






BRIDGELUX®

CREE 
▶ LED Solution Provider

LED  Light for you
powered by OSRAM
CERTIFIED PARTNER

CITILED.
The Light Engine

PHILIPS
LUMILEDS

SHARP

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COMPANY OVERVIEW

40 years of experience

RECOM has been in the electronics industry for over 40 years with extensive expertise in the industrial markets. This experience is now at the service of the Solid State Lighting industry where quality and reliability continue to be the pillars of our portfolio.

With the advent of lighting as a highly technical electrical field, we found ourselves uniquely positioned to organically expand into this market place. We have been able to design unique products to fit and grow with our customers' needs, meeting their specifications for highly efficient and dependable products – just like those on which our reputation has been built.

Global support through our local offices

With local offices in Shanghai, Singapore, New York, Vienna and Frankfurt, RECOM can support your needs at the local level and still support you around the globe when you need it. At RECOM, we believe that local support in the native language is key to success.

An impressive product portfolio

RECOM manufactures state-of-the-art LED driver modules, with both AC input and DC input to meet any possible need in the SSL market. Additional features, such as TRIAC dimming, 0-10 analog dimming, PWM dimming, IP67 rating (for outdoors applications), Power Factor Correction, EMI filters and short circuit protection are standard options in our portfolio.

Continuous innovative development

As SSL is a new and quickly developing market, constant innovation is the only way to stay abreast with the constant improvements in the LED arena. Our engineers are in very close contact with other SSL component manufacturers to provide you with the most advanced LED Drivers that meet the latest requirements for your LED application.

Quality control and safety certifications

Quality and reliability are the pillars of our designs. We not only provide a 5 years warranty for almost all of our lighting portfolio, but we are confident that our designs will last much longer. All our modules are designed to pass world wide certifications including UL and EN standards.

3 REASONS TO USE RECOM LIGHTING

Innovative technology

We have become a particularly innovative power supply vendor over the years due to customers being satisfied with nothing less than the best. For in the end, our development team lives and breathes to meet the needs of our customers. Since our first DC/DC converter came off the production line some two decades ago, not a year has gone by without us launching a new innovation.

Support

RECOM's global application team is experienced in a wide area of industry.

Our comprehensive knowledge base assists our customers in finding LED driver solutions for almost every application.

If you need our support, our dedicated team is ready to hear from you.

We stand behind our products.

RECOM understands the importance of reliability in your critical applications. That is why we are proud to feature a 5 year Warranty on most of our Light-line LED drivers. Our products and processes meet the highest international standards and have been given the thumbs-up by some of the world's leading certification organizations. But for us that is just the beginning – because we aim for zero defects. As quixotic though this quest may be, we still do our best to achieve it. And this applies not only to the manufacturing and quality control phases, but also to our product development process.



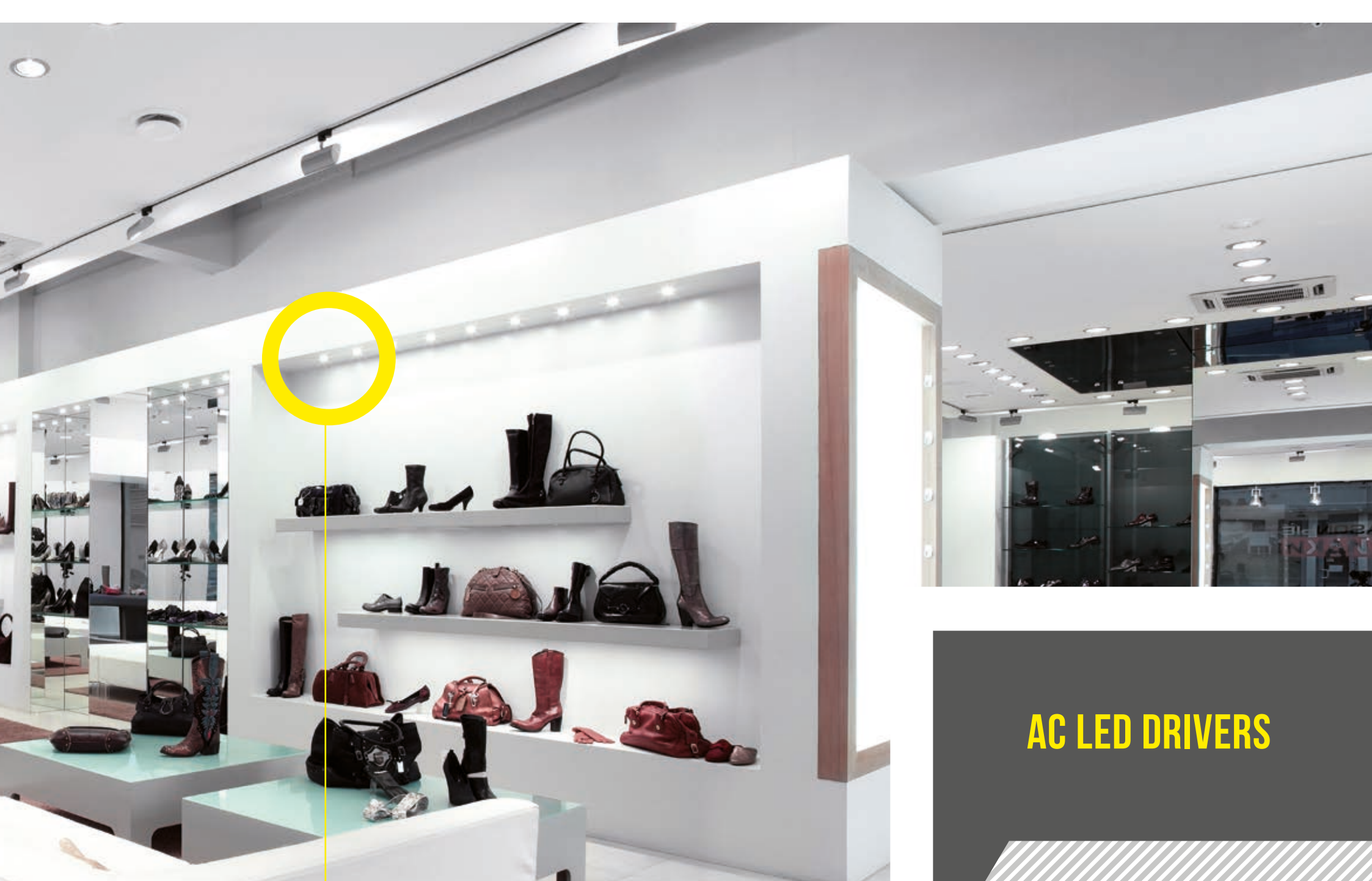


1

RACD25

2

RACD20



3

RACD07

AC LED DRIVERS

Constant Current 3 to 150 watts



Introducing a new family of low power AC input LED drivers, the RACD series; RECOM is offering a low cost solution for low power Solid State Lighting. This family includes modules starting at 3 W up to 150 W in compact packages to fit the different needs of each lighting application. All modules are isolated and fully protected for safety based on UL8750 and EN61347 standards. Additional features like power factor correction, dual mode CV/CC and dimming controls can be found in our extensive portfolio. Building an LED lamp has never been easier!

- Constant current outputs of 350 mA, 500 mA, 700 mA, 1050 mA, 1400 mA, 2100 mA, 2400 mA, 2800 mA, 3200 mA, 4200 mA, 6300 mA and 8300 mA.
- Universal AC input up to 305 VAC
- Power factor corrected
- 3 kVAC isolation, fused input and protected output
- Screw terminal or flying lead terminations
- 3 or 5 Year Warranty
- UL8750 listed, EN61347 and EN55015 certified, ENEC, PSE, CB-Report and RCM

Typical Applications

- | | |
|-----------------------------|-----------------------|
| ▪ Indoor lighting | ▪ Decorative lighting |
| ▪ Cabinet lighting | ▪ Desk lamps |
| ▪ Recessed lighting | ▪ Freezer lamps |
| ▪ Street lighting | ▪ Landscape lighting |
| ▪ High bay/low bay lighting | ▪ Wall lamps |
| ▪ Wall sconce | ▪ Pendant lamps |

Lightline

AC INPUT LED DRIVER

Constant Current AC LED Driver

- Wide and Extra-wide Universal Input Voltage
- 3 or 5 Year Warranty
- Power Factor Correction (12 W and above)
- Constant Current Outputs: 250 mA up to 4200 mA
- High Efficiencies
- Compact Case Sizes
- Mounting Tabs
- RoHS2 and REACH Compliant
- UL 8750 Listed
- CB Reports
- EN6100-3-2 (Class C) Compliant

Series	Output Current	Vin	Vout	Isolation	Certification	Case	Other Features
RACD03	350, 500, 700mA	90-264 VAC	2.5-15, 2.5-11, 2.5-6 V	3.75kVAC	EN, _c UL _{us} , CB, ENEC, RCM, PSE ^{pending}	38.1 x 29.6 x 23.1 mm	3 Year Warranty, IP66, Ultra Compact Size, Dual Mode (CC & CV)
RACD06	350, 500, 700mA	90-264 VAC	2.5-24, 2.5-14, 2.5-12 V	3,75 kVAC	EN, _c UL _{us} , CB, RCM, PSE	58 x 35 x 21 mm	3 Year Warranty, Compact Size, Dual Mode (CC & CV)
RACD07	250, 350, 500, 700mA	90-295VAC	14-28, 10-21, 5-14.5, 3-10.5V	3.75kVAC	EN, _c UL _{us} , CB	57 x 40.8 x 24 mm	3 Year Warranty, IP67, Compact Size, Flying Leads
RACD12	350, 500, 700mA	90-264 VAC	3-36, 3-24, 3-17 V	3kVAC	EN, _c UL _{us} , CB, RCM, PSE	123 x 45 x 18 mm	5 Year Warranty, Low Profile, Screw Terminals
RACD20	350, 500, 700, 1050 mA	90-264 VAC	6-56, 6-40, 6-29, 5-17 V	3 kVAC	EN, _c UL _{us} , CB, RCM, PSE	145 x 50 x 22 mm	5 Year Warranty, Low Profile, Screw Terminals
RACD20/277	350, 500, 700, 1050 mA	90-305 VAC	28-57, 20-40, 14-29, 10.8-19 V	3.75 kVAC	EN, _c UL _{us} , CB, RCM, PSE	80 x 74 x 26.5 mm	5 Year Warranty, 90-305V Wide AC Input, IP66 Rated
RACD30	500, 700 mA	90-264 VAC	10-56, 10-43 V	3 kVAC	EN, _c UL _{us} , RCM	160 x 50 x 22 mm	5 Year Warranty, Low Profile, Screw Terminals
RACD60/OF	700-1100, 1400-2140, 2150-2500, 3570-4200 mA	90-264 VAC	38-54, 21-28, 17-24, 11-13.5 V	3,75 kVAC	EN, _c UL _{us}	101.6 x 50.8 x 28 mm	5 Year Warranty, Open Frame Version (/OF), Adjustable Output Current, Compact 4"x2" Size

Lightline

AC INPUT LED DRIVER

Constant Current AC LED Driver

- Extra-wide Universal Input Voltage
- 3 or 5 Year Warranty
- Power Factor Correction
- High Efficiencies
- Constant Current Outputs: 700 mA up to 11000 mA
- High Output Voltage Series
- Compact Case Sizes
- RoHS2 and REACH Compliant
- UL 8750 Listed
- EN6100-3-2 (Class C) Compliant
- Mounting Tabs

Series	Output Current	Vin	Vout	Isolation	Certification	Case	Other Features
RACD100	2100, 2800, 4200, 8300 mA	90-305 VAC	34-48, 26-36, 14-24, 9-12V	3.75 kVAC	EN, ^c UL _{us} , RCM, PSE	222 x 68 x 39 mm	5 Year Warranty, IP67, Dual Mode (CC & CV)
RACD150	3200, 4200, 6300, 11000 mA	90-305 VAC	9-12, 14-24, 26-36, 34-48 V	3.75 kVAC	EN, ^c UL _{us} , RCM, PSE	222 x 68 x 39 mm	5 Year Warranty, IP67, Dual Mode (CC & CV)
RACD100-A High Voltage	700, 1400 mA	90-305 VAC	100-142, 50-71 V	3.75 kVAC	EN, ^c UL _{us} , PSE	188 x 57 x 37 mm	5 Year Warranty, IP67, High Output Voltage, NXP Green Chip certified
RACD150-A High Voltage	700, 1050, 1400 mA	90-305 VAC	60-210, 60-143, 60-107 V	3.75 kVAC	EN, ^c UL _{us} , PSE	226 x 68 x 39 mm	5 Year Warranty, IP67, High Output Voltage, NXP Green Chip certified
RCOB	350, 400, 450, 500, 550, 600, 650, 700, 800, 900, 1050mA	198-264VAC	25-44	3kVAC	CE marked	106 x 67 x 22mm 121.7 x 78 x 22mm	High Efficiency, Low Cost, 3 Year Warranty, Wide Output Voltage Range, Specially Designed for COB LEDs



Leading-edge and 1-10V Dimmers



The **REDIM** and **REPOT** accessories are available from **RECOM Lighting** as **control elements for LED driver**. Dimming is in numerous applications a „must have“ feature. Most LED drivers use 1-10 V dimming as this kind is easy to design – but there is a huge base of TRIAC dimmers already installed and customer have to use the existing infrastructure to dim their lights. Most installed dimmers need a minimum load of 25 W or 40 W to work correctly – TRIAC dimmable LED drivers are usually below this threshold. This was for RECOM a challenge to offer a leading-edge phasecut dimmer, which starts with a minimum load of 7 Watts. The first generation of dimmers is designed for installation in switch boxes in accordance with DIN 49073.

- Leading-Edge phasecut dimmer
- 1-10 V (max. 40 mA)
- Noise suppression according VDE 0875
- Ambient Temperature Range -10° C to + 80° C
- Thermal protection (switch and fuse)
- Designed for switch boxes DIN 49073
- Adaptor for 6 mm shaft for universal fit
- High Quality Mechanics for accurate control

Series	Operating Principle	Power	Vin	Features
REDIM07	Leading-Edge Phasecut	7-110 VA (W)	207-253 VAC	designed for LED applications, up to 5 RACT20
REDIM20	Leading-Edge Phasecut	20-250 VA (W)	207-253 VAC	for all kind of lamps, up to 12 RACT20
REPOT01-10	1-10V Electronic Potentiometer	40mA max	207-253 VAC	usable with all 1-10 V standard interfaces, up to 10 LED Driver

PWM, 0 to 10V, 1-10V, TRIAC Dimming, Resistor Dimming



RECOM proudly presents our dimmable series of AC input LED drivers. Analog (0 – 10 V) and PWM dimming is featured in our 20 W, 45 W, 60 W, 100 W and 150 W series. Many customers have selected our 20 W TRIAC dimmable RACT LED driver as the best driver in class. Just like our non-dimmable drivers all modules are fully protected for safety based on the UL 8750 and EN61347 standards.

- Constant current outputs of 350 mA, 500 mA, 700 mA, 1050 mA, 1250 mA, 1400 mA, 1850 mA, 2100 mA, 2500 mA and 4200 mA
- Universal AC Input
- Power factor corrected
- Up to 3.75 kVA isolation, fused input and protected output
- Screw terminals or flying lead terminations
- Analog dimming (RACD20D, RACD45-A, RACD60-A, RACD100-A, RACD150-A)
- PWM Dimming (RACD45-A, RACD60-A, RACD100-A, RACD150-A)
- Resistor Dimming (RACD20D, RACD45-A, RACD60-A, RACD100-A, RACD150-A)
- TRIAC dimming (RACT20)
- Thermal dimming (RACD60/TOF)
- 5 Year Warranty

Typical Applications

- Indoor lighting
- Cabinet lighting
- Recessed lighting
- High bay/low bay lighting
- Wall sconce
- Decorative lighting
- Desk lamps
- Wall lamps
- Pendant lamps

Lightline

AC INPUT LED DRIVER

Constant Current AC Dimmable
LED Driver

- Universal Input Voltage
- 5 Year Warranty
- Power Factor Corrected
- High Efficiencies
- High Output Voltage Series
- Constant Current Outputs:
350 mA to 4200 mA
- EN6100-3-2 Class C
- RoHS and REACH Compliant
- UL 8750 Listed
- Mounting Tabs
- PWM Dimming
- Analog (0-10 V) Dimming
- Thermal Dimming
- 3in1 Dimming (Analog/PWM/Reistor)
- TRIAC Dimming

Series	Max lout	Vin	Vout	Isolation	Certification	Case	Other Features
RACD20-D	2x 350 or 1x 700 mA	200-264 VAC	3 - 34 (2x)	3 kVAC		155 x 50 x 21 mm	5 Year Warranty, Dual Outputs, 1-10 V Analog Dimming (15% to 100%)
RACD20-D (US)	2x 350 or 1x 700 mA	90-130 VAC	3-34 (2x)	3 kVAC		155 x 50 x 21 mm	5 Year Warranty, Low Profile, Easy Connections, 1-10 V Analog Dimming (15% to 100%)
RACT20	350, 500, 700, 1050 mA	180-264 VAC	30-56 , 21-39, 15-28, 12-18 V	3.75 kVAC	EN, c UL _{us} , RCM, PSE	137.5 x 50.2 x 23 mm	5 Year Warranty, TRIAC Dimmable down to 0%, Flicker Free Operation
RACT20 (US)	350, 500, 700, 1050 mA	90-135 VAC	30-56 , 21-39, 15-28, 12-18 V	3.75 kVAC	EN, c UL _{us} , RCM, PSE	137.5 x 50.2 x 23 mm	5 Year Warranty, TRIAC Dimmable down to 0%, Flicker Free Operation
RACD25-A	350, 500, 700, 1050, 2100 mA	90-305 VAC	48-57, 36-48, 24-36, 12-24, 9-12 V	3.75kVAC	EN, c UL _{us}	110 x 73.5 x 33mm	5 year warranty, 3 in 1 dimming, IP67
RACD35-A	500, 700, 1000, 1400, 2500 mA	90-305VAC	48-57, 36-48, 24-36, 12-24, 9-12 V	3.75kVAC	EN, c UL _{us}	110 x 73.5 x 33mm	5 year warranty, 3 in 1 dimming, IP67
RACD45-A	700, 1050, 1250, 1850 mA	90-305 VAC	40-57, 33-48, 24-36, 15-24 V	3.75 kVAC	EN, c UL _{us}	164 x 45.1 x 32.5 mm	5 Year Warranty, IP67, 3in1 Dimming, Flying Leads
RACD60-A	1050, 1200, 1650, 2500, 4200 mA	90-305 VAC	40-57, 33-48, 24-36, 15-24, 9-12 V	3.75 kVAC	EN, c UL _{us}	164 x 45.1 x 32.5 mm	5 Year Warranty, IP67, 3in1 Dimming, Flying Leads
RACD60/TOF	700-1100, 1400- 2140, 2150-2500, 3570-4200 mA	90-264 VAC	38-54, 21-28, 17-24, 11-13.5 V	3,75 kVAC	EN, c UL _{us}	101.6 x 50.8 x 28 mm	5 Year Warranty, /OF Open Frame Version, /TOF Thermal Dimming Compact 4"x2" Size

Lightline

AC INPUT LED DRIVER

Constant Current AC Dimmable
LED Driver

- Universal Input Voltage
- 3 or 5 Year Warranty
- Power Factor Corrected
- High Efficiencies
- High Output Voltage Series
- Constant Current Outputs:
350 mA to 4200 mA
- EN6100-3-2 Class C
- RoHS and REACH Compliant
- UL 8750 Listed
- Mounting Tabs
- PWM Dimming
- Analog (0-10 V) Dimming
- Thermal Dimming
- 3in1 Dimming (Analog/PWM/Reistor)
- TRIAC Dimming

Series	Output Current	Vin	Vout	Isolation	Certification	Case	Other Features
RACD100-A	700, 1400 mA	90-305 VAC	100-142, 50-71 V	3.75 kVAC	EN, cUL _{us} , PSE	198 x 57 x 37 mm	5 Year Warranty, IP67, High Output Voltage, NXP Green Chip Certified, Dimmable
RACD150-A	700, 1050, 1400 mA	90-305 VAC	60-210, 60-142, 60-107 V	3.75 kVAC	EN, cUL _{us} , PSE	226 x 68 x 39 mm	5 Year Warranty, IP67, High Output Voltage, NXP Green Chip Certified, Dimmable
RCOB-A	350, 700, 1050 mA	198-264 VAC	6-44 V	3 kVAC	CE marked	106 x 67 x 22mm 121.7 x 78 x 22mm	3 Year Warranty, High Efficiency, Low Cost, Wide Output Range, 1-10V Dimming Down to 0%. Specially Designed for COB LEDs

DALI Accessories



Digital Addressable Lighting Interface (DALI) is a protocol for controlling lighting over a simple two-wire digital interface. The protocol is unique because it has an international standard (IEC62386) which ensures interoperability between different manufacturers and devices - If it has the DALI logo on it, it will work!

RECOM has developed two accessories for DALI systems: a DALI converter (RELI-DA01/R) that translates the DALI commands into 0-10V/1-10V or PWM outputs to control dimmable LED drivers and a DALI Bus power supply (RELV4-16) which has been specially designed to power DALI systems.

DALI-PWM/Analog Converter

- Universal AC input
- DALI command to select Analog or PWM dimming output
- DALI command to select Linear or Logarithmic dimming curve
- Built-in Relay for zero LED driver standby power
- Output can dim single or multiple LED drivers
- CE Marked
- DALI approved

DALI Bus Power Supply

- Universal AC input
- Specially designed for DALI systems according to IEC62386
- Class II power supply (no earth required)
- Withstands indefinite short circuits
- Indicator LED shows DALI traffic
- CE Marked
- DALI approved

Series	Operating Principle	Power	Vin	Other Features
RELI-DA01/R	DALI-to-PWM/ Analog control signal interface	1.6W	90-290VAC	DALI IEC62386, PWM / 0-10V output, compatible with all RECOM dimmable drivers, Mounting Tabs
RELV4-16	DALI Bus power supply	3.2W	90-264VAC	Designed to power the DALI bus, DALI compliant, Mounting Tabs

Constant Voltage 3 to 150 watts



LEDs are usually driven by current drivers, but there are many applications on the market which need constant voltage instead of constant current. C.V. LED drivers must still meet the LED lighting regulations. PFC > 0.9 is already mandatory at power starting with 25W and EN61000-2-3 class C is required which is not typical for standard constant voltage power supplies. All modules are isolated and will meet the mentioned UL and EN standards, the dual mode CC/CV helps to reduce logistic costs, as well as offering a lighting certified power supply for dual-stage drivers (CV supply powering CC drivers)

- Universal Input Voltage
- 3 or 5 year Warranty
- High Efficiency > 85 %
- Constant Voltage Outputs
- Power Factor Corrected above 25W
- RoHS and REACH Compliant
- EN 61000-3-2 (Class C)
- 5 Year Warranty
- UL 8750 listed, ENEC, PSE, CB-Report and RCM

Typical Applications

- | | |
|-----------------------------|-------------------------|
| ▪ Cabinet lighting | ▪ Signage |
| ▪ High bay/low bay lighting | ▪ Backlight for signals |
| ▪ Wall washers | ▪ Road signs |
| ▪ Cove lighting | ▪ Commercial signage |

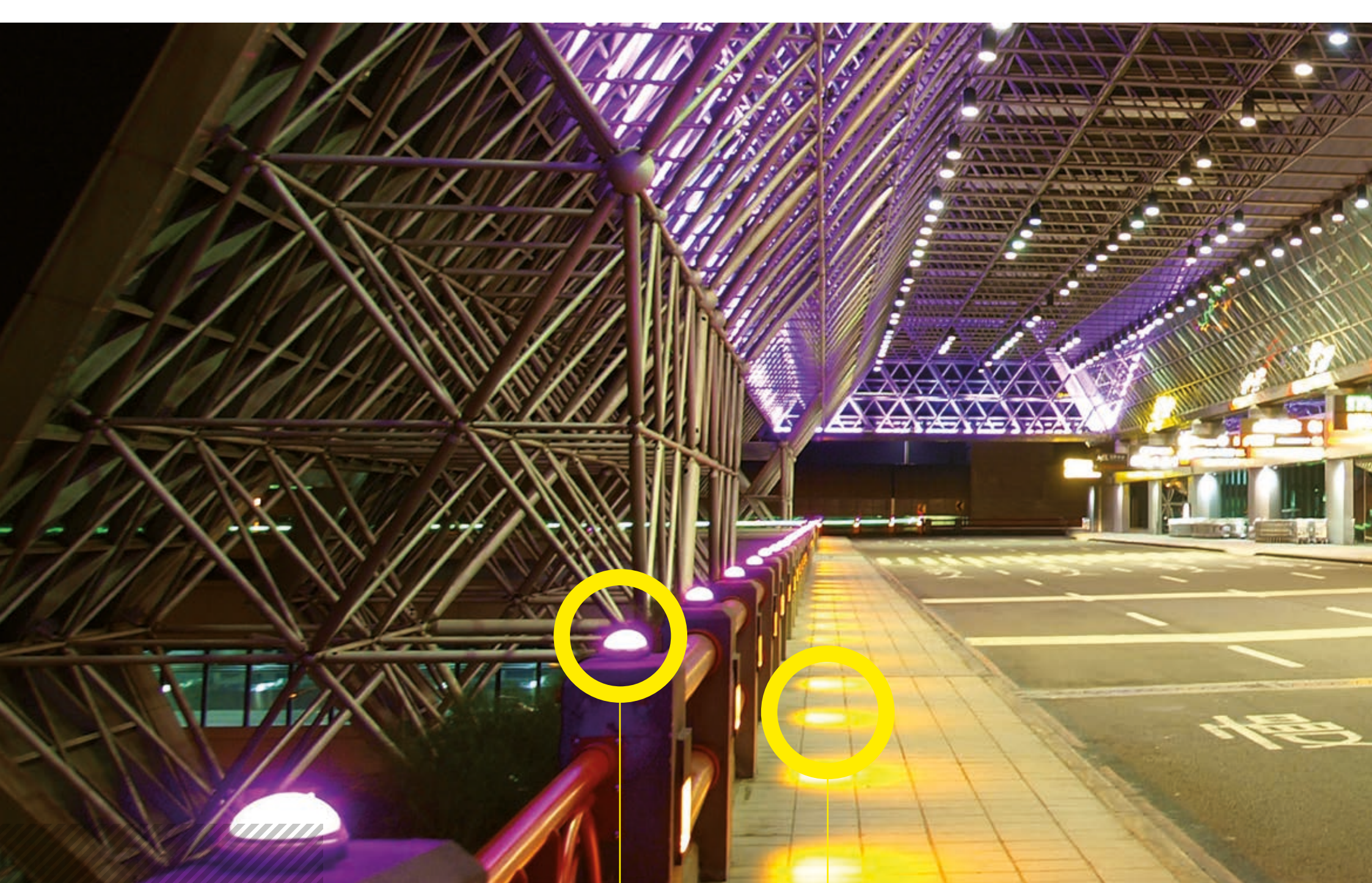
Lightline

AC INPUT LED DRIVER

Constant Voltage AC LED Driver

- Constant Current and Voltage Outputs
- Universal Input Voltage
- 3 or 5 Year Warranty
- Power Factor Corrected (>25W)
- Compact Case Size
- Plastic or Metal Case
- EN6100-3-2 Class C Compliant
- RoHS2 and REACH Compliant
- UL 8750 Listed
- ENEC, PSE, CB-Report and RCM
- Mounting Tabs

Series	Max I _{out}	V _{in}	V _{out}	Isolation	Certification	Case	Other Features
RACD03	0-350, 0-500, 0-700 mA	90-264 VAC	15, 11, 6 V	3.75 kVAC	EN, _c UL _{us} , RCM, PSE _{pending}	52.1 x 29.60 x 23.1 mm	3 Year Warranty, IP66 Rated, Compact Size, Wired Connections
RACD06	0-350, 0-500, 0-700 mA	90-264 VAC	24, 15, 12 V	3.75 kVAC	EN, _c UL _{us} , RCM, PSE	68 x 35 x 21 mm	3 Year Warranty, Compact Size, Screw Terminal Connections
RACV30	0-1250, 0-2500 mA	90-264 VAC	24, 12 V	3 kVAC	EN, _c UL _{us} , RCM, PSE	160 x 50 x 22 mm	5 Year Warranty, PFC >0.9
RACD100	0-2100, 0-2800, 0-4200, 0-8300 mA	90 - 305 VAC	48, 36, 24, 12 V	3.75 kVAC	EN, _c UL _{us} , RCM, PSE	222 x 68 x 39 mm	5 Year Warranty, IP67, Dual Mode (CC & CV)
RACD150	0-3200, 0-4200, 0-6300, 0-11000 mA	90 - 305 VAC	48, 36, 24, 12 V	3.75 kVAC	EN, _c UL _{us} , RCM, PSE	222 x 68 x 39 mm	5 Year Warranty, IP67, Dual Mode (CC & CV)



1 RCD-24-PL

2 RCD-48-1.20/M

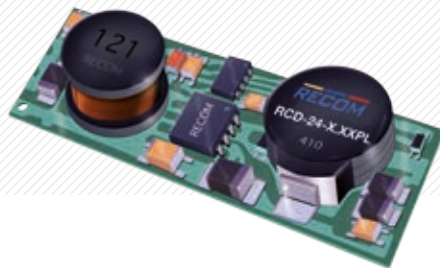


3

RCD-24

DC LED DRIVERS

Buck and Buck/Boost from 1 to 73 watts



RECOM presents the RCD and RBD family offering a variety of DC input LED driver modules with a constant current output from 300 mA up to 1.2 Amps. With a buck topology in RCD series and buck-boost topology in the RBD series, these modules have comprehensive specifications such as: high efficiency (up to 97%), wide input voltage range, very low output dropout voltage, 2 independent dimming options (PWM and 0-10 analog), MTBF up to 600,000 hours, and 3 packages (through hole, wired, and SMD).

- All in one! No need for external components
- 2 independent dimming options that can be used at the same time
- RBD/W and RCD/W suitable for outdoors/wet area applications (IP67)
- High efficiency over a wide range of LED loads
- Buck (RCD) and Buck-Boost (RBD) topology
- First SMD DC LED driver module with built-in Class B filter in the market! (RCD/PL)
- Extremely low profile (only 6.6mm) – (RCD/PL)
- Rheostat (potentiometer) dimming option
- UL, CE, EN60950-1, EN50121-3-2, EN61373 (railway) certified

Typical Applications

- Architectural lighting
- Theatrical lighting (stage lighting)
- Outdoor lighting
- Underwater and marine applications
- Railways
- Solar powered Lighting
- Fluorescent replacement
- Spot lamps
- Decorative lighting
- LED displays
- Freezer lighting
- Backlight LED
- Landscape lighting
- Cabinet lighting
- Battery operated applications

Lightline

DC INPUT LED DRIVER

Constant Current DC LED Driver

- All-in-one
- Ready To Use (no external components necessary for basic use)
- High Efficiency (up to 96%)
- 5 Year Warranty
- PWM/Digital and Analog Dimming
- Wide Input Voltage Range
- Buck & Buck-Boost Topology
- Railway certified (RCD-series only) according to EN50121-3-2 (EMC) + EN61373 (Shock + Vibration)
- Ambient Temperature Range -40°C to +85°C
- UL Certified
- Short Circuit Protected
- Custom Designs Available

Series	Output Current	Vin	Vout	Isolation	Certification	Case	Other Features
RCD-24-x.xx	0.3-1.2 A	4.5-36 VDC	2-35	none	EN, ^c UL _{us} , Railways	DIP	Constant Current, PWM & Analog Dimming
RCD-24-x.xx/W	0.3-1.2 A	4.5-36 VDC	2-35	none	EN, ^c UL _{us} , Railways	DIP wired	Constant Current, Wired Version, PWM & Analog Dimming
RCD-24-x.xx/ VREF	0.3-0.7 A	4.5-36 VDC	2-35	none	EN, ^c UL _{us} , Railways	DIP	Constant Current, Analog Dimming (Rheostat) w. External Potentiometer, Vref output
RCD-24-x.xx/ W/VREF	0.3-0.7 A	4.5-36 VDC	2-35	none	EN, ^c UL _{us} , Railways	DIP wired	Constant Current, Analog Dimming (Rheostat) w. External Potentiometer, Vref output, Wired Version
RCD-24-x.xx/PL	0.3-1.0 A	4.5-36 VDC	2-35	none	EN, ^c UL _{us} , Railways	SMD	Constant Current, SMD Pinless Version, Low profile, Built in Class A/B filter, PWM & Analog Dimming
RCD-48-x.xx	0.35-1.2 A	9-60 VDC	2-56	none	EN, ^c UL _{us} , Railways	DIP	Constant Current, Wide Input / Output Voltage Range, PWM, Analog, Vref Output
RCD-48-x.xx/W	0.35-1.2 A	9-60 VDC	2-56	none	EN, ^c UL _{us} , Railways	DIP wired	Constant Current, Wide Input / Output Voltage Range, PWM, Analog, Vref Output, Wired Version
RBD-12-x.xx	0.35-0.5A	8-36 VDC	2-40	none	EN, ^c UL _{us} , Railways	DIP	Constant Current, Buck-Boost Topology, PWM, Analog, Vref Output
RBD-12-x.xx/W	0.35-0.5A	8-36 VDC	2-40	none	EN, ^c UL _{us} , Railways	DIP wired	Constant Current, Buck-Boost Topology, PWM, Analog, Vref Output, Wired Version

Why use LEDs?

LED technology has the highest Lm/W potential of all domestic lighting technologies, meaning it can deliver more light with less power. The increasing efficiencies and life expectancy of LEDs make them especially appealing for their integration into many types of lighting fixtures.

Benefits of LED vs traditional lighting

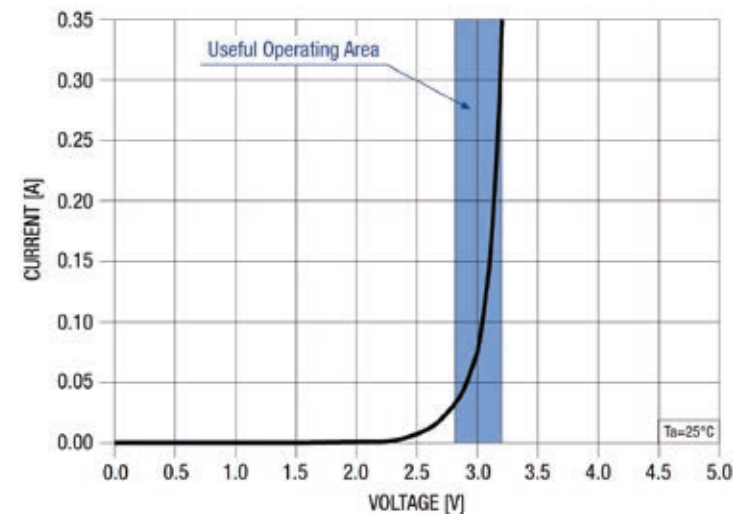
- Energy savings
- Better light quality, color and control
- Long lifetime
- Low maintenance cost

Light source	Typical Lm/W	Watts needed to deliver 1.400 Lumen
Incandescent	10-18	100 Watts
Halogen	15-20	80 Watts
CFL	36-60	30 Watts
Fluorescent	50-100	18 Watts
LED	60-180	10 Watts

*lm/W continues to increase as LED technology evolves

Basic LED characteristics

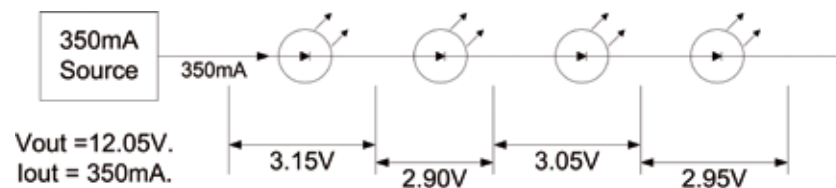
LEDs are non-linear devices. When the voltage increases past a certain threshold, the LED starts to emit light and the current increases sharply. If the voltage continues to rise the LED rapidly overheats and burns out. The trick is to operate LEDs in a narrow band between full OFF and full ON. In addition, the operating voltage varies between different high power LEDs – even within the same batch and supplier. It also changes with the ambient temperature and the age of the LED.



Why a constant current driver is the better solution

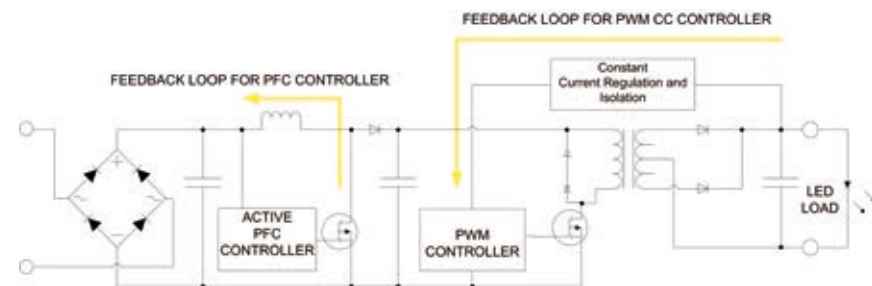
When powered by a constant current driver, each LED in a chain has the same current. Since the emitted light is proportional to the current, all LEDs have the same brightness. The majority of high power white LEDs are designed to operate between 350 mA & 1A. The simplest constant current source is a constant voltage supply driving the LEDs via a resistor. This solution is very cheap, but has a poor current regulation and wastes power generating additional heat.

The next simplest source of constant current is a linear-regulator. The excess power has to be dumped as heat, so a good heat sinking of the regulator is required. Another disadvantage is the poor efficiency of this solution. The ideal solution is a constant current driver that controls the current internally with very high efficiency and no need for a heatsink.



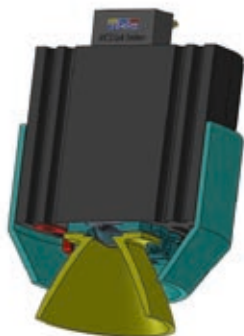
Power factor correction

Energy Star requirements state that any LED driver with more than 25 W be power factor corrected (PFC). Simply put, PFC means that the current drawn by the driver is in phase with the input voltage and that any harmonic interference injected by the driver into the mains supply is below certain limits (Class C for lighting). Power factor is measured as a number between 0 and 1, where 1 is perfection. Class C limits require a figure of at least 0.9 for domestic and commercial lighting. RECOM power factor corrected products have a typical figure of 0.95 or higher. Though the regulations do not require PFC for drivers below 25 W, all RECOM 12 W and 20 W drivers also feature active power factor correction, allowing you to build your LED fixtures with confidence that you will meet all of the international EMC standards, now and in the future.



LED arrays make your light design

LED manufacturers are developing new LED arrays, both with directional and non-directional light, to make it easier for lighting fixture manufacturers to design high brightness LED fixtures without the need to master the binning process for a good light quality and color. Connector manufacturers (e.g. TE, Molex) are also developing lighting connectors that will allow lighting designers to mount and connect the LED arrays to the LED driver without needing a soldering iron. The RECOM AC LED Drivers (RACD20/30) are a perfect match for LED Arrays from Cree (Xlamp, LED Modules), Lumileds (LuxeonS), Bridgelux (RS, ES), Sharp (Mega Zenigata) and more.

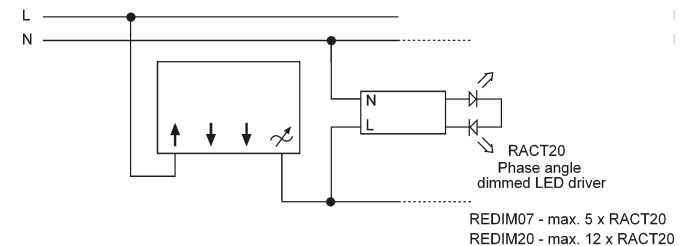


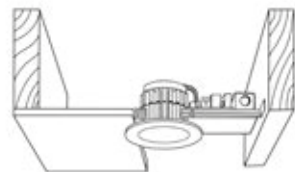
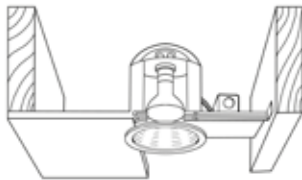
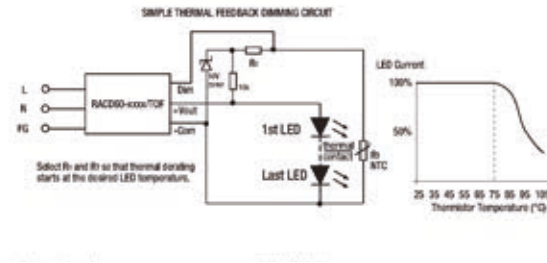
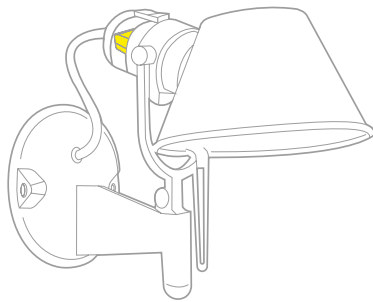
Low power lamps for indoor & outdoor

The RACD03, RACD06 and RACD07 are very compact AC input LED drivers that will cover your needs for constant current drivers for most low power applications, such as desktop lighting, bed lamps, outdoor lanterns, wall lamps, bollards, etc. The small size of both RECOM families will help you to integrate the LED driver inside your fixtures providing the required constant LED current with a universal AC input. The RACD03 and RACD07 are fully silicone potted for wet and damp conditions such as bathrooms, cellars and garden lights while the RACD06 is fitted with screw terminals for easy installation in furniture, kitchen cabinets or within existing light fittings. The three series offer 250 mA, 350 mA, 500 mA and 700 mA options.

AC dimming for light modules

The RACT20 is a LED driver module that is mains dimmable using conventional wall dimmers, allowing existing incandescent installations to be upgraded to LED lights without rewiring. Wall dimmers use either triac (leading edge) or transistor (trailing edge) phase angle control to partially allow the AC waveform through according to the dimmer setting. While incandescent lamps simply react to the average power coming through the dimmer, LEDs are current driven and cannot be directly dimmed this way. The RACT20 cleverly detects the switching edges to calculate the phase angle and uses this information to correctly and linearly dim the LED current over the full 0% to 100% range and works with both leading and trailing edge dimmers.





Thermal feedback dimming control

The RACD60 family of RECOM now comes with a thermal dimming input. A simple thermal feedback circuit can be used to reduce the current as the temperature rises to keep the LED operating reliably at high temperatures. This feature is critical in certain applications where the light must not fail even when the ambient temperature exceeds the design limits. High bay, low bay, parking lot and street lights are examples where reliable and continuous lighting is required for safety. The thermistor sensor changes its resistance sharply above a certain temperature. A set temperature resistor is used to program the dimming feedback to start at any desired LED case temperature, the most common values being around 75°C depending on the application. As the drive current decreases, the power dissipated in the LED also decreases, limiting the potential danger of over-temperature and early failure in your fixture. A low cost zener diode is used to derive a stable 10V reference voltage from the LED output so an external power supply is not required.

Compact high power drivers

Recessed lights have standardized on certain industry-accepted dimensions, making it easier for designers, installers and manufacturers to use interchangeable parts. LED-based lights need an additional driver, however, meaning that the J-Box used for the wiring connections must now also be used as the housing for the additional electronics needed. This places certain size constraints on the LED drivers. The 3W to 60W compact modules from RECOM fit in to standard J-Boxes, making them the ideal choice for these types of lights. Higher power recessed lights or high-bay lighting installation need more powerful LED drivers that are too large for standard J-Boxes, but should be mounted separately for cooling purposes anyway. However, the compact dimensions of the RECOM high power drivers makes them easy to integrate with standard lighting designs with the minimum of re-engineering.

Switching and dimming with DALI

DALI is an interference-free, two-wire system for lighting control standardised according to IEC 60929. DALI technology was available on the market long before LED technology became popular. Thanks to its simple design, DALI bus technology was first developed to control the lighting in large rooms. It is also suitable for subsystems connected through a gateway to a building automation system. Many modern buildings are

equipped with separate DALI buses on each floor. As the technology is relatively cheap, DALI installations are also a great option for small buildings or even individual rooms. RECOM offers two DALI accessories: a DALI certified bus power supply and a digital to analog interface to allow conventional dimmable LED drivers to be used with the DALI system.



Fig. 1: As DALI buses are relatively cheap, they are equally suitable for small rooms and for subsystems in larger buildings.

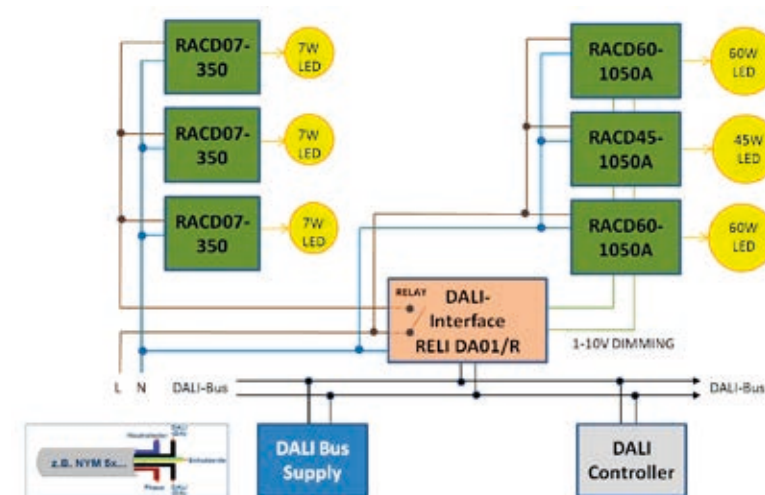
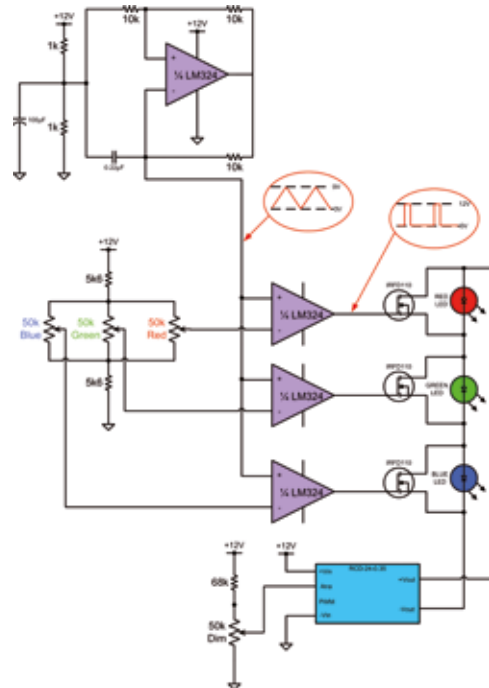


Fig. 2: DALI installation of conference room shown in figure 3, featuring six LED luminaires that are switched and dimmed together through the universal RELI DA01/R DALI interface from RECOM

Simple RGB mixer

This simple RGB mixer uses a single LED driver to color mix an RGB LED. The color can be independently mixed by the 3 potentiometers on the left and additionally, the overall brightness can be dimmed by the analog pin on the RCD-24 driver.

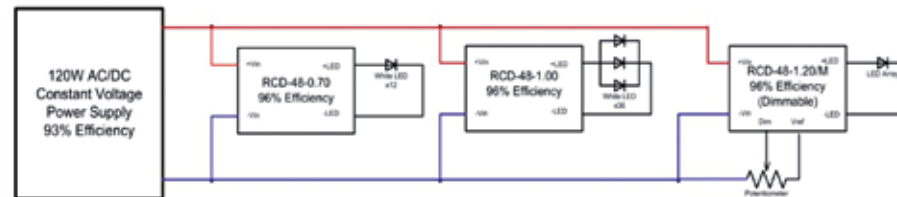


High efficiency DC bus

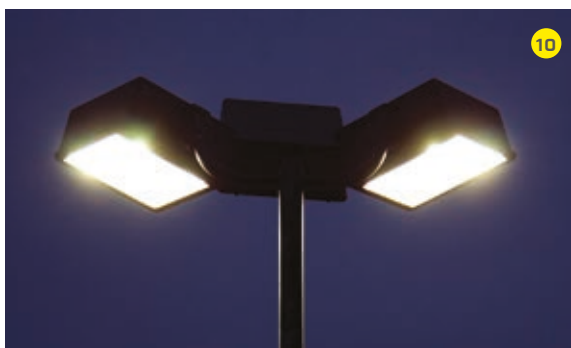
If many low power LED light fittings are required, it can often be more efficient to use a low voltage DC bus power supply rather than to power each LED separately from the mains voltage. AC/DC LED drivers can be very efficient, but for low power drivers, the internal overheads mean that efficiencies of only around 60% can be expected. On the other hand, a 20W AC/DC power supply has an efficiency approaching 85% and a 100W more than 90%. The RCD range of DC LED drivers have an efficiency of around 96%, so a central high power

AC/DC constant voltage power supply powering distributed DC/DC LED drivers offers a highly efficient system solution. The new RCD-48 series of converters have an input voltage range of up to 60V, so allowing both the use low-cost 48V power supplies and the ability to drive longer strings of LEDs of up to 70W. Each DC/DC driver can be simply dimmed using either PWM or analog control voltages, so an individually dimmable, mixed power lighting system is very easy to implement.

$$\text{Power Supply Efficiency} = 0.93 \times 0.96 = 89\%$$




LIGHTING FIXTURES, POWERED BY RECOM



RECOM
LIGHTING

- 1 UNDER CABINET LIGHTING**
Linear cabinet lighting provides bright task lighting to kitchens and/or ambient lighting to shelving and molding. It's important that the driver fits into the cabinet space (e.g. low profile RACD12/20/30). When a transformer is used, a low voltage driver (RCD-24 family) is required (12V or 24V).
Recommendation: RACD12/RACD20/RACD30/RACV30 or RCD-24
- 2 PENDANT LAMP**
Adorning the ceiling, these lamps bring style to your home as a decorative fixture but they also need to provide enough light to illuminate the floor from the ceiling. High power LED-based lamps or modules are required to provide the equivalent of a 60-200W incandescent bulb.
Recommendation: RACD12/RACD20/RACD30/RACT20 or RCOB
- 3 PANEL LIGHTS/TROFFERS**
Square (2x2) or rectangular (4x2) panel lights can be mounted in suspended ceilings with acrylic lens for floor and task lighting in offices and commercial spaces or subtle glow for ambient effect. LED-based panel lights vary from 40W to 120W to provide the required lumen output.
Recommendation: RACD30/RACD45/RACD60/RCD-24 or RCOB
- 4 LANDSCAPE LIGHTING**
Accentuating the natural splendor of gardens and landscapes, they provide both beauty and security to your home. These lights require low power drivers powered by mains or solar panels with protection against wet conditions.
Recommendation: RCD-24/W, RBD-12, RACD03 or RACD07
- 5 OUTDOOR LAMPS**
Post top lights, porch lights or security lights; they highlight the beauty of a home and bring a sense of safety. In the face of diverse weather conditions, the reliability of these lamps is dependent on a high level of ingress protection.
Recommendation: RACD03/RACD25/RACD35/RACD45 or RACD60/IP67
- 6 WALL SCONCE**
Waiting rooms, entrance ways and hallways all benefit from the graceful style and ambience a wall light provides. The creative freedom, flexibility, and energy savings LED's provide make a range of power options key.
Recommendation: RACD06/ RACD07/ RACD12/RACD20/RACT 20 or RCOB
- 7 RECESSED LIGHTING**
Recessed lighting has become a very popular option especially for new construction and remodels. With a LED based recessed system the LED drivers are mounted directly into the junction box or ceiling space and provide illumination for larger areas.
Recommendation: RACD06/RACD07/ RACD12/RACD20 or RCOB
- 8 HIGH BAY LIGHTING**
Nearly every warehouse and industrial building requires powerful high bay lighting that can illuminate from ceilings up to 12m tall in some instances. LED replacements are now greatly reducing their energy consumption and maintenance costs.
Recommendation: RACD100/RACD100-A/ RACD150 or RACD150-A
- 9 BOLLARD LIGHTING**
Both beautiful and functional, bollard lights are used for outdoor path illumination. An LED-based bollard will require low power and reliable LED drivers that are protected against adverse climate conditions.
Recommendation: RACD03 or RACD07
- 10 PARKING LOT**
Parking lot lights must meet many regulatory standards for illumination and energy savings. High efficiency, high power LED drivers are required to meet both requirements. Automatic sensors for better usability, safety and energy control are also becoming standard.
Recommendation: RACD100/RACD150/ RCD-48 or RBD-12



Light is essential to modern life; it allows us to live our lives to our own rhythms and keeps us happy. LED lighting has inaugurated a revolution – more interaction, new form factors and innovative control systems that lead to a completely new quality of light.

RECOM Lighting was founded with the vision of helping the lighting industry to adopt to the lighting revolution. We see LED lighting opportunities today similar to the days when Carl Benz started the automobile revolution some 120 years ago. He turned the concept of the automobile into a working vehicle, but still needed many refinements and technical advances to get a practical, reliable and affordable motor car. Recom Lighting offers competent advice and products that help accelerate the development of LED lighting solutions into equally practical, reliable and affordable LED lights.

Recom Lighting designs and manufactures lighting solutions, offers LED drivers and supplies component parts to help our customers illuminate almost anything one could think of, from solar powered path lighting in city parks to trains and buses, shopping centers and airports.

We continually communicate with and learn from our customers in order to improve our products and services. As technology evolves, we will continually re-evaluate our products and services we offer to our customers. We supply the engines that drive the LED lighting vehicle – dimmable drivers that make lighting systems more efficient, or make the LED lights last longer, or protect our environment. All combined with the commitment and world class support of a truly global player!





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