

Infrastructure Power Solutions

Power Modules, Digital PWM Controllers, Multiphase Controllers,
Power Stage, FPGA Solutions



Product Highlights
April 2017

intersil[™]
A Renesas Company



START YOUR DESIGN

DOWNLOAD YOUR FREE POWERNAVIGATOR SOFTWARE

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Power Management Experts

As an industry leader in power management and analog technology, Intersil provides innovative design solutions that maximize performance and reliability across a broad range of industrial applications, including the smart home and smart grid, test and measurement systems, medical devices and factory automation.

Intersil offers a comprehensive portfolio of highly integrated and efficient digital and analog controllers, power modules and switching regulators that simplify design and integration for power designers seeking solutions for the most complex systems.

Why Intersil?



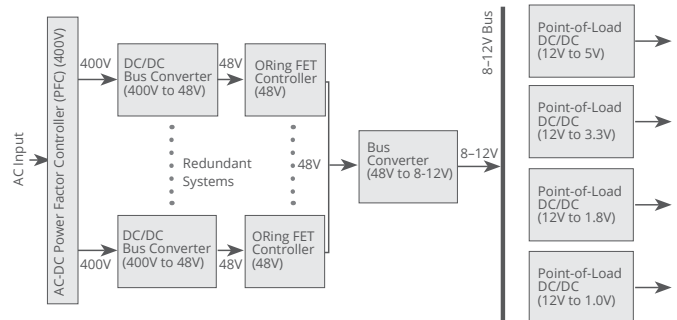
Reliable, Proven Supply Chain

Proven proprietary processes and package technologies, shipping over 1 billion ICs per year.

- **Strong technology development**
 - Proprietary process and package technologies
- **Multi-sourcing strategy**
 - Sourcing from multiple leading-edge semiconductor foundries & assembly/test partners ensures a steady product supply and reduced risk
- **Industry-leading quality & reliability metrics**
 - Billion+ ICs shipped every year
 - Less than 1.0 DPPM (defective parts per million) and improving
 - Decades of experience handling military/space products and delivering world-class quality and reliability metrics
 - ISO/TS16949 and AEC-Q100
 - MIL-PRF-38535 compliant and 100% burned in

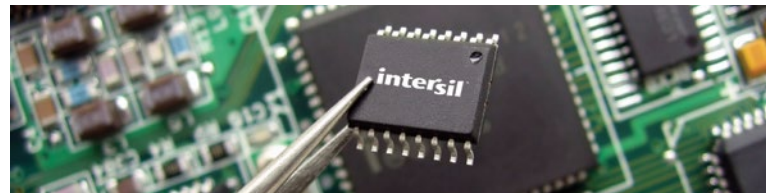
A Complete Power Solution

Intersil's comprehensive portfolio of digital power management DC/DC controllers and power modules are designed to provide best-in-class efficiency and help streamline the design process. Also available are highly-integrated isolated and non-isolated solutions that address every stage of the power chain from high-voltage AC input, AC/DC converters, and DC/DC converters and regulators.

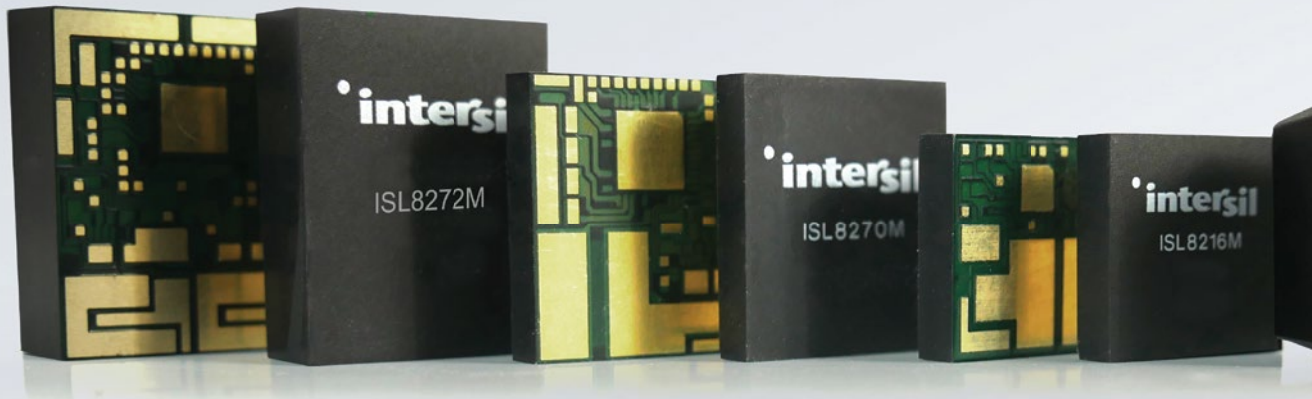


Assured Product Supply

Long life cycles ensure steady flow of product. Intersil still supports customer programs with products in production for over 40 years.



Simplicity & Performance



Power Dense Modules for Compact <10A Designs



Intersil power modules are simple to design, and offer the smallest footprint for a given output current.

- Pin-compatible 3A ISL8202M and 5A ISL8205M single channel analog power modules offer a 2.6V to 5.5V input voltage range, 0.6V to 5.2V output range with $\pm 1.6\%$ accuracy over line/load/temperature, and up to 95% efficiency. The selectable light load efficiency and 100% duty cycle LDO support Energy Star compliance and extend battery life.
- Offered in an ultra-compact 6.5 mm x 9 mm package, the high efficiency fully integrated ISL8203M can be configured as a dual channel 3A or a single channel 6A power module. Supporting parallel operations for 12A+ output currents, the ISL8203M is so flexible that it reduces your design time for virtually all your low power point of load designs.

Output current	33.75mm ² QFN22 4.5x7.5mm 1.85mm height	58.5mm ² QFN23 6.5x9mm 1.85mm height
3A	ISL8202M	ISL8203M
5A	ISL8205M	
6A		ISL8203M
12A+		ISL8203M x 2+



PowerNavigator™

Simple Configuration and Monitoring

Digital Power Design Simplified

Intersil's PowerNavigator™ software allows simple configuration and monitoring of multiple digital-DC devices using a PC with a USB interface. PowerNavigator makes it easy to change all the features and functions of your digital power supply design within a simple graphical user interface.

- All Intersil digital power modules & controllers supported
- Drag-and-drop system design
- Click-and-drag sequencing
- Command tool library



Download Free Software

www.intersil.com/powernavigator

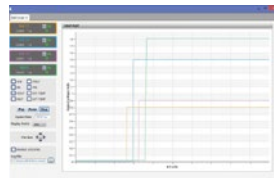


POWERMAP



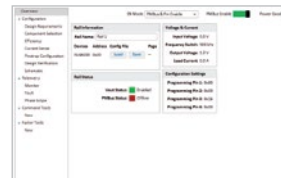
Adds real-time information to the power rail blocks, such as device name, phase count, output voltage and more.

RAILSCOPE



Simplifies system validation, giving users the ability to plot all device telemetry.

RAIL INSPECTOR



Quickly guides users through the power supply parameters setup.

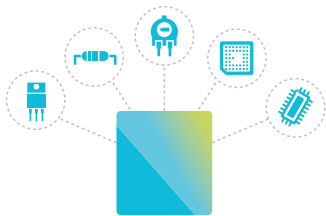
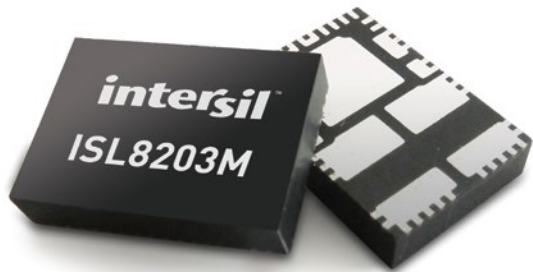
SEQUENCING



Adjust power sequencing of multiple rails using graphical interface.

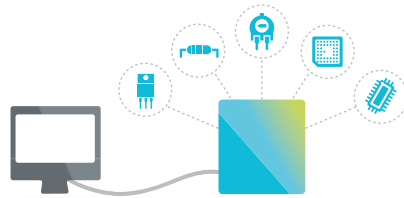
Power Modules

Fully Integrated DC/DC Point-of-Load Solutions



Analog Module

A simple, effective DC/DC power supply solution that integrates necessary power elements in a single package.



Digital Module

A high-performance DC/DC power supply solution that integrates all power elements in a single package and supports digital communication and configurability for advanced power management techniques. Digitally design with PowerNavigator GUI software.

Simple to Design & Use

- Fastest time-to-market power solution
- Flexible & adaptive
- Simple schematics
- Flexible PCB positioning & routing

Power-Dense

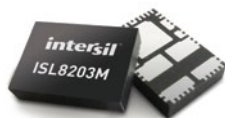
- High power density, small form factor
- Up to ~250W POL in a single package
- Multi-phase and/or multi-module allows high output power

Rugged & Reliable

- Thermally optimized packages
- Built-in voltage/current/thermal protections
- Full output load available
- Fully characterized & tested solution

Analog Power Modules Highlight

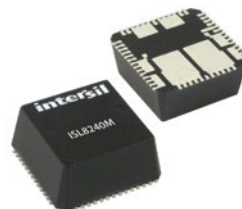
Find
the best
Power Module
suits your
need at
[intersil.com/
powermodule](http://intersil.com/powermodule)



6A
ISL8203M



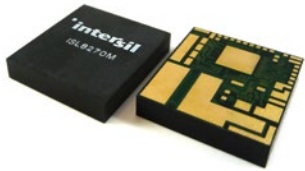
30A
ISL8225M



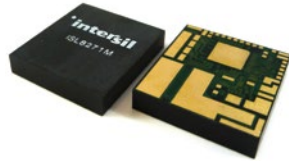
40A
ISL8240M

V_{IN} Range (V)	2.85 - 6	4.5 - 20	4.5 - 20
V_{OUT} Range (V)	0.8 - 5	0.6 - 7.5	0.6 - 2.5
I_{OUT} (A)	Dual 3A or single 6A	Dual 15A or single 30A	Dual 20A or single 40A
Current Share	Yes	Yes	Yes
Multi-phase	Yes	Yes	Yes
PGOOD	Yes	Yes	Yes
Enable	Yes	Yes	Yes
Ambient Temp Range (°C)	-40 to +85	-40 to +125	-40 to +125
Load Fault Protection	Yes	Yes	Yes
Peak Efficiency (%)	95	94	94
Package (mm)	23 Ld QFN (9x6.5x1.83)	26 Ld QFN (17x17x7.5)	26 Ld QFN (17x17x7.5)

Digital Power Modules Highlight



25A
ISL8270M



33A
ISL8271M



50A
ISL8272M



80A
ISL8273M

4.5 - 14	4.5 - 14	4.5 - 14	4.5 - 14
0.6 - 5	0.6 - 5	0.6 - 5	0.6 - 2.5
25	33	50	80
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
-40 to +85	-40 to +85	-40 to +85	-40 to +85
Yes	Yes	Yes	Yes
96	96	96	93
40 Ld HDA MODULE (17 x 19 x 3.55)	40 Ld HDA MODULE (17 x 19 x 3.55)	58 Ld HDA MODULE (18 x 23 x 7.5)	58 Ld HDA MODULE (18 x 23 x 7.5)

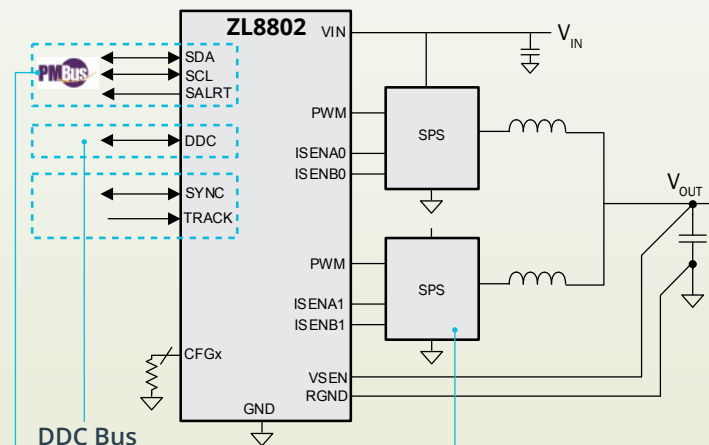
Intelligence in Silicon

Digital PWM Controllers

ZL8802

Dual Output, 2- to 8-Phase, Fully Digital PWM Controller

Full Digital Controllers offer **performance, flexibility** and **advanced feature sets** that are only possible with digital control.



DDC Bus

- Sequencing
- Fault Spreading
- Current Share

PMBus Interface

- Full Telemetry
- Fault Reporting
- SnapShot

Smart Power Stage Compatible

EVALUATION
BOARDDESIGN
MODEL

POWERNAVIGATOR



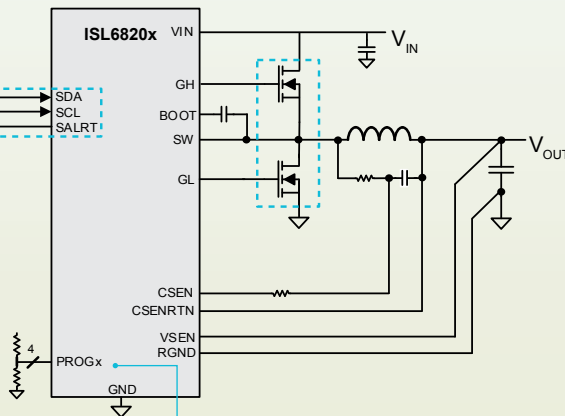
POWERCOMPASS

- V_{IN} range: 4.5V to 14V
- V_{OUT} range: 0.6V to 5V (plus 10% margin)
- Dual output, 2-phase, 4-phase, 6-phase or 8-phase operation.
- Support for configuration file free operation!
- Designed to work with Smart Power Stage
- Tracking in 2-phase in lower configurations
- 200kHz to 1.33MHz switching frequency
- 1% V_{OUT} accuracy over line/load/temp
- 44 Ld 7 x 7 QFN

ISL68200/01

Single-Phase R4 Hybrid Digital PWM Controller

Hybrid Digital Controllers combine the **performance** of Intersil's R4 control loop with the benefits of a **PMBus interface**.



PMBus Interface

- $V_{IN}/V_{OUT}/I_{OUT}/Temp$
- V_{OUT} Margin
- Fault Reporting

PROGx Pins used to program device parameters:

- PMBus Address
- V_{OUT}
- Switching Frequency



EVALUATION BOARD



DESIGN MODEL



POWERNAVIGATOR



POWERCOMPASS

- V_{IN} range: 4.5V to 24V
- V_{OUT} range: 0.5V to 5.5V
- 300kHz to 1.5MHz switching frequency
- Compensation free R4 modulator
- Support for all ceramic output caps
- Integrated drivers (ISL68200) or PWM out (ISL68201)
- No NVM — complete configuration with pin-strap resistors
- Telemetry, fault reporting and V_{OUT} margining via PMBus

Full Digital PWM Controllers

Find
the Digital PWM
Controller that fits
your needs at
[intersil.com/
power](http://intersil.com/power)



**Dual-Ch/Dual-Ph
ZL8800**



**Dual Phase
ZL8801**



**SPS Compatible
ZL8802**

V_{IN} Range (V)	4.5 - 14	4.5 - 14	4.5 - 14
V_{OUT} Range (V)	0.54 - 5.5	0.54 - 5.5	0.54 - 5.5
I_{OUT} (max) (A)	>40	>40	>40
I_Q (mA)	26	26	26
Control Loop	ChargeMode Control	ChargeMode Control	ChargeMode Control
PMBus™ Compliant	Yes	Yes	Yes
Dual Output	Yes	No	Yes
Dual Phase	Yes	Yes	Yes
DDC Current Share	No	Yes - up to 8 Phase	Yes - up to 8 Phase
Package	44 Ld 7x7 QFN	44 Ld 7x7 QFN	44 Ld 7x7 QFN
Driver Recommendation	ZL1505 MOSFET or ISL99140 DrMOS	ZL1505 MOSFET or ISL99140 DrMOS	Smart Power Stage

Hybrid Digital PWM Controllers



Integrated Driver ISL68200

4.5 to 24
0.5 to 5.5
>40A
15mA
R4 Control Loop
Yes
No
No
No
24 Ld 4x4 QFN
Discrete MOSFETs or Dual Channel MOSFETs



PWM Output ISL68201

4.5 to 24
0.5 to 5.5
>40A
15mA
R4 Control Loop
Yes
No
No
No
24 Ld 4x4 QFN
Smart Power Stage or ISL99140 DrMOS

Hybrid Digital vs. Full Digital

Full Digital

- **Digital control loop**
(ChargeMode, compensation-free)
- Full supply telemetry
- V_{IN} , V_{OUT} , I_{IN} , I_{OUT} , Temp. (internal & external), Duty, FSW, BlackBox
- Full fault reporting via PMBus
- Full featured PMBus commands
- NVM with user settable registers
- Optional pin-strap only operation

Hybrid Digital

- **Analog control loop**
(R4, compensation-free hysteretic)
- Full supply telemetry
- V_{IN} , V_{OUT} , I_{OUT} and temperature
- Fault reporting via PMBus
- Limited PMBus commands (<25)
- Pin-strap only operation
(no configuration files required)

Digital Multiphase Controllers

ISL681xx, ISL691xx

Digital Multiphase Controllers & Smart Power Stage for 10A-450A Solutions

Intersil's ISL681xx and ISL691xx digital controllers provide up to seven phases assignable in any combination across two outputs, and combine with smart power stages to provide a scalable solution from 10A to 450A. The result is enhanced power optimization and more energy-efficient networking and communications infrastructure equipment.

- PMBus 1.3 and AVSBus compliant; telemetry for Vin, Vout, input/output current, and temperature diagnostic fault reporting with black box capability
- Flexible phase configuration allows solution to be scaled in current from 10A to 450A; ability to assign phases to any output (X+Y)
- Proprietary digital control scheme with patented synthetic current control
- Supports ISL99227 60A smart power stage with integrated current sensing (see page 18)
- Intuitive setup, control and monitoring via PowerNavigator™ GUI software



EVALUATION BOARD



POWERNAVIGATOR



POWERCOMPASS

Flexible configurations to meet any rail requirements

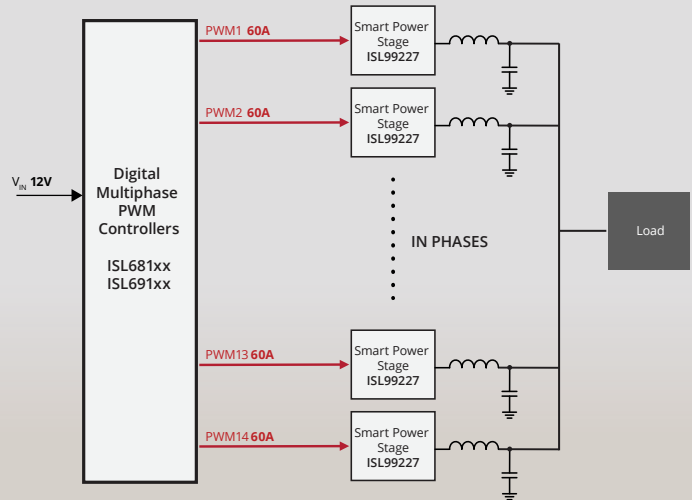
Application	Dual Output Device	Compatible Interfaces	Output Phase Configuration
AVSBus	ISL68137	PMBus, AVSBus	X+Y ≤ 7
	ISL68134	PMBus, AVSBus	X+Y ≤ 4
General Purpose	ISL68127	PMBus	X+Y ≤ 7
	ISL68124	PMBus	X+Y ≤ 4
SVI2	ISL69147	PMBus, AMD SVI2	X+Y ≤ 7
	ISL69144	PMBus, AMD SVI2	X+Y ≤ 4
IMVP8	ISL69137	PMBus, IMVP8	X+Y ≤ 7
	ISL69134	PMBus, IMVP8	X+Y ≤ 4
IMVP8 & VR13	ISL69128	PMBus, IMVP8/VR13	X+Y ≤ 7
VR13	ISL69127	PMBus, VR13	6+1
	ISL69125	PMBus, VR13	X+Y ≤ 4
	ISL69124	PMBus, VR13	X+Y ≤ 4

Digital Multiphase Controllers Product Highlights

Application	Device	Output Phase Configuration	Bias Voltage Range (V)	Input Voltage Range (V)	Output Current Max (A)	Output Voltage Range (V)	Parametric Applications
AVSBus	ISL68134	X+Y≤4	3.3V ±5%	4.5 - 18	240	0 - 3.05	Networking equipment, Telecom/datacom equipment, Server/storage equipment, Point-of-load power supply (Memory, DSP, ASIC, FPGA)
	ISL69137	X+Y≤7	3.3V ±5%	4.5 - 18	450	0 - 3.05	Core and memory for Intel IMVP8 based processor, High performance servers core or memory rail, High performance graphic rail, High-end desktop, Networking, data center, storage and general purpose
General Purpose	ISL68124	X+Y≤4	3.3V ±5%	4.5 - 18	240	0 - 3.05	Networking equipment, Telecom/datacom equipment, Server/storage equipment, Point-of-load power supply (Memory, DSP, ASIC, FPGA)
	ISL68127	X+Y≤7	3.3V ±5%	4.5 - 18	450	0 - 3.05	Networking equipment, Telecom/datacom equipment, Server/storage equipment, Point-of-load power supply (Memory, DSP, ASIC, FPGA)
SVI2	ISL69144	X+Y≤4	3.3V ±5%	4.5 - 18	240	0 - 3.05	Core and graphic for AMD SVI2 based processor, High performance servers core rail, High performance graphic rail, High-end desktop with overclocking option, Networking, data center, storage and GP
	ISL69147	X+Y≤7	3.3V ±5%	4.5 - 18	450	0 - 3.05	Core and graphic for AMD SVI2 based processor, High performance servers core rail, High performance graphic rail, High-end desktop with overclocking option, Networking, data center, storage and GP
IMVP8	ISL69134	X+Y≤4	3.3V ±5%	4.5 - 18	240	0 - 3.05	Core and memory for Intel IMVP8 based processor, High performance servers core or memory rail, High performance graphic rail, High-end desktop, Networking, data center, storage and general purpose
	ISL68137	X+Y≤7	3.3V ±5%	4.5 - 18	450	0 - 3.05	Networking equipment, Telecom/datacom equipment, Server/storage equipment, Point-of-load power supply (Memory, DSP, ASIC, FPGA)
IMVP8 & VR13	ISL69128	X+Y≤7	3.3V ±5%	4.5 - 18	450	0 - 3.05	Core and memory for Intel VR13 based designs, High performance server core and memory rails, High performance graphics rails, Networking, data center, storage, and general purpose
VR13	ISL69124	X+Y≤4	3.3V ±5%	4.5 - 18	240	0 - 3.05	Core and memory for Intel VR13 based designs, High performance server core and memory rails, High performance graphics rails, Networking, data center, storage, and general purpose
	ISL69125	X+Y≤4	3.3V ±5%	4.5 - 18	240	0 - 3.05	Core and memory for Intel VR13 based designs, High performance server core and memory rails, High performance graphics rails, Networking, data center, storage, and general purpose
	ISL69127	6+1	3.3V ±5%	4.5 - 18	360 + 60	0 - 3.05	Core and memory for Intel VR13 based designs, High performance server core and memory rails, High performance graphics rails, Networking, data center, storage, and general purpose

Complete Digital Multiphase Solution

- Digital multiphase controllers
 - 12 advanced digital multiphase controllers
 - Dual outputs
 - Up to 7 phase, expandable to 14 phases
- Smart power stage
 - Integrated drivers and FETs
 - Accurate current sensing
 - Accurate temperature monitoring
 - 32-lead, 5mm x 5mm QFN
- Full development support
 - Graphical User Interface (GUI)
 - Software tools
 - Development boards



Power Stage Product Highlight

Device	Current Rating (A)	PWM (V)	Thermal Flag	OCP Flag	IMON	TMON	Package	P2P Compatible	Used With
5.0V PWM POWER STAGE FAMILY									
ISL99125B	25	5	No	No	No	No	24 Ld 3.5x5 QFN	ISL99135B	Analog Controllers: ISL633x, ISL636x, ISL637x, ISL95829, ISL9585x Digital Hybrid Controllers: ISL68201, ISL6388/98 Full Digital Controller: ISL681xx/ISL691xx, ZL8802 Phase Doublers: ISL6617, ISL6617A
ISL99135B	35	5	No	No	No	No	24 Ld 3.5x5 QFN	ISL99125B	
ISL99227B	60	5	Yes	Yes	Yes	Yes	32 Ld 5x5 PQFN	N/A	
3.3V PWM POWER STAGE FAMILY									
ISL99140	40	3.3	Yes	No	No	No	40 Ld 6x6 QFN	N/A	Full Digital Controllers: ISL681xx/ISL691xx, ISL68/69xxx, ZL8802 Digital Hybrid Controllers: ISL68201, ISL6388/98 (3.3V PWM Setting)
ISL99227	60	3.3	Yes	Yes	Yes	Yes	32 Ld 5x5 PQFN	N/A	

FPGA Power Solutions

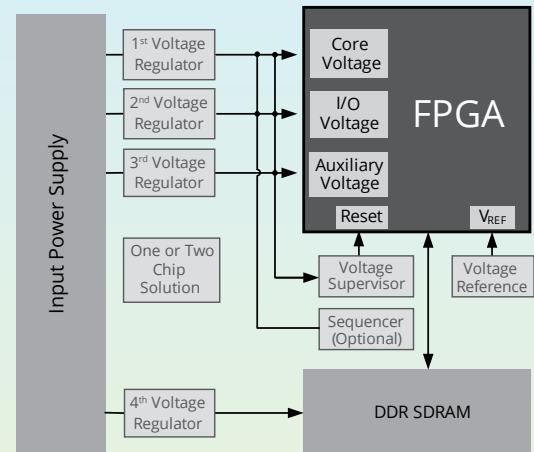
Complete Power Delivery Solutions for FPGAs

Intersil offers a complete portfolio of high performance power solutions for FPGAs and other loads in your system. These products, which range from standard linear regulators to highly flexible PWM controller and driver options to plug-in fully integrated power modules, are tailored to meet your design challenges.

USE POWERCOMPASS TO FIND YOUR FPGA POWER SOLUTION

www.intersil.com/powercompass

- Over 250 templates covering popular FPGA platforms
- Xilinx FPGA power estimator import function to jump start



XILINX

- Spartan Series
- Virtex Series
- Kintex Series
- Artix Series
- Zynq Series

INTEL

(formerly Altera)

- Stratix Series
- Arria Series
- Cyclone Series
- MAX 10 Series

MICROSEMI

- PolarFire FPGA Family
- IGLOO2 Low Density FPGAs
- RTG4 Radiation-Tolerant FPGAs
- SmartFusion2 SoC FPGA

LATTICE

- ECP Family
- iCE Family
- CrossLink Family
- Mach Family

PowerCompass™ Tool

www.intersil.com/powercompass

PowerCompass Multi-Load Configurator

The PowerCompass™ tool makes product selection easy—quickly find Intersil parts that match your requirements, set up multiple rails if needed, perform high-level system analysis and generate reference design files.

- Upfront design time reduced by 92%
- Multiple solution options highlight design tradeoffs for BOM count, design size and price
- Pre-loaded design templates for popular FPGAs and microprocessors



Start Your Project Now

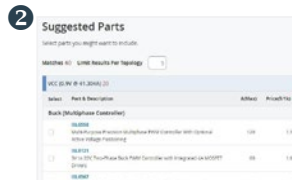
www.intersil.com/powercompass

Define Your Power Requirements



Define your system input and output requirements. You can build a system from scratch, or you can choose from over 250 templates covering popular FPGA platforms such as Xilinx, Altera (now Intel), Lattice, and Microsemi/Actel.

Select Parts



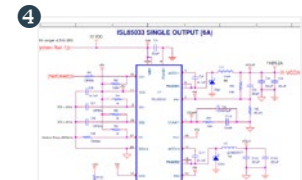
Once you've got your rails identified, suggested parts are just a click away—including both single output devices, and dual devices that could serve more than one output. You can choose as many parts as you'd like to compare.

Summary Analysis



To help you finalize part selections, the app looks at the efficiency data across your specified output operational range, and presents system cost and graphs showing the system efficiency, power dissipation and junction temperature.

Generate Reference Designs



For schematic-enabled parts, you can generate customized reference design files to get a BOM and a set of base schematics with all the associated blocks connected together—simplifying your design effort.

Design Tools and Support

www.intersil.com/tools

REFERENCE DESIGNS & EVALUATION BOARDS



Intersil's board library contains reference designs, evaluation boards, and demonstration boards.

TRAINING & TUTORIALS



Get to know Intersil technology via tutorials, videos, webinars and more.

DESIGN MODELS



See the full list of product design models which include IBIS models, SPICE models, macromodels, and more.

SOFTWARE & DRIVERS



Find software and drivers for Intersil's parts and evaluation platforms.

DOCUMENT LIBRARY



Search for technical documents and software by product type and more.

ISIM ONLINE SIMULATOR



iSim is an interactive design tool for simulating Intersil's power management devices and operational amplifiers.

POWERNAVIGATOR™ GUI



Intersil's PowerNavigator tool allows simple configuration and monitoring of multiple Digital-DC devices using a PC with a USB interface.

POWERCOMPASS™ TOOL



Quickly identify parts that match your specific requirements, set up multiple rails, perform high-level system analysis, and generate custom reference design files.

PRODUCT CROSS REFERENCE



Find Intersil products that are equivalent, similar, substitute or alternate replacement to other Intersil products or products of other manufacturers.

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