Multi-output Regulators Include Supervisory and Watchdog Timers

Analog Devices, Inc. introduced its ADP5041 and ADP5040 multi-output regulators. The regulators meet the increasing demand for greater power density by combining a high-efficiency, 3-MHz, 1.2-A buck regulator and two 300-mA LDOs (low dropout regulators) in a small 20-lead LFCSP package. These regulators use only nine components and 50 mm2 of board space. The ADP5041 and ADP5040 are presented as companions to mid-range FPGAs, microprocessor and DSP systems where core, IO and memory voltages are necessary. The ADP5041 regulator's on-chip watchdog timer provides reliability by monitoring code execution integrity in processor-based systems and resetting the processor if it fails to strobe within a preset timeout period. The ADP5041 also features a high accuracy (±1.5 percent over temperature) reset generator that can be externally programmed to monitor low voltage power supply rails. A wide range of ordering options also is available to address multiple reset and watchdog timings.

The ADP5041 has a special circuit that detects a three-state condition when applied to the watchdog refresh input at the WDI pin typically controlled by a processor/DSP output port. When the processor sets this port in three-state mode, the watchdog refresh timer is disabled, preventing a watchdog reset to the processor. This feature is important when supporting processor/DSP sleep operation where the core is disabled and watchdog timer cannot be refreshed.

The ADP5040 and ADP5041 multi-output regulators reduce thermal dissipation by using high-efficiency switching regulators with up 96 percent buck power efficiency. For low-noise analog circuit applications, the LDOs maintain a power supply rejection greater than 60 dB for frequencies as high as 10 kHz while operating with a low headroom voltage. The ADP5041 and ADP5040 also provide a three-rail system power supply (1.2-A buck regulator and two 300-mA LDOs) with adjustable output voltages, which allows output voltages to be easily set using an external resistor divider network. The 3-MHz buck regulator switching frequency allows small ceramic inductors to be used to further reduce solution size and cost. These features allow the ADP5041 and ADP5040 to be easily and quickly modified for a variety of applications with short product design schedules such as portable medical and industrial devices.

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