Features

Regulated Converters

Rev.2

- Constant Current Output
- Power LED Driver
- Wide Input Voltage Range
- PWM/Digital Dimming and Analogue Voltage Dimming
- Short Circuit Protected
- 96% Efficiency

Description

The RCD series is a step-down constant current source designed for driving high power white LEDs. Standard output currents available are 300mA, 350mA, 500mA, 600mA and 700mA to make this driver compatible with a wide range of LEDs from many different manufacturers without the need for any external components. Despite its compact size, the RCD series is fully featured with very high efficiency, wide input voltage range, high ambient operating temperature and two means of LED dimming: PWM/digital control and analogue voltage dimming. Both dimming controls are independent and can be combined. The driver is also designed to be as reliable as the LEDs it is driving, even at the full operating temperature of 85°C. A wired version is also available.

Selection Guide

Part Number	Input Range (VDC)	Output Current (mA)	Output Voltage (V)	Dimming Control	Mounting Style
RCD-24-0.30	4.5-36V	0-300	2-32	Digital + Analogue	PCB
RCD-24-0.35	4.5-36V	0-350	2-32	Digital + Analogue	PCB
RCD-24-0.50	4.5-36V	0-500	2-32	Digital + Analogue	PCB
RCD-24-0.60	4.5-36V	0-600	2-32	Digital + Analogue	PCB
RCD-24-0.70	4.5-36V	0-700	2-32	Digital + Analogue	PCB
RCD-24-0.30/W	4.5-36V	300	2-32	none	Wired
RCD-24-0.35/W	4.5-36V	350	2-32	none	Wired
RCD-24-0.50/W	4.5-36V	500	2-32	none	Wired
RCD-24-0.60/W	4.5-36V	600	2-32	none	Wired
RCD-24-0.70/W	4.5-36V	700	2-32	none	Wired

Specifications

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

Input Voltage (absolute maximum)		36VDC max.
Recommended Input Voltage		5V min. / 24V typ. / 36VDC max.
Input Filter		Capacitor
Output Voltage Range	Vin=36V	2V min. / 32V max.
Output Current Range	Vin - Vout >1.5~4V	300mA-700mA
Output Current Accuracy	300mA-700mA	±2% typ.
Internal Power Dissipation	Load of 5 LEDs	700mW
Output Current Stability	Vin=36V, Vout =2~32V	±1% max
Output Ripple and Noise (20MHz limited)	Vin=36V, Vout =2~32V	120mVp-p max
Temperature Coefficient	-40~+85°C ambient	±0.015%/°C max.
Maximum Capacitive Load		100µF
Operating Frequency		210 kHz min/ 260kHz typ./ 300kHz max
Efficiency at Full Load		97% max.
Short Circuit Protection		Regulated at rated output current
Operating Temperature Range (free air convection)	300mA/350mA 500mA 600mA 700mA	-40°C to +85°C -40°C to +80°C -40°C to +75°C -40°C to +71°C
Storage Temperature Range		-55°C to +125°C
Maximum Case Temperature		100°C
Thermal Impedance	Natural Convection	55°C/Watt

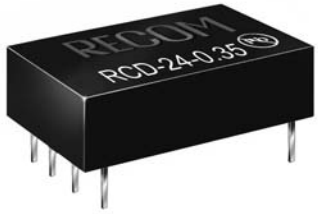
continued on next page

INNOLINE

DC/DC-Converter

RCD-24 Series

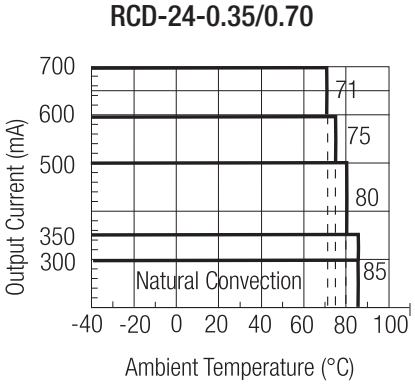
Constant Current Single Output



RECOM

Derating Graph

(Ambient Temperature)

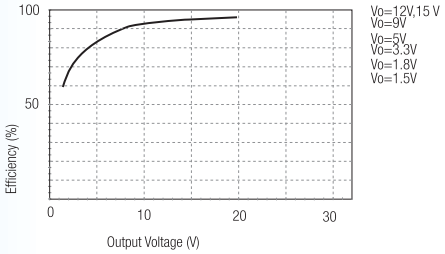


Specifications -Continued

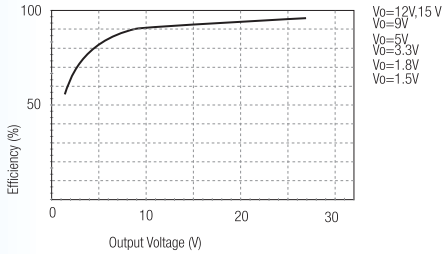
Case Material			Non Conductive Black Plastic
Potting Material			Epoxy (UL94-V0)
Dimensions			22.1 x 12.6 x 8.5mm
Weight			4.5g
Wave Soldering Profile			Max. 265°C/10 sec.
PWM Dimming and ON/OFF Control (Leave open if not used)			
Remote ON/OFF		DC/DC ON	Open or 0V<Vr<0.6V
		DC/DC OFF (Standby)	0.6<Vr<2.9V
		DC/DC OFF (Shutdown)	2.9V<Vr<6V
Remote Pin Drive Current		Vr=5V	1mA max.
Quiescent Input Current in Shutdown Mode		Vin=36V, Vr>2.9V	200µA max.
Maximum PWM Frequency for Linear Operation (measured 10%~90% Dimming)			200Hz
Analogue Dimming Control (leave open if not used)			
Input Voltage Range			0 - 15V
Control Voltage Range Limits		Full On	0.13V ± 50mV
(see Graph)		Full Off	4.5V ± 50mV
Analogue Pin Drive Current		Vc=5V	0.2mA max.
Environmental			
Relative Humidity			5% to 95% RH, non-condensing
Conducted Emissions	(all series, see note)	EN55022	Class B
Radiated Emissions	(all series except 700mA)	EN55022	Class B
ESD	(all series)	EN61000-4-2	Class A
Radiated Immunity	(all series)	EN61000-4-3	Class A
Fast Transient	(all series)	EN61000-4-4	Class A
Conducted Immunity	(all series)	EN61000-4-6	Class A
MTBF (RCD-24-0.70, Nominal Vin, Full Load)		+25°C	605 x 10³ hours
using MIL-HDBK 217F		+71°C	516 x 10³ hours

Note: Requires an input filter to meet EN55022 ClassB conducted emissions, see below.

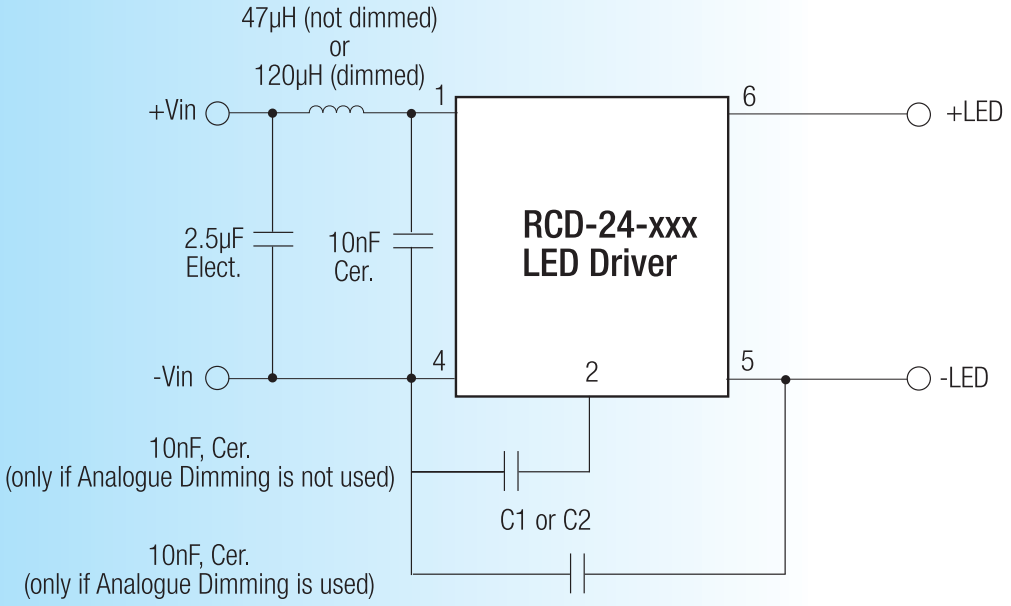
Vin = 24V, Iout = 300-700mA



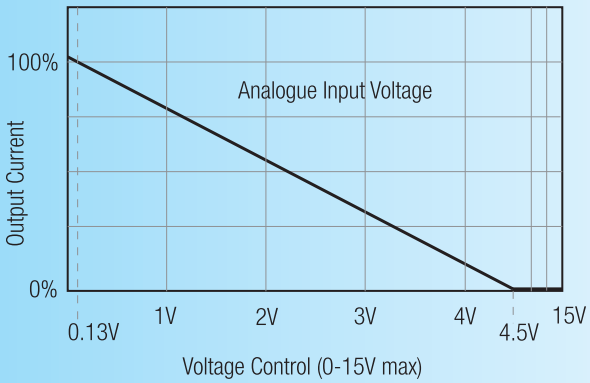
Vin = 32V, Iout = 300-700mA



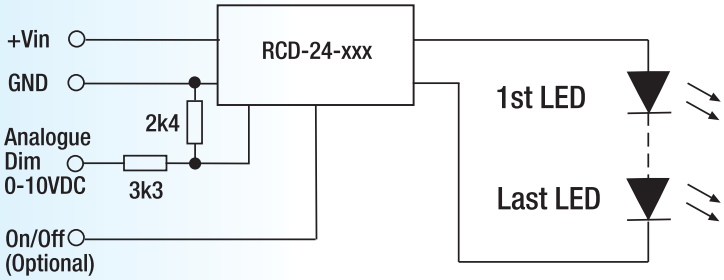
Class B Filter Suggestion



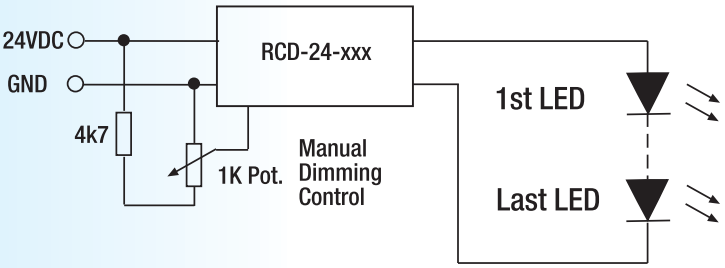
Analogue Dimming Control and Application Circuit Examples



LED DRIVER with 0-10V Interface

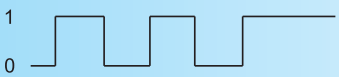


LED DIMMER for up to 7 white LEDs



Digital Dimming Control

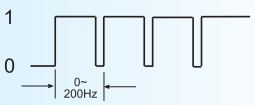
PWM Digital Control Signal



Output Current

* Max output current can also be set using Analogue input

PWM Digital Control Signal



Output Current (LED appears dim)

PWM Digital Control Signal

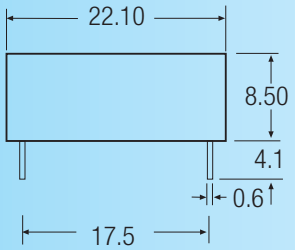
Output Current (LED appears bright)

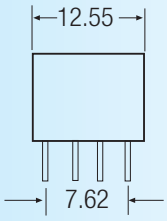
RCD-24 Series

Package Style and Pinning

PCB Mounting Style

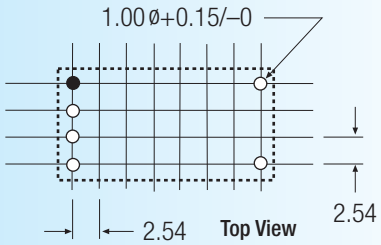
3rd angle projection



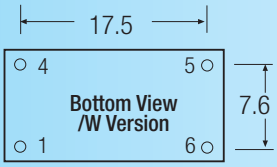


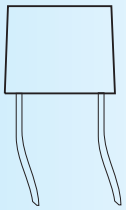
Leave 1 mm space arround case on pcb

Recommended Footprint Details



Wired Style





Pin Connections	RCD-24 Series	
Pin #	**Out**	**Comments**
1	+Vin	DC Supply
2	Analogue Dimming	Leave open if not used
3	PWM/ON/OFF	Leave open if not used
4	GND	Do not connect to -Vout
5	-Vout	LED Cathode Connection
6	+Vout	LED Anode Connection

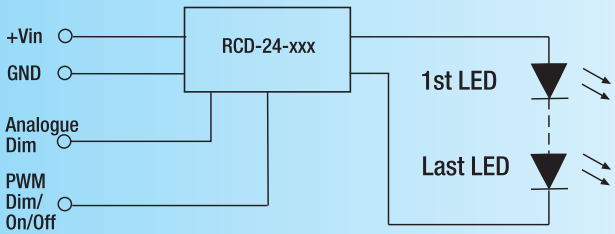
XX.X ± 0.5 mm
XX.XX ± 0.25 mm
Pin Tolerance ± 0.1 mm

Wire Connections	RCD-24/W Series	
Wire #	**Out**	**Comments**
1 (Red)	+Vin	DC Supply
4 (Black)	GND	Do not connect to -Vout
5 (Brown)	-Vout	LED Cathode Connection
6 (Yellow)	+Vout	LED Anode Connection

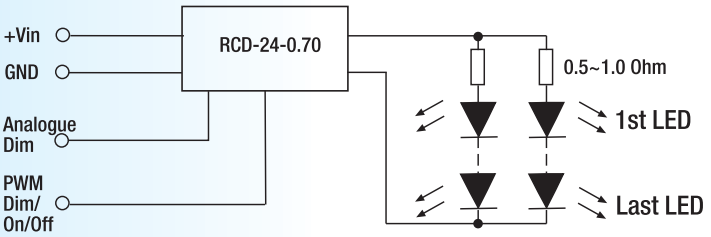
Wire length = 100mm + 10mm stripped & tinned = 110mm total
Wire outside diameter = 1.6mm
Wire core diameter = 0.75mm
Wire is UL/CSA listed/ 22AWG / 300V Rated

Standard Application Circuits

LED DRIVER



MULTIPLE LED DRIVER (up to 20 LEDS)



Driving Two Strings of 350mA LEDs with one 700mA Driver.