

# Specification for Approval

Product Name:            60W Constant Current Driver

Product Model:            X6-060M052

X6-060V052

Rev:                        C.2

XiLiSongbai Road 1061,  
Address: Nanshan District, Shenzhen City,  
Guangdong Province, P.R.China

Post Code: 518108

TEL: 0755-27657000

FAX: 0755-27657908

E-mail: wcx@mosopower.com

Web site: <http://www.mosopower.com>

<b>Prepared By</b>	<b>Checked By</b>	<b>Approved By</b>

# Specification for Approval

Produce Name:            60W Constant Current Driver

Product Model:            X6-060M052

X6-060V052

Rev:                        C.2

<b>CUSTOMER AUTHORIZED SIGNATURE</b>		
<b>Tested By</b>	<b>Checked By</b>	<b>Approved By</b>
(Company seal)Return one copy to MOSO with approved signature and company seal.		

<b>Prepared By</b>	<b>Checked By</b>	<b>Approved By</b>





### Product Feature:

- Input voltage range: 90~305Vac;
- Constant current design;
- Output current adjustable by Built-in potentiometer;
- THD<10%;
- 3-in-1 dimmable: 0~10Vdc, PWM , Resistor;
- Output and Dimming Signal Isolating, Dim to off;
- Surge protection:4KV line-line, 6KV line-earth;
- Protections: OVP, SCP,OTP;
- IP67 design for indoor and outdoor applications;
- Suitable for dry / damp / wet locations;
- 5 years warranty.

### Application

- Suitable for LED roadway lighting, plant lighting, industrial lighting, landscape lighting, etc.

### DESCRIPTION

The X6-60W is a 60W, constant-current, IP67 LED driver that operates from 90-305Vac input with excellent power factor and low THD. It is created for industrial lights, tunnel and street lights. The high efficiency of these drivers and compact metal case enable them to run cooler, significantly improving reliability and extending product life. To ensure trouble-free operation, protection is provided against input surge, output over voltage, over temperature and short circuit protection.

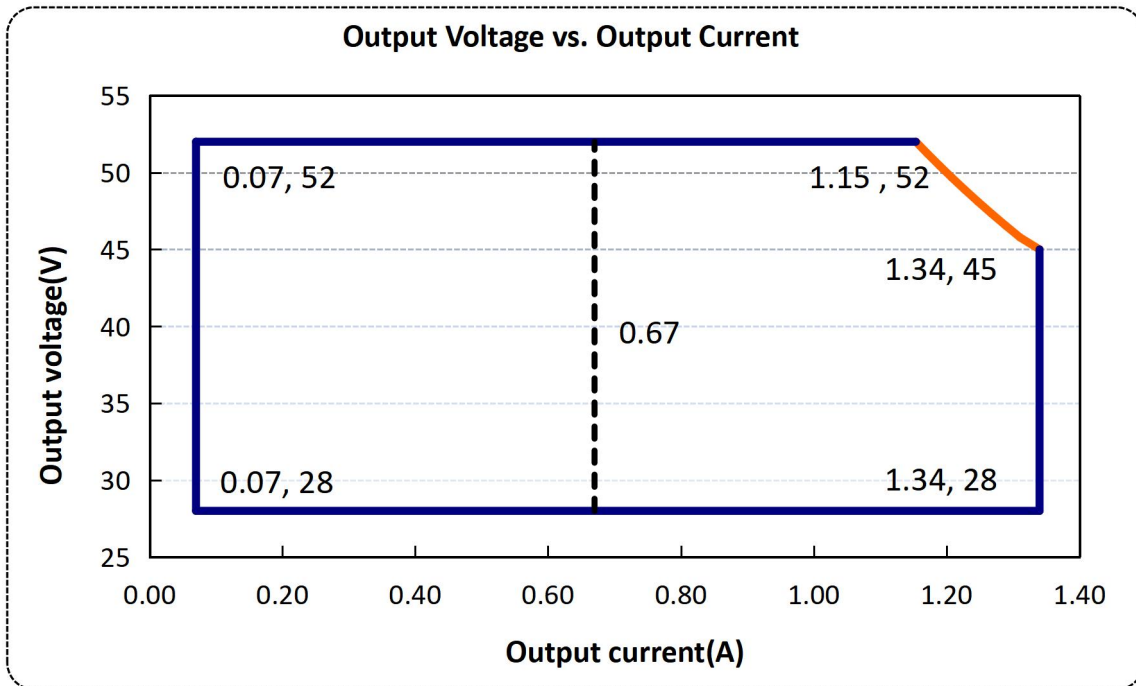
### Models

Model Number	Input voltage range(Vac)	Max Output Power (W)	Output Voltage Range (Vdc)	Default output current (A)	Typical Efficiency	Typical THD	Typical PF	
							120Vac	230Vac
X6-060M052	90-305	60	28-52	1.20	89%	5%	0.99	0.97

### Notes:

Remark: All specifications are measured at 25°C ambient temperature, input voltage 230Vac, and the typical value tested by full load, if no specific note.

### OPERATING AREA I-V



Notes: The drivers are not allowed to work in over-load condition, otherwise warranty will expire.

### INPUT SPECIFICATIONS

Parameter	Min.	Typ.	Max.	Notes
Input Voltage	90Vac	100-277Vac	305Vac	Please refer to the derating curve
Input Frequency	47Hz	50/60	63Hz	
Leakage Current	-	-	0.70mA	277Vac/ 60Hz
Input AC Current	-	-	0.80A	120-277Vac with full load
Inrush Current	-	-	0.25A <sup>2</sup> S	230Vac input, Ta=25°C (cold start)
Power Factor	0.97	0.99	-	120Vac, 50-60Hz, full load
	0.95	0.97	-	230Vac, 50-60Hz, full load
	0.90	0.92	-	277Vac, 50-60Hz, full load
THD	-	5%	10%	120-240Vac with 70%-100% load
	-	-	15%	277Vac with 70%-100% load

## OUTPUT SPECIFICATIONS

Parameter	Min.	Typ.	Max.	Notes
Output Current Tolerance	-5%	-	+5%	
Output Current Set Range(A)	0.67		1.34	
Total Output Current Ripple(pk-pk)	-	5%	10%	20MHz BW, full load & LED Load, ripple is different with difference LED load.
Startup Overshoot Current	-	5%	10%	120~277Vac & full load, LED Load
No Load Output Voltage(V) X6-060M052	-	-	80	
Line Regulation	-3%	-	+3%	25°C±10°C ambient temperature, input voltage changes from 120Vac to 277Vac.
Load Regulation	-8%	-	+8%	25°C±10°C ambient temperature, 230Vac input, load changes from 60% to 100%.
Turn-on Delay Time	-	-	1S	120Vac, 100% load
	-	-	0.5S	230Vac, 100% load
Standby Power(W)	-	-	0.5	230Vac@50Hz

## GENERAL SPECIFICATIONS

Parameter	Min.	Typ.	Max.	Notes
Efficiency @120Vac X6-060M052	86%	88%	-	Measured at full load and 25°C ambient temperature
Efficiency @230Vac X6-060M052	87%	89%	-	Measured at full load and 25°C ambient temperature
Efficiency @277Vac X6-060M052	87%	89%	-	Measured at full load and 25°C ambient temperature
Dielectric Strength	Input-Output	-	3750Vac	10mA/60S
	Input-PE	-	1600Vac	
	Output- PE	-	1600Vac	
Grounding Resistance	-	-	0.1Ω	25A/60S
Insulation Resistance	10MΩ	-	-	Input-Output, Input-PE, Output-PE, 500Vdc/60S/25°C/70%RH
MTBF	-	200000 Hours	-	230Vac, 80% load (MIL-HDBK-217F)
Lifetime	-	50000Hours	-	230Vac&100% load, 75°C case temperature, refer to lifetime VS Tc curve for details
Operating Case Temperature for Safety Tc_s	-40°C	-	+85°C	
Operating Case Temperature for Warranty Tc_w	-40°C	-	+75°C	5 Years Warranty Humidity: 10% to 95% RH

Storage Temperature	-40°C	-	+85°C	Humidity: 10% to 95% RH
Dimensions (L×W×H)mm	L132mm*W65mm*H34mm			
Net Weight	500±50g/PCS			
Package	L424mm*W354mm*H146mm; 12PCS/Ctn, Gross Weight: 8Kg			

**Note:** All specifications are tested by Cree XLamp XP-G2 and typical measured at 230Vac and 25°C unless otherwise stated.

### DIMMING

Parameter	Min.	Typ.	Max.	Notes	
0~10V Absolute Maximum Voltage on the Vdim (+) Pin	-	18V	-		
1~10V Source Current on Vdim(+)Pin	-	100uA	200uA		
Dimming Output Range	X6-060M052	5% I <sub>max</sub>	-	100% I <sub>max</sub>	I <sub>max</sub> =1.34A
	X6-060M052	0.07	-	1.34	
Recommended Dimming Range for 0-10V	0V	-	10V		
PWM_in High Level	9.7V	-	10.3V		
PWM_in Low Level	0V	-	0.3V		
PWM_in Frequency Range	300Hz	-	2KHz		
PWM_in Duty Cycle	1%	-	100%		

### SAFETY STANDARDS

Safety Category	Country / Territory	Standards	Whether have Certification
CCC	China	GB19510.1, GB19510.14	√
CE	Europe	EN61347-1, EN61347-2-13	√
		EN62493	√
		EN62384	√
ENEC			
CB	CB Countries	IEC61347-1, IEC61347-2-13	√
BIS	India	IS 15885(PART 2/SEC 13)	
UL	USA	UL 8750	
CUL	Canada	CSA C22.2 No.250.13	
KC	South Korea	K61347-1, K61347-2-13	
PSE	Japan	J61347-1, J61347-2-13	
SAA	Australia	AS/NZS IEC 61347.2.13	
		AS/NZS 61347.1	

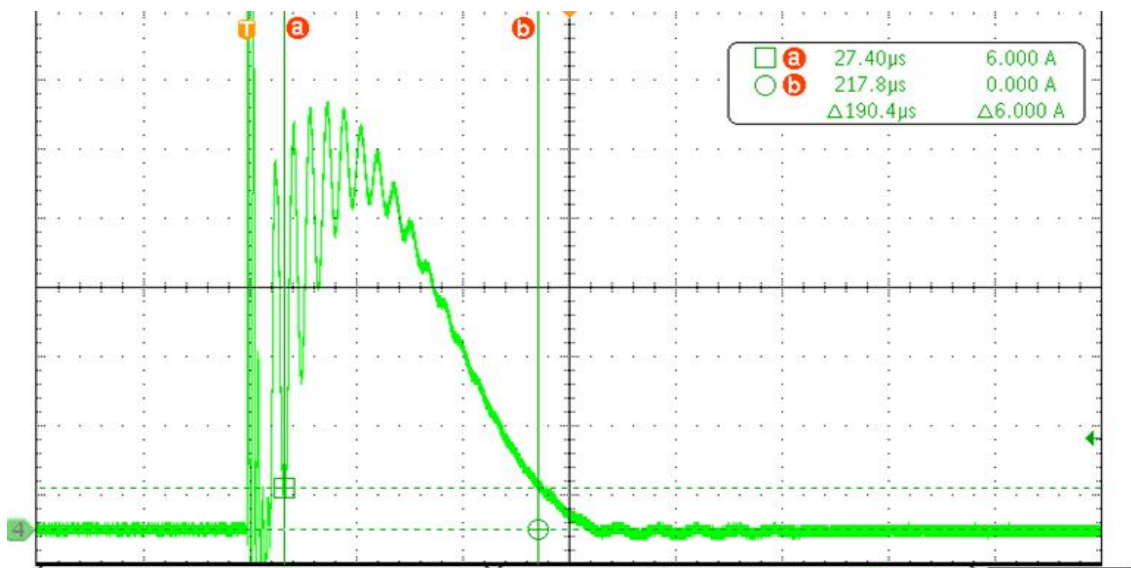
### EMC COMPLIANCE

EMC Category	Country / Territory	Standards	Whether have Certification
CCC	China	GB/T 17743, GB 17625.1	√
CE	Europe	EN 55015	√
		EN 61000-3-2, EN 61000-3-3	√
		EN61000-4-2,3,4,5,6,11	√
		EN 61547	√
KC	South Korea	K61547	
		K00015	
PSE	Japan	J55015	
FCC	USA	FCC part 15	

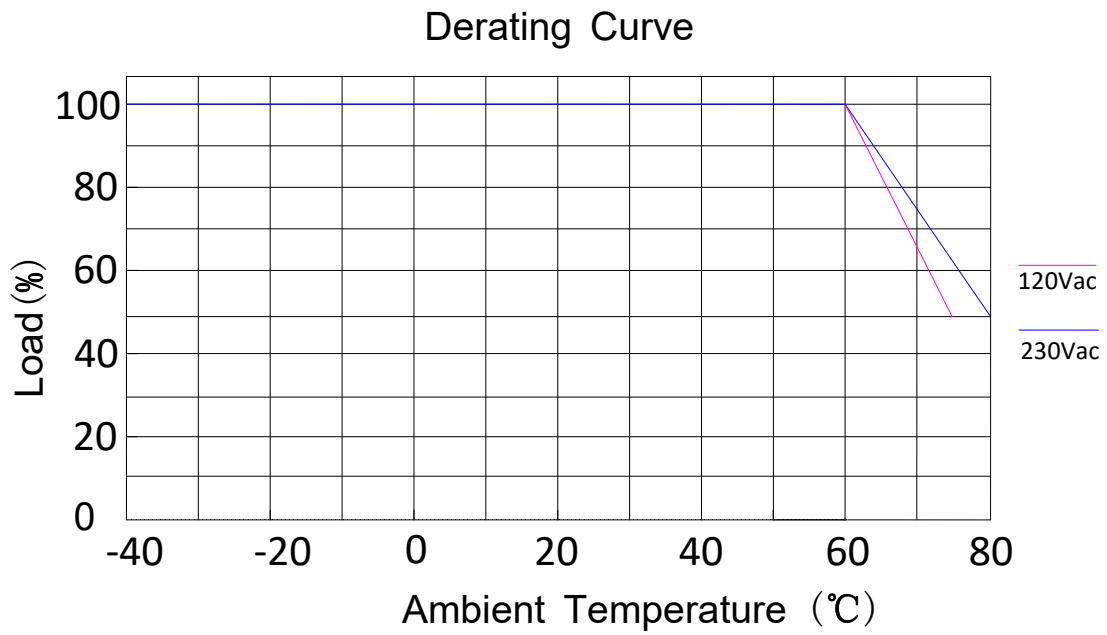
### NOTE:

This LED driver meets the EMI specifications above, but EMI performance of a luminaire that contains it depends also on the other devices connected to the driver and on the fixture itself.

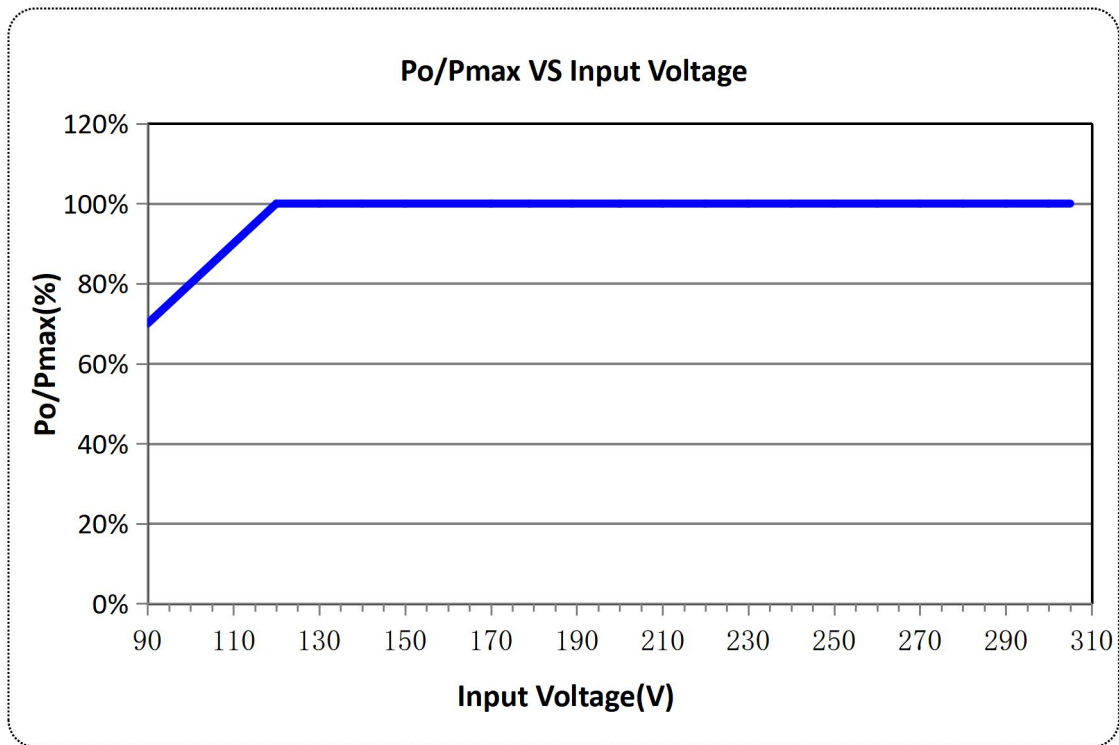
### INRUSH CURRENT WAVEFORM



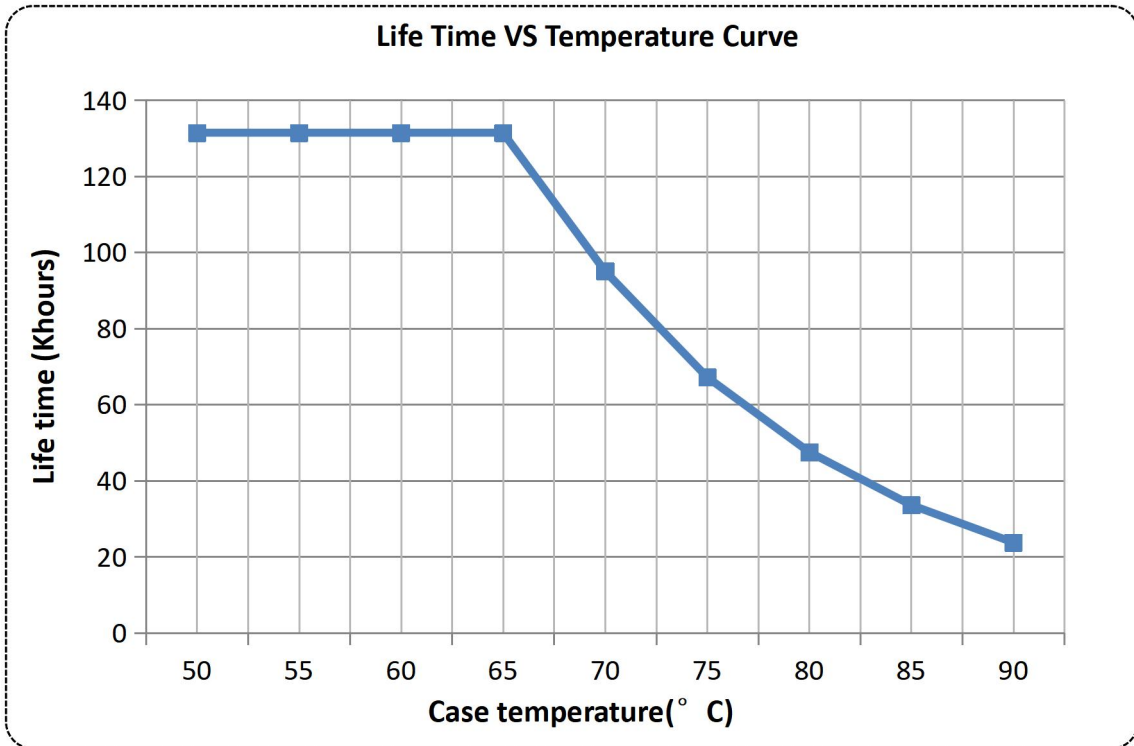
### DERATING CURVE



### OUTPUT POWER VS INPUT VOLTAGE

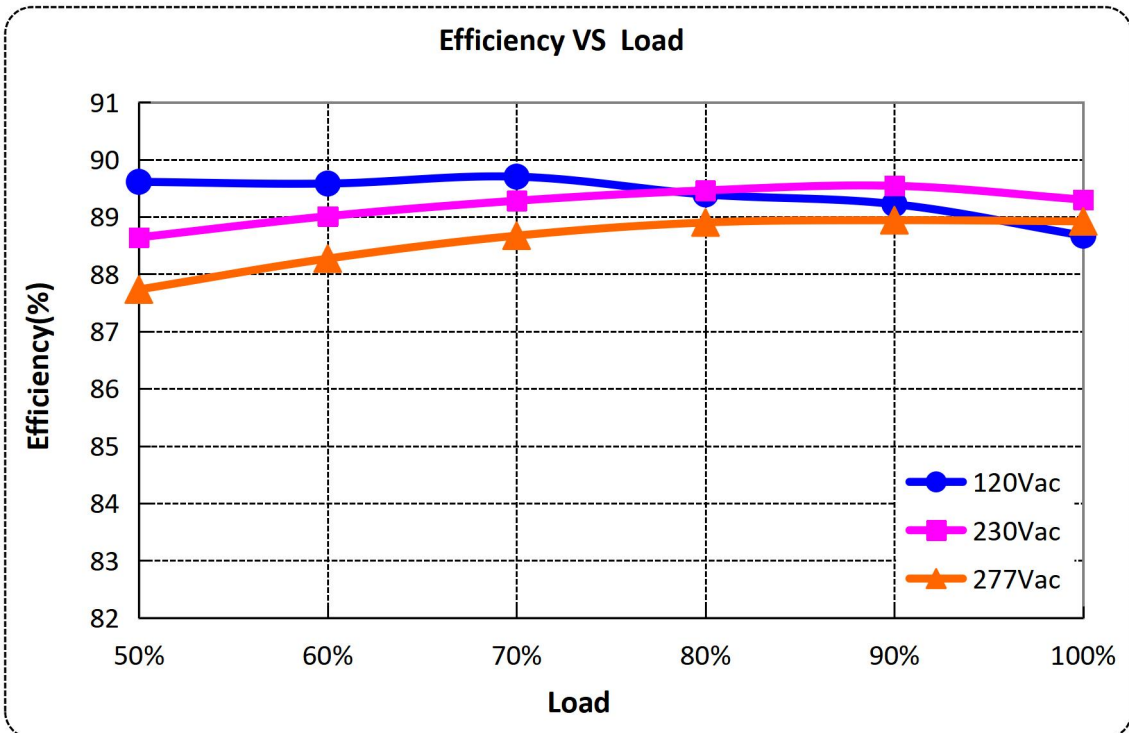


### LIFETIME VS CASE TEMPERATURE

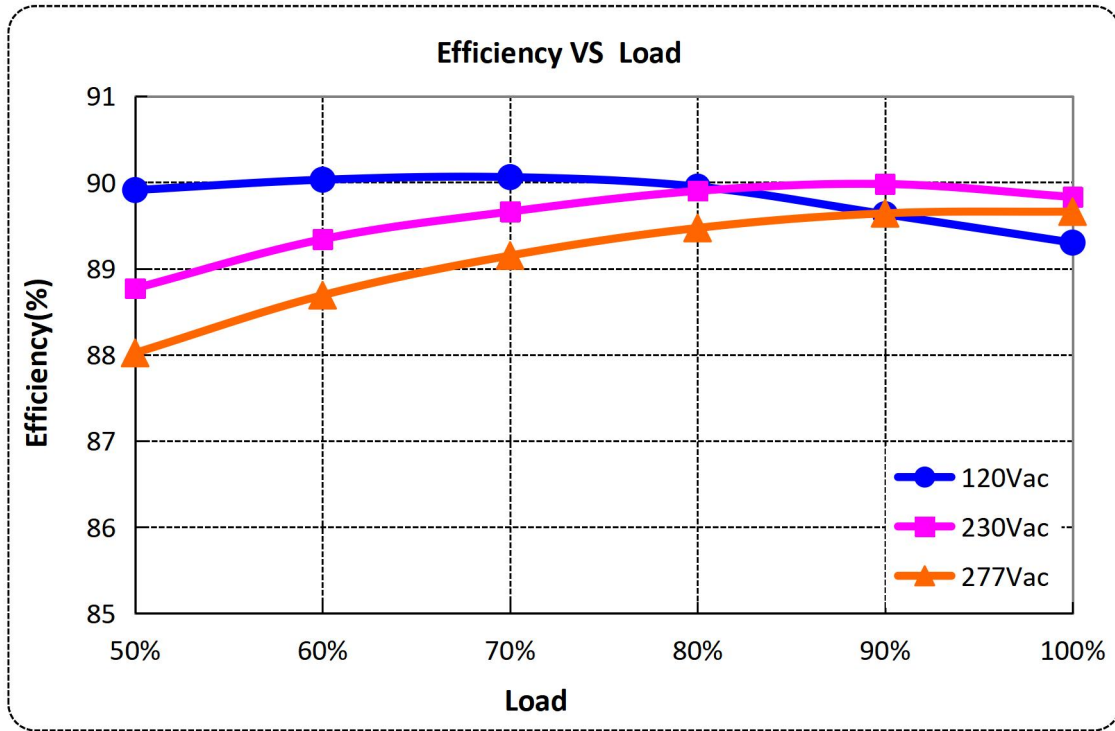


### EFFICIENCY VS LOAD

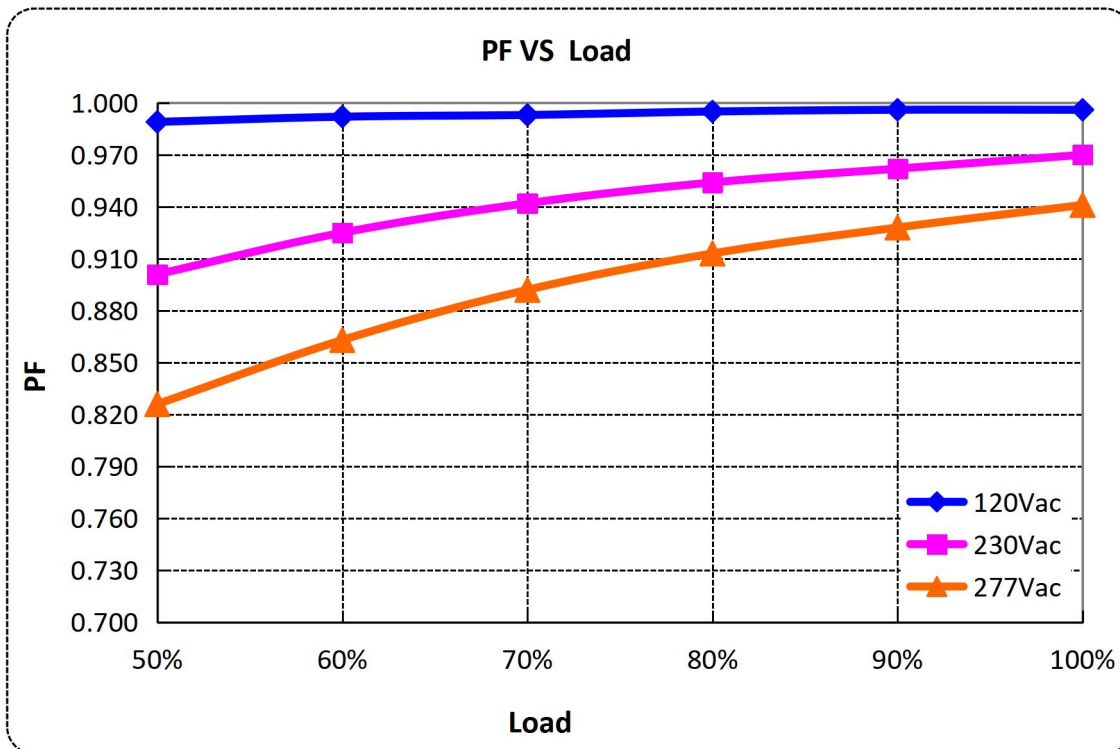
$I_o=1.34A$



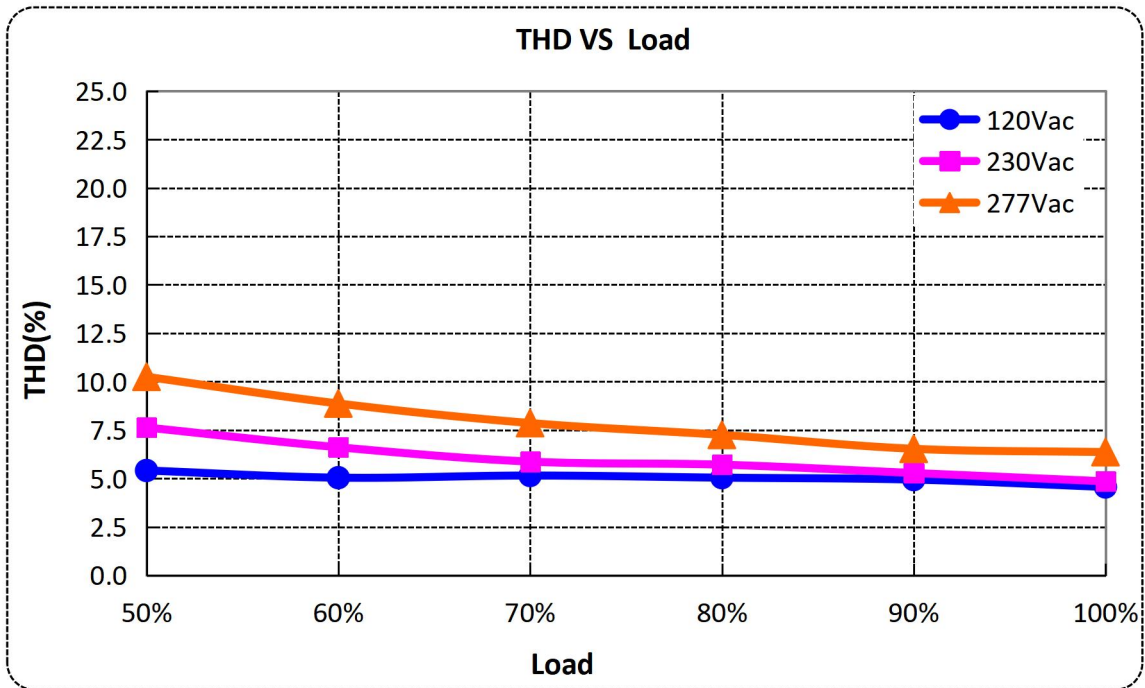
Io=1.15A



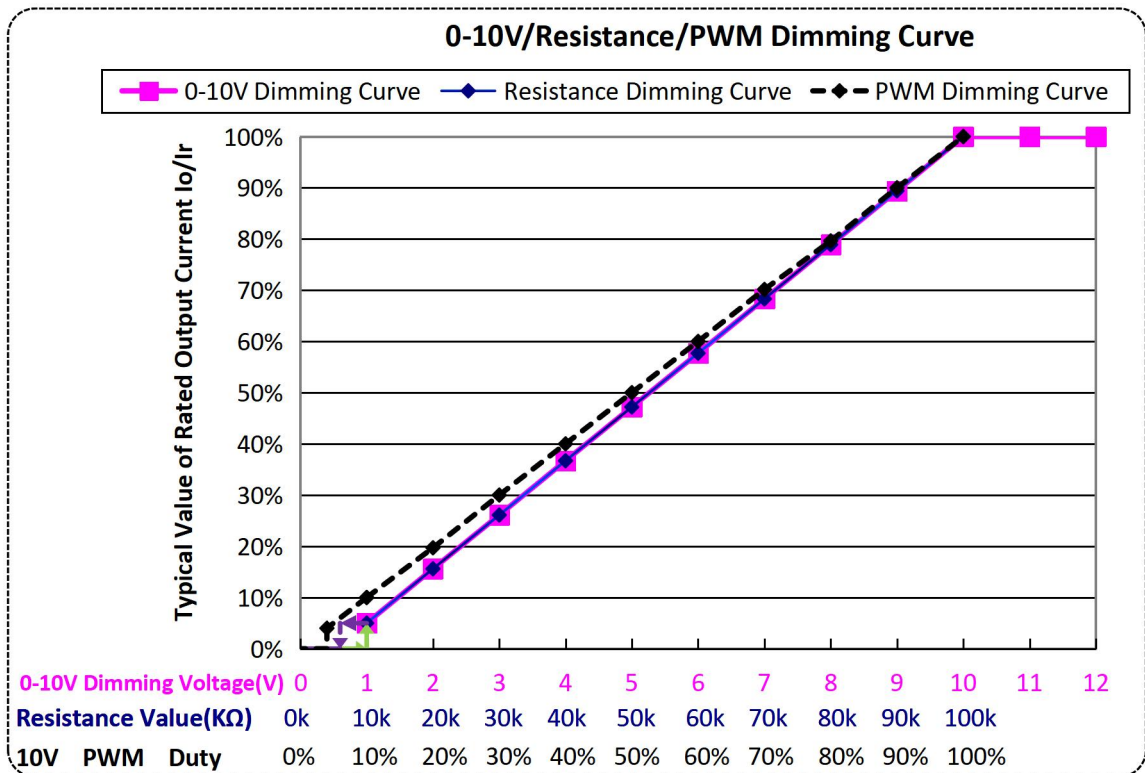
### POWER FACTOR VS LOAD



### TOTAL HARMONIC DISTORTION



### 0-10V/Resistance/PWM DIMMING CURVE



#### Notes:

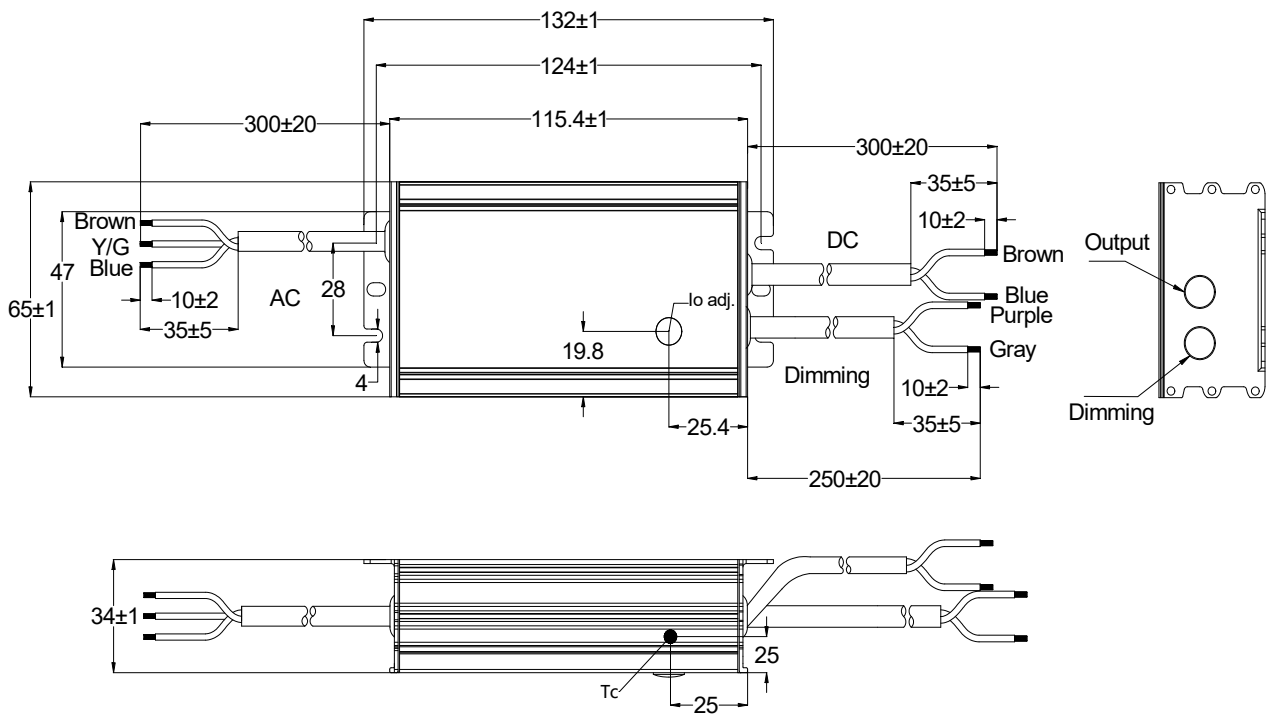
1. The minimum dimming current is about 5%  $I_{max}$ . When the output current is less than 5%  $I_{max}$ , the output current accuracy is not required;
2. When the dimming input signal reaches 0V or 10V PWM duty cycle to 0% or the resistance value reaches 0kΩ, the output can be turned off.

### PROTECTIONS

Parameter	Notes
Over Temperature Protection	Decreases output current, returning to normal after over temperature is removed.
Short Circuit Protection	Constant current mode and auto recovery. No damage will occur when any output is short circuited. The output shall return to normal when the fault condition is removed.
Output over Voltage Protection	Run into protection model when output voltage exceeds limit, and return to normal when the fault.

### MECHANICAL OUTLIN

#### X6-060M052



Wire	Specification	Note
Input	CCC+VDE H05RN-F *3C L=300±20mm	CCC/CE
Output	CCC+VDE H05RN-F *2C L=300±20mm	CCC/CE
Dimming	UL 2733 22AWG *2C L=250±20mm	Y=M

### LABEL

107.00 mm

45.50 mm

**INPUT**

L (BROWN 棕)

G (Y/G 黄/绿)

N (BLUE 蓝)

**MOSO<sup>®</sup> X6-060M052**  
LED DRIVER  
LED 控制装置(恒流型, 内置防雷管)

INPUT (输入)	100-240V~ 50/60Hz, 0.80A Max. PF:0.95 277V~ 50/60Hz, 0.40A Max (277V~ for North America only)
OUTPUT (输出)	28-52V--- 0.134-1.340A Max. (最大电压): 80V --- Max. Power(最大功率): 60W
t <sub>c</sub> : 85°C	t <sub>a</sub> : 60°C Input: 100-240V~, 277V~

**SELV**

MADE IN CHINA  
For LED module only

SHENZHEN MOSO ELECTRONICS TECHNOLOGY CO., LTD  
No. 1061, Songbai Road, Xili Town, Nanshan District,  
Shenzhen, CHINA

**OUTPUT**

(BROWN 棕) Vo +

(BLUE 蓝) Vo -

(PURPLE 紫) DIM +

(GRAY 灰) DIM -

lo adj.