*Application Brief*

# *Power-Supply Design for Horizon Robotics Journey 5*

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This application brief shows the design considerations of the power design for the Horizon Robotics Journey 5 (J5) system-on-chip (SoC). The original power source is the battery. A reverse-protection LM74700-Q1 device is used between the pre-regulator input and the battery. The pre-regulator uses the LM5143A-Q1 dual-synchronous buck controller to convert the battery voltage to a 5V bus. The power-management IC (PMIC) TPS6594-Q1, buck convertors TPS62877-Q1, TPS62810-Q1, and TPS628501-Q1 convert 5V to the power rails for J5 requirements. All components in this design are automotive qualified.

The TPS6594-Q1 PMIC has five buck converters and four LDOs and is non-volatile memory (NVM) programmable, meaning the default register values are set in the TI production line to the desired values for this platform without further need for the customer to change settings. The full orderable part number for this one-time-programmable (OTP) spin is TPS65946440RWERQ1. The three TPS62877-Q1 buck converters have fast transient performance for the high-current requirement

Figure 1 shows a block diagram using the TPS6594-Q1, TPS62877-Q1, LM5143-Q1. For a more detailed power design application note, contact China-reference-design-team@list.ti.com for access request.

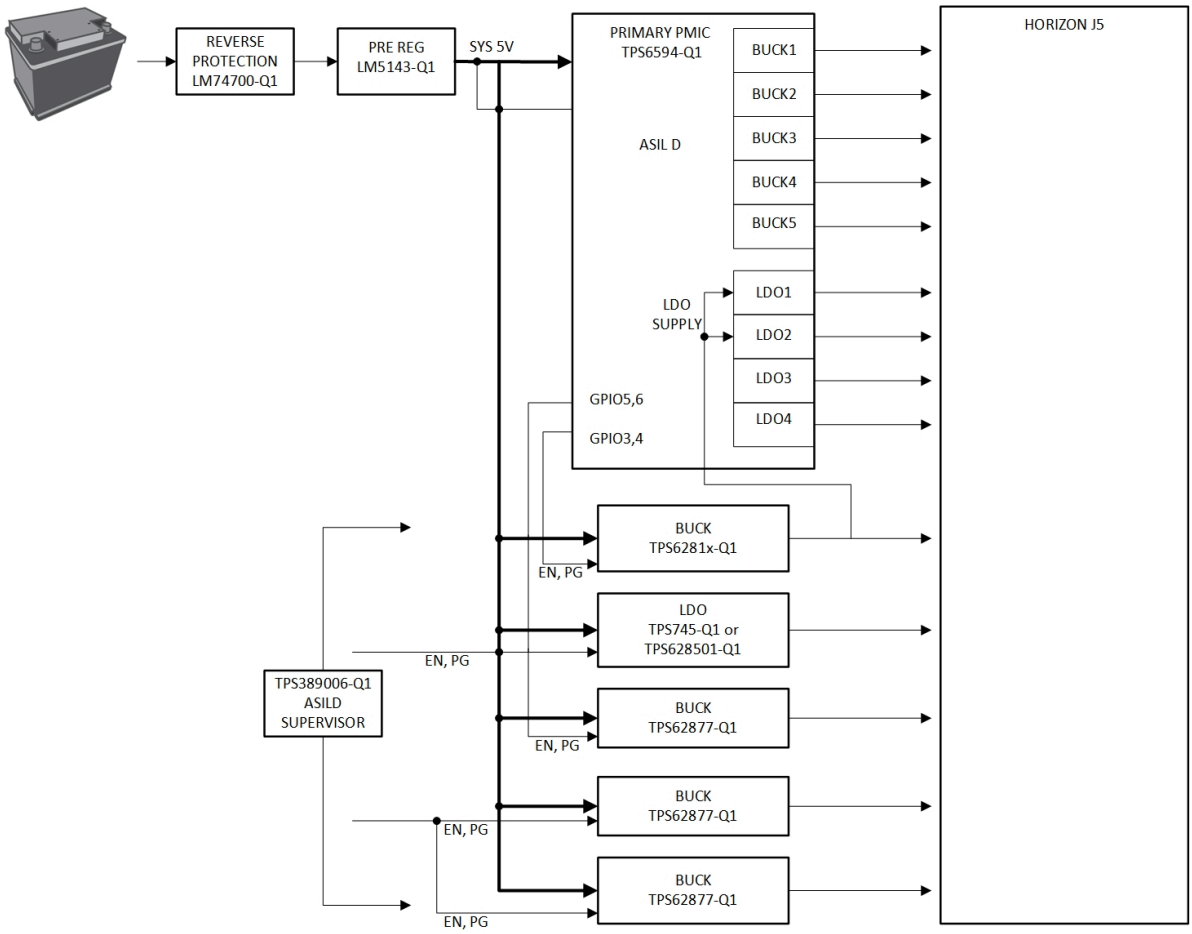


**Figure 1. Power Design**

### References

1. Texas Instruments, *TPS6594-Q1 Power Management IC (PMIC) with 5 BUCKs and 4 LDOs for Safety-Relevant Automotive Applications Data Sheet*
2. Texas Instruments, *TPS62876-Q1 Automotive 2.7-V to 6-V input, 25-A, stackable, synchronous buck converter* product folder
3. Texas Instruments, *LM5143A-Q1 Automotive, 3.5-V to 65-V low-$I_Q$, dual output, stackable synchronous buck DC-DC controller* product folder
4. Texas Instruments, *LM74700-Q1 Low $I_Q$ Reverse Battery Protection Ideal Diode Controller Data Sheet*
5. Texas Instruments, *TPS62810-Q1 Automotive 2.75-V to 6-V, 4-A step-down converter in a 2 mm × 3 mm wettable- flanks QFN package* product folder

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