

## Features

### LED DRIVER

- 70W Buck LED Driver
- Constant Current Output (350 to 1200mA)
- Digital PWM and Analogue Voltage Dimming
- High Efficiency to 96%
- EN, UL and RAILWAYS Certified
- Metal or Plastic Case Version
- IP67 Rated for /W, Plastic Case Version

### Description

The RCD-48 series is a step-down constant current source designed for driving high power LED applications. Four output currents are available. The maximum output voltage is 56V. The buck drivers have digital PWM and/or analogue voltage dimming control and are special featured with very high efficiency. Typical applications are 48V bus lighting solutions or high voltage LED arrays (e.g. high bay lights).

### Selection Guide

| Part Number   | Input Range (VDC) | Output Current (mA) | Output Voltage (VDC) | Dimming Control    | Efficiency Typ. (%) |
|---------------|-------------------|---------------------|----------------------|--------------------|---------------------|
| RCD-48-0.35*  | 9-60              | 0-350               | 2-56                 | Digital + Analogue | 96                  |
| RCD-48-0.50*  | 9-60              | 0-500               | 2-56                 | Digital + Analogue | 96                  |
| RCD-48-0.70*  | 9-60              | 0-700               | 2-56                 | Digital + Analogue | 96                  |
| RCD-48-1.00*  | 9-60              | 0-1000              | 2-56                 | Digital + Analogue | 96                  |
| RCD-48-1.20/M | 9-60              | 0-1200              | 2-56                 | Digital + Analogue | 96                  |

\*add suffix "/W" for wired version with Vref output and analogue + PWM dimming control (seven wires)

Note: Add suffix "/M" for metal case (RCD-48-1.20/M only). No metal case with wires available.

Standard version (no suffix) and wired version (suffix /W) only in plastic case.

### Specifications (typical at 25°C, nominal input voltage, rated output current unless otherwise specified)

|                                                                                                                                                 |                                      |                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|---------------------------|
| Operating Input Voltage Range                                                                                                                   |                                      | 9-60VDC                   |
| Absolute Maximum Input Voltage                                                                                                                  |                                      | 65VDC max.                |
| Output LED String Voltage Range                                                                                                                 |                                      | 2V min. / 56V max.        |
| (depend on the input voltage, defined by the output impedance, see Safe Operating Area)                                                         |                                      |                           |
| Input Filter                                                                                                                                    |                                      | Capacitor                 |
| Output Current Accuracy                                                                                                                         |                                      | ±3% typ. / ±5% max.       |
| Internal Power Dissipation<br>(Vin=60V, Vout=56V)                                                                                               | 350mA                                | 0.8W typ.                 |
|                                                                                                                                                 | 500mA                                | 1.0W typ.                 |
|                                                                                                                                                 | 700mA                                | 1.1W typ.                 |
|                                                                                                                                                 | 1000mA                               | 1.3W typ.                 |
|                                                                                                                                                 | 1200mA                               | 1.4W typ.                 |
| Output Current Stability                                                                                                                        | Vin=60V, Vout=2-56V, Iout=350-1200mA | ±1% max.                  |
| Output Ripple and Noise (20MHz BW)                                                                                                              | Vin=60V, Vout=2-56V, Iout=350-1200mA | 300mVp-p max.             |
| Maximum Capacitive Load                                                                                                                         |                                      | 100µF max.                |
| Switching Frequency                                                                                                                             |                                      | 50kHz min. / 1000kHz max. |
| Efficiency at Full Load                                                                                                                         |                                      | 96% typ.                  |
| PWM DIMMING CONTROL & REMOTE ON/OFF CONTROL                                                                                                     |                                      |                           |
| Input Voltage Range                                                                                                                             |                                      | 5V typ. / 10V max.        |
| Threshold Voltage                                                                                                                               | Device ON                            | 0.5V max.                 |
|                                                                                                                                                 | Device OFF                           | 2.0V min.                 |
| PWM Frequency                                                                                                                                   | For Linear Operation                 | 200Hz max.                |
|                                                                                                                                                 | Frequency Limit                      | 1000Hz max.               |
| ANALOGUE DIMMING CONTROL (Leave open if not used - do not tie to +Vin)                                                                          |                                      |                           |
| Input Voltage Range                                                                                                                             |                                      | 0V min. / 10V max.        |
| Control Voltage Range                                                                                                                           |                                      | 0V min. / 5.1V max.       |
| <i>Note: The analogue dimming range is from 0% to 100%, but the output can be unstable below 10%, when using the analogue dimming function.</i> |                                      |                           |
| Analogue Pin Drive Current                                                                                                                      | Vc=5V                                | 0.2mA max.                |
| Vref Version                                                                                                                                    | Vref Voltage                         | 4.95V                     |
|                                                                                                                                                 | Vref Output Current                  | 0.5mA                     |
|                                                                                                                                                 | Vref Output Short Circuit Current    | 2mA typ.                  |
|                                                                                                                                                 |                                      |                           |
| Ambient Temperature<br>(free air convection)                                                                                                    | 350mA                                | -40°C to +80°C            |
|                                                                                                                                                 | 500mA                                | -40°C to +80°C            |
|                                                                                                                                                 | 700mA                                | -40°C to +75°C            |
|                                                                                                                                                 | 1000mA                               | -40°C to +60°C            |
|                                                                                                                                                 | 1200mA                               | -40°C to +50°C            |

Analogue and PWM Dimming Control Note: Leave open if not used - do not tie to +Vin

continued on next page

**LIGHTLINE**  
DC/DC-Converter  
with 5 year Warranty

**RECOM**

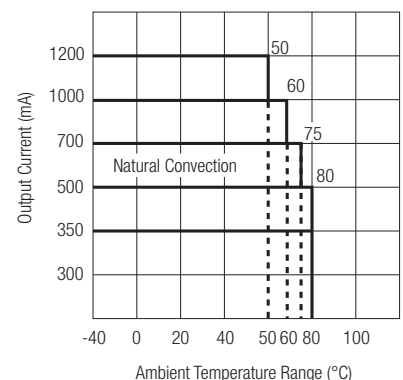
## Constant Current Buck LED Driver



**EN-50121-3-2 Certified**  
**EN-60950-1 Certified**  
**UL-60950-1 Certified**

# RCD-48

## Derating-Graph (Ambient Temperature)

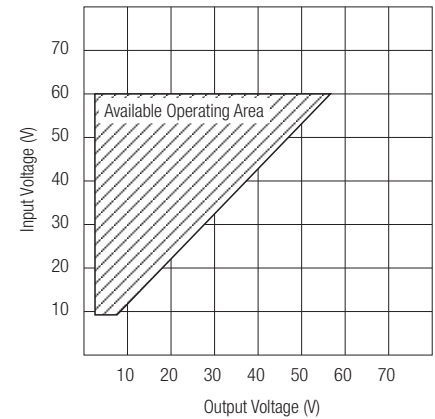


Refer to Application Notes

### Specifications (typical at 25°C, nominal input voltage, rated output current unless otherwise specified)

|                            |                                                                 |                              |
|----------------------------|-----------------------------------------------------------------|------------------------------|
| Storage Temperature        | -55°C to +125°C                                                 |                              |
| Case Thermal Impedance     | 10°C/W typ.                                                     |                              |
| Soldering Temperature      | 265°C / 10sec. max.                                             |                              |
| Relative Humidity          | 95% RH                                                          |                              |
| Input Filter               | Capacitor only                                                  |                              |
| Short Circuit Protection   | Continuous, Auto Recovery                                       |                              |
| Case Material              | Non Conductive Black Plastic<br>Metal Case                      |                              |
| Potting Material           | Silicone Potting Material (UL94V-0)                             |                              |
| Case Dimensions            | Plastic Case                                                    | 32.6 x 16.65 x 11.10 mm      |
|                            | Metal Case                                                      | 32.6 x 16.0 x 11.2 mm        |
| Package Weight             | Pinned (Plastic Case)                                           | 13g                          |
|                            | Wired (Plastic Case)                                            | 16g                          |
|                            | Pinned (Metal Case)                                             | 16g                          |
| Packing Quantity           | Pinned (Plastic/Metal Case)                                     | 29 pcs.                      |
|                            | Wired (Plastic Case)                                            | 12 pcs.                      |
| MTBF (using MIL-HDBK217F)  | +25°C                                                           | 1700 x 10 <sup>3</sup> hours |
| (Nominal Vin at Full Load) | Note: Detailed Information see Application Notes chapter "MTBF" |                              |
| Safety                     | Shock / Vibration                                               | EN61373                      |
|                            | EMC RAILWAYS                                                    | EN50121-3-2:2006             |
|                            | Conducted                                                       | EN55011                      |
|                            | Radiated                                                        | EN55011                      |
|                            | ESD                                                             | EN61000-4-2                  |
|                            | Radiated Immunity                                               | EN61000-4-3                  |
|                            | Fast Transient                                                  | EN61000-4-4                  |
|                            | Surge                                                           | EN61000-4-5                  |
|                            | Conducted Immunity                                              | EN61000-4-6                  |

### Safe Operating Area

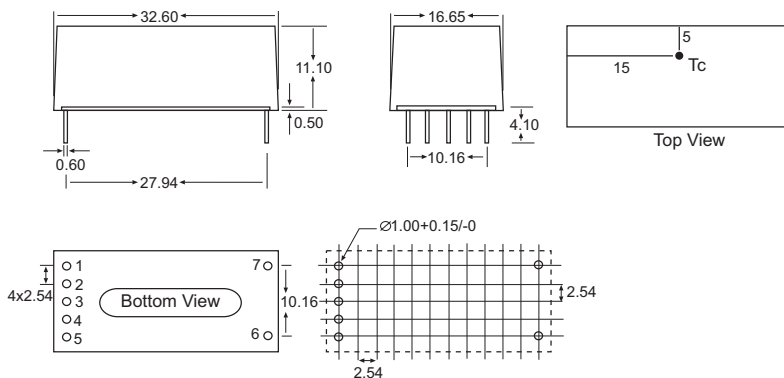


#### Note:

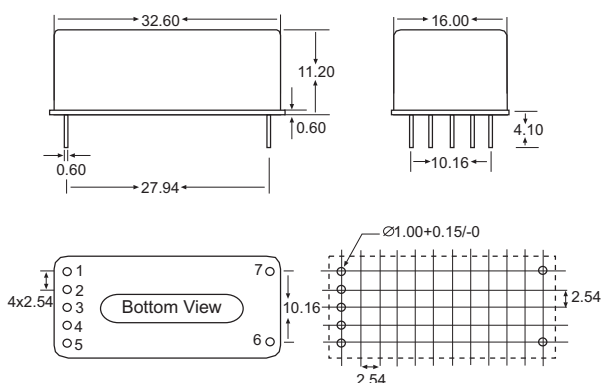
1 All LED Drivers may not be used without a load. They must be switched on the primary side only. Noncompliance may damage the LED or reduce its lifetime.

### Package Style and Pinning

#### Through Hole Case (Plastic)



#### Through Hole Case (Metal)

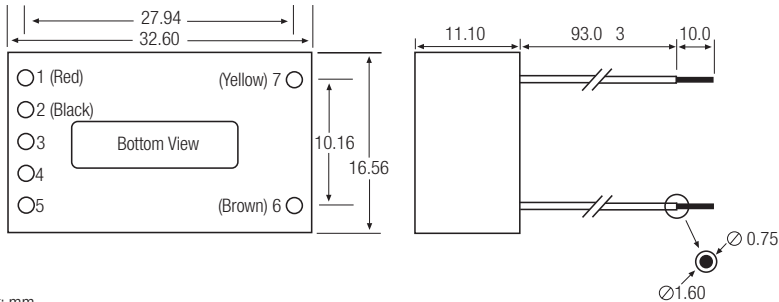


| Pin Connections |                  | RCD-48-x.xx             |
|-----------------|------------------|-------------------------|
| Pin#            | Function         | Comments                |
| 1               | +Vin             | DC Supply               |
| 2               | GND              | Do not connect to -Vout |
| 3               | Vref             | Vref Voltage 5V typ.    |
| 4               | PWM/ON/OFF       | Leave open if not used  |
| 5               | Analogue Dimming | Leave open if not used  |
| 6               | -Vout            | LED Cathode Connection  |
| 7               | +Vout            | LED Anode Connection    |

Unit: mm  
Tolerance:  
XX.X ± 0.5 mm  
XX.XX ± 0.25 mm

## Package Style and Pinning

### Wired Version (Plastic)



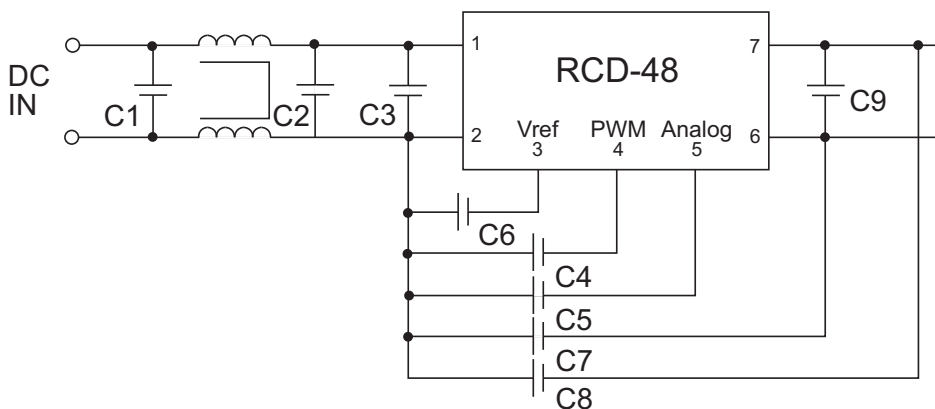
Unit: mm  
Tolerance:  
XX.X ± 1.0 mm  
XX.XX ± 0.25 mm

| Wire Connections<br>Pin# | Function         | RCD-48-x.xx/W<br>Wire color |
|--------------------------|------------------|-----------------------------|
| 1                        | +Vin             | Red                         |
| 2                        | GND              | Black                       |
| 3                        | Vref             | Yellow                      |
| 4                        | PWM/ON/OFF       | Blue                        |
| 5                        | Analogue Dimming | Green                       |
| 6                        | LED-             | Brown                       |
| 7                        | LED+             | Yellow                      |

Wires: UL/CSA approved (22AWG/300V)

## EMI Filter Suggestions

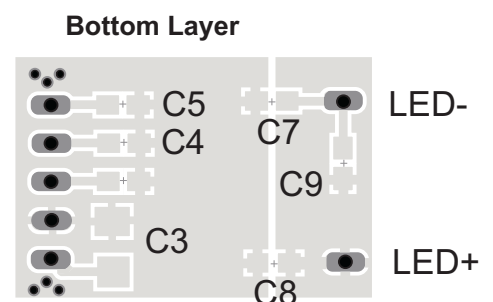
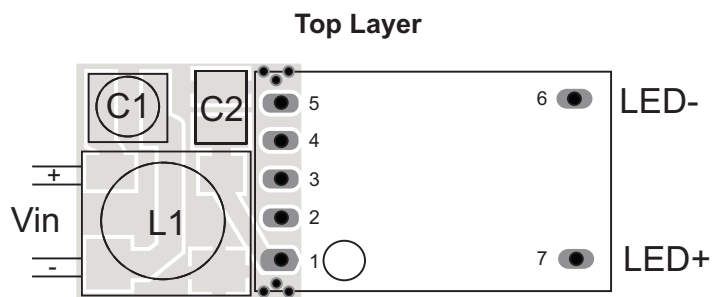
### Class B



LOAD

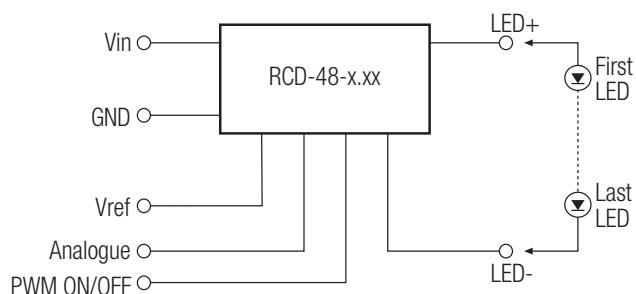
|         |                        |
|---------|------------------------|
| L1      | 1mH (e.g. WE744272102) |
| C1      | 10µF                   |
| C2      | 1µF                    |
| C3      | 100nF close to Pins    |
| C4 - C9 | 10nF                   |

### Filter Suggestion

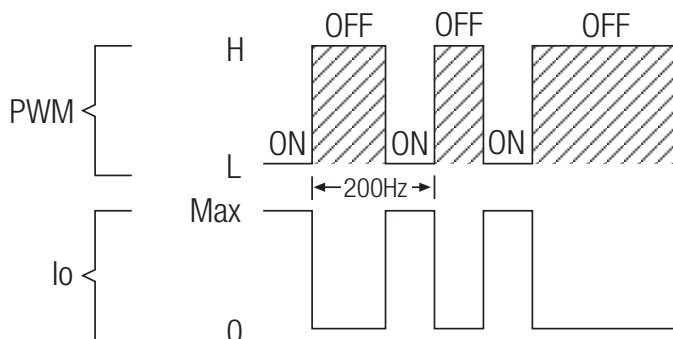


## Standard Application

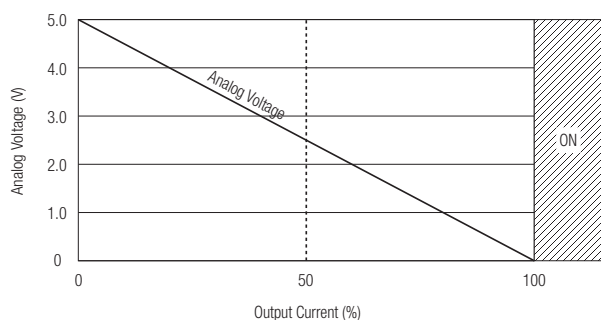
### Single String Application



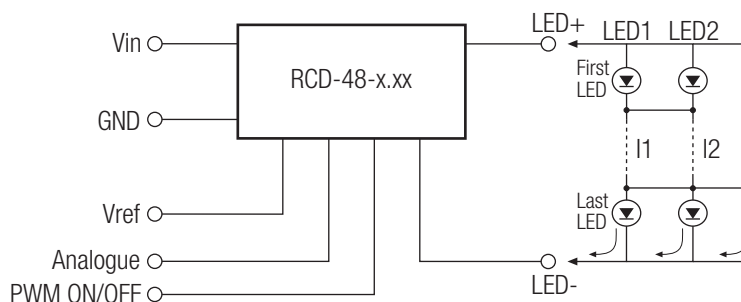
### PWM Dimming Controlled



### Dimming Controlled by Analog Voltage

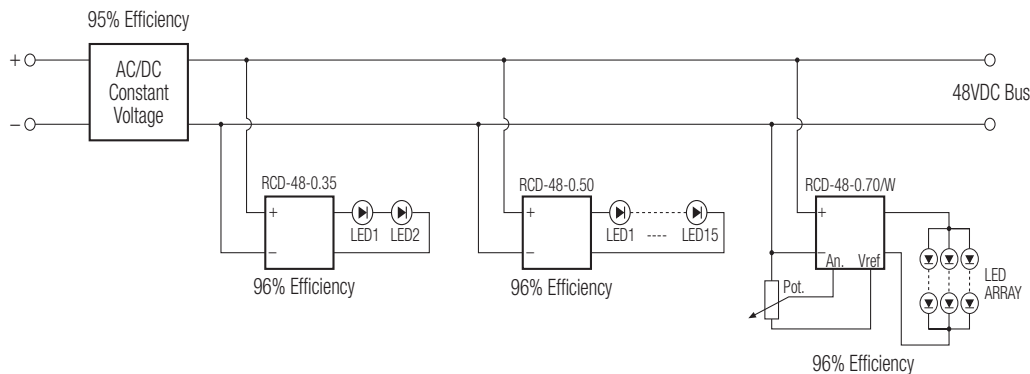


### Lighting/Backlighting Wall Application



RCD-48

### High Efficiency Lighting



#### Note:

It is not possible to parallel the drivers to increase the current.

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