CONSTANT CURRENT, LEADING AND TRAILING EDGE DIMMABLE

TROPO 15W LED DRIVER

DESCRIPTION

TROPO switch mode power supply technology is designed to generate one constant current output from an AC input, and work with industry standard lighting controls in dimming applications.

KEY FEATURES

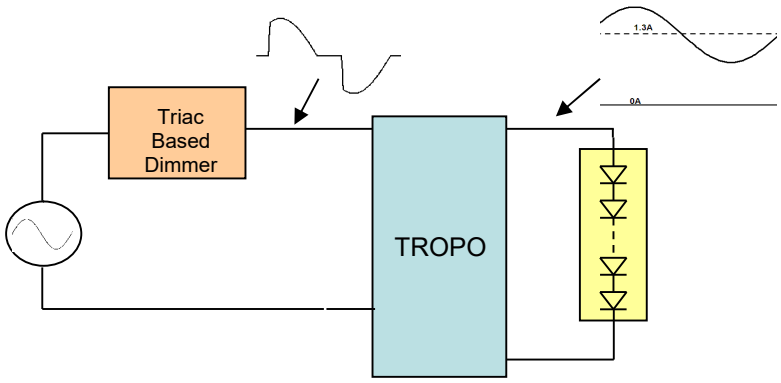
- $120V_{AC}$ or $230V_{AC}$ Input
- Output current availability 0.35A-1.0A.
- Dims with leading and trailing edge dimmers
- Efficiency up to 82%
- 90°C Top case rated
- Compact Encapsulated Assembly
- Active Power Factor Correction
- UL and ENEC Approved
- Long Life
- RoHS Compliant

APPLICATIONS AND BENEFITS

TROPO is designed for powering LED luminaries with standard lighting controls. The modules operate with:

- Standard Light Switches
- Triac based Incandescent Dimmers (Standard phase – leading edge)
- Electronic Low Voltage Dimmers (Reverse Phase – trailing edge)

The following diagram depicts a typical installation utilizing the TROPO:



Tropo's Dimming Options:

- Dimming range down to less than 10% nominal output current
- Output current does not terminate during off time of dimmer
- Output Current up to 1.0A
- Multiple Drivers / LED Assemblies may be connected to a single dimmer
- Facilitates compliance with Energy Star ratings for LED luminares

MODEL CODING AND OUTPUT RATINGS

Low Input Voltage ($120V_{AC}$ Only)					
Model Number	Pout Max (W)	Iout (mA)	Vout Min[1] (V_{DC})	Vout Max[1] (V_{DC})	Vout No_Load (V_{DC})
RLDD015L-350	16.8	350	24	48	60
RLDD015L-350H	7.4	350	12	21	37
RLDD015L-350J	11.2	350	18	32	37
RLDD015L-600	7.2	600	8	12	16
RLDD015L-700	16.8	700	16	24	35
RLDD015L-1000	16.0	1000	10	16	25

High Input Voltage ($230V_{AC}$ Only)					
Model Number	Pout Max (W)	Iout (mA)	Vout Min[1] (V_{DC})	Vout Max[1] (V_{DC})	Vout No_Load (V_{DC})
RLDD015H-350	16.8	350	24	48	60
RLDD015H-350H	7.4	350	12	21	37
RLDD015H-350J	11.2	350	18	32	37
RLDD015H-600	7.2	600	8	12	16
RLDD015H-700	16.8	700	16	24	35
RLDD015H-1000	16.0	1000	10	16	25

Note 1: Total LED forward voltage must be within these ratings under all conditions including dimming. Tropo Application Note 2 provides additional technical information.

Table 1: Absolute Maximum Driver Ratings

INPUT SPECIFICATIONS

Specification	Test Conditions / Notes	Min.	Nominal	Max.	Units
AC Input Voltage	$120V_{AC}$ Rated Models	90	120	135	V_{AC}
AC Input Voltage	$230V_{AC}$ Rated Models	176	230	265	V_{AC}
Input Frequency		47	50/60	63	Hz
Input Current	$120V_{AC}$	-	-	0.17	A
	$230V_{AC}$	-	-	0.09	
Inrush Current	$120V_{AC}$ Half Value time: 20µs	-	-	2.0	Apk
	$230V_{AC}$ Half Value time: 20µs	-	-	2.5	
Efficiency	Rated Load	78	-	82	%
Power Factor	$120V_{AC}$ Rated Load	0.9	-	-	
	$230V_{AC}$ Rated Load; PF is >0.8 for 230VAC Models with output power <10W	0.9	-	-	

OUTPUT SPECIFICATIONS

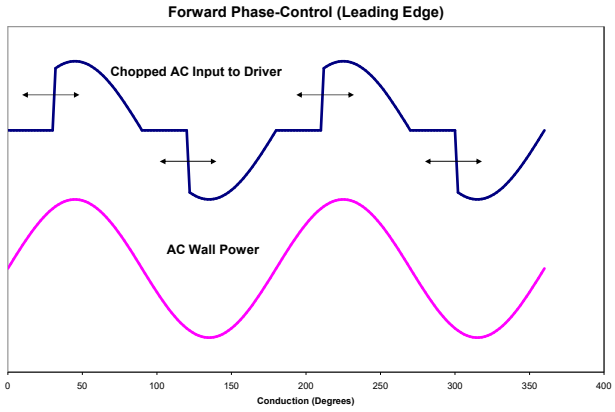
Specification	Test Conditions / Notes	Min.	Nominal	Max.	Units
Output Power Rating	check Model Coding and Output Ratings table	7.2	-	16.8	W
Output Voltage	check Model Coding and Output Ratings table	8	-	48	V
Output Current	check Model Coding and Output Ratings table	350	-	1000	mA
Ripple Current	Iout_Pk-pk/RMS (except for models identified in the table below)	-		40	%
Output Regulation		-	-	±5	%Iout
Start-up time	With no dimmer connected	-		500	ms

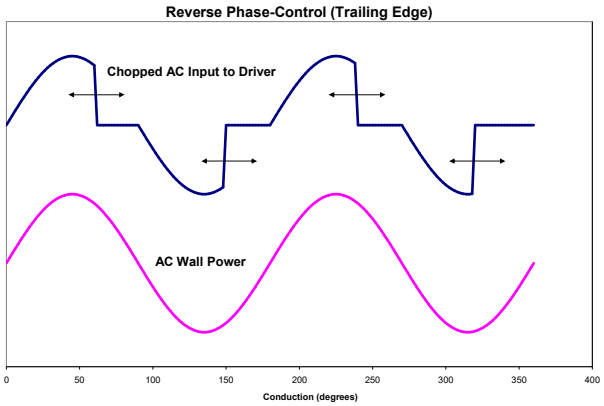
PROTECTION FEATURES

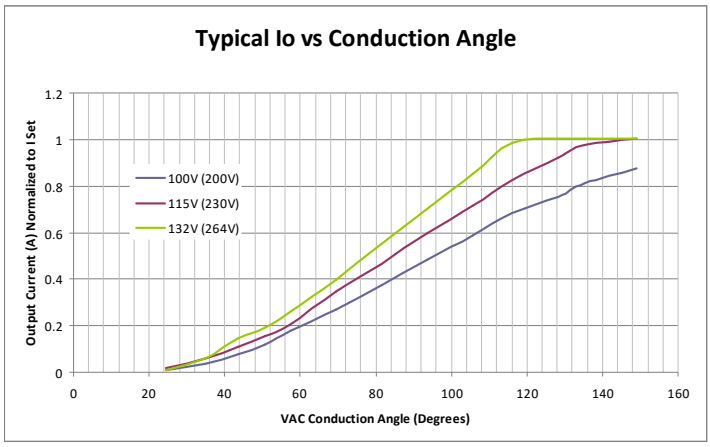
Specification	Test Conditions / Notes	Min.	Nominal	Max.	Units
Output Short-Circuit	Hiccup, Auto recovery	-	-	-	-
Over-Temperature Top Case	Hiccup, Auto recovery	-	-	90	°C
No Load	Unit will not exceed "Vout No_Load" in Table 1	-	-	V_No_Load	V
Isolation Primary-to-Secondary	Reinforced/double Insulation meets IEC/EN61347-2-13 Class II				

LINE DIMMING

Current Dimming of the driver is possible with standard TRIAC based incandescent dimmers that chop the AC voltage, or with ELV dimmers. During the rapid rise time of the AC voltage when the dimmer turns on, the driver does not generate any voltage or current oscillations, and inrush current is controlled. During the on-time of the AC input, the driver regulates the output. The RMS value of the driver output current is proportional to the on-time of the AC input voltage. The RMS output current varies depending upon the conduction angle and RMS value of the applied AC input voltage.







Output Control: Output Dims without any flicker.

Total dimming range is as follows:
Conduction Angle/output: 180 degrees/100% max
30 degrees/10% min

COMPATIBLE LINE DIMMERS:

TROPO drivers are designed to operate with most standard dimmers. However, it has been performed extensive testing with the dimmers listed below. This list of dimmers does not imply any guarantee or warranty of compatibility with a particular application. The lack of dimmers on this list does not imply it is not compatible with TROPO drivers.

Cooper, Aspire Series (Part numbers 9530XXX)
Leviton, Illumitech Series (Part numbers IPI06-XXX)
Leviton, Trimatron Series (Part numbers 6602-X, 6681-X, 6683-X, 6684-X, 700-X and 705-X)
Leviton, SureSlide Series (Part Numbers 6631)
Leviton, True Touch Series (Part Number 6606-1LM)
Lutron Skylark Series (Part Number S-600, S2-LH)

In addition, the following Electronic Low Voltage (ELV) dimmers that employ reverse phase control have been tested with TROPO:

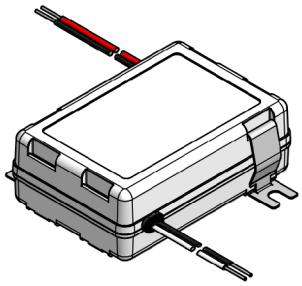
Lutron Nova T Series (Part number NTELV-600)
Lutron Faedra (Part Number FAELV-500-XX)
Leviton Acenti (Part Number ACE06-XXX)
Leviton Vizia (Part Number VZE04)

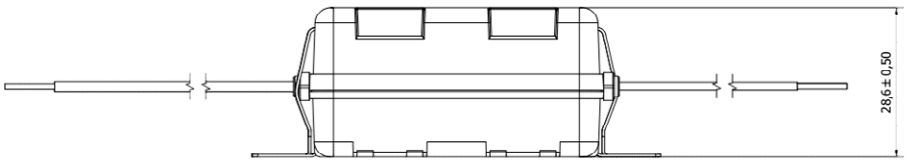
Refer to Tropo Application Note #1, Line Voltage Dimming of Tropo drivers, for further information.

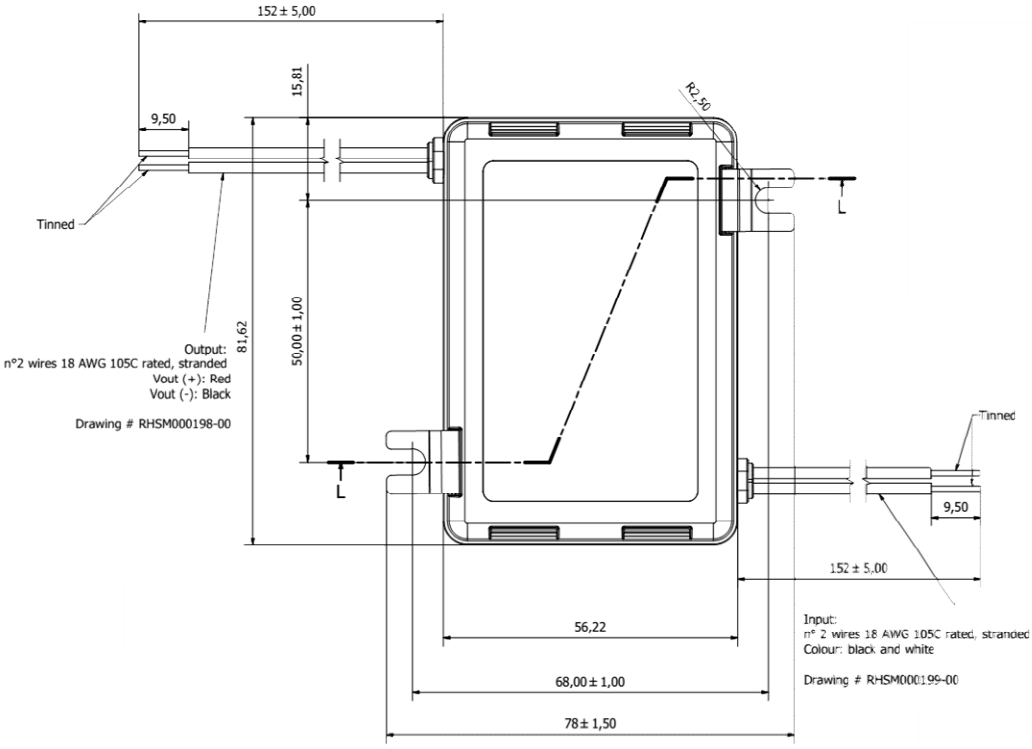
MECHANICAL DETAILS

Enclosure Material:	Partially encapsulated with ABS plastic body enclosure
I/O Connections:	Flying leads, 18AWG, 152mm long, 105C Rated, Stranded, Stripped by approximately 9.5mm and tinned
Mounting Details:	Universal Mounting Clips and 6 mounting locations per package allow installer to choose the most suitable position for the mounting feet
Ingress Protection:	IP 20, UL damp rated

Weight:	145g = 5.1Oz
Dimensions:	82 x 56 x 29 mm
	3.21 x 2.21 x 1.13 in







ENVIRONMENTAL SPECIFICATIONS

Specification	Test Conditions / Notes	Min	Nom	Max	Units
Top Case Temperature Range	Refer to the Top Case measurement point	-30	-	90	°C
Storage Temperature		-40	-	85	°C
Operating Relative Humidity	Non-condensing	5	-	95	%
Surface Temperature	Exposed surfaces temperature under all operating conditions	-	-	90	°C
Cooling	Convection cooled	-	-	-	
Shock EN 60068-2-27	Operating: Half sine, 30 g, 18 ms, 3 axes, 6x each (3 positive and 3 negative). Non-Operating: Half sine, 50 g, 11 ms, 3 axes, 6x each (3 positive and 3 negative).				
Vibration EN 60068-2-64	Operating: 5 – 500Hz, 1gRMS (0.02 g2/Hz), 3 axes, 30 min. Non-Operating: 5 – 500Hz, 2.46gRMS (0.0122 g2/Hz), 3 axes, 30 min.				
Vibration EN 60068-2-6	Operating Sine, 10 – 500Hz, 1g, 3 axes, 1 oct/min., 60 min.				
MTBF	Rated Load, 90°C Top Case, Bellcore	500k	-	-	Hours
Useful Life	90°C Top Case.	-	50k	-	Hours

ELECTROMAGNETIC COMPATIBILITY (EMC) – EMISSIONS

Phenomenon	Conditions / Notes	Standard	Equipment Performance Class
Conducted and Radiated Emission	Test at 230V_{AC}	EN55015	
Conducted and Radiated Emission	Test at 120V_{AC}	FCC CFR47- part 15/subpart B	Class B
Harmonic Current Emissions		EN61000-3-2	Class C
Voltage Changes, Fluctuation and Flicker		EN61000-3-3	

ELECTROMAGNETIC COMPATIBILITY (EMC) – IMMUNITY

Phenomenon	Conditions / Notes	Standard	Note
Equipment for general lighting purposes -EMC Immunity Requirements		EN 61547	
ESD (Electrostatic Discharge)		EN 61000-4-2	
Radiated Radio-Frequency electromagnetic field		EN 61000-4-3	
Electric Fast Transient / Burst	2kV on AC input	EN 61000-4-4	
Surge	Level ±1kV L-N	EN 61000-4-5	
Conducted disturbances induced by Radio-Frequency fields		EN 61000-4-6	
Voltage Dips, short interruptions and Voltage Variations		EN 61000-4-11	
Non-repetitive damped oscillatory transient, Ring wave	2.5kV	ANSI C.62.41	Category A

SAFETY AGENCIES APPROVALS

Certification Body	Safety Standards	Category
c UL us	UL Recognized ANSI / UL60950-1, CSA C22.2 No.60950-1. Models with output voltages <60 V_{DC} include UL and CSA approval (cURus) as LVLE output.	
	LED Driver suitable for dry and damp location	
CE	To obtain the "CE Declaration of Conformity" please contact info@efore.com	
	IEC/EN 61347-2-13 electronic control gear for LED Modules IEC/EN 62384 DC or AC supplied electronic control gear for LED modules – Performance Requirements	
	Reinforced/double Insulation meets IEC/EN61347-2-13 Class II	