

Robust automotive networking

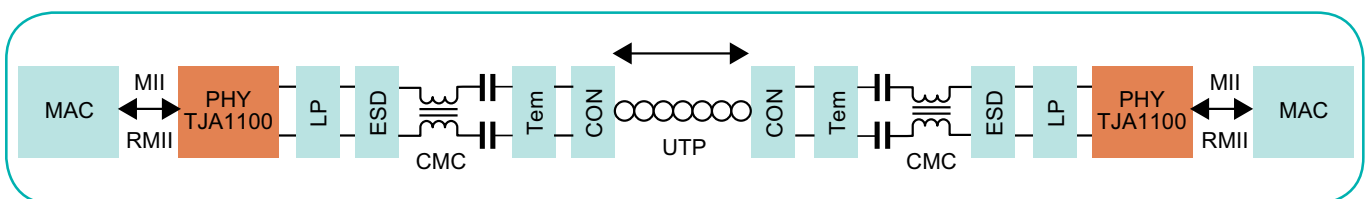
TJA1100 PHY Automotive Ethernet

The IEEE® 802.3bw (100BASE-T1) compliant TJA1100 Ethernet PHY transceiver provides 100 Mbit/s transmit and receive capability over unshielded twisted pair (UTP) cables. NXP® designed it to withstand the most taxing automotive applications while still maintaining low power consumption and system costs.

TJA1100 APPLICATION

The TJA1100 PHY provides robust, automotive-grade signal quality with a bit error rate (BER) of at least 1E-10 or less. It is optimized for capacitive signal coupling to the UTP lines and supports a cable length of at least 15 meters. To comply with automotive EMC requirements, a

common-mode choke, ESD elements, low-pass filters and a common-mode termination network are inserted between the Ethernet PHY and connector. Communication with the media access control (MAC) unit can be realized via the MII or the RMII.



NXP 100BASE-T1 PHY TRANSCEIVER FAMILY

Family	Device	TJA1100	TJA1102S	TJA1102	Description
Automotive	Package	HVQFN36	HVQFN56	HVQFN56	Small size, saves PCB board space
	Temperature range	-40 to +125 °C	-40 to +125 °C	-40 to +125 °C	Automotive Grade 1, high robustness to support automotive applications
	Unshielded twisted pair (UTP) channel length up to at least	15 m	15 m	15 m	Low-weight cable, high flexibility and low cost Proper cable length fit for most automotive requirements
	Interface	MII/RMII	MII/RMII	MII/RMII	Standard interfaces
	Supply voltage	3.3 V	3.3 V	3.3 V	Single supply, no need for external voltage regulators
	Additional supply enabled	-	1.8 V	1.8 V	Save power on component level
	Data rate	100 Mbit/s	100 Mbit/s	100 Mbit/s	Sufficient data rate to meet infotainment, ADAS requirements
	Ethernet ports	1	1	2	Dual port solution saves ECU board place, simplifying system layout and config
	Pin-to-pin compatible		x	x	Port count scalability for platform solutions
	Pin Strapping	x	x	x	Hardware config during start-up, allows autonomous operation
	Signal quality indicator (SQI)	x	x	x	Makes channel effects visible
Diagnosis	Over-temperature protection	x	x	x	Prevent device from getting damaged by overtemperature
	Cabling error detection (shorts and opens)	x	x	x	Remote diagnosis
	Gap-free supply under-voltage detection with fail-silent behavior	x	x	x	Prevents the PHY from running in an undefined state; increases system level functional safety
	Internal, external and remote loopback mode	x	x	x	Allows system diagnostics of the communication path
	Dedicated enable (EN) pin	x	x	x	Emergency shutdown for system safety e.g., block suspicious ECU
	Link diagnosis with LED control output	x			Visualization, supports debugging
Low-Power Mode	Low-power sleep mode	50 µA	45 µA	45 µA	Low power consumption to ensure battery level
	INH switch controls ECU supply	x	x	x	Set automotive power modes
	Local wake-up support	x	x	x	Most common and secured wake-up option
	Robust remote wakeup via data line		x	x	OPEN-Alliance-compliant wakeup-and-sleep concept