

Qualcomm[®] Automotive Powerline Communication (PLC) Solutions

Qualcomm Automotive Powerline Communication Solutions



Robust. Reliable. Energy-efficient.

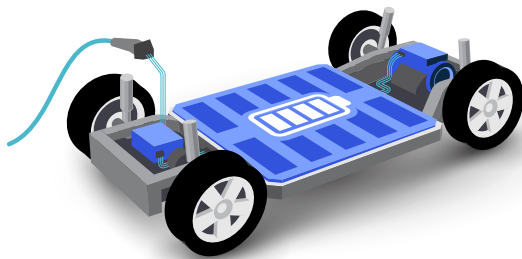
According to analysis from Deloitte¹, electric vehicles (EVs) will be a third of all new car sales by 2030, bringing the total number of EVs sold in a single year to 31.1 million globally—10 million more than previously forecasted. To meet this growing demand, global automakers and suppliers turn to Qualcomm Technologies: a leading PLC HPGP device supplier for Combined Charging System (CCS) EVs, infrastructure, and accessories. We provide a wide range of PLC HPGP devices that fully fit CCS standard requirements, which is the leading global standard for automotive DC charging. Our PLC HPGP solutions are used for several defined applications worldwide, including vehicles, smart grid infrastructure, public charging stations, in-home charger units, EV accessories, and adapters.

¹ "Worldwide roads on course for 31.1 million electric vehicle milestone by 2030," Deloitte Press Release; July 27, 2020

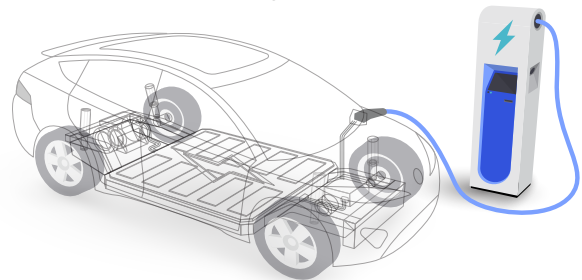
PLC HPGP use cases for Automotive & Smart Grid applications

Compelling solution to enable an integrated EV + Smart Grid Ecosystem

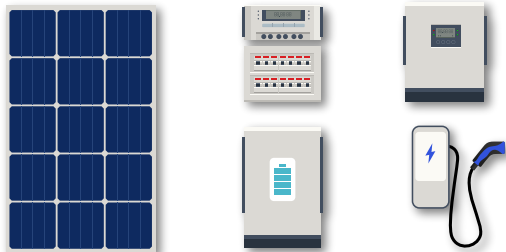
On-Board Conductive Charging systems (OBCs)



Off Board Conductive Charging systems (EVSEs, Home Chargers)



Converters, accessories & smart/solar home applications (often tied with EV @ home charging)



Bi-directional V2H & V2G communication



V1G: Unidirectional controlled charging
Vehicles or charging infrastructure adjust their rate of charging

V2G: Vehicle-to-grid
Smart grid controls vehicle charging and returns electricity to the grid

V2H/B: Vehicle-to-home/-building
Vehicles will act as supplement power suppliers to the home

Benefits of PLC HPGP Charging Applications (CCS)

- Developed and matured over the last 10 years by leading automotive and infrastructure providers
- PLC HPGP-based communication supports smart-grid applications
- CharIN leading the charge to establish CCS as a preferred worldwide EV charging solution
- Strong supply base with multiple device manufacturers committed to the market

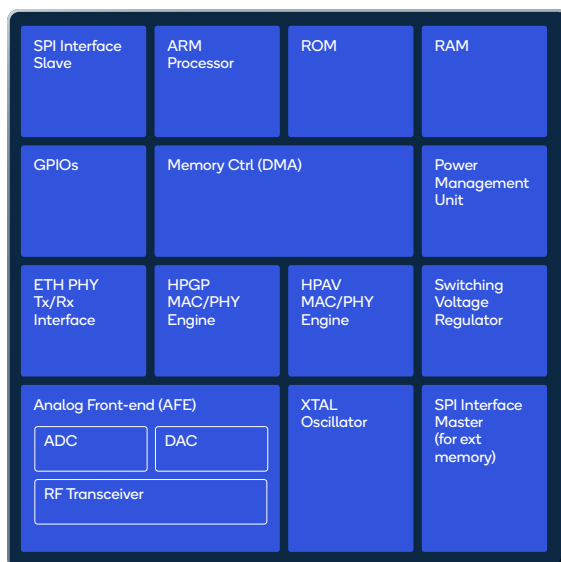
Qualcomm PLC HPGP solutions

	QCA7000-AL3C	QCA7000-AL3B	QCA7005-AL33	QCA70106AQ
Direction	HPGP single chip MAC/PHY	HPGP single chip MAC/PHY	HPGP single chip MAC/PHY	HPGP single chip MAC/PHY HPAV single chip MAC/PHY
Digital Interfaces	SPI	SPI	SPI	SPI, Ethernet
Quality Level	Commercial	Industrial	Enhanced Industrial*	Automotive Grade 2
Operating Ambient Temp. Range	0°C to +70°C	-40°C to +85°C	-40°C to +85°C	-40°C to +105°C
Case Temperature	0°C to +105°C	-40°C to +110°C	-40°C to +110°C	-40°C to +110°C
Package	QFN68 0.4mm pin pitch	QFN68 0.4mm pin pitch	QFN68 0.4mm pin pitch with wettable flanks	QFN68 0.4mm pin pitch with wettable flanks

- PLC HPGP modem device compliant with PLC HPGP MAC/PHY specifications
- QoS as required for PLC HPGP home area network
- Robust, reliable, and power-efficient networking solution as per PLC HPGP specs
- Minimum bill of material (BOM) to enable PLC HPGP communication

New QCA7006AQ

All-in-one, automotive-grade PLC HPGP solution



Note: Size of depicted blocks is not indication of silicon size of IP cells.

Operational overview

Compliant with both HPGP and HPAV specifications

Compliant with ISO 15118 (part 1, part 2, part 3) specifications

Fully interoperable with IEEE 1901 family specifications

Meets CCS type 1 and type 2 requirements

Key value-adds



Main hardware and software features



100Base-T Ethernet PHY interface



HPGP and HPAV modes supported



Ethernet interface enabled by QCA7006AQ-based software products



Digital interface (ETH, SPI) configurable through PIB configuration file

QCA7006AQ

- Seamless upgrade from QCA7000/QCA7005 to QCA7006AQ
- Footprint and pinout compatibility with QCA7000 and QCA7005 devices
- Interoperable with QCA7000 and QCA7005 devices
- Operational with QCA7006AQ-based software products

Qualcomm Automotive PLC Communication advantages



Innovation & Experience

- 20+ years of automotive industry experience
- 150+ million vehicles using Qualcomm Automotive solutions
- #1 in telematics, Bluetooth, and Wi-Fi for Automotive
- #1 in premium, next-gen cockpit design wins for production vehicles starting 2020



PLC Leadership

- Leading PLC device supplier for the CCS EV, Infrastructure, and Accessories markets
- Large market share driven by 10+ years in EV segment
- Stable HW platform and mature HPGP SW for CCS applications



OEM & Governmental Support

- Most EV OEMs use QC700X devices
- Government agencies—such as the California Energy Commission—are actively driving the build out of CCS-enabled EVSE infrastructure from 2022 to 2030 to accelerate EV adoption and smart grid integration.

Qualcomm



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