# Features

## LED DRIVER

- ● AC-DC LED Power Supply
- ● 60W Dual Mode CV and CC Output
- ● Power Factor Corrected
- ● Universal Input Voltage Ranges
- ● Low Cost Open Frame Design
- ● High Efficiency
- ● Adjustable Current Limit
- ● Long 5 Year Warranty

## LIGHTLINE
### AC/DC-Converter
with 5 year Warranty

**RECOM**

## 60 Watt PFC Single Output

RoHS
2002/95/EC
6/6

**UL Pending
EN 61347 Certified
CE Marked**

## RACD60

**Description** A compact universal input voltage 60W constant voltage/ constant current switching power module suitable for driving high power LEDs. The LED drivers have a dual mode of operation: CV mode: at loads below the preset current limit , the RACD60 behaves as a voltage source. CC mode: at loads above the preset current limit, the RACD60 behaves as a current source. Thus the same power supply can be used with both CV and CC LED modules. The current limit can be set by the user. The RACD 60 series have a universal input voltage range and are fully protected against output short circuit, overload and over-temperature. The converters feature built-in power factor correction as standard.

## Selection Guide

| Part Number | Input Voltage Range (VAC) | Output Voltage (VDC) | Output Current Adjust Range (mA) | Preset Current Limit (mA) | Efficiency (230VAC) (%) | Max Power (W) |
|---|---|---|---|---|---|---|
| RACD60-4200* | universal | 11 min - 13.5 max | 3570 - 4200 | 4200 | 85 | 60W |
| RACD60-2400* | universal | 17 min -24 max | 1700 - 2500 | 2400 | 87 | 60W |
| RACD60-2100* | universal | 21 min - 28 max | 1400 - 2140 | 2100 | 89 | 60W |
| RACD60-1400* | universal | 21 min - 28 max | 1400 - 2140 | 1400 | 89 | 60W |
| RACD60-1050* | universal | 33.5 min - 48 max | 825 - 1250 | 1050 | 89 | 60W |
| RACD60-700* | universal | 38 min - 54 max | 700 - 850 | 700 | 89 | 46W |

\* add suffix /OF for open frame version (Standard) or add suffix /IP67 for potted version

## Specifications (typical at 25°C and after warm up time unless otherwise specified )

| | | |
|---|---|---|
| Input Voltage Range | | 90-264VAC |
| Rated Power | | 60 Watts max. |
| Input Frequency Range | | 47-63 Hz |
| Power Factor Correction | Full Load, 115VAC/230VAC | > 0.9 |
| Input Current (full load) | 115VAC/230VAC | 0.8A / 0.4A max. |
| Inrush Current (cold start) | 115VAC/230VAC | 25A / 50A max. |
| Leakage Current | 230VAC/63Hz | <0.75mA max. |
| Input Fuse | Built-in | 3.15A Slow Blow |
| Output Current Accuracy | Full load | ±5% |
| Output Current Adjust | Preset Potentiometer | 75% to 100% approx. |
| Line Voltage Regulation | LL to HL at Full Load | ±4% typ. |
| Load Voltage Regulation | 60% to 100% Load | ±5% typ. |
| Minimum Load Current | | see table |
| Output Ripple and Noise | 20MHz limited,with 0.1µF + 47µF | 5Vp-p max. |
| Operating Frequency | | 65kHz typ. |
| Efficiency at Full Load | | see table |
| Isolation Voltage (60Hz RMS) | input to output (/OF Version) | 3.75kVAC / 1 minute |
| | input to output (/IP67 Version) | 4kVAC / 1 minute |
| | input to filter ground | 1500VAC / 1 minute |
| | output to filter ground | 500VAC / 1 minute |
| Temperature Coefficient | | ±0.02%/°C typ. |
| Overload Protection | | 105% typ. |
| Short Circuit Protection | | Continuous, Hiccup, Automatic Restart |
| Output Overvoltage Protection | | Zener Diode Clamp |

RACD60

## Derating Graph
### (Ambient Temperature)



Natural Convection

All others

4.2A

Output Power (%)

Ambient Temperature Range (°C)
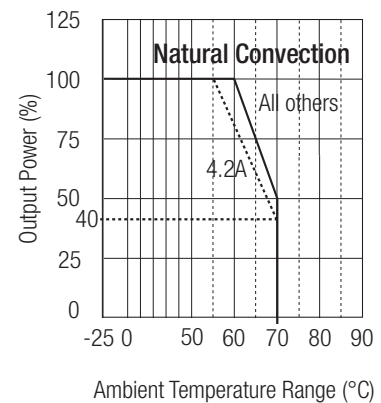
**Please Read Application Notes**

www.recom-electronic.com

REV: 5/2010

# LIGHTLINE
## AC/DC-Converter

**Specifications** cont. (typical at 25°C and after warm up time unless otherwise specified )

| | | |
|---|---|---|
| Operating Temperature Range | free air convection, with derating | -25°C to +70°C |
| Storage Temperature Range | | -40°C to +85°C |
| Humidity | non-condensing | 95% RH max. |
| IP Rating | Open Frame | IP20, Indoor Use Only |
| | Potted Version | IP67 |
| PCB Material | | Plastic Resin with Fibreglass (UL94V-0) |
| Weight | | 165g |
| Packing Quantity | | 1pc |
| EMC | | EN 61547-1 and EN61547-2-13 Certified |
| Harmonics | | Designed to meet EN 61000-3-2 and -3 |
| MTBF | (using MIL-HDBK-217F, 25°C) | 583 x 10³ hours |
| Input/Output Connections | Open Frame | Pin Header (suitable matching connectorJST VHR or similar) |
| . | IP67 | 300mm Cable ± 20mm |

**Input Voltage Derating (Ta=25°C)**
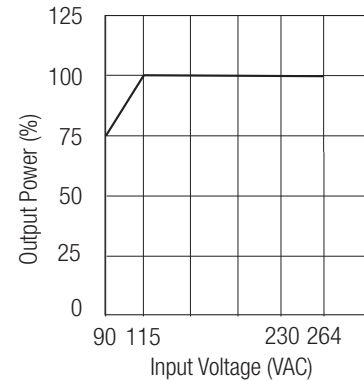


## Application Information

LEDs are typically wired in series to make a string of LEDs and then the strings can be wired in parallel to generate enough light. If only two or three strings are wired in parallel then it is recommended to add resistors (e.g. 0.5R) to each string to help balance out the LED currents in each string. All strings must share a common heatsink for better current matching.
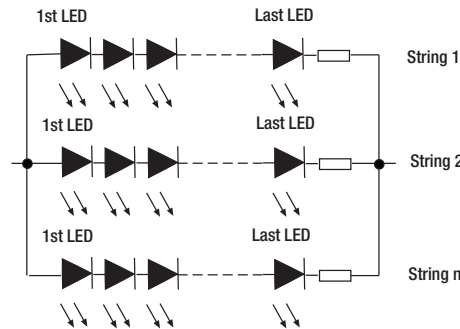


A typical 1W high brightness white LED has a forward voltage of around 3.3V at its operating temperature and draws 350mA. Thus each LED actually draws about 1.15W. Similarly, 3W white LEDs have usually the same forward voltage but can be run at 700mA or more. Using the LED datasheet specification, the optimum LED arrangement and the best driver for each application can be worked out.

The tables below show some examples.  Other LED combinations may have different forward voltages at their recommended operating currents.

| 1W LEDS | LED Arrangement | AC/DC Driver |
|---|---|---|
| 24 | 2 Strings of 12 | RACD60-700 |
| 26 | 2 Strings of 13 | RACD60-700 |
| 28 | 4 Strings of 7 | RACD60-1400 |
| 30 | 3 Strings of 10 | RACD60-1050 |
| 33 | 3 Strings of 11 | RACD60-1050 |
| 35 | 5 Strings of 7 | RACD60-2100 |
| 35 | 7 Strings of 5 | RACD60-2400 |
| 36 | 3 Strings of 12 | RACD60-1050 |
| 39 | 3 Strings of 13 | RACD60-1050 |
| 42 | 3 Strings of 14 | RACD60-1050 |
| 42 | 7 Strings of 6 | RACD60-2400 |
| 42 | 14 Strings of 3 | RACD60-4200 |
| 45 | 3 Strings of 15 | RACD60-1050 |

| 3W LEDS | LED Arrangement | AC/DC Driver |
|---|---|---|
| 12 | 12 in series | RACD60-700 |
| 14 | 2 Strings of 7 | RACD60-1400 |
| 18 | 3 Strings of 6 | RACD60-2100 |
| 18 | 6 Strings of 3 | RACD60-4200 |

| Power LEDs | LED Arrangement | AC/DC Driver |
|---|---|---|
| Cree MX-6 | 11 in series | RACD60-1050 |
| Cree XP-G | 3 in parallel | RACD60-2100 |
| Lumiled Rebel | 13 in series | RACD60-700 |
| Lumiled Star | 3 strings of 4 | RACD60-2100 |
| Bridgelux ES | 3 in series | RACD60-1050 |
| Helion | Single Module | RACD60-1400 |

**RACD60**

## Package Style and Pinning

### RACD60-xxxx/OF

3rd angle projection

101.6

FG

FG

CN1

2

1

FG

CN2

3
4
5

45

Current Limit

95.3

Use M4 Mounting Screws

50.8

25.5

28.0
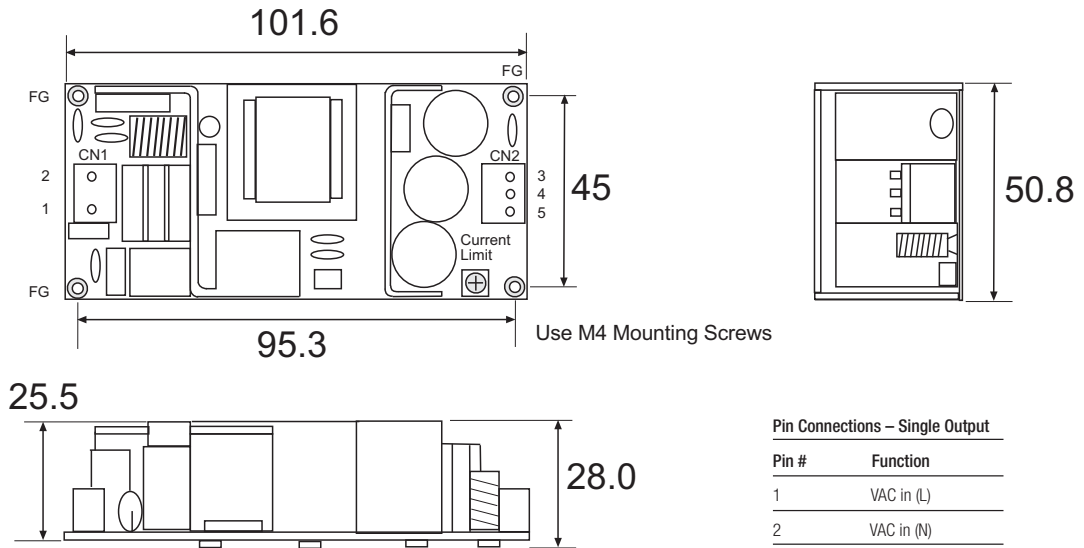
**Pin Connections – Single Output**

| Pin # | Function |
|---|---|
| 1 | VAC in (L) |
| 2 | VAC in (N) |
| 3 | NC |
| 4 | +VDC Out |
| 5 | -VDC Out |

Filter Ground connection via mounting holes
Dimension Tolerance ± 0.25 mm

### RACD60-xxxx/IP67

RACD60

118

300mm Cable

300mm Cable

35

110

121.5
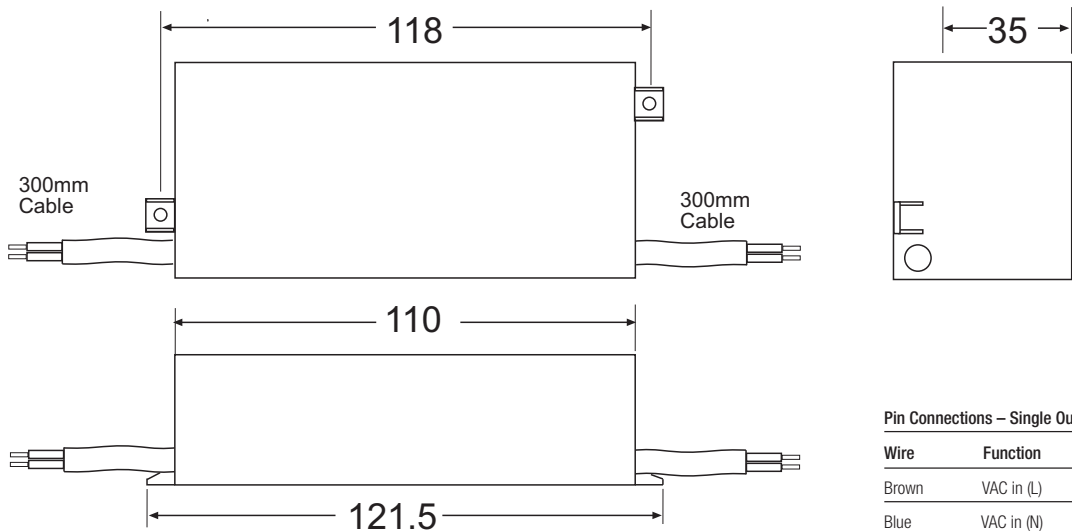
**Pin Connections – Single Output**

| Wire | Function |
|---|---|
| Brown | VAC in (L) |
| Blue | VAC in (N) |
| Red | +VDC Out |
| Black | -VDC Out |

Filter Ground connection via mounting holes
Dimension Tolerance ± 0.25 mm