DA9024

DA9024 Quad 1.2A Buck PMIC with Audio Drivers

The DA9024 is a quad buck 1.2A per channel PMIC with 20 linear regulators, an integrated, class-G, true-ground capless headphone driver, and a class D speaker driver, enabling supply domain flexibility to support associated peripherals and user interface functions.

Controlled by a programmable digital power manager the user-programmable switched and linear regulators have configurable startup sequences, levels and timing. For optimal processor energy-per-task performance dynamic voltage scaling is available on four supply domains.

All linear regulators use Dialog's Smart Mirror™ dynamic biasing technique which maintains high performance over a wide range of operating conditions and a power saving mode (Sleep Mode) to minimize the quiescent current.
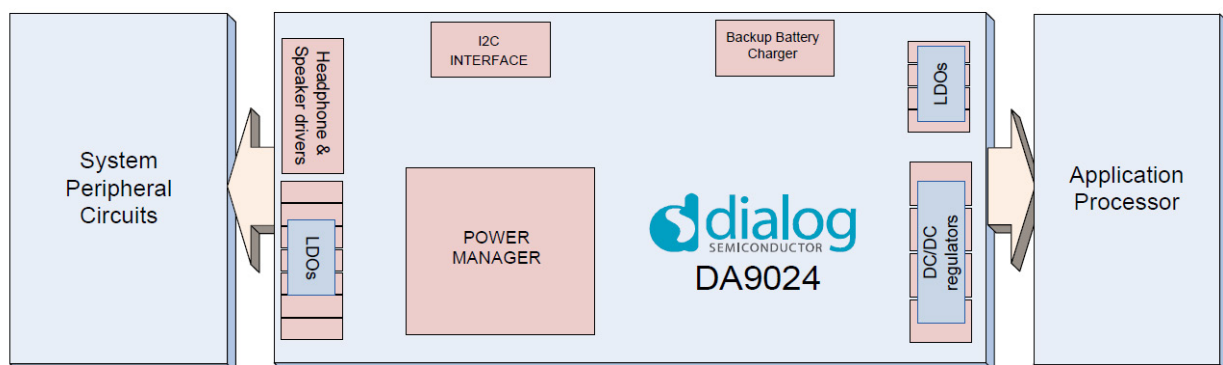
The regulators have output voltages independently programmable via the device control interface.

The buck converters do not require external Schottky diodes and offer a sleep mode (PFM mode) for optimal efficiency at low load currents. All converters use a high switching frequency (2MHz) allowing the use of small 2.2uH external inductors.

A backup battery charger and an ultra-low power real-time-clock (RTC) are also implemented on the IC.

The DA9024 contains a class-G true-ground "capless "headphone driver and a Class D Speaker driver, with Power-Limiter, along with two differential or four single ended input channels with analog routing/mixing.

The DA9024 is controlled by a bidirectional I2C interface and can operate in Standard Mode (up to 400kHz) and High Speed Mode (up to 1.7Mhz) allowing for a highly flexible configuration of end applications.
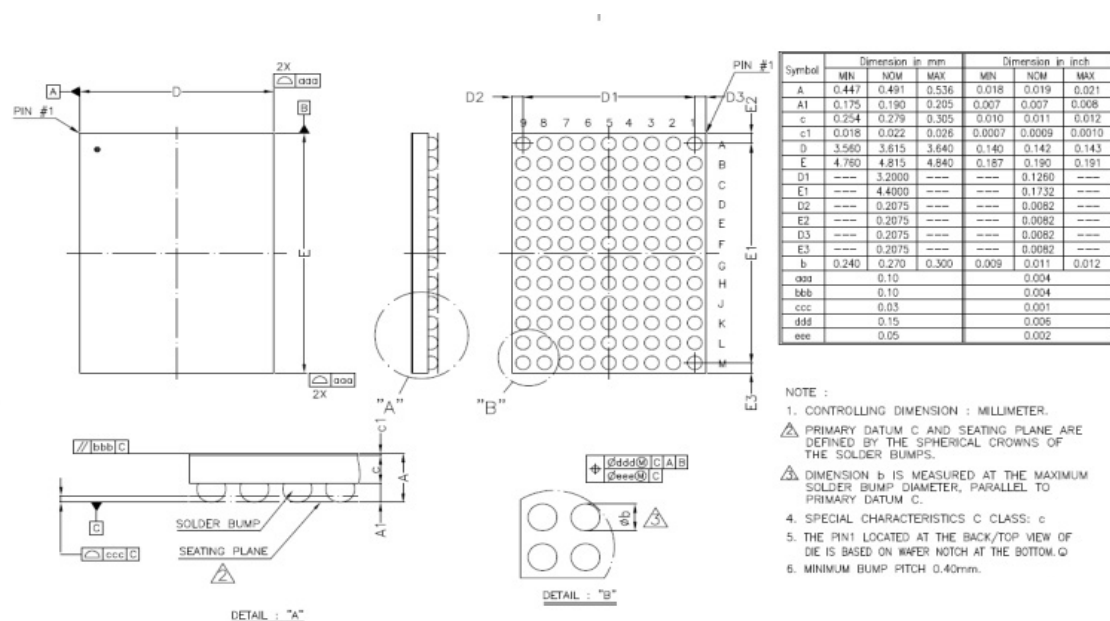
Features

- ► 4 x high efficiency programmable buck converters with DVC and pin controlled states
- ► 20 programmable LDO regulators
- ► 4 input Audio mixer with Capless 45mW Class G headphone and 1.5W (8Ohms) Class D speaker drivers
- ► High speed I2C interface
- ► Back up battery charger
- ► Ultra-low power (<1 µA) 32kHz Real Time Clock with alarm wakeup capability
- ► Temperature / voltage supervision
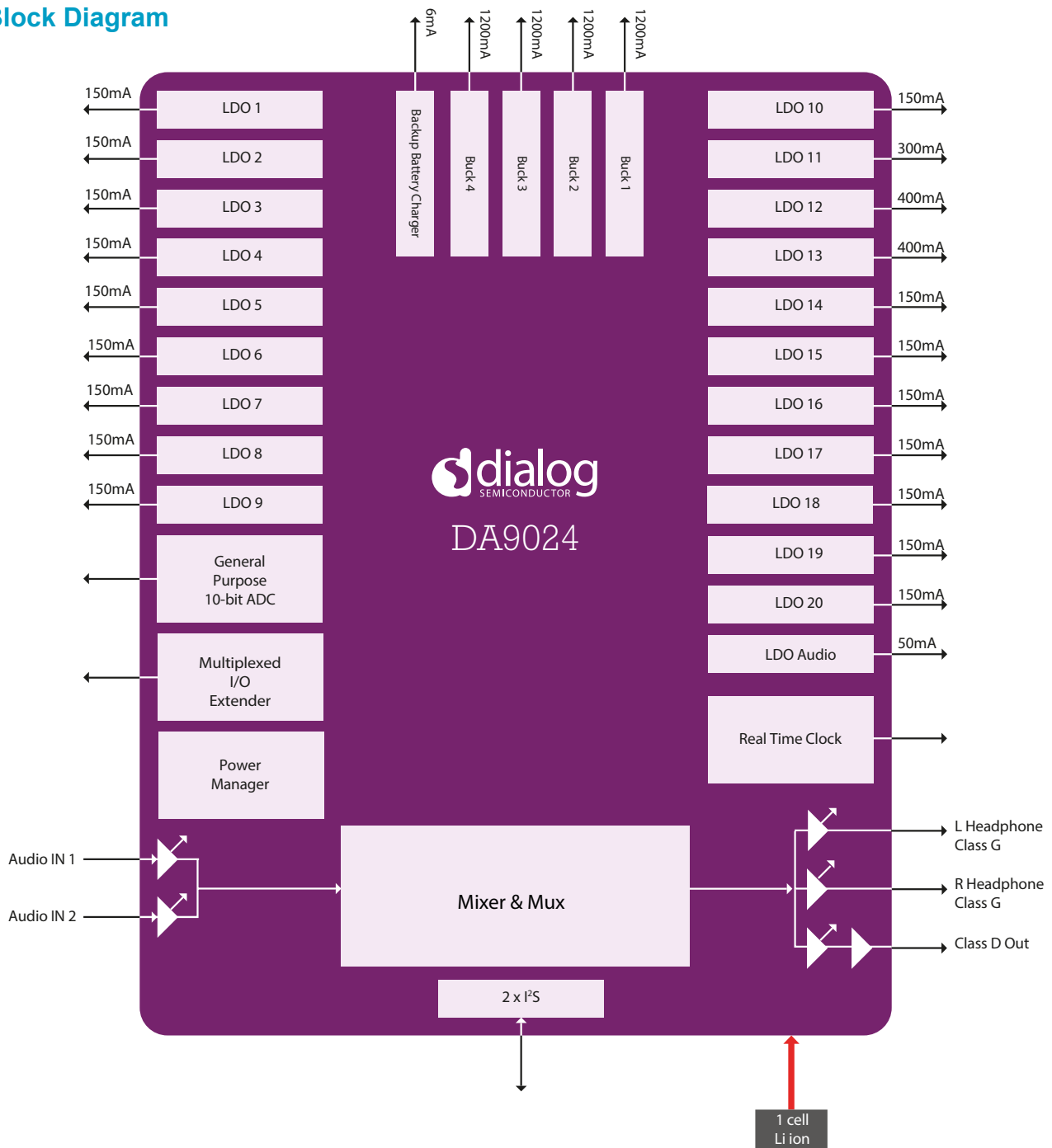- ► Package : 108bump WL-CSP 3.6mm x 4.8mm – 0.4mm pitch

Applications

- ► Smartphone Handsets
- ► Consumer Infotainment Devices
- ► Embedded products

Package Outline Drawing

Symbol	Dimension in mm			Dimension in inch		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.447	0.491	0.536	0.018	0.019	0.021
A1	0.175	0.190	0.205	0.007	0.007	0.008
c	0.254	0.279	0.305	0.010	0.011	0.012
c1	0.018	0.022	0.026	0.0007	0.0009	0.0010
D	3.560	3.615	3.640	0.140	0.142	0.143
E	4.760	4.815	4.840	0.187	0.190	0.191
D1	----	3.2000	----	----	0.1260	----
E1	----	4.4000	----	----	0.1732	----
D2	----	0.2075	----	----	0.0082	----
E2	----	0.2075	----	----	0.0082	----
D3	----	0.2075	----	----	0.0082	----
E3	----	0.2075	----	----	0.0082	----
b	0.240	0.270	0.300	0.009	0.011	0.012
aaa		0.10			0.004	
bbb		0.10			0.004	
ccc		0.03			0.001	
ddd		0.15			0.006	
eee		0.05			0.002	

NOTE :
1. CONTROLLING DIMENSION : MILLIMETER.
2. PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BUMPS.
3. DIMENSION b IS MEASURED AT THE MAXIMUM SOLDER BUMP DIAMETER, PARALLEL TO PRIMARY DATUM C.
4. SPECIAL CHARACTERISTICS C CLASS: c
5. THE PIN1 LOCATED AT THE BACK/TOP VIEW OF DIE IS BASED ON WAFER NOTCH AT THE BOTTOM.
6. MINIMUM BUMP PITCH 0.40mm.

Block Diagram

Block diagram of the Dialog Semiconductor DA9024.

Left side LDOs (all 150mA): LDO 1, LDO 2, LDO 3, LDO 4, LDO 5, LDO 6, LDO 7, LDO 8, LDO 9.

Left blocks: General Purpose 10-bit ADC, Multiplexed I/O Extender, Power Manager.

Top blocks: Backup Battery Charger (6mA), Buck 4 (1200mA), Buck 3 (1200mA), Buck 2 (1200mA), Buck 1 (1200mA).

Right side: LDO 10 (150mA), LDO 11 (300mA), LDO 12 (400mA), LDO 13 (400mA), LDO 14 (150mA), LDO 15 (150mA), LDO 16 (150mA), LDO 17 (150mA), LDO 18 (150mA), LDO 19 (150mA), LDO 20 (150mA), LDO Audio (50mA), Real Time Clock.

Audio IN 1, Audio IN 2 → Mixer & Mux → L Headphone Class G, R Headphone Class G, Class D Out.

2 x I²S. 1 cell Li ion.

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Dialog Semiconductor:

  DA9024-20UJ2