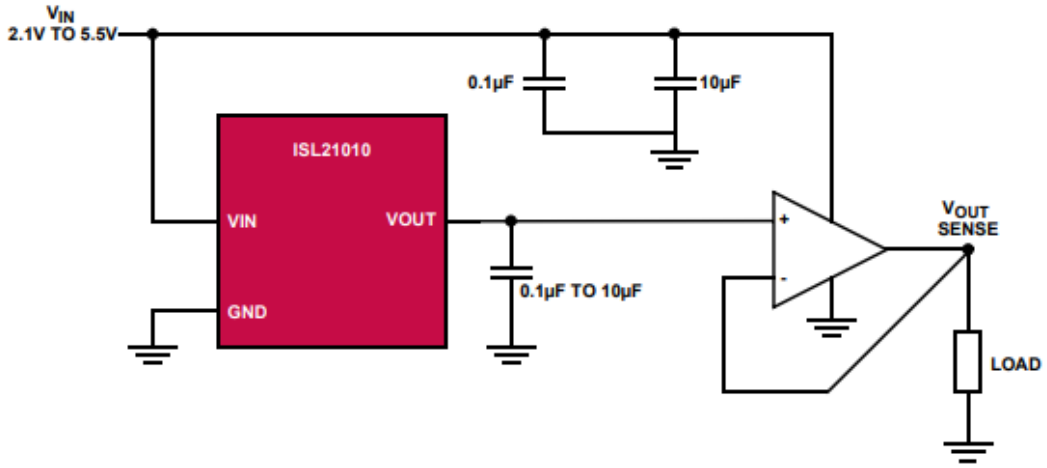
Flexible Supply Voltage

- Operates from a single 2.2V to 5.5V supply (minimum voltage is dependent on voltage option)
- Provides a ±0.2% accurate reference

Output features

- Output current source capability: 25mA
- Output voltage noise (VOUT = 2.048V): 58µVP-P (0.1Hz to 10Hz)

Part #	Package
ISL21010CFH341Z-TK	3L 2.92x1.3mm SOT-23
ISL21010CFH341Z-T7A	3L 2.92x1.3mm SOT-23



Recommended Operating Conditions

Temperature	-40°C to +125°C
Supply Voltage	
V_{OUT} = 1.024V, 1.25V, 1.5V, 2.048V	2.2V to 5.5V
V_{OUT} = 2.5V	2.6V to 5.5V
V_{OUT} = 3.0V	3.1V to 5.5V
V_{OUT} = 3.3V	3.4V to 5.5V
V_{OUT} = 4.096V	4.2V to 5.5V

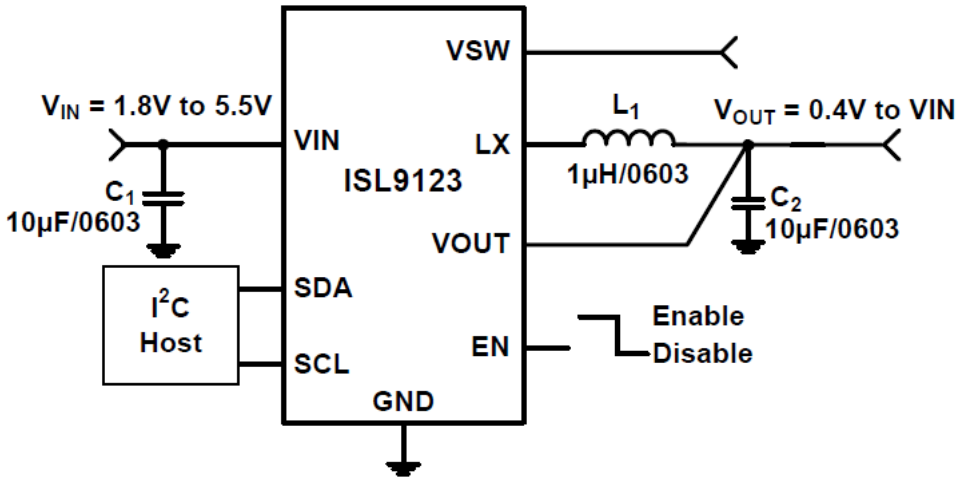
ISL9123 – Ultra-Low IQ Buck Regulator with Bypass

Space-Limited Battery Powered Applications

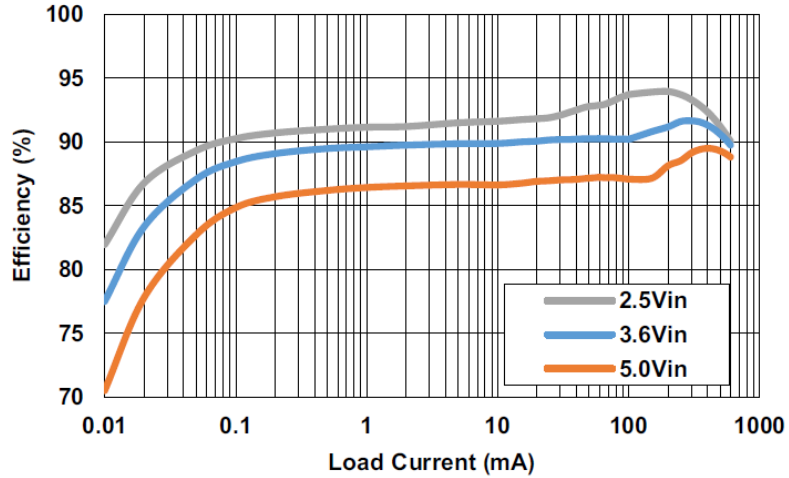
Ultra Low and Efficient Power

- Ultra Low Iq = 950nA
  - 80% efficiency at 10µA load
  - 97% peak efficiency
- Input voltage range: 1.8V to 5.5V
- Output voltage range: 0.4 to 5.375V
- Output current: up to 600mA (VIN = 3.6V, VOUT = 1.8V)
- Selectable Forced and Auto Bypass power saving modes

Part #	Default V_{OUT}	Package
ISL9123IINZ-T	3.0V	8L 1.8x1.0mm WLCSP
ISL9123IICZ-T	1.8V	8L 1.8x1.0mm WLCSP
ISL9123II4Z-T	1.0V	8L 1.8x1.0mm WLCSP



Typical Operating Circuits



Efficiency vs Load current

5P49V6965 – VersaClock® 6E Programmable CG

Programmable Clock Generator for Low Power High Performance PCIe Gen1-3

High Performance

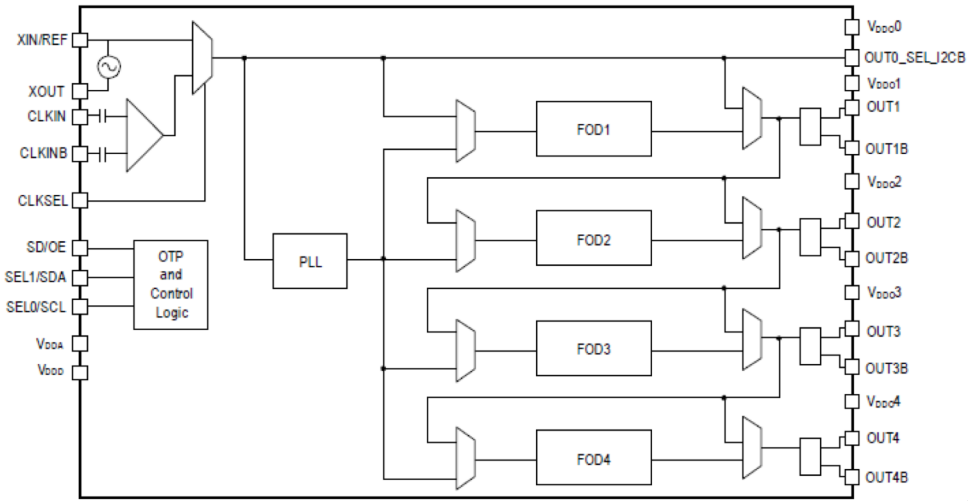
- Low phase noise PLL, < 0.5ps RMS typical phase jitter on outputs

Configurable and Programmable

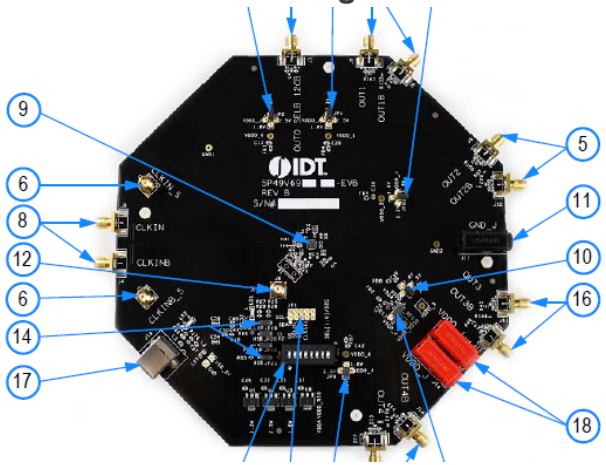
- Flexible 1.8V, 2.5V, 3.3V power-rails
- Four banks of internal OTP memory
- I²C serial programming interface
- Four universal output pairs individually configurable
- Programmable output enable or power-down mode

Dynamic Balance

- LVCMOS clock outputs: 1kHz to 200MHz
- LVDS, LVPECL, HCSL differential clock outputs: 1kHz to 350MHz
- Redundant clock inputs with manual switchover



Block Diagram



Evaluation Board for 5P49V6965

Part #	Temp.	Package
5P49V6965A000NLGI	-40 to +85°C, Industrial	24Ld 4x4mm VFQFPN
5P49V6965AdddNLGI	-40 to +85°C, Industrial	24Ld 4x4mm VFQFPN

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