



# The smarter way to energy efficiency

GreenChip Lighting Solutions  
Selection Guide



# The smarter way to energy efficiency

Aimed at improving energy efficiency and reducing carbon emissions, NXP's GreenChip ICs enable you to build cost-effective, high-efficiency power and lighting solutions. Suitable for any device that draws AC power, GreenChip products feature smart power designs that deliver many extra benefits – from minimal standby power to enabling wirelessly activated lighting networks.

With electronic devices governed by tough sets of EnergyStar and other utility industry regulations, it's essential your products meet the latest power efficiency standards in active and standby (unplugged) power conditions. Our GreenChip portfolio helps you meet and exceed these tough new regulations.

At the heart of these solutions lies our GreenChip technology, based on a unique process that allows the integration of virtually any type of circuit element onto an IC alongside power transistors. The result is highly efficient, smart power and lighting ICs which give your designs maximum potential.

If you're making any product that plugs into a power socket or screws into a light fixture, can you afford to be without GreenChip?

## Smart and efficient lighting solutions

Our GreenChip ICs for lighting systems fall into three categories: GreenChip smart lighting products, GreenChip SSL for solid-state LEDs and GreenChip CFL for compact fluorescent lamps.

# GreenChip smart lighting solutions

## The next step in lighting efficiency

GreenChip smart lighting brings together wireless IP connectivity, energy-efficient lighting and low standby power (down to 50mW). NXP's JenNet-IP software, provides the ultra-low-power wireless connectivity, resulting in a compact, low-cost solution that enables new ways to control lights and manage energy consumption.

The GreenChip smart lighting solution highlights the possibilities of an energy-efficient lighting network with an Internet address for every light bulb. It serves as the foundation for the "Internet of Things" – in which every home appliance can be monitored through sensors and controlled via an IP address.

## IEEE802.15.4 compliant Wireless microcontroller

Type number	Microcontroller	Maximum Temperature	Memory	Transceiver	Software	Power consumption	Standby power	Link budget	Availability
JN5148-001	32-bit RISC core	85°C	128 kB RAM, 128 kB ROM	IEEE802.15.4	IEEE802.15.4 MAC, JenNet, ZigBee Pro HA	15 mA TX, 17.5 mA RX	1.2 uA with sleep timer, 100 nA deep sleep with button push wake-up	97.5 dB	Released
JN5148-Z01	32-bit RISC core	85°C	128 kB RAM, 128 kB ROM	IEEE802.15.4	ZigBee Pro HA, SE	15 mA TX, 17.5 mA RX	1.2 uA with sleep timer, 100 nA deep sleep with button push wake-up	97.5 dB	Released
JN5148-J01	32-bit RISC core	85°C	128 kB RAM, 128 kB ROM	IEEE802.15.4	JenNet-IP gateways	15 mA TX, 17.5 mA RX	1.2 uA with sleep timer, 100 nA deep sleep with button push wake-up	97.5 dB	Released
JN5142-J01	32-bit RISC core	125°C	32 kB RAM, 128 kB ROM	IEEE802.15.4	JenNet-IP smart devices	15 mA TX, 17.5 mA RX	0.5 uA with sleep timer, 1 uA with sleep timer & RAM held, 100 nA deep sleep with button push wake-up	97.5 dB	Released
JN5161 JN5164 JN5168	32-bit RISC core	125°C	8/32/32 kB RAM, 64/160/256 kB flash	IEEE802.15.4	JenNet-IP, ZigBee Pro HA, LL, GP, RF4CE smart devices	15 mA TX, 17.5 mA RX	0.5 uA with sleep timer, 1 uA with sleep timer & RAM held, 100 nA deep sleep with button push wake-up	97.5 dB	Q4 2012



## Reference design

Reference design	Description	RF chip	Lamp driver	ACDC converter	Software stack	Mains isolation	Standby power	LED voltage	Efficiency @ 30/60 V LEDs	Power factor	Functionality	Small Signal Demo Board	Large Signal Demo Board	Availability
CFL110.1 CFL230.1	low power CFL, 110 V & 230 V, 20 W, isolated, analog dimming	JN5142 JN5164/68	UBA20270	TEA1721	JenNet-IP ZigBee	Yes	140 mW	N.A.	CFL driver >90%	0.6 to >0.9	on/off, RF dimmable to 2%, not triac tolerant, external powers so power scalable	SLN19 (JN5142) SLN28 (JN516x)	SLN24	Released
CFL110.2 CFL230.2	low cost CFL, 110 V & 230 V, 20 W, isolated, analog dimming	JN5142 JN5164/68	UBA20270	TEA1721	JenNet-IP ZigBee	Yes	480 mW	N.A.	CFL driver >90%	0.6 to >0.9	on/off, RF dimmable to 2%, not triac tolerant, external powers so power scalable	Schematics, BOM & Gerbers SLN21	SLN24	Released
SSL110.1 SSL230.1	low power SSL, 110 V & 230 V, 15 W, non-isolated, not triac tolerant, PWM dimming	JN5148 JN5142 JN5164/68	SSL21082 SSL21084	TEA1721	JenNet-IP ZigBee	No	140 mW	12-80 V	87 / 90% 88 / 91%	0.6 to 0.85	on/off, RF dimmable to <1%, not triac tolerant, integrated powers	SLN12 (JN5142) SLN27 (JN516x)	SLN10 SLN11	Released
SSL110.2	low power SSL, 110 V/15 W, non-isolated, triac tolerant, PWM dimming	JN5148 JN5142 JN5164/68	SSL21082	TEA1721	JenNet-IP ZigBee	No	140 mW	12-80 V	87 / 90%	0.6 to 0.85	on/off, RF dimmable to <1%, triac tolerant, integrated powers	SLN12 (JN5142) SLN27 (JN516x)	SLN09	Released
SSL110.3 SSL230.3	low cost, SSL, 110 V & 230 V, 15 W, non-isolated, not triac tolerant, PWM dimming	JN5148 JN5142 JN5164/68	SSL21082 SSL21084	None	JenNet-IP ZigBee	No	350 mW	12-80 V	80%		on/off, RF dimmable to <1%, not triac tolerant, integrated powers	SLN12 (JN5142) SLN27 (JN516x)	SLN25	Release Q3 2012
SSL110.4 SSL230.4	low power SSL, 110 V & 230 V, 15 W, non-isolated, not triac tolerant, analog dimming	JN5148 JN5142 JN5164/68	SSL2101	TEA1721	JenNet-IP ZigBee	No	150 mW	12-80 V	85 / 88%	0.6 to >0.9	on/off, RF dimmable to <1%, not triac tolerant, integrated powers, power scalable with SSL2103	SLN12 (JN5142) SLN27 (JN516x)	Schematics, BOM & Gerbers	Released
SSL110.5 SSL230.5	low power SSL, 110 V & 230 V, 15 W, isolated LEDs, non-isolated antenna, not triac tolerant, analog dimming	JN5148 JN5142 JN5164/68	SSL2101	TEA1721	JenNet-IP ZigBee	Yes (LEDs) No (antenna)	160 mW	9-80 V	84 / 85 %	0.6 to >0.9	on/off, RF dimmable to <1%, not triac tolerant, integrated powers, power scalable with SSL2103	SLN12 (JN5142) SLN27 (JN516x)	Schematics, BOM & Gerbers	Released
SSL110.6 SSL230.6	low cost SSL, 110 V & 230 V, 15 W, isolated LEDs, non-isolated antenna, not triac tolerant, PWM dimming	JN5148 JN5142 JN5164/68	SSL21082 SSL21084	None	JenNet-IP ZigBee	Yes (LEDs) No (antenna)	350 mW	9-80 V	tdb	tdb	on/off, RF dimmable to <1%, not triac tolerant, integrated powers	SLN12 (JN5142) SLN27 (JN516x)	Schematics & BOM	Release Q4 2012
SSL110.7 SSL230.7	low power SSL, 230V/15W, isolated LEDs and antenna, not triac tolerant, analog dimming	JN5148 JN5142 JN5164/68	TEA1731/33	TEA1721	JenNet-IP ZigBee	Yes (LEDs) Yes (antenna)	160 mW	9-80 V	84 / 85 %	0.6 to >0.9	on/off, RF dimmable to <1%, external powers so power scalable	SLN12 (JN5142) SLN27 (JN516x)	Schematics & BOM	Release tbd

Optional features = triac compatibility, power factor, fast start-up time from mains, meeting regional EMI & harmonic regulations, standby power vs cost optimization, open string protection (LED)

# GreenChip SSL

## Efficient, integrated solutions for LED lamps

Take full advantage of the benefits of dimmable LED lighting with our GreenChip SSL family of driver and controller ICs. Perfect for retrofit LED lamps. They are highly integrated and highly efficient. For example, our SSL21081 or UBA3070 deliver up to 92% efficiency.

## Solid State Lighting

Type number	Package name	Description	Dimming	Isolated/ non-isolated	Topology	Power level [max] (W)	Nominal mains (V)	MOSFET	fosc [max] (kHz)	Short Winding Protection
SSL21151T	SO7	Low-cost non-dimmable LED driver IC	Non dimming	Both	Flyback / Buck Boost	5	100 - 230	Internal	53	N
SSL21153T	SO7	Low-cost non-dimmable LED driver IC	Non dimming	Both	Flyback / Buck Boost	10	100 - 230	Internal	53	N
SSL21081T	SO8	Compact non-dimmable LED driver IC	PWM Dimming	non-isolated	Buck	10	100 - 120	Internal	200	Y
SSL21081AT	SO8	Compact non-dimmable LED driver IC	PWM Dimming	non-isolated	Buck	10	100 - 120	Internal	200	N
SSL21083T	SO8	Compact non-dimmable LED driver IC	PWM Dimming	non-isolated	Buck	10	230	Internal	200	Y
SSL21083AT	SO8	Compact non-dimmable LED driver IC	PWM Dimming	non-isolated	Buck	10	230	Internal	200	N
SSL1523P	DIP8	Non-dimmable LED driver IC	Non dimming	Both	Buck / Flyback	15	100 - 230	Internal	200	Y
SSL1523AP	DIP8	Non-dimmable LED driver IC	Non dimming	Both	Buck / Flyback	15	100 - 230	Internal	200	N
SSL21101T	SO14	Accurate non-dimmable LED driver IC	Non dimming	Both	Flyback / Buck Boost	15	100 - 230	Internal	126,4	N
SSL2109T	SO8	Compact non-dimmable LED controller IC	PWM Dimming	Both	Buck / Flyback	n.a.	100 - 230	External	200	Y
SSL2109AT	SO8	Compact non-dimmable LED controller IC	PWM Dimming	Both	Buck / Flyback	n.a.	100 - 230	External	200	N
SSL2101T	SO16	Dimmable LED driver IC	Mains dimming	Both	Buck / Flyback	15	100 - 230	Internal	200	N
SSL2102T	SO20	Dimmable LED driver IC	Mains dimming	Both	Buck / Flyback	25	100 - 230	Internal	200	N
SSL2103T	SO14	Dimmable LED controller IC	Mains dimming	Both	Buck / Flyback	n.a.	100 - 230	External	130	N
SSL21082T	SO12	Dimmable LED driver IC	Mains dimming	non-isolated	Buck	15	100 - 120	Internal	200	Y
SSL21082AT	SO12	Dimmable LED driver IC	Mains dimming	non-isolated	Buck	15	100 - 120	Internal	200	N
SSL21084T	SO12	Dimmable LED driver IC	Mains dimming	non-isolated	Buck	15	230	Internal	200	Y
SSL21084AT	SO12	Dimmable LED driver IC	Mains dimming	non-isolated	Buck	15	230	Internal	200	N
SSL2129AT	SO8	Dimmable LED controller IC	Mains dimming	Both	Buck / Flyback	n.a.	100 - 230	External	200	N
SSL4101T	SO16	Flyback power supply controller IC with PFC for LED lighting	0 V - 10 V dimming	Isolated	QR PFC + QR Flyback	150	100 - 277	External	460 (PFC) / 150 (Flyback)	N
SSL4120T	SO24	Resonant power supply controller IC with PFC for LED lighting	0 V - 10 V dimming	Isolated	PFC + Resonant	400	100 - 277	External	460 (PFC) / 670 (Half Bridge)	N
UBA3070T	SO8	LED current controller IC	PWM Dimming	Non-isolated	Buck	n.a.	100 - 277	External	205	N

# GreenChip CFL, TL, and HID

## Flexible solutions for compact fluorescent lamps

Using GreenChip CFL ICs – such as UBA20271 – helps make your CFL bulbs more reliable and longer lasting. They also exceed SuperCFL requirements for dimming and are more efficient than standard CFLs.

## Selection guide for CFL, HF-TL driver ICs and HID controllers

Type number	Package name	Description	Dimming	Power level [max] (W)	Nominal mains (V)	V <sub>HV</sub> [max] (V)	V <sub>DD</sub> [max] (V)	MOSFETs	Current boost	Preheat
UBA2015AP	DIP20	Dimmable HF-TL controller IC with PFC	0 V - 10 V dimming	n.a.	100 - 277	570	14	External	N	Fixed Frequency
UBA2015AT	SO20	Dimmable HF-TL controller IC with PFC	0 V - 10 V dimming	n.a.	100 - 277	570	14	External	N	Fixed Frequency
UBA2015P	DIP20	HF-TL controller IC with PFC	Non dimming	n.a.	100 - 277	570	14	External	N	Fixed Frequency
UBA2015T	SO20	HF-TL controller IC with PFC	Non dimming	n.a.	100 - 277	570	14	External	N	Fixed Frequency
UBA2016AP	DIP20	Dimmable HF-TL controller IC with PFC and boost	0 V - 10 V dimming	n.a.	100 - 277	570	14	External	Y	RMS Control
UBA2016AT	SO20	Dimmable HF-TL controller IC with PFC and boost	0 V - 10 V dimming	n.a.	100 - 277	570	14	External	Y	RMS Control
UBA2017AP	DIP16	Dimmable HF-TL controller IC	0 V - 10 V dimming	n.a.	100 - 277	570	14	External	N	Fixed Frequency
UBA2017AT	SO16	Dimmable HF-TL controller IC	0 V - 10 V dimming	n.a.	100 - 277	570	14	External	N	Fixed Frequency
UBA2017P	DIP16	HF-TL controller IC	Non dimming	n.a.	100 - 277	570	14	External	N	Fixed Frequency
UBA2017T	SO16	HF-TL controller IC	Non dimming	n.a.	100 - 277	570	14	External	N	Fixed Frequency
UBA20260T	SO16	Step-dimmable controller IC for CFL	Step dimming	n.a.	120 - 230	500	14	External	Y	RMS Control
UBA20261T	SO20	Step-dimmable driver IC for CFL	Step dimming	20	120	350	14	Internal	Y	RMS Control
UBA20262T	SO20	Step-dimmable driver IC for CFL	Step dimming	20	230	500	14	Internal	Y	RMS Control
UBA20270T	SO16	Dimmable controller IC for CFL	Mains dimming <5%	n.a.	120 - 230	500	14	External	Y	RMS Control
UBA20271T	SO20	Dimmable driver IC for CFL	Mains dimming <5%	20	120	350	14	Internal	Y	RMS Control
UBA20272T	SO20	Dimmable driver IC for CFL	Mains dimming <5%	20	230	500	14	Internal	Y	RMS Control
UBA2211AP	DIP8	Non-dimmable driver IC for CFL	Non dimming	11	230	373	15	Internal	N	RMS Control
UBA2211AT	SO14	Non-dimmable driver IC for CFL	Non dimming	11	230	373	15	Internal	N	RMS Control
UBA2211BP	DIP8	Non-dimmable driver IC for CFL	Non dimming	18	230	373	15	Internal	N	RMS Control
UBA2211BT	SO14	Non-dimmable driver IC for CFL	Non dimming	18	230	373	15	Internal	N	RMS Control
UBA2211CP	DIP8	Non-dimmable driver IC for CFL	Non dimming	23	230	373	15	Internal	N	RMS Control
UBA2211CT	SO14	Non-dimmable driver IC for CFL	Non dimming	23	230	373	15	Internal	N	RMS Control
UBA2212CP	DIP14	Non-dimmable driver IC for CFL with boost	Non dimming	23	120	202	14	Internal	Y	RMS Control
UBA2212CT	SO14	Non-dimmable driver IC for CFL with boost	Non dimming	23	120	202	14	Internal	Y	RMS Control
UBA2213AP	DIP8	Non-dimmable driver IC for CFL with boost	Non dimming	11	230	373	15	Internal	Y	RMS Control
UBA2213AT	SO14	Non-dimmable driver IC for CFL with boost	Non dimming	11	230	373	15	Internal	Y	RMS Control
UBA2213BP	DIP8	Non-dimmable driver IC for CFL with boost	Non dimming	18	230	373	15	Internal	Y	RMS Control
UBA2213BT	SO14	Non-dimmable driver IC for CFL with boost	Non dimming	18	230	373	15	Internal	Y	RMS Control
UBA2213CP	DIP8	Non-dimmable driver IC for CFL with boost	Non dimming	23	230	373	15	Internal	Y	RMS Control
UBA2213CT	SO14	Non-dimmable driver IC for CFL with boost	Non dimming	23	230	373	15	Internal	Y	RMS Control

## Selection guide for HID controllers

Type number	Package name	Description	V <sub>HV</sub> [max] (V)	V <sub>DD</sub> [max] (V)	Internal oscillator	Clock input	High-Low input	Bridge topology	Remark
UBA2036TS	SSOP28	Full-bridge controller IC for HID automotive lighting	550	14	Y	Y	N	Full-bridge	Robust due to HVSOI
UBA2037T	SO24	Full-bridge controller IC for HID general lighting	550	14	Y	Y	N	Full-bridge	Robust due to HVSOI
UBA2037TS	SSOP28	Full-bridge controller IC for HID general lighting	550	14	Y	Y	N	Full-bridge	Robust due to HVSOI
UBA2080AT	SO14	Half-bridge level-shift controller IC	600	15.5	N	Y	Y	Half-bridge	Latch-up free and robust
UBA2080P	DIP8	Half-bridge level-shift controller IC	600	15.5	N	N	Y	Half-bridge	Latch-up free and robust
UBA2080T	SO8	Half-bridge level-shift controller IC	600	15.5	N	N	Y	Half-bridge	Latch-up free and robust
UBA2081P	DIP8	Half-bridge level-shift controller IC	600	15.5	N	Y	N	Half-bridge	Latch-up free and robust
UBA2081T	SO8	Half-bridge level-shift controller IC	600	15.5	N	Y	N	Half-bridge	Latch-up free and robust

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Date of release: September 2012

Document order number: 9397 750 17328

Printed in the Netherlands

