

50 Watt - LD50W Series

CONSTANT VOLTAGE OR CONSTANT CURRENT LED DRIVER WITH DIMMING



DIMMING
LD50W Series
50W

Model: LD50W Series

- Drive Mode: Constant Current or Constant Voltage
- Technology: PFC Off-Line Switch Mode
- Output Power: 50W Max.
- Input Voltage: 90 to 305VAC, 47- 63Hz
- Number of Outputs: One
- Output Voltages: 4VDC - 142VDC
- Output Currents: 350mA - 4200mA
- Optional 0-10V or PWM Positive Dimming 10% - 100%

Environmental

1. Operating temperature: Tc 90C Maximum. Reference -30 to +50°C ambient
2. Storage temperature range: -40 to +85°C
3. Humidity (non-condensing): 5% - 95%RH
4. Cooling: Convection
5. Vibration Frequency: 5-55Hz/2g, 30 minutes
6. Impact resistance: 1g/s
7. MTBF@ 25°C: 474,000 hours @ Full Load per MIL-217F Notice 2.

Safety and Compliance

1. UL8750, EN61347, CSA 22.2 safety compliant
2. FCC, 47CFR Part 15 Class B & EN55015 compliant.
3. Water resistant and Dust Proof Design: IP66, NEMA4, for Dry, Damp, Wet Locations.
4. Compact, Lightweight Design.
5. Safety Isolation between Primary and Secondary
6. Meets EN61000-3-2 & EN61000-3-3 Class C
7. Protection: output over-voltage, output over-current, output short circuit, auto-recovery.
8. EN61000-4-5: 2kV L-N, 8/20 µsec surge protection.

Electrical Specifications at 25°C

- Input voltage range: 90 to 305VAC
- Frequency: 47- 63HZ
- Power Factor: ≥ 0.90 at $\geq 60\%$ Load, 120Vac/230Vac, $\geq 88\%$ Load 277Vac
- THD%: $\leq 20\%$ at $\geq 60\%$ Load, 120Vac/230Vac, $\geq 80\%$ Load 277Vac
- Inrush current: <30A at 25C, 277Vac, cold start, Max. Load
- Input current: 0.50A at 120Vac, 60Hz, Maximum Load
- Efficiency: 85% typical at 230Vac Full Load
- Constant Current regulation: +/-3% Over Input Line Variation
- Load regulation accuracy: +/-4%
- Leakage current: 400uA typical; Hold up time: half cycle



IP66



Constant Current Versions

Part Number ⁽²⁾	US Class 2	CN Class 2	Output Voltage Range	Output Constant Current	Current Accuracy	Output Power Maximum	Typical Efficiency ⁽¹⁾
LD50W-142-C0350	NO	NO	47 - 142 VDC	350 mA	$\pm 3\%$	50W	89%
LD50W-111-C0450	NO	NO	37 - 111 VDC	450 mA	$\pm 3\%$	50W	89%
LD50W-100-C0500	NO	NO	34 - 100 VDC	500 mA	$\pm 3\%$	50W	89%
LD50W-72-C0700	NO	NO	24 - 72 VDC	700 mA	$\pm 3\%$	50W	88%
LD50W-60-C0830	NO	NO	20 - 60 VDC	830 mA	$\pm 3\%$	50W	88%
LD50W-48-C1050	YES	YES	16 - 48 VDC	1050 mA	$\pm 3\%$	50W	88%
LD50W-42-C1190	YES	YES	14 - 42 VDC	1190 mA	$\pm 3\%$	50W	87%
LD50W-40-C1250	YES	YES	13 - 40 VDC	1250 mA	$\pm 3\%$	50W	87%
LD50W-36-C1400	YES	YES	12 - 36 VDC	1400 mA	$\pm 3\%$	50W	87%
LD50W-29-C1750	YES	YES	9 - 29 VDC	1750 mA	$\pm 3\%$	50W	87%
LD50W-24-C2100 ⁽⁵⁾	YES	YES	8 - 24 VDC	2100 mA	$\pm 3\%$	50W	87%
LD50W-20-C2500	YES	YES	7 - 20 VDC	2500 mA	$\pm 3\%$	50W	87%
LD50W-18-C2800	YES	YES	6 - 18 VDC	2800 mA	$\pm 3\%$	50W	86%
LD50W-15-C3330	YES	YES	5 - 15 VDC	3330 mA	$\pm 3\%$	50W	85%
LD50W-12-C4200 ⁽⁵⁾	YES	YES	4 - 12 VDC	4200 mA	$\pm 3\%$	50W	84%

Notes

1. Typical efficiency measured at 230VAC input, full load
2. For dimmable versions add appropriate designator to the end of the part number: For Example: LD50W-18-C2800-RD is 0-10V or resistance dimmable version, LD50W-18-C2800-PD is PWM dimmable version.
-RD 0-10V & Resistance dimmable version comes with an extra two wires +Purple/-Gray on the output side.
-PD PWM Dimmable version comes with an extra two wires +Purple/-Grey on the output side.
3. -RD 0-10V Dimming is compatible with most quality 0-10V wall dimmers and direct 0-10V analog signal. See page 3 for details.
4. -PD PWM version is PWM Dimmable via a positive 10% to 100% Duty Cycle, 500Hz to 1.5KHz, 0-10V Pulse. See page 4 for details.
5. SAM Recognized

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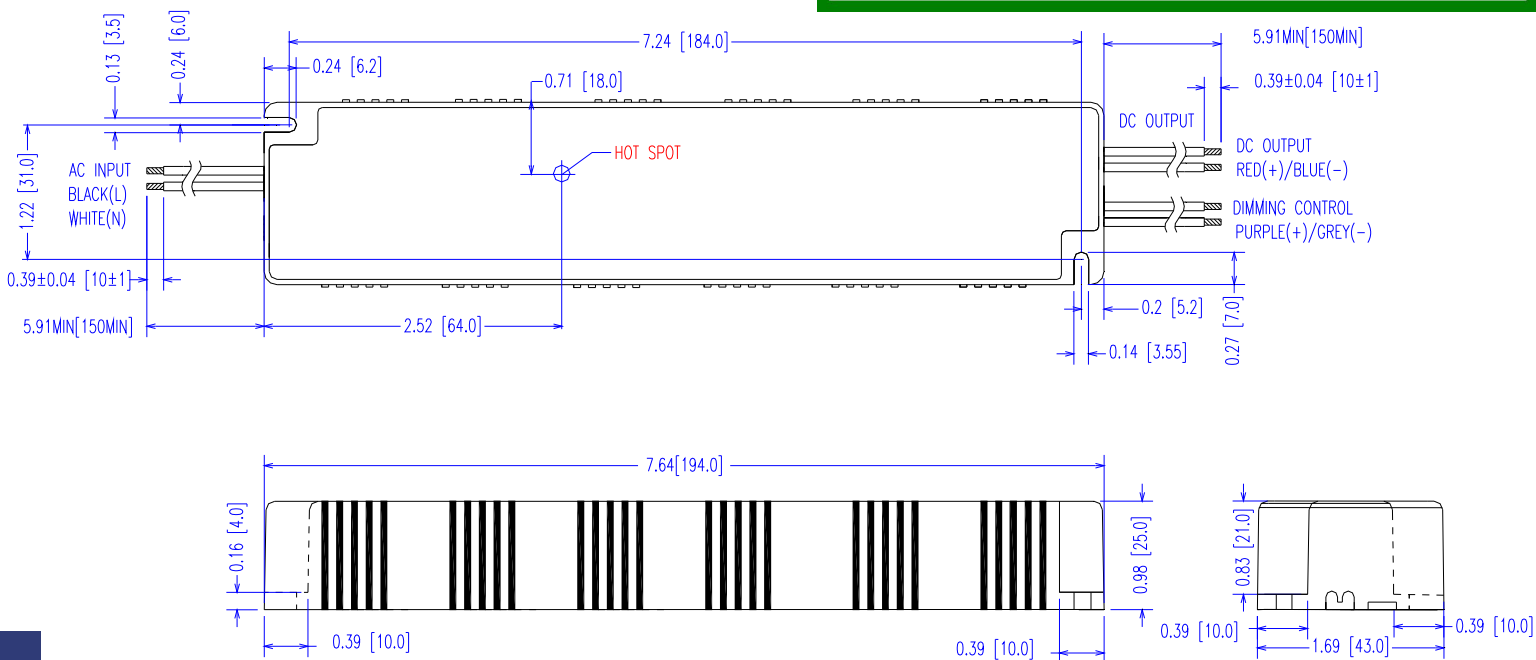
Constant Voltage Versions

Part Number	US Class 2	CN Class 2	Output Voltage	Output Current Range	Voltage Accuracy	Output Power Maximum	Typical Efficiency ⁽¹⁾
LD50W-142	NO	NO	142 VDC	88 - 350 mA	± 5%	50W	89%
LD50W-111	NO	NO	111 VDC	113 - 450 mA	± 5%	50W	89%
LD50W-100	NO	NO	100 VDC	125 - 500 mA	± 3%	50W	89%
LD50W-72	NO	NO	72 VDC	175 - 700 mA	± 5%	50W	88%
LD50W-60	NO	NO	60 VDC	208 - 830 mA	± 5%	50W	88%
LD50W-48	YES	YES	48 VDC	263 - 1050 mA	± 5%	50W	88%
LD50W-42	YES	YES	42 VDC	298 - 1190 mA	± 5%	50W	87%
LD50W-40	YES	YES	40 VDC	313 - 1250 mA	± 5%	50W	87%
LD50W-36	YES	YES	36 VDC	350 - 1400 mA	± 5%	50W	87%
LD50W-29	YES	YES	29 VDC	438 - 1750 mA	± 5%	50W	87%
LD50W-24 ⁽⁵⁾	YES	YES	24 VDC	525 - 2100 mA	± 5%	50W	87%
LD50W-20	YES	YES	20 VDC	625 - 2500 mA	± 5%	50W	87%
LD50W-18	YES	YES	18 VDC	700 - 2800 mA	± 5%	50W	86%
LD50W-15	YES	YES	15 VDC	833 - 3330 mA	± 5%	50W	85%
LD50W-12 ⁽⁵⁾	YES	YES	12 VDC	1050 - 4200 mA	± 5%	50W	84%

Mechanical Dimensions: Inches [mm]

Material: Black PC ABS Plastic Case
Fully Encapsulated
Weight: 323 grams (11.4 oz) Typical

Labeling Example



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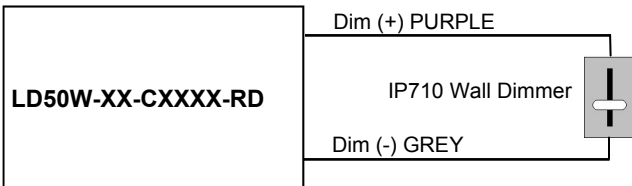
-RD 2-Wire 0-10V CCR Dimming Scheme

Parameters	Minimum	Typical	Maximum
Source Current out of 0-10V Purple Wire	0mA	—	2mA
Absolute Voltage Range on 0-10V (+) Purple Wire	-2.0V	—	+15V
Sink Current into 0-10V Purple Wire	0mA	—	1.2mA

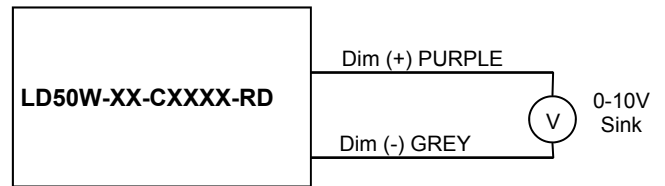
Notes

- RD 0-10V dimmable version comes with an extra two wires +Purple/-Grey on the output side.
- RD version is compatible with most 0-10V Wall Slide dimmers and direct 0-10V analog signal.
Recommended wall slide dimmer is Leviton IP710 or equivalent
- RD 0-10V dimmable version is not intended to dim below about 5% @ 0V or 10% @ 1.0V
- RD 0-10V dimmable version output will be 100% with Purple/Grey open and minimum with Purple/Grey Shorted.

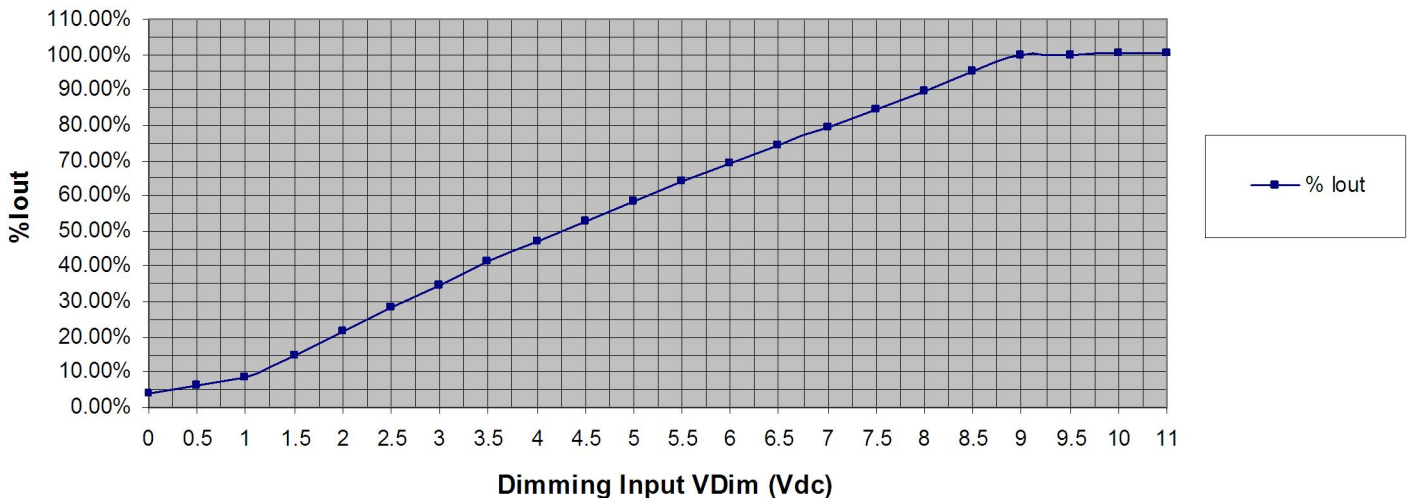
-RD 2-Wire Resistance Dimming Scheme



-RD 2-Wire 0-10V Analog Dimming Scheme



% Output Current vs. 0-10VDC Dimming Input



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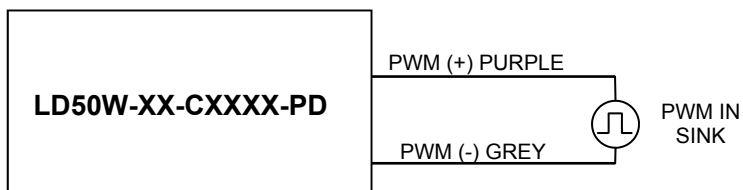
-PD 2-Wire CCR PWM Positive Dimming Scheme

Parameters	Minimum	Typical	Maximum
Absolute Maximum Voltage Range on PWM Input (Purple Wire)	-2.0V	10V	+15V
Input LOW Level Voltage Range (Purple Wire)	-2.0V	0V	+5.5V
Input HIGH Level Voltage Range (Purple Wire)	+9.0V	10V	+15V
Current into PWM Input (Purple Wire)	0mA	—	1.2mA
Source Current out of PWM Input (Purple Wire)	0mA	—	2mA
PWM Input Signal Frequency	500Hz	—	1500Hz
PWM Input Signal Positive Duty Cycle	0%	10-90%	100%

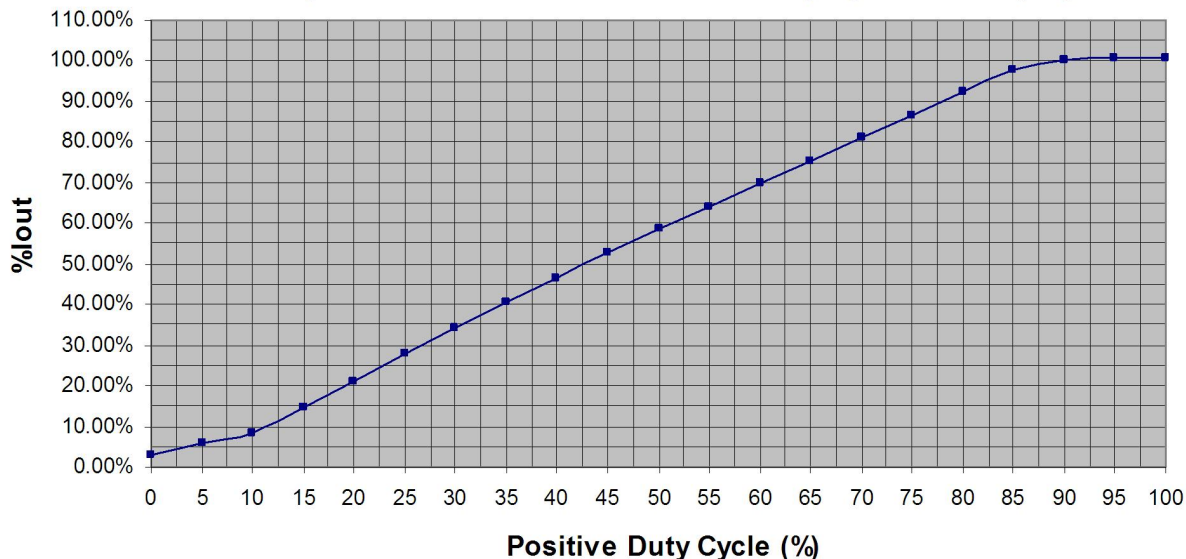
Notes

1. -PD PWM Dimmable version comes with an extra 2 wires +Purple/-Grey on the output side.
2. -PD PWM Dimmable version is not intended to dim below about 5% @ 0% Duty Cycle or 10% @ 10% Duty Cycle
3. -PD PWM dimmable version output will be 100% with Purple/Grey open and minimum with Purple/Grey Shorted.

-PD 2-Wire PWM Positive Dimming Scheme



% Output Current vs. 1.0 kHz, Positive Duty Cycle Dimming Input



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Input Specifications

Parameter	Min.	Typ.	Max.	Notes/Conditions
Input Voltage	90 Vac	—	305 Vac	120, 230, 240, 277 Vac Nominal Values
Input Frequency	47 Hz	—	63 Hz	50/60Hz Nominal
Input AC Current	—	—	0.50 A	Measured at 120Vac/60Hz Input, Output Full load.
	—	—	0.24 A	Measured at 230Vac/60Hz Input, Output Full load.
Inrush Current (Peak)	—	—	30A	Measured at 277Vac/60Hz Input, Output Full Load, Ta 25°C, Cold Start 50% I _{peak} duration \approx 750 μ sec ($1/2 \cdot I_p^2 \cdot t$)
Inrush Current (I ² t)	—	—	0.34 A ² s	
Leakage Current	—	—	0.28mA	Measured at 120Vac/60Hz Input, Output Full load.
	—	—	0.75mA	Measured at 277Vac/60Hz Input, Output Full load.
THD	—	—	20%	\geq 60% Load @ 120Vac/230Vac, \geq 80% Load @ 277Vac
Power Factor (PF)	0.90	—	—	\geq 60% Load @ 120Vac/230Vac, \geq 88% Load @ 277Vac

Output Specifications

Parameter	Min.	Typ.	Max.	Notes/Conditions
DC Output Voltage	Per Table	—	Per Table	Per Tables on Page 1
DC Output Constant Current	-3%	Per Table	+3%	Per Tables on Page 1
Output Power	—	—	Per Table	Per Tables on Page 1
Ripple & Noise (V _{pk-pk})	—	—	20% V _o	20 MHz BW, Full load output in parallel with 0.1 μ F ceramic & 10 μ F Electrolytic.
Ripple (I _{pk-pk})	—	—	50% I _o	20 MHz BW, Full load output in parallel with 0.1 μ F ceramic & 10 μ F Electrolytic. 120 Hz component
Start-up Time	—	700 mS	1000 mS	Measured at 120Vac/60Hz Input, Output Full load.
Hold-up Time	—	30 mS	—	Typical @ 277Vac Input, Output Full load.

Environmental Specifications

Parameter	Min.	Typ.	Max.	Notes/Conditions
Case Temperature (T _c)	-30 °C	—	+90 °C	Measured at location specified on case.
Operating Temperature (T _a)	-30 °C	—	+60 °C	This is a reference range. T _c controls temperature range.
Storage Temperature (T _s)	-40 °C	—	+85 °C	Non operating temperature range.
Operating Humidity	—	—	95% RH	Relative Humidity, non-condensing.
Vibration	5 Hz	—	55 Hz	2G, 10 minutes/1 cycle, period 30 minutes, each along X, Y, Z axis.
MTBF	474,000 Hours	—	—	MIL-HDBK-217F Notice 2, T _a = 25C, Output Full Load.

Protection Specifications

Parameter	Min.	Typ.	Max.	Notes/Conditions
Output Short Circuit (SCP)	—	—	—	No Damage, Auto recovery after short is removed.
Output Over Current (OCP)	—	—	+8% I _o	Constant Current Limiting circuit.
Output Over Voltage (OVP)	—	—	120% V _o	No Damage, Auto recovery after fault is removed.

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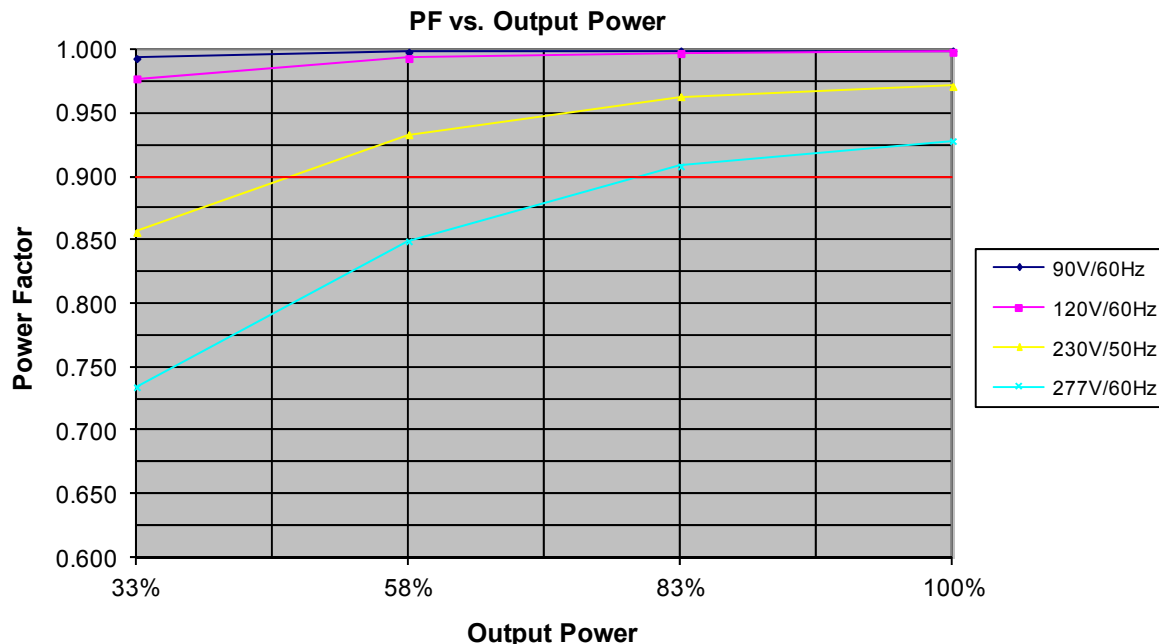
Safety Compliance

Safety	Notes/Standards
UL/CUL	UL8750, UL1310 for UL Class 2 & CAN/CSA C22.2 No. 250.13
CE	EN61347-1, EN61347-2-13
Withstand Voltage	Input to Output: 3750 Vac
Isolation Resistance	Input to Output: >100 MΩ, 500VDC @ 25 °C, 70 % RH
Dimming Circuit	Dim+ Purple/Dim- Grey are considered part of the secondary circuit.

EMC Compliance

Standard	Notes/Conditions
FCC, 47CFR Part 15	Class B
EN 55015	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment.
EN 61000-3-2	Part 3-2: Limits for harmonic current emissions Class C, $\geq 80\%$ Rated Power
EN 61000-3-3	Part 3-3: Limitation of voltage changes, voltage fluctuations and flicker.
EN 61000-4-5	Part 4-5: Surge Immunity test, 2 kV L-N, 4 kV L-FG & N-FG
Energy Star	Energy Star transient protection: Ballast or driver shall comply with ANSI/IEEE C62.41.1-2002 and ANSI/IEEE C62.41.2-2002, Category A operation. The line transient shall consist of seven strikes of a 100 kHz ring wave, 2.5 kV level, for both common mode and differential mode.

Power Factor Curves (Typical)



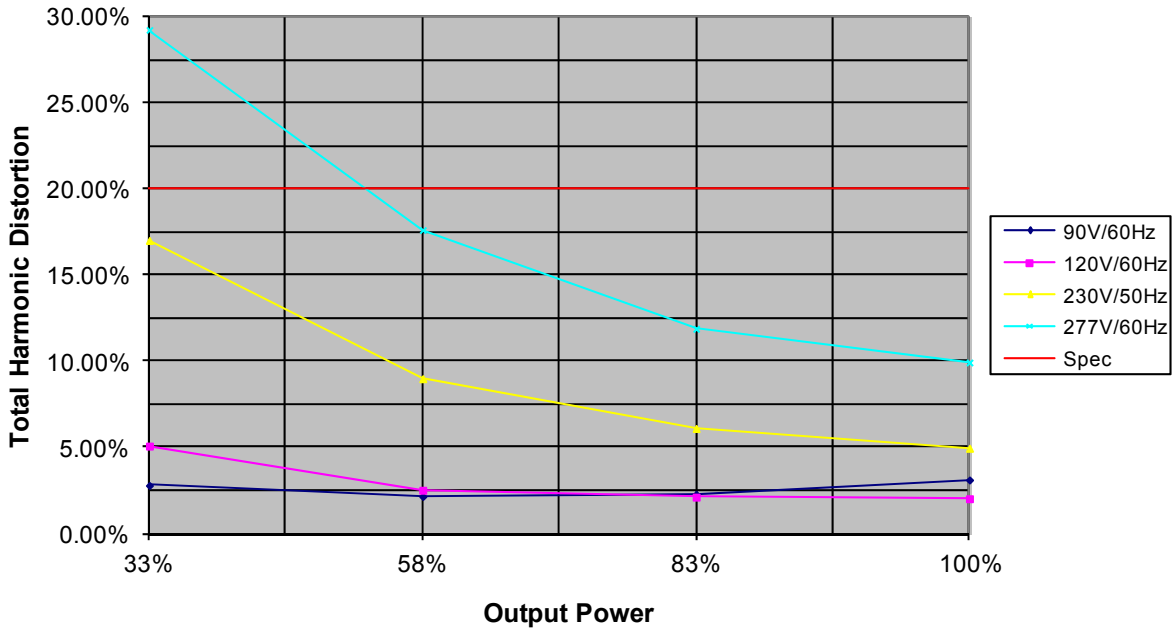
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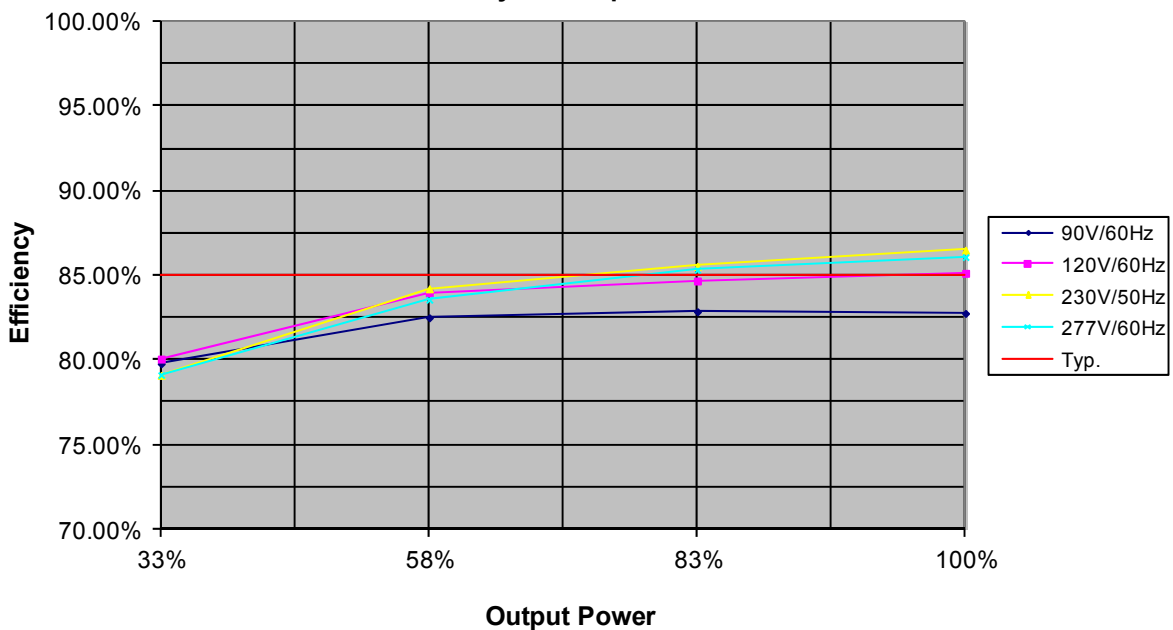
THD Curves (Typical)

THD vs. Output Power



Efficiency Curve (Typical)

Efficiency vs. Output Power



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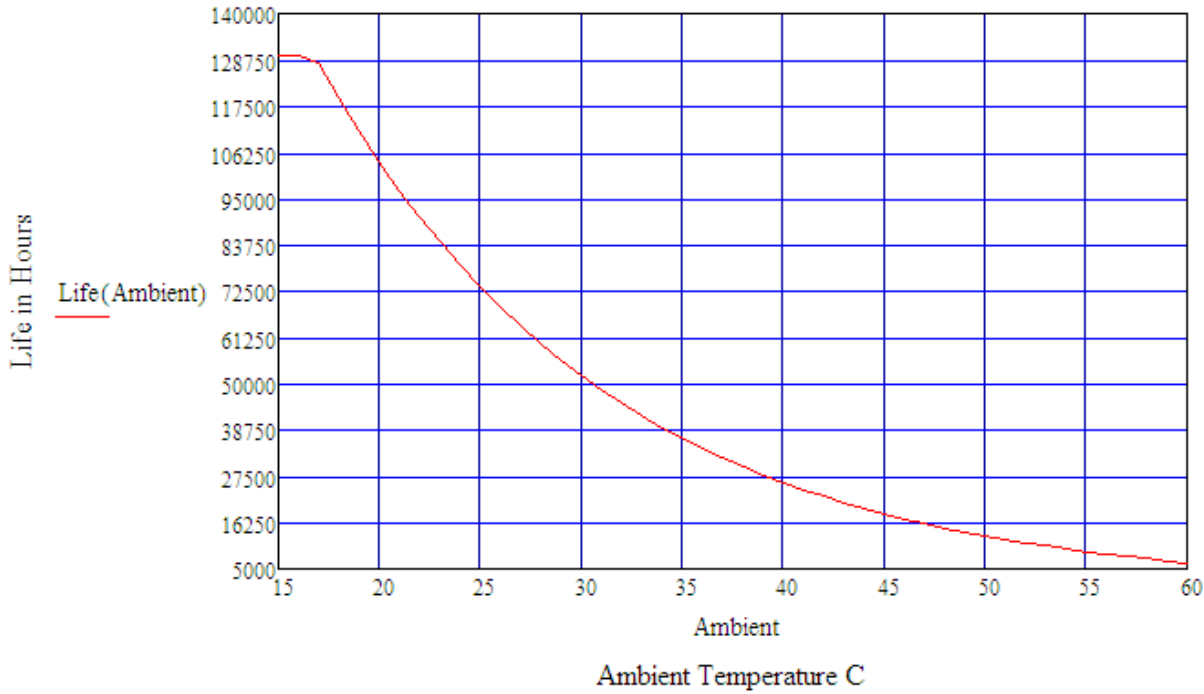
LED Optimized Drivers

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Life vs. Ambient Temperature

LD50W Estimated Life Full Load @ 120Vac



Life vs. Case (Tc) Temperature

LD50W Estimated Life Full Load @ 120Vac

