

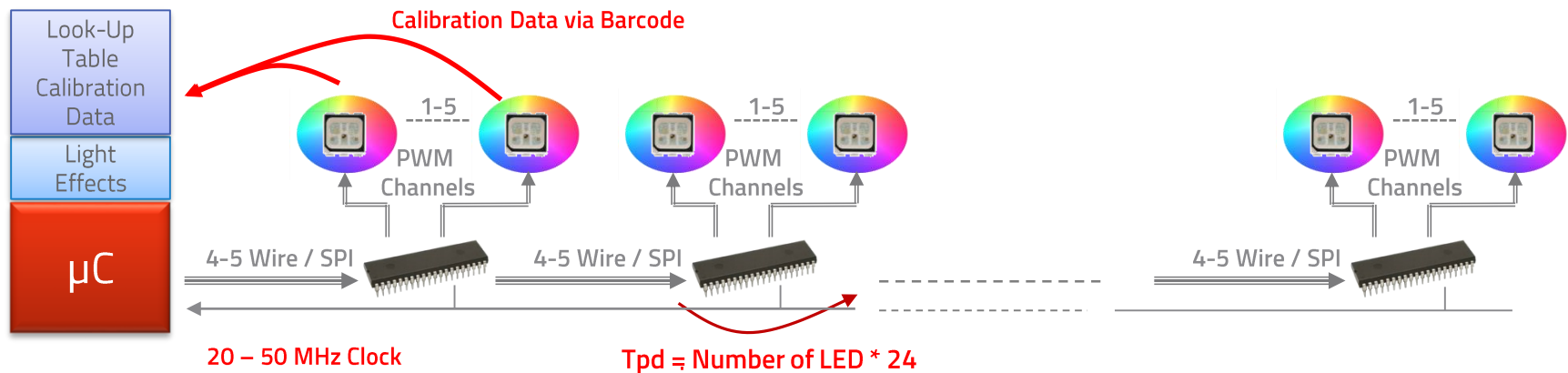


A short Introduction

November 2016

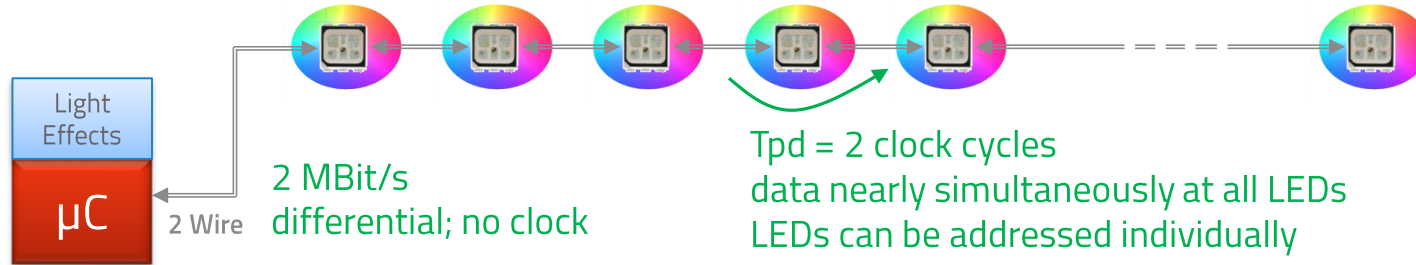


Current System Concept for LED Lighting



- Large number of integrated circuits and wiring requirements
 - high cost
- Calibration of each LED and drivers necessary to stabilize color and brightness over temperature and lifetime
 - binning classes and barcoding
 - extensive and complex SW management
- One way communication to LED and sub controllers with latencies
 - high speed communication impacting EMI robustness
 - no diagnostics

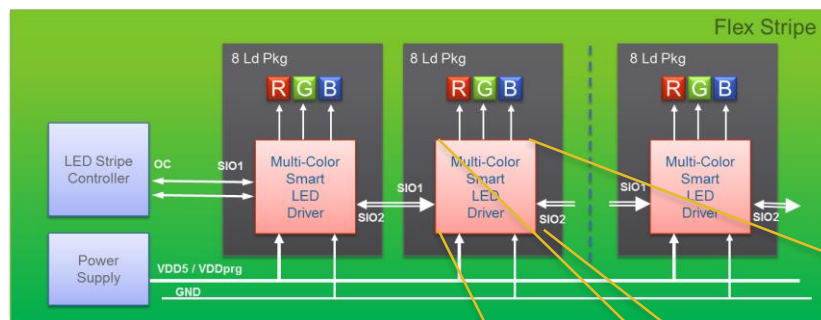
Inova LED Controller Concept



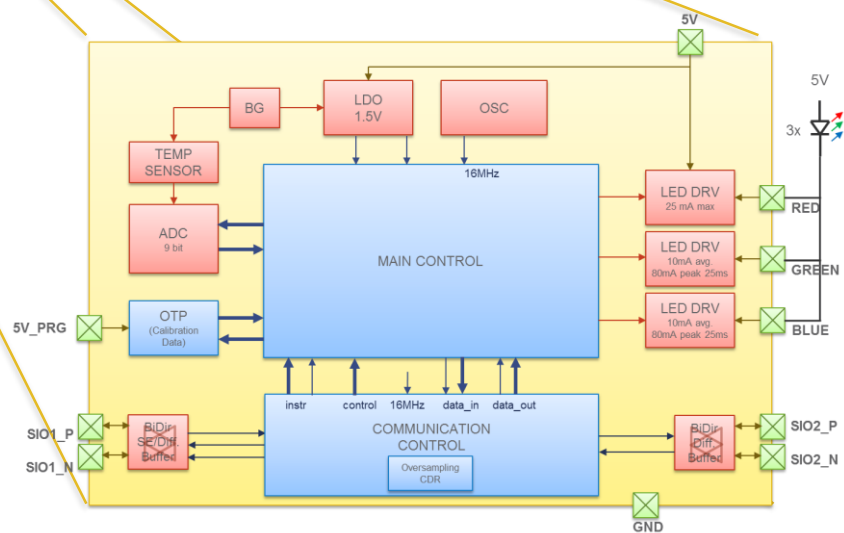
- Integration of LEDs, LED controller and advance communication link in one small 3 mm package
 - system cost reduction
- Calibration of LED and driver during production process of LED module
 - no binning classes, no bar coding – calibration data stored in LED
 - no look up tables in µC anymore
 - system assembly using LED from the tape with guaranteed parameters
- Bi-directional communication between µC and LED module with lowest latencies
 - EMI robust design based on 2 Mbit/s communication - no dedicated clock
 - LED temperature can be diagnosed individually by µC
 - efficient use of bandwidth due to individual addressing of each LED



System Concept



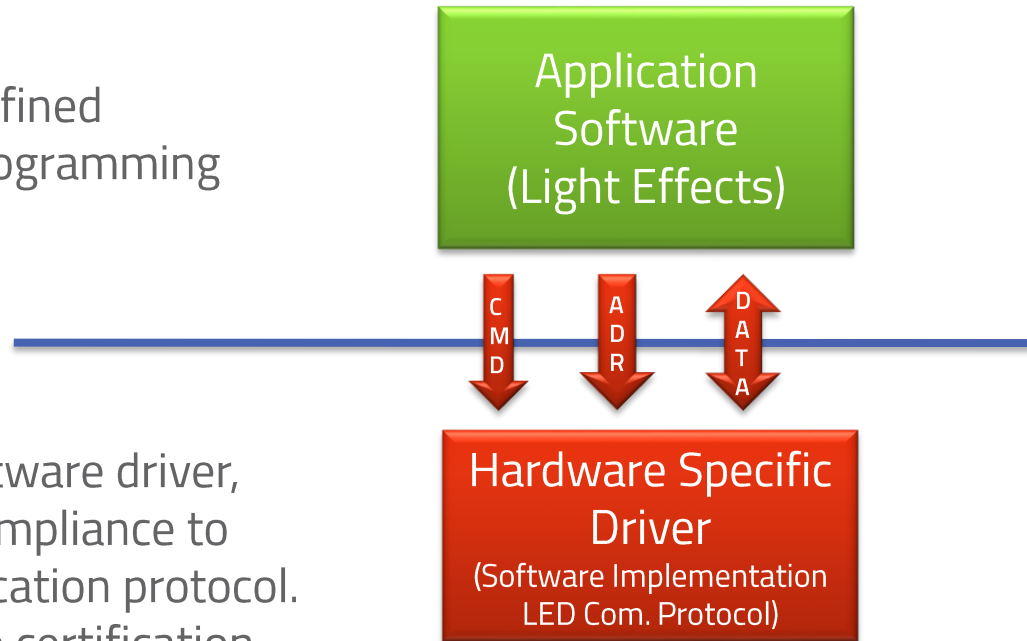
up to 4096 LED



Inova Deliverables

Stable, well defined
Application Programming
Interface (API)

First hand software driver,
guarantees compliance to
LED communication protocol.
No compliance certification
required.







Summary

	State of the art	Inova LED Controller
Control and Communication	For changing a parameter in a single LED, all LEDs have to be addressed and updated (shift register approach)	Each LED can be addressed individually. All LED can be addressed via broadcasting if required
Calibration of Color and Brightness	Parameter transfer via barcoding Binning classes (grading)	Calibration of LED at the end of LED production, data stored in LED.
Temperature Compensation	SW controlled by Microcontroller	Automatic, selfcontrolled in LED
Handling	Calibration data for LED need to be stored in Lookup tables and handled by SW in main controller	Automatic calibration by controller in LED
Diagnostics	Very limited via OC error signaling. No identification of affected LED.	Temperature, status and functionality can be accessed for each LED.



ISELED Open Alliance

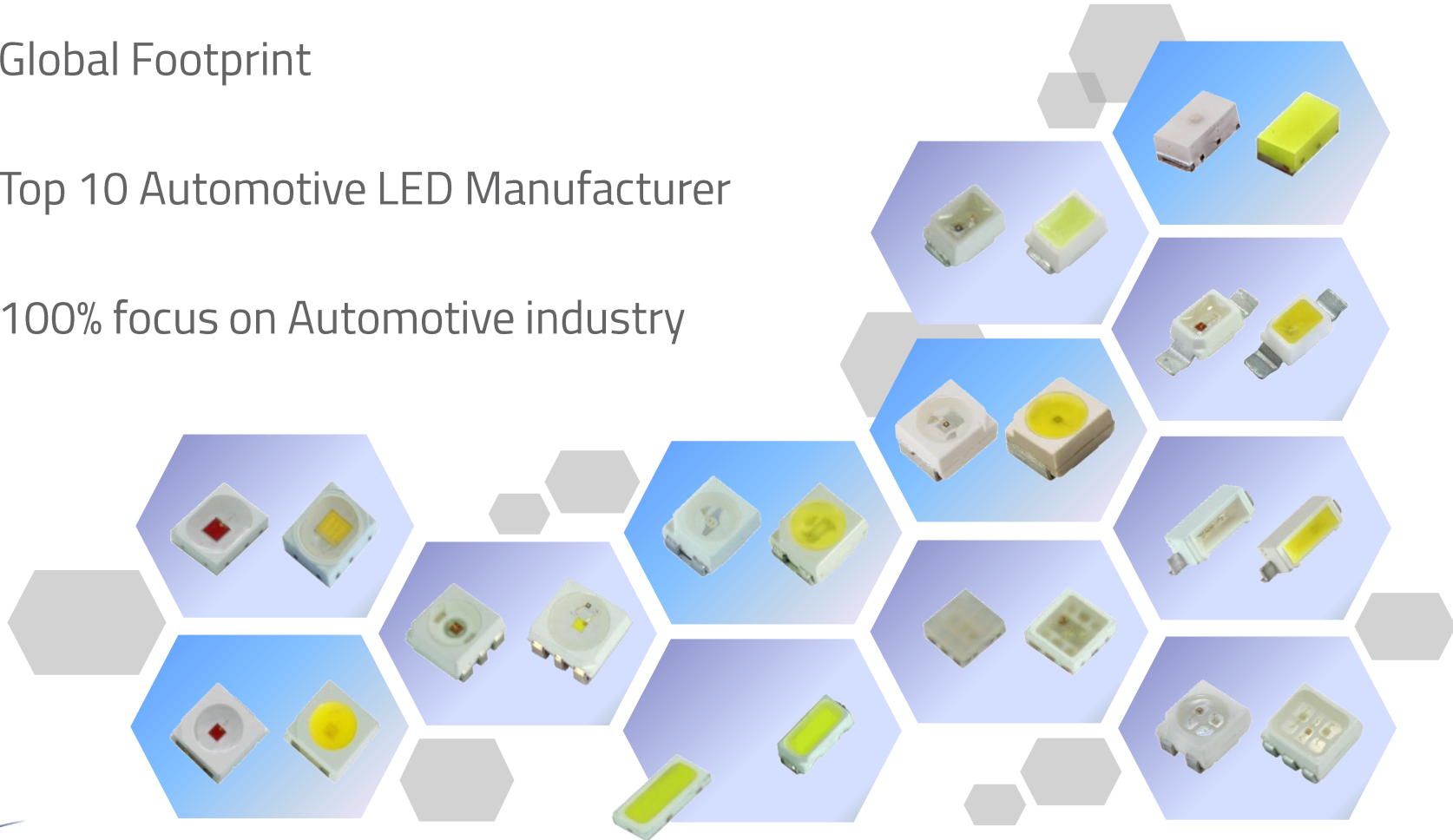
- Open Alliance announced to provide system concept to car manufacturers
- Theoretical Framework **DISPLAY LAB**
PFORZHEIM UNIVERSITY 
- LED Manufacturer **DOMINANT™**
Opto Technologies
Innovating Illumination
- System Controller 
- System Integrator 
- ISELED Concept LED Controller 



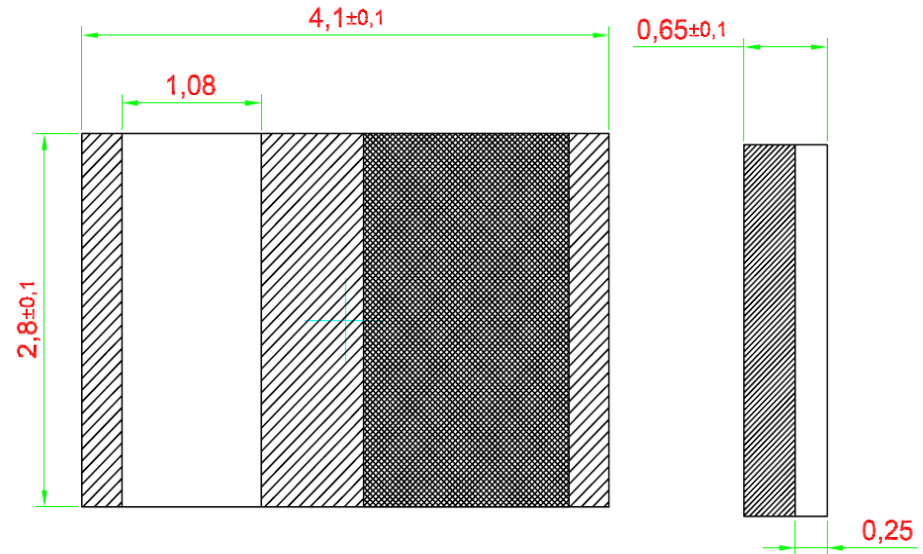
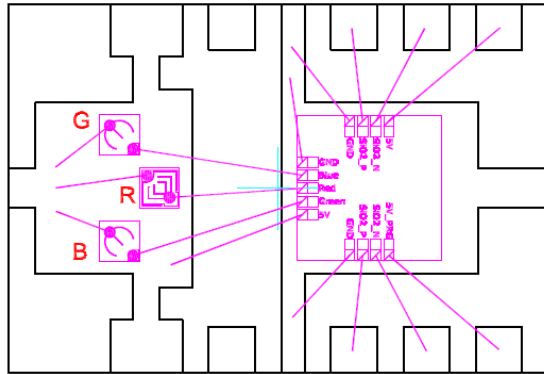
Dominant

DOMINANT™
Opto Technologies
Innovating Illumination

- Global Footprint
- Top 10 Automotive LED Manufacturer
- 100% focus on Automotive industry



State of the Art Packaging



Miniature size



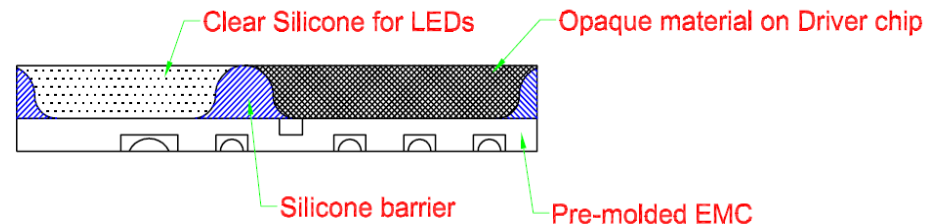
Low thermal resistance



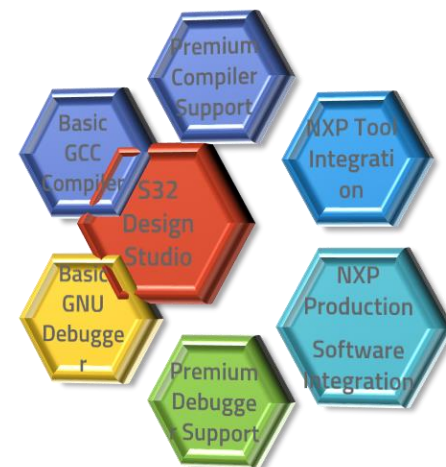
Superior corrosion resistance



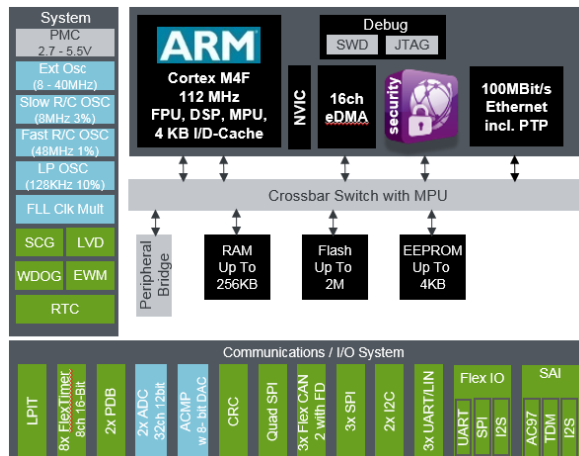
Min 2KV ESD Protection



S32K MCU - Perfect Fit



Flash	Pin Count								
	16/24	32	48	64	80	100	100 BGA	144	176
2M							S32K148	S32K148	S32K148
1M						S32K146	S32K146	S32K146	
512K				S32K144		S32K144	S32K144		
256K			S32K118	S32K142 / S32K118		S32K142			
128K		S32K116	S32K116	KEAZ128	KEA128				
64K		KEAZN64		KEAZ(N)64	KEAZ64				
32K		KEAZN32 /		KEAZN32					
16K		KEAZN16		KEAZN16					
8K	KEAZN8								



Most Scalable Portfolio

- ARM Cortex M
- 8K to 2M Flash
- HW and SW compatibility



Performance and Features

- Up to 112MHz
- Best low-power
- ISO26262 – ASIL support
- Hardware Security (CSEC)
- ISO CAN-FD
- FlexIO – Configurable Serial Communication Interface

Availability of S32K144 and SDK:
Samples/Beta SDK: Now
Production: H2 2017



Ecosystem

- S32 Design Studio
- SDK: Software Development Kit
- Autosar





- TE providing **early application prototypes** as part of the project
- Strengths include electromechanical packaging and connectivity
- Thanks to our advanced engineering teams supported by our global lighting teams in Europe and Canada

Demand for higher integration of optical parts, electronics and connectivity should interior lighting evolve as indicated

Availability

- First samples of LED Controller by Inova Q1 2017
- First samples of LED by Dominant Q1 2017
- LED Demokit by Inova Q1 2017





DISPLAY LAB
PFORZHEIM UNIVERSITY



DOMINANT™
Opto Technologies
Innovating Illumination

 **inova**
Semiconductors





SPEED UP YOUR LIGHT



REVOLUTIONARY CONCEPT FOR INTERIOR LIGHTING IN VEHICLES

- Digital LED, Calibration-Free Use
- Simple 2-Wire Interface
- Embedded Temperature and Aging Compensation
- Daisy Chaining of up to 4.096 LED
- Complete Ecosystem (LED, Controller, Software)
- Full Diagnosis Capability for Functional Lighting
- Designed for Automotive

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