



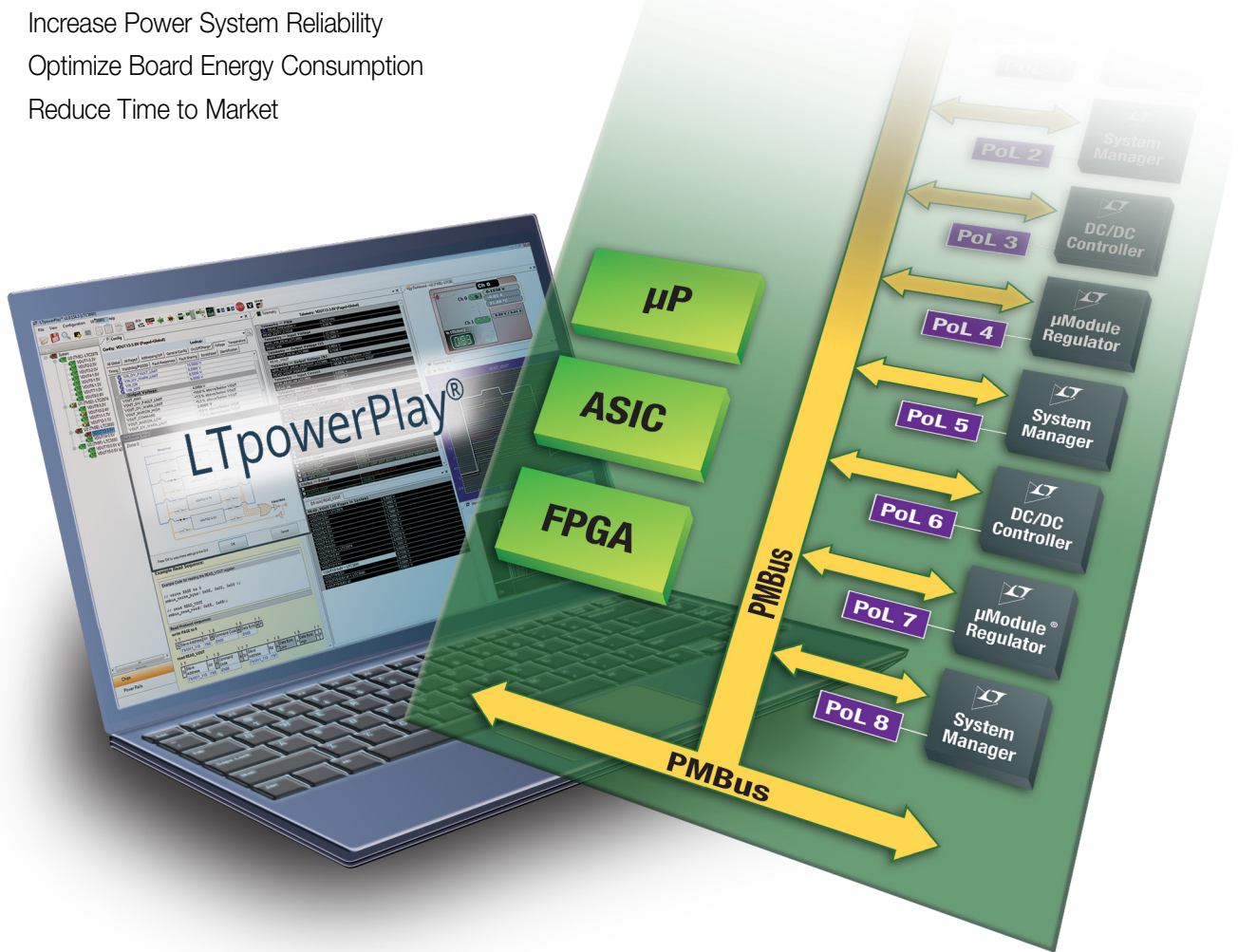
**THE DATASHEET OF
LTC3887IUJ-2#PBF**



DIGITAL POWER SYSTEM MANAGEMENT

µModule Regulators • DC/DC ICs • Manager ICs • Sequencers • Supervisors

- ✓ Digitally Manage Point-of-Load (POL) Power Supplies
 - Trim, Margin, Sequence, Supervise, Log Faults
 - Monitor Voltage, Current, Power, Energy, and Temperature
- ✓ Increase Power System Reliability
- ✓ Optimize Board Energy Consumption
- ✓ Reduce Time to Market



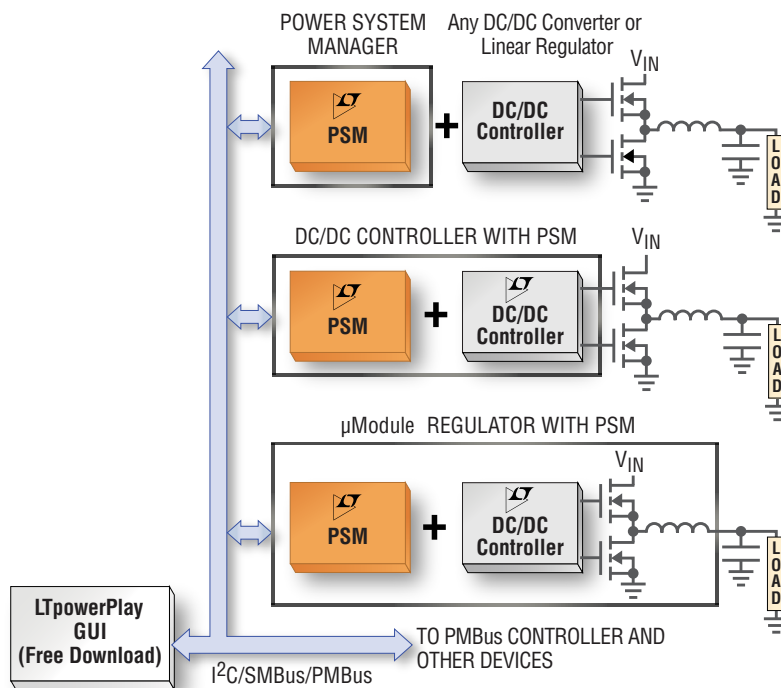
Take Control of Your Power Supplies

Accelerate characterization and optimization during prototyping and field operation with Analog Devices' digital power system management (PSM) products, configured and monitored via a PMBus/SMBus/I²C digital interface.

Digital Power System Management

Benefits

- ±0.25% Voltage Accuracy
- Products
 - Power System Managers
 - DC/DC Controllers with PSM
 - Fully Integrated μ Module[®] Regulators
- LTpowerPlay[®] GUI: Engineering-Level Development Environment
- PMBus Compliant Commands Over I²C/SMBus Digital Interface
- EEPROM for Configuration and Black Box Fault Logging
- Autonomous Operation – No Software Coding Required
- Coordinate Sequencing and Fault Management Across PSM Devices
- Reduced BOM Cost and Validation Effort



μ Module Regulators, DC/DC Controllers and Monolithic Regulators with Power System Management

- Fast Analog Feedback Loop with Digital Telemetry and Control
- Program V_{OUT} , I_{LIM} , OV/UV Level, Frequency, Ramp Rate, Sequencing Time Delays, Margining
- Read Back V_{IN} , I_{IN} , V_{OUT} , I_{OUT} , P_{OUT} , Duty Cycle, Temperature, Faults

PSM Switcher Selection Guide

| Features | μ Module Regulators | | | LTC [®] 3880 | LTC3880-1 | LTC3882 |
|--|------------------------------------|----------------------|----------------------|------------------------------------|------------------------------------|----------------------------|
| | LTM [®] 4676 | LTM4676A | LTM4675 | | | |
| PSM | Full | Full | Full | Full | Full | Full |
| Number of Outputs | 2 | 2 | 2 | 2 | 2 | 2 |
| PWM Control Mode | Current | Current | Current | Current | Current | Voltage |
| Start-Up Time (Typ) | 153 (170 Max) | 60 (70 Max) | 60 (70 Max) | 145 | 145 | 70 |
| Input Current Sense | Calibrated | Calibrated | Calibrated | Inferred | Inferred | No |
| V_{OUT} Range (V) | 0.5 to 4.0, ch0 0.5 to 5.4, ch1 | 0.5 to 5.5 | 0.5 to 5.5 | 0.5 to 4.0, ch0 0.5 to 5.4, ch1 | 0.5 to 4.0, ch0 0.5 to 5.4, ch1 | 0.5 to 5.3 |
| V_{IN} Range (V) | 4.5 to 26.5 | 4.5 to 17 | 4.5 to 17 | 4.5 to 24 | 4.5 to 24 | 3.0 to 38 |
| V_{OUT} Accuracy (%) | 1 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| I_{OUT} (A) Max | Dual 13 or Single 26 | Dual 13 or Single 26 | Dual 9 or Single 18 | 30/Phase* | 30/Phase* | 40A/Phase* |
| Temperature Sensing | ΔV_{BE} | ΔV_{BE} | ΔV_{BE} | ΔV_{BE} | ΔV_{BE} | ΔV_{BE} and Direct |
| DCR Sensing | NA | NA | NA | Low | Low | Ultralow |
| Dedicated PGOOD Pins | No | No | No | No | No | No |
| Gate Drivers | NA | NA | NA | Yes | Yes | No |
| Three-State PWM Control | NA | NA | NA | No | No | Yes |
| Digitally Adjustable Loop Compensation | No | No | No | No | No | No |
| On-Chip LDO from V_{IN} | Yes | Yes | Yes | Yes | No | No |
| Fast ADC Mode | No | Yes | Yes | No | No | No |
| Corresponding Slaves | NA | NA | NA | LTC3870 | LTC3870 | NA |
| Package (mm x mm) | 16 x 16 x 5.01 BGA | 16 x 16 x 5.01 BGA | 11.9 x 16 x 3.51 BGA | 6 x 6 QFN-40 | 6 x 6 QFN-40 | 6 x 6 QFN-40 |

* Depends on choice of external components

Power System Managers

- Manage Any Adjustable Point-of-Load Power Supply
- Trim, Margin, Sequence, Supervise, Manage Faults, Monitor Telemetry, Record Fault Logs
- Read Back Voltage, Current, Power, Energy, Temperature, and Faults

| Device | Voltage Supply Channels Managed ¹ | Number of Current Sensed Loads | Input Energy | Temp Sense | | Digital Interface | | | EEPROM | Includes Res/Cap | Trim/Margin/Monitor Accuracy | Sequencing | | | Bias Supply | | | Package (mm × mm) | Demo Board |
|----------------------|--|--------------------------------|--------------|------------|----------|-------------------|-------|------------------|--------|------------------|------------------------------|------------|---------|----------|-------------|----|--------------|-------------------|------------|
| | | | | Internal | External | PMBus | SMBus | I ² C | | | | Time | Cascade | Tracking | 3.3V | 5V | 12V | | |
| LTC2970 ² | 2 | 2 | | • | | | • | • | | | ±0.50% | | | | • | • | 4 x 5 QFN-24 | DC980 | |
| LTC2972 | 2 | 3 | • | • | 2 | • | • | • | • | | ±0.25% | • | • | • | • | • | 6 x 7 QFN-44 | DC2619 | |
| LTC2974 | 4 | 4 | | • | 4 | • | • | • | • | | ±0.25% | • | • | • | • | • | 9 x 9 QFN-64 | DC1978 | |
| LTC2975 | 4 | 5 | • | • | 4 | • | • | • | • | | ±0.25% | • | • | • | • | • | 9 x 9 QFN-64 | DC2022 | |
| LTC2977 | 8 | | | • | | • | • | • | • | | ±0.25% | • | | • | • | • | 9 x 9 QFN-64 | DC2028 | |
| LTC2979 | 16 | | | • | | • | • | • | • | | ±0.50% | • | | • | | | 12 x 12 BGA | | |
| LTC2980 | 16 | | | • | | • | • | • | • | | ±0.25% | • | | • | • | • | 12 x 12 BGA | DC2198 | |
| LTM2987 | 16 | | | • | | • | • | • | • | • | ±0.25% | • | | • | • | • | 15 x 15 BGA | DC2023 | |

¹ A channel refers to the collection of functions that trims, supervises and monitors a given power supply rail.

² See LTC2970-1 for sequencing.

Programmable 6-Channel Sequencer and Supervisors with EEPROM

| Device | Sequencer/Supervisor | Comparator Outputs | Threshold Range | Threshold Accuracy | Power Supply | Package (mm × mm) | Demo Board |
|---------|----------------------|--------------------|---------------------------------------|--------------------|----------------|------------------------|------------|
| LTC2933 | Supervisor | No | 1V to 13.9V (1×) 0.2V to 5.8V (5×) | ±1% | 3.4V to 13.9V | 5×4 DFN-16, SSOP-16 | DC1633 |
| LTC2936 | Supervisor | Yes | 0.2V to 5.8V (6×) | ±1% | 3.13V to 13.9V | 4×5 QFN-24, SSOP-24 | DC1605 |
| LTC2937 | Both | No | 0.2V to 6V (6×) | ±0.75% | 2.9V to 16.5V | 5×6 QFN-28 | DC2313 |

| DC/DC Controllers | | | | | | | | Monolithic Regulators |
|-----------------------------|------------------|------------------|-----------------------------|-----------------------------|-----------------------------|------------------|------------------|------------------------------|
| LTC3882-1 | LTC3883 | LTC3883-1 | LTC3884 | LTC3884-1 | LTC3886 | LTC3887 | LTC3887-1 | LTC3815 |
| Full | Full | Full | Full | Full | Full | Full | Full | Partial |
| 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 1 |
| Voltage | Current | Current | Current | Current | Current | Current | Current | Current |
| 70 | 145 | 145 | 65 | 65 | 65 | 70 | 70 | <10 |
| No | Yes | Yes | Yes | Yes | Yes | Inferred | Inferred | Yes |
| 0.5 to 5.3 | 0.5 to 5.4 | 0.5 to 5.4 | 0.5 to 5.4 | 0.5 to 5.4 | 0.5 to 13.2 | 0.5 to 5.5 | 0.5 to 5.5 | 0.4 – 0.72 • V _{IN} |
| 3.0 to 38 | 4.5 to 24 | 4.5 to 24 | 4.5 to 38 | 4.5 to 38 | 4.5 to 60 | 4.5 to 24 | 4.5 to 24 | 2.2 to 5.5 |
| 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 1 |
| 40A/Phase* | 30/Phase* | 30/Phase* | 30/Phase* | 30/Phase* | 30/Phase* | 30/Phase* | 30/Phase* | 6A |
| ΔV _{BE} and Direct | ΔV _{BE} | ΔV _{BE} | ΔV _{BE} and Direct | ΔV _{BE} and Direct | ΔV _{BE} and Direct | ΔV _{BE} | ΔV _{BE} | Internal |
| Ultralow | Low | Low | Very Low | Very Low | Low | Low | Low | NA |
| Yes | Yes | Yes | Yes | Yes | Yes | No | No | Yes |
| No | Yes | Yes | Yes | No | Yes | Yes | No | NA |
| Yes | No | No | No | Yes | No | No | Yes | NA |
| No | No | No | Yes | Yes | Yes | No | No | No |
| No | Yes | No | Yes | Yes | Yes | Yes | Yes | Yes |
| No | No | No | Yes | Yes | Yes | Yes | Yes | NA |
| NA | LTC3870 | LTC3870 | LTC3874 | LTC3874 | LTC3870 | LTC3870 | LTC3870 | NA |
| 6 x 6 QFN-40 | 5 x 5 QFN-32 | 5 x 5 QFN-32 | 7 x 7 QFN-48 | 7 x 7 QFN-48 | 7 x 8 QFN-46 | 6 x 6 QFN-40 | 6 x 6 QFN-40 | 4 x 6 QFN-38 |

Hardware Support

A DC1613 USB-to-I²C/SMBus/PMBus controller (adapter) is used to interface any PSM demo board to a computer. Every PSM device comes with at least one specific demo board. Some PSM demo boards can be cascaded together for evaluating multiple rails.

To USB Port of
Computer Running
LTpowerPlay

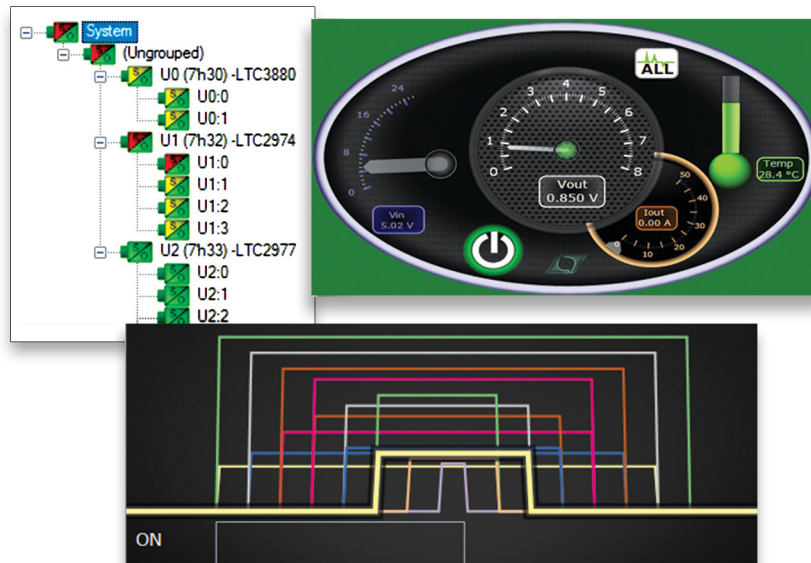


12-Pin Ribbon Cable
to PSM Demo Board

If Needed, DC2086 Adapts
12-Pin Cable to 4-Pin Header

Software Support

LTpowerPlay is a powerful and intuitive Windows-based development environment used to configure and interrogate PSM devices. It can also be used in an offline mode (with no hardware present) in order to build a multichip configuration file that can be saved and reloaded at a later time. It is available as a free download at: www.analog.com/LTpowerPlay



Device Programming

PSM devices ship from Analog Devices with a default register configuration loaded in EEPROM. The options to ship with a customized, application-specific configuration developed during the prototyping phase are as follows:

- **Analog Devices NVM Programming Service:** This involves submitting the configuration file, then receiving a few custom programmed samples (First Articles) for verification and approval. Contact Linear Express: express@analog.com
- **In-Circuit Programming:** Use LTpowerPlay on a computer with a DC1613 USB-to-PMBus controller (adapter) to program PSM devices on circuit boards with pin headers accessing the PSM device.
- **JTAG Programming:** Use third-party programmers from Asset Intertech or JTAG Technologies to program PSM devices on circuit boards connected to JTAG scan chains without needing additional programmers or pin headers.

Getting Started

1. Obtain the PSM Starter Kit, **DC1962C-KIT**
2. Download **LTpowerPlay**
3. Watch the **Video**



Scan to watch video:
<http://ltpowerplay.com/ps1full>

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