

Features LED DRIVER

- 60W Class II AC-DC LED Power Supply
- Dual Mode CV or CC Output
- Power Factor Corrected
- Universal Input Voltage Range
- User Adjustable Current Limit (/OF)
- Thermal Feedback Dimming (/TOF)
- Waterproof Enclosure (/IP67)
- cUL/UL8750 Certified, CE Marked
- High Efficiency
- Long 5 Year Warranty

Selection Guide

Part Number	Output Voltage Range (min - max)	Output Current Range (min - max)	Factory Set Current Limit	Efficiency (230VAC) Typ.	Output Power Range
RACD60-4200*	11 - 13.5V	3570 - 4200mA	4.2A	85%	40-60W
RACD60-2400*	17 - 24V	2150 - 2500mA	2.4A	87%	30-60W
RACD60-2100*	21 - 28V	1400 - 2140mA	2.1A	89%	30-60W
RACD60-1400*	21 - 28V	1400 - 2140mA	1.4A	89%	30-60W
RACD60-1050*	38 - 54V	700 - 1100mA	1.0A	89%	27-60W
RACD60-700*	38 - 54V	700 - 1100mA	0.7A	89%	27-60W

* use suffix /OF for open frame version (standard) - output current limit adjustable with on-board trimmer

* use suffix /TOF for open frame version with thermal feedback - output current limit externally adjustable.

* use suffix /IP67 for waterproof potted version - fixed output currents only

ordering examples:

RACD60-700/OF= open frame, adjustable current limit preset to 700mA.

RACD60-1050/TOF=open frame, 1050mA, adjustable 700-1050mA with ext. voltage or PWM signal.

RACD60-1400/IP67 = enclosed IP67 waterproof, non-adjustable 1400mA output.

Note: all currents within range are available - use RACD60-xxxx/IP67 where xxxx is the desired fixed current e.g. RACD60-900/IP67 = enclosed IP67 waterproof, non-adjustable 900mA output.

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

Input Voltage Range	All Versions	90-264VAC
Rated Power		60 Watts max.
Input Frequency Range	All Versions	50/60 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	<0.7mA max.
Input Fuse	Built-in	3.15A Slow Blow
Output Current Accuracy	Full load	±5%
Output Current Adjust	Preset Potentiometer (/OF) External Voltage (/TOF)	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	All Versions	65kHz typ.
Efficiency at Full Load		see table
Isolation Voltage (60Hz RMS)	input to output input to filter ground output to filter ground	3.75kVAC / 1 minute 1880VAC / 1 minute 500VAC / 1 minute
Temperature Coefficient	All Versions	±0.02%/°C typ.
Overload Protection	All Versions	105% typ.
Short Circuit Protection		Continuous, Hiccup, Automatic Restart

LIGHTLINE
AC/DC-Converter
with 5 year Warranty

RECOM

**60 Watt PFC
Single Output**



**UL 8750 Certified
cUL 8750 Certified*
EN 61347 Certified**

RACD60

* except 700mA/1100mA Versions

Description

The RACD60 is a compact universal input voltage 60W constant constant current power module suitable for driving high power LEDs. The LED driver has a dual mode of operation:-

CV mode: at loads below the preset current limit, the RACD60 behaves as a fixed voltage source.
CC mode: at loads above the preset current limit, the RACD60 behaves as a fixed current source.
Thus the same power supply can be used with both CV and CC LED modules.

The RACD60 series have a universal input voltage range with active power factor correction and are fully protected against output short circuit, overload and over-temperature.

Three versions are available: a low cost open-frame with either internal (/OF) or external user-adjustable current limit (/TOF), and a sealed IP67 potted version (/IP67) with factory set output currents for outdoor or high humidity applications.

Please Read Application Notes

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LIGHTLINE

AC/DC-Converter

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

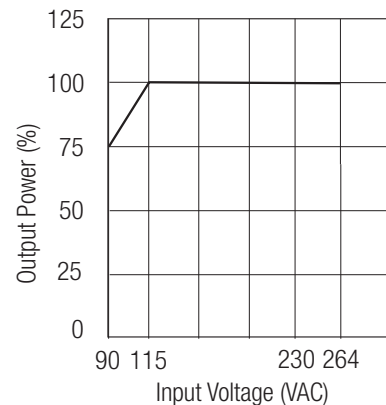
Open Circuit Output Voltage	4200mA	19VDC
(Zener Diode Clamp)	2400mA	25VDC
Typical Values	2100mA/1400mA	29VDC
	1050mA/700mA	55VDC
Output Current Adjust (/TOF only)	External Voltage (1-10V)	10.5V max.
	External PWM (10V)	300Hz max.
Operating Temperature Range	free air convection, with derating	-30°C to +70°C
(refer to derating graphs)	Case temperature (/IP67)	85°C max.
Storage Temperature Range		-40°C to +85°C
Humidity	non-condensing	95% RH max.
Environmental Protection	Open Frame (/OF, /TOF)	Indoor Use Only
	Potted Version (/IP67)	IP67
PCB Material	Plastic Resin with Fibreglass (UL94V-0)	
Weight	Open Frame (/OF, /TOF)	165g
	Potted Version (/IP67)	200g
Packing Quantity	1pc	
EMC	EN 55015, EN61347-1, EN61347-2-13	
Harmonics	Designed to meet EN 61000-3-2 (Class C, Full load) and EN 61000-3-3	
MTBF	(using MIL-HDBK-217F, 25°C)	583 x 10 ³ hours
Certifications	LED Lighting Safety -all models	UL8750
	LED Lighting Safety (Canada) -1400, 2100, 2400 4200mA only	cUL8750
	CE LVD Directive -all models	EN61347
Input/Output Connections	/OF	Pin Header (suitable matching connector JST VHR or similar)
.	/IP67	340mm Cable ± 20mm

* Do not connect or disconnect the LED load while the converter is on. This may damage the LED or sharply reduce its life.

RACD60

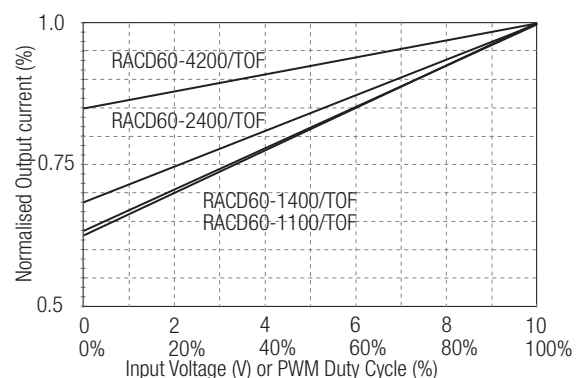
Series

Input Voltage Derating (Ta=25°C)

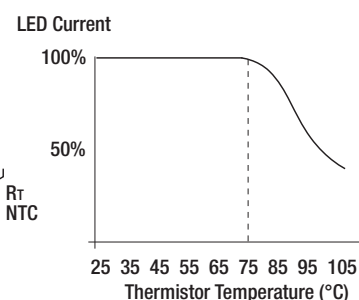
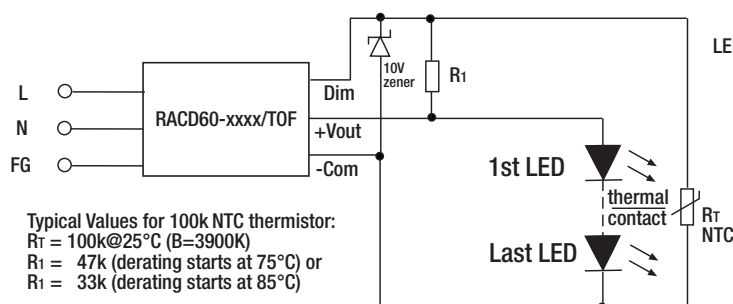


/TOF Output Current Adjustment

The /TOF offers the possibility to derate the output current with an external voltage or PWM signal. Thermal feedback derating is an effective way to reduce the LED current at high temperatures to avoid over-stressing the LED.

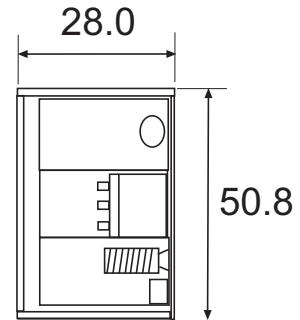
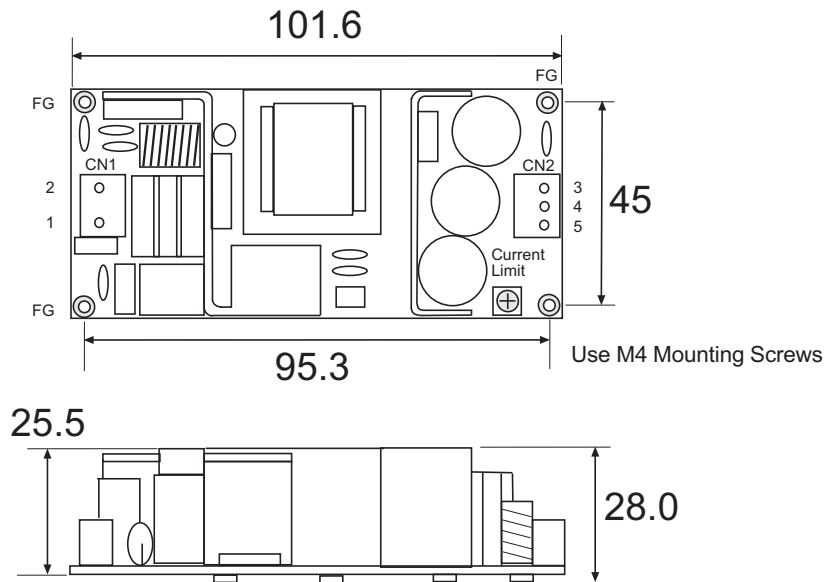


SIMPLE THERMAL FEEDBACK DIMMING CIRCUIT



Package Style and Pinning

RACD60-xxxx/OF and RACD60-xxxx/TOF



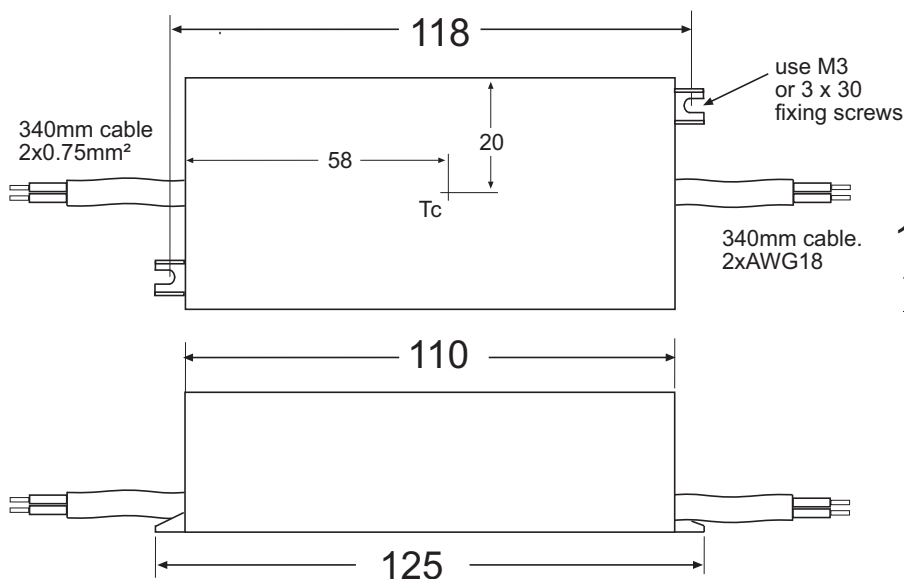
Pin Connections

Pin #	/OF	/TOF
1	VAC in (L)	VAC in (L)
2	VAC in (N)	VAC in (N)
3	NC	Thermal feedback
4	+VDC Out	+VDC Out
5	-VDC Out	Com

Filter Ground connection via mounting holes
Dimension Tolerance ± 0.25 mm

Package Style and Pinning

RACD60-xxxx/IP67



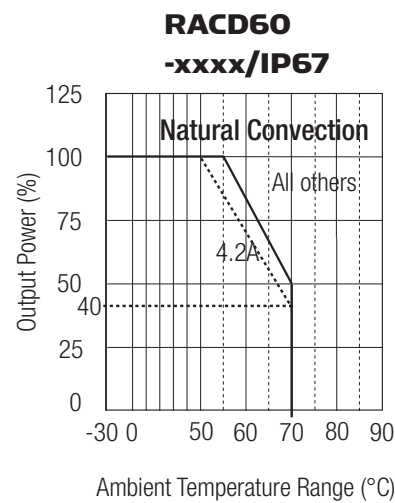
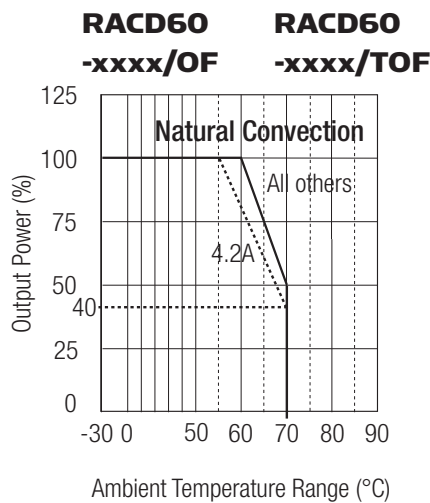
Tc = Case Temperature Measuring Point

Wire Connections

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

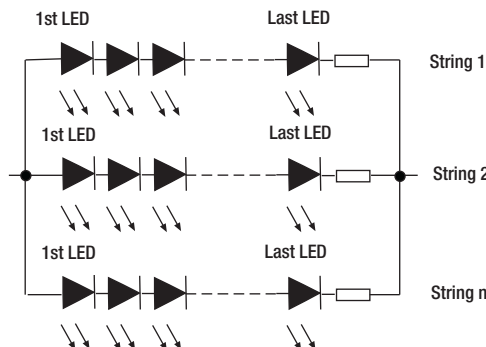
Dimension Tolerance ± 0.25 mm

Derating Graphs



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

High Power LEDs	LED Arrangement	AC/DC Driver
Cree CXA2011	Single Array	RACD60-1050
Cree XM-L	6 in series	RACD60-2100
Lumiled Rebel	13 in series	RACD60-700
Osram Dragon	14 in series	RACD60-1050
Bridgelux RS	Single Array	RACD60-2100
Helieon	Single Module	RACD60-1400