LED Optimized Drivers

25 Watt - LP25W-56-PC1300-RD

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

25W LP25W PROGRAMMABLE

Model: LP25W Series

- Drive Mode: Flicker Free Programmable Constant Current
- Output Voltage: 12 - 56VDC
- Output Current: Set by resistor value (Rset) or GUI
- Programmable Output Current (POC): 150 - 1300mA
- 0-10V Linear or LOG Dim Curves, Dimming 0% - 100%(B)
- Dim to Zero? YES/NO setting.(C)
- Soft Start? YES/NO setting.(D)
- Auxiliary Output: 12V @ 200mA Max.

Environmental

1. Operating temperature: Tc 85C Maximum. Reference -30 to +60°C ambient
2. UL Class P
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: 382,000 hours @ Full Load per MIL-217F Notice 2.

Safety and Compliance

1. UL8750, EN61347, CSA 22.2 safety listed, UL Class P
2. FCC, 47CFR Part 15 Class A certified
3. Damp & Dust resistant design IP20
   NEMA1, for Dry & Damp Locations.
4. Rectangular style metal case with or without mount studs.
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, Over Temperature, 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
- THD%: ≤ 20% at 120/230Vac ≥ 30% Load, 277Vac ≥ 40% Load
- Power Factor: ≥ 0.90 at 120/230Vac ≥ 30% Load, 277Vac ≥ 40% Load
- Inrush current: <5A at 25C, 277Vac, cold start, Max. Load
- Input current: 0.28A Maximum @ 120Vac
- Efficiency: 83% typical at 230Vac Full Load
- Constant Current regulation: ± 2% Over Input Line Variation
- Load regulation accuracy: ± 3%
- Leakage current: 700uA Max. @ 277Vac

Programmable Parameters

Programmable Parameter	Programmable Minimum Value	Programmable Maximum Value	Factory Default	GUI Programmable
Output Constant Current (Iout)	150 mA (A)	1300 mA (A)	700 mA	YES
Disable Dimming?	NO	YES	NO	YES
Dimming Curves: LINEAR or LOG	1% (Min Dim) (B)	N/A Fixed 100% (B)	LIN 0% (Min Dim) (B)	YES
Dim to Zero?	NO (C)	YES (C)	NO (C)	YES
Soft Start?	NO (D)	YES (D)	NO	YES
NTC Minimum Ohms	1K Ω	10K Ω	2K Ω	YES
NTC Minimum %Iout	~ 0%	100%	~ 10%	YES
NTC Maximum Ohms	2K Ω	10K Ω	6.3K Ω	YES
Constant Lumen Output Lookup Table	1kHours/50% Iout	254k Hours/100%, Max 8 entry Lookup Table	Disabled	YES
End of Life Indicator	1k Hours	254k Hours	Disabled	YES

A. Output Current: Set by Resistor or using EP-PRG-01 USB Programmer interface & EPtronics PC based GUI Software.
Programmable Output Current (POC): 150 - 1300mA Power limited to 25W maximum by Voltage foldback.
B. Minimum Dimming current: If Dim to Zero = NO then Min Dim is 3mA or 1%, or % Set whichever is greater.
C. Dim to Zero?: If YES then will always dim to 0mA at Vdim ≤1.00V regardless of Min Dim% Setting.
D. Soft Start?: See page 12. NO then startup time <500ms. YES aesthetic fade on time to first light (400mA) <500ms, 100% Output will be < 4.00 Seconds. Start-up time & Soft Start time are set to meet CA Title 24-2016. When Iout is programmed ≤400mA then no aesthetic fade can occur, Max time at 1300mA.

Programmable Constant Current Version

c UL LISTED E325626 · CLASS P · CE · FCC · IP20 · RoHS Compliant

Part Number (1)	US/CN Class 2	Output Voltage Range	Output Constant Current (3)(4)	Current Accuracy	Output Power Maximum (2)	Typical Efficiency (2)
LP25W-56-PC1300-RD	YES	12 - 56 VDC	150 mA to 1300 mA	± 5%	25W	84%

Notes:

1. For alternate case style with 2 each #8-32 Studs add "S" to end of part number: LP25W-56-PC1300-RDS. Refer to drawing on Page 3. Standard case color is Black. For White case add "W" to the end of the part number: LP25W-56-PC1300-RDW or LP25W-56-PC1300-RDSW
2. Typical efficiency measured at 230VAC input, Iout 1.0A, full load
3. Keep POC (Programmable Output Current) within 25W Maximum Power Operating Window. Refer to Power Operating Window graph. Part will foldback output Voltage to maintain power limits.
4. See page 8 for programmable output current (POC) graphs.
5. See page 10 for NTC graph.

Custom designs available. Please consult with the factory.

Specifications subject to change without notice

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

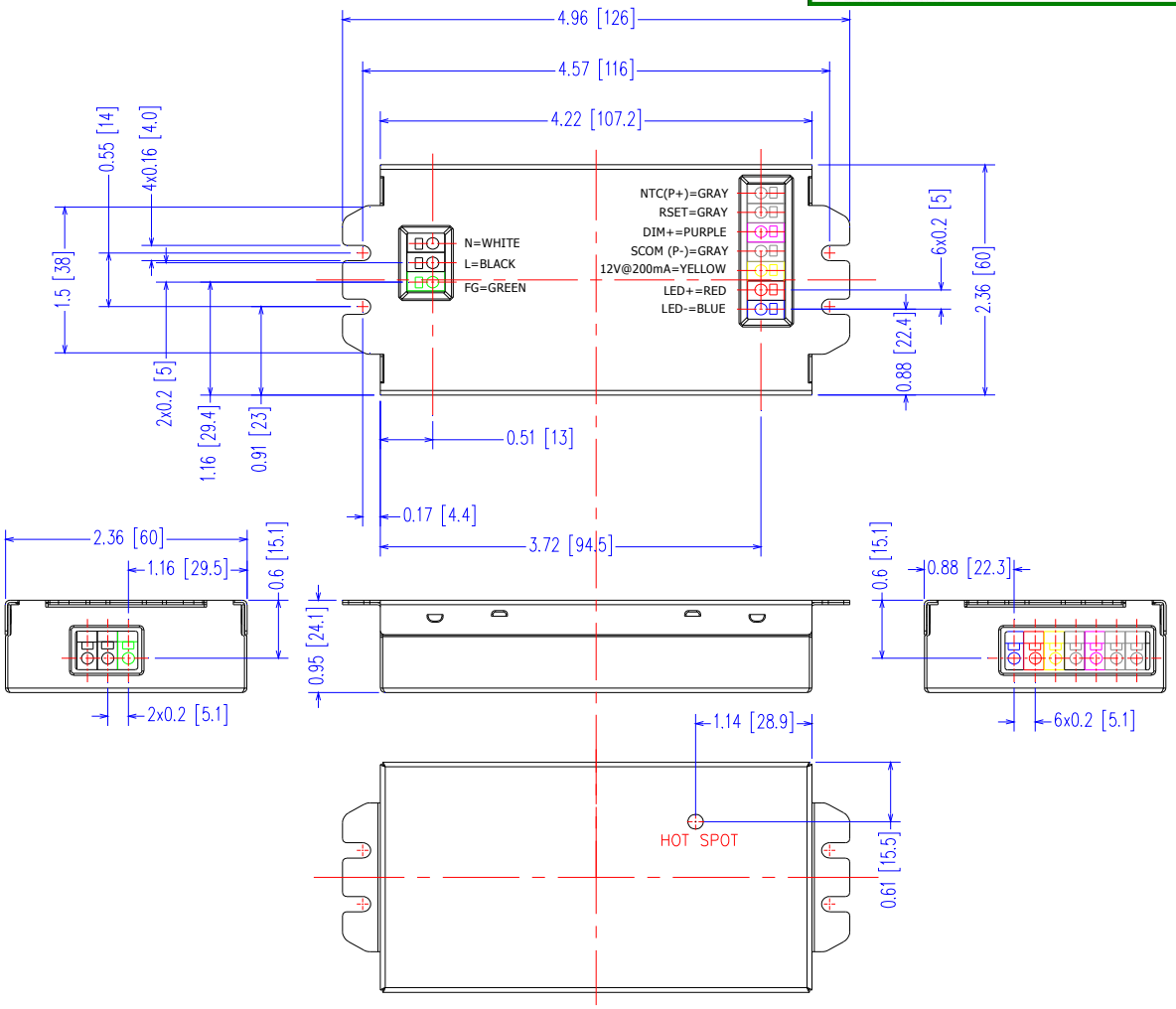
Mechanical Dimensions: Inches [mm]

Material: Metal Housing
Weight: 7.7 oz (218 grams) Typical
Case must be grounded in end use application

Standard Housing: LP25W-56-PC1300-RD

Standard case color is black.
For white case add “W” to the end of the part number:
LP25W-56-PC1300-RDW

Labeling Example



Case Parameter	Inches [mm]
Length	4.96 [126]
Width	2.36 [60]
Height	0.95 [24.1]
Connectors	UL, KF253, WAGO 253 Push Pin or equivalent.

LED wiring distance:

Recommended maximum wiring distance at Iout max with ~5% Vout Drop.

AWG	#22	#21	#20	#19	#18
Distance (m)	7.0	8.8	11.1	14.1	17.7
Distance (ft)	23.0	29.0	36.6	46.1	58.1

25 Watt - LP25W-56-PC1300-RD

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

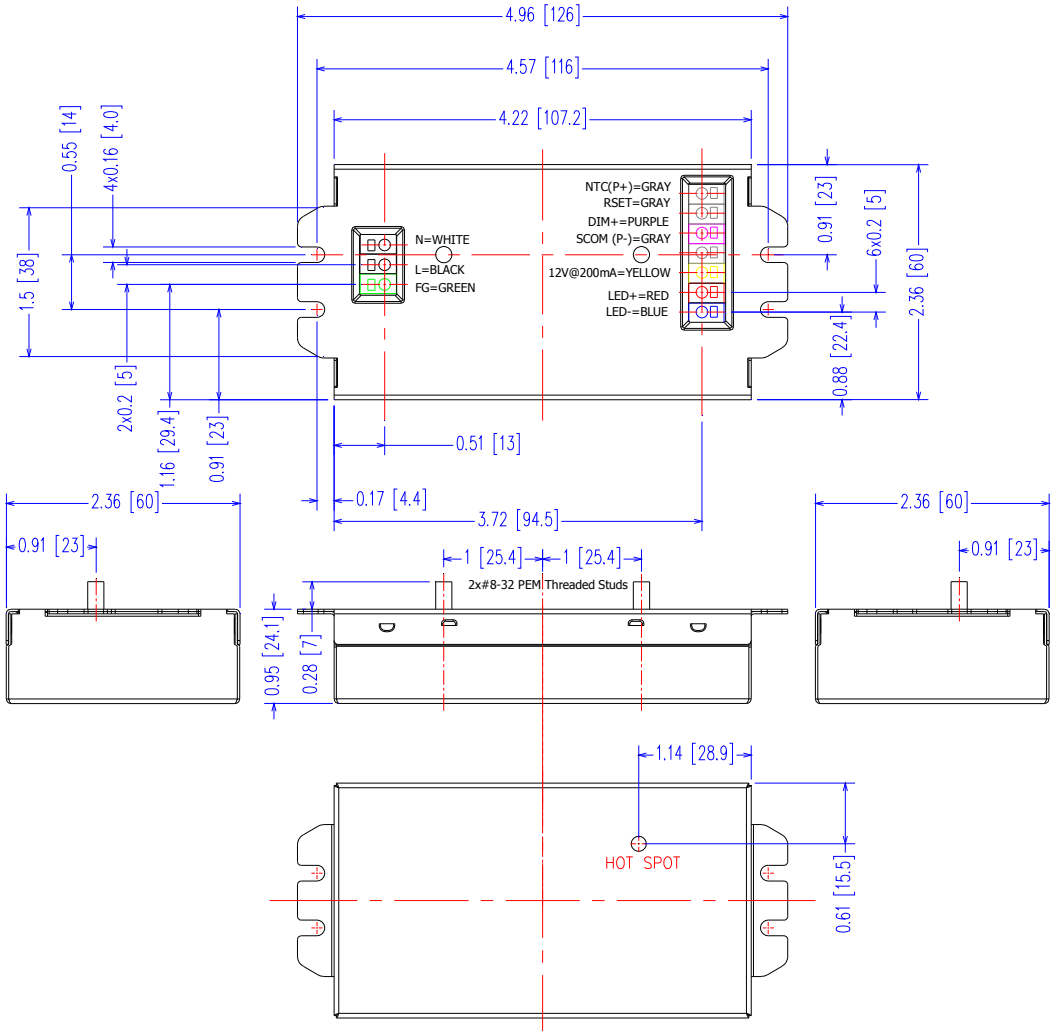
Mechanical Dimensions: Inches [mm]

Material: Alternate Metal Housing
Weight: 7.7 oz (218 grams) Typical
Case must be grounded in end use application
Includes 2x#8-32 Threaded studs for mounting.
No side connectors.

Alternate Housing: LP25W-56-PC1300-RDS
Includes 2x#8-32 Studs for mounting, No side connectors.

Standard case color is black.
For white case add “W” to the end of the part number: LP25W-56-PC1300-RDSW

Labeling Example



Case Parameter	Inches [mm]
Length	4.96 [126]
Width	2.36 [60]
Height	0.95 [24.1]
Connectors	UL, KF253, WAGO 253 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

Custom designs available. Please consult with the factory.

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25 Watt - LP25W-56-PC1300-RD

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

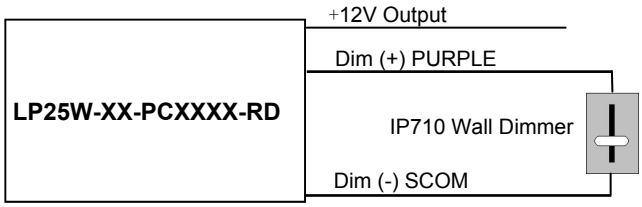
-RD, 0-10V & Resistance Dimming Scheme

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	—	1.0mA

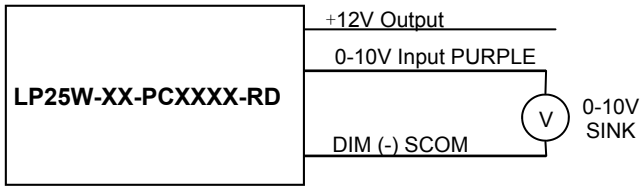
Notes

1. Part comes with DIM+, COM & +12V auxiliary connectors. DIM+ and +12V returns are connected to SCOM (P-).
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 DIM+ Purple and SCOM Gray wires. +12V auxiliary is not used for dimming.
3. Dimmed output current will be Minimum Programmed Dim% Value when Vdim ≤1.00V.
4. Output will be 100% with DIM+/SCOM open and Minimum Programmed Value with DIM+/SCOM Shorted.
5. Minimum dimming level & Dim to Zero? are programmable with EPtronics LED Driver Interface Programming Tool.

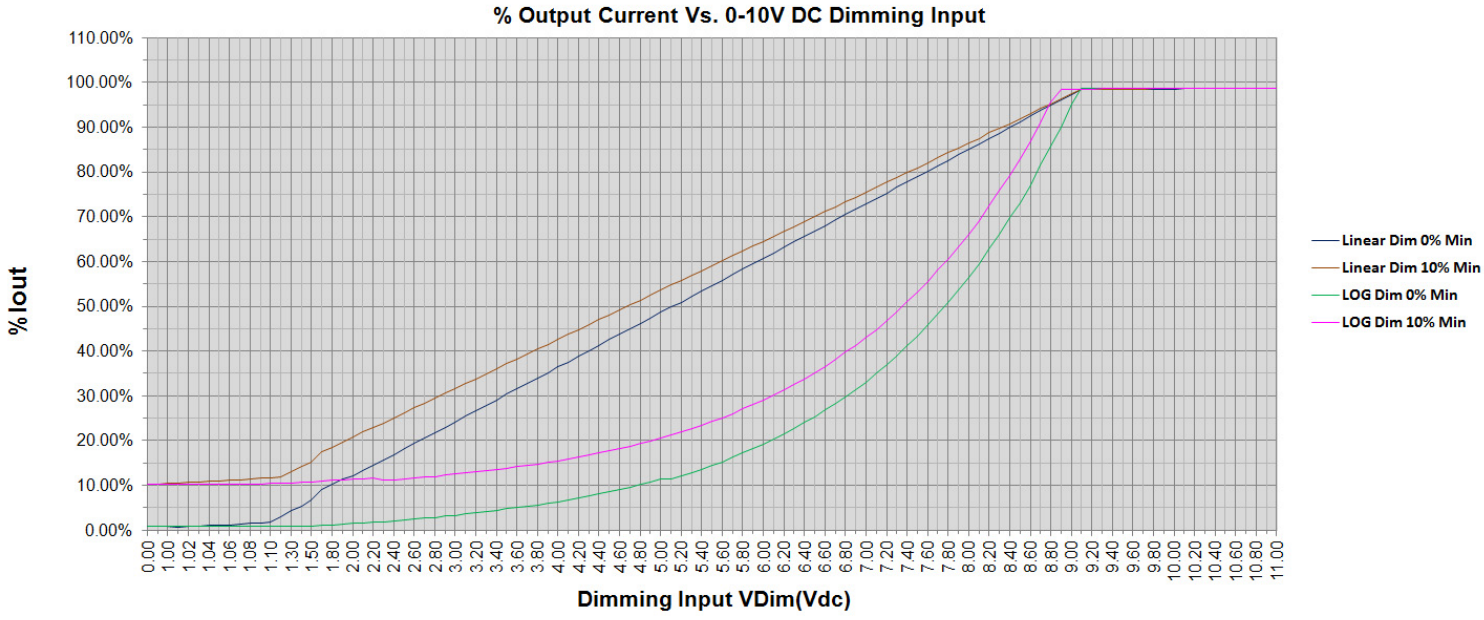
-RD 2-Wire Resistance Dimming Scheme



-RD 2-Wire 0-10V Dimming Scheme



Typical Dimming Curves: Dim to Zero? = NO



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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	——	——	0.28 A	Measured at 120Vac/60Hz Input, Output Full load.
	——	——	0.13 A	Measured at 277Vac/60Hz Input, Output Full load.
Inrush Current (Peak) Ipk 10%Pw <100usec	——	——	3A	Measured at 120Vac/60Hz Input, Output Full Load, Ta 25^{O}C, Cold Start
	——	——	5A	Measured at 277Vac/60Hz Input, Output Full Load, Ta 25^{O}C, Cold Start
Leakage Current	——	——	0.50mA	Measured at 120Vac/60Hz Input, Output Full load.
	——	——	0.70mA	Measured at 277Vac/60Hz Input, Output Full load.
THD	——	——	20%	Measured at 120/230Vac ≥ 30% Load, 277Vac ≥ 40% Load
Power Factor (PF)	0.90	——	——	Measured at 120/230Vac ≥ 30% Load, 277Vac ≥ 40% Load

Output Specifications

Parameter	Min.	Typ.	Max.	Notes/Conditions
DC Output Voltage	Per Table	——	Per Table	Per Table on Page 1
DC Output Current (POC) 150-1300mA	-5%	Per Table	+5%	Programmable Output Current (POC) POC is set using Rset resistor Per table on Page 8 or GUI
Output Power	——	——	25.2W	Voltage Foldback
Ripple & Noise (Vpk-pk)	——	——	3% Vo	20 MHz BW, Full load output in parallel with 0.1 µF ceramic & 10 µF Electrolytic.
Ripple (Ipk-pk)	——	——	5% Io	20 MHz BW, Full load output in parallel with 0.1 µF ceramic & 10 µF Electrolytic. 120 Hz component (Flicker Free)
Start-up Time	——	——	500 mS	Measured at 98% of Iout, 120Vac/60Hz Input, Output @ Any 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 ^{O}C	——	+85 ^{O}C	Measured at location specified on case.
Operating Temperature (Ta)	-30 ^{O}C	——	+60 ^{O}C	This is a reference range. Tc controls temperature range.
Storage Temperature (Ts)	-40 ^{O}C	——	+100 ^{O}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	——	382,000 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)	——	——	25W	Voltage Foldback
Over Temp Protection (OTP)	——	95C	100C	Foldback at Tc ≥95C, OFF @ Tc ~115C

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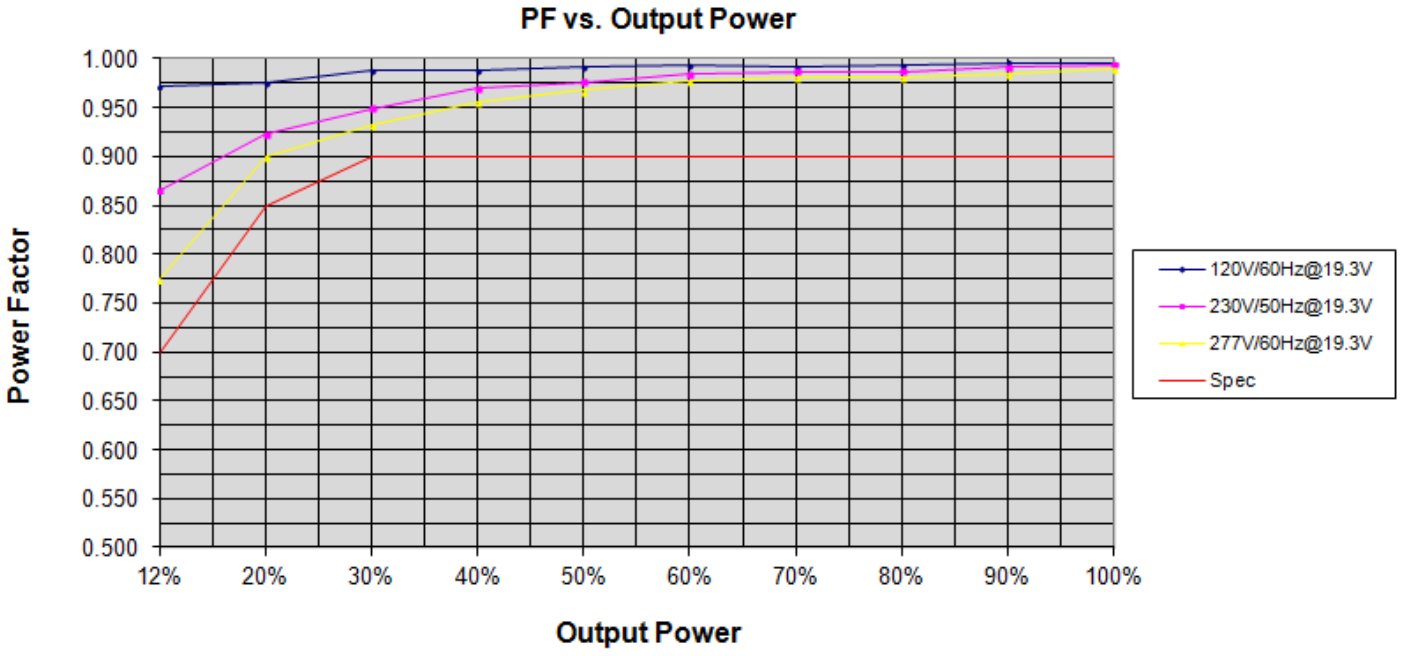
Safety & Compliance

Safety	Notes/Standards
UL/CUL Listed UL Class P	UL8750 & CAN/CSA C22.2 No. 250.13, UL Class P
CE	EN61347-1, EN61347-2-13
Withstand Voltage	Input to Output: 3750 Vac
Isolation Resistance	Input to Output: >100 MΩ, 500VDC @ 25 ^{O}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.
Sound Rating	<24dB Class A

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):



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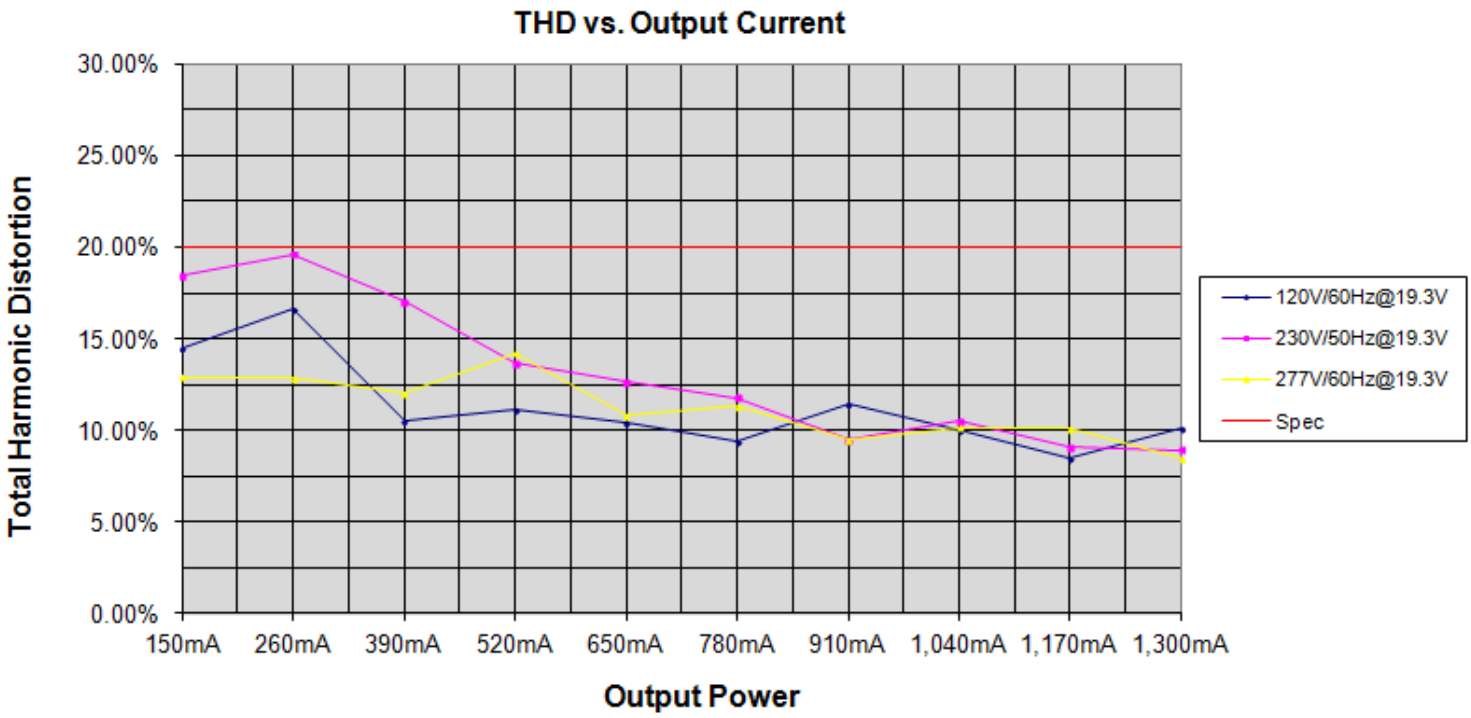
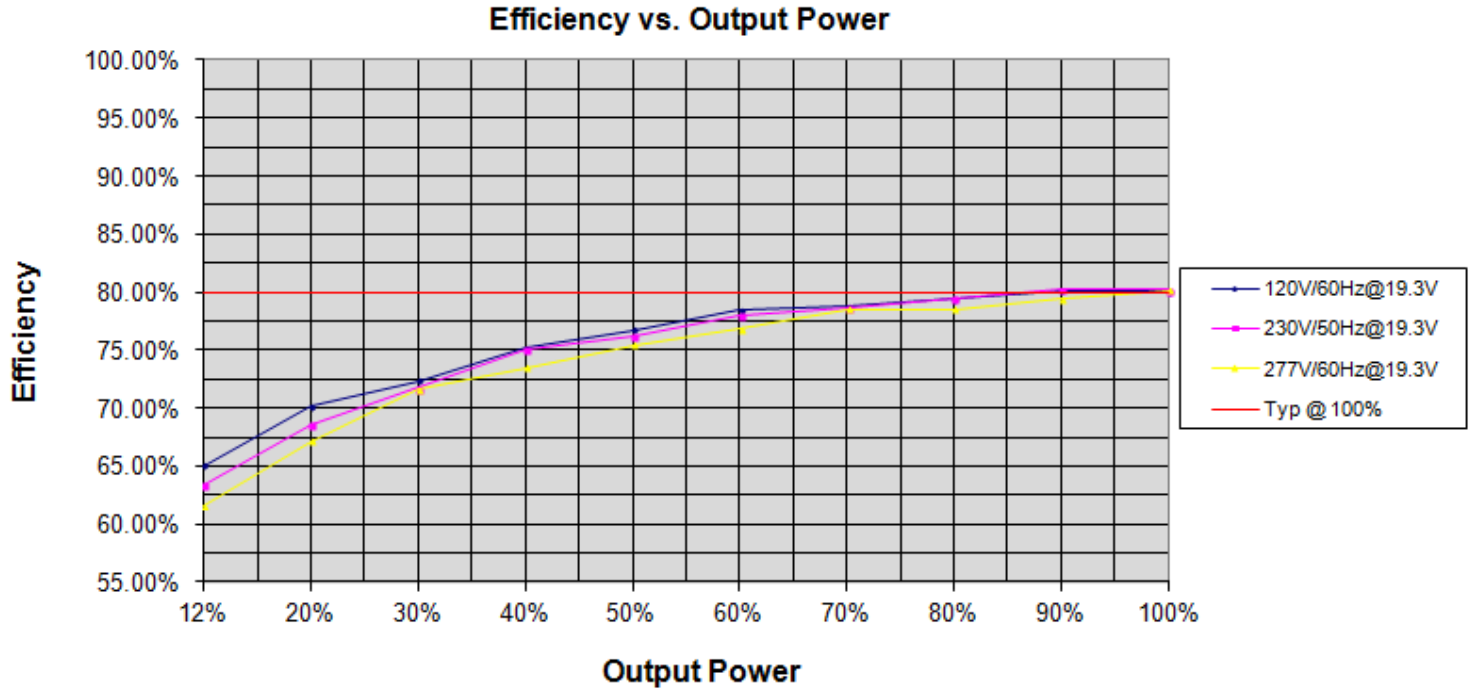
THD Curves (Typical):



Efficiency Curves (Typical):



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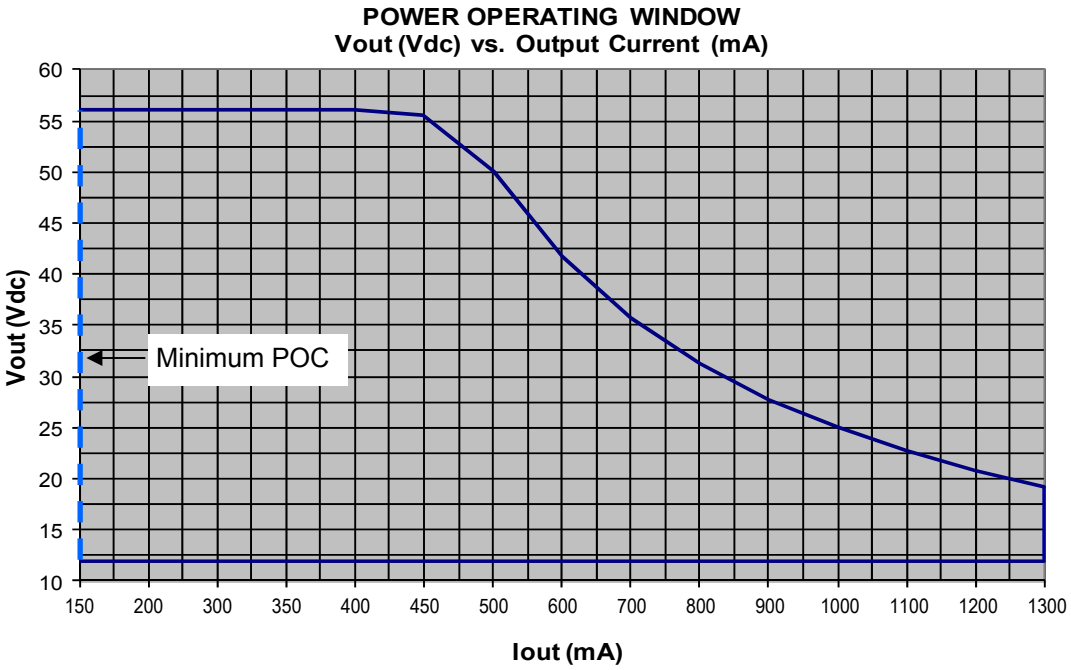
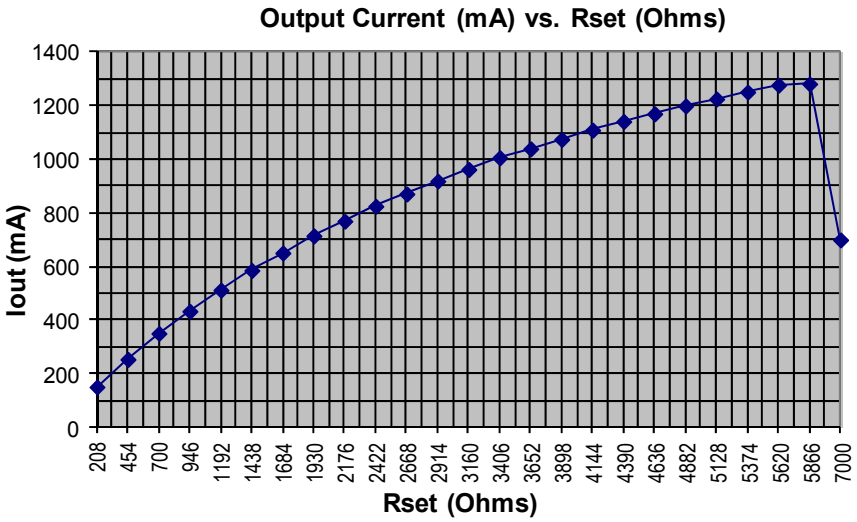
Power Operating Window



POC (Programmable Output Current)

Rset [1] (Ohms)	Iout (mA)
208	150
346	209
592	308
838	396
1084	478
1330	554
1576	622
1822	687
2068	745
2314	800
2560	853
2806	899
3052	944
3298	985
3544	1024
3790	1062
4036	1095
4282	1128
4528	1158
4774	1187
5020	1215
5266	1242
5512	1266
5758	1282
6000	1300
7000 [1]	GUI SET [1]

POC Setting: If Rset is open[1], EP Interface Programming GUI can be used to set Iout.
Output Current vs. Rset or GUI value is within ± 5%
Rset can be any ≥1/4W, ± 1%, ≥20V rated resistor
[1] Rset >7,000 Ohms will default Iout to GUI setting.



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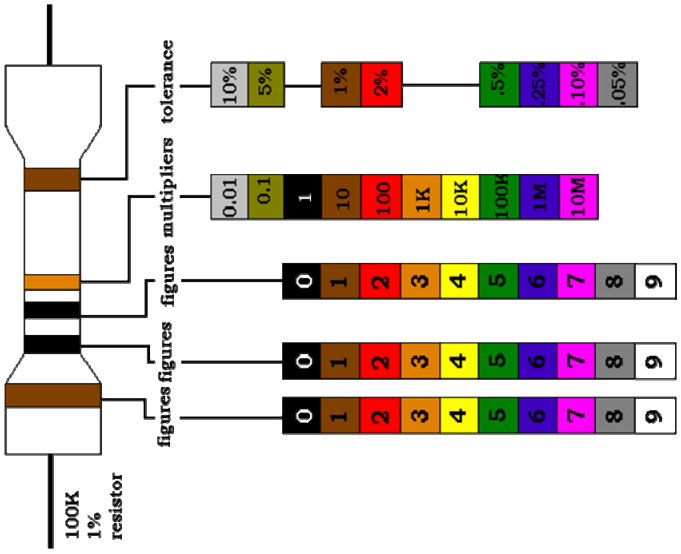
FLICKER FREE PROGRAMMABLE LED DRIVER WITH 0-10V DIMMING & 12V AUX

1% EIA E96 Standard Resistor Values vs. Iout

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

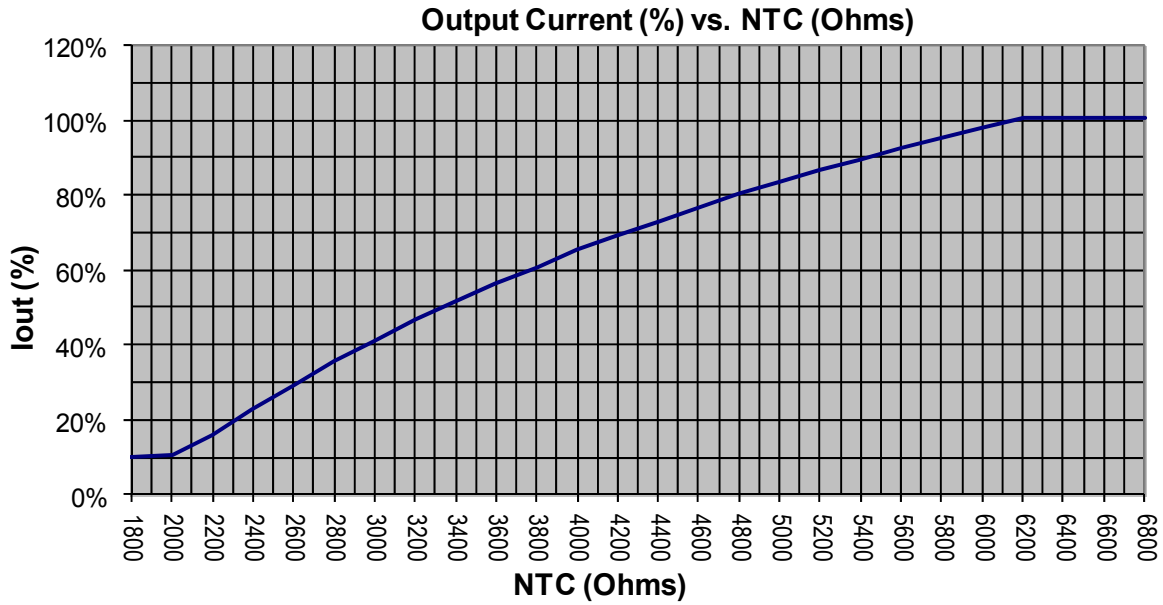
	POC		POC		POC		POC		POC		POC
Rset (Ohms)	Iout (mA)	Rset (Ohms)	Iout (mA)	Rset (Ohms)	Iout (mA)	Rset (Ohms)	Iout (mA)	Rset (Ohms)	Iout (mA)	Rset (Ohms)	Iout (mA)
210	150.9	383	225.1	698	347.5	1270	537.0	2320	805.4	4870	1212.7
215	153.2	392	228.8	715	353.7	1300	545.9	2370	816.2	4990	1226.6
221	155.8	402	232.9	732	359.9	1330	554.8	2430	829.0	5110	1240.1
226	158.0	412	237.0	750	366.4	1370	566.5	2490	841.5	5230	1253.3
232	160.7	422	241.0	768	372.8	1400	575.2	2550	853.9	5360	1267.2
237	162.9	432	245.1	787	379.6	1430	583.7	2610	866.1	5490	1280.7
243	165.5	442	249.1	806	386.3	1470	595.1	2670	878.0	5620	1293.9
249	168.1	453	253.6	825	393.0	1500	603.4	2740	891.7	5760	1307.8
255	170.7	464	258.0	845	399.9	1540	614.5	2800	903.3	5900	1300.0
261	173.3	475	262.4	866	407.2	1580	625.4	2870	916.5	6000	1300.0
267	175.9	487	267.2	887	414.4	1620	636.2	2940	929.5	7000	GUI SET
274	179.0	499	271.9	909	421.9	1650	644.2	3010	942.3		
280	181.6	511	276.6	931	429.3	1690	654.8	3090	956.6		
287	184.6	523	281.3	953	436.7	1740	667.8	3160	968.9		
294	187.6	536	286.4	976	444.3	1780	678.1	3240	982.6		
301	190.6	549	291.4	1000	452.2	1820	688.2	3320	996.1		
309	194.0	562	296.5	1020	458.8	1870	700.7	3400	1009.4		
316	197.0	576	301.8	1050	468.5	1910	710.6	3480	1022.3		
324	200.4	590	307.2	1070	475.0	1960	722.8	3570	1036.6		
332	203.8	604	312.5	1100	484.5	2000	732.4	3650	1049.1		
340	207.1	619	318.2	1130	494.0	2050	744.3	3740	1062.8		
348	210.5	634	323.8	1150	500.3	2100	755.9	3830	1076.2		
357	214.2	649	329.4	1180	509.6	2150	767.5	3920	1089.3		
365	217.6	665	335.4	1210	518.8	2210	781.1	4640	1185.2		
374	221.3	681	341.3	1240	528.0	2260	792.2	4750	1198.5		

1% Resistor Color Codes:



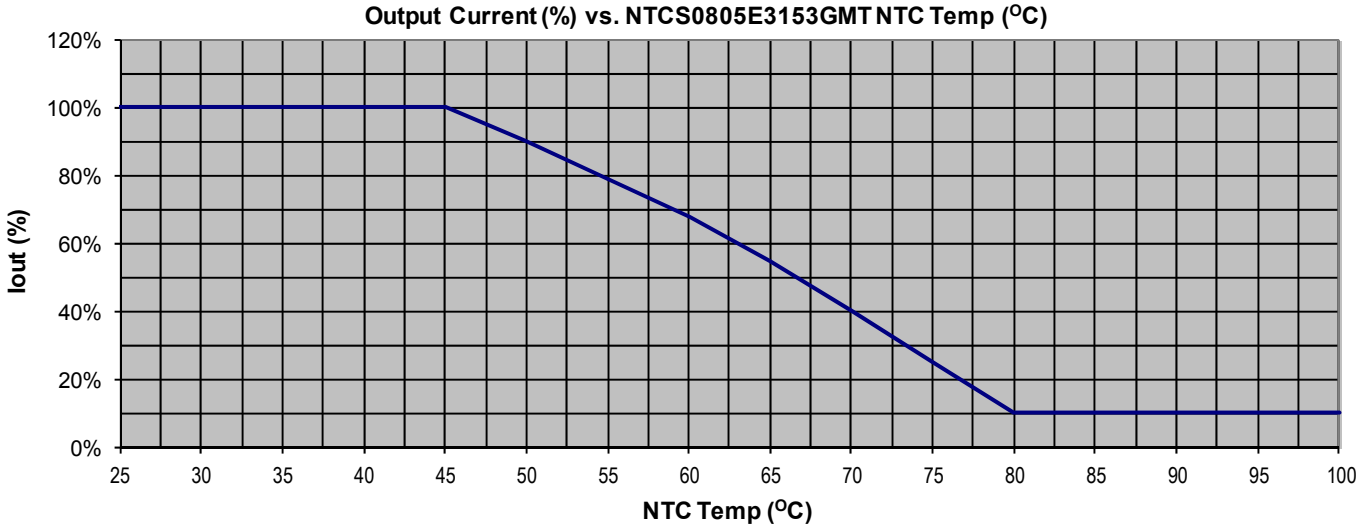
Module Temperature Protection using External NTC

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 ~ 10% Iout, NTC High = 6.3K, 100% Iout
Programmable settings: NTC Minimum Level (%), NTC Minimum Ohms, NTC Maximum Ohms.



Module Temperature Protection Example

NTC = 805SMD, R_{25C} = 15K Ohm ± 2%, R_{64C} = 3700, Vishay Part#: NTCS0805E3153GMT
With part set: NTC Max = 6.3K, NTC MIN = 2.0K, Iout Min = 10%



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

EPtronics LED Driver Interface Programming Tool: PC Based Software

Programmable Output Current (POC): Programmable Iout Per table page 1
Programmable NTC settings: NTC Minimum Level (%), NTC Minimum Ohms, NTC Maximum Ohms.
Factory Default: NTC Minimum = 2.0K, ~ 10% Iout, NTC Maximum = 6.3K, 100% Iout
Programmable dimming curve: Linear or LOG
Factory Default: Linear Dimming Curve
Programmable Minimum Dim Level: 0% (Min Dim) to 100% Iout programmed value.
Factory Default: Min dim level 0% (Actual Min Dim per specifications)
Programmable Dim to Zero?: YES or NO. YES will cause 0mA at ≤1.0V, else will be Minimum Dim Level.
Factory Default: YES

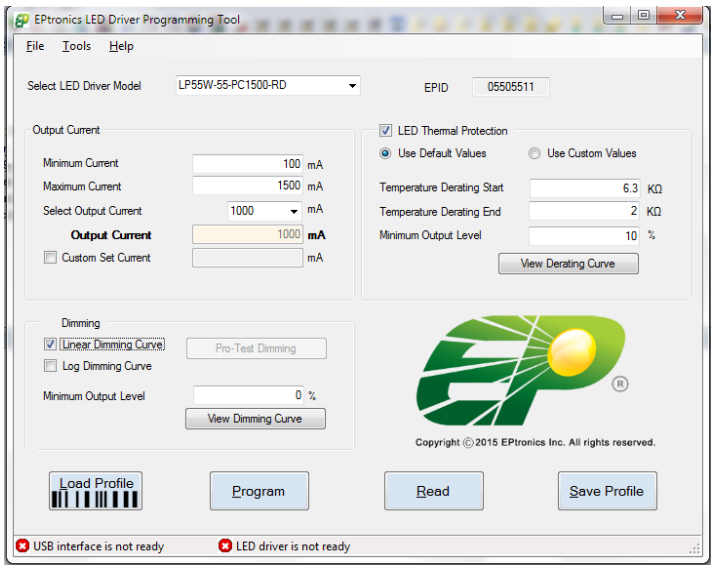
EPtronics LED Driver Interface Programming Tool:
The EPtronics LED Driver Interface Programming Tool is a programming and configuration tool for EPtronics intelligent programmable LED drivers. It consists of the EP Programming Interface (EP-PRG-01) which is connected between the USB port of a computer and the LED driver being programmed, and the EPtronics LED Driver Interface Programming Tool software. The EPtronics LED Driver Interface Programming Tool 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.

EPtronics LED Driver Interface Programming Software:
The EPtronics LED Driver Interface Programming software is the windows based GUI that allows the user to assign custom part numbers 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 or the use of an EPtronics Programming Cradle which will auto program upon insertion the an LED driver into the cradle.

The EPtronics LED Driver Interface Programming 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 Programming Interface and the required LED driver circuitry will be powered from the EP-PRG-01 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.***

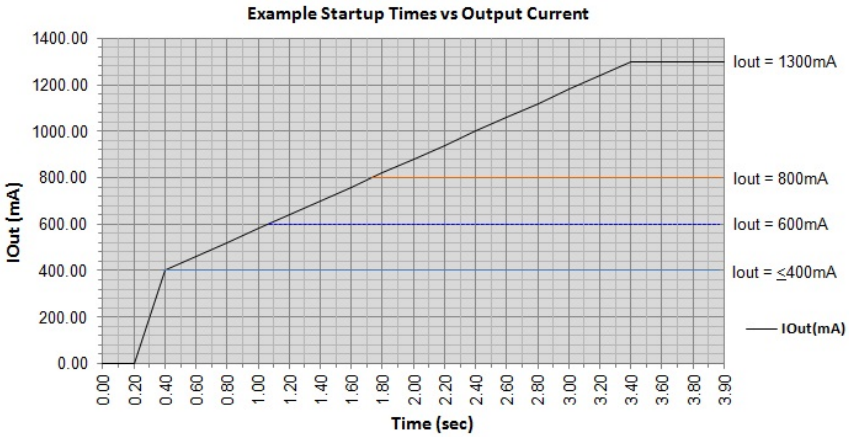


25 Watt - LP25W-56-PC1300-RD

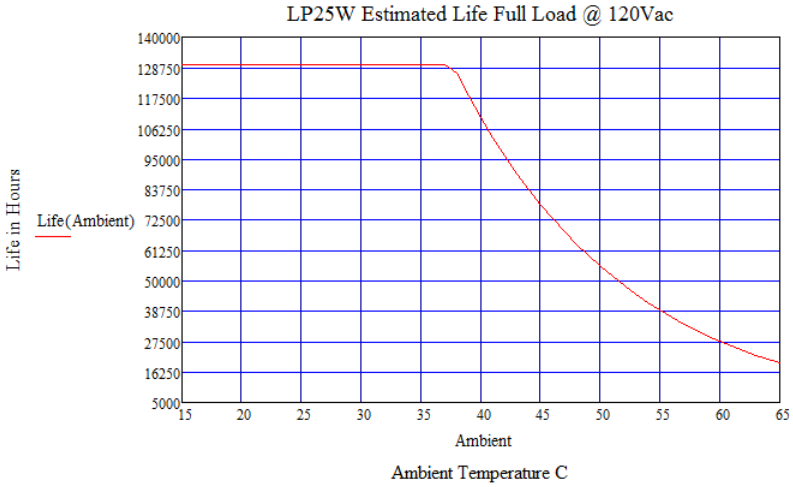
FLICKER FREE PROGRAMMABLE LED DRIVER WITH 0-10V DIMMING & 12V AUX

Soft Start Operation:

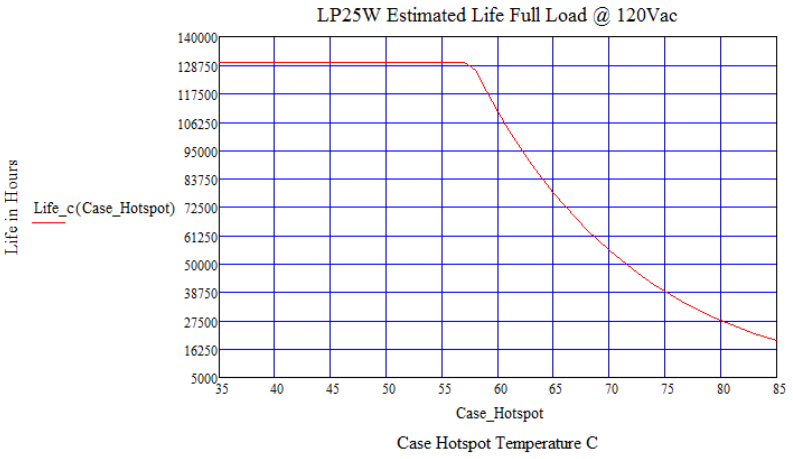
Target Specification: Time-To-First-Light <500ms, Time to 90% Iout ~ 3.00 Seconds, Time to 100% Iout <3.6 Seconds



Life vs. Ambient Temperature



Life vs. Case (Tc) Temperature



Custom designs available. Please consult with the factory.

Specifications subject to change without notice

Revision History

REV - Change Date	Description of Changes		
	Items	Changed From	Changed To
REV C - 05/01/2018	Initial preliminary spec release	Version A	Version C
REV C - 05/25/2018	PF Dimming Curves	277Vac ≥30% Load LIN,LOG,S-CURVE,INV2	277Vac ≥35% Load LIN or LOG
REV C - 06/13/2018	Life Curves , Dim LIN & LOG, OTP	N/A	Corrected
REV C - 08/23/2018	Recommended Wire Distances	N/A	Corrected
REV C - 09/04/2018	Case Mount Slots	0.19 [5mm]	0.16 [4mm]

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

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