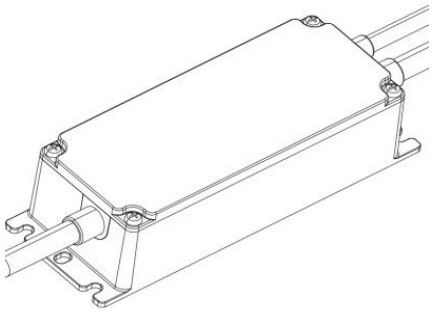
Features

- Programmable constant current and voltage output
- High efficiency: 90% typical @220Vac, full load
- High power factor: 0.98 typical. @ 220Vac, full load
- Isolated 0-10V/PWM/ Resistor Dimming
- With Lightning Protection & all-round protections
- 6kV/10kV surge capability



Description

This specification describes the performance characteristics of a 60W versatile power supply for LED Driver.
The output current of this series are programmable, and designed for 0-10V/PWM/Resistor dimming applications.

Model Name Definition

60	PHL	60	CV	-	XX	X	-	XXX
Rated Output Power	Series name	Maximum output voltage	Constant current and constant voltage output		Options: 1. D0 2. D1	Options: 1. U(UL Wire) 2. V(VDE&CCC Wire) 3. Blank(UL&VDE&CCC Wire)		Options

Specifications

Part Number	Max. Output Power	Programmable Current Range	Output Voltage Range	Efficiency typical@220VAC	Dimming	AUX power
60PHL60CV-D0	60W	0.57-1.43A	30-60V	90%	0-10V	12V 200mA
60PHL60CV-D1	60W	0.57-1.43A	30-60V	90%	1-10V	/
60PHL100CV-D0	60W	0.34-0.86A	42-100V	91%	0-10V	12V 200mA
60PHL100CV-D1	60W	0.34-0.86A	42-100V	91%	1-10V	/

Input Specifications

Parameter	Min.	Typ.	Max.	Notes
Rated Input AC Voltage	100 Vac	-	277Vac	
Limit Input AC Voltage	90Vac	-	305Vac	
Input Frequency	47Hz	50/60 Hz	63 Hz	
Leakage Current	-	-	0.75 mA	At 220Vac / 50Hz input , grounding effectively
Input AC Current	-	-	0.35A	Measured at full load and 220 Vac input.
Inrush Peak Current	-	-	60A	At 220Vac input, 25°C cold start. See Inrush Current Waveform for the details.
PF	0.95	-	-	At 220Vac, 80%-100% load, 25°C and 60Hz
THD	-	-	15%	At 220Vac, 80%-100% load, 25°C and 60Hz

Efficiency	89%	90%	-	60PHL60CV：Measured at 220Vac input、100% load and steady-state temperature in 25°C ambient
	90%	91%		60PHL100CV：Measured at 220Vac input、100% load and steady-state temperature in 25°C ambient

Output Specifications

Parameter	Min.	Typ.	Max.	Notes
Output Current Tolerance	-5%Io set	-	5%Io set	At 25°C and full load condition
Total Output Current Ripple (pk-pk)	-	-	15%Io max	At 25°C and full load condition, 8kHz BW
Startup Overshoot Current	-	-	20%Io max	At 25°C and full load condition, 8kHz BW
No Load Output Voltage	-	-	75V	Only for 60PHL60CV
	-	-	120V	Only for 60PHL100CV
Line Regulation	-	-	±3%	Measured at 25°C and full load
Load Regulation	-	-	±3%	At 25°C condition
Turn-on Delay Time	-	-	2.0 s	Measured at 220Vac input.
Temperature Coefficient of Io set	-0.05%/°C	-	0.05%/°C	Case temperature = 0°C ~Tc max
12V Auxiliary Output Voltage (60PHL60CV-D0/60PHL100CV-D0)	11V	12 V	15 V	
12V Auxiliary Output Source Current(60PHL60CV-D0/60PHL 100CV-D0)	0 mA	-	200 mA	Return terminal is “Dim−“
OTP Tc	85°C	90°C	95°C	Output current will drop to 50% lowest, or shut down.
SCP				Hiccup mode, Auto recover
OPP				Auto recover
OCP				Auto recover

General Specifications

Parameter	Min.	Typ.	Max.	Notes
MTBF	234,000 Hours	-	-	Measured at 220Vac input, 80%Load and 25 ° C ambient temperature (MIL-HDBK-217F)
Lifetime	50,000 Hours	-	-	Measured at 220Vac input, 100% load and 75°C case temperature; See lifetime vs. Tc curve for the details
Operating Case Temperature for Safety Tc_s	-40°C	-	+90°C	
Operating Case Temperature for Warranty Tc_w	-40°C	-	+80°C	
Operating Ambient Temperature Ta	-40°C	-	+70°C	At 176-277Vac input
Storage Temperature	-40°C	-	+85°C	Humidity: 5%RH to 90%RH

IP Grade	IP67			
Dimensions Inches (L × W × H) Millimeters (L × W × H)	5.45×1.92×1.26 in 138.3×48.6×32.1mm			
Net Weight/pcs	-	420g	-	

Dimming Specifications

1. 0-10V Dimming(60PHL60CV-D0/60PHL100CV-D0)

Parameter	Min.	Typ.	Max.	Notes
Absolute Maximum Voltage on the Vdim (+) Pin	-1 V	-	15 V	
Source Current on Vdim (+)Pin	90uA	100uA	110uA	
Dimming Output Range	-	10%Io set	Io set	80%Io max ≤ Io set ≤ 100%Io max
	-	8%Io max	Io set	Io set ＜80%Io max
Recommended Dimming Input Range	0V	-	10 V	Default 0-10V dimming mode.
Dim off Voltage	0.6 V	0.8 V	1.0V	
Dim on Voltage	0.8 V	1.0 V	1.2 V	
Dim off Resistance	5kΩ	8kΩ	10kΩ	
Dim on Resistance	7kΩ	10kΩ	12kΩ	
Hysteresis	-	0.2 V	-	
PWM_in High Level	9.5 V	10V	10.5 V	
PWM_in Low Level	-0.3 V	-	0.6 V	
PWM_in Frequency Range	500 Hz	-	3 KHz	
PWM_in Duty Cycle	1%	-	100%	
PWM Dimming off	6%	8%	10%	
PWM Dimming on	8%	10%	12%	

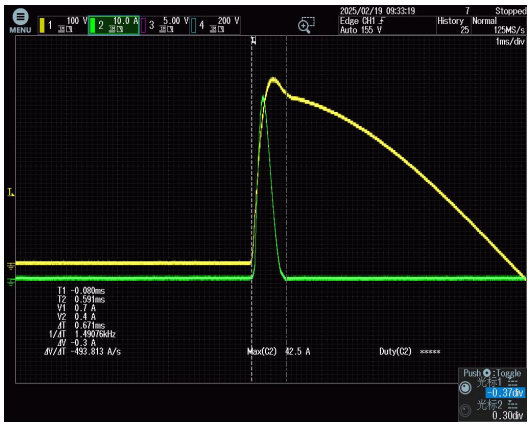
2. 1-10V Dimming(60PHL60CV-D1/60PHL100CV-D1)

Parameter	Min.	Typ.	Max.	Notes
Absolute Maximum Voltage on the Vdim (+) Pin	-1 V	-	15 V	
Source Current on Vdim (+)Pin	90uA	100uA	110uA	
Dimming Output Range	-	10%Io set	Io set	80%Io max ≤ Io set ≤ 100%Io max
	-	8%Io max	Io set	Io set ＜80%Io max
Recommended Dimming Input Range	1V	-	10 V	Default 1-10V dimming mode.
PWM_in High Level	9.5 V	10V	10.5 V	
PWM_in Low Level	-0.3 V	-	0.6 V	
PWM_in Frequency Range	500 Hz	-	3 KHz	
PWM_in Duty Cycle	1%	-	100%	

Safety &EMC Compliance

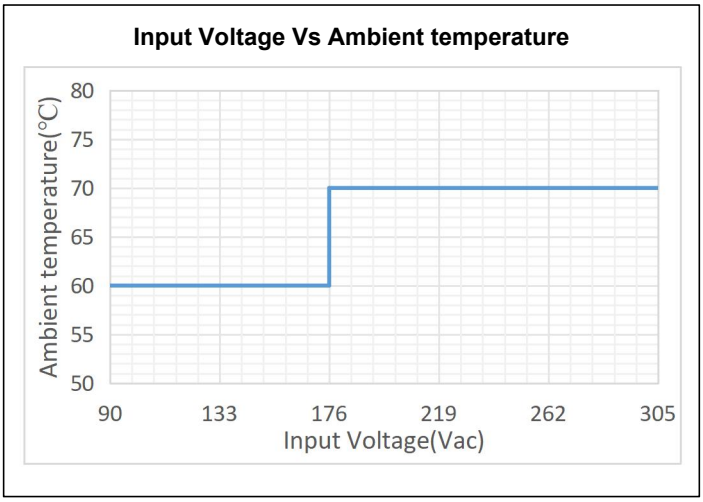
Safety Category	Standard
UL/CUL	UL8750,CAN/CSA-C22.2 No. 250.13-12
Dielectric Strength(Hi-pot)	Primary to Secondary: 3200Vac 10mA max
	Primary to Earth: 1600Vac 10mA max.
	Secondary to Earth: 1600Vac 10mA max.
	Dimming to Output: 1200Vac 10mA max.
Insulation Resistance	50Mohm min.@ primary to secondary add 500Vdc test voltage
Grounded Resistance	0.1Ω max. @ 25A, 1 minute
ENEC&CE	EN61347-1, EN 61347-2-13
CB	IEC 61347-1, IEC 61347-2-13
CCC	GB19510.1, GB19510.14
EMI Standards	Notes
EN55015	Class B
	This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired Operation.
EMS Standards	Notes
EN 61000-4-2	Electrostatic Discharge (ESD): 8 kV air discharge, 4 kV contact discharge, Criteria A
EN 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test-RS, Criteria A
EN 61000-4-4	Electrical Fast Transient / Burst-EFT: level 3, Criteria B
EN 61000-4-5	Surge Immunity Test: AC Power Line: line to line 6kV, line to earth 10kV, Criteria B
EN 61000-4-6	Conducted Radio Frequency Disturbances Test-CS, Criteria A
EN 61000-4-8	Power Frequency Magnetic Field Test, Criteria A
EN 61000-4-11	Voltage Dips Criteria B
EN 61547	Electromagnetic Immunity Requirements Applies To Lighting Equipment

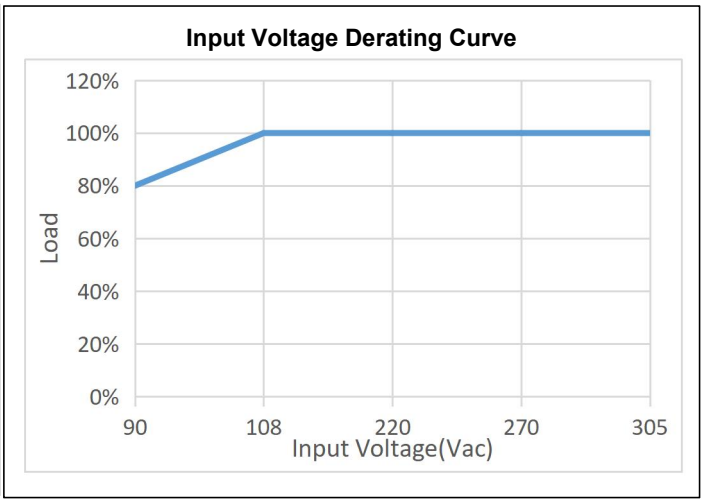
Inrush Current (@Full load and cold start)

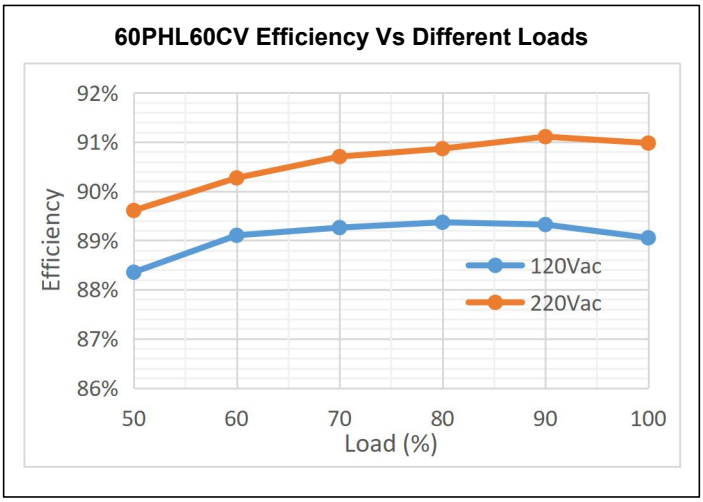


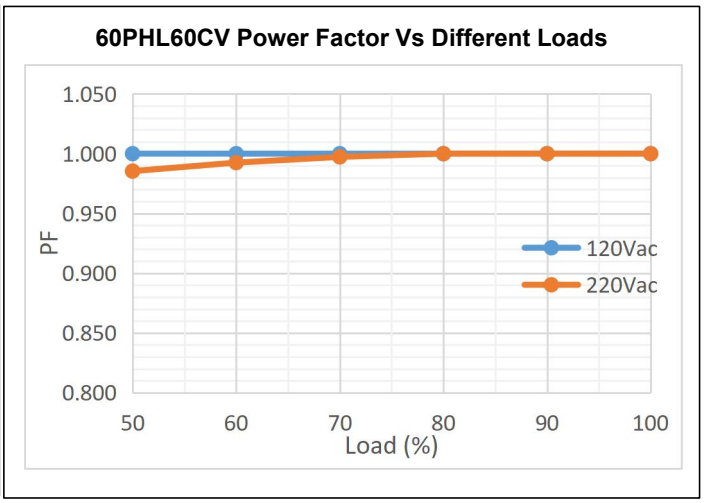
Vin(Vac)	Fin(Hz)	Ipeak(A)	T duration(us)
120	47	14.5	681
220	50	33.8	701
277	63	42.5	671

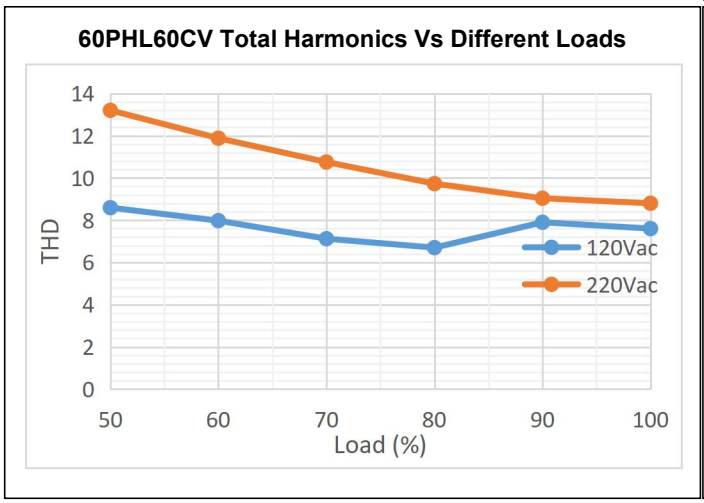
Performance Curve

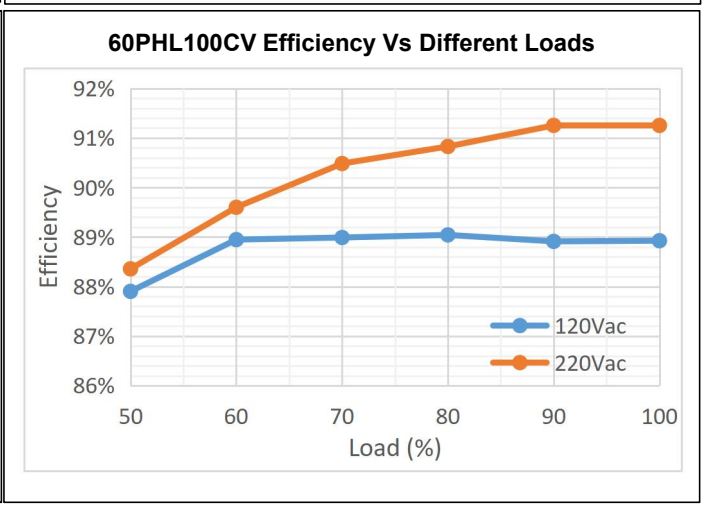




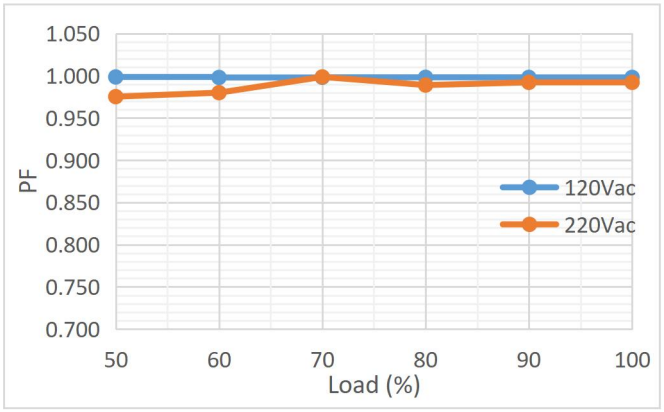




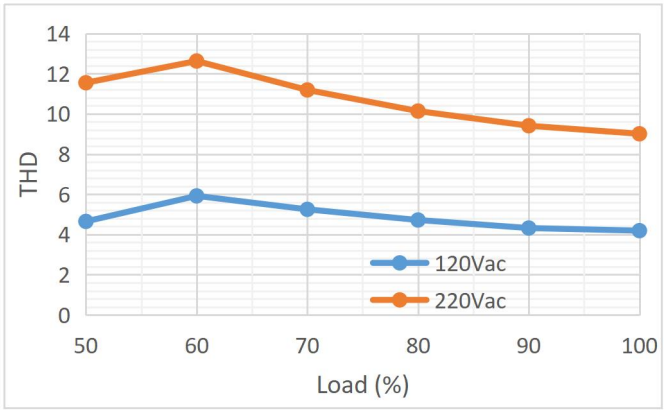




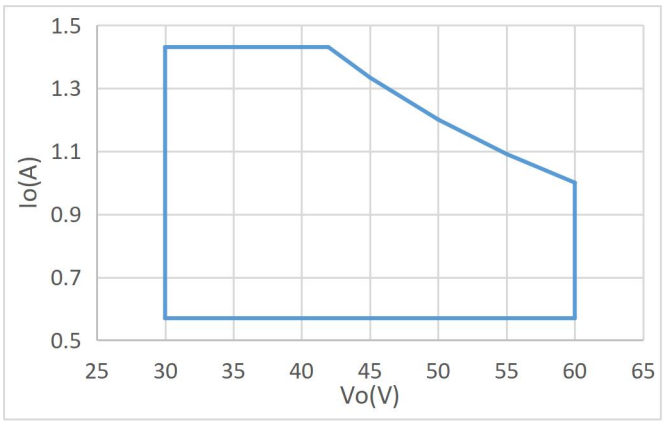
60PHL100CV Power Factor Vs Different Loads



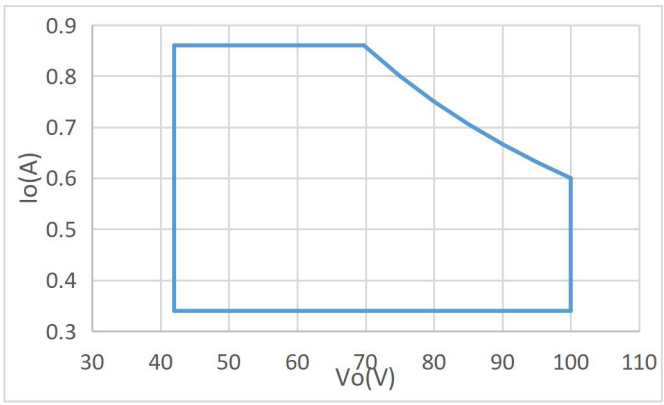
60PHL100CV Total Harmonics Vs Different Loads



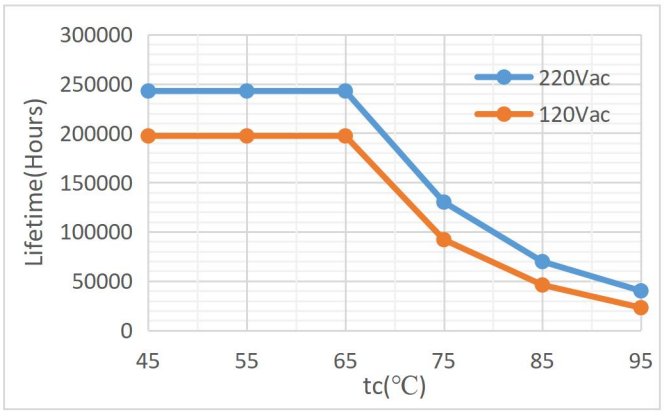
60PHL60CV I/V Operating Area



60PHL100CV I/V Operating Area

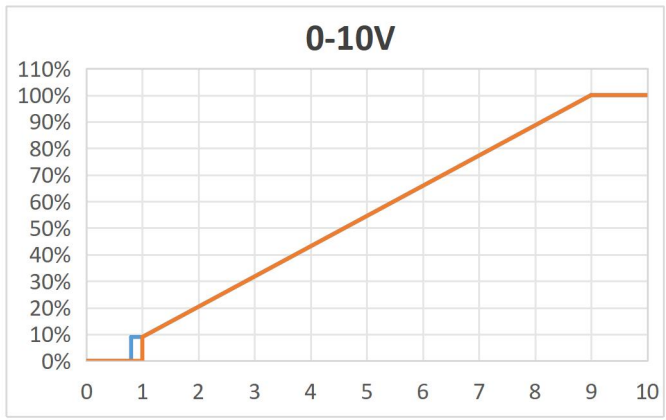


Life Vs Case Temperature



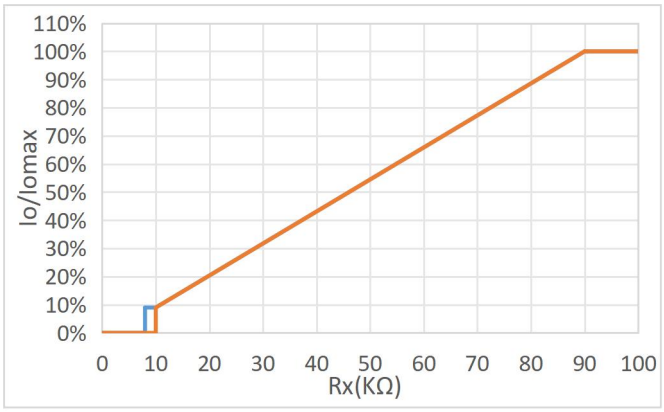
Dimming Curve

60PHL60CV-D0/60PHL100CV-D0 Io/Ir vs Vdim

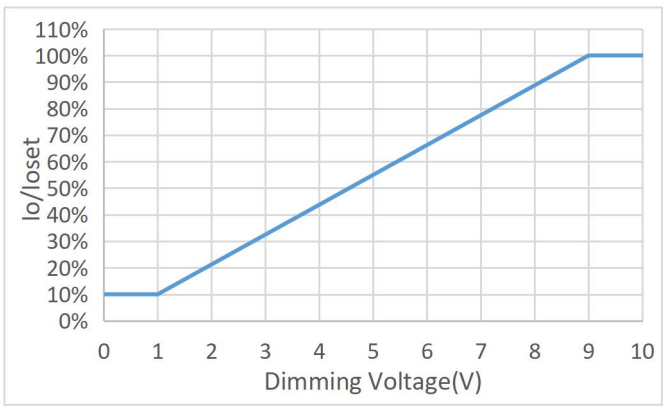


60PHL60CV-D0/60PHL100CV-D0 Io/Ir vs Vdim

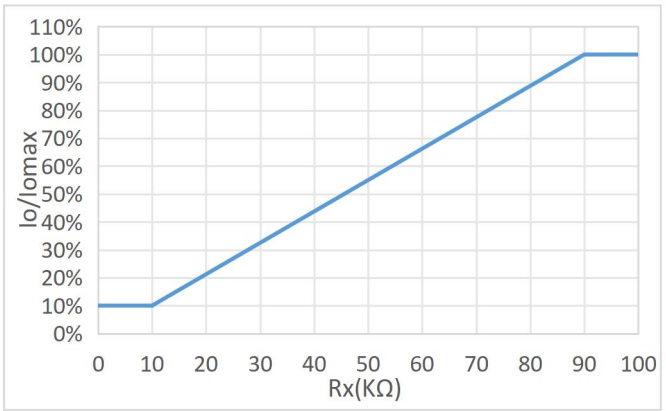
60PHL60CV-D0/60PHL100CV-D0 Io/Iomax vs Rx



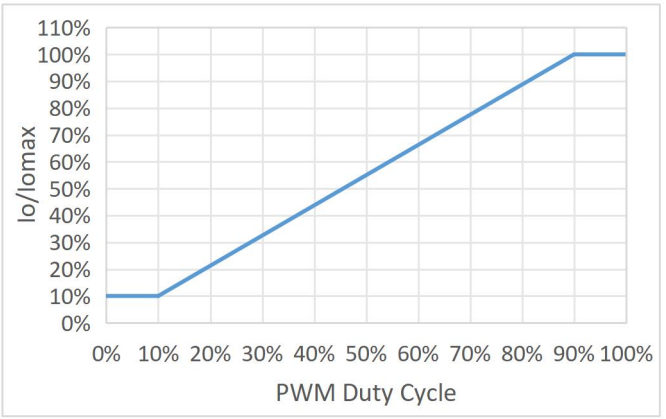
60PHL60CV-D1/60PHL100CV-D1 Io/Ioset vs Dimming Voltage



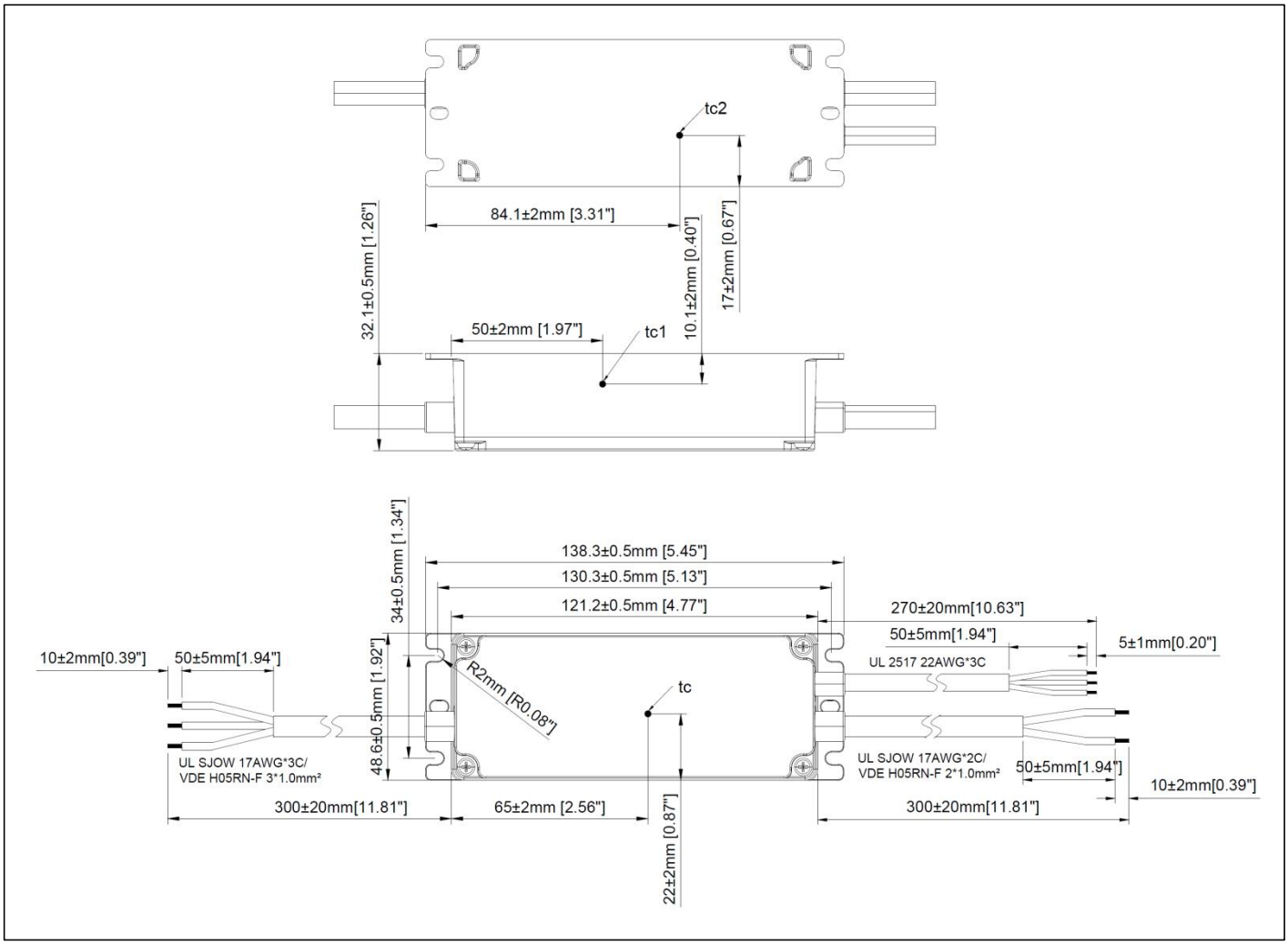
60PHL60CV-D1/60PHL100CV-D1 Io/Iomax vs Rx



60PHL60CV-D1/60PHL100CV-D1 Io/Iomax vs PWM Duty Cycle



Mechanical Drawing



Revision History

Change Date	Rev.	Description of Change		
		Item	From	To
2023/3/10	V1.0			
2023/9/16	V1.1	Update Mechanical Drawing		
2023/9/28	V1.2	Update Mechanical Drawing		Update the installation size
2023/10/26	V1.3	Update Mechanical Drawing		Update the size and add tc
		Operating Ambient Temperature Ta	MAX:50°C	MAX:70°C
2023/12/27	V1.4	Add Input Voltage Vs Ambient temperature		
		No Load Output Voltage	MAX: 66V	MAX: 75V
		Add Net Weight		
		Update Mechanical Drawing		
		Add Inrush Current		
2024/1/9	V1.5	Dielectric Strength(Hi-pot)	Primary to Secondary:3000Vac / 10mA max	Primary to Secondary: 3750Vac

			10mAMax	
			Primary to Earth: 1500Vac 10mA max.	Primary to Earth: 1600Vac 10mA max.
			Secondary to Earth: 500Vac 10mA max.	Secondary to Earth: 1600Vac 10mA max.
			Dimming to Secondary: 1500Vac 10mA max.	Dimming to Secondary: 1600Vac 10mA max.
		Update Model Name Definition		
		Safety Category		Add ENEC/CE/CB/CCC
		Input Frequency	Min：45Hz	Min：47Hz
2024/3/2	V1.6	Update Dimming Curve : 0-10V/PWM		
		Dim off Voltage	0.3-0.5-0.8	0.6-0.8-1.0
		Dim on Voltage	0.5-0.7-1	0.8-1.0-1.2
		PWM Dimming off	3%-5%-8%	6%-8%-10%
		PWM Dimming on	5%-7%-9%	8%-10%-12%
		Total Output Current Ripple (pk-pk)	Note：At full load condition, 20 MHz BW	Note： At 25 ° C and full load condition, ≤200Hz BW
		Startup Overshoot Current	Note：At full load condition	Note： At 25 ° C and full load condition, ≤200Hz BW
2024/8/14	V1.7	Add Dim off Resistance/Dim on Resistance		
		Add Io/Iomax vs Rx		
2024/10/15	V1.8	Delete 60PHL60CV-DA/60PHL100CV-DA		
		Add 60PHL60CV-D1/60PHL100CV-D1 Io/Iomax vs PWM Duty Cycle Curve		
		Operating Ambient Temperature Ta	Notes：At 220-277Vac input	Notes：At 176-277Vac input
		Dimming Output Range	Min：10%Io set Min：8%Io max	Typ：10%Io set Typ：8%Io max
		PWM_in Duty Cycle	Max：98%	Max：100%
		Update Mechanical Drawing		
2025/2/18	V1.9	Dielectric Strength(Hi-pot)	Primary to Secondary: 3750Vac 10mA max	Primary to Secondary: 3200Vac 10mA max
		Add IP Grade/Inrush Current		
		Input Specifications		Add Efficiency
			Inrush Current	Inrush Peak Current
		PF/THD		add 25°C and 60Hz
		Total Output Current Ripple (pk-pk)/Startup Overshoot Current	At 25°C and full load condition, ≤200Hz BW	At 25°C and full load condition, 8kHz BW
		Line Regulation/Load Regulation		Add 25°C
		Lifetime	Measured at 220Vac input, 80% load and 75 ° C case	Measured at 220Vac input, 100% load and 75°C case temperature;

			temperature; See lifetime vs. Tc curve for the details	See lifetime vs. Tc curve for the details
		Update 60PHL60CV EFF/THD/PF Curve		
		Add 60PHL100CV EFF/THD/PF Curve		
		6OPHL100CV:Efficiency	typical@220VAC: 90%	typical@220VAC: 91%
2025/2/24	V2.0	No Load Output Voltage	Max： 120V(Note： Only for 60PHL120CV)	Max： 120V(Note： Only for 60PHL100CV)
		Dielectric Strength(Hi-pot)	Dimming to Secondary: 1600Vac 10mA max.	Dimming to Output: 1200Vac 10mA max.