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## LED Driver

# Indoor 50 W Dimmable SI-EPF006660WW



## Constant Current LED Driver Wide Operating Range up to 1.4 A – Dimmable

### Features & Benefits

- Output Current Range: 0.5 ~ 1.4 A (adjustable via R set)
- Output Voltage Range: 20 ~ 50 Vdc
- Output Power Range: 10 ~ 50 W
- Dimming Control: 0-10 V
- Input Voltage: 120 ~ 277 Vac, 50/60 Hz
- Safety: UL / cUL (UL 60950 + UL 8750)
- EMI: FCC Part 15 Class B
- Protections: Short Circuit, Open Load Protection
- $t_a$  Range: -20 ~ +55 °C
- Expected lifetime: 50,000 hours at  $t_a = 55$  °C,  $t_c < 85$  °C
- Environmental Compliance: RoHS
- Long lasting & high reliability
- Slim metal housing

### Applications

- Ambient Lighting (Linear and Area) and other Indoor Lighting Applications
- Office – Industry – Shop



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## 1. Characteristics

Article		Symbol	Specification			Unit	Note
			Min.	Typ.	Max.		
INPUT SPECIFICATIONS							
Nominal Voltage		V <sub>in</sub>	120 ~ 277			Vac	Full input range, no range switching
Voltage Range			108		305	Vac	
Nominal Frequency		f <sub>in</sub>	50 / 60			Hz	
Frequency Range			47		63	Hz	
Input Current	At 120 Vac	I <sub>in</sub>			0.59	A	At full load
	At 277 Vac	I <sub>in</sub>			0.29	A	At full load
Total Harmonic Distortion		THD			20	%	At P <sub>o</sub> >20 W, 120-277 Vac
Power Factor		PF	0.9			-	At P <sub>o</sub> >20 W, 120-277 Vac
Efficiency		η	83	88		%	At full load, 120 Vac, 60 Hz
Stand-by Power					1	W	At <1 V dimming voltage, 120-277 Vac
Protection Class				2		-	
In-rush Current					20	A <sub>pk</sub>	Cold or hot start (t <sub>width</sub> = 300 μs measured at 50 % I <sub>pk</sub> ) at 277 Vac
OUTPUT SPECIFICATIONS							
Nominal Voltage		V <sub>o</sub>	20 ~ 50			Vdc	±2 %; at I <sub>o</sub> = 0.5-1.4 A
Max. Voltage					55	Vdc	Open circuit, No-load protection
Nominal Current		I <sub>o</sub>	0.5 ~ 1.4			A	±5 % (1.4 A), ±10 % (0.5 A)
Nominal Power		P <sub>o</sub>	10 ~ 50			W	At I <sub>o</sub> = 0.5-1.4 A, V <sub>o</sub> = 20-50 V
Turn-on Delay Time		T <sub>d</sub>			1	s	At full load, 108 Vac input

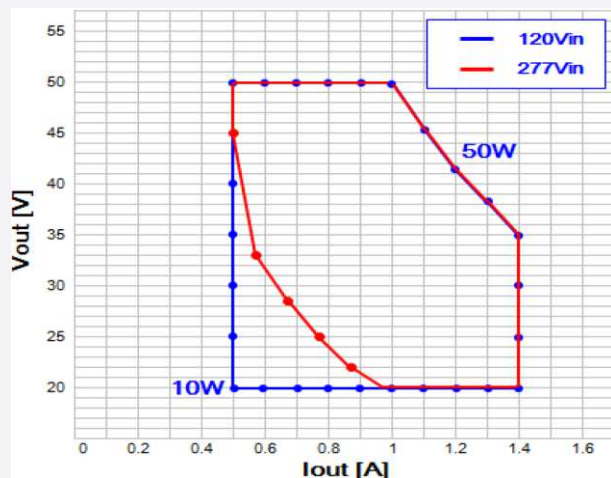
1) The rated area shows the load condition to meet the PF, THD performance.

Article	Symbol	Specification			Unit	Note
		Min.	Typ.	Max.		
DIMMING SPECIFICATIONS						
Dimming Control		0-10 V			See Dimming Specification section	
ENVIRONMENTAL SPECIFICATIONS						
Ambient Temperature	t <sub>a</sub>	-20		55	°C	
Case Temperature	t <sub>c</sub>			90	°C	Tref max/ Measured Tref 89/75°C
Storage Temperature	t <sub>s</sub>	-25		80	°C	Cool down before operating
Relative Humidity		20		90	%	Not condensing
Surge Transient Protection	L / N			±1	kV	According to IEC/EN 61547
	LN / GND			±2	kV	
IP Rating		20			-	Suitable for indoor environment
Expected Lifetime (e-cap)		50,000			h	At t <sub>a</sub> = -20 ~ 55 °C @ t <sub>c</sub> < 85 °C,
MTBF		100,000			h	At t <sub>a</sub> = 25 °C, full load, 230 Vac
Dimensions	L x W x H	11.8 x 1.2 x 0.8			inch	
		300 x 30 x 21			mm	
Net Weight		270			g	± 30 g

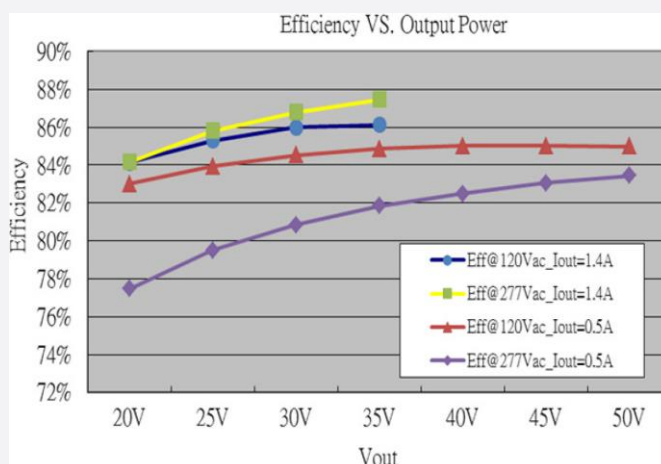


## 2. Typical Characteristics Graphs

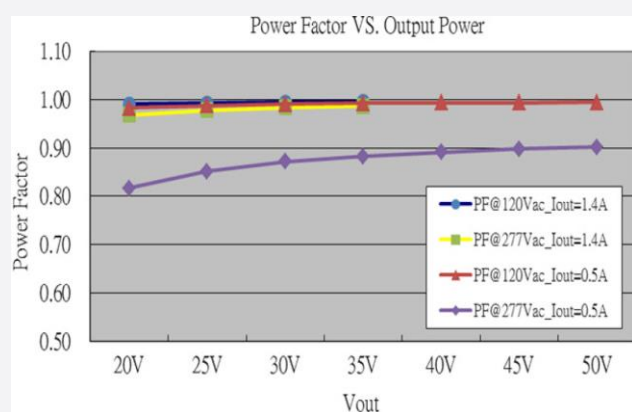
a) Operating Window



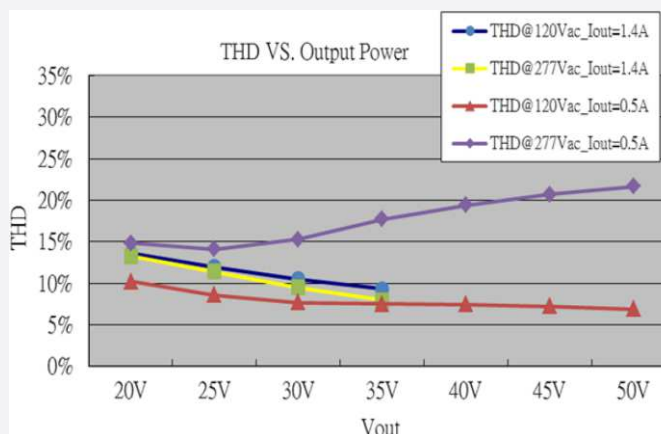
b) Efficiency vs. Load



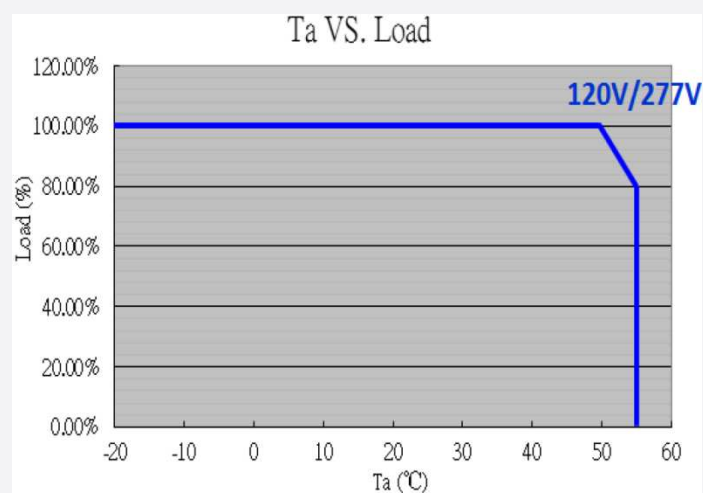
c) PF Vs Output power



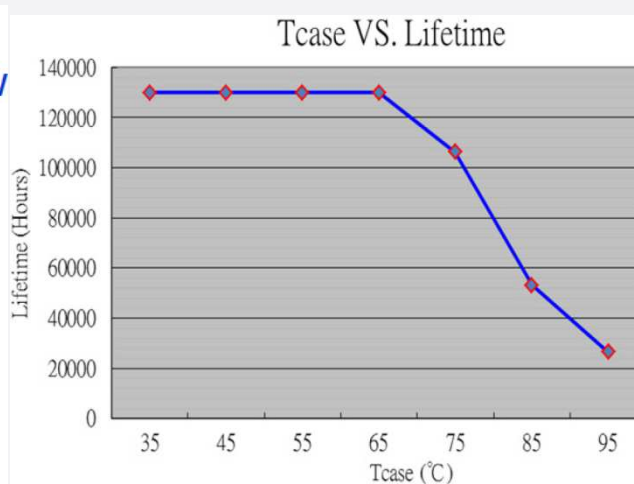
d) THD Vs Output power



e)  $T_a$   $V_a$  Load de-rating

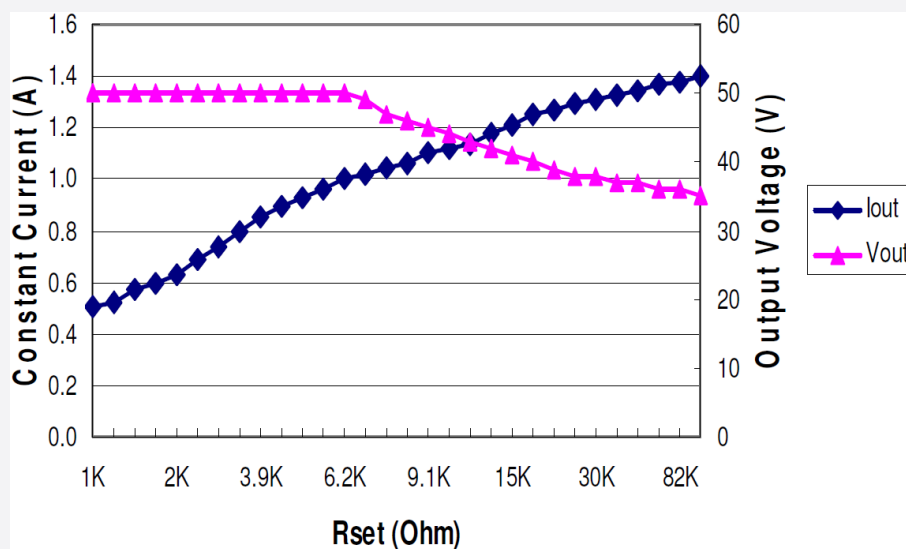


f)  $T_{case}$  Vs Life time



The output current can be adjusted using Rset resistor:

- Disconnect Rset resistor to set full load at 1.4 A / 35 V condition
- Connect Rset resistor to set output current (see below table and curve); for Rset = 6.2 kOhm, the output is full load at 1 A / 50 V condition
- The unit has minimum output current at 0.5 A when the Rset is less than 1 kOhm
- The output voltage is limited by maximum output power (if the output current is set at 1.4 A, the maximum output voltage will be 35 V; if the output current is set at 1 A, the maximum output voltage will be 50 V)



Rset ( $\Omega$ )	Output Current (A)	Current Tolerance (%)	MAX Output Voltage (V)	Open Load Voltage (V)
1K	0.507	$\pm 10$	50	52
1.3K	0.522		50	52
1.5K	0.574		50	52
1.6K	0.596		50	52
2K	0.633		50	52
2.4K	0.691		50	52
2.7K	0.738		50	52
3.3K	0.797		50	52
3.9K	0.858		50	52
4.3K	0.895		50	52
4.7K	0.932	$\pm 7$	50	52
5.6K	0.965		50	52
6.2K	1.000		50	52
6.8K	1.020		49	51
7.5K	1.043		47	49
8.2K	1.065		46	48
9.1K	1.102		45	47
10K	1.116		44	46
11K	1.138		43	45
13K	1.175		42	44
15K	1.211	$\pm 5$	41	43
20K	1.248		40	42
22K	1.270		39	41
24K	1.292		38	40
30K	1.307		38	40
33K	1.329		37	39
43K	1.344		37	39
51K	1.365		36	38
82K	1.380		36	38
110K	1.404		35	38



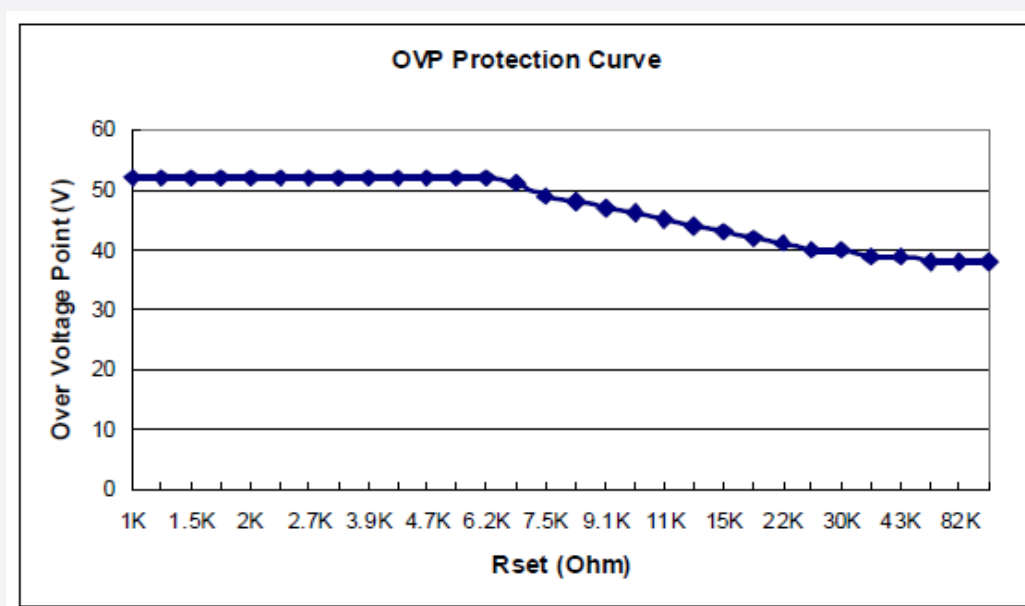
### 3. Protection

#### a) Output Short Circuit Protection

The PSU should be protected when the output short and do not result in a fire hazard, shock hazard, or damage to the PSU. The protection is **auto-recovery mode**. The test procedure is setup at LED mode and short V+ to GND, after the fault condition removed, the PSU should be auto-recovery and works normally..

#### b) Output Over Voltage Protection

When output open condition occurs, the PSU should Clamp output voltage at the Open Load Voltage and not to damage the PSU. The Open Load Voltage can adjust by Rset resistor. After the output is reloaded, the PSU should be works normally. Open Load Voltage is referring from following curve.

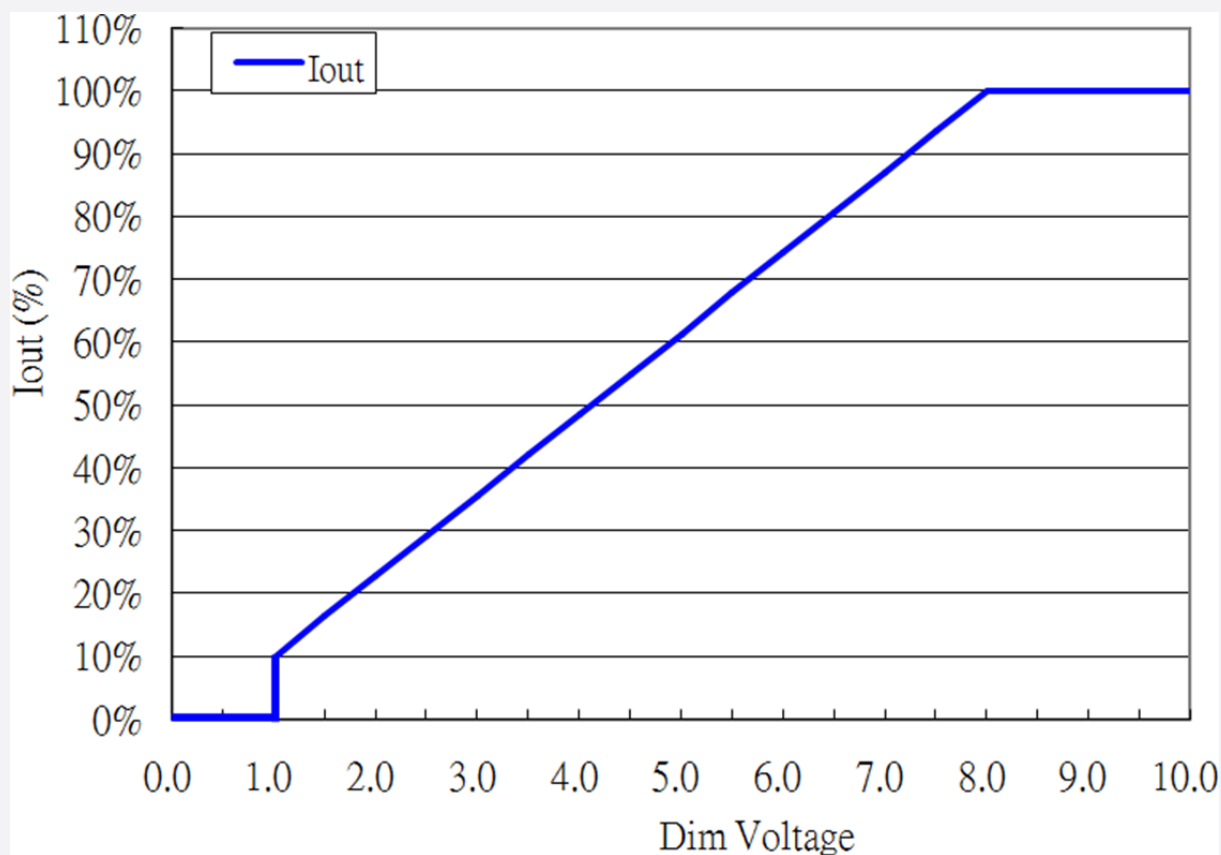


#### c) Protection tables

Protection Specification	Protection Mode	Condition
Output Short Protection	Auto-Recovery	(1) AC turn on then output short (2) Output short then AC turn on
Output Open Protection	Clamp Open Load Voltage (refer to the OVP curve)	(1) AC turn on then output open (2) Output open then AC turn on
AC Transient Protection	Auto-Recovery	120 ~ 277Vac range switching

#### 4. Dimming Specification

The unit has Analog Dimming (AD) function, using 0-10 Vdc. The typical dimming curve is shown below:  
(the current of LED module is 1.043 A at full load condition and Vout 50V)



	Symbol	Unit	Min	Typ	Max	Remark
Dimming	Range	V	0		10	
	Dim off	V	0		1	
	Dim. Min.	V	1			
	Dim Max.	V	8		10	
	I <sub>SOURCE</sub>	mA			0.6	

※ Compatible Dimmer : IP710-DL, NTSTV-DV, DVSTV

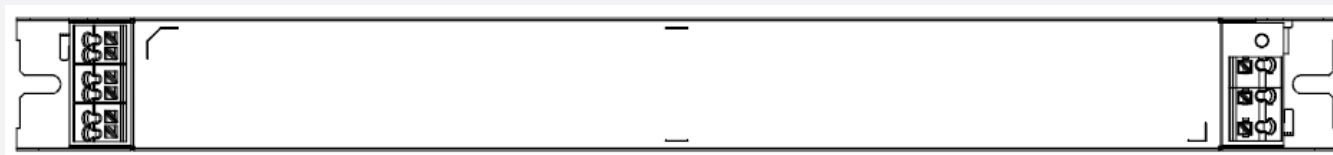
## 5. Reliability

### Test Items and Conditions

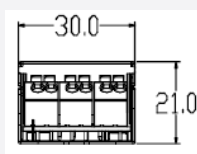
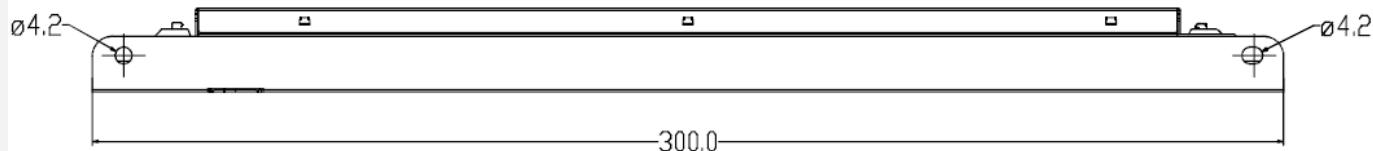
Test Item		Specification	Condition
Leakage Current		< 0.7 mA	According to IEC/EN 60950
Earth Continuity		< 0.5 $\Omega$	According to IEC/EN 61347 100 % tested in production line
Hi-Pot	Input – Output	3750 Vac, 60 s, cut-off current 10 mA	100 % tested in production line
	Input – Case	1500 Vac, 60 s, cut-off current 10 mA	100 % tested in production line
Insulation Resistance	Input – Output	500 Vdc, 60 s, insulation resistance 4 M $\Omega$	100 % tested in production line
	Input – Case	500 Vdc, 60 s, insulation resistance 2 M $\Omega$	100 % tested in production line
Surge	L / N	$\pm 1$ kV	According to IEC/EN 61547
	LN / GND	$\pm 2$ kV	
ESD	Contact	$\pm 4$ kV	According to IEC 61000-4-2
	Air	$\pm 8$ kV	

## 6. Outline Drawing & Dimension

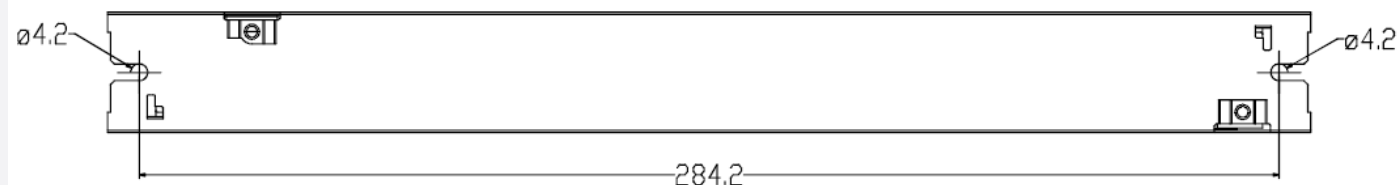
### a) Dimension (mm)



Top



Sides



Bottom

Housing material: SGCC

### b) Wiring

Connectors type (input and output): DN50A or compatible  
 Wire cross-section:  $0.5 - 1.5 \text{ mm}^2$   
 Wire peeling length: 7 - 9.5 mm





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