Introducing Marvell's Third Generation Brightlane™ Ethernet Switch

Industry's most advanced platform for automotive security and safety

May 31, 2022
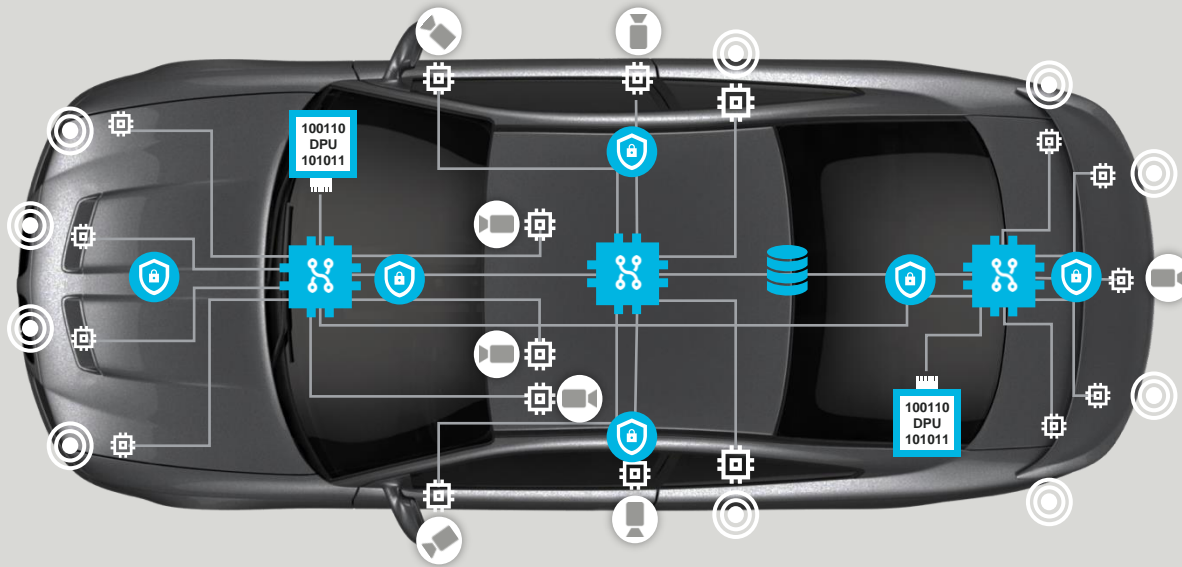
Marvell® Brightlane™ solutions transform automotive

Smarter

Safer

Greener

Ethernet

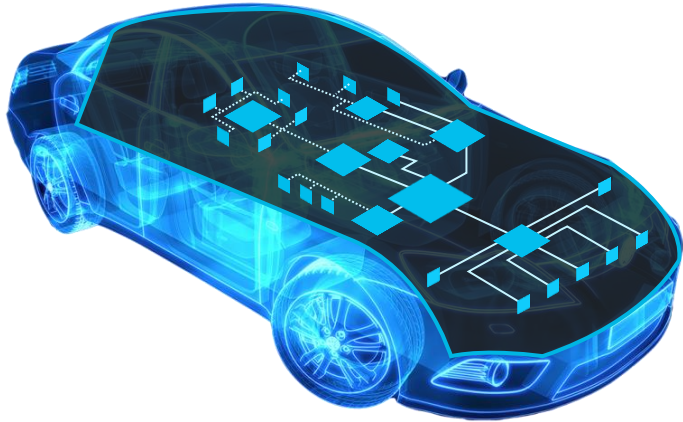100110 DPU 101011
Compute

Security

Storage

100110 DPU 101011

Leading with Ethernet networking, expanding with custom compute

Fastest growing automotive Ethernet company

Industry-leading products

- Secured switch

- Gigabit Ethernet PHY

- 10 gigabit Ethernet PHY

- Ethernet camera bridge

- Built on 2000+ Ethernet patents

30+ Brightlane™ products, 30 OEMs design wins: 8 of top 10

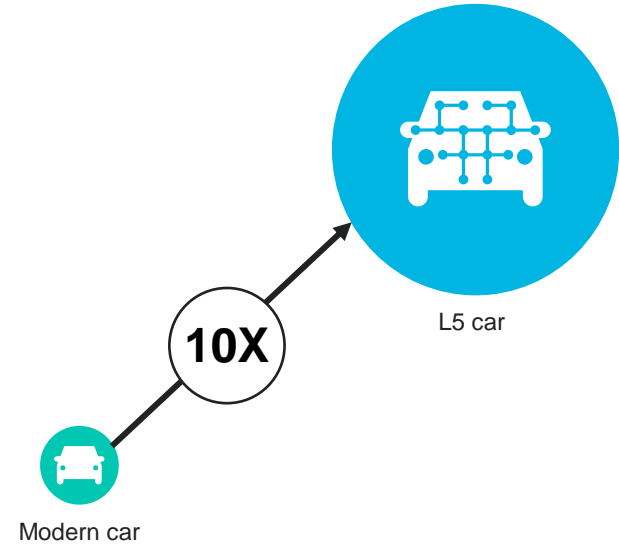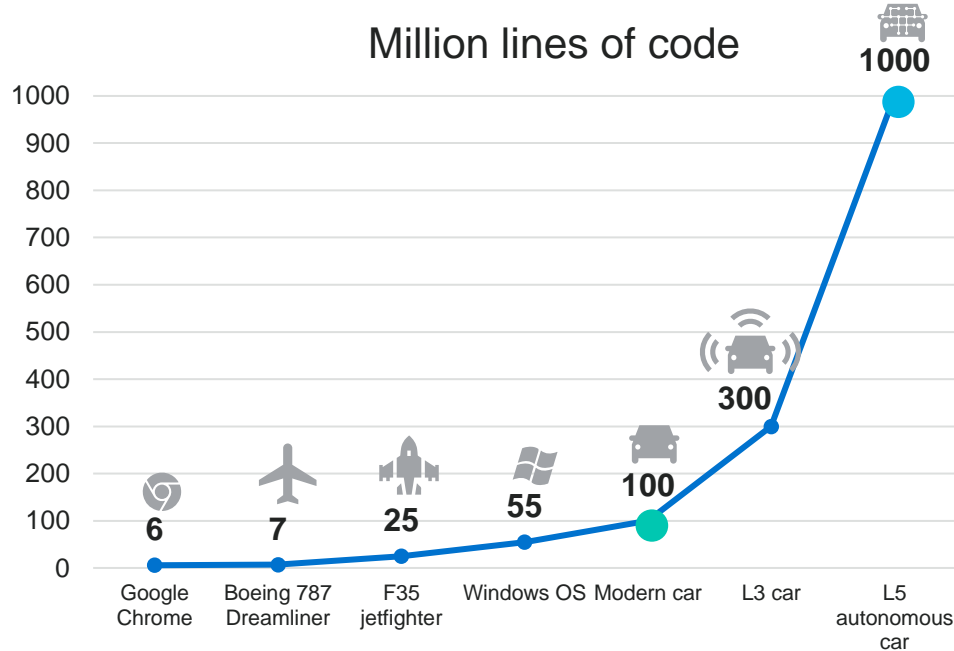# Transition to software-defined vehicles

Yesterday: One time buy

Tomorrow: Pay as you go

Enabled with OTA cloud connectivity

Transition to software-defined vehicles

Million lines of code

Item	Million lines of code
Google Chrome	6
Boeing 787 Dreamliner	7
F35 jetfighter	25
Windows OS	55
Modern car	100
L3 car	300
L5 autonomous car	1000

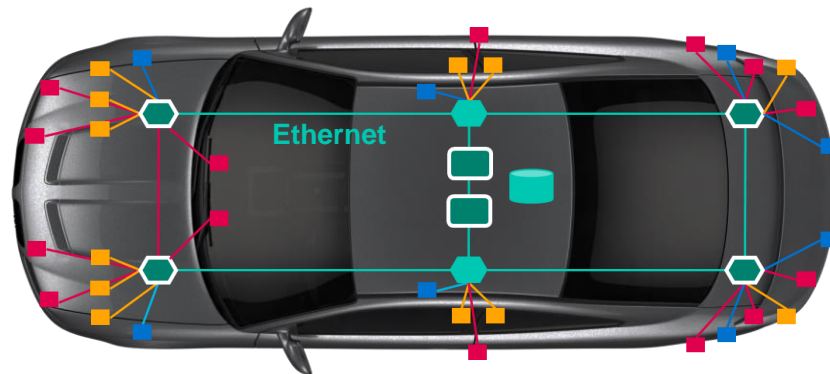Modern car → **10X** → L5 car

More software + connectivity → greater security threat surface

Source: VW

Transition to zonal architecture
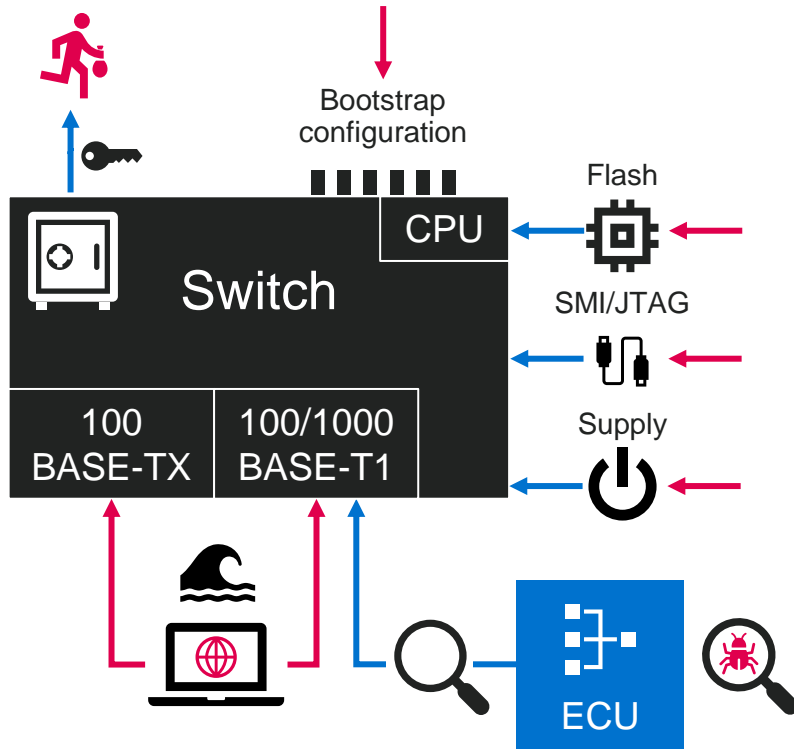

Point to point, rigid, expensive

Networked, secure, scalable, intelligent
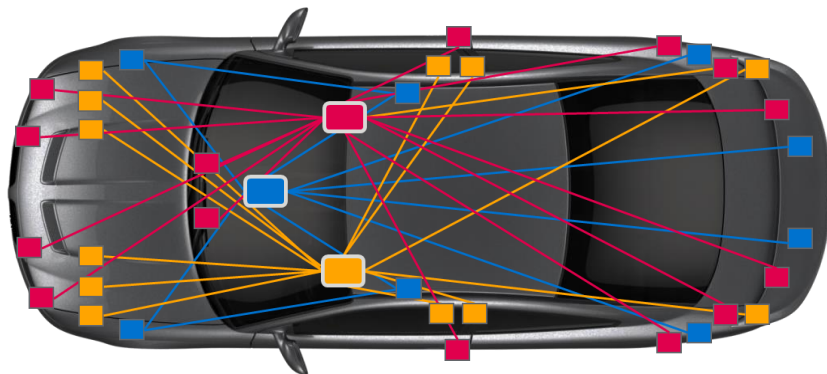
Ethernet

Ethernet is the enabler

Automotive security environment

Areas to secure

- Firmware image
- Device configuration
- Data exchange
- Redundancy and integrity

Example threats

- Prevent or alter configuration
- Steal private information
- Disrupt traffic transmission/reception

Introducing third gen Brightlane™ Ethernet switch

- Most comprehensive and advanced Ethernet switch for automotive security and safety
- Integrated MACsec and PHYs, embedded HSM and dual-core lockstep CPU redundancy
  - Secures Layer 2 and encryption keys
  - Mitigates intrusion, man-in-the-middle, replay attacks

Third gen secure automotive switch with MACsec and 1000BASE-T1 PHYs
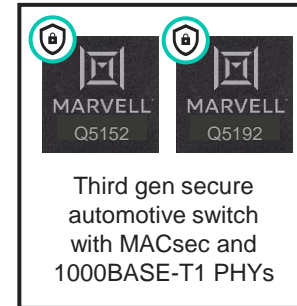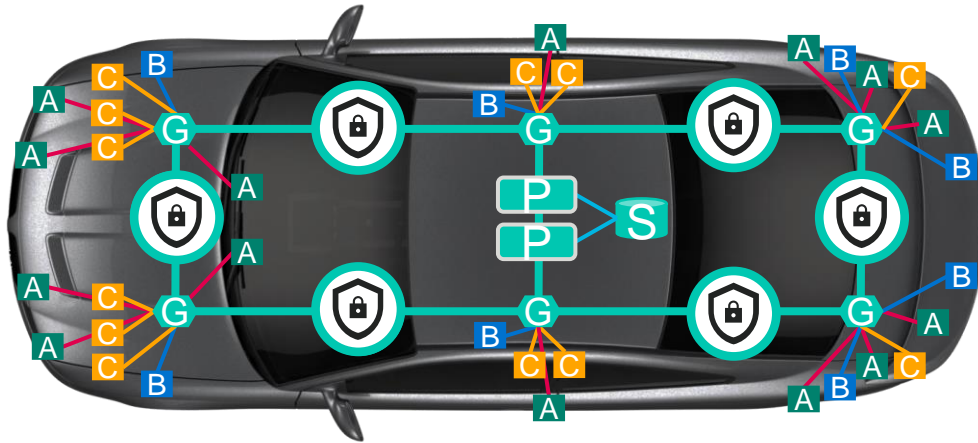
Third generation 88Q5152 Ethernet switch
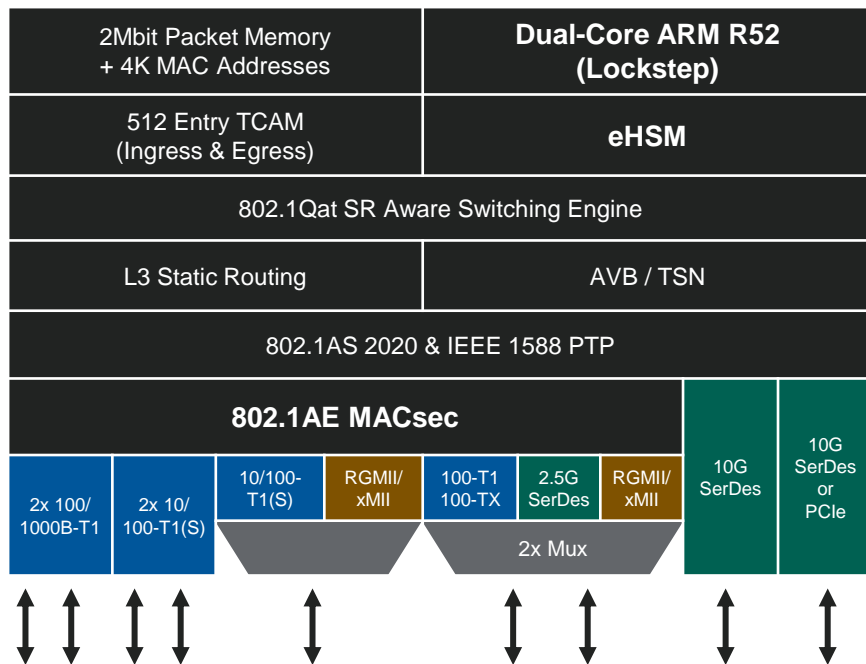
2Mbit Packet Memory + 4K MAC Addresses	Dual-Core ARM R52 (Lockstep)		
512 Entry TCAM (Ingress & Egress)	eHSM		
802.1Qat SR Aware Switching Engine			
L3 Static Routing	AVB / TSN		
802.1AS 2020 & IEEE 1588 PTP			
802.1AE MACsec		10G SerDes	10G SerDes or PCIe
2x 100/ 1000B-T1	2x 10/ 100-T1(S)	10/100-T1(S)	RGMII/ xMII	100-T1 100-TX	2.5G SerDes	RGMII/ xMII		
		2x Mux						

Industry-leading feature set

- Integrated 1000BASE-T1, 100BASE-T1, & 10BASE-T1S PHYs

- 802.1AE MACsec

- Dual-core ARM R52 CPU operating in lockstep

- eHSM for secure key management

- AEC-Q100 Grade 2 (-40°C to +105°C)

- 9-port switch in 15x15mm BGA

Third generation 88Q5192 Ethernet switch
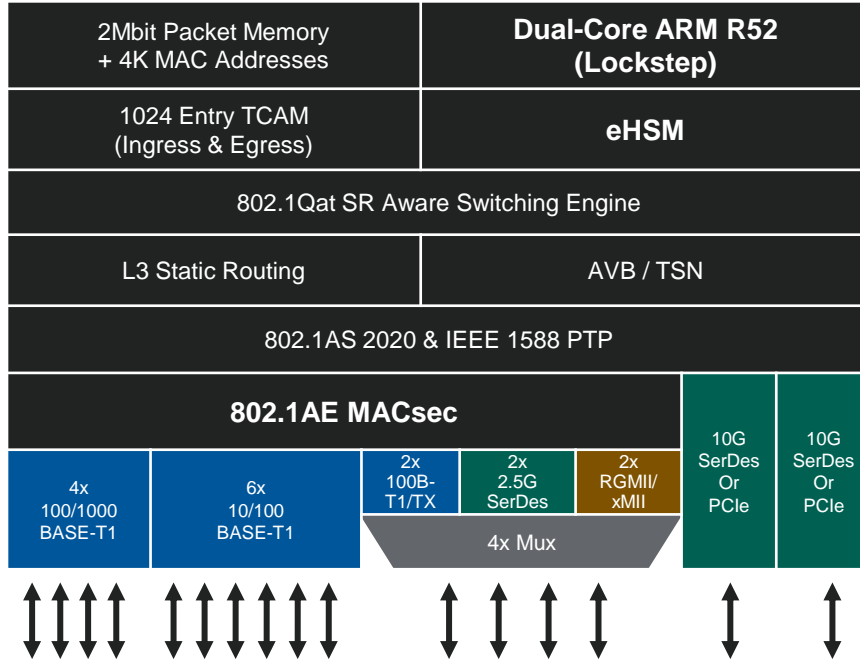
2Mbit Packet Memory + 4K MAC Addresses	Dual-Core ARM R52 (Lockstep)
1024 Entry TCAM (Ingress & Egress)	eHSM
802.1Qat SR Aware Switching Engine	
L3 Static Routing	AVB / TSN
802.1AS 2020 & IEEE 1588 PTP	

802.1AE MACsec

4x 100/1000 BASE-T1	6x 10/100 BASE-T1	2x 100B-T1/TX	2x 2.5G SerDes	2x RGMII/xMII	10G SerDes Or PCIe	10G SerDes Or PCIe
		4x Mux				

Industry-leading feature set

- Integrated 1000BASE-T1, 100BASE-T1, & 10BASE-T1S PHYs
- 802.1AE MACsec
- Dual-core ARM R52 CPU operating in lockstep
- eHSM for secure key management
- AEC-Q100 Grade 2 (-40°C to +105°C)
- 16-port switch in 19x19mm BGA

Enables safe, secure in-vehicle networking

Dual core lockstep CPU redundancy for safety

Layer 2 security through integrated MACsec

ISO 26262 collateral and ASPICE software

Sampling now

88Q5152
9-port secure switch
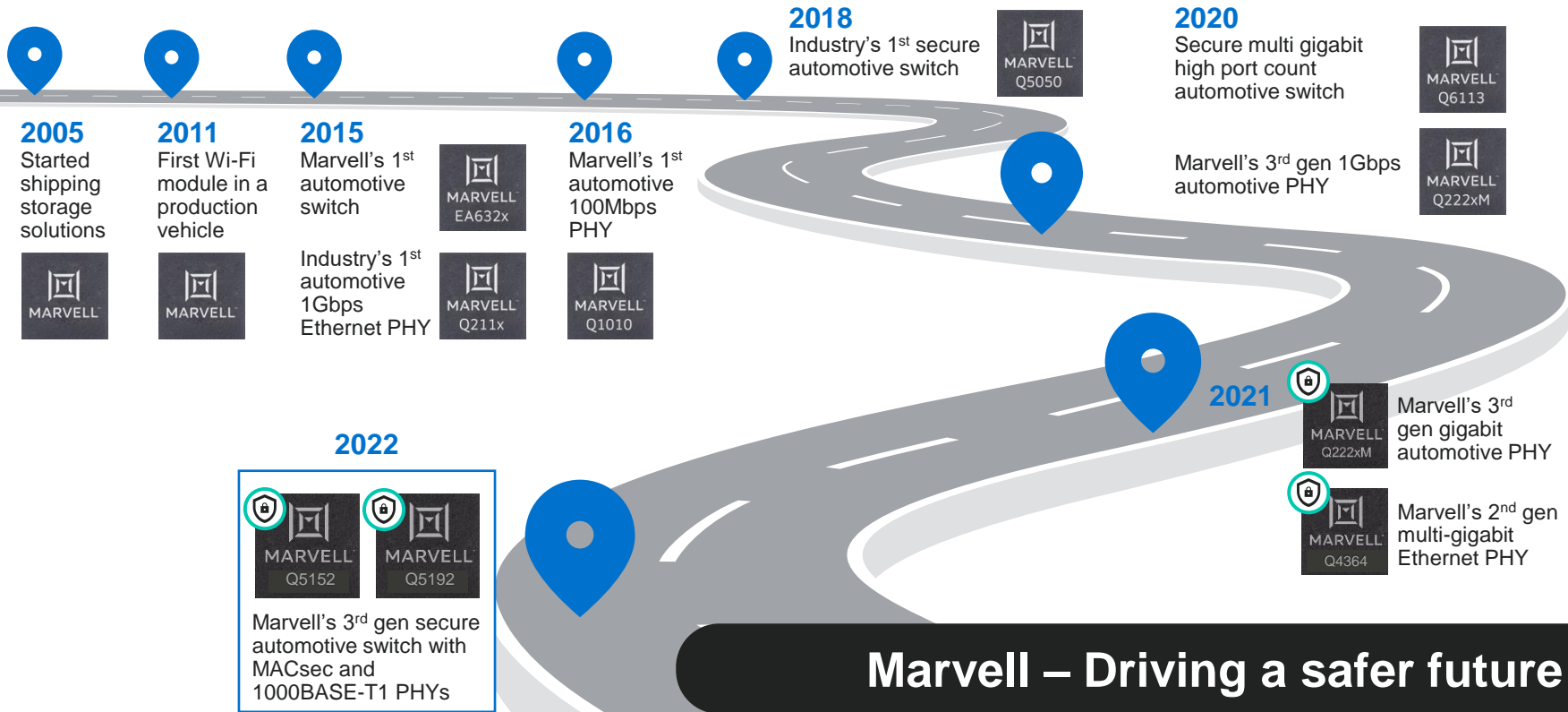with 1000/100/10BASE-T1 PHYs
and MACsec 15x15mm BGA

88Q5192
16-port secure switch
with 1000/100/10BASE-T1 PHYs
and MACsec 19x19mm BGA

Development boards for
88Q5152 and 88Q5192

Extending IVN leadership with 88Q5152/88Q5192

2018
Industry's 1st secure automotive switch

Q5050

2020
Secure multi gigabit high port count automotive switch

Q6113

Marvell's 3rd gen 1Gbps automotive PHY

Q222xM

2005
Started shipping storage solutions

MARVELL

2011
First Wi-Fi module in a production vehicle

MARVELL

2015
Marvell's 1st automotive switch

MARVELL EA632x

Industry's 1st automotive 1Gbps Ethernet PHY

MARVELL Q211x

2016
Marvell's 1st automotive 100Mbps PHY

MARVELL Q1010

2021
Marvell's 3rd gen gigabit automotive PHY

MARVELL Q222xM

Marvell's 2nd gen multi-gigabit Ethernet PHY

MARVELL Q4364

2022

MARVELL Q5152   MARVELL Q5192

Marvell's 3rd gen secure automotive switch with MACsec and 1000BASE-T1 PHYs

Marvell – Driving a safer future

Summary: Third Gen Brightlane™ Ethernet Switch

Extends Marvell's automotive leadership in secure Ethernet IVN

Industry's most advanced and comprehensive security and safety solution

First to integrate MACsec, PHYs, dual core lockstep CPU and eHSM

ASPICE software and ISO 26262 collateral