

KDPOF Optical In-Vehicle Network Solution The New KD9351 Automotive FOT

January 2022









Agenda

- Company overview
- KDPOF technology
- The new KDPOF KD9351 FOT





Business at a Glance

Overview		Product		
Founded	• 2010	Key Products	Transceiver	
Location	Madrid, Spain		 Transimpedance Amplifier ("TTA") LED Driver 	KDPOF KD1001 N6K757 1309
Employees	• 28 FTE including, 15 IC designers	Supply chain	Wafer fabrication with TSMC and XFAB	
Business Model	Fabless ASSP vendor		 Packaging and testing with ASE 	KDPOF KD1001A
In-house capabilities	 Digital, AMS electronics, Optoelectronics and optics design IC & photonics characterisation, automotive qualification, failure analysis 	End markets	 Main focus Automotive Applications in Home and Industrial 	K

Technology		
Patents granted	TransceiverTIALED Driver	EP74397 EP98515 EP80387 EP105112 EP105113
Associations	Jaspar	ALLIANCE
Standards	World Class Standards	KDPOF actively participated in standardisation process



Customers - design wins and prospects

• Progressing from product evaluation to mass production

• Markets

- Automotive
- Home networking
- Industrial





Locations

- Head Quarters
 - Madrid (Spain)
- Other locations
 - France
 - Valencia (Spain)
- Commercial offices
 - Sweden
 - Germany
 - Japan
 - Korea
 - GC





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HD video is pushing auto link capacity above **100 Gb/s**·m where fiber is advantaged over copper







Optical 1000 Gb/St 25 Gb/s 50 Gb/s x 15 m x 15 m [4K 24b 60fps] 11.9 Gb/s x 10 m 100 Gb/s+r

10

100

Data rate (Gb/s)

* Source: Corning Inc.



Copper transmission can evolve, but not without significant challenges

Technical approach

Add more (parallel) lanes	Cost andConnectionDecrease
Larger conductors (& shielding)	Cost andConnectionDecrease
Increase DSP complexity (equalization, FEC, etc.)	Higher poIncreased
Higher signal amplitude	Higher poIncreased

Associated issues

weight of duplicate cables and connectors on size increase ed mechanical flexibility weight of cables on size increase ed mechanical flexibility ower consumption d latency ower consumption d EMC issues

* Source: Corning Inc.





Optical brings a number of advantages to IVN

Optical Fiber Advantage

Cost effective reach	 Flexibility optimum
Cable size, flexibility Connector size	IncreasedEasier ins
Lower cable weight	 Fuel effici
Upgrade path	 Fiber doe data rates
Glass fiber does not work harden	 Fiber cable without b
Reduced EMC issues	Glass fibeReduced
Low power consumption	Longer baseImproved
Link reliability	 Reduced shielding



Impact on IVN (In-Vehicle Network)

- to locate high data rate components in locations
- d mechanical flexibility of harness stallation and routing of cable ends
- iency
- es not require cable upgrade for future higher s
- les can resist repeated bend and vibration reakage better than copper
- er provides galvanic isolation, EMI resistance engineering costs
- attery life
- thermal management
- risk of interconnect loss/failure due to aging of

* Source: Corning Inc.



	KDPOF Current Technology	KDPOF Next Generation			
IEEE Std	IEEE Std 802.3bv 1000BASE- RH	IEEE P802.3cz nGBASE-AU			
Bit rate	100 Mb/s 1 Gb/s	2.5 Gb/s 5 Gb/s 10 Gb/s 25 Gb/s 50 Gb/s			
Light source	650nm LED	IR VCSEL			
Medium	SI-POF	OM3 MM-GOF			
RX	PIN photodiode	PIN photodiode (smaller, faster)			
Performance	40m-0IC 15m-4IC	40M-4IC			
Semiconductor Technology	CN	MOS			
BER	1	0 -12			
Temperature (°C)	-40 ~ +105				





KDPOF Advanced DSP

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125°C



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KD9351: The New KDPOF Automotive 1G FOT New Optical Port Concept











KD9351 Block Diagram





- KD9351 FOT integrates:
 - TX: LED driver, LED
 - RX: TIA, PD
 - EMC shielding





KD9351 Features

- Operation modes
 - **1** Gb/s operation mode, 1000BASE-RHC Physical Medium Dependent (PMD) sublayer according to the IEEE Std 802.3bvTM-2017
 - **100 Mb/s** operation for applications requesting low data rates and high optical link margin
- Optimized for multimode plastic optical fiber (**POF**) with the channel characteristics specified by IEEE Std 802.3bvTM-2017 Clause 115
- Wake-up & Sleep support as per ISO 21111
- Guaranteed **BER < 10⁻¹²** for 1 Gb/s and 100 Mb/s operation modes, when operating with KD1053 PCS-PMA transceiver
- Low power consumption, single 3.3 V supply
- **Low-cost** bill of materials (BOM)
- Automotive **AEC-Q100 grade 2** (-40 to +105oC operating ambient temperature)
- 36-pin LGA (7 x 8 mm) package









KD9351 Header Connector





- Pitch reduced from 6,2mm to 4mm
- Port downsize
- Shield case removed from the connector with same EMC performance, as shielding is integrated into the KD9351 component
- Snap-fit connector, no soldering necessary





MOST 150 vs. Next Generation

SFF vs. Next Generation



Thank you

César Esteban <u>cesar.esteban@kdpof.com</u>

https://www.kdpof.com

