AM335x PMIC Selection Guide

FEATURE	TPS65216	TPS650250	TPS65910	TPS65217	TPS65218D0
REGULATORS	4 DC/DCs, 1 LDO	3 DC/DCs, 2 LDOs	3 DC/DCs, 9 LDOs	3 DC/DCs, 4 LDOs	6 DC/DCs, 1 LDOs
SPEED GRADE SUPPORTED (MHz)	300, 600, 720, 800, 1000	300, 600	300, 600, 720, 800, 1000	300, 600, 720, 800, 1000	300, 600, 720, 800, 1000
OTHER FEATURES	• 1 load switch • Power-Fail comparator • Supports warm-reset	• Power-fail comparator • 1 RTC LDO	• 5 V boost (100 mA) • 1 RTC LDO	• 2 LDOs configurable as load switches • WLED backlight driver	• 3 load switches • 1 buck-boost • Power-Fail comparator • Supports warm-reset • 2 RTC DC/DCs
CHARGER	×	×	×	✓	×
RTC	×	×	✓	×	×
VOLTAGE RANGE	3.6–5.5 V	2.5–6.0 V	2.7–5.5 V	3.3–5.5 V(1)	2.7–5.5 V
DYNAMIC VOLTAGE SETTING	✓	×	✓	✓	✓
SUPERVISOR	✓(2)	×	×	×	✓(2)
POWER SEQUENCING	✓	×	✓	✓	✓
I^2C INTERFACE	✓	×	✓	✓	✓
TEMPERATURE RANGE	-40–105°C	-40–85°C, -40–125°C (Q1)	-40–85°C	-40–105°C	-40–105°C
MEMORY SUPPORT	DDR2, DDR3, DDR3L, DDR4	DDR2, DDR3	DDR2, DDR3	DDR2, DDR3, DDR3L	DDR2, DDR3, DDR3L, DDR4
PACKAGE	48-pin QFN 6x6-mm^2, 0.4-mm pitch	32-pin QFN 5x5-mm^2, 0.5-mm pitch	48-pin QFN 6x6-mm^2, 0.4-mm pitch	48-pin QFN 6x6-mm^2, 0.4-mm pitch	48-pin QFN 6x6-mm^2, 0.4-mm pitch; 48-pin HTQFP 9x9-mm^2, 0.5-mm pitch
USER'S GUIDE	SPRUIP2	SLVU731	SWCU093	SLVU551	SLVUAA9
HARDWARE DESIGN	—	TIDA-00299	TIDEP0003	BeagleBone	TIDEP0024

(1) 20-V tolerant for line power on AC pin

(2) Configurable +/-4% or +/-5% tolerance

TPS65216 – Cost Optimized PMIC

The TPS65216 device is a single-chip PMIC designed to power the AMIC110 and AMIC120 families of processors in lined-powered (5 V) applications. The TPS65216 device can also power the AM335x family of processors in always-on applications. The TPS65216 device provides four DC/DC converters, one LDO, and integrated power sequencing. By integrating the power sequencing, users can save cost from discrete external sequencing components necessary for the AMIC1x and AM335x family of processors. The TPS65216 device has a streamlined feature set, making it perfect for systems that only require a simple power configuration. This PMIC, when used in conjunction with the AMIC110 processor, are ideal for EtherCAT® (Ethernet for Control Automation Technology) applications. When used with the AM335x processor, the TPS65216 is suitable for grid infrastructure applications such as smart meters and data concentrators. The TPS65216 device integrates only the minimum required feature set, making it a cost-optimized, fully-integrated solution.

TPS650250 – Wide Temperature Range PMIC

The TPS650250 device is a single-chip PMIC designed to power the AM335x family of processors in lined-powered (5 V) applications. The TPS650250 device can power the AM335x family of processors supporting 300- and 600-MHz frequencies. The TPS650250 device can also power the AMIC110 processor. The TPS650250 device features three DC/DC converters, two LDOs, and has a maximum temperature range up to 125°C. The TPS650250 device has external enable pins for sequencing. Because the TPS650250 device has a maximum temperature range up to 125°C, the PMIC is suitable for automotive applications such telematics, cluster, or industrial applications which commonly require 105°C components.

TPS65910 – Most Integrated PMIC

The TPS65910x device is an integrated PMIC designed for applications powered by one Li-ion battery cell or a 5-V input adapter and can supply multiple power rails. The TPS65910x device is the most integrated PMIC for the Sitara™ AM335x processor family. The TPS65910 device can power the AM335x family of processors supporting 300-, 600-, 720-, 800-, and 1000-MHz frequencies. Of the AM335x solutions, the TPS65910 has the largest amount of rails, making it a full-system PMIC. Specifically, the TPS65910x device provides three DC/DC converters and nine LDOs. This gives the TPS65910x device the ability to power an entire system, including the processor and system peripherals. An example application where a full-system PMIC might be needed is in video surveillance systems. Video surveillance systems require power hungry processors as well as many peripherals such as microphones, speakers, LCDs, and wired or wireless connectivity. The biggest benefit of the TPS65910 device is that it can integrate a full system into a single package to reduce the number of components and overall solution size.

TPS65217 – Included Linear Charger PMIC

The TPS65217x device is a single-chip PMIC designed to power the AM335x in portable and lined-powered (5 V) applications. The TPS65217x device can power the AM335x family of processors supporting 300-, 600-, 720-, 800-, and 1000-MHz frequencies. The PMIC features three DC/DC converters and four LDOs, and a linear charger. Of the AM335x solutions, the TPS65217 device is the only solution with a linear charger, making it perfect for portable battery-operated systems. Discrete battery charger circuits can consume valuable board real-estate. When combining discrete power regulators, power-up and power-down sequencing, and a discrete linear charger circuit, in addition to accounting for space between discrete components, fitting a discrete power solution in a small area can be challenging. Portable battery-operated systems like blood glucose meters, which might have limited board space, can benefit from the TPS65217 device because the devices integrates all the necessary DC/DC converters, LDOs, sequencing, and the charging circuit to provide an overall smaller power solution.

TPS65218D0 – Lowest Power Consumption PMIC

The TPS65218D0 device is a single-chip user programmable PMIC that powers the Sitara AM335x processor family for portable (Li-Ion battery) and lined-powered (5 V) applications. The TPS65218D0 device can power the AM335x family of processors supporting 300-, 600-, 720-, 800-, and 1000-MHz frequencies. Of the AM335x PMIC options, the TPS65218D0 device supports the lowest power consumption mode for the AM335x (Real-time clock [RTC]) compared to the available options, making it the most power efficient. The TPS65218D0 device provides five buck converters, one LDO, three load switches, and a buck-boost converter. The TPS65218D0 buck-boost converter is useful for 1-cell battery systems because of its ability to boost voltage or buck voltage. 1-cell batteries have an output of approximately 2.7 V to 3.5 V. Because one of the most common power rails is 3.3 V, the buck-boost converter can increase or decrease the 1-cell battery voltage to achieve a regulated 3.3-V power rail in portable applications. Another feature of the TPS65218D0 device is that it can also be powered by a back-up battery. In low-battery scenarios where data can potentially be lost, a back-up battery ensures that important data is saved and maintained. An example where a back-up battery support is desired is Electronic Point of Sale (EPoS) systems. EPoS systems record what sales are made, and can take data, process, and store the information for business transactions. If a scenario occurs where the system is disconnected from a power adapter or from a Li-ion battery supply, the TPS65218D0 device can switch between power supplies, ensuring power is maintained so that important business data can be saved.

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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265