



Efficient Lighting

Power Management & Control Solutions

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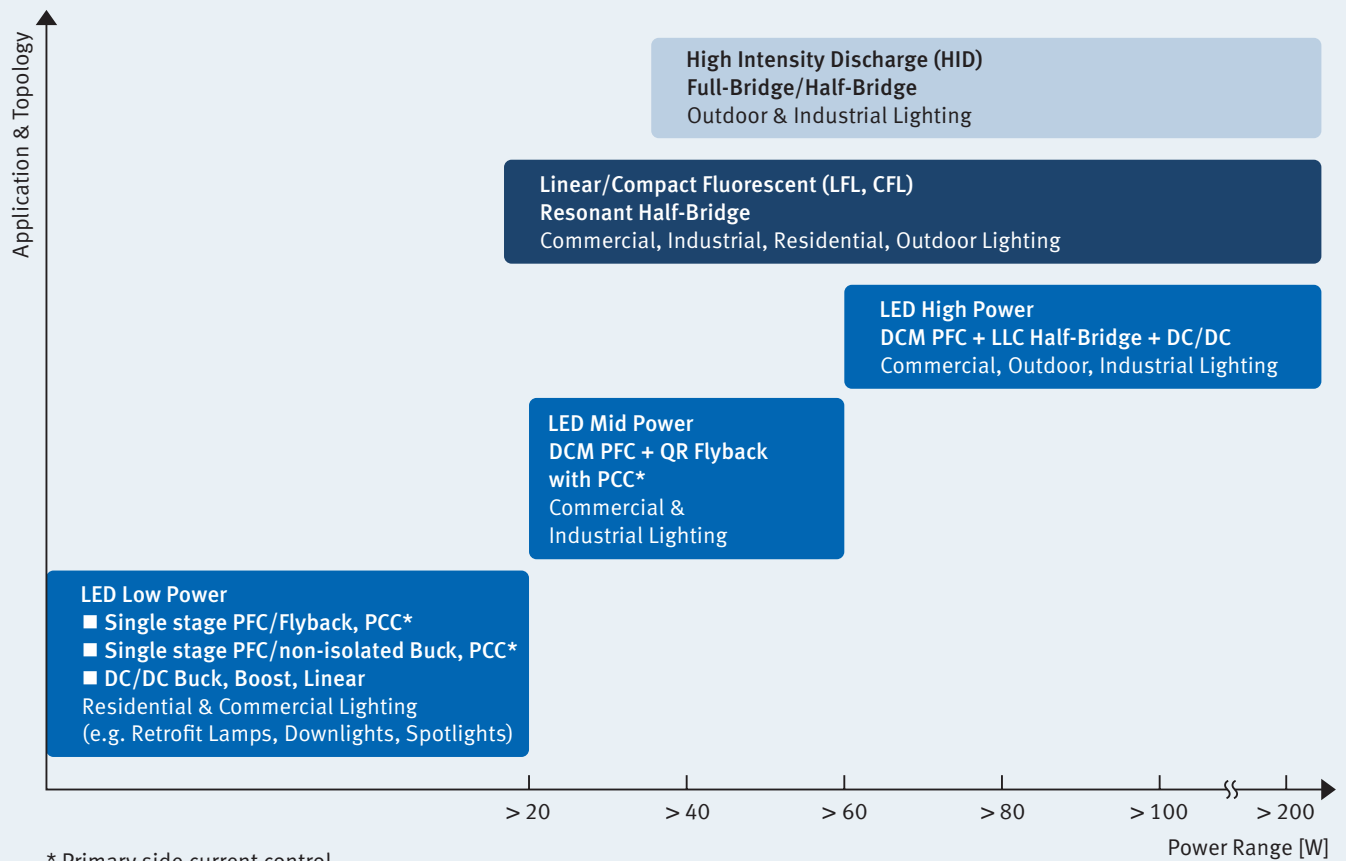
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Global concerns regarding climate change demand that we use our limited energy resources more efficiently. Approximately 20% of the global electrical energy is consumed by lighting applications. The trend toward energy-efficient lighting is apparent and requires both efficient light-source technologies and electronic components. Infineon as global number-one-ranking power semiconductor market leader for the last 8 consecutive years, offers an innovative product portfolio for general lighting applications, supporting benchmark efficiency improvements, system miniaturization, reliability and overall cost savings.

Infineon delivers innovative, high-performance solutions with best-in-class technologies that can be used in a broad range of applications.

- Fully integrated ballast controllers for fluorescent lamps
- Highly efficient offline LED driver ICs for lamp retrofits and low-power LED converters
- DC/DC switched mode and linear LED drivers for single string LED applications
- High performance power management ICs and microcontrollers for intelligent lighting systems
- Extensive portfolio of leading edge CoolMOS™ and OptiMOS™ Power MOSFETs

Lighting applications vs. power range & topology



Due to our highest level of quality, service and technology, Infineon is an OSRAM “LED Light for you” certified partner and supports customers with outstanding and forward-looking solutions for Solid State Lighting (SSL).





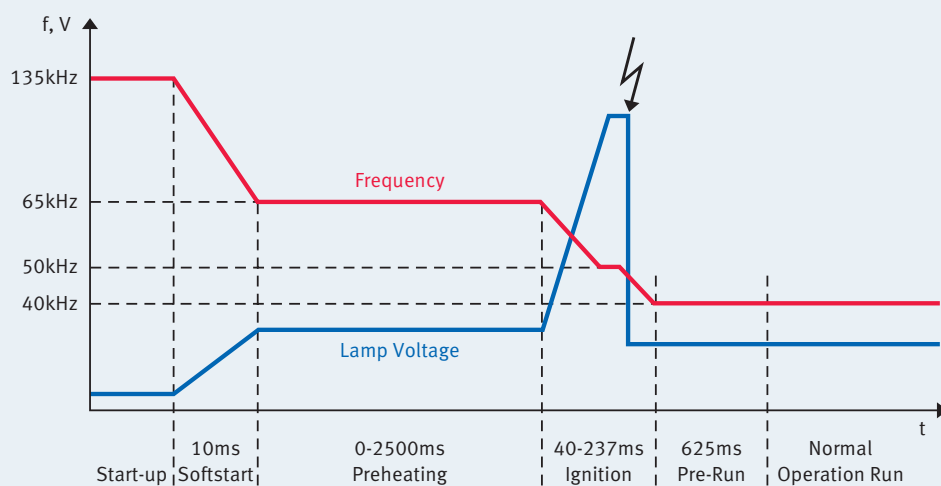
Smart Fluorescent Ballast Controllers

Smart ballast control ICs by Infineon integrate all functions required to operate FL lamps such as preheat-, ignition- and run-mode and protection features. Digital mixed-signal power control is employed enabling speedy, cost-effective and stable ballast designs with a minimum number of external components. Reliable and robust high voltage isolation is achieved using Infineon's proprietary CoreLess Transformer technology (CLT).

Product Highlights

- Integrated high performance critical conduction mode PFC stage
- Improved Total Harmonic Distortion (THD) and harmonic distortion for low power applications in DCM mode
- Built-in protection functions such as Over-Voltage Protection (OVP) and Over-Current Protection (OCP)
- Adjustable end-of-life detection in multi-lamp topologies and detection of capacitive mode operation
- Intelligent digital-/mixed-signal lamp inverter control
- Integrated high-voltage level-shift half-bridge driver using coreless transformer technology

Infineon smart ballast fluorescent controllers have the control for all operating phases integrated



Key Features

- Able to handle lamp chokes with high saturation behavior
- Special in-circuit test mode for faster test time
- Parameters set with resistors only
- Excellent dynamic PFC performance enables very low THD across wide load ranges
- Separate adjustable levels of lamp overload and rectifier effect detection (EoL1, EoL2)
- Intelligent discrimination between surge and half-bridge overcurrent events
- Self-adapting dead time adjustment of the half-bridge driver
- Highly accurate timing and frequency control over wide temperature range (-25 to 125 °C)

Benefits

- Optimized lamp choke size, reduced BOM costs
- Halving the time for key tests such as end-of-life detection and preheat/operation modes
- Reduced system cost and improved ballast stability
- Suitable for dimming & multi-power ballasts
- Enables ballast compatibility with a wider range of lamp types
- Lamp can automatically restart following surge events and handle correctly EOL events
- Eases design of multi-power ballasts and reduces EMI
- Reliable, stable ballast designs

Product Type List

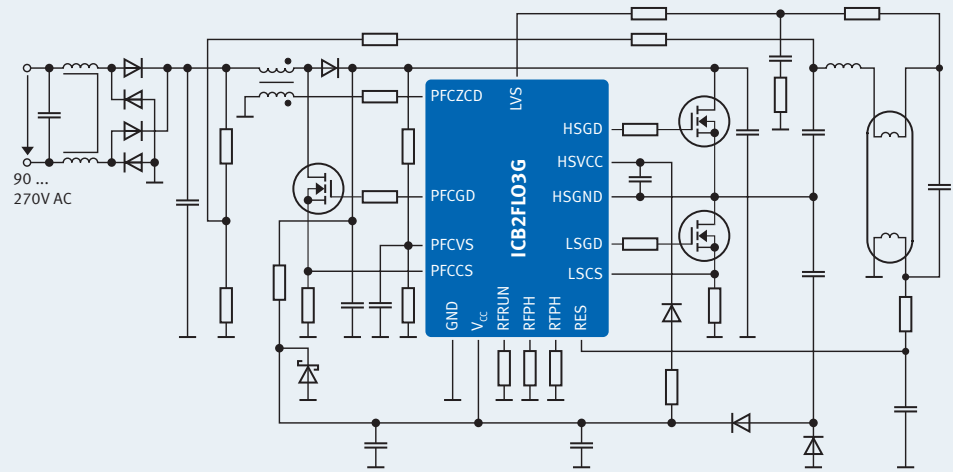
Product Type	Package	PFC	Topology	Half-Bridge Driver	adj. run frequency	Lamp Connection	Dimmable	Protection
ICB2FL01G	DSO-19 (300mil)	CrCM	Half-Bridge	± 900V	max. 120kHz	serial, parallel (type 1-4)	yes	Surge, Capacitive Mode, EoL*, PFC under and overvoltage, PFC and HB overcurrent
ICB2FL02G	DSO-19 (300mil)	CrCM	Half-Bridge	± 900V	max. 140kHz	serial, parallel (type 1-4)	optimized	
ICB2FL03G	DSO-16 (150mil)	CrCM	Half-Bridge	± 650V	max. 120kHz	serial (type 1-2)	yes	

* EoL including lamp overload and rectifier effect detection



Application Example for ICB2FL03G

Demoboard for 54W T5 Single Lamp Design with Voltage Mode Preheating



Description

- 54W T5 single lamp design with voltage mode preheating
- Active PFC in Critical/Discontinuous Conduction Mode (CritCM/DCM) and a half-bridge topology for lamp inverter
- Components used:
 - ICB2FL03G smart lamp ballast controller in DSO-16 package
 - MOSFET switches 3x IPD60R1K4C6 in TO252 for PFC and half-bridge
- Efficiency >93% with lamp after 30min operation in run mode @ 230V_{ACRMS}
- PF >0.99 @ 230V_{ACRMS}
- THD <4% @ 230V_{ACRMS}
- Proprietary ignition control allows for operation close to magnetic saturation of inductors
- Implementation of numerous monitoring and protection features for highest reliability (surge, inverter/PFC-overcurrent, bus over-/undervoltage, EOL1 overload, EOL2 rectifier effect, emergency detection according to VDE0108)
- Supports customer in-circuit test mode for reduced tester time
- Assembly option on PCB for dimming functionality

Related Application Note

Info number	Description
AN ICB2FL03G	ICB2FL03G smart ballast control IC for fluorescent lamp ballasts

Related Evaluation Board

Board name	Product	Description	Order number
Evaluation board ICB2FL03G	ICB2FL03G CoolMOST™ MOSFET	Demoboard for 54W T5 single fluorescent lamp design with voltage mode preheating using ICB2FL03G	Eval ICB2FL03G

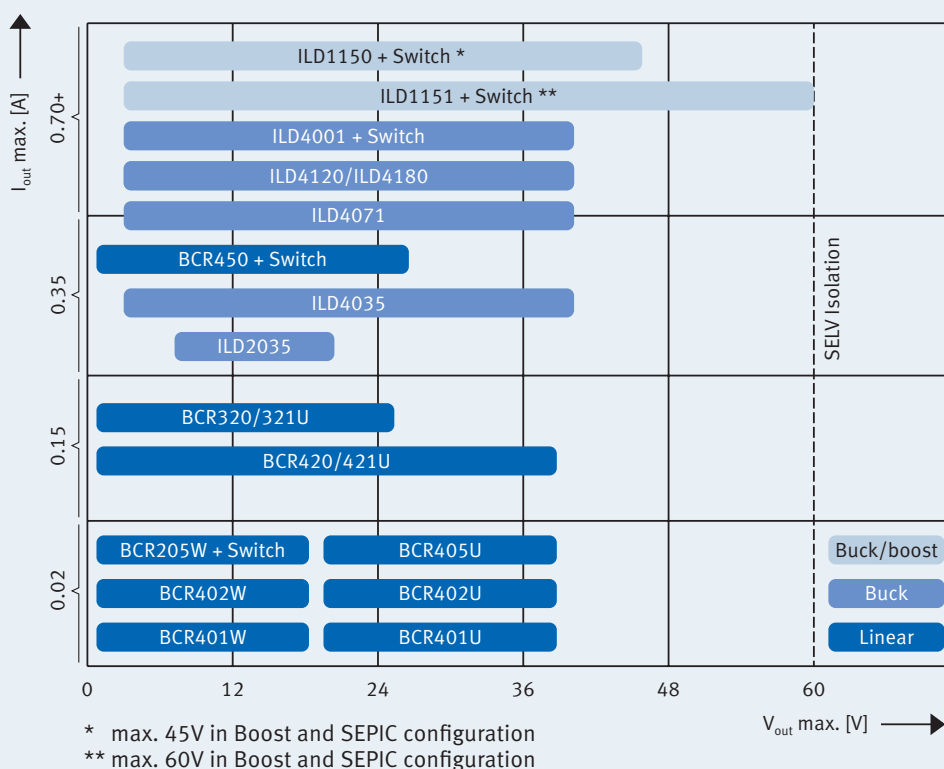
www.infineon.com/smartlighting

DC/DC LED Driver

The DC/DC LED drivers consist of two main product families: The BCR series is the smallest size and lowest cost product family for linear LED drivers. The ILD series are switch-mode LED drivers with highest efficiency.

Both families come with a line-up of regulators with integrated power stage and with a line-up of controllers that allow utmost scalability by flexible dimensioning of the output stage.

Family overview of DC/DC LED drivers for General Lighting applications



The BCR linear LED drivers are perfectly suited for driving LED currents from 10mA to 250mA, making it the ideal choice for low to mid power LEDs in general lighting applications.

This represents the lowest cost solution that requires ultra-low external part count and PCB space. The light output can be adjusted by an external resistor. PWM dimming is supported either by a microcontroller interface or by means of an external digital transistor.

Thanks to its negative thermal coefficient the LED load will be protected from being overdriven.

www.infineon.com/lowcostleddriver



The ILD switch-mode LED drivers, on the other hand, support currents from 150mA to 3A, making them the ideal choice for high- and ultra-high power LEDs in general lighting applications.

The voltage management is very flexible for the selection of the topology: buck, buck/boost, boost and SEPIC configuration are supported.

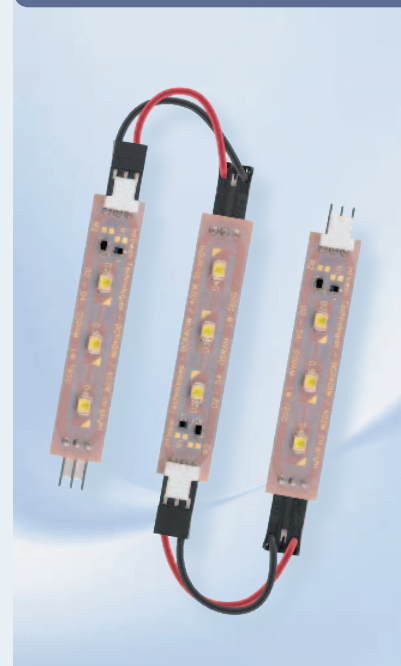
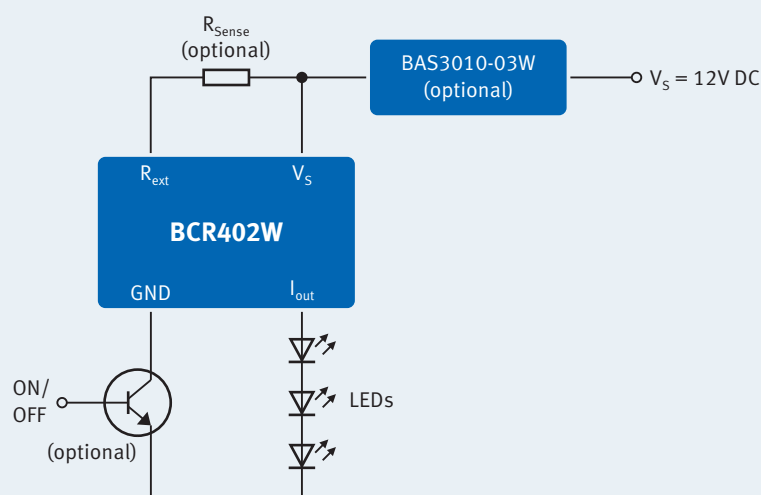
Efficiency can be as high as 98% across a wide range of operation conditions. For the vast majority of buck LED drivers the user has the choice of dimming concepts: PWM or analog voltage.

Integrated smart thermal protection, over voltage and over current protection contribute to a longer LED lifetime.

Product Type	Group	Topology	VS (min)	VS (max)	Iout (typ)	Iout (max)	Dimming	Package	Ptot (max)
BCR205W	LED Controller	Linear	1.8V	18.0V	0.5mA	ext. Switch	no	SOT343	100mW
BCR450	LED Controller	Linear	8V	27.0V	70.0mA	ext. Switch	Digital	SC74	500.0mW
ILD4001	LED Controller	Buck	4.5V	42.0V	10.0mA	ext. Switch	Analog or digital	SC74	500.0mW
ILD1150	LED controller	Boost/ Buck Boost/ SEPIC	4.75V	45.0V	90.0mA	ext. Switch	Digital	SSOP-14	-
ILD1151	LED Controller	Boost/ Buck Boost/ SEPIC	4.5V	45.0V	90.0mA	ext. Switch	Analog or digital	SSOP-14	-
ILD2035	LED Drivers for high power LEDs	Buck	8.0V	22.0V	350.0mA	400.0mA	no	SC74	1,000.0mW
ILD4035	LED Drivers for high power LEDs	Buck	4.5V	40.0V	350.0mA	400.0mA	Analog or digital	SC74	1,000.0mW
ILD4071	LED Drivers for high power LEDs	Buck	5.0V	40.0V	100mA	700mA	Analog or digital	DSO-8	-
ILD4120	LED Drivers for high power LEDs	Buck	4.5V	40.0V	1,200.0mA	1200mA	Analog or digital	DSO-8	1,500.0mW
ILD4180	LED Drivers for high power LEDs	Buck	4.75V	45.0V	1,800.0mA	1,800.0mA	Digital	DSO-8	-
TLE 4309G	LED Drivers for high power LEDs	Linear	4.5V	24.0V	500.0mA	500.0mA	Digital	T0263	-
BCR320U	LED Drivers for mid power LEDs	Linear	1.4V + VfLED	24V + VfLED	250.0mA	300.0mA	no	SC74	1,000.0mW
BCR321U	LED Drivers for mid power LEDs	Linear	1.4V + VfLED	24V + VfLED	250.0mA	300.0mA	Digital	SC74	1,000.0mW
BCR420U	LED Drivers for mid power LEDs	Linear	1.4V + VfLED	40V + VfLED	150.0mA	200.0mA	no	SC74	1,000.0mW
BCR421U	LED Drivers for mid power LEDs	Linear	1.4V + VfLED	40V + VfLED	150.0mA	200.0mA	Digital	SC74	1,000.0mW
BCR401U	LED Drivers for low power LEDs	Linear	1.4V + VfLED	40.0V	10.0mA	65.0mA	Digital	SC74	750.0mW
BCR401W	LED Drivers for low power LEDs	Linear	1.2V + VfLED	18.0V	10.0mA	60.0mA	Digital	SOT343	500.0mW
BCR402U	LED Drivers for low power LEDs	Linear	1.4V + VfLED	40.0V	20.0mA	65.0mA	Digital	SC74	750.0mW
BCR402W	LED Drivers for low power LEDs	Linear	1.4V + VfLED	18.0V	20.0mA	60.0mA	Digital	SOT343	500.0mW
BCR405U	LED Drivers for low power LEDs	Linear	1.4V + VfLED	40.0V	50.0mA	65.0mA	Digital	SC74	750.0mW

Application Example for BCR402W

Channel Letter with Low Power LEDs



Key Features & Benefits

- Homogenous light output in different LED strings
- Easy to implement with low component count
- No sense resistor required for common currents like 10mA/20mA
- Flexibility to adjust the current by external resistor from 10mA up to 60mA
- Negative thermal coefficient protecting lifetime of LEDs

Infinion component list

BCR402W	Low power LED driver
BAS3010A-03W	Schottky Diode for reverse polarity protection (RPP) – 12V board
BAT64-03W	Schottky Diode for reverse polarity protection (RPP) – 24V board

Related Application Note

Info number	Description
AN182	Comparison of Resistor Biasing versus BCR401W / BCR402W LED Driver Biasing of +12V & +24V DC Low-Current LED Striplights

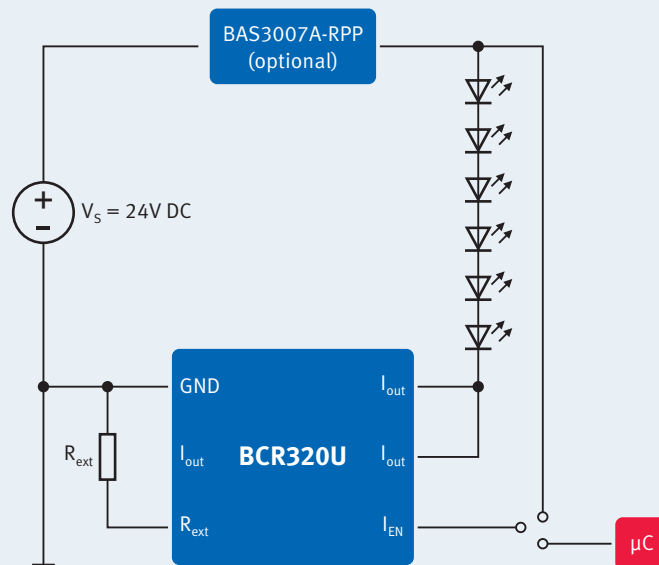
Related Evaluation Board

Board name	Product	Description	Order number
12V low current LED demoboard	BCR402W BAS3010A-03W	12V BCR402W demoboard driving 3x 0.2W LEDs in series	BCR402W 12V LED BOARD
24V low current LED demoboard	BCR402W BAT64-03W	24V BCR402W demoboard driving 6x 0.2W LEDs in series	BCR402W 24V LED BOARD



Application Example for BCR320U

LED Strip with Medium Power LEDs



Key Features & Benefits

- Homogenous light output in different LED strings
- Easy to implement with low component count
- Flexibility to adjust the current by external resistor from 10mA up to 250mA
- Direct microcontroller interface for PWM dimming for BCR421U and BCR321U
- Negative thermal coefficient protecting lifetime of LEDs
- High power dissipation capability

Infineon component list

BCR320U	Medium power LED driver
BAS3007A-RPP	Schottky bridge for reverse polarity protection (RPP)

Related Application Note

Info number	Description
AN212	Driving Half Watt LEDs on a light strip with BCR320U, BCR321U or BCR420U, BCR421U

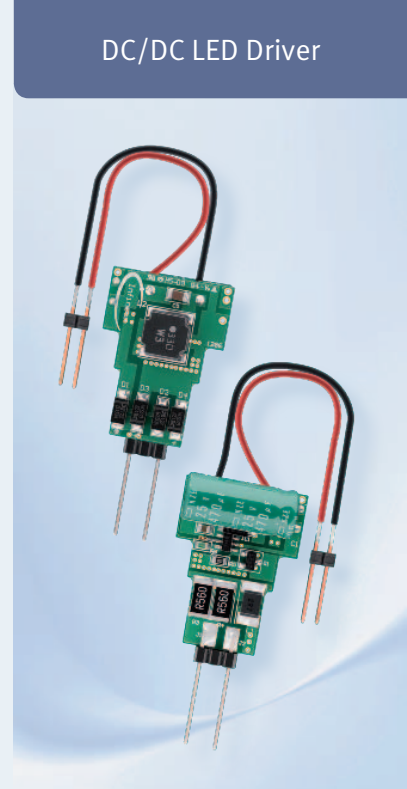
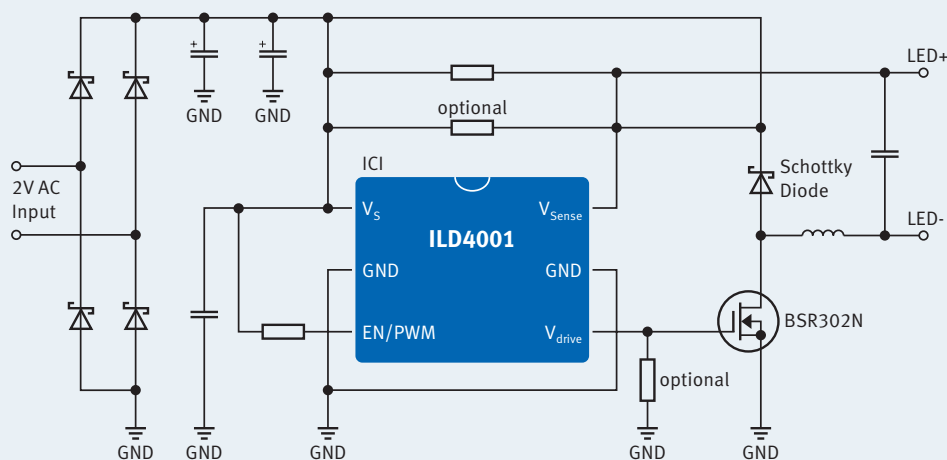
Related Evaluation Board

Board name	Product	Description	Order number
24V Half Watt LED demoboard	BCR320U BAS3007A-RPP	24V BCR402W striplight demoboard driving 6x 0.5W LEDs in series	BCR320U HW LED BOARD

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Application Example for ILD4001

7W and 10W MR16 Low Voltage Halogen Replacement Lamps



Key Features & Benefits

- Flexibility to adjust the output current in a wide range due to LED controller with external MOSFET
- Flicker-free operation with electronic transformers
- Thermal protection of LEDs without usage of NTC or PTC
- Low system cost due to usage of N-channel MOSFETs as power stage

Infineon component list

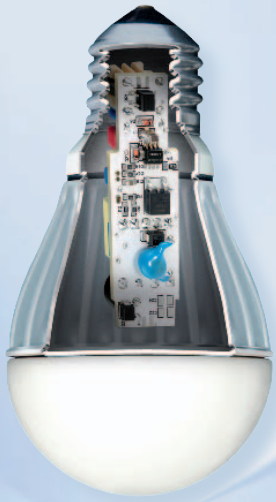
ILD4001	High power LED controller
BSR302N	Small signal MOSFET

Related Application Note

Info number	Description
AN214	MR16 7W / 10W control board using ILD4001 step down LED controller

Related Evaluation Board

Board name	Product	Description	Order number
MR16 7W board	ILD4001 BSR302N	Control board for 7W MR16 low voltage halogen replacement lamps	MR16 7W board
MR16 10W board	ILD4001 BSR302N	Control board for 10W MR16 low voltage halogen replacement lamps	MR16 10W board



LED Offline

Infineon provides a single stage flyback and floating buck solution with PFC functionality.

Innovative primary control techniques combined with accurate PWM generation for phase cut dimming enable solutions with very low component count for smallest form factor.

Dimmable off-line LED driver

- ICL8001G simplifies LED driver implementation
- ICL8002G is optimized for best possible dimming performance
- ICL8082G integrates a CoolMOS™ switch for highest power density

Non-dimmable off-line LED driver

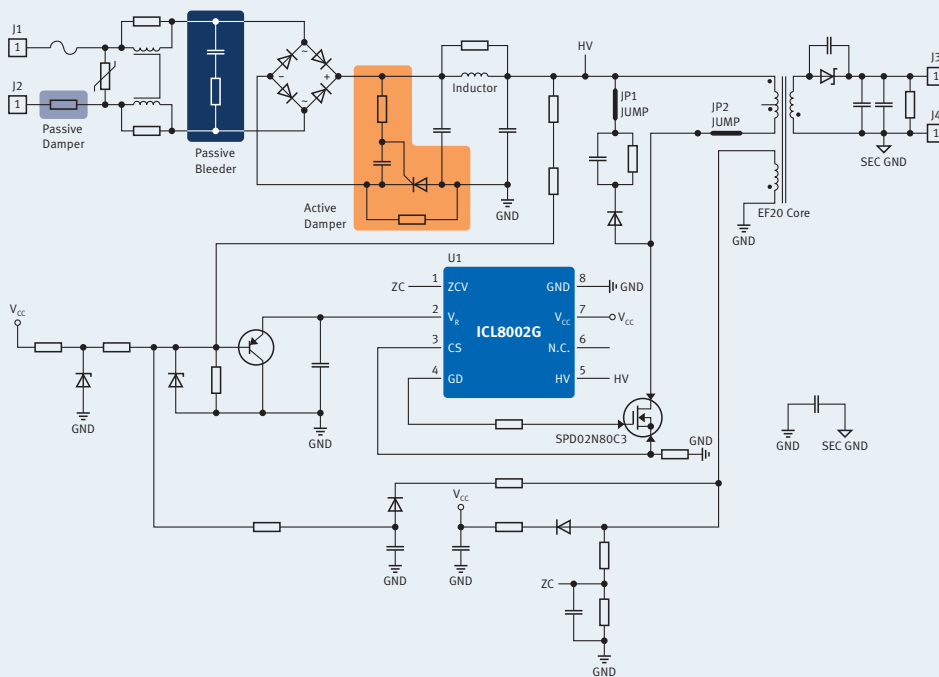
- The ICLS series deploys fixed frequency operation mode with PFC functionality. Applied innovative primary control techniques result in excellent system efficiencies with significant reduced external component count.
- The integrated CoolMOS™ switch simplifies designs end enables compact applications.

Product	Group	Type	Dimming	PFC	Topology	f _{RUN} (kHz)	RDS ON (Ohm)	VDS (max)	Package
ICL8001G	Off-line LED driver	Controller	yes (trailing/leading edge)	DCM mode	Quasi-resonant flyback / buck	ZCD	-	-	DSO-8
ICL8002G	Off-line LED driver	Controller	yes (trailing/leading edge)	DCM mode	Quasi-resonant flyback / buck	ZCD	-	-	DSO-8
ICLS8082G	Off-line LED driver	Regulator	yes (trailing/leading edge)	DCM mode	Quasi-resonant flyback / buck	ZCD	2,26	800V	DSO-12
ICLS6021J	Off-line LED driver	Regulator	no (but dimmer safe)	DCM mode	Fixed frequency flyback / buck	67	6,45	650V	DIP-8
ICLS6022J	Off-line LED driver	Regulator	no (but dimmer safe)	DCM mode	Fixed frequency flyback / buck	67	4,70	650V	DIP-8
ICLS6022G	Off-line LED driver	Regulator	no (but dimmer safe)	DCM mode	Fixed frequency flyback / buck	67	4,70	650V	DSO-12
ICLS6023J	Off-line LED driver	Regulator	no (but dimmer safe)	DCM mode	Fixed frequency flyback / buck	67	1,70	650V	DIP-8
ICLS8023Z	Off-line LED driver	Regulator	no (but dimmer safe)	DCM mode	Fixed frequency flyback / buck	65	2,26	800V	DIP-7

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Application Example for ICL8002G

Dimmable 13W LED Bulb in Isolated Flyback Topology



Key Features & Benefits

- High dimmer compatibility – flicker-free operation
- Isolated flyback topology $V_s = 230\text{VAC}$
- High efficiency of $> 85\%$
- Low system cost due to low component count
- High power factor > 0.9
- Small form factor
- Short time to light

Infineon component list

ICL8002G	Off-line LED controller for dimmable lighting applications
SPD02N80C3	MOSFET, 800V, 2.7Ω, DPAK

Related Application Note

Info number	Description
AN-ICL8002G-LED-Flyback Demoboard	Quasi-resonant flyback converter for phase cut dimming with high power factor

Related Evaluation Board

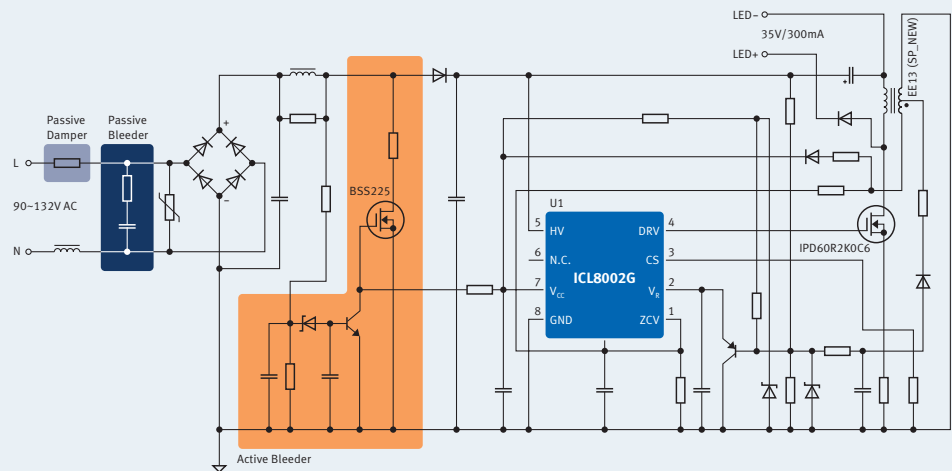
Board name	Product	Description	Order number
230V isolated control board for dimmable LED bulb	ICL8002G SPD02N80C3	Demoboard for dimmable 13W LED bulb in isolated flyback topology	EVALLED-ICL8002G-B1

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Application Example for ICL8002G

Dimmable 12W LED Bulb in Non-Isolated Buck Topology



Key Features & Benefits

- High dimmer compatibility – flicker-free operation
- Non-isolated topology $V_s = 120\text{VAC}$
- High efficiency $> 85\%$
- Very low system cost
- Very high power factor > 0.95
- Small form factor

Infineon component list

ICL8002G	Off-line LED controller for dimmable lighting applications
IPD60R2K0C6	MOSFET, 600V, 2Ω, DPAK
BSS225	MOSFET, 600V, 45Ω, SOT89

Related Application Note

Info number	Description
AN-ICL8002G-LED-Buck Demoboard	Non-isolated buck converter for phase cut dimming with high power factor

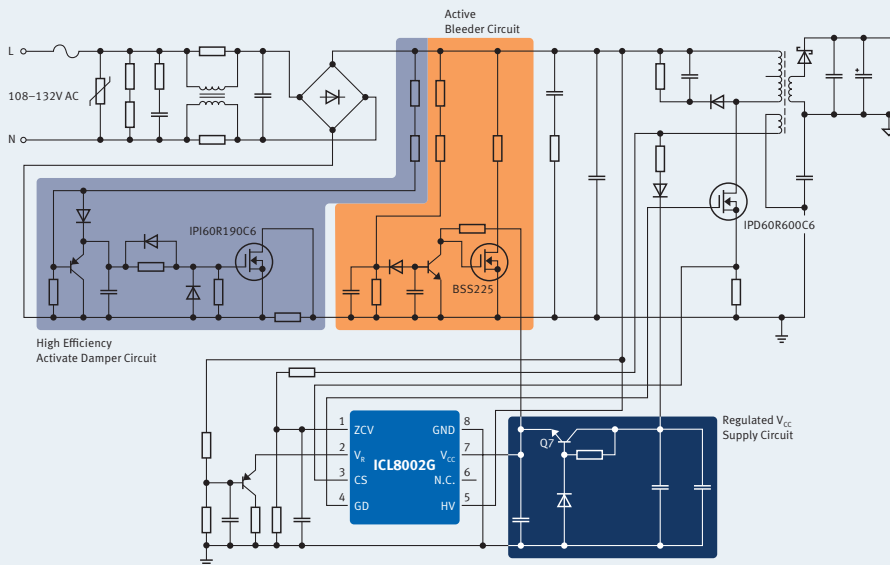
Related Evaluation Board

Board name	Product	Description	Order number
120V non-isolated control board for dimmable LED bulbs	ICL8002G IPD60R2K0C6	Demoboard for dimmable 12W LED bulb in non-isolated buck topology	EVALLED-ICL8002G-B2

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Application Example for ICL8002G

120V High Efficiency Dimmable 24W PAR38 LED Lamp



Key Features & Benefits

- High dimmer compatibility – flicker-free operation
- Isolated flyback topology, $V_s = 120\text{VAC}$
- Very high efficiency > 90%
- Very high power factor > 0.95

Infineon component list

ICL8002G	Off-line LED controller for dimmable lighting applications
IPI60R190C6	MOSFET 600V, 190m Ω
IPD60R600C6	MOSFET, 600V, 600m Ω , DPAK
BSS225	MOSFET, 600V, 45 Ω , SOT89

Related Application Note

Info number	Description
AN-ICL-8002-G-120V High efficiency flyback LED demoboard	120V high efficiency flyback converter for dimmable PAR38 with high power factor

Related Evaluation Board

Board name	Product	Description	Order number
120V isolated dimmable LED PAR38 board	ICL8002G IPI60R190C6 IPD60R600C6 BSS225	Demoboard for dimmable 24W LED PAR38 in isolated flyback topology	EVALLED-ICL8002G-B3

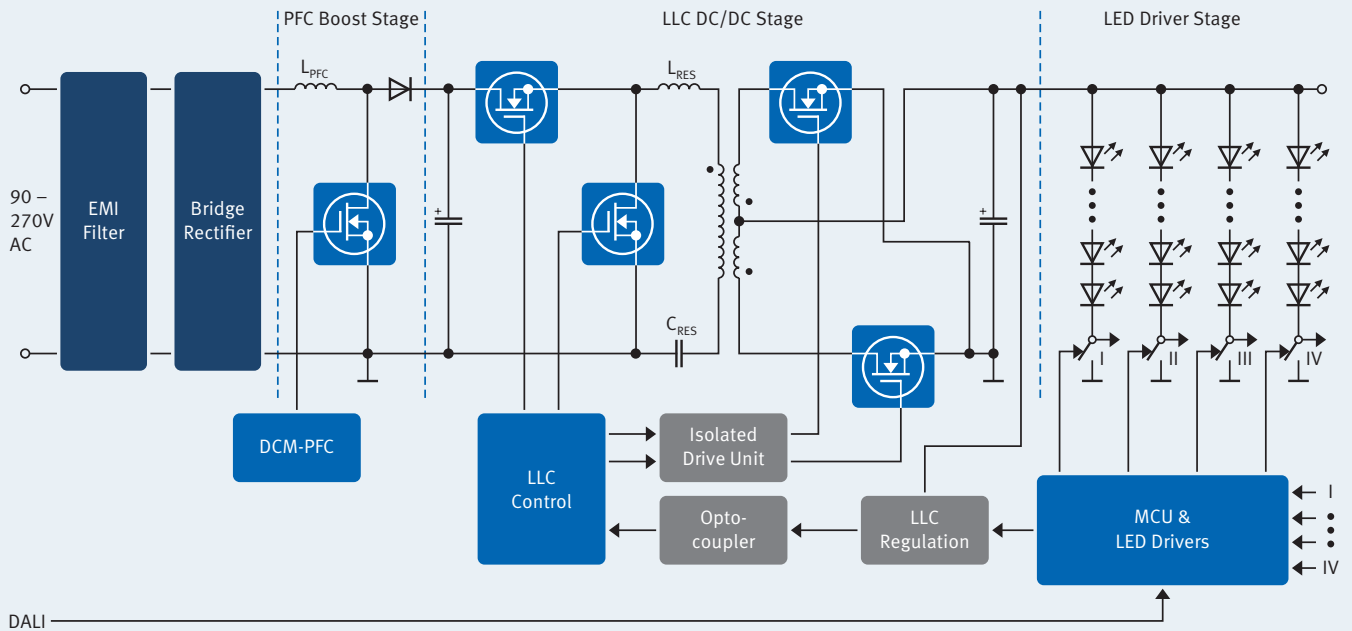
Application Example 120W LED Ballast for Wide Area Lighting

Modular Solution with Adaptive Voltage Scheme to Maximize Efficiency

Description

- 2-stage power supply topology using DCM-PFC + LLC and secondary side LED current control
- Adjustable multi-string LED configuration to cover a broad power range from 60-120W
- Supply voltage: 90-270VAC
- Output voltage: 36V to 42VDC
- Output current: 4 channels x 700mA
- Overall efficiency >91%
- Power factor > 0.95
- Protection features: open- and short-circuit protection and auto-detection, over temperature, brownout
- DALI interface for intelligent light control and dimming
- Long lifetime due to simple and robust linear drivers in secondary stage





Infinion component list

PFC boost stage:	LLC DC/DC stage:	LED driver stage:
TDA4863-2G (DCM PFC IC)	ICE2HS01G (LLC Control IC)	XC824 or XC825 for DALI
IPA60R190E6	IPA60R380C6	BCR450 + BDP947 (LED Driver + boost transistor)
	IPP110N20N3	ICE3B0365J (Aux-Power Supply)

Related Application Note

Info number	Description
AN 120W LED Street Light Power Supply	120W LED Street Light Power Supply

Related Evaluation Board

Board name	Product	Description	Order number
120W LED Ballast for 36-42V LED Strings	TDA4863-2G ICE2HS01G XC824 BCR450 + BDP947 ICE3B0365J CoolMOS™/OptiMOS™	Demoboard for a 4-channel 120W LED Ballast (Vout: 36-42V DC)	EVAL-120WSL-36/42V
120W LED Ballast for 46-52V LED Strings	TDA4863-2G ICE2HS01G XC824 BCR450 + BDP947 ICE3B0365J CoolMOS™/OptiMOS™	Demoboard for a 4-channel 120W LED Ballast (Vout: 46-52V DC)	EVAL-120WSL-46/52V
XC824 plug-in board	XC824	XC824 plug-in board for 120W LED Ballast	EVAL-XC824-120WSL
XC835 DALI plug-in board	XC825	XC835 DALI plug-in board for 120W LED Ballast	EVAL-XC825DALI120W

CoolMOS™ – N-Channel MOSFETs

The revolutionary CoolMOS™ power family sets new standards in the field of energy efficiency. As technology leader in high voltage MOSFETs, CoolMOS™ offers a significant reduction of conduction- and switching losses and enables high power density and efficiency for superior power conversion systems. Particularly the latest, state-of-the-art generation of high voltage power MOSFETs have made ballasts, off-line LED drivers and AC/DC power supplies more efficient, more compact, lighter and cooler than ever before. This success was achieved by offering the lowest on-state resistance per package outline, the fastest switching speed and the lowest gate driver requirements of high voltage MOSFETs commercially available.

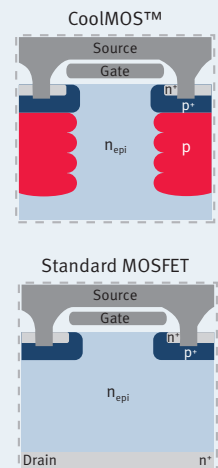
CoolMOS™ technology

On state: Reduction of resistance of epitaxial layer by high doped n-columns

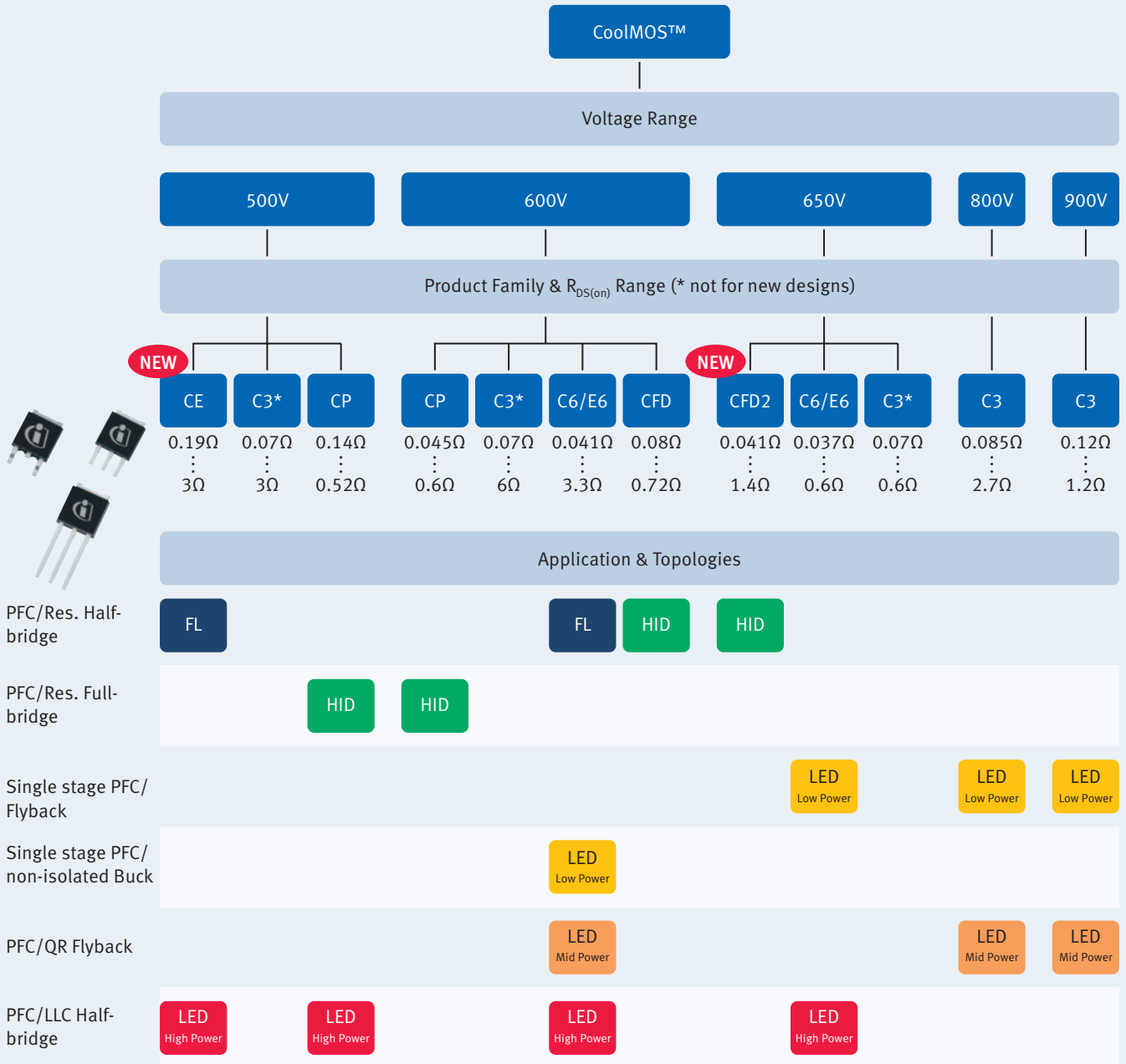
- Higher doping level in n-type drift region results in lower $R_{DS(on)}$

Blocking State: Compensation of additional charge by adjacent p-columns

- Half of active chip area is covered by p-columns
- During blocking state the p-column compensates the charge of the adjacent n-column resulting in high breakdown voltage at an area specific on-resistance below the silicon limit



Infinite offers a comprehensive product portfolio for lighting applications. The selection table below shows an overview of the most suitable voltage and $R_{DS(on)}$ classes for different applications and topologies.





XC82x / XC83x Microcontrollers

Low Pin-Count Microcontrollers for Industrial and Automotive Applications

Based on popular 8051 architecture Infineon offers low pin-count XC82x and XC83x microcontrollers with smart and autonomous peripherals offloading CPU. With advanced timers, excellent mixed signal and application specific peripherals for touch control and LED displays, XC82x and XC83x fit to a broad range of industrial and consumer applications.

All microcontrollers can generate flexibly programmable PWM for 4 output channels which are used for dimming of LED strings. With the 10bit ADC system supervision e.g. overcurrent protection can be enabled efficiently.

Furthermore, using UART the XC82x and XC83x products can serve as DALI controllers for lighting control gears.

Products are available up to 150°C conforming with the automotive quality standard of AEC Q100.

Key features

- 16bit 4 channel PWM clocked at 64MHz
- 10bit ADC with < 1µs conversion time
- 2-8KB ECC Flash with read-out protection
- Specific peripherals for capacitive touch control and LED displays
- UART, SPI, I2C
- Supports DALI implementation
- TSSOP-16 and -28
- Up to 150°C and AECQ100

www.infineon.com/xc800

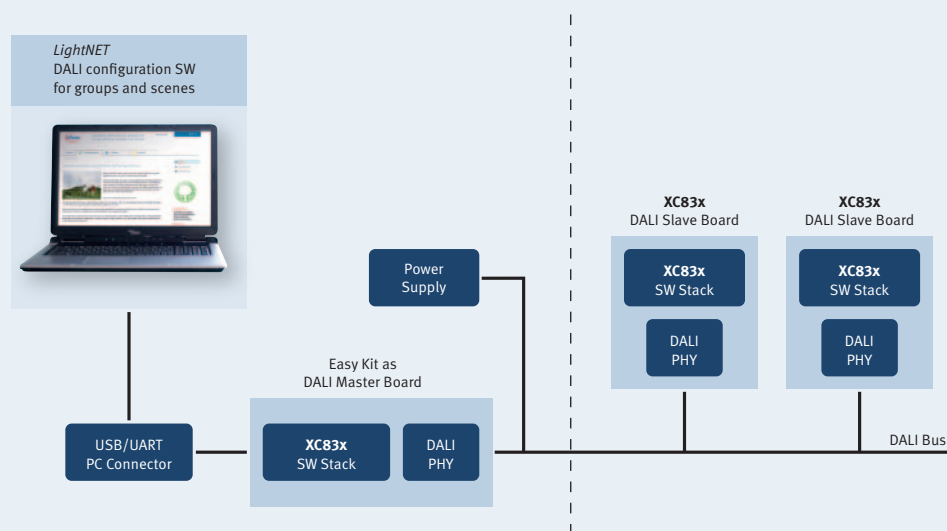
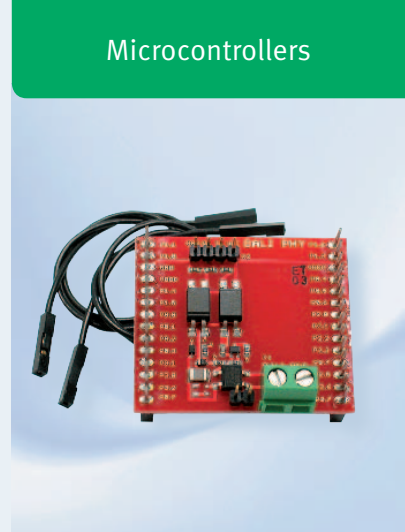
Application Example for DALI

DALI Evaluation Network with SW and HW Components by Infineon

The Digital Addressable Lighting Interface (DALI) is a protocol enabling the design of lighting communication networks. For detailed information on DALI see www.dali-ag.org.

With the XC82x and XC83x microcontrollers Infineon offers low-pin-count microcontrollers to design DALI-conforming control gears.

Evaluation can be done using the XC82x or XC83x Easy Kits which can be connected to a DALI network with the DALY PHY adapter boards. *LightNET* is a SW tool to configure the DALI evaluation network from the PC. For detailed instructions see related application notes.



Related Application Notes

Description	Internet Link
Guide to using DALI LightNet tool Demoboard for 54W T5 single lamp design with voltage mode preheating	www.infineon.com/lighting
DALI Control Gear Software Stack Dimming demoboard 26W TC-TEL single lamp design	www.infineon.com/dali
DALI Control Device using XC836 Demoboard for 54W T5 single lamp design with voltage mode preheating	www.infineon.com/dali
DALI Demo using Touch Sense Control	www.infineon.com/dali

Related Evaluation Boards

Board name	Order number
XC82x Easy Kit	KIT_XC822_EK_V1
XC83x Easy Kit	KIT_XC836_EK_V1
DALI PHY adapter	KIT_XC822_XC836_DALI

www.infineon.com/dali

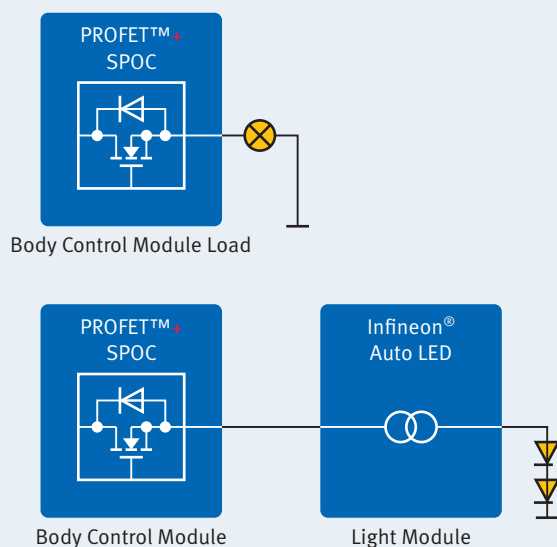
Driving Innovations for Automotive Lighting

Infineon offers a full lineup of best-in-class semiconductor solutions targeted at automotive lighting and smart body control applications. Across the entire interior and exterior spectrum, these products set new standards for innovation, performance, energy efficiency and cost effectiveness.

From protected single and multi-channel power switches for bulbs and LEDs through protected linear LED drivers with diagnostic functionality to switched DC/DC buck and boost high-current LED drivers and front-light LEDs, you'll find exactly what you need to keep your design on the road to success.

Highlights

- New discrete **PROFET™+** family with 100 % package compatibility in the 0.5-11A load current range to accommodate different loads (bulbs and LEDs) in one design.
- Integrated multichannel **SPI Power Controller (SPOC) family** to reduce PCB footprint and microcontroller load in compute-intensive body control modules.
- **Automotive LED drivers** for optimized LED front, rear and ambient lighting in decentralized add-on modules.



www.infineon.com/automotive-lighting

Support Tools

Application Notes

Description	Info number / Internet link
ICB2FL01G smart ballast control IC for fluorescent lamp ballasts demoboard for 54W T5 single lamp design with voltage mode preheating	AN ICB2FL01G www.infineon.com/smartlighting
ICB2FL02G smart ballast control IC for fluorescent lamp ballasts dimming demoboard 26W TC-TEL single lamp design	AN ICB2FL02G www.infineon.com/smartlighting
ICB2FL03G smart ballast control IC for fluorescent lamp ballasts demoboard for 54W T5 single lamp design with voltage mode preheating	AN ICB2FL03G www.infineon.com/smartlighting
Quasi-resonant flyback converter for phase cut dimming with high power factor	AN-ICL8002G-LED-flyback demoboard
Non-isolated buck converter for phase cut dimming with high power factor	AN-ICL8002G-LED-buck demoboard
120V high efficiency flyback converter for dimmable PAR38 with high power factor	AN-ICL8002G-120V high efficiency flyback LED Demoboard
MR16 3W control board with ILD2035 step down LED driver	AN 214 www.infineon.com/LED.appnotes
MR16 7W / 10W control board using ILD4001 step down LED controller	Application note AN-EVAL MR16 7W / 10W control board using ILD4001 step down LED controller www.infineon.com/LED.appnotes
Driving 2W to 5W LEDs with ILD4001	AN 213 www.infineon.com/LED.appnotes
Driving 2W LEDs with ILD4120	AN 270 www.infineon.com/LED.appnotes
Driving 1W LEDs with ILD4035	AN 215 www.infineon.com/LED.appnotes
Driving half watt LEDs on a light strip with BCR320U, BCR321U or BCR420U, BCR421U	AN 212 www.infineon.com/LED.appnotes
Comparison of resistor biasing versus BCR401W / BCR402W LED driver biasing of +12V & +24V DC low-current LED striplights	AN 182 www.infineon.com/LED.appnotes
120W LED street light power supply	AN 120W LED street light power supply www.infineon.com/lighting
Guide to using DALI LightNet tool demoboard for 54W T5 single lamp design with voltage mode preheating	www.infineon.com/lighting
DALI control gear software stack dimming demoboard 26W TC-TEL single lamp design	www.infineon.com/dali
DALI control device using XC836 demoboard for 54W T5 single lamp design with voltage mode preheating	www.infineon.com/dali
DALI demo using touch sense control	www.infineon.com/dali

Demoboards

Board name	Product	Description	Order number
Evaluation board ICB2FL01G	ICB2FL01G CoolMOS™ MOSFET	Demoboard for 54W T5 single fluorescent lamp design with voltage mode preheating using ICB2FL01G	AN ICB2FL03G www.infineon.com/smartlighting
Evaluation board ICB2FL02G	ICB2FL03G CoolMOS™ MOSFET	Demoboard for dimmable 26W TC-TEL single fluorescent lamp design using ICB2FL02G	AN ICB2FL03G www.infineon.com/smartlighting
Evaluation board ICB2FL03G	ICB2FL03G CoolMOS™ MOSFET	Demoboard for 54W T5 single fluorescent lamp design with voltage mode preheating using ICB2FL03G	AN ICB2FL03G www.infineon.com/smartlighting
230V isolated dimmable LED bulb board	ICL8002G SPD02N80C3	Demoboard for dimmable 13W LED bulb in isolated flyback topology	EVALLED-ICL8002G-B1
120V non-isolated dimmable LED bulb board	ICL8002G IPD60R2K0C6	Demoboard for dimmable 12W LED bulb in non-isolated buck topology	EVALLED-ICL8002G-B2
120V isolated dimmable LED PAR38 board	ICL8002G IPI60R190C6 IPD60R600C6 BSS225	Demoboard for dimmable 20W LED PAR38 in isolated flyback topology	EVALLED-ICL8002G-B3
MR16 3W board	ILD2035 4x BAS3010A	Control board for 3W MR16 low voltage halogen replacement lamps	MR16 3W board
MR16 7W board	ILD4001 BSR302N	Control board for 7W MR16 low voltage halogen replacement lamps	MR16 7W board

Board name	Product	Description	Order number
MR16 10W board	ILD4001 BSR302N	Control board for 10W MR16 low voltage halogen replacement lamps	MR16 10W board
ILD4001 0.7A board	ILD4001 BSR302N	Evaluation board for high power LEDs at DC voltage input using ILD4001	ILD4001 0.7A board
ILD4001 1A board	ILD4001 BSP318S	Evaluation board for high power LEDs at DC voltage input using ILD4001	ILD4001 1A board
ILD4120 board	ILD4120	Evaluation board for high power LEDs at DC voltage input using ILD4120	ILD4120 board
ILD4035 12V board	ILD4035	Evaluation board for high power LEDs at 12DC voltage input using ILD4035	ILD4035 12V board
ILD4035 24V board	ILD4035	Evaluation board for high power LEDs at 24DC voltage input using ILD4035	ILD4035 24V board
ILD4180 board	ILD4180	Evaluation board for high power LEDs voltage input using ILD4180	Demoboard ILD4180
ILD1151 in boost in voltage mode topology	ILD1151	Boost to GND configuration (B2G) – topology BOOST in voltage mode	Demoboard ILD1151 Ver1
ILD1151 in boost topology	ILD1151	Boost to GND configuration + short to GND protection (B2G + S2G) – topology BOOST	Demoboard ILD1151 Ver2
ILD1151 in buck-boost topology	ILD1151	Boost to battery (B2B) – topology BUCK / BOOST	Demoboard ILD1151 Ver3
ILD1151 in buck-boost topology (Sepic configuration)	ILD1151	SEPIC configuration – topology BUCK / BOOST	Demoboard ILD1151 Ver4
BCR450 board	BCR450 BAS3007A-RPP	Evaluation board for mid & high power LEDs voltage input using BCR450	BCR450 board
BCR320U board	BCR320U BAS3007A-RPP	Evaluation board for mid power LEDs voltage input using BCR320U	BCR320U HW LED board
BCR402W 12V board	BCR402W BAS3010A	LED strip for low power LEDs voltage input using BCR402W	BCR402W 12V LED board
BCR402W 24V board	BCR402W BAT64-03W	LED strip for low power LEDs voltage input using BCR402W	BCR402W 24V LED board
120W LED ballast for 36-42V LED strings	TDA4863-2G ICE2HS01G XC824 BCR450 + BDP947 ICE3B0365J CoolMOS™/OptiMOS™	Demoboard for a 4-channel 120W LED ballast (Vout: 36-42V DC)	EVAL-120WSL-36/42V
120W LED ballast for 46-52V LED strings	TDA4863-2G ICE2HS01G XC824 BCR450 + BDP947 ICE3B0365J CoolMOS™/OptiMOS™	Demoboard for a 4-channel 120W LED ballast (Vout: 46-52V DC)	EVAL-120WSL-46/52V
XC824 plug-in board	XC824	XC824 plug-in board for 120W LED ballast	EVAL-XC824-120WSL
XC835 DALI plug-in board	XC825	XC835 DALI plug-in board for 120W LED ballast	EVAL-XC825DALI120W
Evaluation board XC82x Easy Kit	XC822	Evaluation board for XC82x 8-bit microcontrollers series	KIT_XC822_EK_V1
Evaluation board XC83x Easy Kit	XC836	Evaluation board for XC83x 8-bit microcontrollers series	KIT_XC836_EK_V1
DALI PHY adapter		Adapter board to connect 8-bit microcontroller evaluation boards to simulate and configure a DALI network on physical DALI bus	KIT_XC822_XC836_DALI

LED Driver Online Design Tool

The online LED Driver Design Tool enables users to quickly design and simulate LED driver circuitries used in all kinds of LED applications such as retrofit lamps, ballasts, spotlights, downlights, channel letters with power requirements <25W.

The proposed driver design can be further customized with the implemented redesign option where external components can be modified.

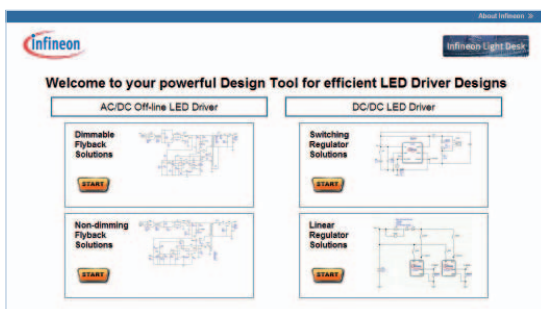
The following topologies are supported:

- Quasi-resonant PFC/Flyback for phase-cut dimming
- Fixed-frequency PFC/Flyback for non-dimming
- DC/DC buck
- Linear

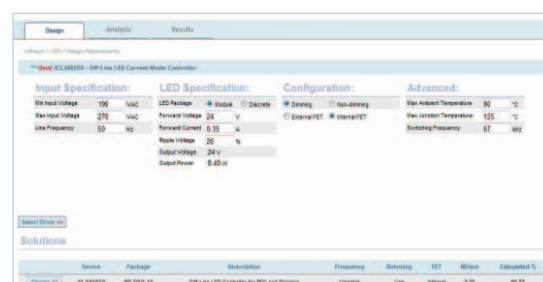


The steps to a successful LED Driver Design

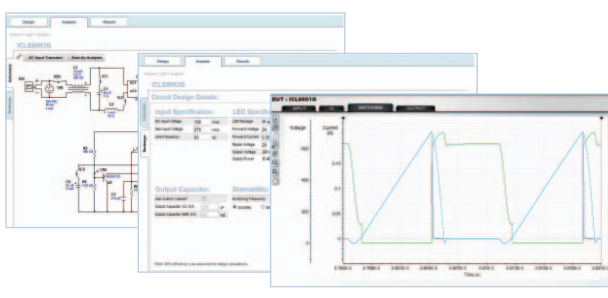
1. Selection of the application/topology



2. Specification of design parameter 3. Selection of suitable LED driver



4. Review schematics and redesign (optional) 5. Simulation: AC input transient, start-up analysis



6. Download Design Summary

- Design specification
- Schematics
- Transformer design details
- Bill of Materials
- Simulation results

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