

XILINX VERSAL ACAP POWER AND TIMING: OVERVIEW

One of Xilinx's newest SoC families is the Versal Adaptive Compute Acceleration Platform (ACAP). It contains scalar processing engines, adaptable hardware, intelligent engines (SW programmable and HW adaptable) and Network-On-Chip, a SW programmable infrastructure. This requires precise, adaptable timing and power.

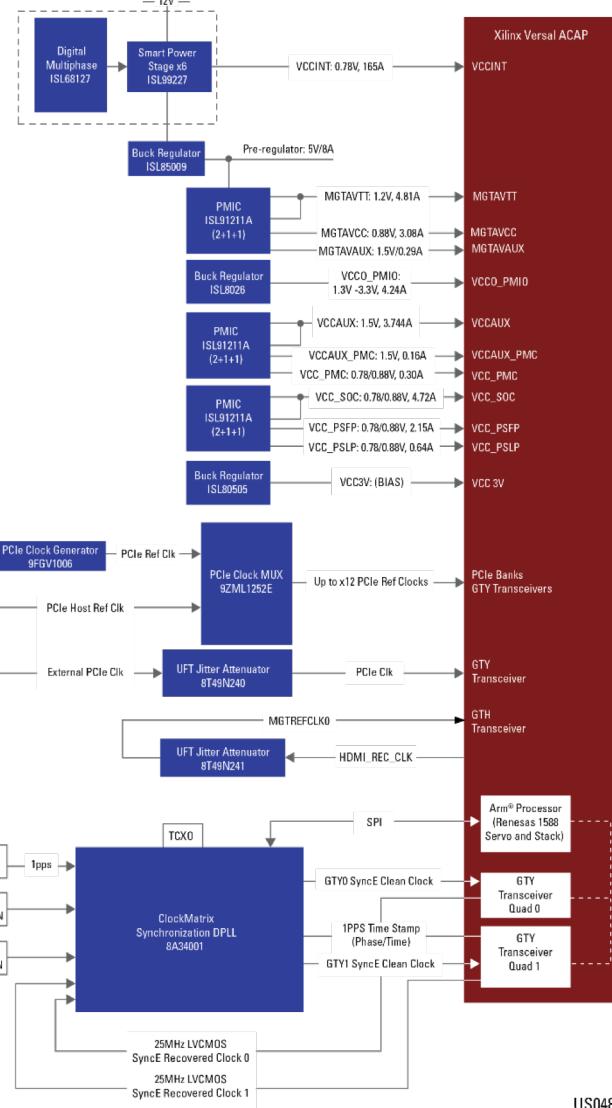
This winning combination highlights the timing solution that Xilinx used on their reference design and the suggested power devices.

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

Key Features:

- Digital multi-phase power to deliver up to 165A at 0.78V to meet the strict specs set forth by Xilinx
- Pre-programmed PMICs helps meet any use case required
- FemtoClock®NG Universal Translator capable of supporting 10G/40G/100G SONET/SDH and Ethernet networks
- Added a system synchronizer for IEEE 1588

XILINX VERSAL ACAP POWER AND TIMING: BLOCK DIAGRAM



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XILINX VERSAL ACAP POWER AND TIMING: SUMMARY

▪ System benefits

- High currents at tight tolerances to meet Xilinx requirements
- Programmable 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	ISL99227	Smart Power Stage (SPS) Module with Integrated High Accuracy Current and Temperature Monitors
Power	ISL85009	9A, 3.8V to 18V Input, Synchronous Buck Regulator
Power	ISL91211A	Triple Output Power Management IC
Power	ISL8026	Compact Synchronous Buck Regulators
Power	ISL80505	High Performance 500mA LDO
Timing	9FGV1006	Programmable PhiClock™ Generator
Timing	9ZML1252E	2:12 DB1200ZL Derivative Low Power HCSL Clock Mux
Timing	8T49N240	FemtoClock®NG Universal Frequency Translator
Timing	8T49N241	FemtoClock®NG Universal Frequency Translator
Timing	8A34001	System Synchronizer for IEEE 1588 - Eight Channels

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

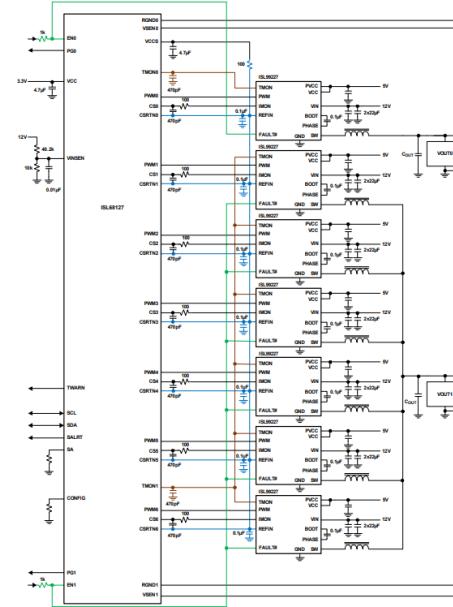
PMBus 1.3 Support

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

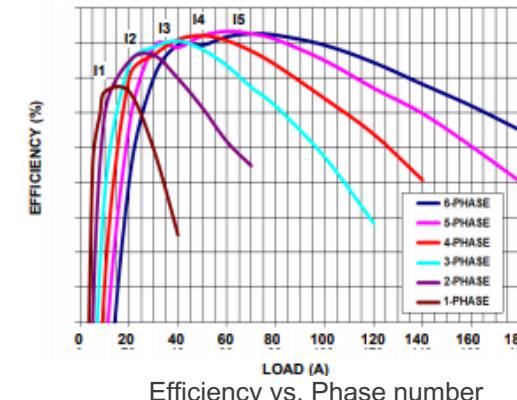
Advanced linear digital modulation

- 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



ISL99227/B – Smart Power Stage (SPS) Module

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

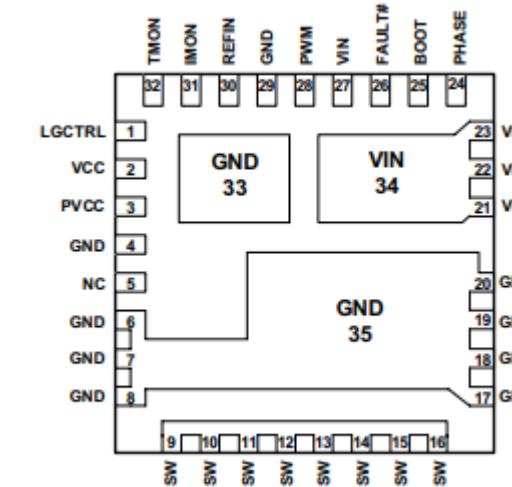
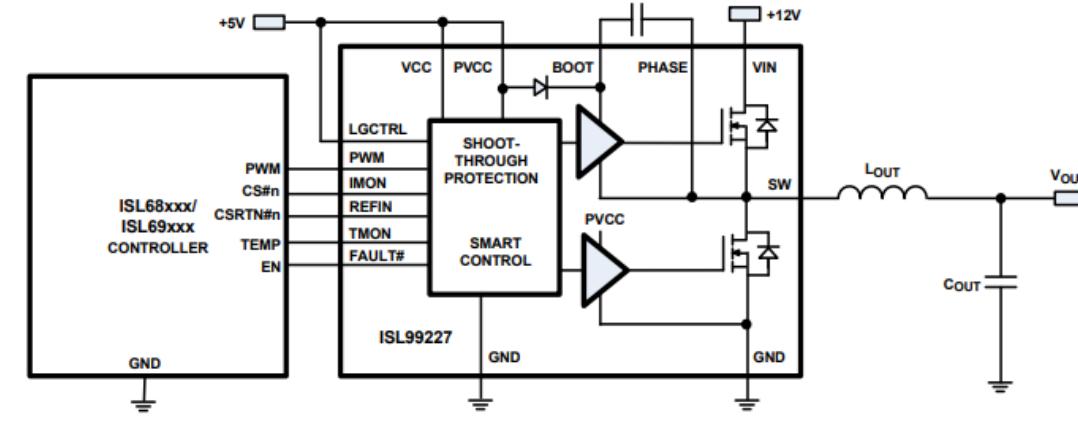
Key Features

- 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



ISL85009 – 9A, 3.8V to 18V, Synchronous Buck Regulator

Servers and cloud infrastructure POLs, IPCs, factory automation, PLCs

Flexible power

- Input voltage range 3.8V to 18V
- PWM output voltage adjustable from 0.6V
- Up to 9A output load
- DCM/CCM

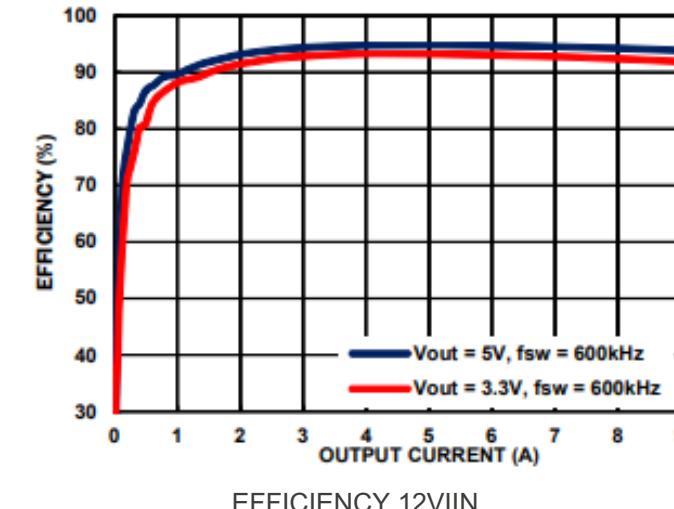
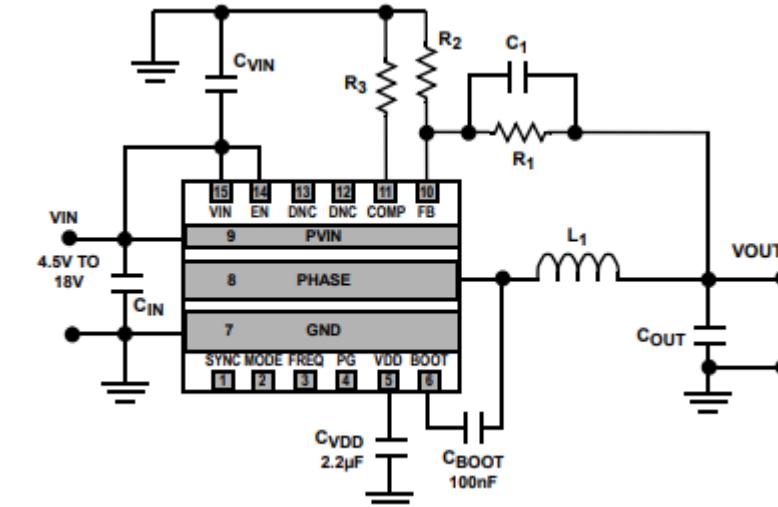
High Efficiency and Accuracy

- Efficiency up to 95%
- PWM output voltage adjustable from 0.6V

Built in protection

- Open-drain PG window comparator
- Overvoltage and thermal protection

Part #	Package
ISL85009FRZ-T7A	15L 3.5x3.5 QFN (T&R 250)
ISL85009FRZ-T	15L 3.5x3.5 QFN (T&R 6000)



ISL91211A/B – Triple/Quad Output Power Management IC

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

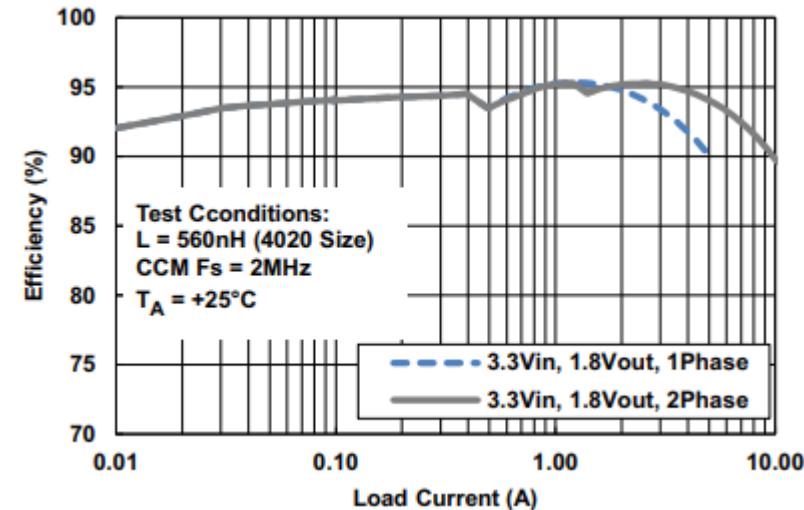
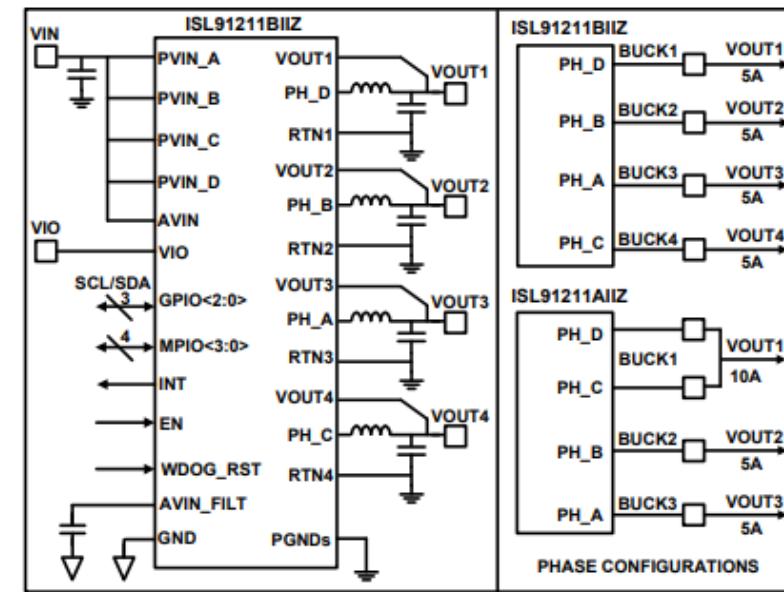
Custom Power

- 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)
- $\pm 0.7\%$ system accuracy, remote voltage sensing
- Small solution size

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



ISL8026 – Compact Synchronous Buck Regulators

DC/DC POL modules, Li-ion battery and portable power applications

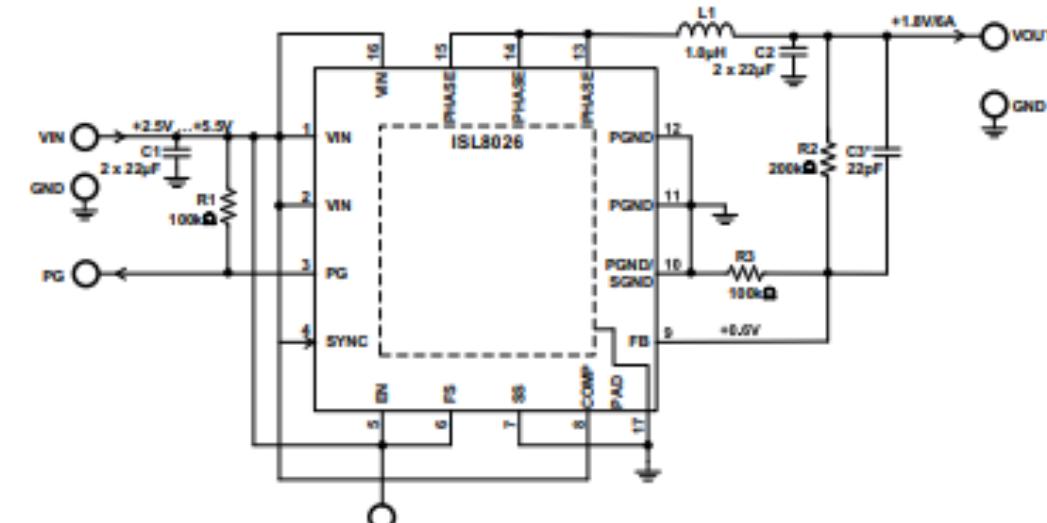
High Current Out

- Step-down DC/DC converters that can deliver 6A of continuous output current from a 2.5V to 5.5V input supply.
- Very low ON-resistance FETs - P-channel 36mΩ and N-channel 13mΩ typical values

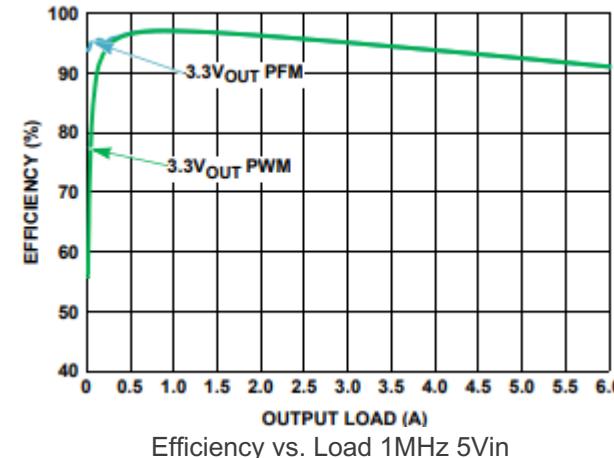
High Efficiency and Accuracy

- Synchronous buck regulator with up to 95% efficiency
- 1.0% reference accuracy over load/line/temperature (-40°C to +85°C)
- 1.5% reference accuracy over load/line/temperature (-40°C to +125°C)

Part #	Package
ISL8026IRTAJZ-T7A	16L 3x3mm TQFN
ISL8026FRTAJZ-T7A	16L 3x3mm TQFN



Typical Application Circuit Configuration



Efficiency vs. Load 1MHz 5Vin

ISL80505 – High Performance 500mA LDO

Noise sensitive instrumentation systems in Industrial, Medical and Telcom

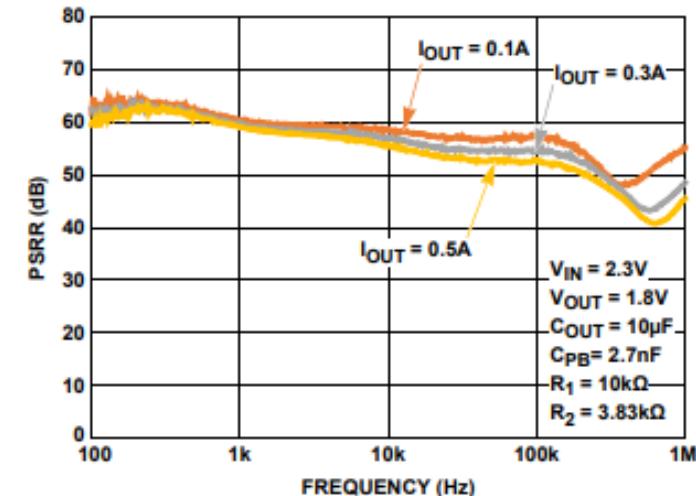
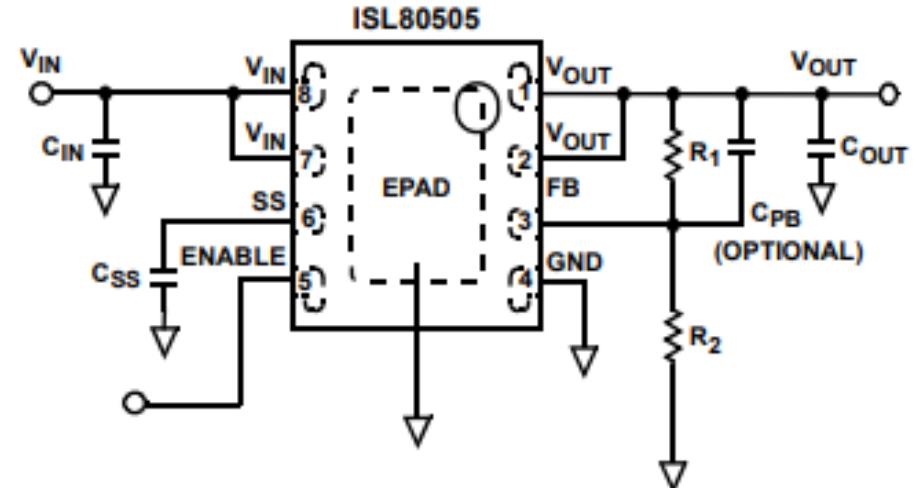
Strong Output Features

- $\pm 1.8\%$ VOUT accuracy guaranteed over line, load, and $T_J = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$
- Very low 45mV dropout voltage at $V_{\text{OUT}} = 2.5\text{V}$
- Stable with a $4.7\mu\text{F}$ output ceramic capacitor
- Very fast transient response
- Programmable output soft-start time
- Excellent PSRR over wide frequency range
- Current limit protection

Key Benefits

- A submicron BiCMOS process is utilized for this product family to deliver the best in class analog performance and overall value. This CMOS LDO consumes significantly lower quiescent current as a function of load compared to bipolar LDOs, giving higher efficiency in small footprint.
- State-of-the-art internal compensation achieves a very fast load transient response and excellent PSRR

Part #	Package
ISL80505IRAJZ-T7A	8L 3x3mm DFN (T&R 250)
ISL80505IRAJZ	8L 3x3mm DFN (T&R 800)
ISL80505IRAJZ-T	8L 3x3mm DFN (T&R 6000)



9FGV1006 – LOW NOISE, HIGH-PERFORMANCE Programmable PhiClock™ Generator

High Performance Clock

- Two outputs used for low phase noise spread-spectrum applications such as PCIe Express
- Both are completely independent of each other
- 25MHz–325MHz LVDS or LP-HCSL outputs
- 10MHz–200MHz output frequency (LVCMOS), integer configuration
- 10MHz–156.25MHz output frequency (LVDS or LP-HCSL), fractional or spread spectrum configuration

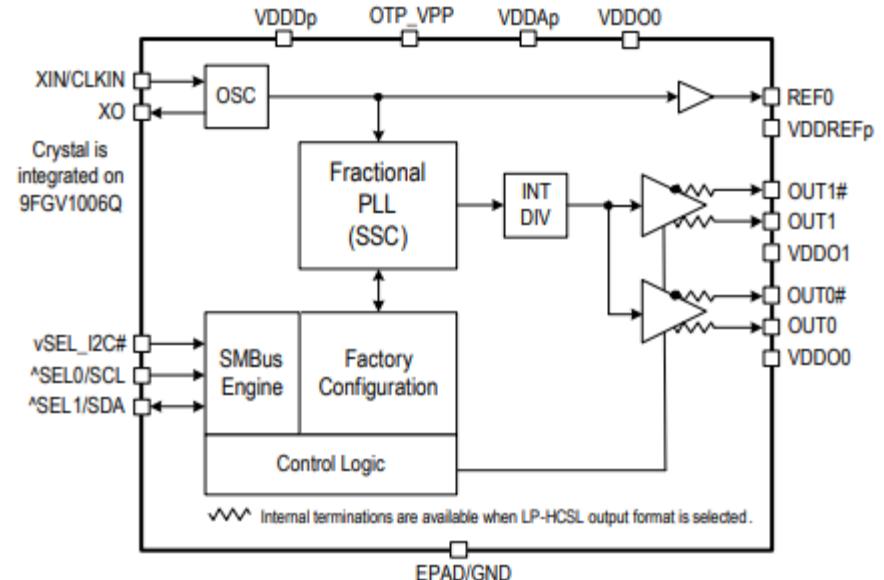
Configurable

- On-board OTP supports up to 4 complete configurations
- Configuration selected via strapping pins or I²C

Key Specifications

- 12kHz–20MHz typical phase jitter at 156.25M (SSC off) 276ps RMS
- PCIe Gen4 jitter (CC) < 0.23ps RMS
- PCIe Gen5 jitter (CC) < 0.08ps RMS
- PCIe Gen5 jitter (SRIS) < 0.07ps RMS

Part #	Package
9FGV1006A000LTGI	16L 3x3mm LGA
9FGV1006Q500LTGI	16L 3x3mm LGA
9FGV1006A001LTGI	16L 3x3mm LGA
9FGV1006A002LTGI	16L 3x3mm LGA



9ZML1252E – LOW POWER, HIGH-PERFORMANCE

2:12 DB1200ZL Derivative Low Power HCSL Clock Mux

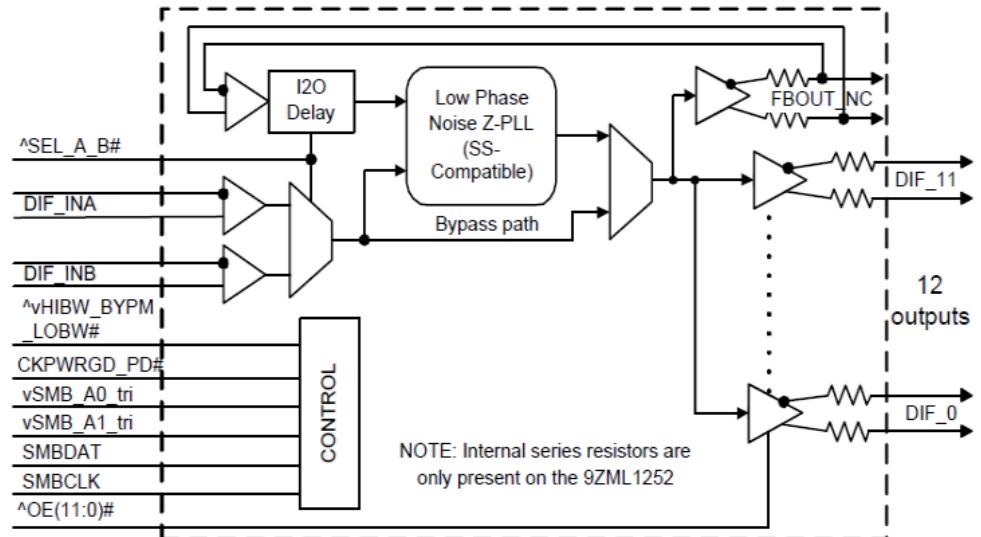
Key Features

- 2-input/12-output differential mux
- LP-HCSL outputs with $Z_{out} = 85\Omega$; eliminate 48 resistors
- 12 Low-power HCSL (LP-HCSL) output pairs with $85\Omega Z_{out}$
- Suitable for PCI-Express Gen1–4 or QPI/UPI applications
- 9 selectable SMBus addresses; multiple devices can share same SMBus segment

Key Specifications

- Cycle-to-cycle jitter < 50ps
- Output-to-output skew < 50ps
- Input-to-output delay: Fixed at 0 ps
- Input-to-output delay variation < 50ps
- Phase jitter: PCIe Gen4 < 0.5ps rms

Part #	Package
9ZML1252EKILF	75L 10x10mm QFN
9ZML1252EKILFT	75L 10x10mm QFN (T&R)



8T49N240 - ULTRA-PERFORMANCE JITTER ATTENUATOR

FemtoClock®NG Universal Frequency Translator

Excellent Jitter Performance

- < 200fs (typical) RMS (including spurs): 12kHz to 20MHz for integer-divider outputs in jitter attenuator mode or in fractional-feedback synthesizer mode

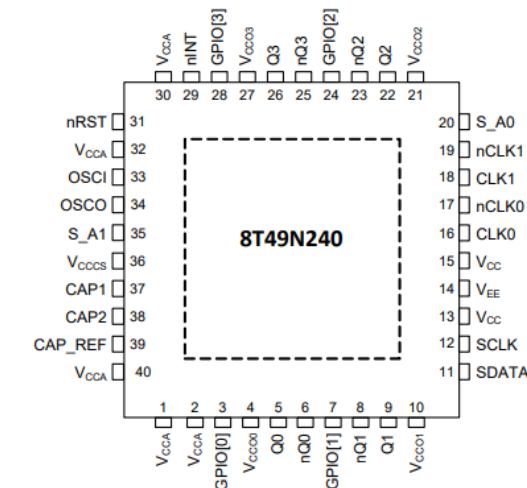
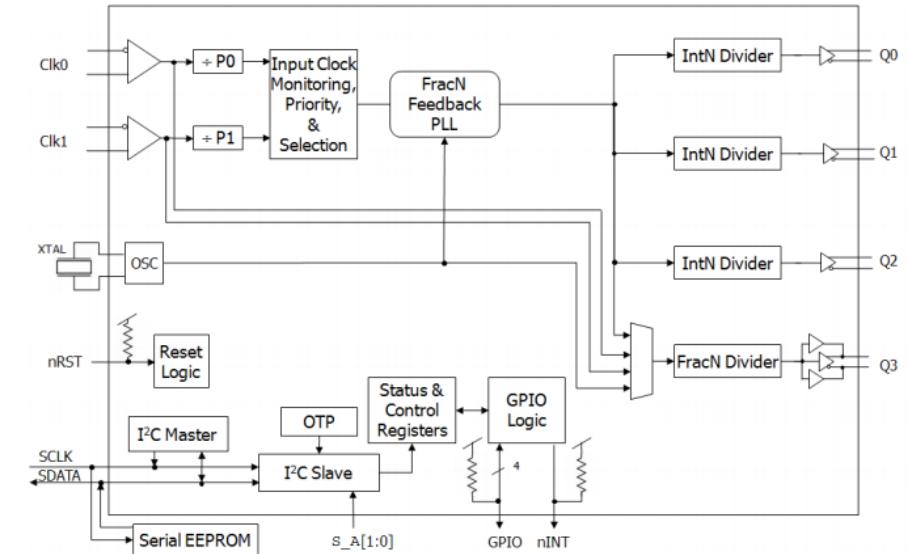
Wide Support

- Operating Modes: Synthesizer, Jitter Attenuator
- Operates from a 10MHz to 54MHz fundamental-mode crystal
- Accepts up to two LVPECL, LVDS, LVHSTL, or LVC MOS input clocks

Configurable

- Output Generates up to 4 LVPECL / LVDS / HCSL or 16 LVC MOS output clocks ranging from 8kHz up to 1.0GHz (diff), 8kHz to 250MHz (LVC MOS), that meet jitter limits for 10G up to 25G Ethernet applications

Part #	Package
8T49N240-991NLGI	40L 6x6mm VFQN
8T49N240-994NLGI	40L 6x6mm VFQN



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

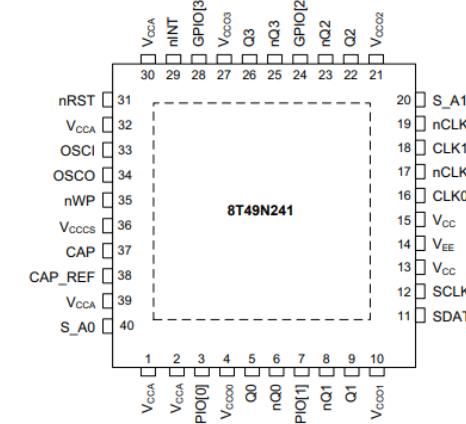
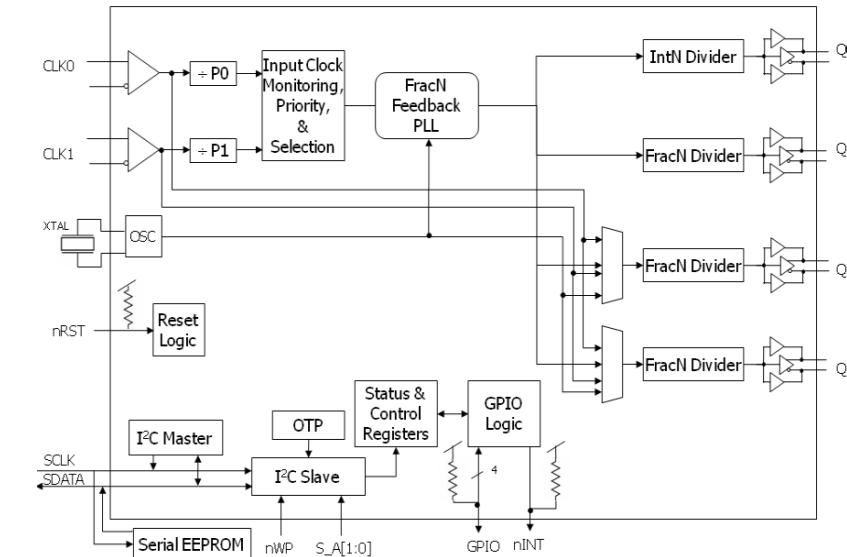
Wide Input Frequency

- 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



8A34001 – HIGH PERFORMANCE

System Synchronizer for IEEE 1588 - Eight Channels

Flexible Timing

- Eight independent timing channels
- Digital PLLs (DPLLs) lock to any frequency from 0.5Hz to 1GHz
- DPLLs / Digitally Controlled Oscillators (DCOs) generate any frequency from 0.5Hz to 1GHz
- DPLLs comply with ITU-T G.8262 for Synchronous Ethernet (SyncE)

Simple Input Frequency

- Device requires only a crystal oscillator or fundamental-mode crystal: 25MHz to 54MHz

IEEE Support

- DCOs can be controlled by external IEEE 1588 software to synthesize Precision Time Protocol (PTP) / IEEE 1588 clocks with frequency resolution less than 1.11×10^{-16}
- Combo Bus simplifies compliance with ITU-T G.8273.2

Part #	Package
8A34001C-000AJG	144L 10x10mm CABGA
8A34001C-000AJG8	144L 10x10mm CABGA
8A34001PC-000AJG	144L 10x10mm CABGA

