Power Management IC for W-CDMA, Quad-band GSM, Wi-Fi and Bluetooth
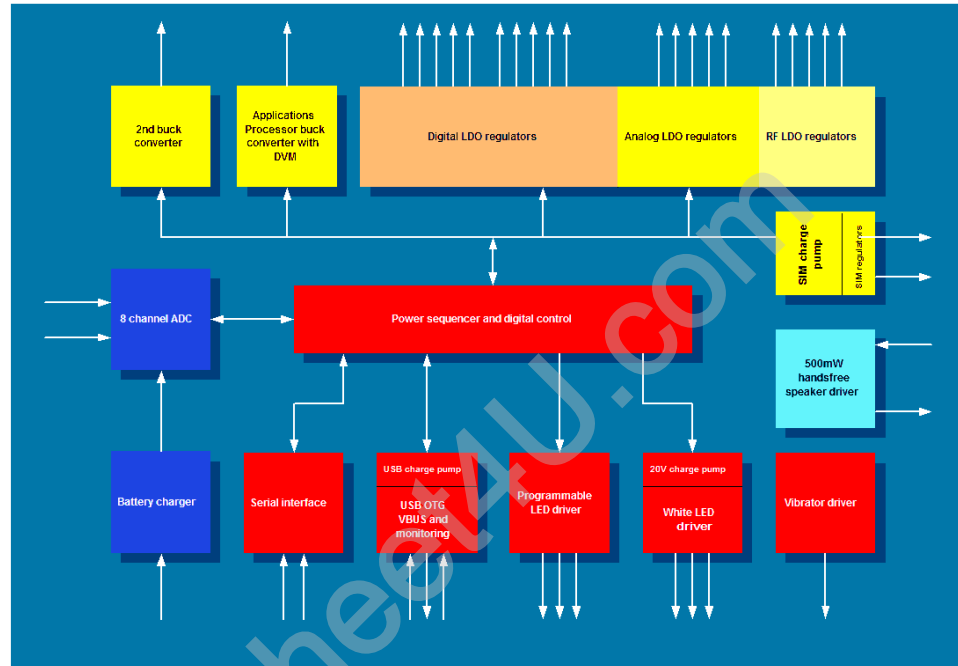
Dialog Semiconductor

DA9030

PMIC FOR MOBILE PLATFORMS SUPPORTING BOTH INTEL COMMUNICATION PROCESSORS AND INTEL® PXA27X FAMILY

Key Features:

- **Highly integrated power management IC with 38 functional blocks**

- **Supports Wireless Intel Speedstep® technology**

- **One IC supports both communications and applications processors**

- **Unique Smart Mirror™ LDOs (patent pending)**

- **Direct connection to battery, plus multimode battery charger (Lithium)**

- **Key specifications**
  - 19 high performance low dropout programmable regulators
  - RTC and low noise microphone bias regulators
  - 2 high efficiency DC-DC buck converters, one with DVM to support PXA27x processors, one for communications processor or additional memory support
  - Boost converters for SIM card, white LED and USB interface
  - Serial white LED, general purpose LED and vibrator drivers
  - 500mW handsfree driver

Applications:

GSM/GPRS smartphones

Wireless PDA

W-CDMA telephones

Portable computing platforms

Dialog Semiconductor's DA9030 is a highly integrated power management IC (PMIC) designed to minimize power consumption in entry-level, mid-range and premium smartphones as well as personal digital assistants (PDAs) and communicators with highly sophisticated multimedia and internet capabilities. It is targeted at cell phones incorporating radios for W-CDMA, quad-band GSM, Wi-Fi (802.11b wireless LAN) and Bluetooth. The DA9030 manages the complete power management requirements of both the communications processor, such as Intel's Hermon, and the Intel® PXA27x family of applications processors in the mobile handset.

Developed in collaboration with Intel, the DA9030 supports the Wireless Intel SpeedStep® technology. Combined with dynamic voltage management (DVM) and Dialog Semiconductor's patented Smart Mirror™ LDOs – which offer very low quiescent current consumption and high power supply rejection performance – it enables significant power consumption and system cost savings compared to equivalent discrete solutions. This combination provides intelligent management of voltage and frequency changes, optimizing both switching and linear regulators for maximum power efficiency.

It connects directly to the battery and provides stable, low noise supplies for all core circuits within the product. All the supplies are fed using high performance low dropout (LDO) voltage regulators using Dialog's Smart Mirror™ technology.

A state machine in the DA9030 controls complete system start up and shutdown sequencing. Dedicated system level power management supports the RUN, TURBO, IDLE, SLEEP and DEEP SLEEP operating states of the PXA27x processor.

Two high efficiency DC-DC buck converters provide high current, low voltage supplies to the main communication processor and additional memory. Synchronous and asynchronous modes ensure a high operating efficiency over a wide range of current demands. One converter has DVM with programmable voltage and slew rate control to support the Wireless Intel SpeedStep® technology and optimize current consumption of the PXA27x processor.

The DA9030 includes a multimode battery charger for Lithium chemistry battery packs. The charger is fully programmable, uses dual loop monitoring and control for rapid and safe operation, provide automatic charger detection and battery pack temperature monitoring. Other functions integrated include programmable white LED, general purpose LED, 0.5 Watt handsfree speaker driver and vibrator driver, minimizing the need for external components.

Innovative silicon for a mobile world

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DA9030

Specifications

Voltage regulator section highlights
- High power supply rejection, typically 80dB @ 1KHz
- Dynamic biasing for high efficiency and low quiescent consumption
- Small external decoupling capacitors for low cost and PCB area
- Over current and thermal protected outputs

Voltage regulator section overview

Regulator Module	Supply type	Default Voltage	Programmable Voltage	Current rating
Buck Converter 1	Processor core or memory	1.2V	0.9 to 1.5V plus 1.8V	600mA.
Buck Converter 2	Processor core with DVM (VCC_core)	1.2V	0.85 to 1.625V plus 1.8V	600mA.
LDO1	Digital baseband interface	1.2V	1.2 to 3.2V	50mA.
LDO2	Digital	1.8V	1.8 to 3.2V	100mA.
LDO3	Digital	2.8V	1.8 to 3.2V	150mA
LDO4	Digital	1.8V	1.8 to 3.2V	100mA
LDO5	RF or Analog	2.8V	1.8 to 3.2V	100mA
LDO6	Digital (SIM supply)	3.0V	1.8 to 3.2V	30mA
LDO7	RF or Analog Low Noise	2.8V	1.8 to 3.2V	80mA
LDO8	RF or Analog very low noise	2.8V	1.8 to 3.2V	80mA
LDO9	RF or Analog	2.8V	1.8 to 3.2V	100mA
LDO10	Auxillary digital	1.8V	1.8 to 3.2V	200mA
LDO11	Auxillary digital	2.8V	1.8 to 3.2V	200mA
LDO12	Low Noise (VCC_IO, LCD, etc)	2.8V	1.8 to 3.2V	200mA
LDO13	Low noise microphone bias	2.1V	fixed	2mA
LDO14	RF or Analog very low noise	2.85V	2.3 to 3.0V	15mA
LDO15	Low Noise (VCC_pll)	1.3V	1.2 to 1.95V	25mA
LDO16	Digital (VCC_sram)	1.1V	1.05 to 1.8V	40mA
LDO17	Digital (VCC_usim)	1.8V	1.8 to 3.2V	30mA
LDO18	Digital (VCC_mem)	2.8V	1.8 to 3.2V	110mA
LDO19	Digital (VCC_flash)	1.8V	1.8 to 3.2V	100mA
LDO RTC	Real time clock (VCC_BAT)	2.65V	fixed	5mA

Battery Charger section highlights

- Supports 4.1 and 4.2V Lithium cells
- Autonomous operation for precharge function
- Fast linear (CV/CC) and pulse charging modes (standalone operation)
- Built-in fixed and programmable safety cutoffs
- Supports charging currents up to 1.4A

Audio section highlights

- 500mW 8Ω loudspeaker driver with volume and anti pop control

Other features

- Programmable white LED drivers with boost converter (up to 10 LEDs)
- Programmable standard LED drivers for backlight and signalling
- Programmable vibrator driver
- System control for power ON and OFF sequencing
- USB VBUS generator and bus monitoring

Package
- 196BGA 8*8*1mm, 0.5mm pitch

For more information

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