SC2021Q Type-C/ PD and Dual DPDM Fast Charge Controller

1 Description

SC2021Q is a Type-C / PD and DPDM fast charge controller for automotive applications. It complies with the latest Type-C and PD 3.0 standards and supports the proprietary high voltage fast charge protocols with dual DPDM interfaces. It targets for the wall adapters, travel adapters and car chargers.

SC2021Q minimizes external components by integrating USB PD baseband PHY, Type-C detection, dual DPDM PHYs, VBUS discharging paths, VCONN supply, programmable feedback compensation, voltage and current sense, 10-bit high performance ADC, dual 10-bit DACs, NMOS gate driver, I2C interface and protection circuits. It contains a 32-bit high performance micro-controller core with 32k-Byte OTP ROM and 2.5k-Byte RAM, which provides cost effective solutions to many applications.

SC2021Q supports various protection mechanisms including Over Voltage Protection (OVP), Under Voltage Protection (UVP), Over Current Protection (OCP), Short Circuit Protection (SCP), Over Temperature Protection (OTP), DPDM Over Voltage Protection (DPDM OVP), CC Over Voltage Protection (CCOVP), VCONN Over Voltage (VCONN OVP), VCONN Over Current (VCONN OCP) and VCONN Short Protection (VCONN SCP), so to effectively ensure stable and reliable operation of system.

The SC2021Q is available in 32-pin QFN package.

2 Features

- **AEC-Q100**
  - AEC-Q100 Qualified for automotive applications
- **USB Type-C**
  - Support Type-C DFP protocols
  - Support DRP or UFP protocols with external Rd
  - Configurable resistor R_P
- **USB Power Delivery**
  - Support DFP USB PD 3.0 with PPS
  - Hardware BMC transmitter and receiver
  - Full feature physical layer
  - Hardware CRC
  - Hardware reset
  - Integrate PD 3.0 protocol engine
  - Integrate VCONN and support SOP' for e-marker
- **Dual DPDM Fast Charging Interfaces**
  - Integrate 2x firmware controlled DPDM interfaces
  - Support Apple charging, BC1.2, DCP, HVDCP, FC, AFC, FCP, SCP, VOOC, UART, I2C and other proprietary charging protocols
- **Power**
  - Wide operation range: 3V to 22V (26V tolerant)
  - Integrate programmable feedback compensation
- **MCU Subsystem**
  - Integrated 32-bit high performance MCU core
  - 32k-Byte OTP and 2.5k-Byte RAM
  - Reserve independent space for storing chip ID code
  - Support UART, I2C and multiple I/Os
  - Support sleep mode
- **Analog Block**
  - Support OPTO interface for adapter
  - Support FB interface for car charger
  - Dual DACs for CC/CV loop.
  - 10-bit ADC to monitor the voltage / current / DPDM/ other signals
  - Integrated high side current sense amplifier
  - Integrated NMOS gate driver
  - Integrated VBUS discharging paths
  - Integrated temperature sense module
- **Protections**
  - 26V tolerant for CC1 and CC2
  - 12V tolerant for DP and DM
  - On chip OVP, UVP, SCP, VCONN OVP, VCONN OCP, VCONN SCP, OTP, DPDM OVP, CC OVP
- **Package**
  - 32-pin QFN, 4mm x 4mm x 0.75mm

3 Applications

- Wall adapters
- Travel adapters
- Car chargers

4 Device Information

Part Number	Package	Body Size
SC2021QQDER	QFN32	4mm x 4mm x 0.75mm