

AS1454 Family | Product Brief

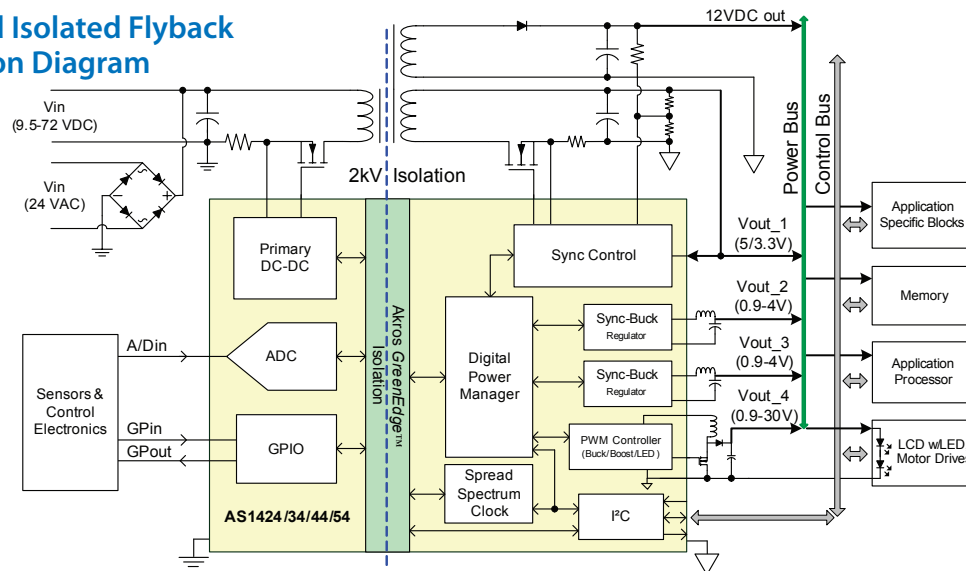
9-72VDC / 24VAC Isolated Digital Power SoC with Integrated GreenEdge™ 2kV Isolation & Quad Outputs

The AS1454/44/34/24 are Quad-Output Digital Power SoCs for 9.5-72VDC & 24VAC isolated power applications. All are built on Akros' integrated GreenEdge™ 2kV digital isolation technology creating a flexible power platform that eliminates all opto-couplers and minimizes component count and design footprint.

Synchronous converters with digital loop and timing control are integrated with digital isolation as part of an advance power system architecture for high-efficiency and cost-effective designs. Selectable spread-spectrum clocking on all PWMs reduces the power supply spectral noise for superior EMC performance. Bi-directional Isolated GPIO and isolated ADC ease system level design in many industrial and medical applications.

With two externally-programmable high-current capable outputs (Vout1 and Vout4), and two internal Buck Regulators (Vout2 and Vout3, with 1.25A option in AS1424/34 and 2A option in AS1444/54), the device family provides a scalable platform solution for sub-50W range applications. An I²C (AS1434 & AS1454 only) compatible management interface provides advanced power control and diagnostics capability. Hardware-programmable device operation is available on all four devices.

Simplified Isolated Flyback Application Diagram



Typical Applications

- Surveillance Cameras and Building Management Systems
- Automotive Power and Infotainment Systems
- Industrial & Medical Equipment
- Telecom Backplane and Distributed Power Systems
- Multi-rail Isolated Flyback and Forward Power Supplies, <50W

Features

Digitally-Isolated Programmable Power

Primary-Side DC-DC Controller

- High-efficiency DC-DC Controller with Digital Optimization
- Integrated Primary-Secondary High-Voltage 2kV Digital Isolation
- Programmable Primary Clock Frequency

Secondary-Side Power Outputs

- Output #1: Sync Controller with programmable power-FET timing for high efficiency at both light and full loads

- Outputs #2 and #3: Fully integrated Buck Regulators w/2A FETs
- Output #4: DC-DC Controller for Buck, Boost, or LED Driver
- High current capability on Outputs #1 and #4
- Programmable PWM Frequencies

Power Management

- Hardware-programmable start-up power sequencing
- Individual output Power-Good management
- Voltage margining for each output
- Primary GPIO controlled via Secondary GPIO or I²C
- Isolated ADC for primary-side sensor measurements
- 5V μ C-compatible with interrupt on alarm services
- Programmable watchdog timer

EMC Compliance and Protection

- Synchronous spread-spectrum clocking on all PWMs
- Meets UL60950 and UL1577 requirements for basic isolation to 2kVDC/1.5kV_{RMS}



Architecture Overview

The AS14x4 uses a current-controlled DC/DC architecture and integrated 2kV digital isolation for a wide input range (9.5V-72V) isolated high-efficiency primary converter with no opto-isolators. Integration of multiple buck/boost regulators creates a full Power System-on-a-Chip (SoC) solution for electronic equipments requiring power in sub-50W range.

Typically used in an isolated Flyback topology, the AS14x4 includes one primary-to-secondary synchronous PWM controller, two secondary side synchronous DC-DC Buck regulators and an additional secondary-side DC-DC Buck/Boost controller. All four PWM clocks are user programmable for rate and then automatically synchronized and spread-spectrum modulated for improved clock phase-edge EMI control and power efficiency.

Digitally Isolated Power Outputs

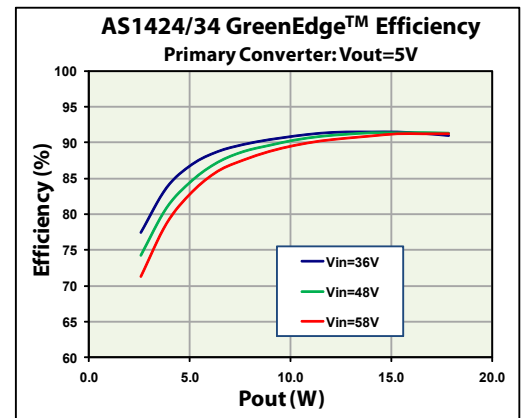
All internal connections between the Primary and Secondary power planes are isolated using Akros *GreenEdge™* high-voltage and high-speed isolation technology. This eliminates the need for opto-isolators in both power control loops and I²C/GPIO/ADC paths between these power planes.

Synchronous Primary DC-DC Converter

- *GreenEdge™* integrated sync-rectification driver eliminates external transformer winding
- High efficiency from light to full load
- Programmable PowerFET timing control — facilitates use of off the shelf transformers and wide range of power FETS

Synchronous Secondary Buck Regulators and Programmable Buck/Boost Controller

- Two fully-integrated synchronous buck regulator with power FETs (2A in AS1454/44, 1.25A in AS1434/24)
- One programmable DC-DC controller for high-current Buck, Boost, or LED driver
- Programmable PWM frequencies, synchronized to primary-side clock
- Hardware programmable soft-start and power sequencing
- Multi-phased clocking with spread-spectrum for EMC management



Software Features

While both Hardware (pin I/O controlled) and Software (I²C controlled) operation is available, the I²C register set gives the platform designer several additional advanced device features.

AS14x4 I²C Register Controlled Key Features

- Enable/disable of each power output for system power management
- Individual output Power-Good management with interrupt on Alarm Services
- Voltage margining for each output
- Isolated primary-side GPIO controlled via I²C
- Isolated primary-side A/D converter monitored via I²C
- Multiple spread-spectrum algorithms on all PWMs & watchdog timer

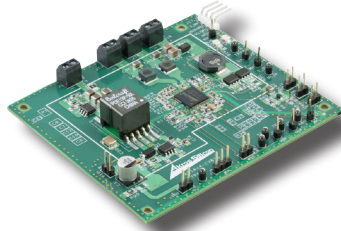
Development Tools

Akros Silicon provides a complete development kit including hardware evaluation board (EVB), a software GUI to access AS14x4 software features, USB-I²C controller for ease of connecting the EVB or end product to a PC, reference design schematics, BOM, layout and application guides.

AS14x4 Product Family

The AS14x4 family has four pin-compatible devices, all available in 64-lead 9x9 QFN Reduction of Hazardous Substance (RoHS) compliant packages.

Part #	HW Mode	SW I ² C Mode	I _{out1/4}	I _{out2/3} (max, each)	Recommended Usage
AS1424	X		Set Externally	1.25 A _{RMS}	<20W
AS1434	X	X	Set Externally	1.25 A _{RMS}	<20W
AS1444	X		Set Externally	2.0 A _{RMS}	<50W
AS1454	X	X	Set Externally	2.0 A _{RMS}	<50W



Akros Silicon
6399 San Ignacio
Ave, Suite 250,
San Jose,
CA 95119

USA

1296 Kifer Road, Suite 603
Sunnyvale, CA 94086

t: +1 916.351.8100
f: +1 916.351.8102

Marcom@AkrosSilicon.com
www.AkrosSilicon.com