

FAN5903

Buck Converter with Bypass Mode for 3 G / 3.5 G / 4 G PAs

Features

- 2.7 V to 5.5 V Input Voltage Range
- V_{OUT} Range from 0.4 V to 3.5 V (or V_{IN})
- Small Form Factor Inductor
 - 2012 470 nH or 540 nH for Minimal PCB Area
 - 2520 1.0 μ H for Higher Efficiency
- Bypass Dropout at 500 mA, 60 mV Typical
- 100% Duty Cycle for Low Dropout Operation
- Input Under-Voltage Lockout / Thermal Shutdown
- 1.34 mm x 1.29 mm, 9-Bump, 0.4 mm-Pitch WLCSP
- 3 MHz / 6 MHz Selectable Switching Frequency to Facilitate System Optimization
- High-Efficiency PFM Operation at Low Power
- Sleep Mode for Very Low I_Q Operation
- Up to 96% Efficient Synchronous Operation at High-Power Conditions
- 10 μ s Output Voltage Step Response for Early Power Loop Settling

Applications

- Dynamic Supply Bias for 3G/3.5G and 4G PAs
- Power Supply for WCDMA/LTE PAs

Resources

For more information or a full copy of this datasheet, please contact a Fairchild representative.

Description

FAN5903 is a high-efficiency, low-noise, synchronous, step-down, DC-DC converter designed for powering 3 G / 3.5 G / 4 G RF Power Amplifiers (PAs) in handsets and other mobile applications.

The output voltage may be dynamically varied from 0.40 V to 3.50 V, proportional to an analog input V_{CON} , ranging from 0.16 V to 1.40 V provided by an external DAC. This allows the PA to be supplied with the voltage that enables maximum power-added efficiency.

An integrated bypass FET automatically switches on when battery voltage drops close to the desired output voltage ($V_{OUT}=V_{BAT}-200$ mV). The DC-DC switches back to Synchronous Mode when the voltage dropout exceeds 375 mV. The integrated bypass FET is also enabled when V_{CON} is nominally greater than to 1.5 V.

The FAN5903 offers fast transition times, enabling changes to the output voltage in less than 10 μ s for power transitions. Moreover, a Current-Mode control loop with fast transient response ensures excellent line and load regulation.

Light-load efficiency is optimized by operating in PFM Mode for load currents typically less than 100 mA.

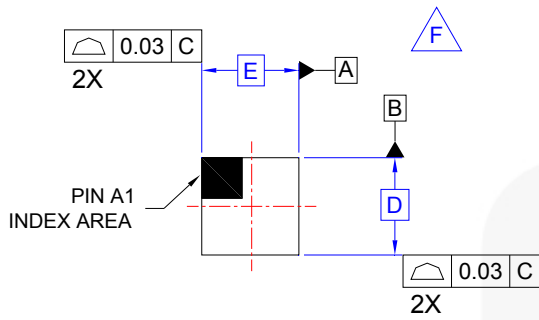
The switching frequency may be set to 3 MHz or 6 MHz, enabling further optimization of system performance. The FAN5903 typically uses a single, small-form-factor inductor of 540 nH. Efficiency may be further optimized using a 1.0 μ H inductor when running at 3 MHz.

When output regulation is not required, the FAN5903 may be placed in Sleep Mode by setting V_{CON} nominally to 50 mV. This ensures a very low I_Q (<70 μ A) while enabling a fast return to output regulation. The FAN5903 enables significant current reduction and increased talk time and is available in a 1.34 mm x 1.29 mm, 9-bump, 0.40 mm-pitch, WLCSP package.

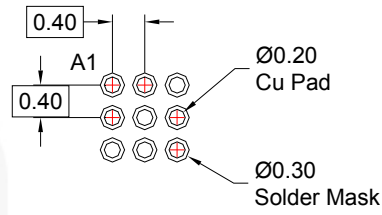
Ordering Information

Part Number	Operating Temperature Range	Package	Packing Method
FAN5903UCX	-40 to +85°C	1.34 mm x 1.29 mm, 9-bump, 0.4 mm Pitch, Wafer-Level Chip-Scale Package (WLCSP)	Tape and Reel

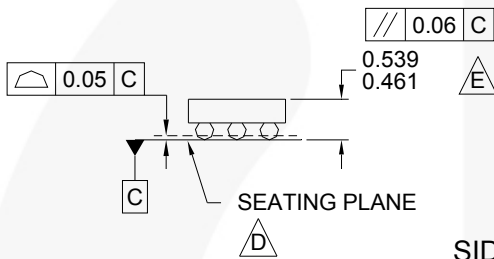
Physical Dimensions



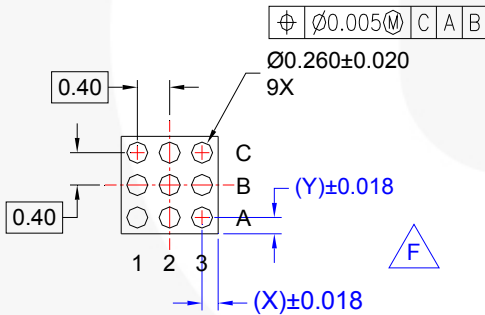
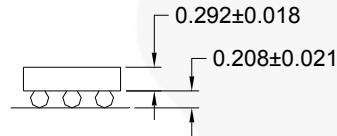
TOP VIEW



LAND PATTERN RECOMMENDATION (NSMD PAD TYPE)



SIDE VIEWS



BOTTOM VIEW

NOTES:

- A. NO JEDEC REGISTRATION APPLIES.
- B. DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS AND TOLERANCE PER ASMEY14.5M, 1994.
- D. DATUM C IS DEFINED BY THE SPHERICAL CROWNS OF THE BALLS.
- E. PACKAGE NOMINAL HEIGHT IS 500 MICRONS ±39 MICRONS (461-539 MICRONS).
- F. FOR DIMENSIONS D, E, X, AND Y SEE PRODUCT DATASHEET.
- G. DRAWING FILNAME: MKT-UC009ARev1

Product	D	E	X	Y	Unit
FAN5903UCX	1.292 ± 0.030	1.342 ± 0.030	0.271	0.246	mm

Figure 42. 1.34 x 1.29mm, 9-Bump, 0.4mm-Pitch WLCSP





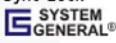
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