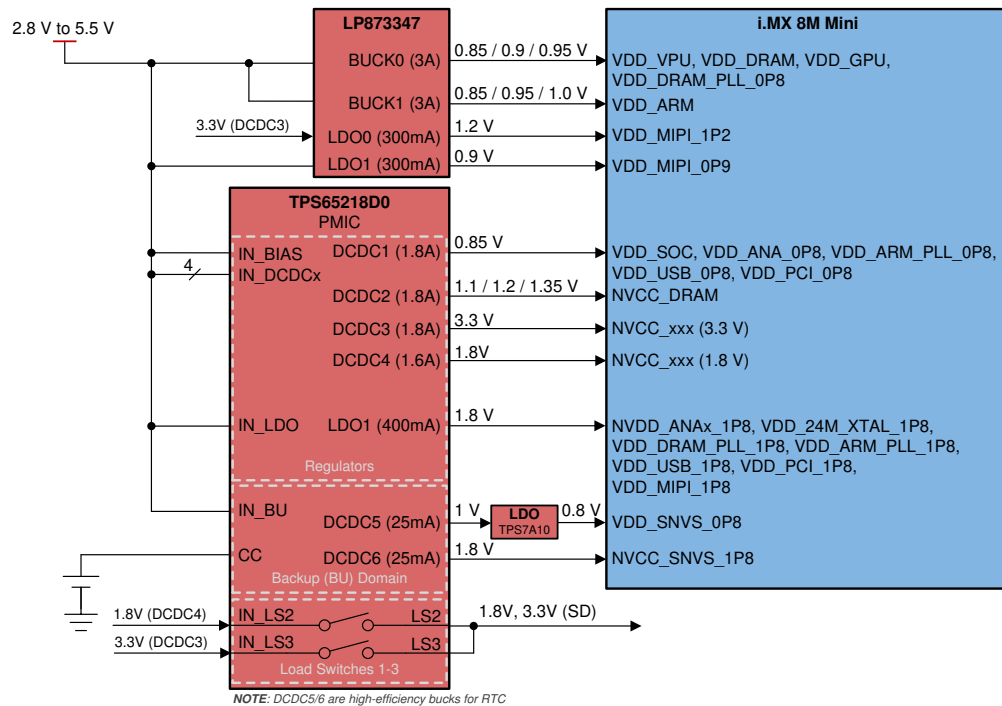


Powering the NXP i.MX 8M Mini with the TPS65218D0 and LP873347 PMICs



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Figure 1. System Power Block Diagram

Can PMICs Be Changed?

Using a multi-rail power management IC (PMIC) for an applications processor is common, but typically the vendor recommends the PMIC that must be used for each processor. Even if the suggested PMIC is not ideal for the needs of the processor, often the complexity makes it difficult to swap out the PMIC for another solution. The purpose of this tech note is to show that the TPS65218D0 and LP873347 PMICs can provide power for the i.MX 8M Mini processor.

Why the TPS65218D0 and LP873347?

The TPS65218D0 and LP873347 devices have an input range from 2.8 to 5.5 V, making this solution appropriate for applications powered from a 3.3-V or 5-V DC supply or a Li-Ion battery. The LP873347 device has two step-down converters that provide the dynamic (0.85-V to 1.0-V) power rails required for the ARM® and VPU/GPU/DRAM cores while two 300-mA LDOs provide power for MIPI. The TPS65218D0 device has four step-down converters that generate another 0.85-V rail for the SoC core, the 1.2 V (or 1.35-V) rail required for DDR4 (or DDR3L) memory, a

3.3-V rail required for I/Os, and a 1.8-V rail for the processor analog domain and additional I/Os. A low-dropout (LDO) regulator provides 0.9-V to 3.4-V at up to 400-mA. The TPS65218D0 automatically sequences these rails in the correct power-up sequence for the i.MX 8M Mini processor.

How Do Designers Make the Switch?

The TPS65218D0 output voltages and sequencing order are determined by an EEPROM-backed register map, which can be programmed using the [BOOSTXL-TPS65218](#) socketed booster pack. Samples of the TPS65218D0RSLR can be programmed during the prototype phase of product development and soldered down on the [TPS65218EVM-100](#) or the prototype PCB of the final product to evaluate the performance of the PMIC. To order pre-programmed samples of the TPS65218D0RSLR for the NXP i.MX 8M Mini processor that match this tech note, [contact the programming services](#) organization at ARROW.

Table 1. i.MX 8M Mini Power Requirements

TPS65218D0 and LP873347 PMICs				i.MX 8M Mini processor		
POWER-UP SEQUENCE	POWER SUPPLY (OUTPUT)	OUTPUT CURRENT [mA]	OUTPUT VOLTAGE [V]	POWER SUPPLY (INPUT)	VOLTAGE RATING [V]	MAX CURRENT [mA]
4	LP873347 Buck0	3000	0.85 / 0.9 ⁽¹⁾ / 0.95	VDD_VPU, VDD_GPU, VDD_DRAM, VDD_DRAM_PLL_0P8	0.805 (min), 0.9 (max) / 0.855 (min), 0.95 (max) / 0.9 (min), 1.0 (max)	2500
5	LP873347 Buck1	3000	0.85 / 0.95 ⁽¹⁾ / 1.0	VDD_ARM	0.805 (min), 0.95 (max) / 0.9 (min), 1.0 (max) / 0.95 (min), 1.05 (max)	2200
10	LP873347 LDO0	300	1.2	VDD_MIPI_1P2	Minimum: 1.14 Maximum: 1.26	4
4	LP873347 LDO1	300	0.9	VDD_MIPI_0P9	Minimum: 0.855 Maximum: 1.0	256
3	TPS65218D0 DCDC1	1800	0.85	VDD_SOC, VDD_ANA_0P8, Misc_0P8	Minimum: 0.805 Maximum: 0.9	1050
8	TPS65218D0 DCDC2	1800	1.1 ⁽¹⁾ / 1.2 / 1.35	NVCC_DRAM	1.14 (min), 1.26 (max) / 1.283 (min), 1.425 (max)	-(²)
9	TPS65218D0 DCDC3	1800	3.3	NVCC_xxx (3.3 V)	Minimum: 3.0 Maximum: 3.6	IO Current
7	TPS65218D0 DCDC4	1600	1.8	NVCC_xxx (1.8 V)	Minimum: 1.71 Maximum: 1.89	IO Current
6	TPS65218D0 LDO1	400	1.8	VDD_ANAx_1P8, Misc_1P8	Minimum: 0.78 Maximum: 0.9	366
2	TPS65218D0 DCDC5, TPS7A10 LDO	25	1.0, 0.8 ⁽³⁾	VDD_SNVs_0P8	Minimum: 0.76 Maximum: 0.9	10
1	TPS65218D0 DCDC6	25	1.8	NVCC_SNVs_1P8	Minimum: 1.62 Maximum: 1.98	3
N/A	TPS65218D0 LS2/LS3	500 / 500	1.8 / 3.3	SD Card Power Mux (I ² C-controlled)	N/A	-(²)

⁽¹⁾ This is the default value recommended for this design at power-up.

⁽²⁾ The maximum current for this rail is not listed in the i.MX 8M Mini data sheet.

⁽³⁾ To generate 0.8 V for VDD_SNVs, the TPS7A10 LDO or a resistor divider can be used to lower the output voltage of DCDC5. The output voltage DCDC5 of the TPS65218D0 is internally fixed at 1.0 V

Table 2. Adjacent Tech Notes

Processor	Title
i.MX 6Solo and 6DualLite	Powering the NXP i.MX 6Solo, 6DualLite with the TPS65218D0 PMIC
i.MX 7Solo and 7Dual	Powering the NXP i.MX 7 Processor with the TPS65218D0 PMIC

References

Texas Instruments, [TPS65218D0 Power Management for ARM® Cortex™-A8/A9 SOCs and FPGAs Data Sheet](#)

Texas Instruments, [LP8733xx Dual High-Current Buck Converter and Dual Linear Regulator Data Sheet](#)

NXP Semiconductors, [i.MX 8M Mini Applications Processor Datasheet for Consumer Products \(iMX8MMCEC\)](#), Rev. 0.1, 02/2019

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