



# LED Optimized Drivers

## 55 Watt - LP55W-55-PC1500-RD

FLICKER FREE PROGRAMMABLE LED DRIVER WITH 0-10V DIMMING & 12V AUX



PROGRAMMABLE  
LP55W  
55W

### Model: LP55W Series

- Drive Mode: Flicker Free Programmable Constant Current
- Technology: PFC Corrected 2-Stage Switch Mode
- Output Power: 55W Max.
- Input Voltage: 120 to 277VAC, 50/60Hz
- Output Voltage: 12 - 55VDC
- Output Current: Set by resistor value (Rset) or GUI
- Programmable Output Current (POC): 100 - 1500mA
- 0-10V Linear or LOG Dimming 0% - 100%
- Auxiliary Output: 12V @ 200mA Max.

### Environmental

1. Operating temperature: Tc 80C Maximum. Reference -30 to +50°C ambient
2. UL Type TL (Tref Max/Meas. Tref): 86/60°C
3. Storage temperature range: -40 to +85°C
4. Humidity (non-condensing): 5% - 90%RH
5. Cooling: Convection
6. Vibration Frequency: 5-55Hz/2g, 30 minutes
7. Impact resistance: 1g/s
8. MTBF@ 25°C: 362,000 hours @ Full Load per MIL-217F Notice 2.

### Safety and Compliance

1. UL8750, EN61347, CSA 22.2 safety recognized, UL Type TL
2. FCC, 47CFR Part 15 Class A certified
3. Damp & Dust resistant design IP20 NEMA1, for Dry & Damp Locations.
4. Rectangular style metal case.
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 transient protection.

### Electrical Specifications at 25°C

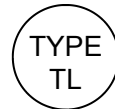
- Input voltage range: 120-277Vac (Full range 108 to 305Vac)
- Frequency: 47 - 63HZ
- Power Factor:  $\geq 0.90$  at  $\geq 60\%$  Output Power, 120Vac/230Vac/277Vac 50/60Hz
- THD%:  $\leq 20\%$  at  $\geq 60\%$  Output Power, 120Vac/230Vac/277Vac 50/60Hz
- Inrush current:  $<30A$  at 25C, 277Vac, cold start, Max. Load
- Input current: 0.56A Maximum @ 120Vac
- Efficiency: 88% typical at 230Vac Full Load
- Constant Current regulation:  $\pm 2\%$  Over Input Line Variation
- Load regulation accuracy:  $\pm 3\%$
- Leakage current: 700uA typical; Hold up time: half cycle

### Programmable Parameters

Programmable Parameter	Programmable Minimum Value	Programmable Maximum Value	Factory Default	GUI Programmable	RSET Programmable	
Output Constant Current (Iout)	100 mA	1500 mA	1000 mA	YES	YES	
Disable Dimming?	NO	YES	NO	YES	N/A	
Dimming Curve	LINEAR	0%	N/A Fixed 100%	0%	YES	N/A
	LOG	0%	N/A Fixed 100%	0%	YES	N/A
NTC Minimum Ohms	1K $\Omega$	10K $\Omega$	2K $\Omega$	YES	N/A	
NTC Minimum %Iout	~ 0%	100%	~ 10%	YES	N/A	
NTC Maximum Ohms	2K $\Omega$	10K $\Omega$	6.3K $\Omega$	YES	N/A	

**Output Current:** Set by Resistor Value "Rset" or using EP Programmer USB interface & EPtronics PC based GUI Software. When Rset is open (no resistor present) then GUI setting controls programmed output current. Programmable Output Current (POC): 100 - 1500mA Power limited to 55W maximum by Voltage foldback.

### Programmable Constant Current Version



IP20



Part Number	US Class 2	CN Class 2	Output Voltage Range	Output Constant Current (2)(3)	Current Accuracy(2)	Output Power Maximum (2)	Typical Efficiency (1)
LP55W-55-PC1500-RD	YES	YES	12 - 55 VDC	100 mA to 1500 mA	$\pm 5\%$	55W	88%

### Notes

1. Typical efficiency measured at 230VAC input, Iout 1.0A, full load
2. Keep POC (Programmable Output Current) within 55W Maximum Power Operating Window. Refer to Power Operating Window graph. Part will foldback output Voltage to maintain power limits. Iout from 100-179 mA is  $\pm 10\%$ , Iout from 180-1500 mA is  $\pm 5\%$
3. See page 7 for programmable output current (POC) graphs.
4. See page 8 for NTC graphs
5. See page 9 for GUI programmable version.

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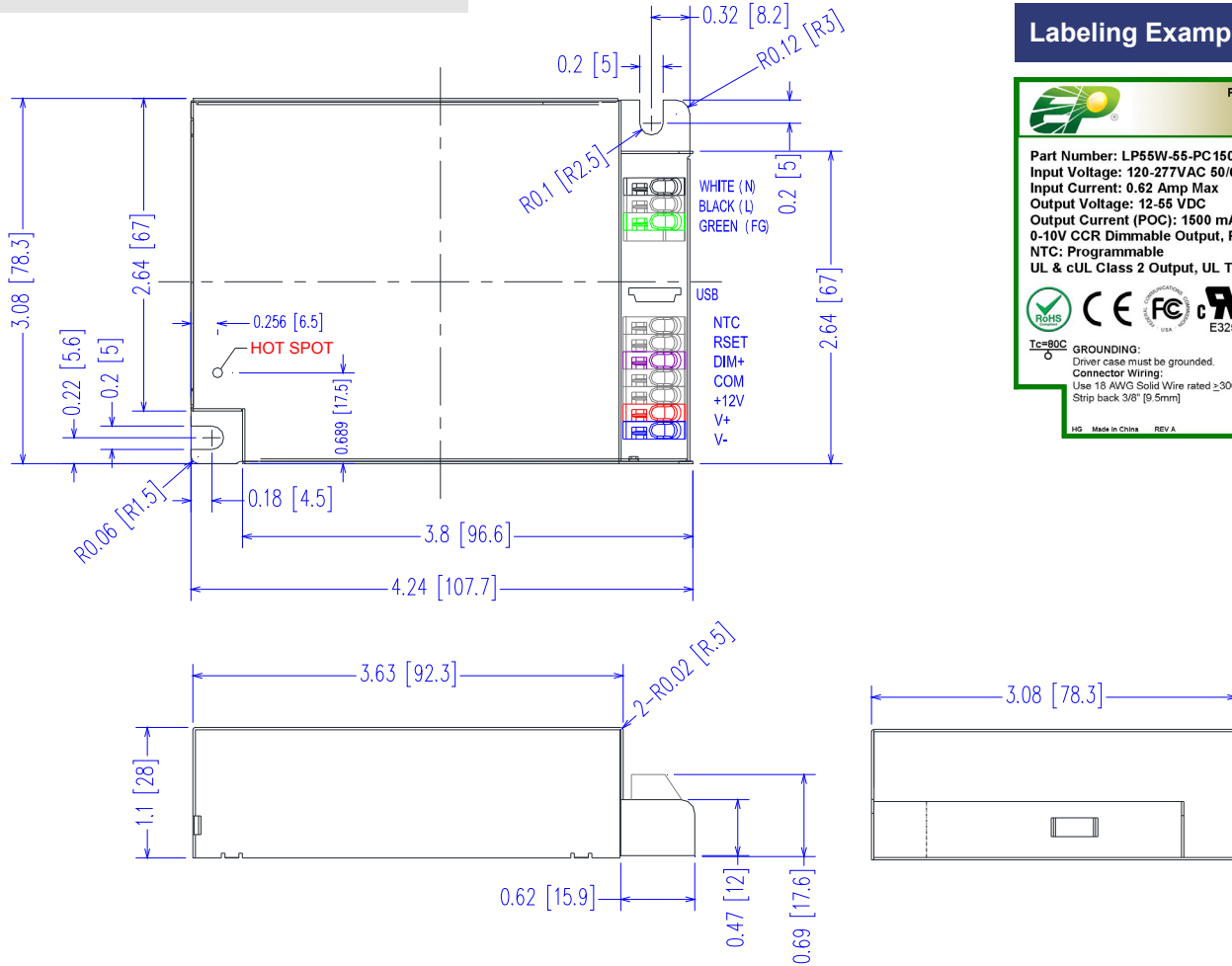
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## Mechanical Dimensions: Inches [mm]

Material: Metal Housing  
Weight: 12 oz ( 340 grams) Typical  
Case must be grounded in end use application



## Labeling Example



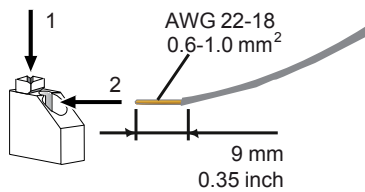
Case Parameter	Inches [mm]
Length	4.24 [107.7]
Width	3.08 [78.3]
Height	1.1 [28.0]
Connectors	UL, KF250-3.5, WAGO 250-402 Push Pin or equivalent.

### LED wiring distance

Recommended maximum wiring distance at full load.

AWG	#22	#21	#20	#19	#18
Distance (m)	10	12	14	18	22
Distance (ft)	32.8	39.4	45.9	59	72.2

### KF250-3.5 CONNECTORS



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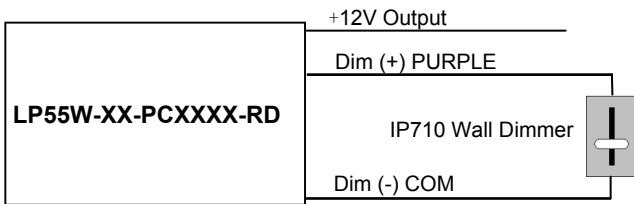
### -RD, 0-10V & Resistance Dimming Scheme

Parameters	Minimum	Typical	Maximum
12V Auxiliary Output	11V	12.0V	13.0V
12V Auxiliary Output Source Current	0mA	—	200mA
Absolute Voltage Range on 0-10V Input (Purple Wire)	-2.0V	—	+15V
Source Current out of 0-10V Input (Purple Wire)	0mA	—	1.5mA

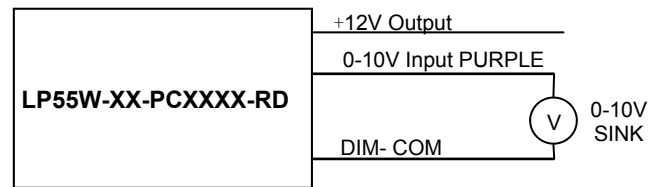
### Notes

1. Part comes with DIM+, COM & +12V auxiliary connectors. DIM+ and +12V return are connected to COM.
2. Part is compatible with most 0-10V Wall Slide dimmers and direct 0-10V analog signal. Recommended dimmer is Leviton IP710 or equivalent connected between Purple and COM wires. +12V auxiliary is not used for dimming.
3. Output current will be Minimum Programmed Value when  $V_{dim} \leq 1.00V$ . If set to 0% then this is dim to zero operation.
4. Output will be 100% with DIM+/COM open and Minimum Programmed Value with DIM+/COM Shorted.
5. Minimum dimming level is programmable with EP Programmer GUI.

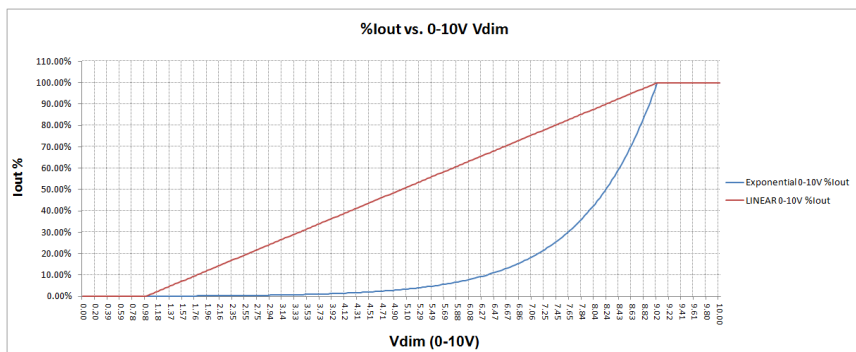
### -RD 2-Wire Resistance Dimming Scheme



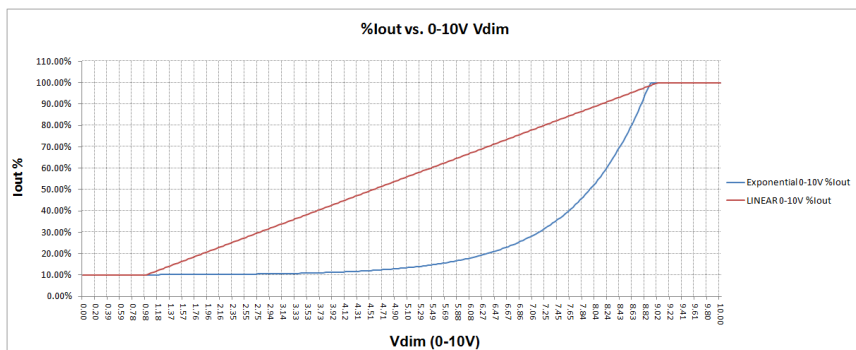
### -RD 2-Wire 0-10V Dimming Scheme



### Typical Dim Curves: Iout Min set to 0%



### Typical Dim Curves: Iout Min set to 10%



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**Input Specifications**

Parameter	Min.	Typ.	Max.	Notes/Conditions
Input Voltage	108 Vac	—	305 Vac	120, 230, 240, 277 Vac Nominal Values
Input Frequency	47 Hz	—	63 Hz	50/60Hz Nominal
Input AC Current	—	—	0.56 A	Measured at 120Vac/60Hz Input, Output Full load.
	—	—	0.25 A	Measured at 277Vac/60Hz Input, Output Full load.
Inrush Current (Peak)	—	18A	30A	Measured at 277Vac/60Hz Input, Output Full Load, Ta 25°C, Cold Start 50% Ipeak duration $\approx$ 750 $\mu$ sec ( $1/2 \cdot I_p^2 \cdot t$ )
Inrush Current (I <sup>2</sup> t)	—	—	0.33 A <sup>2</sup> 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 Power $\geq$ 60%
Power Factor (PF)	0.90	—	—	Measured at 120, 230, 277Vac Input, Output Power $\geq$ 60%

**Output Specifications**

Parameter	Min.	Typ.	Max.	Notes/Conditions
DC Output Voltage	Per Table	—	Per Table	Per Table on Page 1
DC Output Current (POC) 180-1500mA	-5%	Per Table	+5%	Programmable Output Current (POC) POC is set using Rset resistor Per table on Page 5 or GUI
DC Output Current (POC) 100-179mA	-10%	Per Table	+10%	Programmable Output Current (POC) POC is set using Rset resistor Per table on Page 5 or GUI
Output Power	—	—	55W	Voltage Foldback
Ripple & Noise (Vpk-pk)	—	—	3% Vo	20 MHz BW, Full load output in parallel with 0.1 $\mu$ F ceramic & 10 $\mu$ F Electrolytic.
Ripple (Ipk-pk)	—	—	5% Io	20 MHz BW, Full load output in parallel with 0.1 $\mu$ F ceramic & 10 $\mu$ F Electrolytic. 120 Hz component (Flicker Free)
Start-up Time	—	400 mS	750 mS	Measured at 120Vac/60Hz Input, Output Full load.
Hold-up Time	—	30 mS	—	Typical @ 277Vac Input, Output Full load.
Auxiliary Output (V)	11	12	13	@ 200mA Maximum

**Environmental Specifications**

Parameter	Min.	Typ.	Max.	Notes/Conditions
Case Temperature (Tc)	-30 °C	—	+80 °C	Measured at location specified on case.
Operating Temperature (Ta)	-30 °C	—	+50 °C	This is a reference range. Tc controls temperature range.
Storage Temperature (Ts)	-40 °C	—	+85 °C	Non operating temperature range.
Operating Humidity	—	—	90% 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	—	362,000 Hours	—	MIL-HDBK-217F Notice 2, Ta = 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% Io	Constant Current Limiting circuit.
Output Over Voltage (OVP)	—	—	105% Vo	No Damage, Auto recovery after fault is removed.
Output Power Limit (OPL)	—	—	55W	Voltage Foldback

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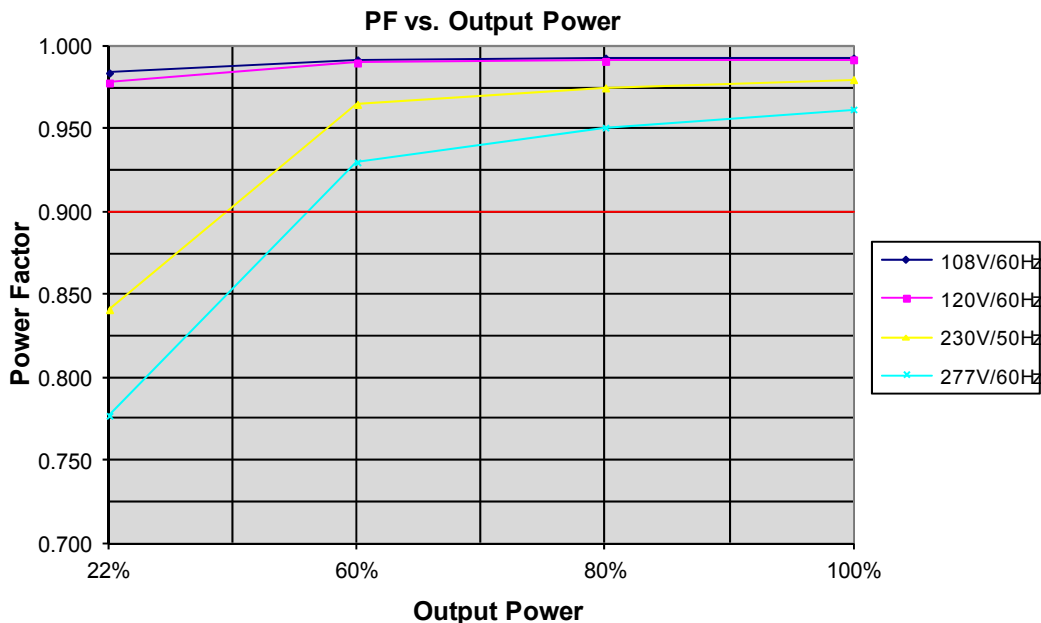
### Safety Compliance

Safety	Notes/Standards
UL/CUL	UL8750, UL1310 for UL Class 2 & CAN/CSA C22.2 No. 250.13, UL Type TL 86/60 °C
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
0-10V Dimming Circuit	Dim+ Purple/Dim- Gray are considered part of the secondary circuit.
FG	The metal case of the driver must be connected to earth ground (FG) in the end-use application.

### EMC Compliance

Standard	Notes/Conditions
FCC, 47CFR Part 15	Class A
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): Vout 55V @ Iout 1000mA



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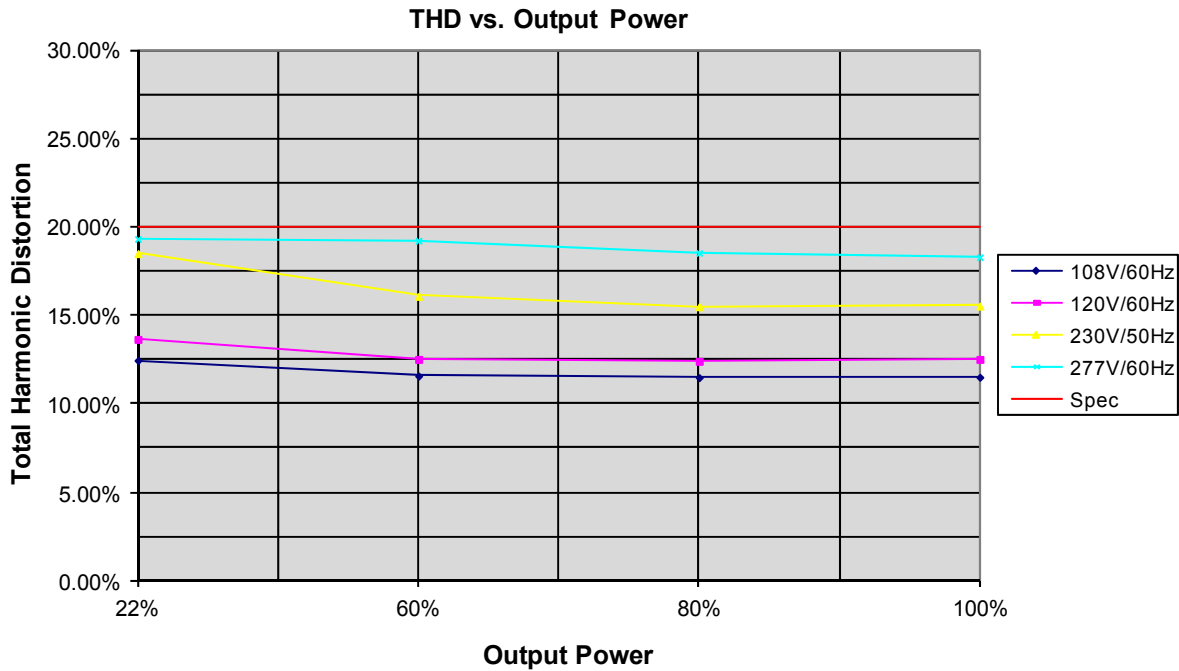


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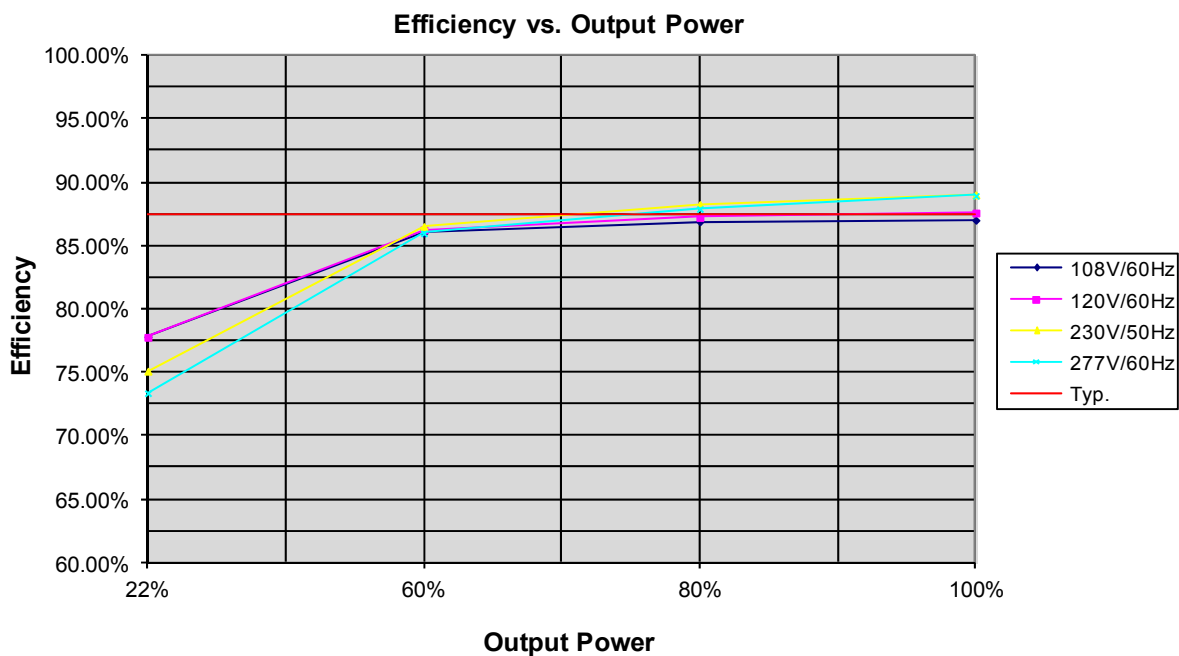
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THD Curves (Typical): Vout 55V @ Iout 1000mA



Efficiency Curves (Typical): Vout 55V @ Iout 1000mA

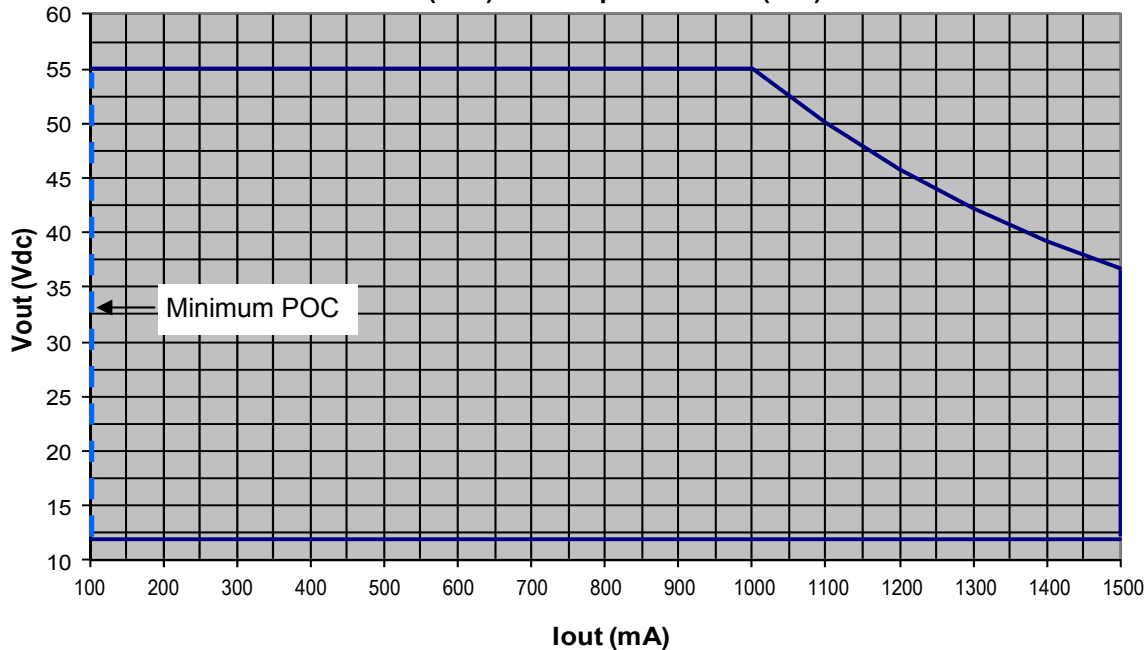


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### Power Operating Window

**POWER OPERATING WINDOW**  
Vout (Vdc) vs. Output Current (mA)

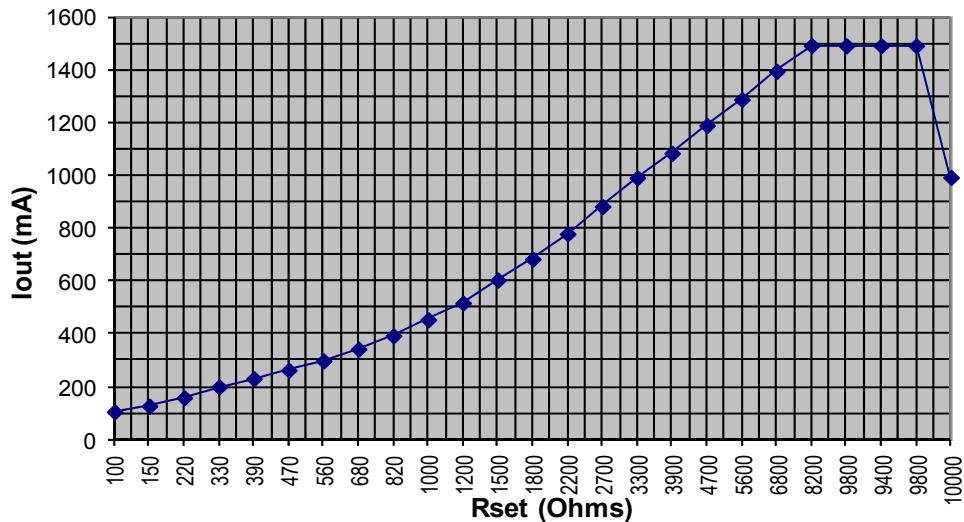


### POC (Programmable Output Current)

Rset <sup>(1)</sup> (Ohms)	Iout (mA)
100	100
162	130
230	160
270	180
320	200
395	230
442	250
569	300
698	350
845	400
996	450
1150	500
1490	600
1870	700
2300	800
2800	900
3320	1000
3660	1050
5230	1250
5700	1300
6220	1350
6800	1400
7460	1450
8200	1500
9800	1500
10000 <sup>(1)</sup>	GUI SET <sup>(1)</sup>

POC Setting: If Rset is open, EP Programmer GUI can be used to set Iout. Output Current vs. Rset or GUI value is within  $\pm 5\%$ . Rset can be any  $\geq 1/4W$ ,  $\pm 1\%$ ,  $\geq 20V$  rated resistor.  
<sup>(1)</sup> Rset >9,900 Ohms will default Iout to GUI setting.

**Output Current (mA) vs. Rset (Ohms)**



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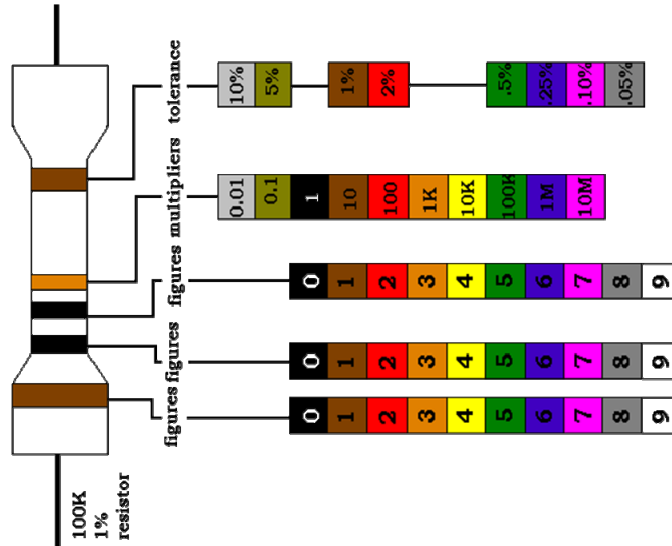
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**1% EIA E96 Standard Resistor Values vs. Iout**

**1% EIA E96 Standard Resistor values vs. Calculated Output Current Nominal Value**

Rset (Ohms)	POC Iout (mA)	Rset (Ohms)	POC Iout (mA)	Rset (Ohms)	POC Iout (mA)	Rset (Ohms)	POC Iout (mA)	Rset (Ohms)	POC Iout (mA)	Rset (Ohms)	POC Iout (mA)	Rset (Ohms)	POC Iout (mA)
100	100.9	187	140.7	348	210.5	649	329.4	1210	518.8	2260	792.2	4870	1212.7
102	101.8	191	142.5	357	214.2	665	335.4	1240	528.0	2320	805.4	4990	1226.6
105	103.2	196	144.7	365	217.6	681	341.3	1270	537.0	2370	816.2	5110	1240.1
107	104.1	200	146.5	374	221.3	698	347.5	1300	545.9	2430	829.0	5230	1253.3
110	105.5	205	148.7	383	225.1	715	353.7	1330	554.8	2490	841.5	5360	1267.2
113	106.9	210	150.9	392	228.8	732	359.9	1370	566.5	2550	853.9	5490	1280.7
115	107.9	215	153.2	402	232.9	750	366.4	1400	575.2	2610	866.1	5620	1293.9
118	109.2	221	155.8	412	237.0	768	372.8	1430	583.7	2670	878.0	5760	1307.8
121	110.6	226	158.0	422	241.0	787	379.6	1470	595.1	2740	891.7	5900	1321.2
124	112.0	232	160.7	432	245.1	806	386.3	1500	603.4	2800	903.3	6040	1334.4
127	113.4	237	162.9	442	249.1	825	393.0	1540	614.5	2870	916.5	6190	1348.0
130	114.8	243	165.5	453	253.6	845	399.9	1580	625.4	2940	929.5	6340	1361.3
133	116.2	249	168.1	464	258.0	866	407.2	1620	636.2	3010	942.3	6490	1374.2
137	118.0	255	170.7	475	262.4	887	414.4	1650	644.2	3090	956.6	6650	1387.6
140	119.4	261	173.3	487	267.2	909	421.9	1690	654.8	3160	968.9	6810	1400.7
143	120.7	267	175.9	499	271.9	931	429.3	1740	667.8	3240	982.6	6980	1414.1
147	122.6	274	179.0	511	276.6	953	436.7	1780	678.1	3320	996.1	7150	1427.2
150	123.9	280	181.6	523	281.3	976	444.3	1820	688.2	3400	1009.4	7320	1439.8
154	125.8	287	184.6	536	286.4	1000	452.2	1870	700.7	3480	1022.3	7500	1452.8
158	127.6	294	187.6	549	291.4	1020	458.8	1910	710.6	3570	1036.6	7680	1465.5
162	129.4	301	190.6	562	296.5	1050	468.5	1960	722.8	3650	1049.1	7870	1478.4
165	130.8	309	194.0	576	301.8	1070	475.0	2000	732.4	3740	1062.8	8060	1490.9
169	132.6	316	197.0	590	307.2	1100	484.5	2050	744.3	3830	1076.2	8200	1500.0
174	134.8	324	200.4	604	312.5	1130	494.0	2100	755.9	3920	1089.3	10000	GUI SET
178	136.6	332	203.8	619	318.2	1150	500.3	2150	767.5	4640	1185.2		
182	138.4	340	207.1	634	323.8	1180	509.6	2210	781.1	4750	1198.5		

**1% Resistor Color Codes:**





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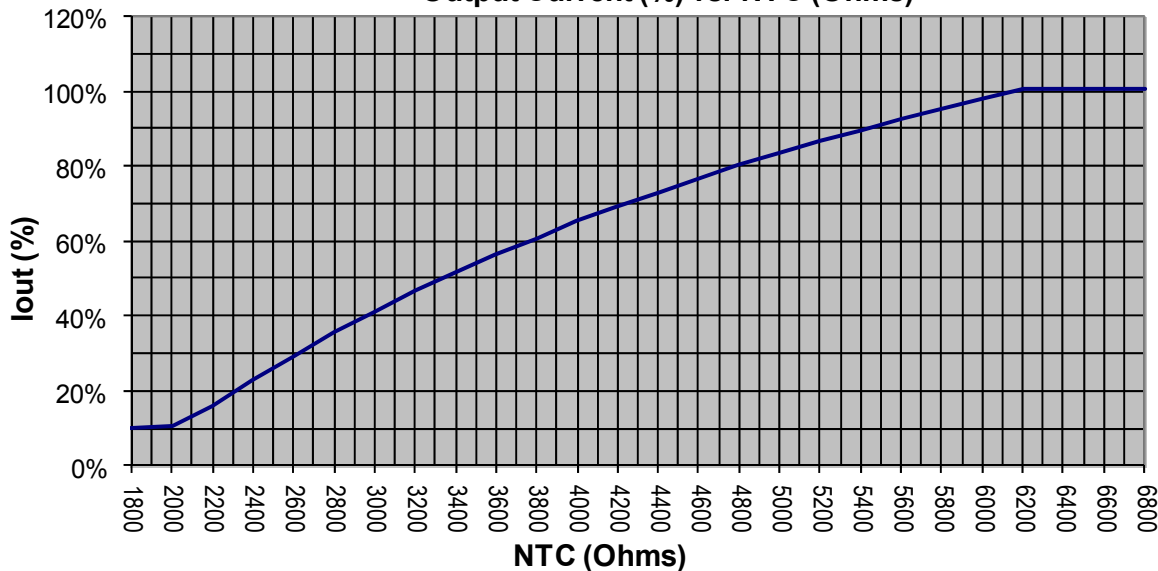
### Module Temperature Protection using External NTC

**Example:** NTC High, NTC Low and NTC Minimum Iout% can be programmed using EP Programmer USB interface & EPtronics PC based GUI Software.

Factory Default Settings: NTC Low = 2.0K  $\approx$  10% Iout, NTC High = 6.3K, 100% Iout

Programmable settings: NTC Minimum Level (%), NTC Minimum Ohms, NTC Maximum Ohms.

**Output Current (%) vs. NTC (Ohms)**

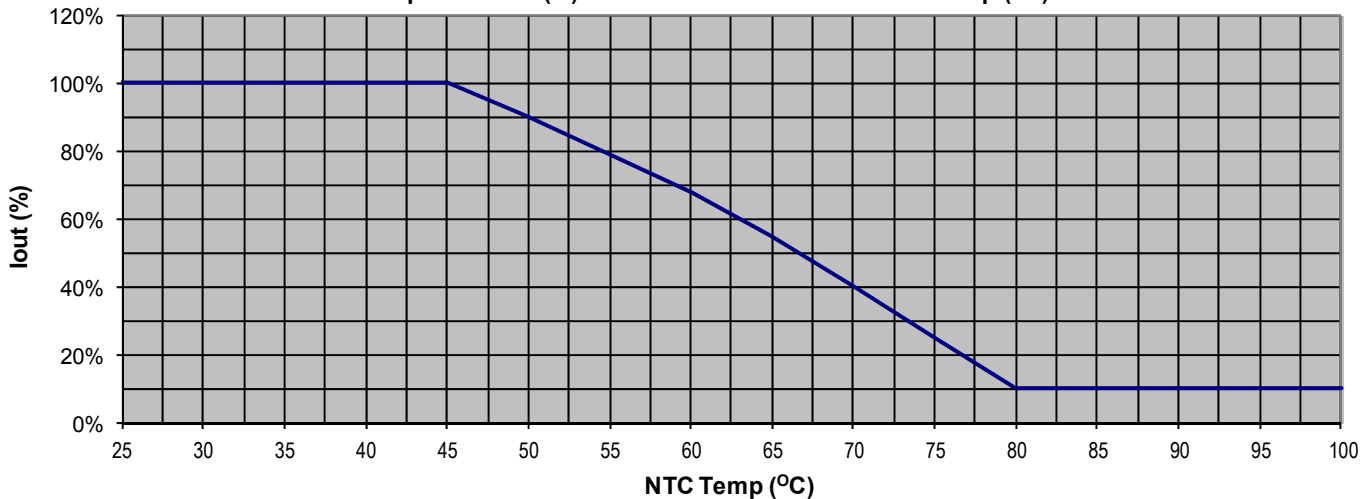


### Module Temperature Protection Example

NTC = 805SMD,  $R_{25C} = 15K \text{ Ohm} \pm 2\%$ ,  $R_{64C} = 3700$ , Vishay Part#: NTCS0805E3153GMT

With part set: NTC Max = 6.3K, NTC MIN = 2.0K, Iout Min = 10%

**Output Current (%) vs. NTCS0805E3153GMT NTC Temp (°C)**



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## EP Programmer PC Based Software , USB Interface

**Programmable Output Current (POC):** Programmable lout from 100mA to 1500 mA

**Programmable NTC settings:** NTC Minimum Level (%), NTC Minimum Ohms, NTC Maximum Ohms.

Factory Default: NTC Minimum = 2.0K,  $\approx$  10% lout, NTC Maximum = 6.3K, 100% lout

**Programmable dimming curve:** Linear or LOG

Factory Default: Linear Dimming Curve

**Programmable Minimum Dim Level:** 0% (OFF) to 100% lout programmed value.

Factory Default: Min dim level 0%

### EPtronics Programming Tool:

The EP Programmer is a programming and configuration tool for EPtronics intelligent programmable LED drivers. It consists of the EP programmer which is connected between the USB port of a computer and the LED driver being programmed, and the EP programmer software. The EP programmer software is a PC based graphical user interface that allows the user to program and configure the operating parameters of an EPtronics Programmable LED Driver. This interface allows the operator to set the LED drivers output current within its specified range, in the increments specified. It also provides the ability to enable/disable and control features like "Dimming", "Auxiliary Output", "NTC Thermal Protection", "Constant Lumen Module" & "End-of-life indicator" when available in the EPtronics intelligent LED driver being programmed.

### EP Programming Interface: (EP-PRG-01)

Is the physical USB unit connected between the USB port of a computer and the LED driver being programmed. This unit also provides all power required to the LED driver being programmed. No connection to an AC power source is required for programming the LED driver.

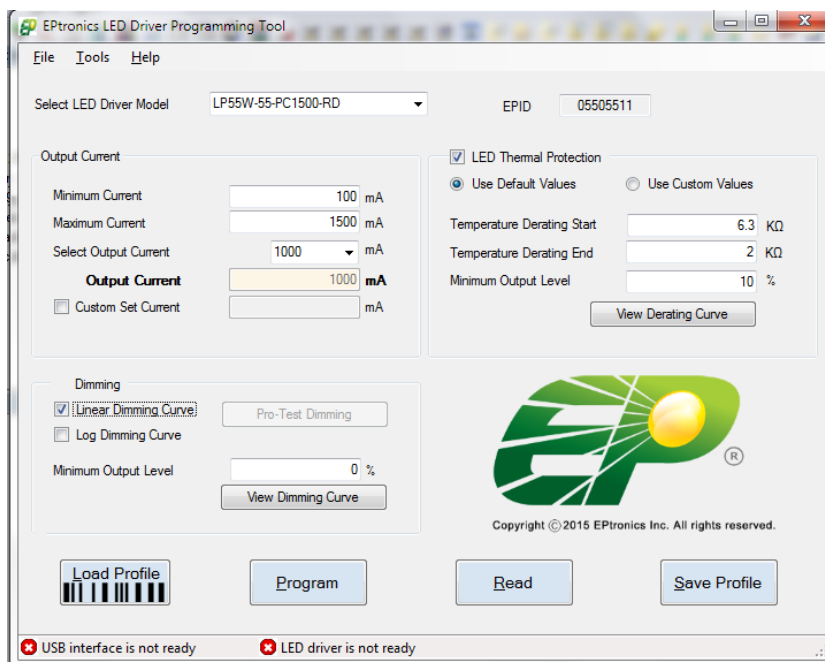
### EP Programmer Software:

The EP Programmer software is the windows based GUI that allows the user to assign custom part number(s) to the LED driver being programmed. The user can then save the profile to a computer disk and recall as needed. The user can then use the "Auto Program" feature to quickly program as many LED drivers with the saved profile as is required. Each driver programming simply requires a click of the mouse to program in a single step.

The EP Programmer software supports bar code scanners. The barcode scanner can be used to automate the programming of the attached LED driver. This barcode scanner interface also provides an option to either enable or disable logging of the parameters to an excel file.

*Note: The programming of the LED driver does not require the input be connected to an AC power connection. The EP Programmer and the required LED driver circuitry will be powered from the EP Programmer module via the USB connection to a computer.*

**For new GUI settings to take effect the AC input must cycled off/on and the USB interface disconnected.**

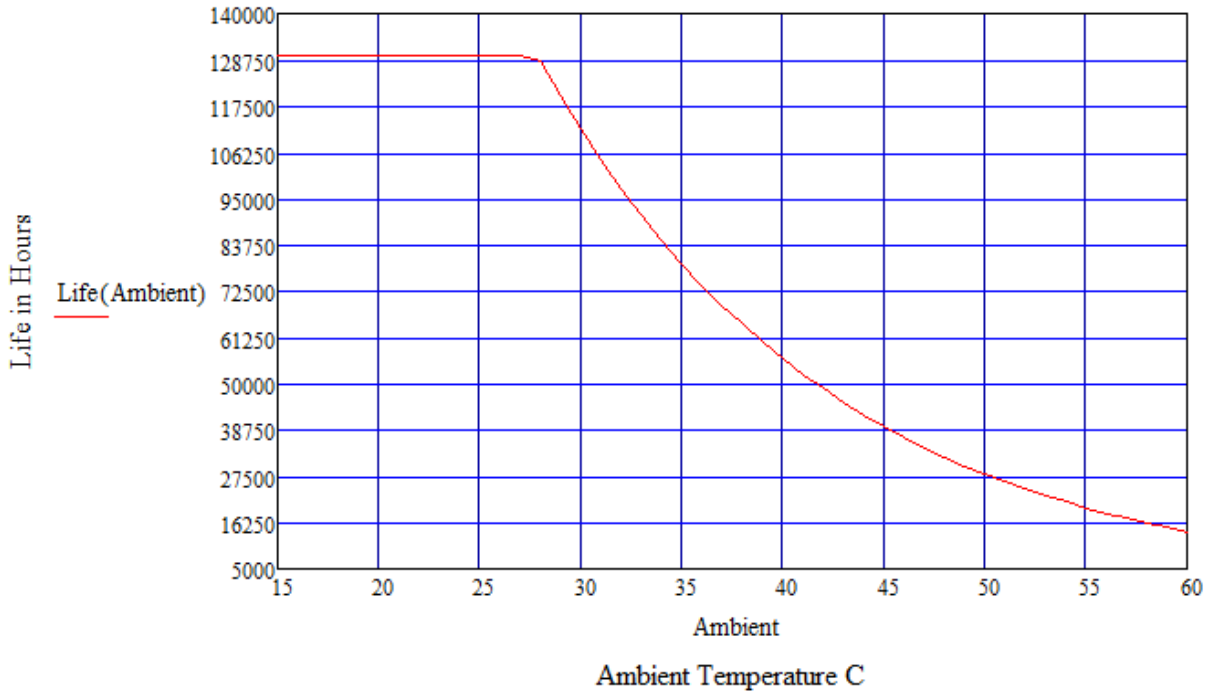


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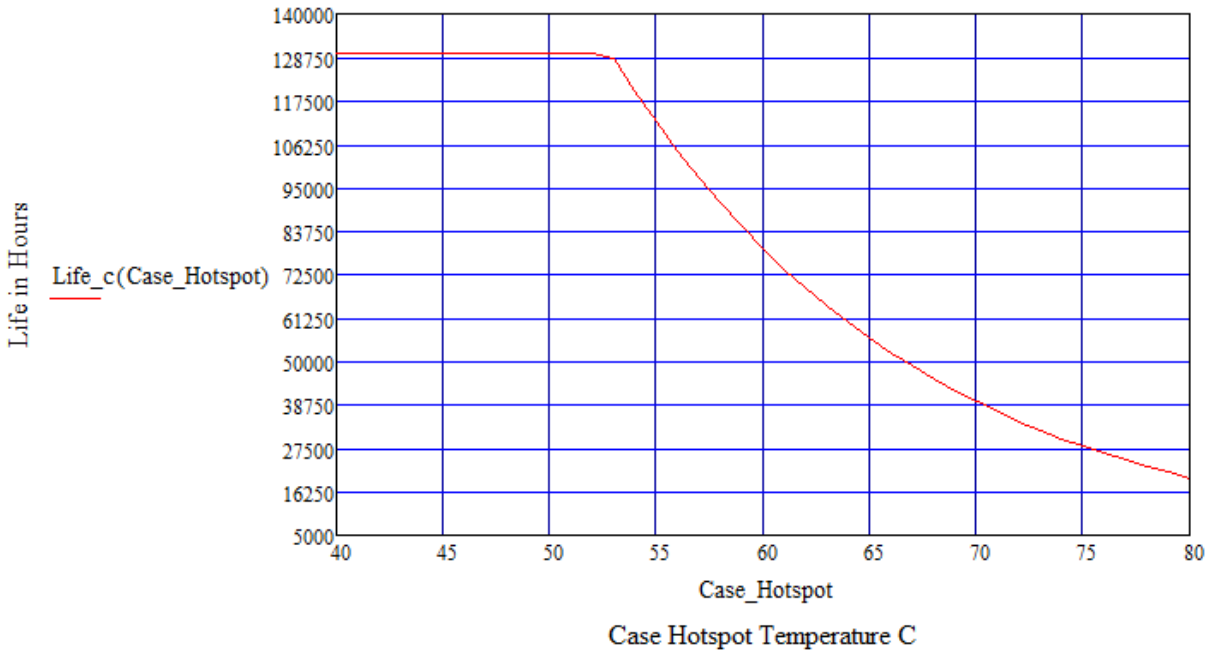
## Life vs. Ambient Temperature

LP55W Estimated Life Full Load @ 120Vac



## Life vs. Case (Tc) Temperature

LP55W Estimated Life Full Load @ 120Vac



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