

20 Watt — LD20W Series

CONSTANT VOLTAGE OR CONSTANT CURRENT LED DRIVER WITH DIMMING



DIMMING
LD20W Series
20W

Model: LD20W Series

- Drive Mode: Constant Current or Constant Voltage
- Technology: PFC Off-Line Switch Mode
- Output Power: 20W Max.
- Input Voltage: 90-305VAC, 47- 63Hz
- Number of Outputs: One
- Output Voltages: 4VDC - 57VDC
- Output Currents: 350mA - 1660mA
- Optional 0-10V or PWM Positive Dimming 10% ~ 100%

Environmental

1. Operating temperature: Tc 90C Maximum. Reference -30 to +60°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@ 40°C: 488,000 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 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/4kV 8/20 usec transient protection.

Electrical Specifications at 25°C

- Input voltage range: 90-305Vac
- Frequency: 47 - 63Hz
- Power Factor: ≥ 0.90 at $\geq 70\%$ Load, 120Vac/230Vac, $\geq 90\%$ Load 277Vac
- THD%: $\leq 20\%$ at $\geq 60\%$ Load, 120Vac/230Vac/277Vac
- Inrush current: $<15A$ at 25C, 230V, cold start, Max. Load
- Input current: 0.25A at 120Vac, 60Hz, Maximum Load
- Efficiency: 85% typical at 230Vac full load.
- Line regulation accuracy: $\pm 3\%$
- Load regulation accuracy: $\pm 4\%$
- Leakage current: 300uA typical; Hold up time: half cycle

Constant Current Versions



IP66



Part Number ⁽²⁾	US Class 2	CN Class 2	Output Voltage Range	Output Constant Current	Current Accuracy	Output Power Maximum	Typical Efficiency ⁽¹⁾
LD20W-57-C0350	YES	YES	19 - 57 Vdc	350 mA	$\pm 4\%$	20W	84%
LD20W-48-C0350	YES	YES	16 - 48 Vdc	350 mA	$\pm 4\%$	16.8W	83%
LD20W-43-C0460	YES	YES	15 - 43 Vdc	460 mA	$\pm 4\%$	20W	83%
LD20W-40-C0500	YES	YES	14 - 40 Vdc	500 mA	$\pm 4\%$	20W	82%
LD20W-36-C0550	YES	YES	12 - 36 Vdc	550 mA	$\pm 4\%$	20W	82%
LD20W-28-C0700	YES	YES	10 - 28 Vdc	700 mA	$\pm 4\%$	20W	81%
LD20W-24-C0830 ⁽⁵⁾	YES	YES	8 - 24 Vdc	830 mA	$\pm 4\%$	20W	81%
LD20W-22-C0910	YES	YES	7 - 22 Vdc	910 mA	$\pm 4\%$	20W	81%
LD20W-18-C1100	YES	YES	6 - 18 Vdc	1100 mA	$\pm 4\%$	20W	80%
LD20W-15-C1330	YES	YES	5 - 15 Vdc	1330 mA	$\pm 4\%$	20W	80%
LD20W-13-C1540	YES	YES	4 - 13 Vdc	1540 mA	$\pm 4\%$	20W	79%
LD20W-12-C1660 ⁽⁵⁾	YES	YES	4 - 12 Vdc	1660 mA	$\pm 4\%$	20W	78%

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: LD20W-18-C1400-RD is 0-10V or resistance dimmable version, LD20W-18-C1400-PD is PWM dimmable version.
-RD 0-10V & Resistance dimmable version comes with an extra two wires +Purple/-Grey 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.

20W**LD20W Series****DIMMING****LED Optimized Drivers**

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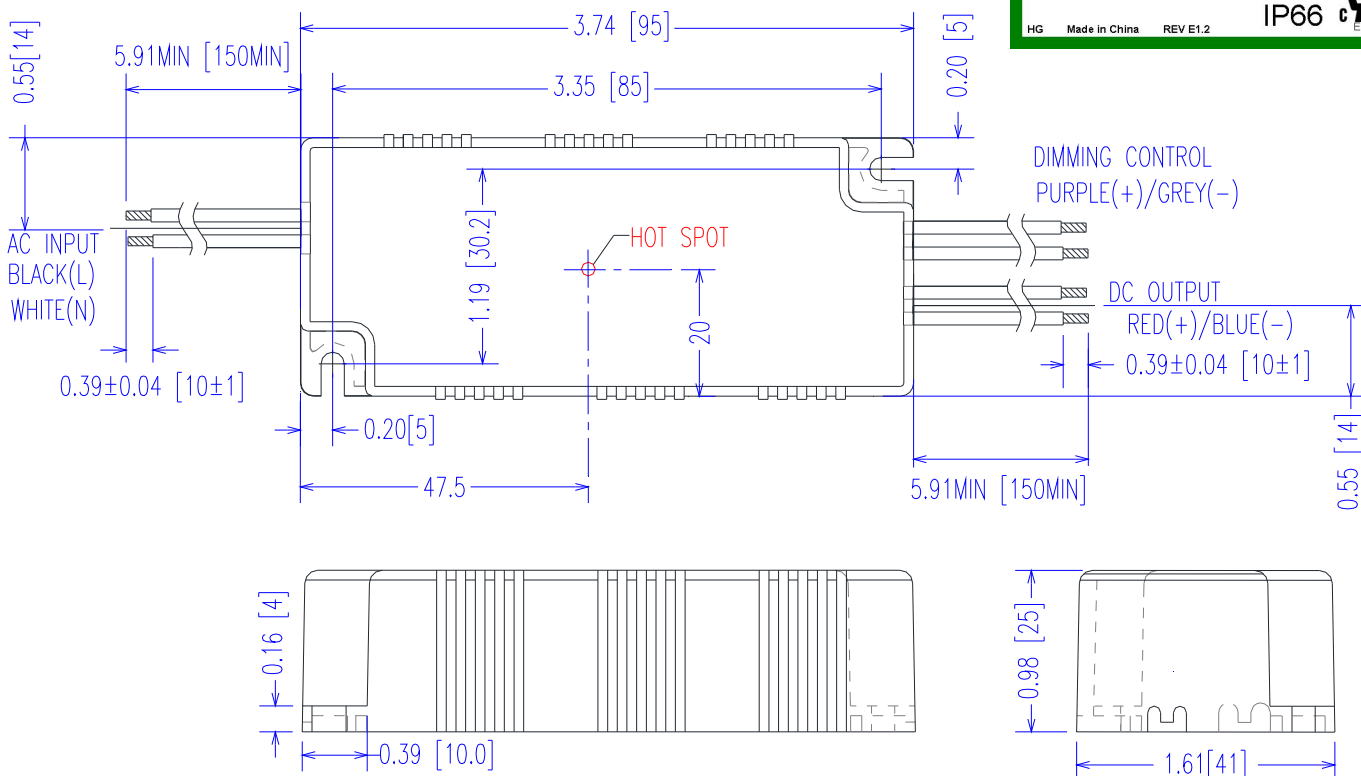
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Constant Voltage Versions

Part Number	US Class 2	CN Class 2	Output Constant Voltage	Output Current Range	Voltage Accuracy	Output Power Maximum	Typical Efficiency ⁽¹⁾
LD20W-57	YES	NO	57 Vdc	88 - 350 mA	± 5%	20W	85%
LD20W-48	YES	NO	48 Vdc	88 - 350 mA	± 5%	16.8W	85%
LD20W-43	YES	NO	43 Vdc	115 - 460 mA	± 5%	20W	85%
LD20W-40	YES	NO	40 Vdc	125 - 500 mA	± 5%	20W	85%
LD20W-36	YES	YES	36 Vdc	138 - 550 mA	± 5%	20W	85%
LD20W-28	YES	YES	28 Vdc	175 - 700 mA	± 5%	20W	84%
LD20W-24 ⁽⁵⁾	YES	YES	24 Vdc	208 - 830 mA	± 5%	20W	84%
LD20W-22	YES	YES	22 Vdc	228 - 910 mA	± 5%	20W	84%
LD20W-18	YES	YES	18 Vdc	275 - 1100 mA	± 5%	20W	83%
LD20W-15	YES	YES	15 Vdc	333 - 1330 mA	± 5%	20W	83%
LD20W-13	YES	YES	13 Vdc	385 - 1540 mA	± 5%	20W	82%
LD20W-12 ⁽⁵⁾	YES	YES	12 Vdc	415 - 1660 mA	± 5%	20W	82%

Mechanical Dimensions: Inches [mm]

Material: Black PC ABS Plastic Case
Fully Encapsulated
Weight: 165 grams (5.8 oz) Typical

**Labeling Example**

DIMMING CONTROL
PURPLE(+)/GREY(-)

DC OUTPUT
RED(+)/BLUE(-)

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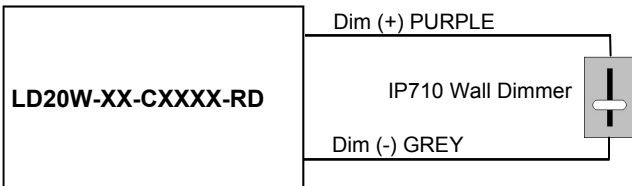
-RD 2-Wire 0-10V CCR Dimming Scheme

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

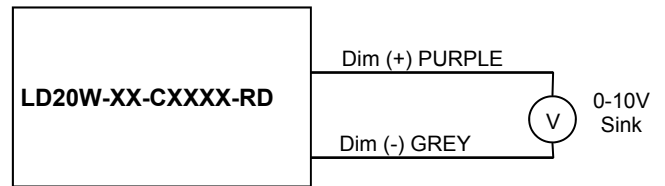
Notes

- 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 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.

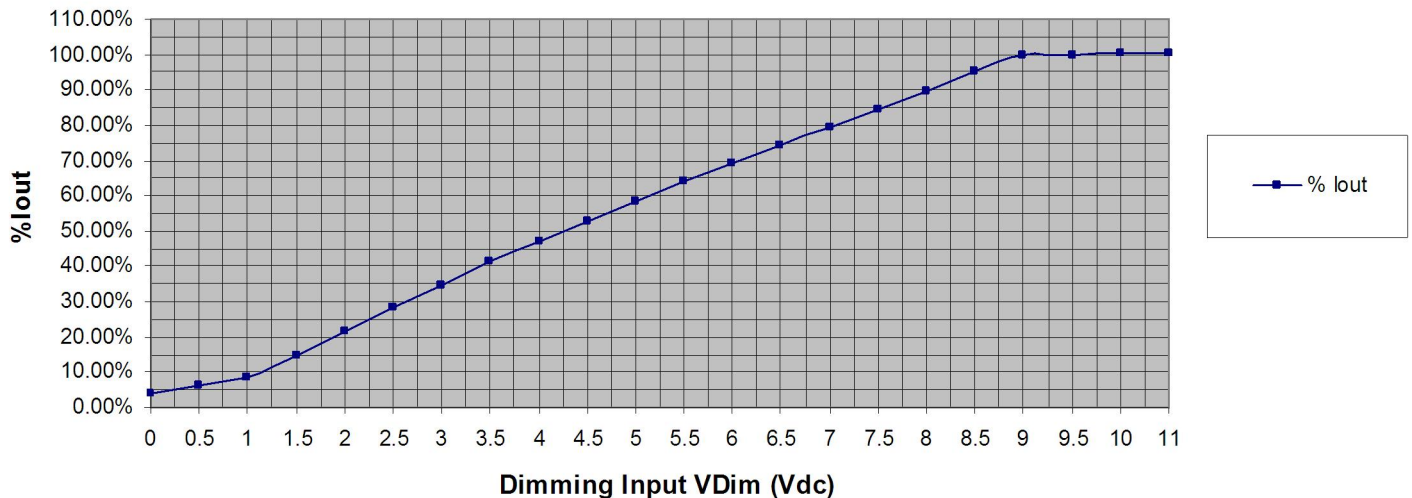
-RD 2-Wire Resistance Dimming Scheme



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



% Output Current vs. 0-10VDC Dimming Input



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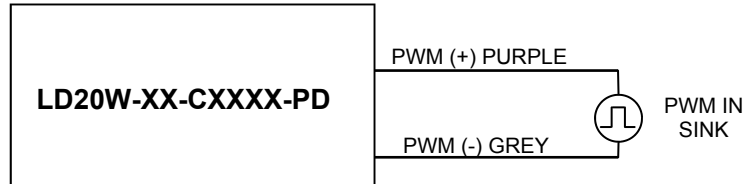
-PD 2-Wire CCR PWM Positive Dimming Scheme

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%

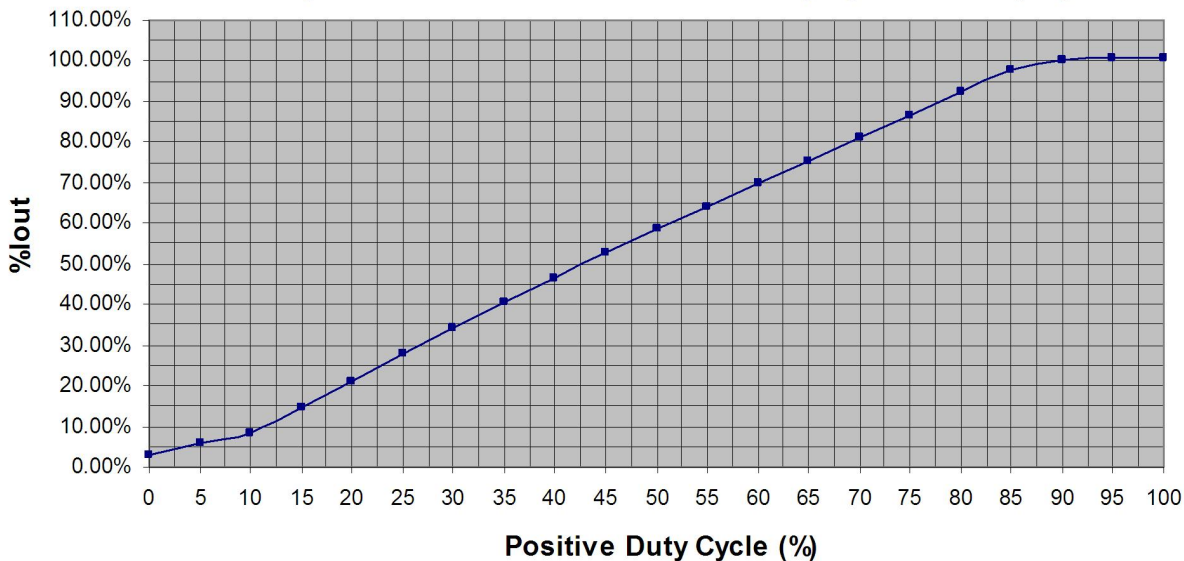
Notes

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	—	—	0.25 A	Measured at 120Vac/60Hz Input, Output Full load.
	—	—	0.13 A	Measured at 230Vac/50Hz Input, Output Full load.
	—	—	0.11 A	Measured at 277Vac/60Hz Input, Output Full load.
Inrush Current (Peak)	—	—	50A	Measured at 277Vac/60Hz Input, Output Full Load, Ta 25°C, Cold Start 50% I _{peak} duration \approx 250 μ sec (1/2 * I _p ² * t)
Inrush Current (I ² t)	—	—	0.31 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%	Measured at \geq 60% Load, 120Vac/230Vac/277Vac
Power Factor (PF)	0.90	—	—	Measured at \geq 70% Load, 120Vac/230Vac, \geq 90% 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	-5%	Per Table	+5%	Per Tables on Page 1
Output Power	—	—	Per Table	Per Tables on Page 1 (+ [12V@200mA, 2.4W Auxiliary])
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 (Flicker Free)
Start-up Time	—	200 mS	800 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	530,000 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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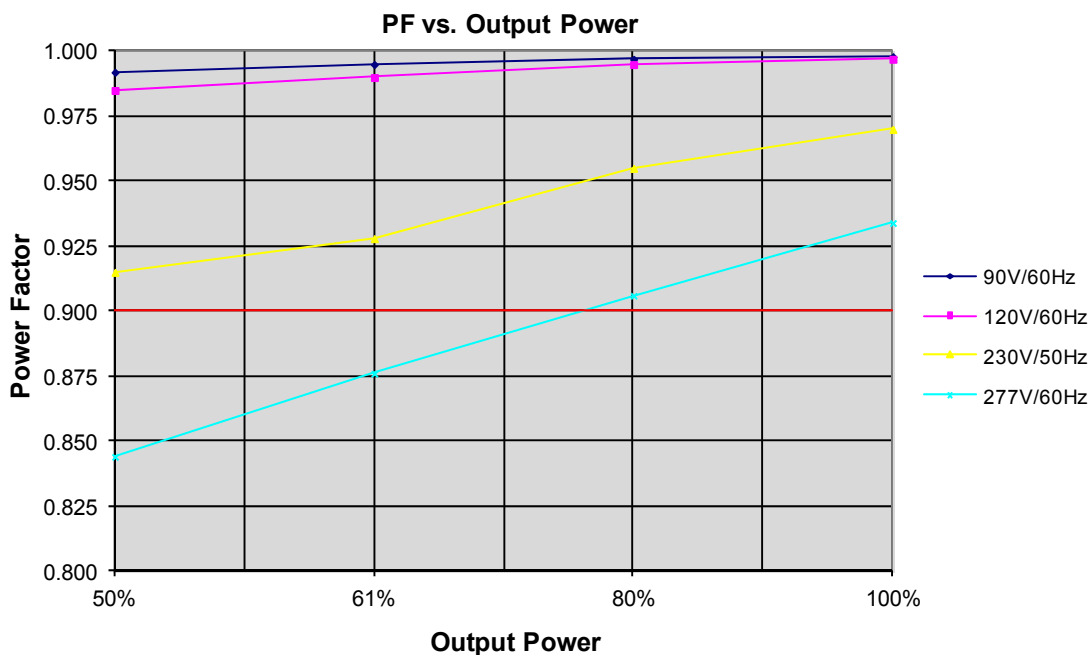
Safety Recognized

Safety	Notes/Standards
UL/CUL Recognized	UL8750 & 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	Dim+ Purple/Dim- Gray are considered part of the secondary circuit.

EMC Certified

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, ≥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)



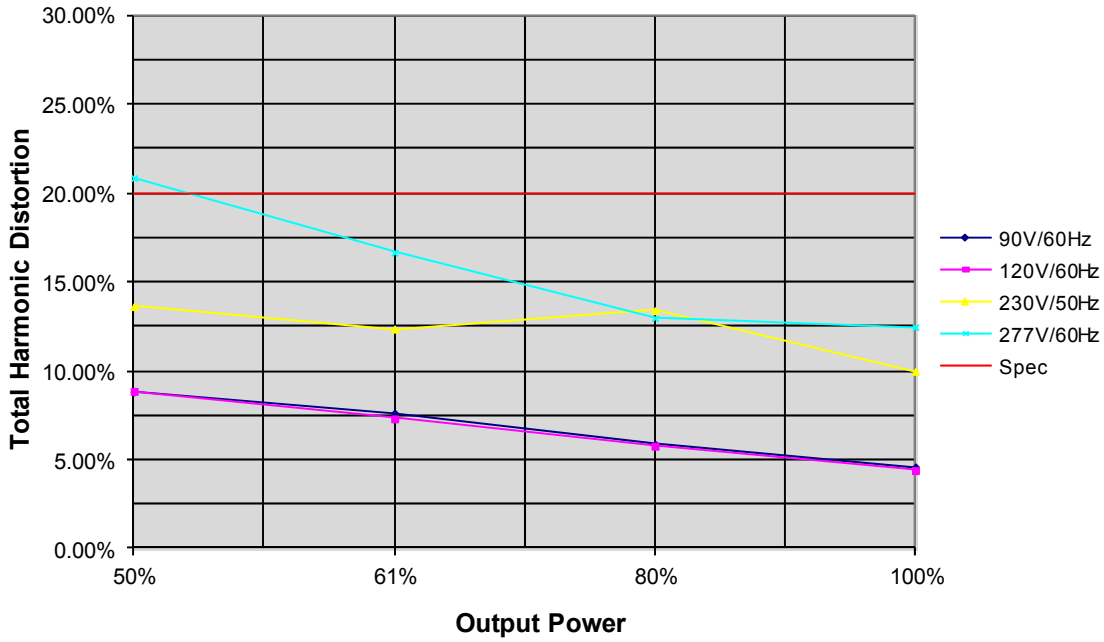
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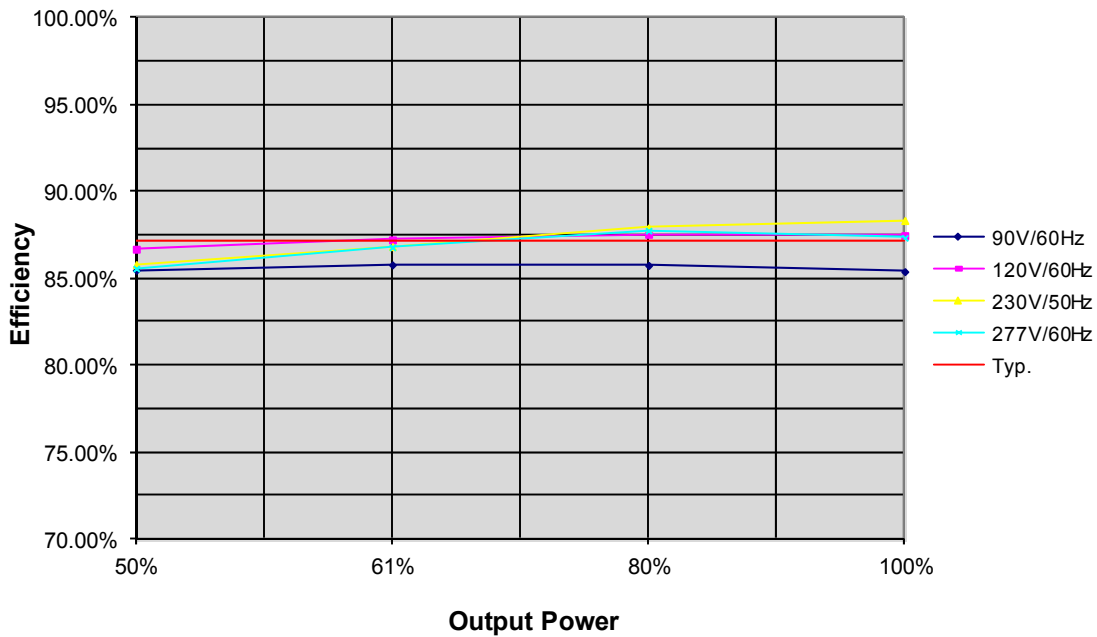
THD Curves (Typical)

THD vs. Output Power



Efficiency Curve (Typical)

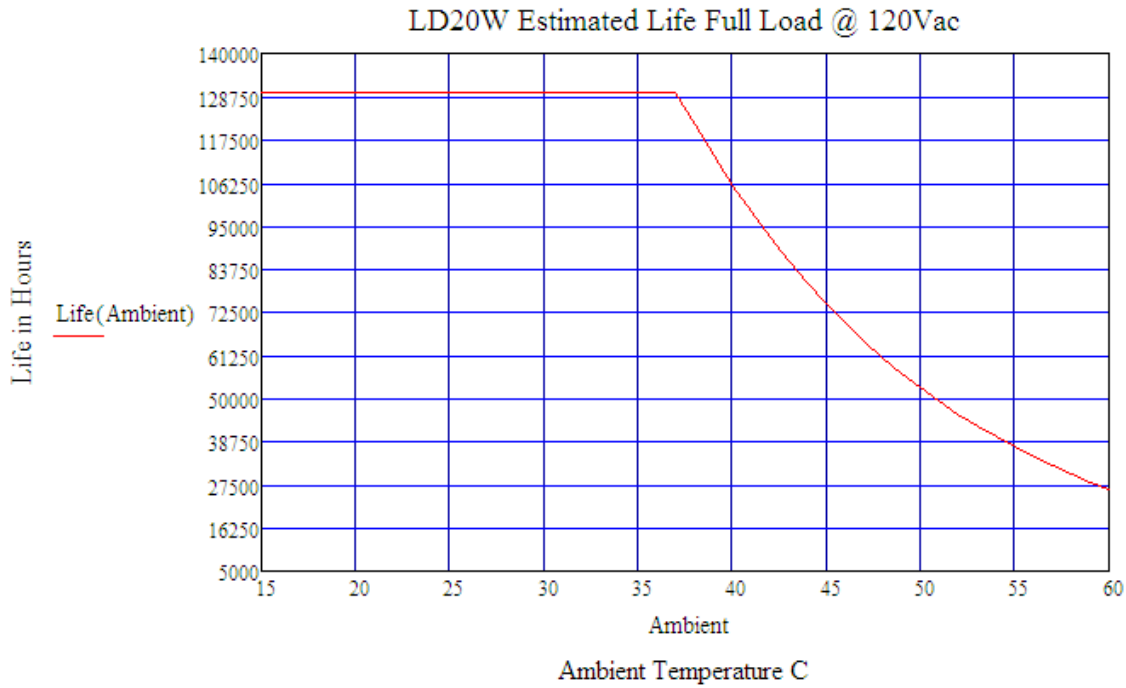
Efficiency vs. Output Power



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Life vs. Ambient Temperature



Life vs. Case (Tc) Temperature

