.dp digital power 2.0 for programmable LED drivers

Light + Building, Frankfurt
March 13 – 18, 2016

Thomas Hutsteiner, Business Manager

Todays challenges in the lighting industry

The **lighting industry undergoes a fast transition** towards solid state LED lighting

- Companies need to completely **restructure** their R&D and manufacturing
  - **Acquire new competency** and partnerships
  - Development and **product cycles become much shorter**
  - **Manage portfolio diversity** and keep R&D and operational expenses (OPEX) under control
- Companies are actively shaping the future with **game-changing innovations** and unique systems and services
  - Keep the pace with **innovation leaders**
  - Realize benefits of connected and **smart lighting**

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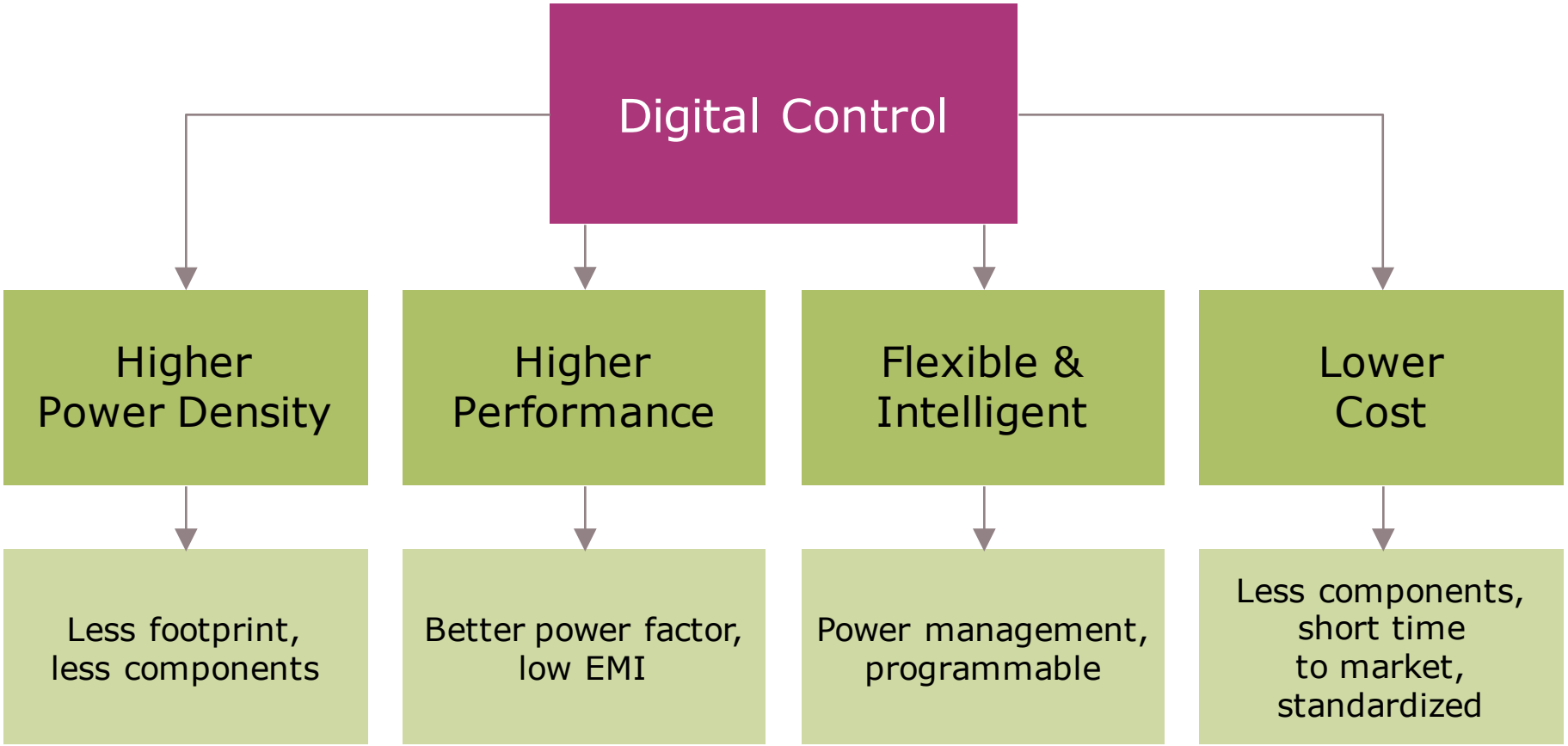
Digital control offers a wide range of benefits



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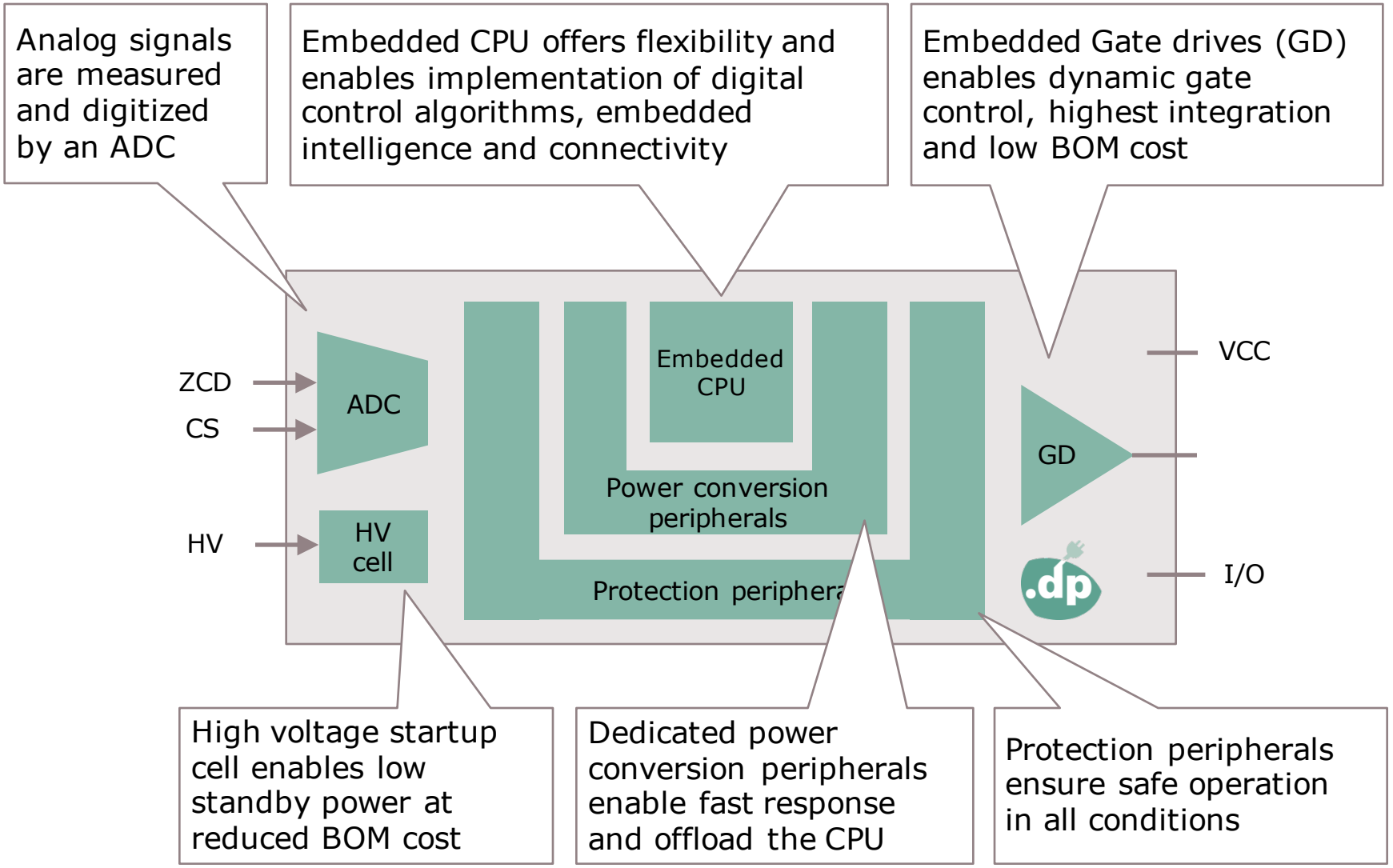
Infineon .dp digital power 2.0 is the first embedded digital power system



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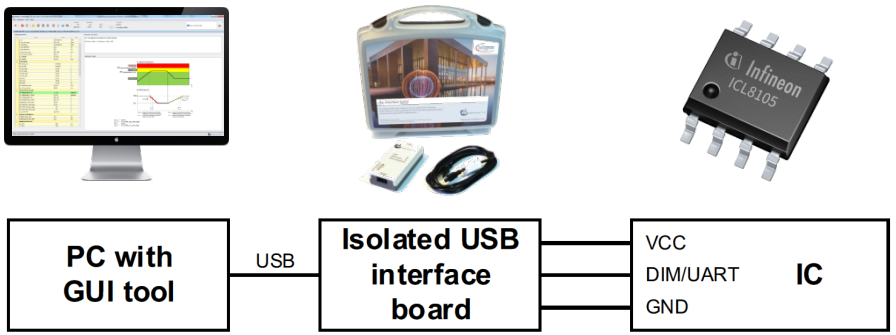
Our business model: We offer ready-to-use & configurable ICs for a maximum in flexibility

- Infineon delivers an **application specific standard product** (ASSP), the user does not have the burden to program functionality
- The user has a maximum of **flexibility by parameter configuration**, such as the output current, the minimum dimming level, defined operation limits like the maximum allowed temperature, etc.
- **All relevant tools are provided** to conveniently configure parameters and program the IC during the development process and even for production



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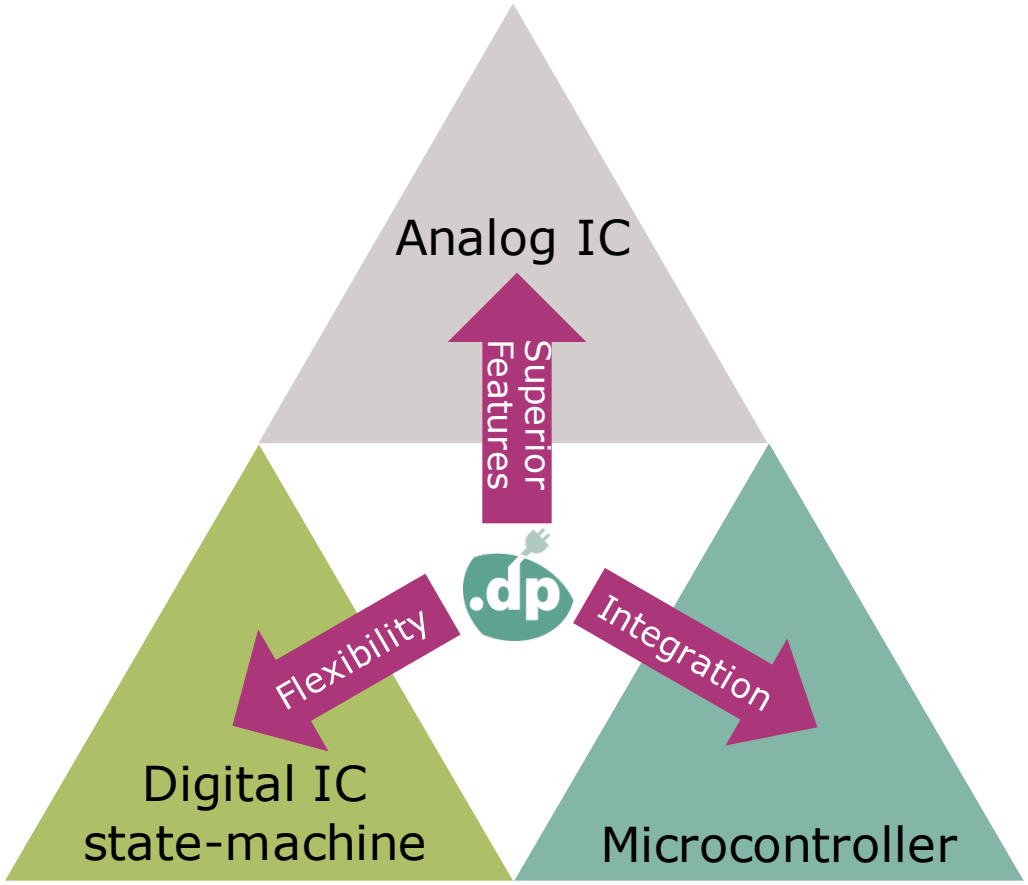
.dp is a new technology and combines the advantages of alternative solutions



- **Analog ICs:**
  Limited feature set requires external component network, adaption leads to many PCB variants
- **Microcontroller:**
  Control algorithm know-how & R&D resource needed, requires **many external components** for power conversion
- **Digital IC state-machine:**
  Advanced functionality, but the missing core means a **compromise in flexibility**

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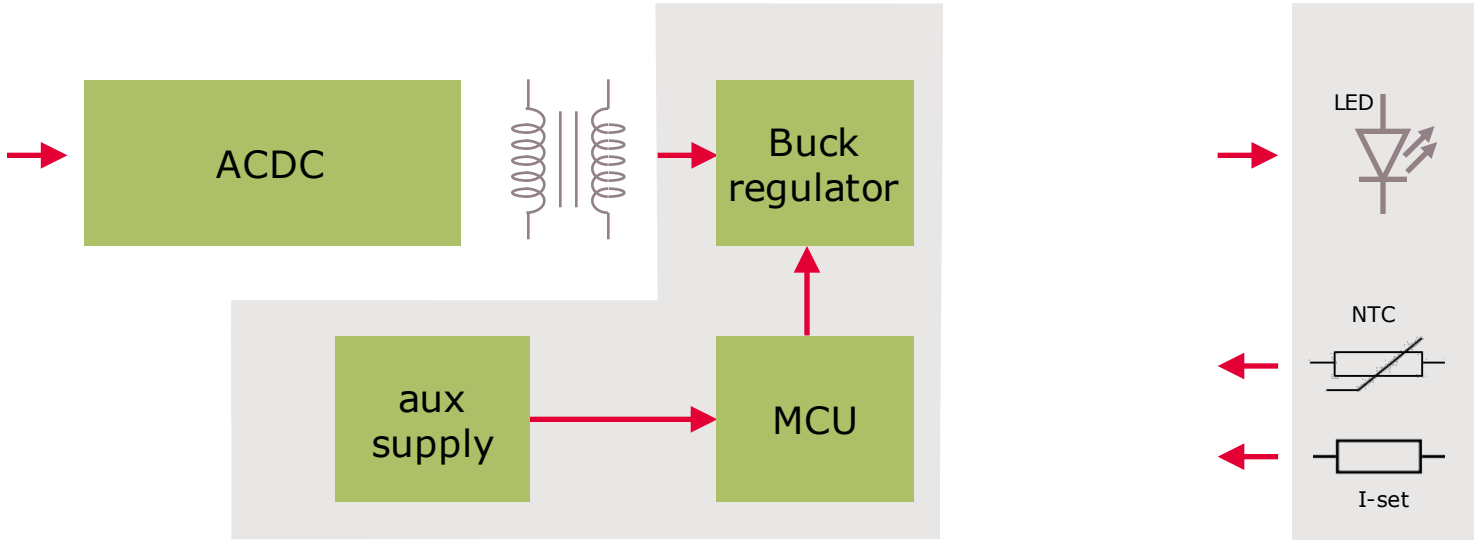
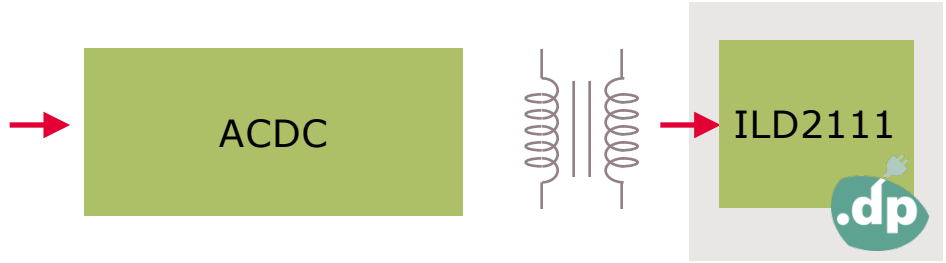
Competitive system & BOM cost by integrating added value features

State of the art



Solution built on .dp ILD2111 reduces BOM cost by up to 20 %



A CPU is needed to process the I-set and NTC resistor value to set the right driving current

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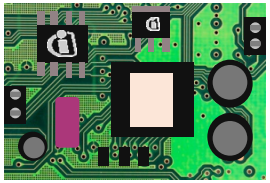
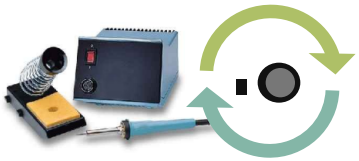
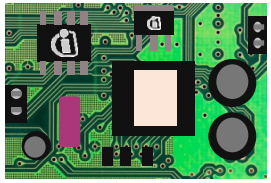
Real-time parameter configuration speeds up the development rapidly

Conventional

Conventional analog configuration:
Iterations take several hours


New dimensioning → Get & change components → Design & assemble PCB → Verify

.dp digital power 2.0

Real time configuration:
Iterations take a few minutes only




Real-time configuration → Verify

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Convenient parameter configuration during development supported with all relevant tools

ICL8105 Single Stage PFC QR Flyback
System Simulation & Design Creation

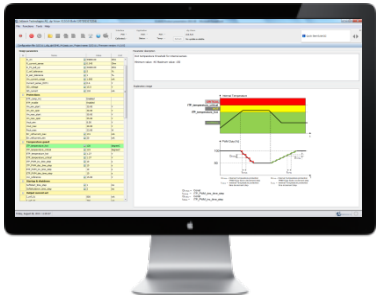
digital power™ 2.0

Author of Tool:	*Lau Tiam Poh (IFAP DC PMM AE)*	*Cell Legend:* Design Input *Read/Write*; Info *Read Only*; Output *Read Only*
Release Version:	*3,00*	
Important Note:	*i) Macro must be enabled & saved in *.xlsm format for this tool.*	
	ii) For Excel best view settings, please click >> Optimize View	
	iii) Sheet protected by password. User can only modify Design input(light-green coloured cell)	
	Iv) Please press "Enter" on the cell which design input is modified (except drop-down list input)	

Step 1:	System Simulation & Transformer Design	OK
Step 2:	Transformer Construction (Optional)	OK
Generate:	TRANSFORMER DRAWING	OK
Step 3:	Finalize System Design	OK
Generate:	BOM & IC PARAMETERS	OK

A user friendly tool simplifies the parameter configuration process. Experienced LED driver designers can finalize a paper design within 15 minutes

All relevant tools are provided to conveniently configure parameters and program the IC during the development process





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Programmable LED driver with digital power 2.0 increase supply chain efficiency

Programmable LED drivers allow **lighting fixture makers** to rapidly respond to customer needs. At the same time they significantly reduce the number of stock keeping units.

	Case	Power Rating	350 mA	500 mA	700 mA	900 mA	1050 mA	1400 mA	1750 mA
1		5W	X						
		10W	X	X	X				
		15W	X		X				
2		20W	X	X	X				
		30W			X				
		35W	X	X	X		X		
3		42W				X	X		
		60W			X		X		
		65W						X	X

Manufacturers of electronic control gears can introduce platforms to minimize the number of assembly variants.

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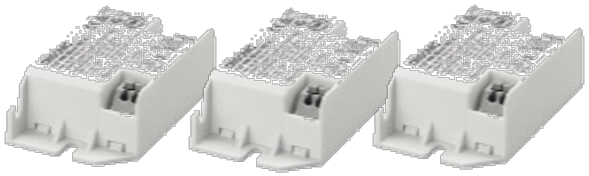
Infineon offers a turnkey solution to enable programmable LED drivers

Conventional LED driver



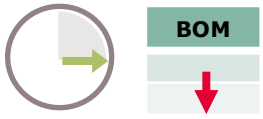
350mA 500mA 700mA

Programmable LED driver



Infineon offers a turnkey solution for programmable LED drivers

- No additional microcontroller and software expertise required, leading to less cost, lower BOM and shorter time to market



- Generation of a customized GUI to be used for programming the LED driver. This is supported by the ".dp vision GUI builder" software tool



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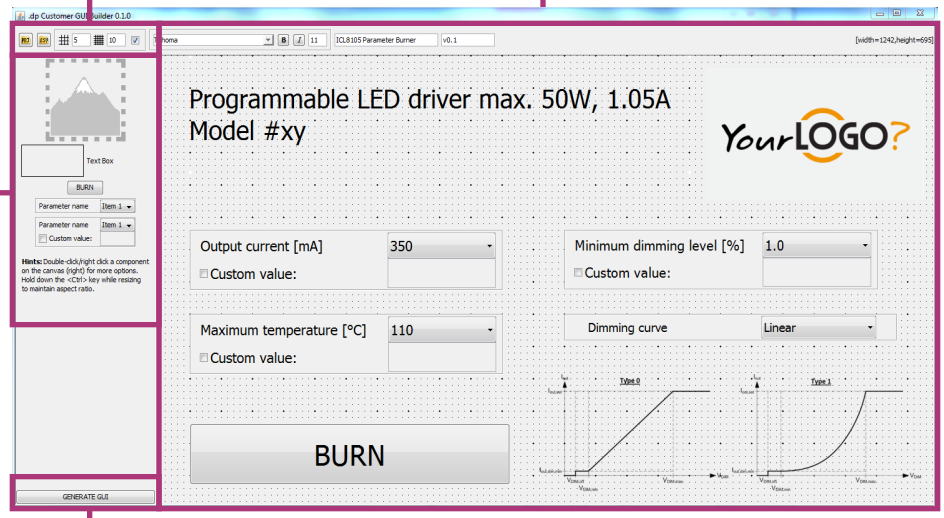
Generation of a customized software with the .dp vision GUI builder

- Arrangement and scaling of elements
- Selection of parameters and edit names

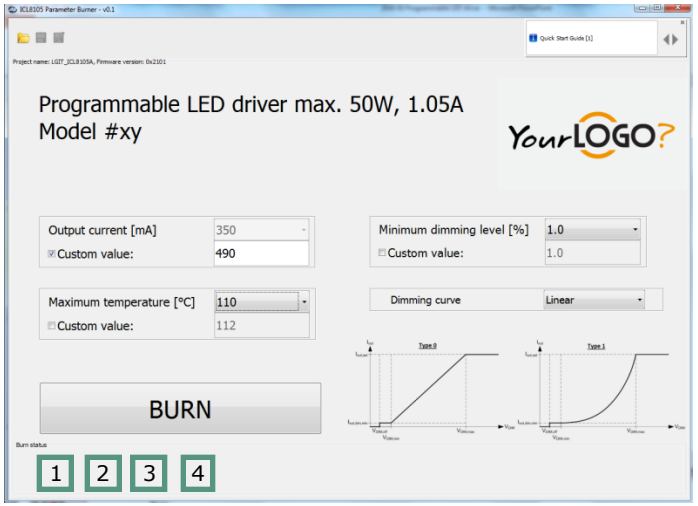
Open parameters and save project



Generation of software

Selection of elements: Drop box, combo box, text, frame, picture

Customized software



- Fully customized to imitate corporate style look & feel
- Multiple LED drivers programmable simultaneously
- Status reporting

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Digital power 2.0 products, ICL8105 and ILD2111 are high performance ICs



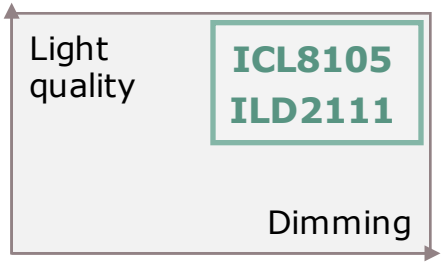
Configurable **single-stage flyback** controller with power factor correction (PFC) for constant output current

- Smooth operation with extended dimming capability
- Fast engineering and simplified variant handling in production
- Isolated 0-10 V dimming with configurable dimming curve
- Intelligent thermal management
- Small BoM due to primary side control and high level of integration



Configurable **DCDC buck** controller, designed as a constant current source with hysteretic regulation

- Output current setting with a simple resistor, digitally configurable to be LEDSET 1 & 2 value compatible
- Flicker-free, phase-aligned PWM dimming to 1 %
- Selection of optimal operating window with respect to switching frequency and output current ripple
- Scalable input voltage range



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Summary

- **.dp digital power 2.0** products ICL8105 and ILD2111 address the fast growing segment of **programmable and dimmable LED driver**
- By integrating functionality, digital power 2.0 helps to reduce the bill of material, leading to **competitive system cost**
- **LED driver designers** can conveniently configure operation parameters of the IC to **speed up the development process**. Digital configuration enables platform concepts to **reduce the number of assembly variants**
- **LED fixture makers** can significantly **optimize the supply chain efficiency** with programmable LED drivers

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Support material

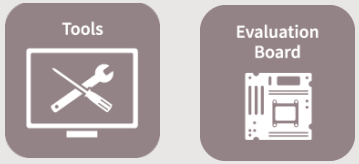
Collaterals and Brochures



- Product Briefs
- Selection Guides
- Application Brochures
- Presentations
- Press Releases, Ads

- www.infineon.com/dp
- www.infineon.com/lighting
- www.infineon.com/webinar

Technical Material



- Application Notes
- Technical Articles
- Simulation Models
- Datasheets, MCDS Files
- PCB Design Data

- www.infineon.com/ICL8105
- www.infineon.com/ILD2111
- www.hitex.com/dp
- www.infineon.com/lowcostleddriver
- www.infineon.com/ledoffline

Videos



- Technical Videos
- Product Information Videos

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Contact



- Digital Power 2.0 Team

mailto:DigitalPower2-0@infineon.com

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