



# New Product Announcement

## AP43776Q

### AP43776Q Dual-Port USB Power Delivery Protocol Decoder for Automotive Charging

The DIODES™ AP43776Q is an automotive-compliant, USB Type-C® Power Delivery (PD) 3.1, Standard Power Range (SPR), 3.3V~21V decoder dedicated to power source applications with legacy capability.

It is compliant with USB Type-C specification Rev 1.2 and USB power delivery specification Rev 3.0 Silicon Compliance Certification: [TID – 6206](#). It also has passed QC4/4+/QC5 Compliance Certification by GRL (QC20211008263).

The device supports Programmable Power Supply (PPS) with 20mV/step resolution and 50mA/step current resolution for optimal battery thermal management.

I2C interface and GPIO pins are available to facilitate multi-port, independent output voltage applications with built-in smart power sharing firmware. Smart features such as low-battery and thermal power management, as well as charging status or fault indication, are supported via customizable built-in firmware.

This part supports DisplayPort™ Alternate Mode by decoding the CC pin handshaking and via I2C controlling the SS data switches.

The device is available in the Wettable Flank W-QFN4040-20 (SWP) (Type A1) package.

*Automotive-compliant – AEC-Q100 grade 1 qualified in IATF 16949 certified manufacturing sites and supports PPAP documentation.*

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#### The DIODES™ Advantage

The automotive-compliant, dual-port, USB PD protocol decoder is for multi-port, fast-charging applications.

- **Supports Two Independent USB Type-C PD Ports with USB PD3.1 SPR (3.3V~21V) Voltages**  
Multiple USB Type-C ports with independent charging output voltages for optimized power usage
- **Enables USB Type-C PD with DisplayPort Alt Mode**  
Fully supports USB Type-C over Alternate Mode to allow upstream-facing port (UFP) video data (DisplayPort, USB 3.1) into infotainment systems
- **CC1/CC2 Short-Protection to  $V_{BUS}$**   
To avoid damages caused by unintended shorts between CC1/2 pins and  $V_{BUS}$  pin
- **Supports E-Marker Cable Detection with Built-In  $V_{CONN}$  Switch and Overcurrent Protection (OCP)**  
Aides USB Type-C cable authentication
- **I2C/UART Interface Enables Inter-Chip Communication**
  - 1) Supports smart power sharing for up to four USB Type-C PD ports
  - 2) Saves the USB Type-C PD port  $V_{BUS}$  output MOS switch by using the synchronous buck-boost controller/converter's MOS

#### Applications

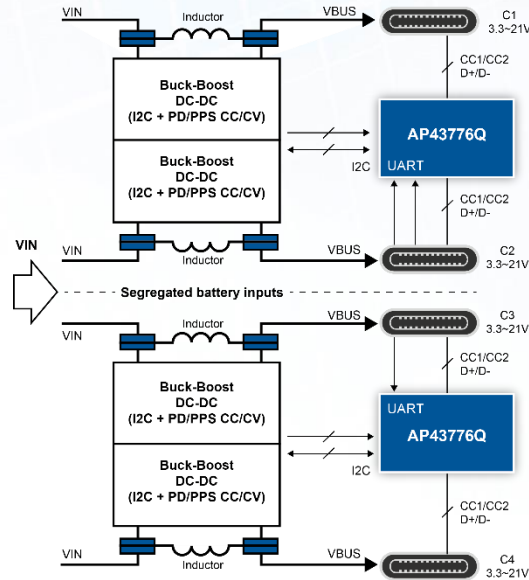
- In-vehicle USB PD3.1 SPR multi-port charging
- Quad USB PD3.1 SPR ports supporting smart power sharing



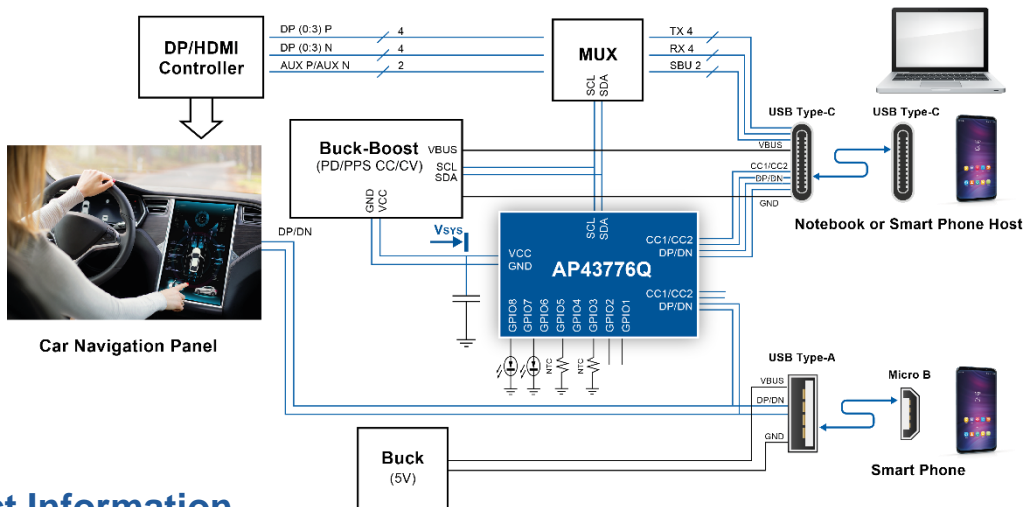
# Application Schematics

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## AP43776Q Dual-Port with DP-Alt Mode and BC 1.2 DCP Mode in Vehicles



### Product Information

| Part Number                       | VCC Max | Typical Operating Current | Max Sleep Current | Compatible Protocol      | Package                      |
|-----------------------------------|---------|---------------------------|-------------------|--------------------------|------------------------------|
|                                   | V       | mA                        | µA                |                          |                              |
| <a href="#">AP43776QZDZW20-13</a> | 6       | 1.5                       | 1200              | USB PD3.1 SPR & QC4/4+/5 | W-QFN4040-20 (SWP) (Type A1) |

### Ordering Information

| Orderable Device                  | Compliance (Only Automotive Supports PPAP) | Packaging                    | Moisture Sensitivity | Packing  |                 |
|-----------------------------------|--|------------------------------|----------------------|----------|-----------------|
|                                   |  |                              |                      | Quantity | Carrier         |
| <a href="#">AP43776QZDZW20-13</a> | <a href="#">Automotive</a>                 | W-QFN4040-20 (SWP) (Type A1) | MSL-1                | 3,000    | 13" Tape & Reel |