Features dimmable LED Driver

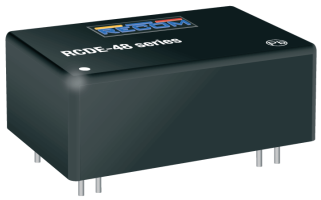
- Low cost buck LED driver
- 6-60V input
- Constant current output (350, 700 or 1050mA)
- Digital PWM and analog voltage dimming
- High efficiency up to 97%
- No internal E-Caps
- RoHS2 conform

RECOM
DC/DC Converter

RCDE-48

Constant Current Buck LED Driver

3 YEAR warranty



Description

The RCDE-48 series is a step-down constant current source designed for driving high power LED applications from 12V, 24V or 48V nominal input voltages. 350, 700 or 1050mA output currents are available as standard. The input voltage range is from 6V up to 60VDC with UVLO. These high efficiency buck drivers have digital PWM and/or analog voltage dimming control which is capable of being controlled by 3.3V logic. The dimming input can also be used as an CTRL pin. Typical application is a 48V powered lighting solution for up to 15 high brightness LEDs in series.

Selection Guide

Part Number	Input Voltage Range [VDC]	Output Voltage Range [VDC]	Output Current [mA]	Efficiency typ. (1) [%]	Dimming Control
RCDE-48-0.35	6-60	3-52	0-350	97	Analog and PWM
RCDE-48-0.70	6-60	3-52	0-700	97	Analog and PWM
RCDE-48-1.05	6-60	3-52	0-1050	97	Analog and PWM

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.

Notes:

Note1: Efficiency is tested at nominal input and 15 LEDs (15 x V_F 3VDC = 45VDC) at +25°C ambient

Model Numbering

RCDE-48-

nom. Input Voltage — Output Current

Ordering Examples

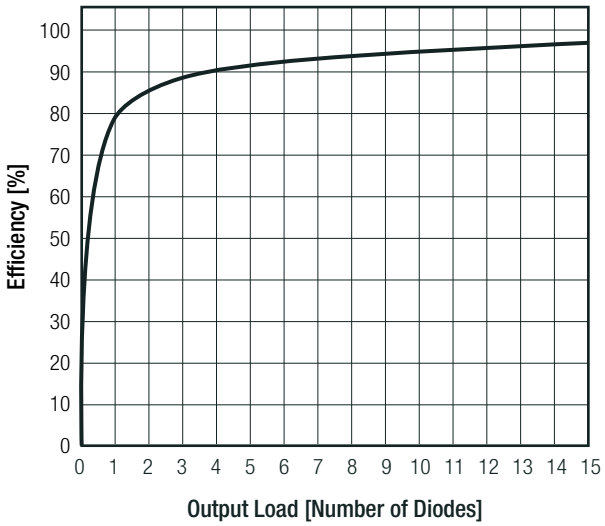
RCDE-48-0.70 6-60 Vin 3-52Vout 0-700mA Analog and PWM Dimming

Specifications (measured @ Ta= 25°C, nom. Vin and 15 LEDs (15*3V=45V) unless otherwise stated)

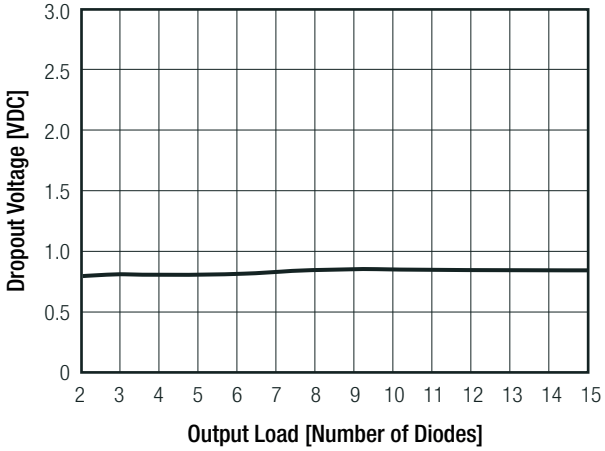
BASIC CHARACTERISTICS					
Parameter	**Condition**		**Min.**	**Typ.**	**Max.**
Internal Input Filter					capacitor
Input Voltage Range	nom Vin= 48VDC		6VDC	48VDC	60VDC
Under Voltage Lockout (UVLO)	nom. Vin= 48VDC	DC-DC ON DC-DC OFF			5.6VDC 5.3VDC
Standby Current	nom. Vin= 48VDC	DC-DC OFF		5mA	
Internal Operating Frequency			210kHz		550kHz
Output Ripple Current	20MHz BW	RCDE-48-0.35 RCDE-48-0.70 RCDE-48-1.05		100mAp-p 200mAp-p 320mAp-p	
Output Ripple Noise	20MHz BW	RCDE-48-0.35 RCDE-48-0.70 RCDE-48-1.05		200mVp-p 300mVp-p 400mVp-p	
Reflected Back Ripple Current				50mAp-p	
Dropout Voltage	refer to "DROPOUT VOLTAGE" for detailed information	RCDE-48-0.35 RCDE-48-0.70 RCDE-48-1.05		1VDC 1.5VDC 2VDC	3VDC

RCDE-48-0.35

Efficiency vs. Load

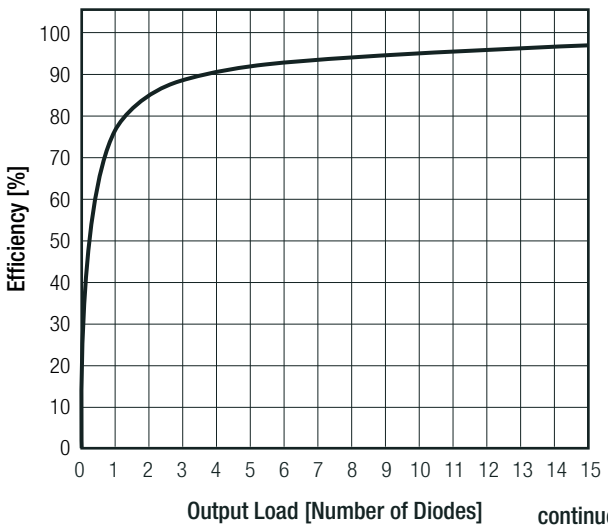


Dropout Voltage vs. Load

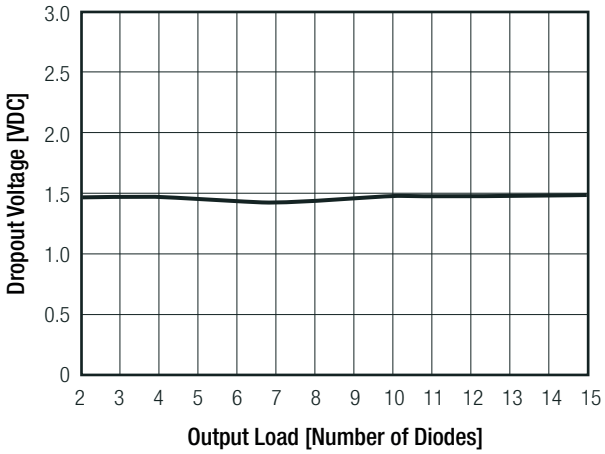


RCDE-48-0.70

Efficiency vs. Load



Dropout Voltage vs. Load

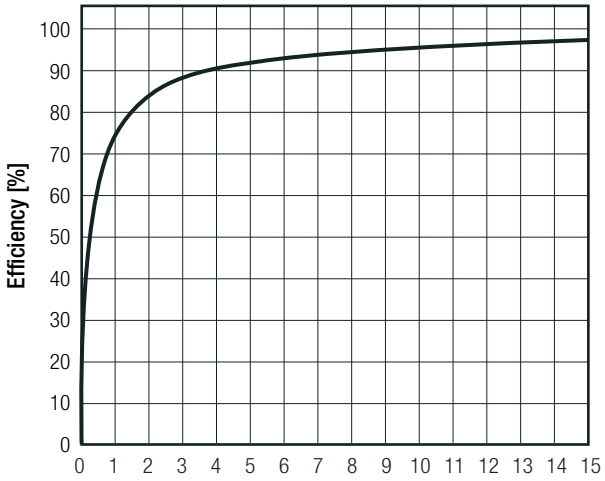


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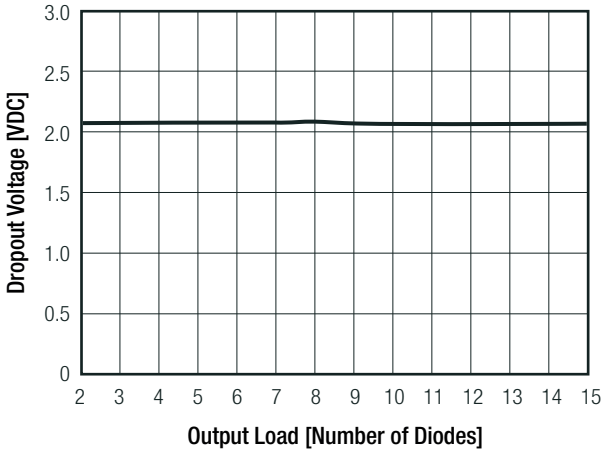
Specifications (measured @ Ta= 25°C, nom. Vin and 15 LEDs (15*3V=45V) unless otherwise stated)

RCDE-48-1.05

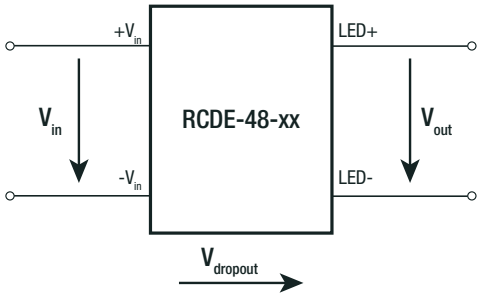
Efficiency vs. Load



Dropout Voltage vs. Load



DROPOUT VOLTAGE



Dropout voltage is the smallest difference between a regulators input and its output voltage, which is required to maintain regulation and enable the regulator to provide rated output voltage or current.

V_{in} = input voltage
V_{out} = output voltage
$V_{dropout}$ = dropout voltage
n_{LED} = number of LEDs
$V_{F\ max.}$ = forward voltage

Example:

$V_{dropout}$ = 3VDC max.
n_{LED} = 11 LEDs
$V_{F\ max.}$ = 3VDC

$V_{out\ max.} = V_{in} - V_{dropout}$

$V_{in\ min.} = n_{LED} \times V_{F\ max.} + V_{dropout}$

$V_{in\ min.} = 11 \times 3 + 3$

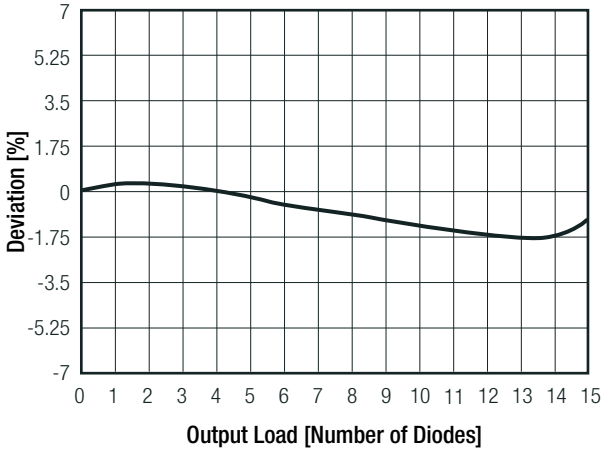
$V_{in\ min.} = \underline{36VDC}$

REGULATIONS

Parameter	Condition	Value
Output Current Accuracy		±7.0% max.
Output Current Stability		±2.0% typ.

Deviation vs. Load

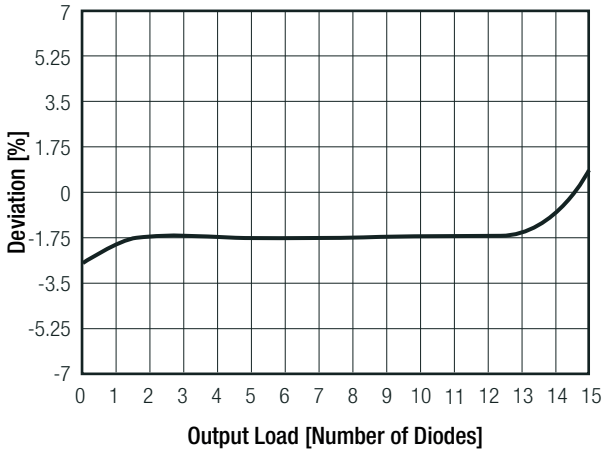
RCDE-48-0.35



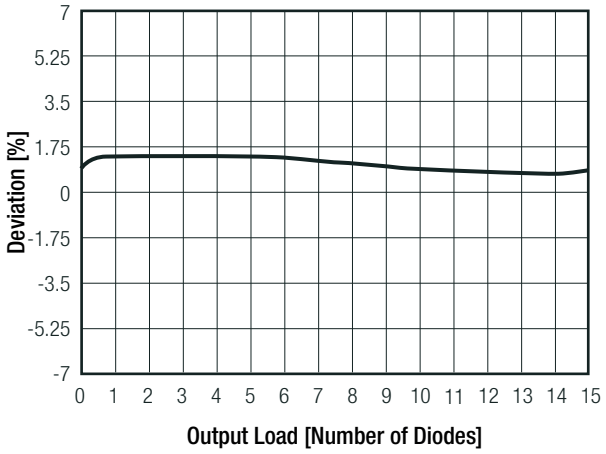
Specifications (measured @ Ta= 25°C, nom. Vin and 15 LEDs (15*3V=45V) unless otherwise stated)

Deviation vs. Load

RCDE-48-0.70



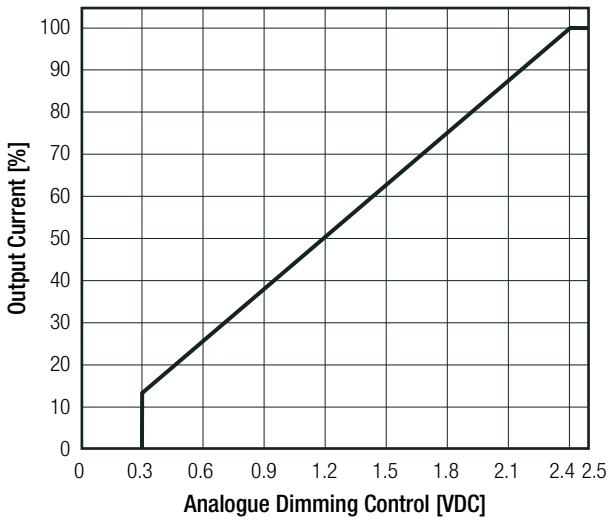
RCDE-48-1.05



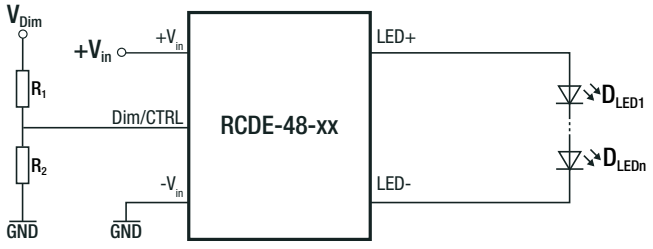
ANALOG DIMMING CONTROL (leave open if not used - do not tie to +Vin)

Parameter	Condition		Value
Input Voltage Limits	low line, DC-DC OFF high line, DC-DC ON		0VDC to 0.3VDC 3VDC to 12VDC
Control Voltage Range	20% to 100%		0.3VDC to 2.5VDC
Pin Drive Current	Analog	Vc= 5VDC	1mA max.

Analog Dimming



Analog Dimming Application 1-10VDC



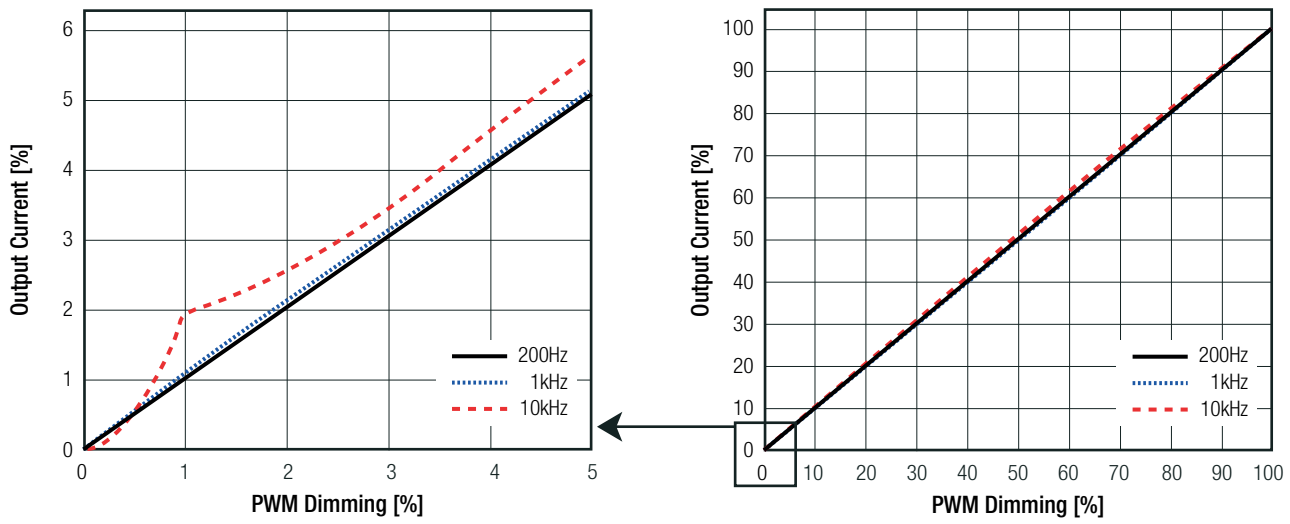
V_{Dim}	R_1	R_2
1 - 10VDC	20kΩ	10kΩ

Specifications (measured @ Ta= 25°C, nom. Vin and 15 LEDs (15*3V=45V) unless otherwise stated)

PWM DIMMING AND ON/OFF CTRL (leave open if not used - do not tie to +Vin)

Parameter	Condition		Value
Input Voltage Limits	low line, DC-DC OFF high line, DC-DC ON		0VDC to 0.3VDC 3VDC to 12VDC
Dimming Voltage Range	0% to 100%		0% - 100%, duty cycle
Pin Drive Current	ON/OFF CTRL	Vc= 5VDC	1mA max.
PWM Frequency	for linear operation frequency limit		200Hz - 1kHz 10kHz max.

PWM Dimming



PROTECTIONS

Parameter	Type	Value
Over Temperature Protection (OTP)	case temperature	115°C typ., ±10°C

ENVIRONMENTAL

Parameter	Condition		Value
Operating Temperature Range	@ natural convection 0.1m/s		refer to “Derating Graph”
Maximum Case Temperature			105°C
Temperature Coefficient			0.06%/K typ.
Thermal Impedance			32K/W
Operating Altitude			5000m
Operating Humidity	non-condensing		95% RH
MTBF	according to MIL-HDBK-217F, G.B.	+25°C +40°C	1830 x 10^3 hours 1730 x 10^3 hours

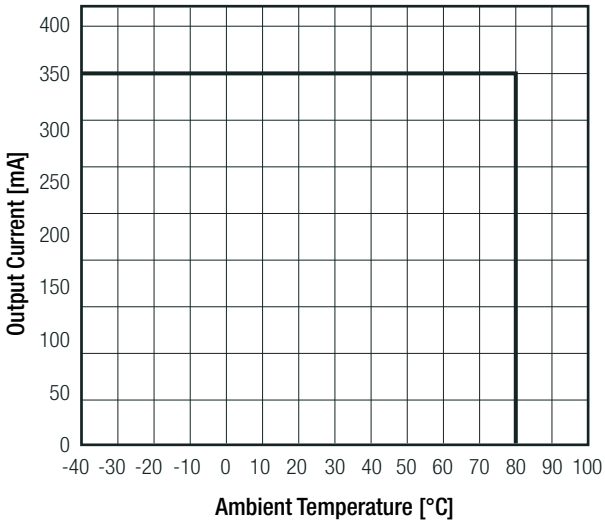
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Specifications (measured @ Ta= 25°C, nom. Vin and 15 LEDs (15*3V=45V) unless otherwise stated)

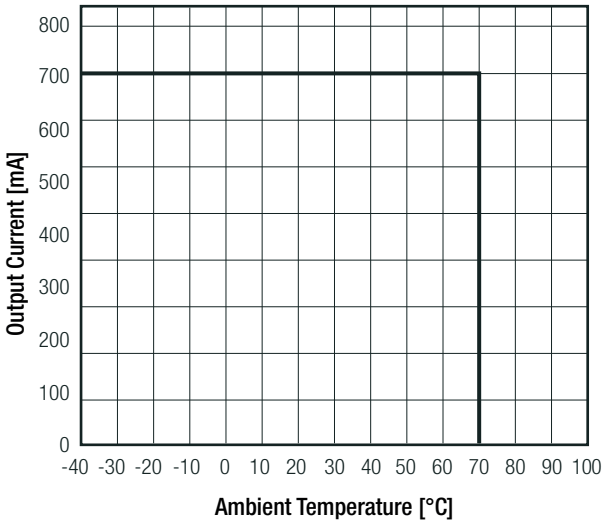
Derating Graph

(@ Chamber and natural convection 0.1m/s)

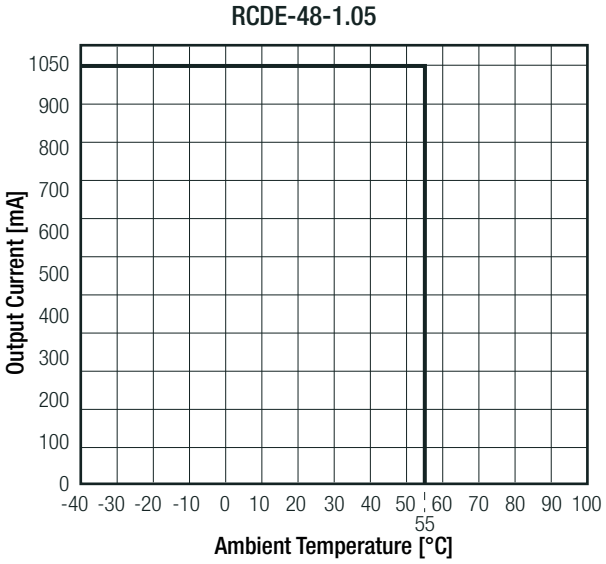
RCDE-48-0.35



RCDE-48-0.70



RCDE-48-1.05



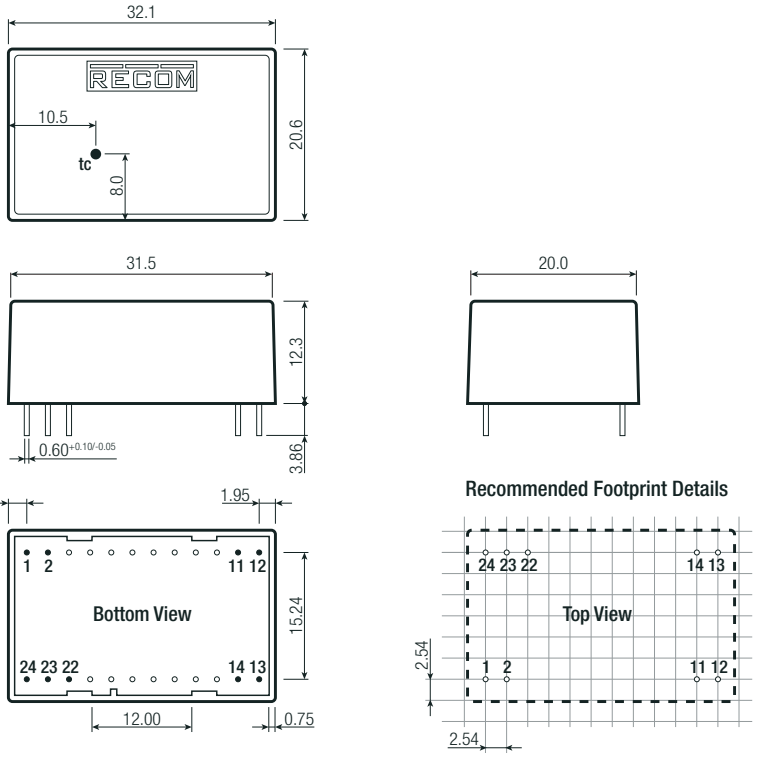
SAFETY AND CERTIFICATIONS		
Certificate Type (Safety)	**Report Number**	**Standard**
RoHS2+		RoHS 2011/65/EU + AM2015/863
EMC Compliance	**Condition**	**Standard / Criterion**
Limits and Methods of Measurement of Radio Disturbance Characteristics of Electrical Lighting and Similar Equipment	with external filter	EN55015

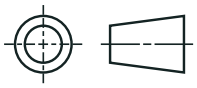
Specifications (measured @ Ta= 25°C, nom. Vin and 15 LEDs (15*3V=45V) unless otherwise stated)

DIMENSION AND PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case, baseplate potting PCB	non-conductive black plastic, (UL94 V-0) silicone, (UL94 V-0) FR4, (UL94 V-0)
Dimension (LxWxH)		32.1 x 20.6 x 12.3mm
Weight		16.0g typ.

Dimension Drawing (mm)





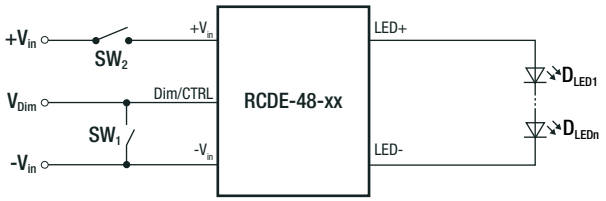
Pin Connections

#	Function	Description
1, 2	-Vin	-DC supply
11, 12	LED-	LED cathode connection
13, 14	LED+	LED anode connection
22	Dim/CTRL	leave open if not used
23, 24	+Vin	+DC supply

tc= case temperature measuring point
Tolerance: xx.x= ±0.5mm
xx.xx= ±0.25mm

INSTALLATION AND APPLICATION

Connection



Notes:

Note2: Do not connect LED+ with +Vin and LED- with -Vin

PACKAGING INFORMATION

Parameter	Type	Value
Packaging Dimension (LxWxH)	tube	512.9 x 22.2 x 20.9mm
Packaging Quantity		14pcs
Storage Temperature Range		-55°C to +125°C
Storage Humidity	non-condensing	95% RH max.

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