

96 Watt LD96W –TL

CONSTANT CURRENT TRIAC & ELV DIMMABLE LED DRIVERS



PHASE DIMMING

LD96W –TL
96W

Model: LD96W –TL Series

- Designed for use with Triac and ELV Dimmers 120Vac, 230Vac, 240Vac, 277Vac.
- Drive Mode: Constant Current with CCR Dimming
- Output Power: 96W Max.
- Input Voltage: 120Vac, 230Vac, 240Vac, 277Vac.
- Number of Outputs: One
- Output Voltages: 14VDC - 274VDC
- Output Currents: 350mA - 4000mA

Environmental

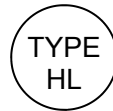
1. Operating temperature: Tc 90C Maximum. Reference -30 to +60°C ambient
2. Storage temperature range: -40 to +85°C
3. Humidity (non-condensing): 5% - 95%RH
4. Cooling: Convection
5. Vibration Frequency: 5-55Hz/2g, 30 minutes
6. Impact resistance: 1g/s
7. MTBF@ 40°C: 375,000 hours @ Full Load per MIL-217F Notice 2.

Safety and Compliance

1. UL8750, EN61347, CSA 22.2 safety recognized, UL Type HL
2. FCC, 47CFR Part 15 Class A & EN61000-6-4 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 µsec surge protection.

Electrical Specifications at 25°C

- Input Voltage: 120/230/240/277Vac 50/60 Hz, Maximum Range: 100-305Vac
- Frequency: 50/60HZ
- Power Factor: ≥ 0.90 at $\geq 60\%$ Load, 120Vac/230Vac/277Vac
- THD%: $\leq 20\%$ at $\geq 60\%$ Load, 120Vac/230Vac/277Vac
- Inrush current: $<20A$ at 25C, 277Vac, cold start, Max. Load
- Input current: 0.94A max. at 120Vac, 60Hz, Maximum Load
- Efficiency: 90% typical at 230Vac 50Hz
- Line regulation accuracy: $\pm 4\%$
- Load regulation accuracy: $\pm 5\%$
- Dimming Range: CCR Mode refer to Dimming Curves on page 2.



IP66



Constant Current Versions

Part Number	US Class 2 Type HL	CN Class 2	Output Voltage Range	Output Constant Current	Current Accuracy	Output Power Maximum	Typical Efficiency (1)	DIMMER ⁽³⁾
LD96W-274-C0350-TL	NO	NO	162 - 274 VDC	350 mA	$\pm 5\%$	96W	92%	Incan & ELV
LD96W-137-C0700-TL	NO	NO	81 - 137 VDC	700 mA	$\pm 5\%$	96W	92%	Incan & ELV
LD96W-92-C1050-TL	NO	NO	54 - 92 VDC	1050 mA	$\pm 5\%$	96W	92%	Incan & ELV
LD96W-69-C1400-TL	NO	NO	41 - 69 VDC	1400 mA	$\pm 5\%$	96W	91%	Incan & ELV
LD96W-54-C1750-TL	YES	YES	32 - 54 VDC	1750 mA	$\pm 5\%$	96W	91%	Incan & ELV
LD96W-48-C2000-TL	YES	YES	28 - 48 VDC	2000 mA	$\pm 5\%$	96W	90%	Incan & ELV
LD96W-39-C2450-TL	YES	YES	23 - 39 VDC	2450 mA	$\pm 5\%$	96W	90%	Incan & ELV
LD96W-30-C3150-TL	YES	YES	18 - 30 VDC	3150 mA	$\pm 5\%$	96W	90%	Incan & ELV
LD96W-24-C4000-TL	YES	YES	14 - 24 VDC	4000 mA	$\pm 5\%$	96W	89%	Incan & ELV

Notes

1. Typical efficiency measured at 230Vac input, full load, no dimmer.
2. All versions are $\leq 10\%$ to $\sim 100\%$ CCR Dimmable with any good quality proper power phase dimmer.
3. Use any good quality 120VAC $\leq 600W$ Incandescent (Triac) or ELV (Electronic Low Voltage) dimmer. Refer to page 2 for dimming curves.
4. Use very good quality 230/240/277VAC Incandescent (Triac) or ELV (Electronic Low Voltage) dimmer. Please note that dimmer must be properly loaded to operate. Many 230/277Vac dimmers require a minimum load of proper type to operate. Refer to page 2 for dimming curves.

Example: 230-277Vac dimmers

Leviton AWSMG-MAW 120Vac to 277Vac Incan type, forward phase magnetic low voltage dimmer will not work properly unless loaded to $\sim 0.09A$ constant load. This dimmer is not recommended for use unless loaded properly.

Leviton AWSMG-EAW 120Vac to 277Vac ELV type, reverse phase electronic low voltage dimmer will work properly and is recommended for use.

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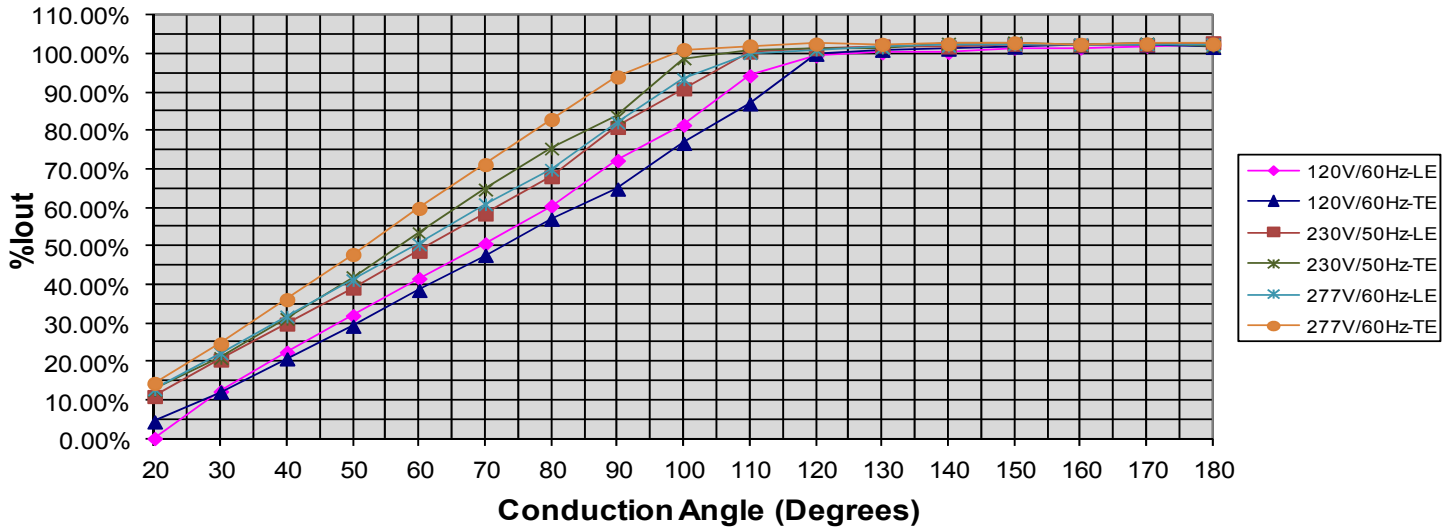


LED Optimized Drivers
Triac & ELV Dimmable

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Typical Dimming Curve:

%Output Current vs. Conduction Angle in Degrees



Mechanical Dimensions: Inches [mm]

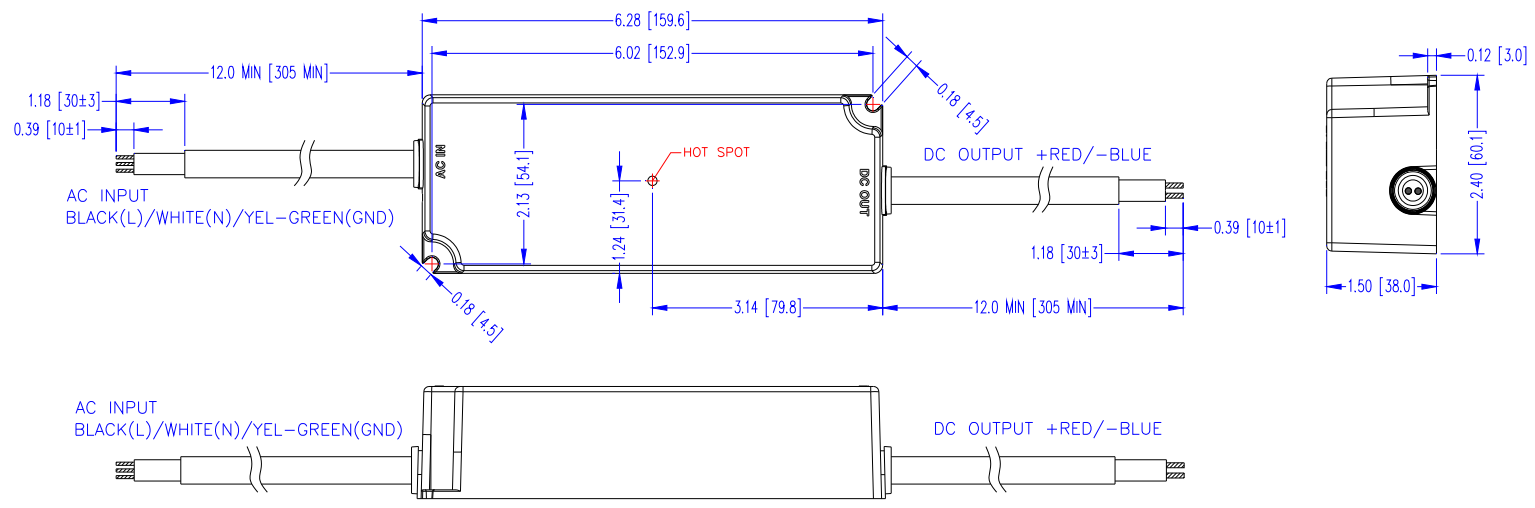
Material: Black PC ABS Plastic Case
Fully Encapsulated
Weight: 311 grams (11.0 oz) Typical

Labeling Example

AC Phase Dimmable LED Optimized Driver
EPtronics, Inc.
www.EPtronics.com
800 643-0688/310 538-0700

Part Number: LD96W-39-C2450-TL
Input Voltage: 120/230/240/277VAC 50/60Hz
Input Current: 0.94 Amp Max, PF >0.81
Output Voltage: 23-39 VDC
Output Current: 2450 mA CC
Output Power: 96W Maximum
CCR AC Phase Dimmable Output
Triac (Incandescent) & ELV Dimmable
UL & cUL Class 2 Output, UL Type HL

IP66
LED + = RED
LED - = BLUE



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Input Specifications

Parameter	Min.	Typ.	Max.	Notes/Conditions
Input Voltage	100 Vac	—	305 Vac	120, 230, 240, 277 Vac Nominal Values
Input Frequency	47 Hz	—	63 Hz	50/60Hz Nominal
Input AC Current	—	—	1.14 A	Measured at 100Vac/60Hz Input, Output Full load.
	—	—	0.94 A	Measured at 120Vac/60Hz Input, Output Full load.
	—	—	0.49 A	Measured at 230Vac/60Hz Input, Output Full load.
Inrush Current (Peak)	—	14A	20A	Measured at 277Vac/60Hz Input, Output Full Load, Ta 25°C, Cold Start 50% Ipeak duration ~750 µsec (1/2*I _p ² *t)
Inrush Current (I ² t)	—	—	0.15 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 120, 230, 277Vac Input, Output ≥60% Load
Power Factor (PF)	0.90	—	—	Measured at 120, 230, 277Vac Input, Output ≥60% Load

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
Ripple & Noise (V _{pk-pk})	—	—	20% V _o	20 MHz BW, Full load output in parallel with 0.1 µF ceramic & 10 µF Electrolytic.
Ripple (I _{pk-pk})	—	—	50% I _o	20 MHz BW, Full load output in parallel with 0.1 µF ceramic & 10 µF 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	342,000 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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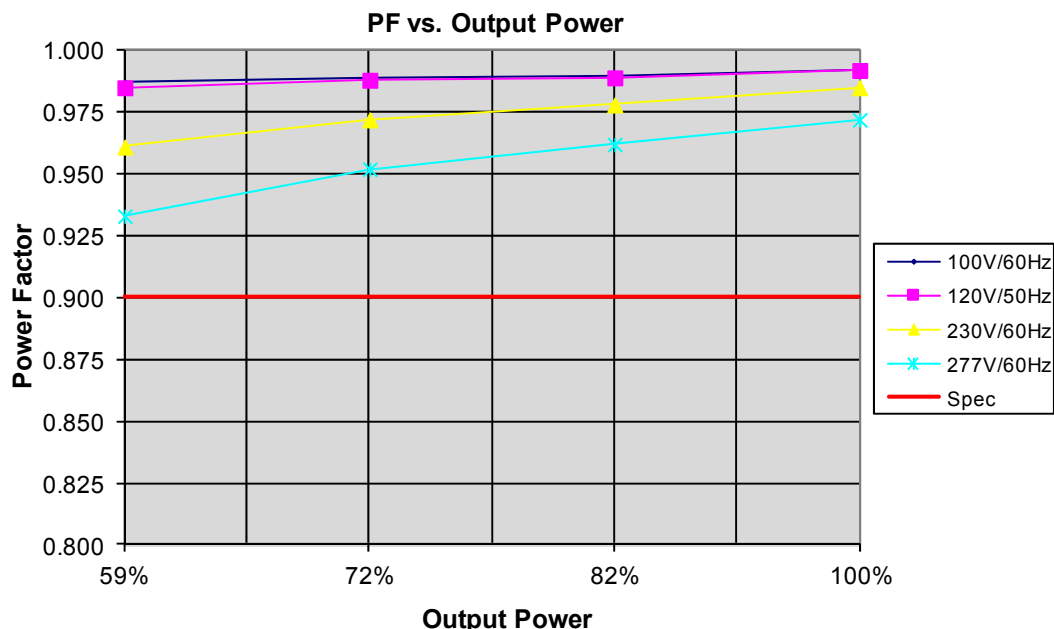
Safety Compliance

Safety	Notes/Standards
UL/CUL	UL8750, UL1310 for UL Class 2 & CAN/CSA C22.2 No. 250.13, UL Type HL
Withstand Voltage	Input to Output: 3750 Vac
Isolation Resistance	Input to Output: >100 MΩ, 500VDC @ 25 °C, 70 % RH
Dimming Circuit	Dimmable by Forward Phase (Incan) or Reverse Phase (ELV) dimmers. Dimmer must be properly loaded.

EMC Compliance

Standard	Notes/Conditions
FCC, 47CFR Part 15	Class A
EN 61000-6-4	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
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) - Direct Connect to AC (No Dimmer)

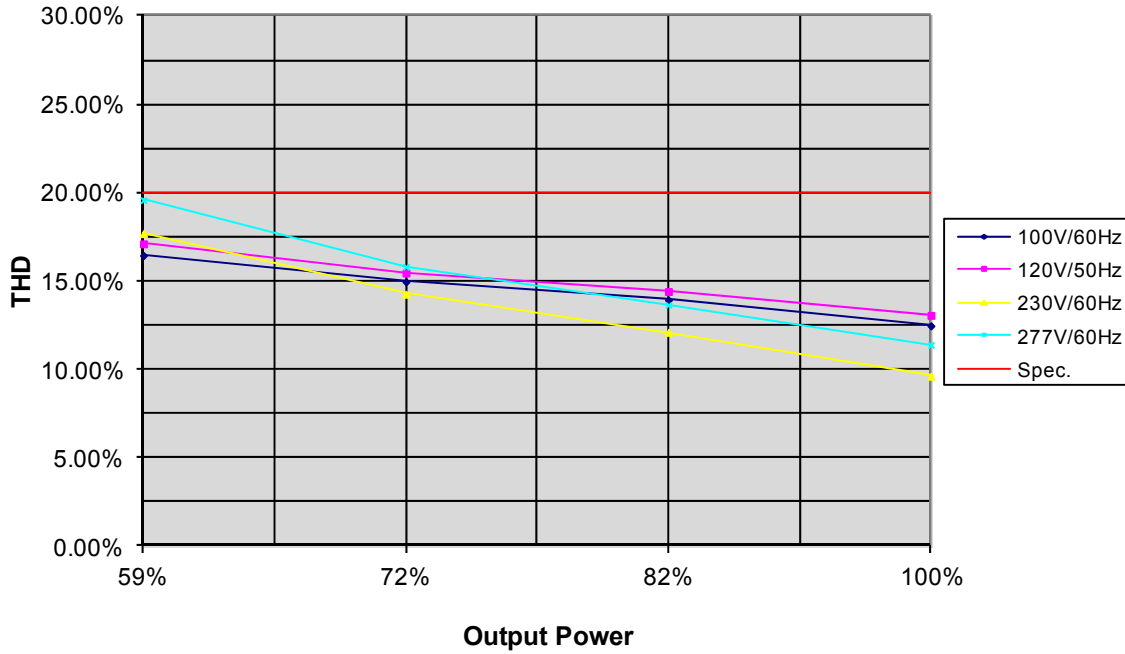


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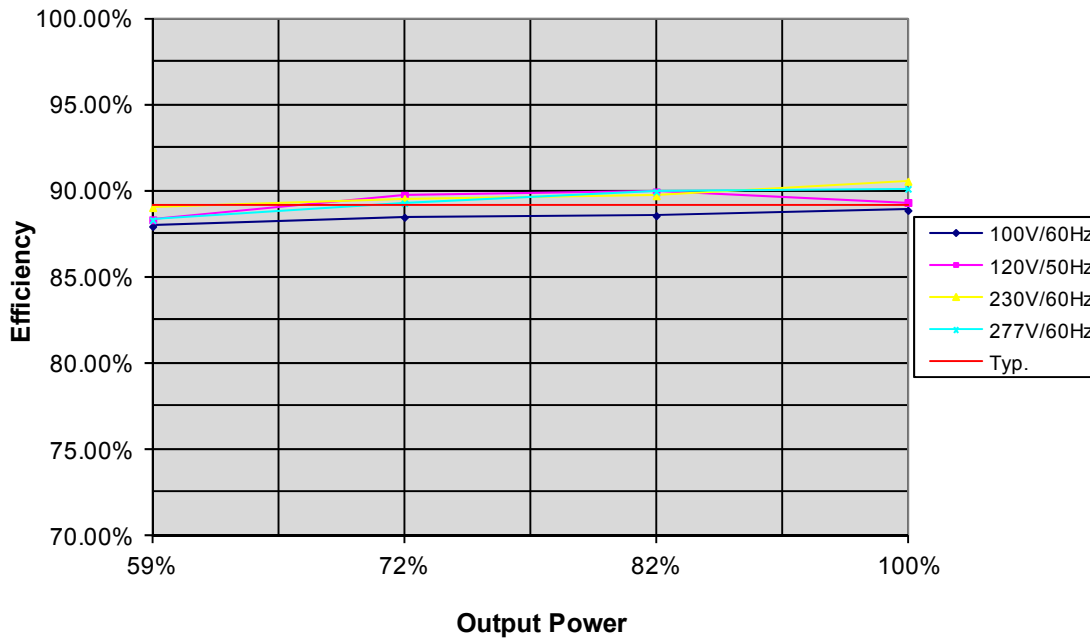
THD Curves (Typical) - Direct Connect to AC (No Dimmer)

THD vs. Output Power



Efficiency Curve (Typical) - Direct Connect to AC (No Dimmer)

Efficiency vs. Output Power



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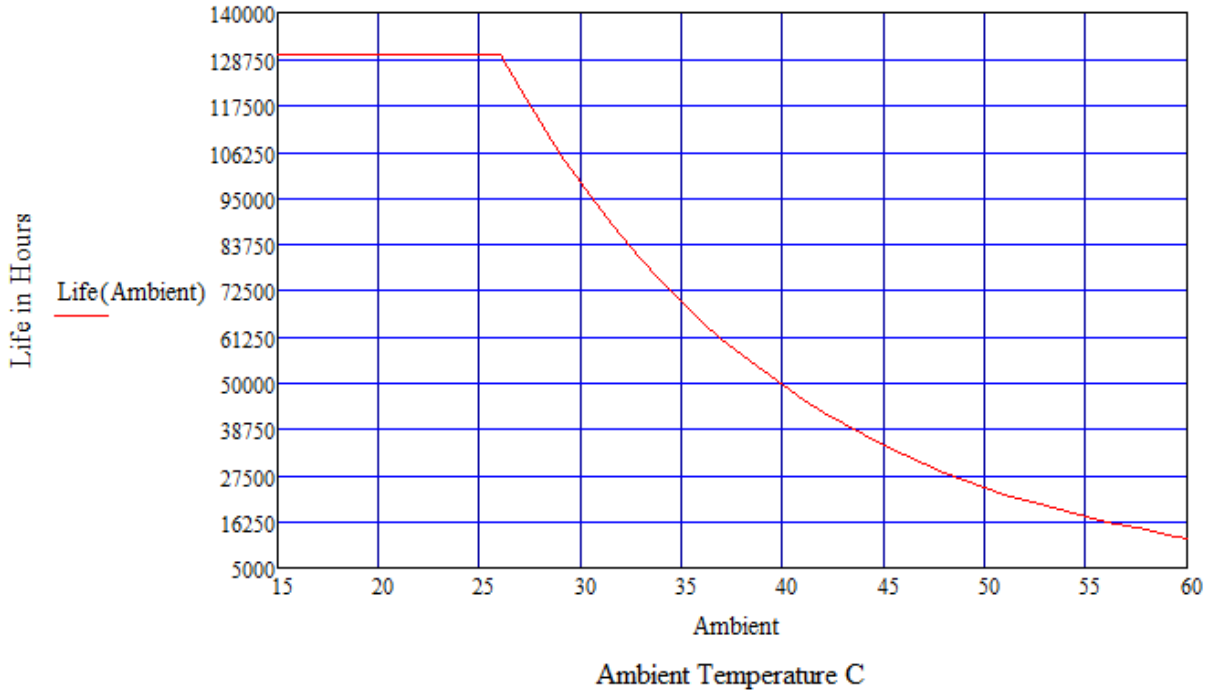
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Life vs. Ambient Temperature

LD96W -TL Estimated Life Full Load @ 120Vac



Life vs. Case (Tc) Temperature

LD96W -TL Estimated Life Full Load @ 120Vac

