

# ispPAC Power Manager

## Ruggedized to Provide Reliable Power Start-up and Management

Imagine implementing complete power sequencing and monitoring functions on a single chip, without using a jumble of comparators, resistors, capacitors, timers and logic! That's what you get with the ispPAC® Power Manager family of devices, the industry's first mixed-signal PLDs. To alter your design, simply reprogram the device's E<sup>2</sup>CMOS® configuration memory.

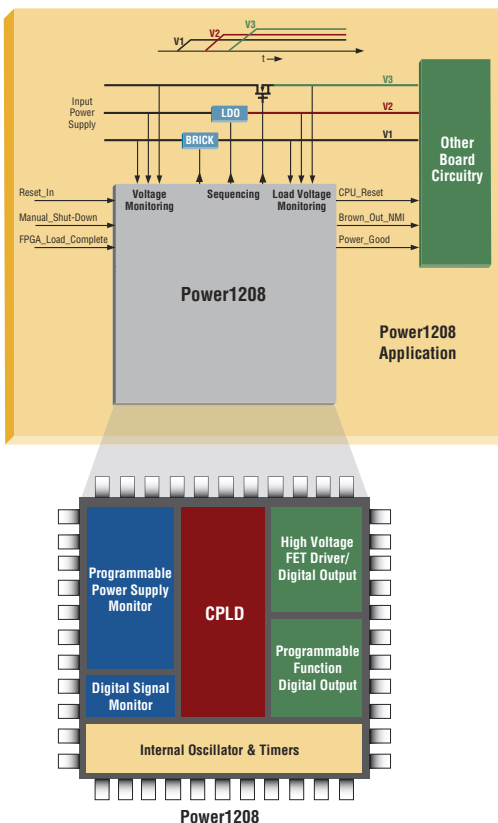
Power Manager devices, available in standard and precision series, combine Lattice Semiconductor's industry-leading ispPAC and CPLD technologies. Programmable analog inputs support highly accurate, simultaneous monitoring of multiple power supply nodes (up to 12), while an on-chip ruggedized CPLD offers the most efficient mechanism to generate control signals for power supply sequencing and supervisory signal generation.

ispPAC Power Manager devices feature on-chip dedicated programmable timers to control supply sequencing timing or for stretching pulses. Programmable high voltage pins drive external MOSFETs to support a variety of power supply sequencing mechanisms. These devices offer complete power management functionality with the smallest footprint available.



### Key Features and Benefits

- **The first programmable analog + digital solution!**
  - No external analog or digital components required for power supply management
  - Programmability and integration simplifies system development in multi-voltage board designs
- **Ruggedized CPLD provides efficient implementation of sequencing, monitoring and supervisory signal logic**
  - Wide gating, flexible macrocell
  - Large operating power supply range (as wide as 2.25V to 5.5V)
  - High glitch immunity
- **Programmable analog input thresholds monitor standard or non-standard power supply voltages**
  - Power supply voltage monitoring accuracy to 0.5%
  - Monitor voltages as low as 0.7V
  - Hysteresis auto-scales with threshold voltage
  - Power supply discharge detection option
- **Programmable delay timers (32µs to 524ms) provide flexible timing control**
- **Internal oscillator provides on-chip clock generation/ time base**
- **High voltage MOSFET driver outputs provide power supply ramp rate control**
  - Programmable gate voltage ramp rate
  - Programmable output voltage (8V to 12V)
  - Soft start capability
- **LVTTL/LVCMOS inputs and open drain outputs (logic I/O) for supervisory signal generation and control**
- **JTAG In-System Programmable with E<sup>2</sup>CMOS configuration storage**

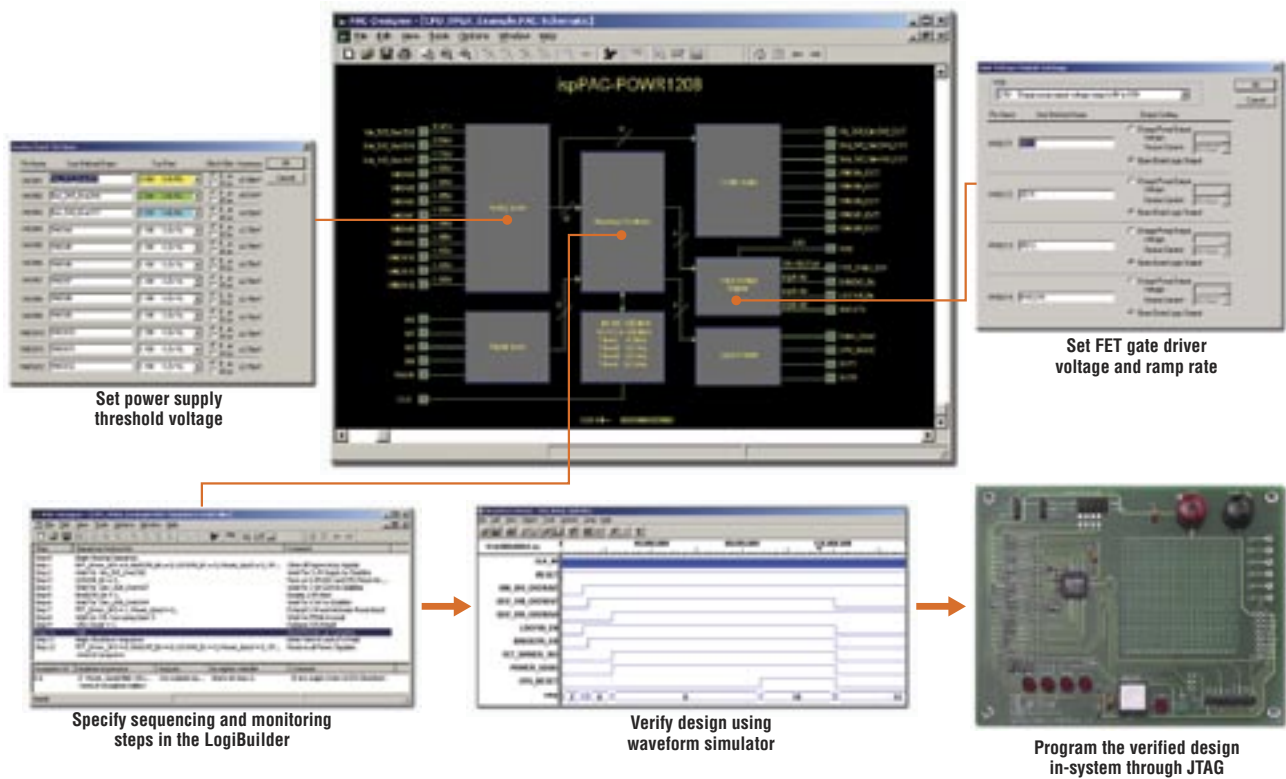


Power1208 devices sequence and monitor power supply voltages and generate supervisory signals

## Design Made Simple with PAC-Designer Software

PAC-Designer® software supports the ispPAC Power Manager family of devices and includes both the digital logic fitter and waveform simulators, offering the convenience of design and verification of the power sequencing and moni-

toring circuit using PC-based software. The verified design can be downloaded into an ispPAC Power Manager device through the PC's parallel port using an ispDOWNLOAD® Cable.



## ispPAC Power Manager Features

Parameter	Standard Power Manager		Precision Power Manager
	Power1208	Power604	Power1208P1
Analog Input Pins	12	6	12
Precision	0.90%	0.90%	0.50%
Trip Points per Input	192	192	384
Lowest Supply Voltage Monitored	1.2V	1.2V	0.7V
Power-Off Detection	—	—	80mV
CPLD Macrocells	16	8	16
Outputs	8	4	8
FET Drivers	4	0	4
Operating Voltage	2.25V to 5.5V	2.25V to 5.5V	2.7V to 5.5V
Package	44-pin TQFP	44-pin TQFP	44-pin TQFP
Ordering Part Number	ispPAC-POWR1208-01T44I	ispPAC-POWR604-01T44I	ispPAC-POWR1208P1-01T44I

### Also Available

ispPAC10 Device – Signal Conditioning Circuit  
 ispPAC20 Device – Control Loop and Monitoring Circuit  
 ispPAC30 Device – Versatile Analog Front-end Circuit  
 ispPAC80 Device – 5th-Order Lowpass Filter (50-750KHz)  
 ispPAC81 Device – 5th-Order Lowpass Filter (10-75KHz)  
 PAC-Designer Software  
 ispPAC Evaluation Boards  
 PAC System Design Kits

### Applications Support

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