A Car Charger Chip with DC/DC and Type-C+ QC 2.0 Capability

FEATURES

- 4.5V to 36V Input Voltage Range
- 3A Continuous Output Current
- 100m ohm Internal Power MOSFET Switch
- Fixed 420kHz Switching Frequency
- Cycle-by-Cycle Current Limit
- Over-Current/ Temperature Protection
- Thermally Enhanced Packages

- USB Type-C v1.1 Cable Detect
- Built-in discharge path for QC & Type-C
- Support QC 2.0 Class A: 5V, 9V, and 12V
- Support BC1.2 DCP mode
- Support Legacy Devices Fast Charging
- Automatic Selection for different mode

APPLICATIONS

- Car Chargers
- Cigarette Lighter Adaptor (CLA)
- Power bank Charging port

PACKAGES

- SOP-8EP
- QFN-12L

GENERAL DESCRIPTION

CY2823 is an USB Car Charger which integrates a DC/DC converter and a Type-C+ QC 2.0 charger decoder together. For the DC/DC converter, it covers a wide input voltage and provides high efficiency current mode control during the step – down process for fast loop response and easy compensation. For the charger ID capability, this device has different charger types including emerging Type-C, QC 2.0 Class A, BC 1.2, DCP modes, and legacy devices.

The DC/DC converter of CY2823 provides a 3A, current-mode step-down converter with an integrated high-side switch. It operates with a wide input voltage from 4.5V to 36V, and the PWM switching frequency fixed at 420kHz internally. Meanwhile, it performs a highly efficient control for fast loop response and easy compensation by automatically entering into PSM mode during light load. Also, cycle-by-cycle current limiting and thermal shutdown are provided for fault condition protections. An internal 2ms soft-start design reduces input start-up current and prevents the output voltage and inductor current from overshooting during power-up.

The detection procedure of CY2823 firstly performs Type-C detection (for CY2823-12L) based on USB Type-C specification v1.1 for Downstream Facing Port. And then, USB BC 1.2 DCP mode is enabled. After that, the legacy (500mA USB 2.0, 900mA USB 3.0, 2.4A for D+/D- at 2.7V) detection is performed. In addition, QC detection is implemented with class A capability, where VBUS can support 5V, 9V, or 12V according to QC protocol handshake results.

In order to offer high C/P products, CY2823 is categorized into 2 different packages as the following table 1:

	Role Selection	TYPE C CC / Rp	QC 2.0 Class A	BC1.2 DCP D+/D- short	Legacy D+/D- 2.7v	PIN counts packaging
CY2823-12L	Source	V	A	V	V	QFN-12L
CY2823-8L	Source		A	V	V	SOP-8L

Table 1. CY2823-12L/8L Features Mapping