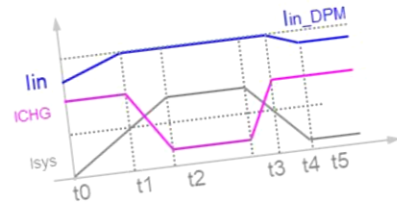
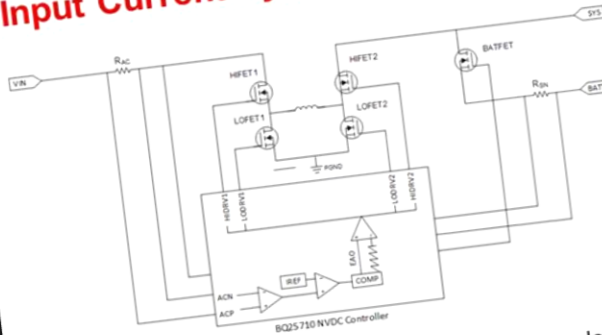


CURRENT AND VOLTAGE DYNAMIC POWER MANAGEMENT

OF MULTI-CELL CHARGE CONTROLLERS

Input Current Dynamic Power Management



- Limits the input current with the system load as high priority
- Charger sets the current reference

Benefit:

Maximizes the utilization of adaptor capability *without* overloading

System requirements

Performance vs. budget safe charging

Convenient
&
universal



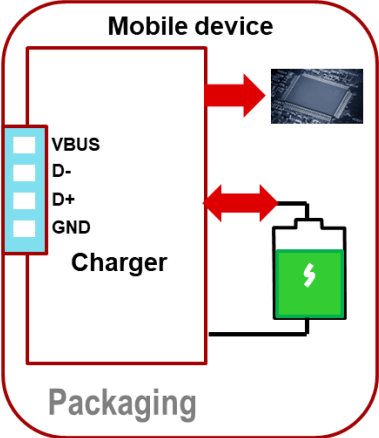
Input source

Adaptor or USB
Input current / Voltage



Control interface

Standalone
I2C
SMBus



System

Min Voltage
Current

Battery

Voltage, Charge Current
Chemistry Configuration
Capacity

Safety and protection

Overvoltage/Overcurrent/
Over-temperature, etc

Battery run time
&
life time


Small solution size and cost effective

Universal Charging

- **Challenge:** many adapters / charging ports with known and unknown current capacity
 - Known current capability: Input Current DPM to maximize utilization without overloading
 - Unknown current capability: Input Voltage DPM to maximize utilization with limited overloading



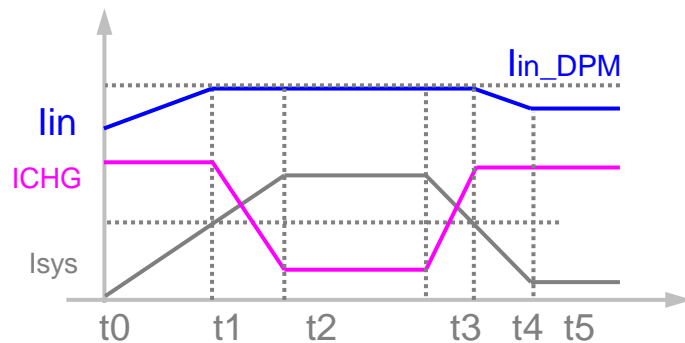
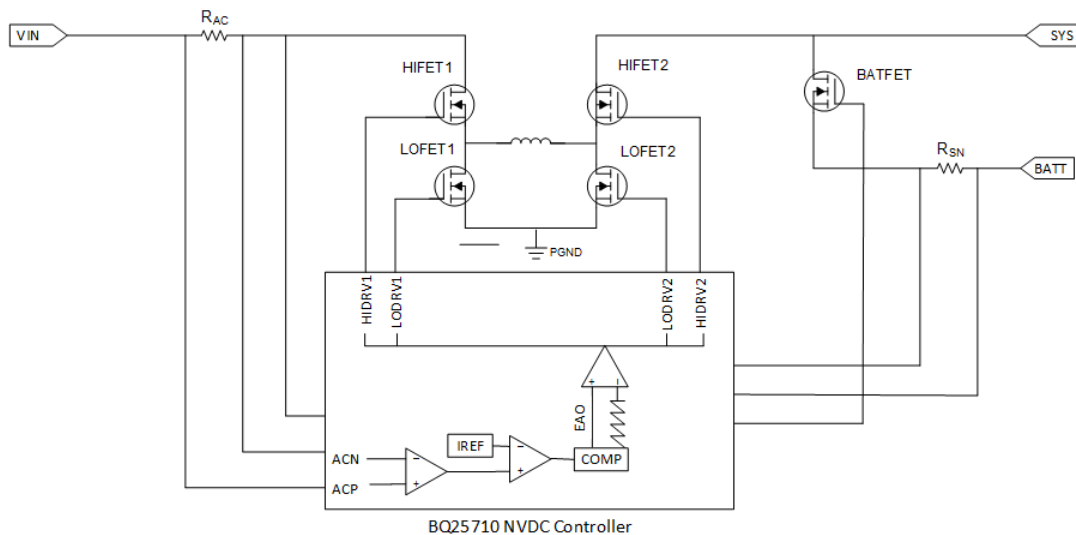
USB Power Delivery (PD) over USB Type-C™

Precedence	Mode of operation	Nominal voltage	Maximum current
Highest	USB PD	Up to 20 V	Up to 5 A
	USB Type-C current @ 3A	5 V	3 A
	USB Type-C current @ 1.5A	5 V	1.5 A
	USB BC1.2	5 V	Up to 1.5 A
	USB 3.1	5V	900 mA
Lowest	USB 2.0	5V	500 mA

• What is USB Power Delivery (PD)?

- USB Power Delivery is a charging technology. It uses USB-C cables and connectors to deliver higher levels of power to your devices.
- With USB PD, the charging device negotiates a known voltage and current limit with the source
- Perfect application for Input Current Dynamic Power Management

Input current dynamic power management



- Limits the input current with the system load as high priority
- Charger sets the current reference

Benefit:

Maximizes the utilization of adaptor capability ***without*** overloading

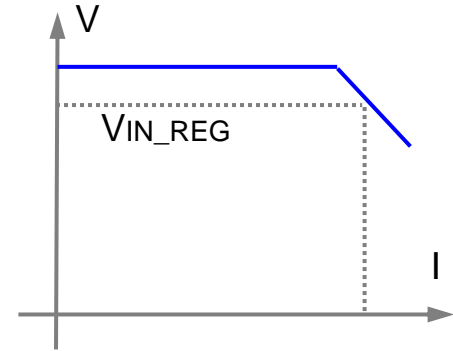
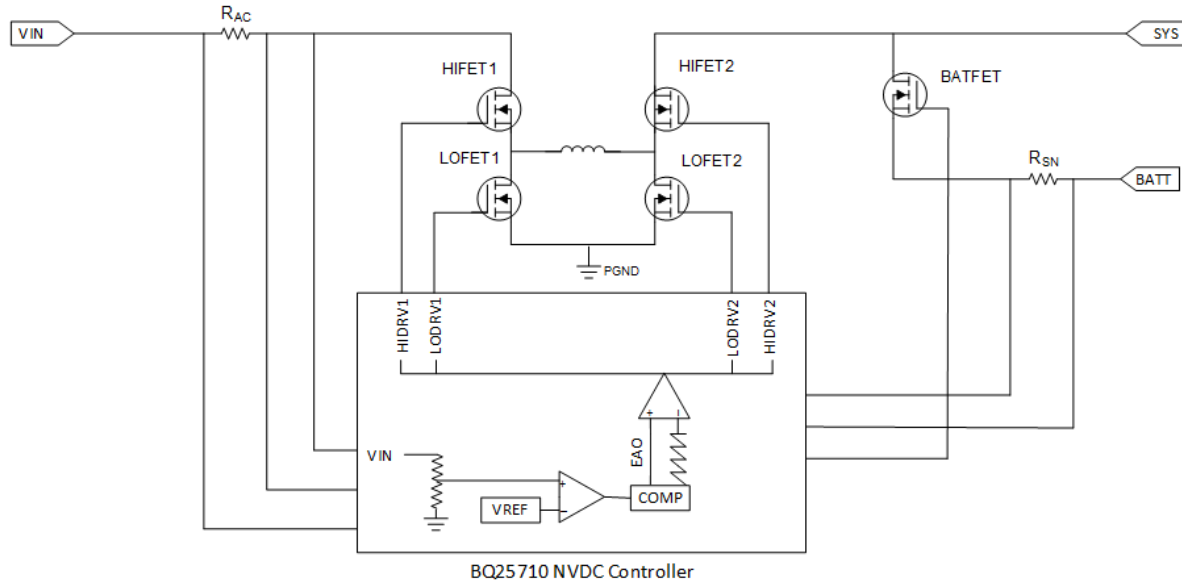
Input voltage DPM for unknown current capability

- Barrel-jack adapters are still a very common power source
- Barrel size indicates voltage, but no standard mechanism for communicating current limit.



Question: How do you keep from overloading an adapter when the current limit is unknown?

Input voltage dynamic power management



- Limits the input voltage with the system load as high priority

Benefit:

Maximize the utilization of adaptor capability with limited overloading

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