Cypress USB TypeC 技术和市场

EZ-PD系列产品应用于主机，Dongle, Dock, 线缆, 充电器, 车充,移动电源, 显示器

中国区： Steven Zhu



USB Type-C Products With Power Delivery

Optimized for Multiple Applications

CCG1:
First To Market
Notebooks, dongles, cables, docks, monitors

CCG2:
Smallest Footprint
Cables and smartphones

CCG3:
Highest Integration
Power adapters and accessories

CCG4:
First 2-Port Type-C
Personal Computers

CCG3PA: New
First PD3 & QC4
Power adapters and power banks

A $896M Market Growing at 89% CAGR[1] 2016 – 2021

- Programmable PSoC MCU platform has enabled rapid device prototypes, paving the way for first-to-market production solutions
- Superior integration yields cost-effective single-chip solutions
- Easy implementation of low-cost power delivery up to 100W
- Configurability enables engineers to keep pace with Type-C and power delivery specs, eliminating compliance issues
- Products optimized for every Type-C application accelerate customer's time to market

Today's laptops use multiple ports for data, power, displays, accessories and Ethernet

One single USB Type-C port can replace them all

Cypress has been "Making USB Universal"® since 1996, with more than 1.4B units shipped

1. Gartner 2015 and Cypress estimates

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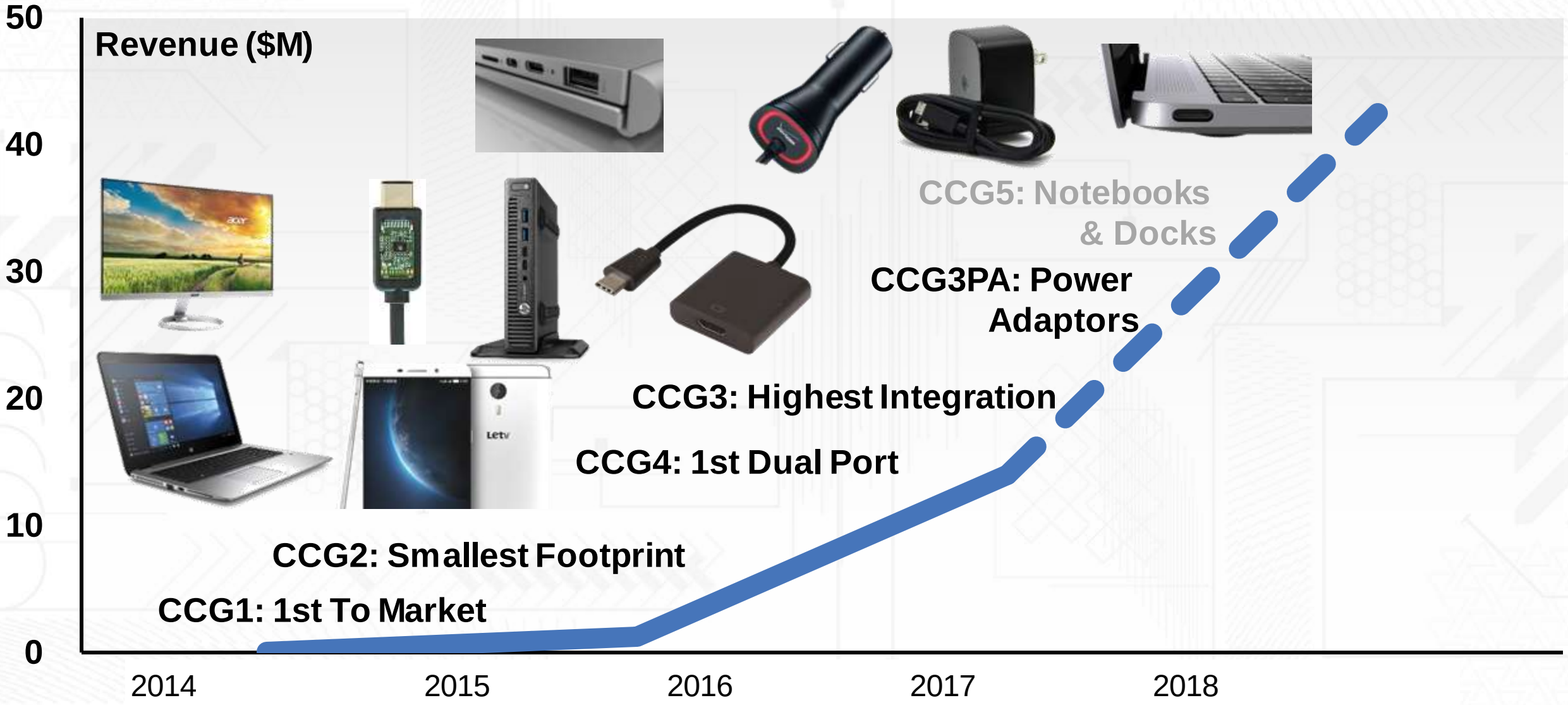
We Have Earned the #1 Market Position with 35% Market share



Design Problems Engineers Face

- **A USB-C power source requires a large BOM**
  - A Type-C power adapter/charger requires multiple ICs, including 30-V–tolerant regulator, high-voltage PFET gate drivers, overvoltage protection (OVP) and overcurrent protection (OCP) circuits, V_{BUS}-to-configuration channel (CC) short protection and electrostatic discharge (ESD) protection
- **New power adapter/charger designs are required to support Power Delivery 3.0 (PD 3.0) with programmable power supply (PPS) support and Quick Charge 4.0 (QC 4.0) standards**
  - External low-side current sense[1] and voltage regulation[2] are required to enable programmable V_{BUS} control
- **Rapidly evolving USB standards make compliance and interoperability a challenge**
  - USB-C and PD specifications are continuously changing
  - Many existing devices do not interoperate, creating user confusion and resentment
- **Cypress' CCG3PA solves these problems, providing:**
  - Integrated 30-V–tolerant regulator, V_{BUS}-to-CC short protection, high-voltage PFET gate drivers, OVP, OCP and ESD protection
  - Integrated voltage regulation and low-side current-sense amplifier for programmable V_{BUS} control
  - Integrated ARM® Cortex®-M0 and 64KB Flash with read-while-write function for firmware upgradeability to overcome interop issues

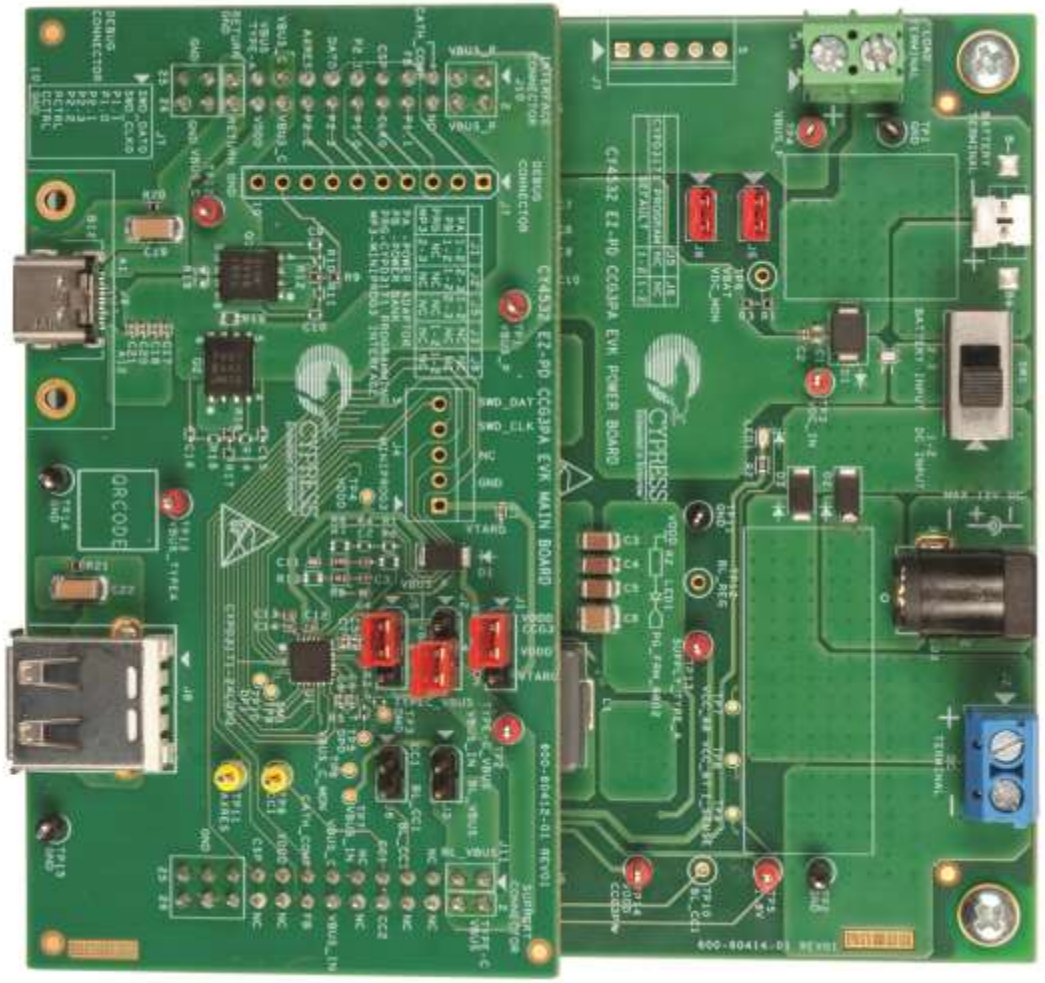
CCG3PA enables a high level of integration, reduces BOM cost and simplifies system design

[1] Circuit to measure the current flowing on the V_{BUS} [2] Analog feedback control circuit to regulate V_{BUS}

Getting Started

- **CCG3PA Evaluation Kit provides:**
  - Support for power adapters/chargers and power banks
  - One Type-C source or sink port and Type-A source port
  - Support for USB PD 3.0 with PPS support
  - Support for QC 4.0, BC 1.2, Apple Charging 2.4A and Samsung AFC[1] charging protocols on Type-A port
  - Support for 1-cell and 2-cell battery (power bank application)
  - Charging for notebooks, mobile phones and USB-powered devices
  - Firmware upgradeability

$149 CCG3PA Evaluation Kit (CY4532)



[1] Adaptive Fast Charging

CCG3PA Solution Example:

Type-C Power Adapter / Mobile Charger

CCG3PA Value

- **Design Problems**
  - Power adapter / mobile charger must support latest standards
  - Must be turnkey for ease-of-design
  - Must be highly integrated to lower BOM cost
  - Must be reprogrammable to keep up with USB-IF standards
  - Industry standards demand low power for no-load conditions
- **CCG3PA Solution**
  - Provides Type-C solution with Power Delivery 3.0 (PD 3.0) with programmable power supply support and Quick Charge 4.0 (QC 4.0)
  - Includes an ARM® Cortex®-M0 and certified USB-PD stack
  - Integrates voltage regulation, 30-V–tolerant regulator, V_{BUS}-to-CC short protection, high-voltage PFET gate driver and ESD protection
  - Supports field upgrades with free, fully-compliant firmware
  - Delivers Low Power: 30 µA (Deep Sleep Mode)

Suggested Collateral

Webpages: Type-C, CCG3PA and Reference Design

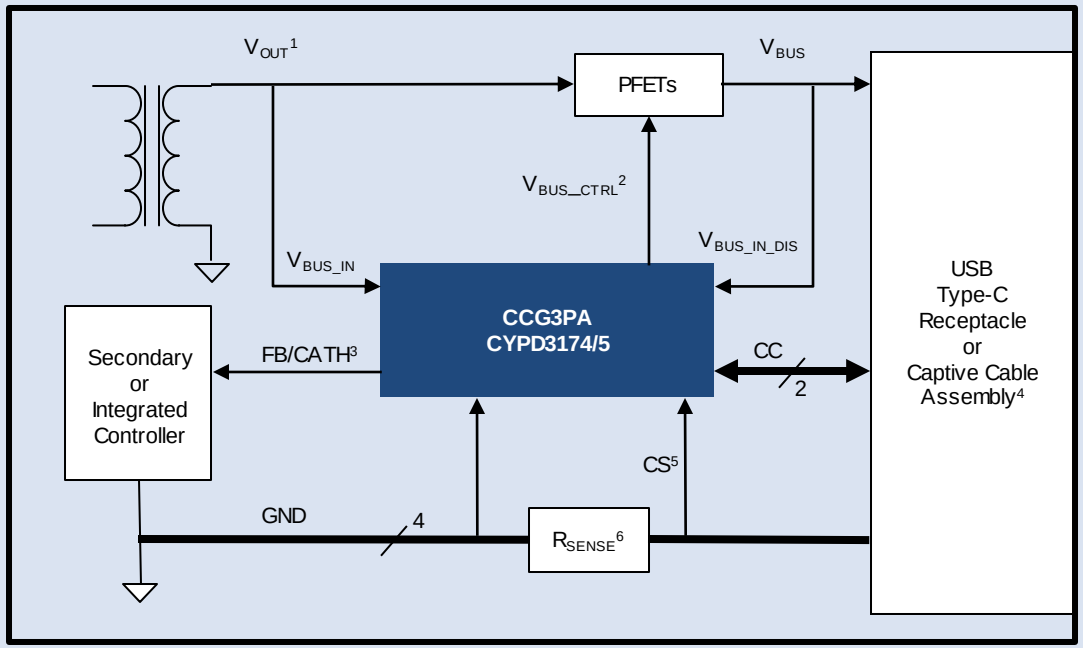
Datasheet: CCG3PA Datasheet

Video: CCG3PA Demo Video

How to Get Started

Contact Sales for CCG3PA Evaluation Board

Type-C Power Adapter/Mobile Charger with CCG3PA



New Smartphone Charger with USB-C Receptacle

[1] Output voltage of the AC-to-DC adapter
[2] Signal to control V_{BUS} load switch
[3] Output voltage selection using feedback control
[4] A cable permanently attached to the AC adapter
[5] Current-sensing input
[6] Resistor used to sense overcurrent

CCG3PA Solution Example:

Type-C Car Charger

CCG3PA Value

- **Design Problems**
  - Car charger must support latest standards
  - Must be turnkey for ease-of-design
  - Must be highly integrated to lower BOM cost
  - Must be reprogrammable to keep up with USB-IF standards
  - Industry standards demand low power for no-load conditions
- **CCG3PA Solution**
  - Provides Type-C solution with Power Delivery 3.0 (PD 3.0) with programmable power supply support and Quick Charge 4.0 (QC 4.0)
  - Includes an ARM® Cortex®-M0 and certified USB-PD stack
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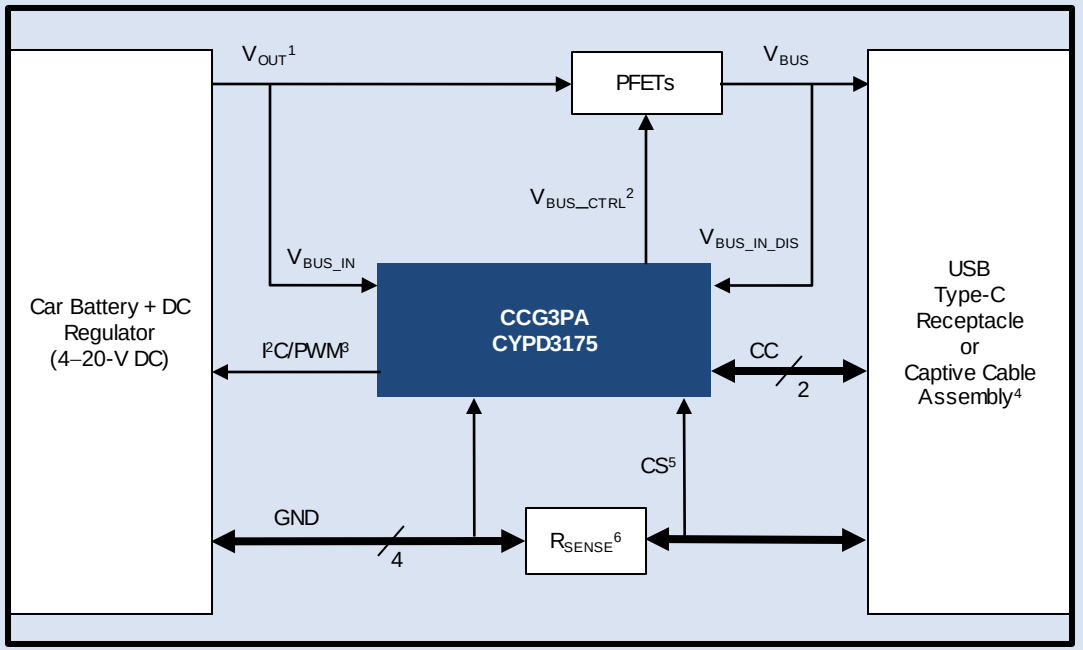
Type-C Car Charger with CCG3PA



USB-C Charger with USB-PD

[1] Output voltage of the AC-to-DC adapter
[2] Signal to control V_{BUS} load switch
[3] Output voltage selection using I²C or PWM
[4] A cable permanently attached to the AC adapter
[5] Current-sensing input
[6] Resistor used to sense overcurrent

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CCG3PA Solution Example:

Type-C Power Bank

CCG3PA Value

- **Design Problems**
  - Power bank must support latest standards
  - Must be turnkey for ease-of-design
  - Must be highly integrated to lower BOM cost
  - Must be reprogrammable to keep up with USB-IF standards
  - Industry standards demand low power for no-load conditions
- **CCG3PA Solution**
  - Provides Type-C solution with Power Delivery 3.0 (PD 3.0) with programmable power supply support and Quick Charge 4.0 (QC 4.0)
  - Includes an ARM® Cortex®-M0 and certified USB-PD stack
  - Integrates voltage regulation, 30-V–tolerant regulator, V_{BUS}-to-CC short protection, high-voltage PFET gate driver and ESD protection
  - Supports field upgrades with free, fully-compliant firmware
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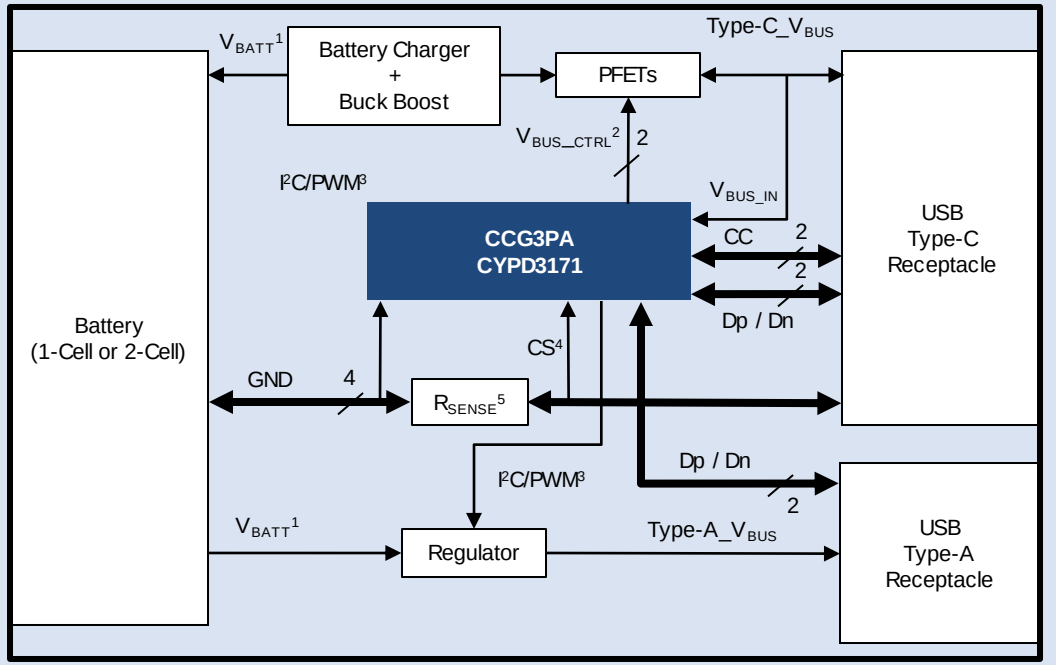
Type-C Power Bank with CCG3PA



USB-C Power Bank with USB-PD

[1] Battery Voltage
[2] Signal to control V_{BUS} load switch
[3] Output voltage selection using I²C or PWM
[4] Current-sensing input
[5] Resistor used to sense overcurrent