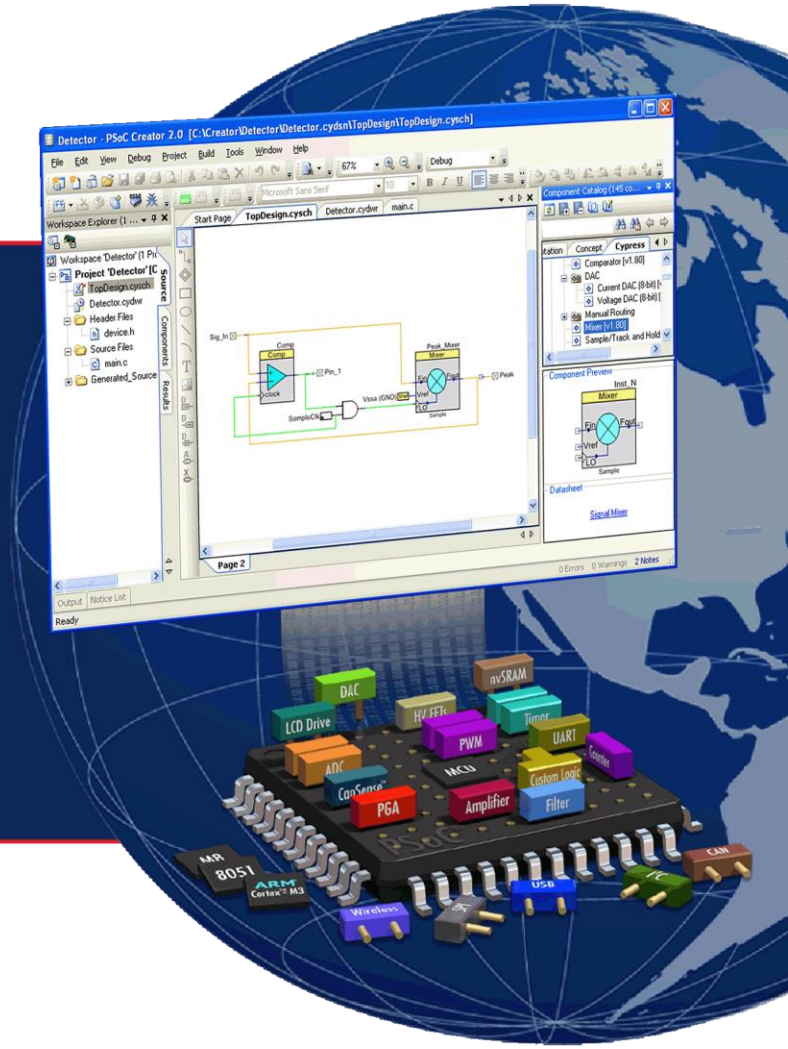
Solution Examples:

Automotive PMIC



Cypress Automotive PMIC Family Solution Example:
Body Control System

Cypress Value

Design Challenges

Integration of components for body control systems
Extreme battery voltage fluctuation
System reliability
Support for several functions, the latest network interfaces and automotive security

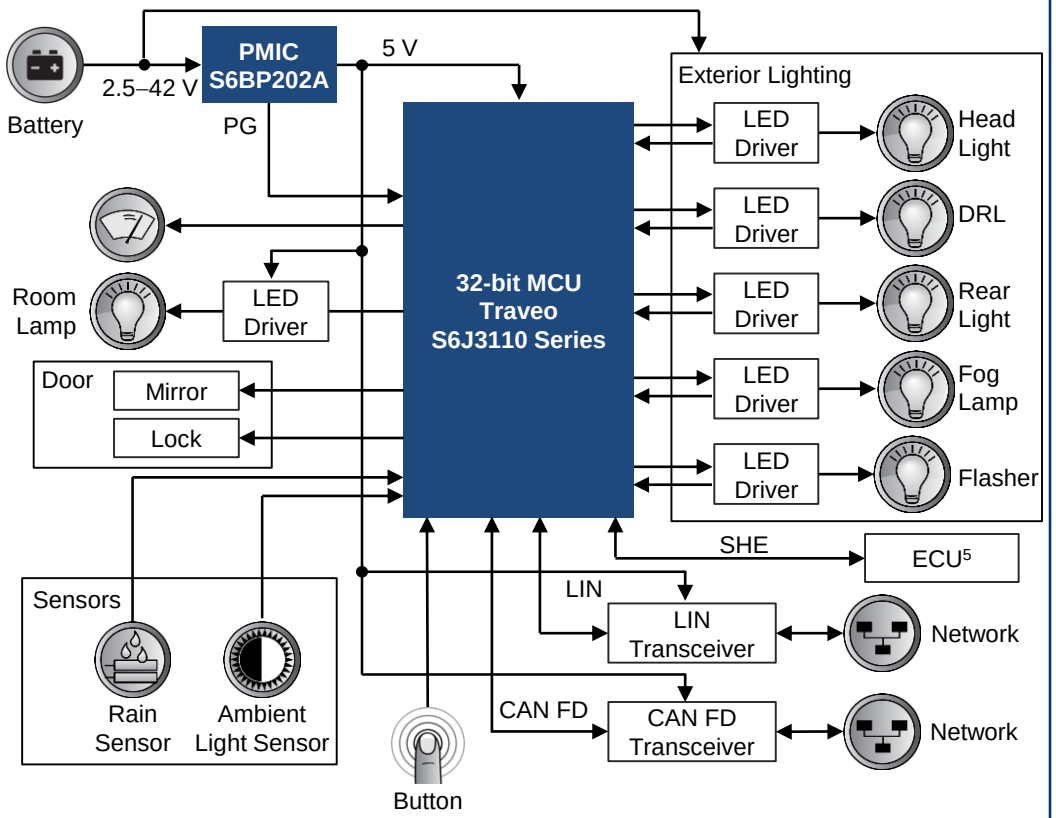
Cypress Solution

Integrates S6BP202A automotive PMIC and Traveo™[1] for body control systems
Manages extreme battery voltage fluctuation
Provides power good (PG)[2] to support system safety functions[3]
Supports body control system peripherals and CAN FD and SHE[4] interfaces

References and Links

Datasheet: S6BP202A

Block Diagram



[1] Cypress automotive microcontroller family with ARM® Cortex®-R5 core and embedded Flash memory designed for instrument cluster, body electronics, climate control, and electric/hybrid vehicle (EV/HV) motor control applications
[2] An output signal that PMICs provide to signify that the supplied power by PMICs is proper and ready
[3] A set of system functions that protect ECUs from damage and/or from generating erroneous results during abnormal power supply conditions
[4] Secure hardware extension
[5] Electronic control unit: An embedded system that controls one or more electrical systems in a vehicle

Cypress Automotive PMIC Family Solution Example:
Solid-State Instrument Cluster System

Cypress Value

Design Challenges

Solid-state cluster displays with graphics require more power than hybrid cluster displays

Extreme battery voltage fluctuation caused by disconnection of a powered load or low temperature start-up

Total system current consumption limited to 100 µA while the engine is off

Cypress Solution

Uses S6BP211A to supply up to 24 W at 4 A

Tolerates battery voltage fluctuation associated with load dump and cold-cranking conditions

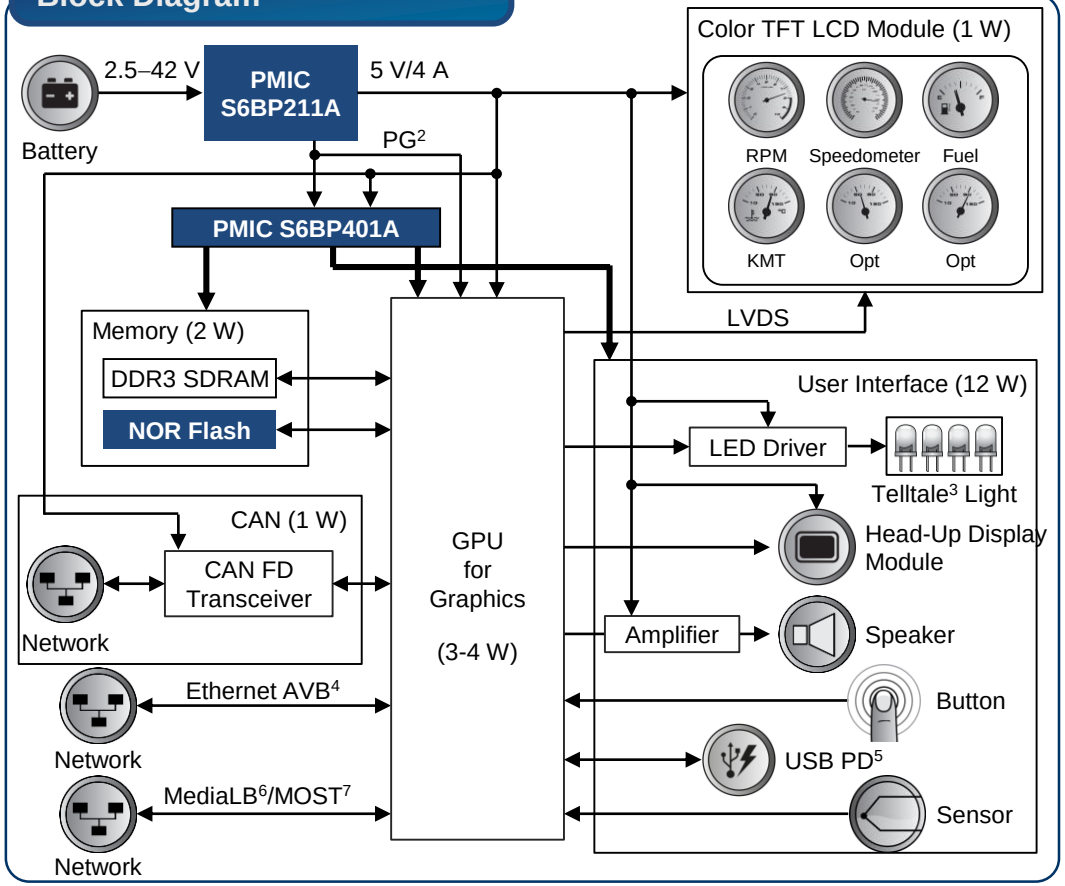
Consumes quiescent current[1] of 13 µA

References and Links

Preliminary Datasheet: Contact Sales

Webpage: NOR Flash Memory

Block Diagram



Solid-State Instrument Cluster

[1] Current consumed by PMIC under no load condition
[2] Power good: An output signal that PMICs provide to signify that the supplied power is proper and ready
[3] Status or malfunction indicator
[4] IEEE802.1 Audio/Video Bridging
[5] USB Power Delivery
[6] Media Local Bus
[7] Media-Oriented Systems Transport

Cypress Automotive PMIC Family Solution Example:
Instrument Cluster System

Cypress Value

Design Challenges

Integration of components for instrument cluster system
Extreme battery voltage fluctuation
System reliability
Support for 4- to 7-inch color LCD, head-up display (HUD) and the latest network interfaces such as CAN FD and Ethernet
High-speed system for instant-on and seamless display

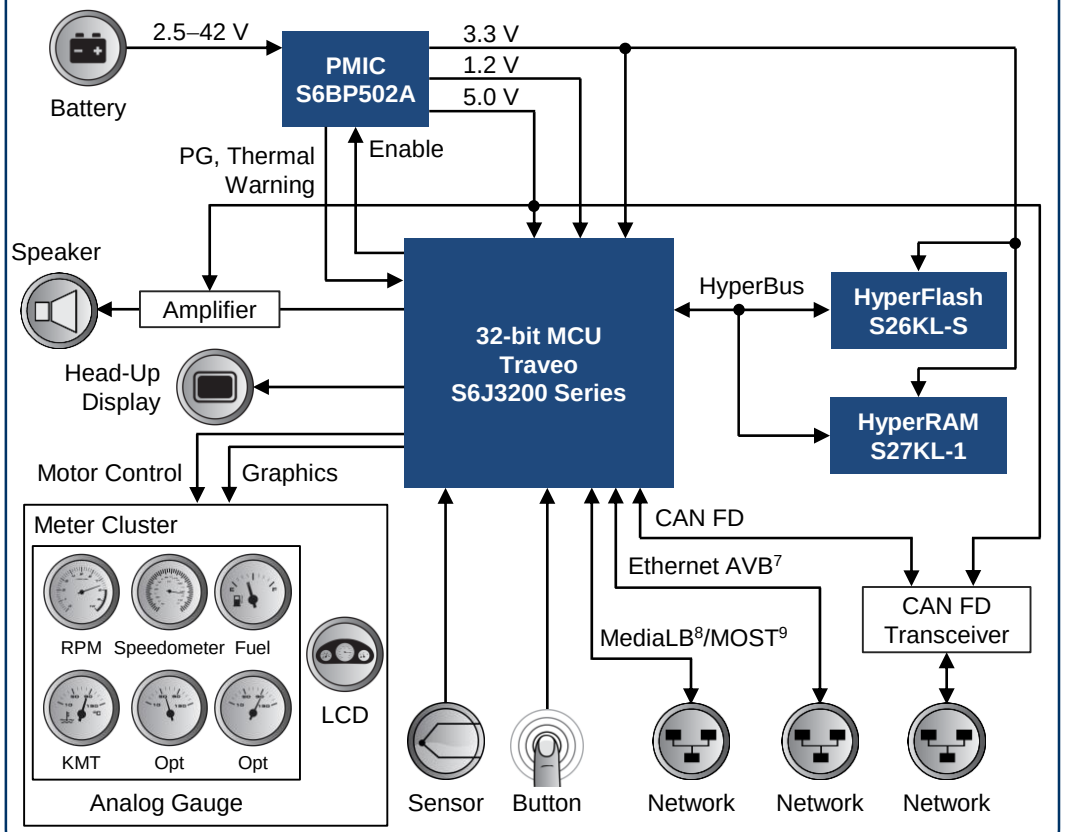
Cypress Solution

Integrates S6BP502A automotive PMIC, Traveo™[1], and HyperFlash™[2] and HyperRAM™[3] memories
Manages extreme battery voltage fluctuation
Power good (PG)[4] and thermal warning features support system safety functions[5]
Provides a single-chip solution with 2.5D graphics engine and the latest network interfaces
Offers an access speed of up to 333 MBps with a HyperBus™[6] interface

References and Links

Preliminary Datasheet: S6BP502A

Block Diagram



[1] Cypress automotive microcontroller family with ARM® Cortex®-R5 core and embedded Flash memory designed for instrument cluster, body control, climate control, and electric/hybrid vehicle (EV/HV) motor control applications
[2] A Cypress NOR Flash memory product family that offers higher bandwidth than Quad SPI NOR Flash memory with one-third the number of pins of parallel NOR Flash memory
[3] A self-refresh DRAM with a HyperBus interface
[4] An output signal that PMICs provide to signify that the supplied power by PMICs is proper and ready
[5] A set of system functions that protect ECUs from damage and/or from generating erroneous results during abnormal power supply conditions
[6] A high-bandwidth, 12-signal interface that transfers information over eight I/O signals at Double-Data-Rate (DDR), delivering up to 333 MBps
[7] IEEE802.1 Audio/Video Bridging
[8] Media Local Bus
[9] Media Oriented Systems Transport

Cypress Automotive PMIC Family Solution Example: ADAS

Cypress Value

Design Challenges

Compact solution that powers entire ADAS including cameras and GPU (e.g., Visconti4 and EyeQ2)
Extreme battery voltage fluctuation
AM radio interference
System reliability
High-speed system for instant-on and for seamless display

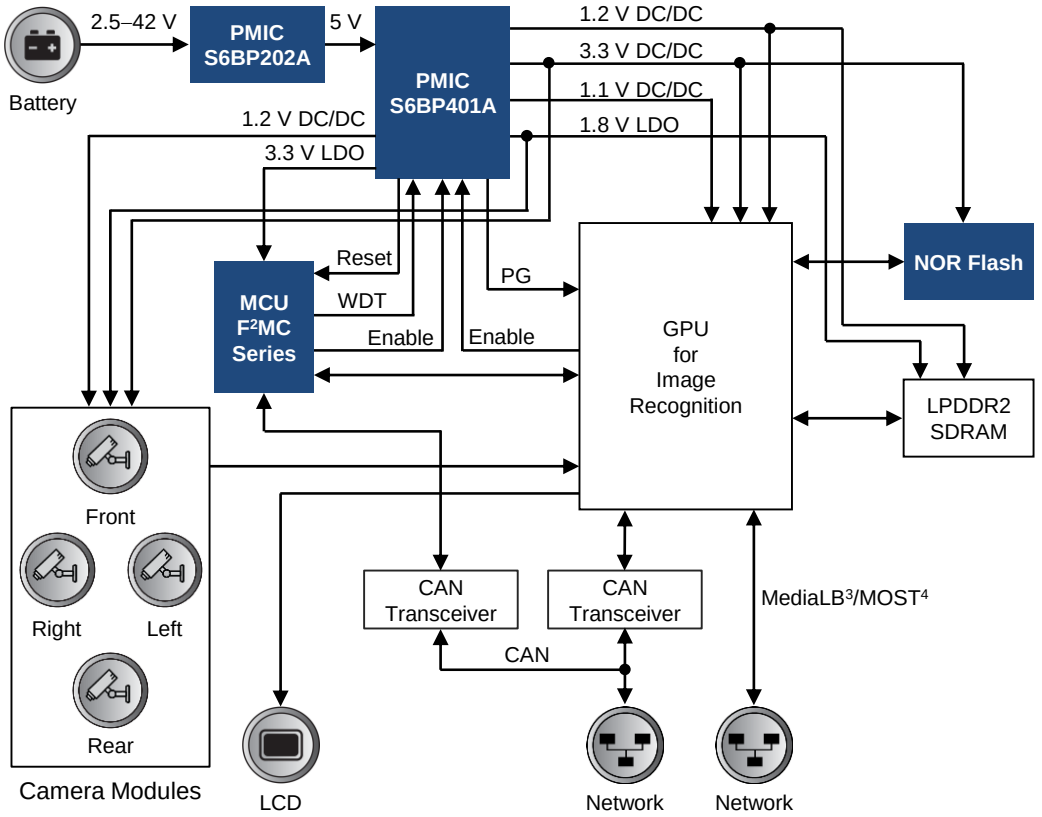
Cypress Solution

Integrates S6BP401A automotive PMIC to power GPU and peripherals
Integrates S6BP202A automotive PMIC that manages extreme battery voltage fluctuation
Operates at 2.1-MHz switching frequency to avoid AM radio interference
Watchdog timer (WDT), power good (PG)[1] PMIC features plus F²MC low-cost MCU support system safety functions[2]
Uses NOR Flash for flexibility and performance

References and Links

Datasheets: S6BP202A and S6BP401A

Block Diagram



ADAS with Image Recognition

Lane Departure Warning (LDW)
Forward Collision Warning (FCW)
Backward Collision Warning (BCW)
Forward Pedestrian Collision Warning (FPCW)
Traffic Sign Recognition (TSR)
Top View Parking Assistance (TVPA)

[1] An output signal that PMICs provide to signify that the supplied power by PMICs is proper and ready
[2] A set of system functions that protect ECUs from damage and/or from generating erroneous results during abnormal power supply conditions
[3] Media Local Bus
[4] Media Oriented Systems Transport

Cypress Automotive PMIC Family Solution Example:
Camera-Based ADAS with Visconti4

Cypress Value

Design Challenges

Compact solution that powers the entire ADAS electronic control unit (ECU) based on the Visconti4 image signal processor (ISP)

Optimized solution to power the ISP, MCU, LPDDR2 SDRAM, NOR Flash memory and image sensor

Low-heat-generating solution that avoids the temperature increase of a small ADAS ECU

Cypress Automotive PMIC (S6BP401A) Solution

Integrates six channels of power management and system safety functions[1] (including watchdog timer) to save 11%[3] of the PCB area

Uses a PMIC that has the necessary output voltage settings

Achieves high conversion efficiency and improves the temperature increase by 17°C[2]

Suggested Collateral

Datasheet: S6BP401A

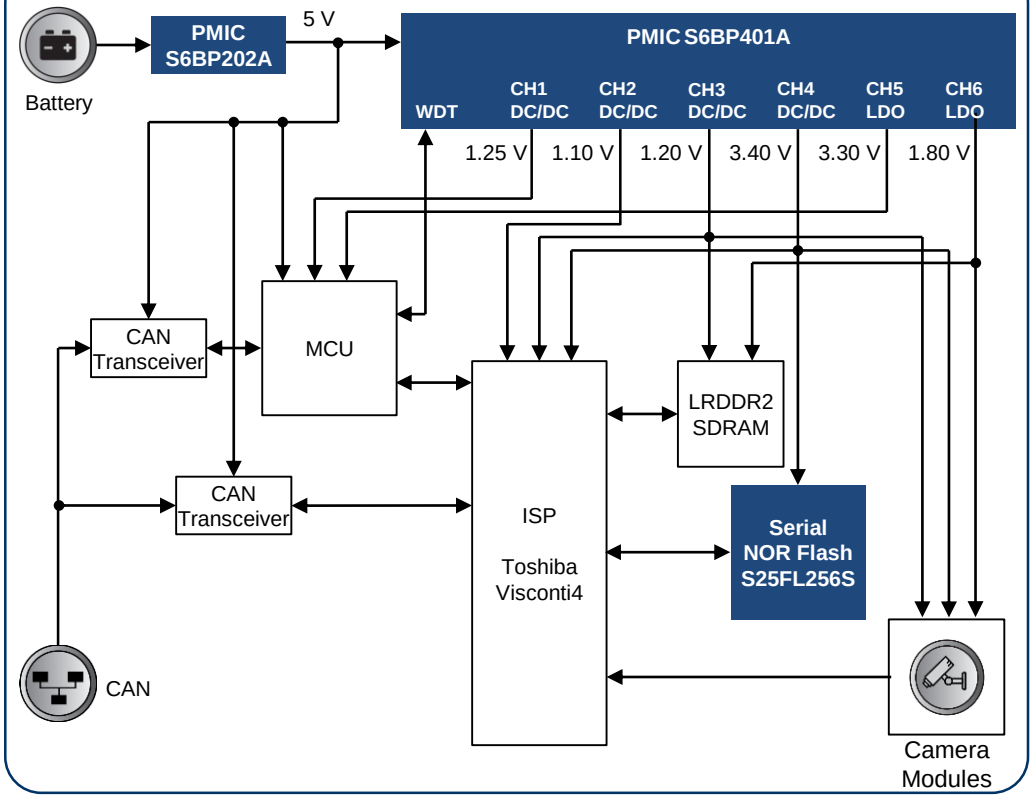
Application Note: *How to Design a Power Management System with S6BP401A* (AN98649)

How to Get Started

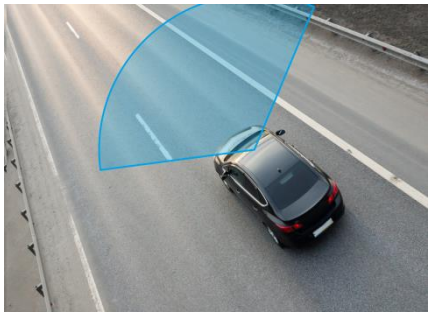
Download the suggested collateral

Buy the Evaluation Kits: S6SBP401AJ0SA1001
S6SBP401AM2SA1001

Block Diagram



Front Monitoring Monocular Camera System for Popular Cars



[1] A set of system functions that protect ECUs from damage and/or from generating erroneous results during abnormal power supply conditions

[2] Compared with an equivalent solution with LT3371 and TLS205B0

Cypress Automotive PMIC Family Solution Example:
Camera-Based ADAS with FPGA[1]

Cypress Value

Design Challenges

Compact solution that powers the entire ADAS electronic control unit (ECU) based on FPGA

Optimized solution to power the FPGAs, MCU, DDR2 SDRAM, NOR Flash memory and image sensor

Low-heat-generating solution that avoids the temperature increase of a small ADAS ECU

Cypress Automotive PMIC (S6BP401A) Solution

Integrates six channels of power management and system safety functions[2] (including watchdog timer) to save 11%[4] of the PCB area

Uses a PMIC that has the necessary output voltage settings

Achieves high conversion efficiency and improves the temperature increase by 17°C[3]

Suggested Collateral

Datasheet: S6BP401A

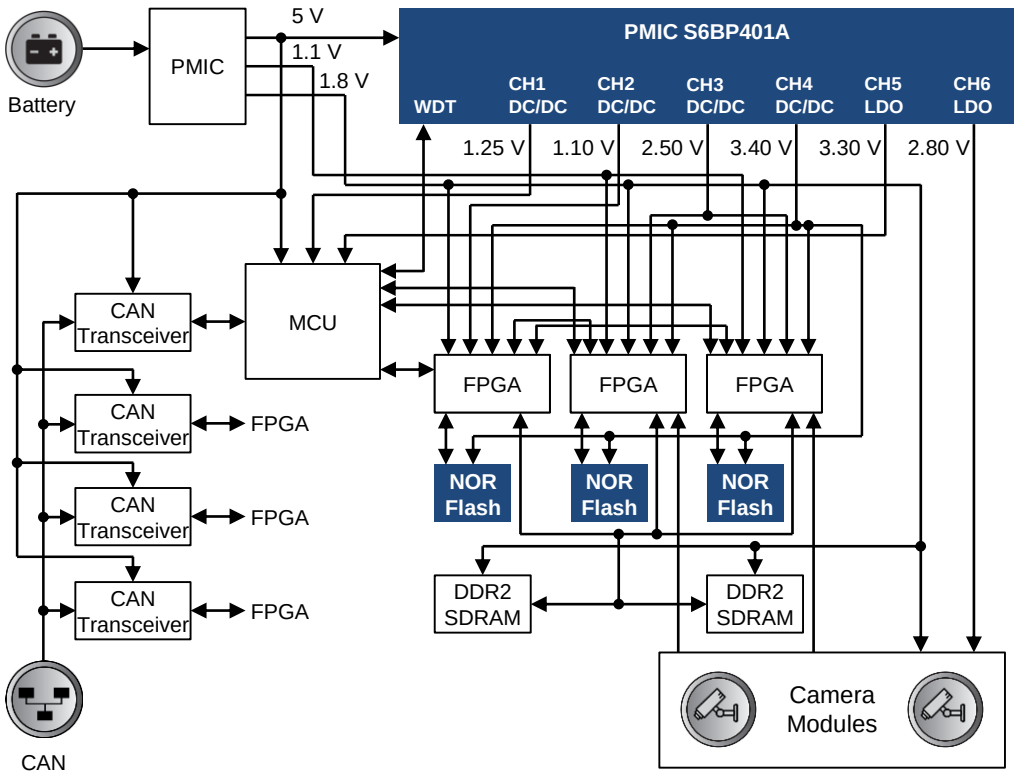
Application Note: *How to Design a Power Management System with S6BP401A* (AN98649)

How to Get Started

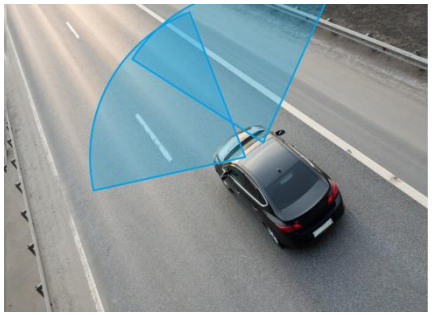
Download the suggested collateral

Buy the Evaluation Kits: S6SBP401AJ0SA1001
S6SBP401AM2SA1001

Block Diagram



Front Monitoring Stereo Camera System for High-End Cars



[1] Field-programmable gate array
[2] A set of system functions that protect ECUs from damage and/or from generating erroneous results during abnormal power supply conditions
[3] Compared with an equivalent solution with LT3371 and TLS205B0

Cypress Automotive PMIC[1] Family Solution Example:
Camera-Based ADAS with EyeQ3

Cypress Value

Design Challenges

Compact solution that powers entire the ADAS electronic control unit (ECU) based on the EyeQ3 image signal processor (ISP)

Optimized solution to power the ISP, MCU, LPDDR2 SDRAM, NOR Flash memory and image sensor

Low-heat-generating solution that avoids the temperature increase of a small ADAS ECU

Cypress Automotive PMIC (S6BP401A) Solution

Integrates six channels of power management and system safety functions[1] (including watchdog timer) to save 11%[3] of the PCB area

Uses a PMIC that has the necessary output voltage settings

Achieves high conversion efficiency and improves the temperature increase by 17°C[2]

Suggested Collateral

Datasheet: S6BP401A

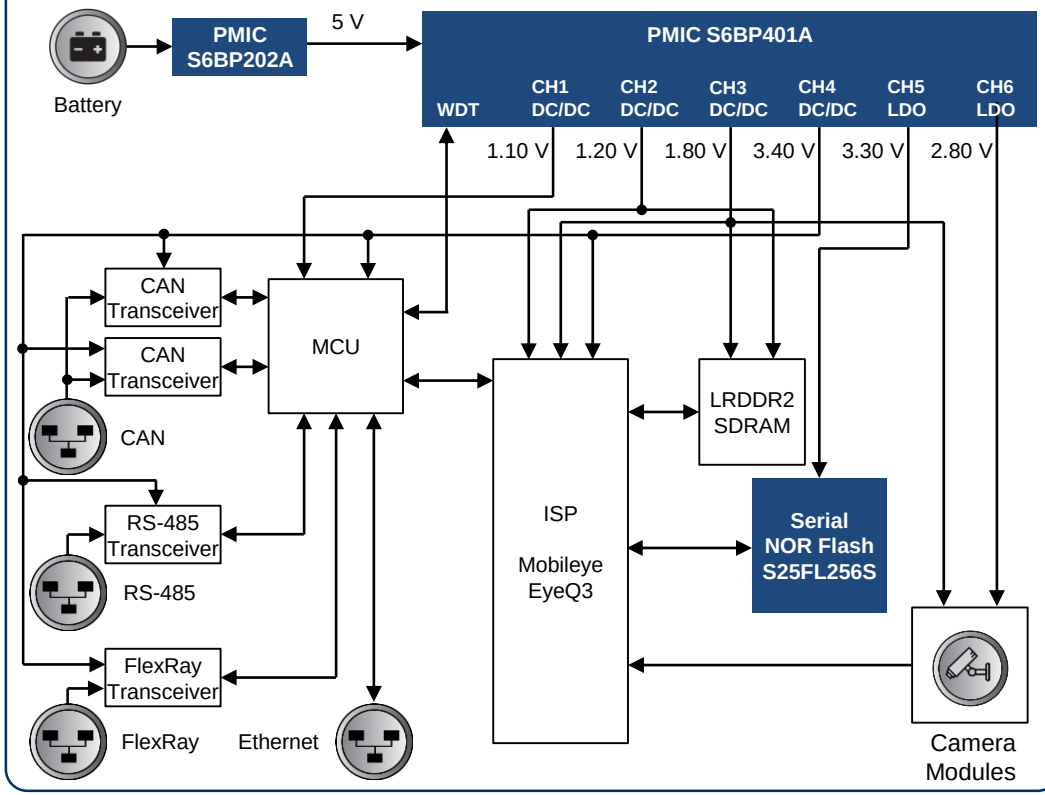
Application Note: *How to Design a Power Management System with S6BP401A* (AN98649)

How to Get Started

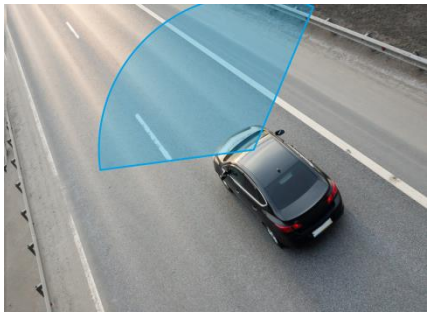
Download the suggested collateral

Buy the Evaluation Kits: S6SBP401AJ0SA1001
S6SBP401AM2SA1001

Block Diagram



Front Monocular Camera System



[1] A set of system functions that protect ECUs from damage and/or from generating erroneous results during abnormal power supply conditions

[2] Compared with an equivalent solution with LT3371 and TLS205B0