



LED Driver • Constant Voltage • 60W
MEAN WELL PWM-60 Series



■ Features

- Constant Voltage PWM style output with frequency 1.47kHz
- Plastic housing with class II design
- Built-in active PFC function
- Class 2 power unit
- No load power consumption <0.5W
- Fully encapsulated with IP67 level
- Function: 3 in 1 dimming(dim-to-off); DALI
- Minimum dimming level 0.2% for DA type
- Typical lifetime>50000 hours and 5 years warranty

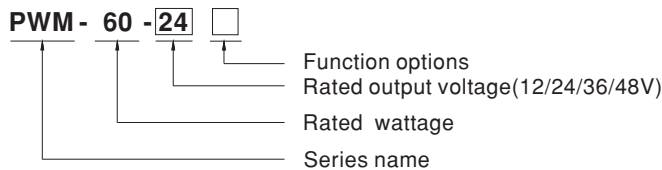
■ Applications

- LED strip lighting
- Indoor LED lighting
- LED decorative lighting
- LED architecture lighting
- Type “HL” for use in Class I, Division 2 hazardous (Classified) location.

■ Description

PWM-60 series is a 60W LED AC/DC LED driver featuring the constant voltage mode with PWM style output, which is able to maintain the brightness homogeneity when driving all kinds of LED strips. PWM-60 operates from 90~305VAC and offers models with different rated voltage ranging between 12V and 48V. Thanks to the high efficiency up to 90%, with the fanless design, the entire series is able to operate for -40°C ~ +85°C case temperature under free air convection. The entire series is rated with IP67 ingress protection level and is suitable to work for dry, damp or wet locations. PWM-60 is equipped with dimming function that varies the duty cycle of the output, providing great flexibility for LED strips applications.

■ Model Encoding



Type	IP Level	Function	Note
Blank	IP67	3 in 1 dimming function (0~10Vdc, 10V PWM signal and resistance)	In stock
DA	IP67	DALI control technology.(for 12V/24V with DA type only)	In stock



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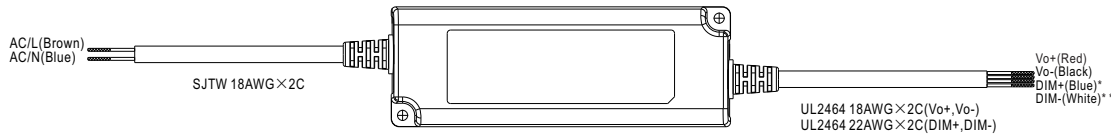
SPECIFICATION

MODEL	PWM-60-12□	PWM-60-24□	PWM-60-36□	PWM-60-48□	
OUTPUT	DC VOLTAGE	12V	24V	36V	48V
	RATED CURRENT	5A	2.5A	1.67A	1.25A
	RATED POWER	60W	60W	60.12W	60W
	DIMMING RANGE	0 ~ 100%			
	PWM FREQUENCY (Typ.)	1.47kHz			
	SETUP, RISE TIME Note.2	500ms, 80ms/ 115AC or 230VAC			
	HOLD UP TIME (Typ.)	16ms/115VAC or 230VAC			
INPUT	VOLTAGE RANGE Note.3	90 ~ 305VAC 127 ~ 431VDC (Please refer to "STATIC CHARACTERISTIC" section)			
	FREQUENCY RANGE	47 ~ 63Hz			
	POWER FACTOR (Typ.)	PF>0.97/115VAC, PF>0.95/230VAC, PF>0.92/277VAC @ full load (Please refer to "POWER FACTOR (PF) CHARACTERISTIC" section)			
	TOTAL HARMONIC DISTORTION	THD< 20% (@load≥60%/115VAC, 230VAC; @load≥75%/277VAC) (Please refer to "TOTAL HARMONIC DISTORTION" section)			
	EFFICIENCY (Typ.)	86%	89%	90%	90%
	AC CURRENT (Typ.)	0.8A / 115VAC 0.4A / 230VAC 0.32A / 277VAC			
	INRUSH CURRENT (Typ.)	COLD START 50A(twidth=270μs measured at 50% Ipeak) at 230VAC; Per NEMA 410			
	MAX. NO. of PSUs on 16A CIRCUIT BREAKER	9 units (circuit breaker of type B) / 16 units (circuit breaker of type C) at 230VAC			
	LEAKAGE CURRENT	<0.25mA / 277VAC			
	NO LOAD POWER CONSUMPTION	<0.5W			
PROTECTION	OVERLOAD	108 ~ 130% rated output power Hiccup mode, recovers automatically after fault condition is removed			
	SHORT CIRCUIT	Shut down o/p voltage, re-power on to recover			
	OVER VOLTAGE	15 ~ 17V	28 ~ 34V	41 ~ 46V	54 ~ 60V
	OVER TEMPERATURE	Shut down o/p voltage, re-power on to recover			
	ENVIRONMENT	WORKING TEMP.	Tcase=-40 ~ +85°C (Please refer to "OUTPUT LOAD vs TEMPERATURE" section)		
MAX. CASE TEMP.		Tcase=+85°C			
WORKING HUMIDITY		20 ~ 95% RH non-condensing			
STORAGE TEMP., HUMIDITY		-40 ~ +80°C, 10 ~ 95% RH			
TEMP. COEFFICIENT		±0.03%/°C (0 ~ 50°C)			
VIBRATION		10 ~ 500Hz, 5G 12min./1cycle, period for 72min. each along X, Y, Z axes			
SAFETY & EMC	SAFETY STANDARDS Note.5	UL8750 (type "HL") (except for DA-Type), UL879 (for 12V,24V Blank Type only), CSA C22.2 No. 250.13-12; ENEC EN61347-1, EN61347-2-13 independent, EN62384, IP67, BIS IS15885 (for 12,24,48 Blank Type only), EAC TP TC 004, GB19510.1, GB19510.14 approved; Design refer to EN60335-1			
	DALI STANDARDS	Comply with IEC62386-101, 102, 207 for DA-Type only, Device type 6(DT6)			
	WITHSTAND VOLTAGE	I/P-O/P: 3.75KVAC			
	ISOLATION RESISTANCE	I/P-O/P: 100M Ohms / 500VDC / 25°C / 70% RH			
	EMC EMISSION Note.6	Compliance to EN55015, EN61000-3-2 Class C (@load≥60%); EN61000-3-3, GB17743 and GB17625.1, EAC TP TC 020			
	EMC IMMUNITY	Compliance to EN61000-4-2, 3, 4, 5, 6, 8, 11; EN61547, light industry level (surge immunity Line-Line 2KV), EAC TP TC 020			
OTHERS	MTBF	996K hrs min. Telcordia SR-332 (Bellcore); 271.03K hrs min. MIL-HDBK-217F (25°C)			
	DIMENSION	150*53*35mm (L*W*H)			
	PACKING	0.49Kg; 30pcs/15.7Kg/1.0CUFT			
NOTE	<ol style="list-style-type: none"> All parameters NOT specially mentioned are measured at 230VAC input, rated current and 25°C of ambient temperature. De-rating may be needed under low input voltages. Please refer to "STATIC CHARACTERISTIC" sections for details. Length of set up time is measured at first cold start. Turning ON/OFF the driver may lead to increase of the set up time. The driver is considered as a component that will be operated in combination with final equipment. Since EMC performance will be affected by the complete installation, the final equipment manufacturers must re-qualify EMC Directive on the complete installation again. This series meets the typical life expectancy of >50,000 hours of operation when Tcase, particularly (C) point (or TMP, per DLC), is about 75°C or less. Please refer to the warranty statement The ambient temperature derating of 3.5°C/1000m with fanless models and of 5°C/1000m with fan models for operating altitude higher than 2000m(6500ft). For any application note and IP water proof function installation caution, please refer our user manual before using. 				

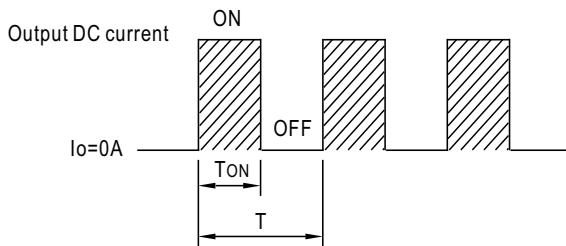


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MEAN WELL PWM-60 Series

DIMMING OPERATION



- ※ **Dimming principle for PWM style output**
- Dimming is achieved by varying the duty cycle of the output current.



$$\text{Duty cycle(\%)} = \frac{T_{ON}}{T} \times 100\%$$

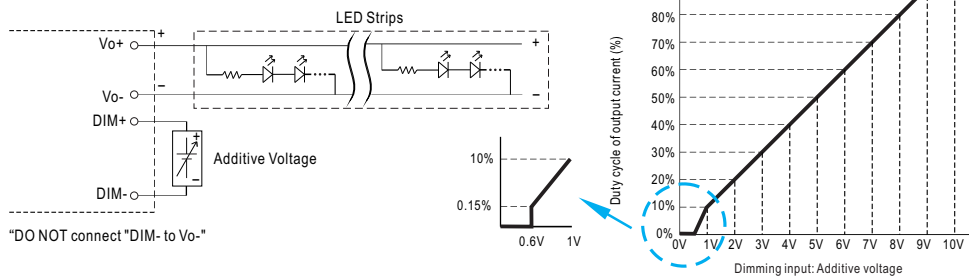
Output PWM frequency : 1.47kHz fixed (Typ.)

* DIM+ for Blank-Type
DA+ for DA-type
** DIM- for Blank-Type
DA- for DA-type
NOTE: DA Type is no distinction between "+" and "-" poles

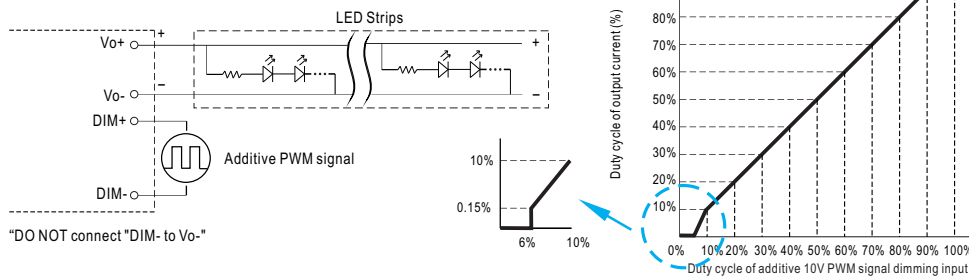
※ 3 in 1 dimming function (for Blank-Type)

- Apply one of the three methodologies between DIM+ and DIM-: 0 ~ 10VDC, or 10V PWM signal or resistance.
- Dimming source current from power supply: 100µA (typ.)

◎ Applying additive 0 ~ 10VDC



◎ Applying additive 10V PWM signal (frequency range 100Hz ~ 3KHz):





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© Applying additive resistance:

LED Strips

Vo+ +

Vo- -

DIM+ o

DIM- o

Additive Resistance

"DO NOT connect DIM- to Vo-"

Duty cycle of output current (%)

Dimming Input: Additive resistance

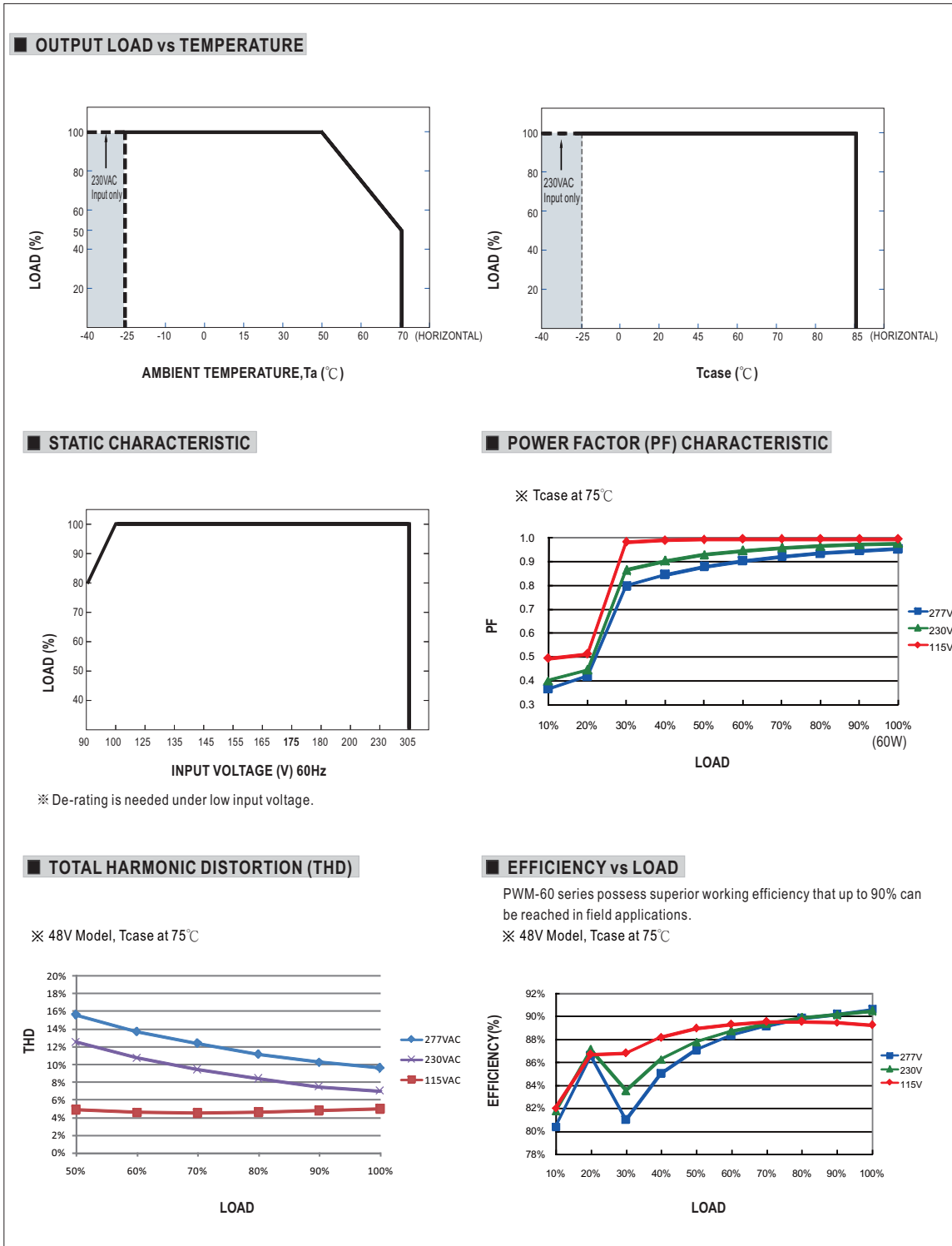
Note : 1. Min. duty cycle of output current is about 6% and the output current is not defined when $0\% < I_{out} < 6\%$.
2. The duty cycle of output current could drop down to 0% when dimming input is about $0k\Omega$ or $0V_{dc}$, or 10V PWM signal with 0% duty cycle.

※ DALI Interface (primary side; for DA-Type)

- Apply DALI signal between DA+ and DA-.
- DALI protocol comprises 16 groups and 64 addresses.
- First step is fixed at 0.2% of output

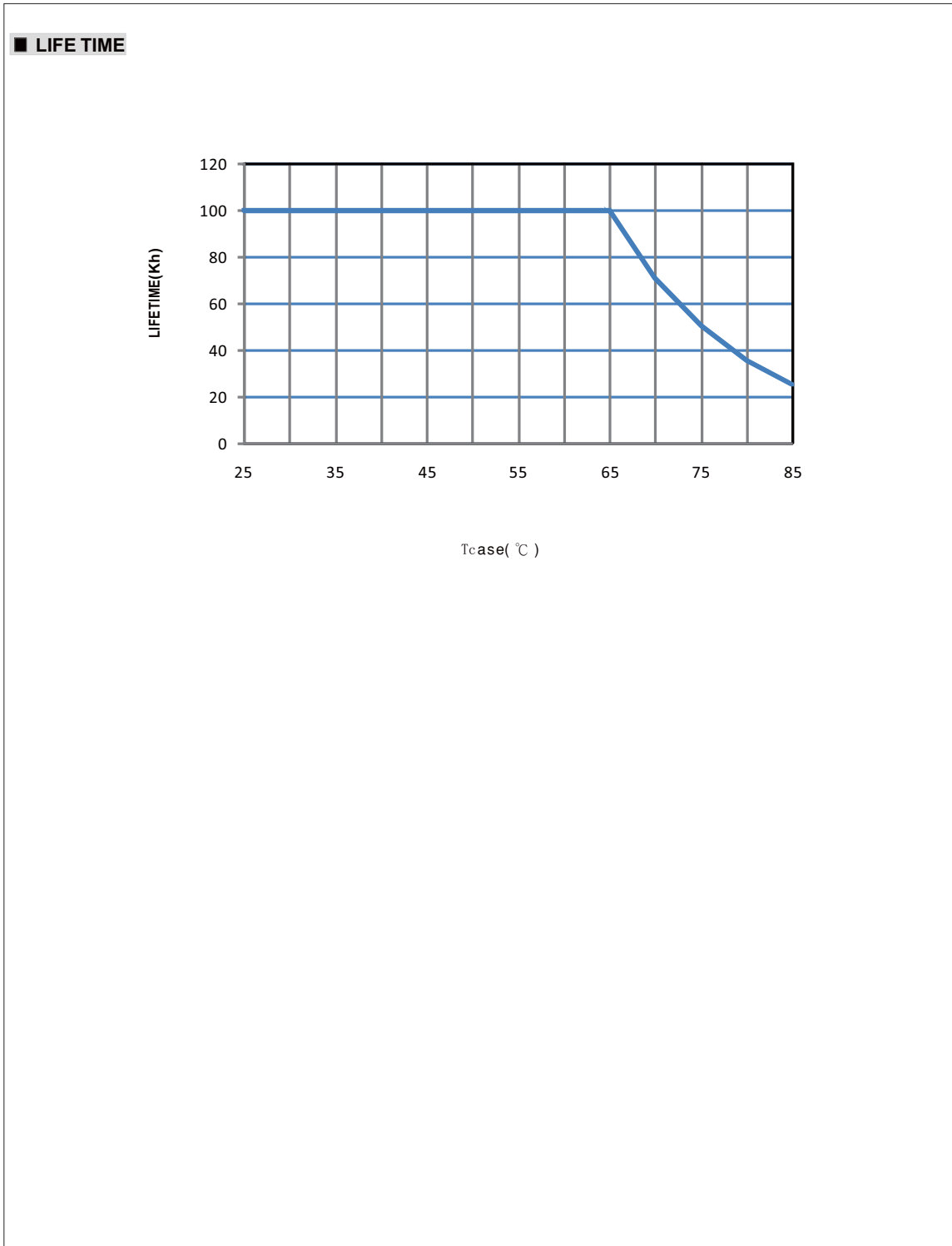


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MEAN WELL PWM-60 Series





■ Features

- Constant Voltage PWM style output with frequency 1.47kHz
- Plastic housing with class II design
- Built-in active PFC function
- Class 2 power unit(except PWM-90-12)
- No load power consumption <0.5W
- Fully encapsulated with IP67 level
- Function: 3 in 1 dimming (dim-to-off); DALI
- Minimum dimming level 0.2% for DA type
- Typical lifetime>50000 hours and 5 years warranty

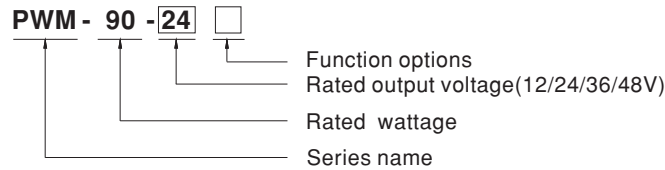
■ Applications

- LED strip lighting
- Indoor LED lighting
- LED decorative lighting
- LED architecture lighting

■ Description

PWM-90 series is a 90W LED AC/DC LED driver featuring the constant voltage mode with PWM style output, which is able to maintain the brightness homogeneity when driving all kinds of LED strips.PWM-90 operates from 90~305VAC and offers models with different rated voltage ranging between 12V and 48V. Thanks to the high efficiency up to 90.5%, with the fanless design, the entire series is able to operate for -40°C ~ +85°C case temperature under free air convection. The entire series is rated with IP67 ingress protection level and is suitable to work for dry, damp or wet locations. PWM-90 is equipped with dimming function that varies the duty cycle of the output, providing great flexibility for LED strips applications.

■ Model Encoding



Type	IP Level	Function	Note
Blank	IP67	3 in 1 dimming function (0~10Vdc, 10V PWM signal and resistance)	In Stock
DA	IP67	DALI control technology(for 12V/24V with DA type only)	In Stock



LED Driver • Constant Voltage • 90W
MEAN WELL PWM-90 Series

SPECIFICATION

MODEL		PWM-90-12□	PWM-90-24□	PWM-90-36□	PWM-90-48□
OUTPUT	DC VOLTAGE	12V	24V	36V	48V
	RATED CURRENT	7.5A	3.75A	2.5A	1.88A
	RATED POWER	90W	90W	90W	90.24W
	DIMMING RANGE	0 ~ 100%			
	PWM FREQUENCY (Typ.)	1.47kHz			
	SETUP, RISE TIME Note.2	500ms, 80ms/ 115VAC or 230VAC			
	HOLD UP TIME (Typ.)	16ms/115VAC or 230VAC			
INPUT	VOLTAGE RANGE Note.3	90 ~ 305VAC 127 ~ 431VDC (Please refer to "STATIC CHARACTERISTIC" section)			
	FREQUENCY RANGE	47 ~ 63Hz			
	POWER FACTOR (Typ.)	PF>0.98/115VAC, PF>0.96/230VAC, PF>0.92/277VAC @ full load (Please refer to "POWER FACTOR (PF) CHARACTERISTIC" section)			
	TOTAL HARMONIC DISTORTION	THD< 20% (@load≥60%/115VAC, 230VAC; @load≥75%/277VAC) (Please refer to "TOTAL HARMONIC DISTORTION" section)			
	EFFICIENCY (Typ.)	88%	90.5%	90.5%	90.5%
	AC CURRENT (Typ.)	0.95A / 115VAC	0.5A / 230VAC	0.4A / 277VAC	
	INRUSH CURRENT (Typ.)	COLD START 60A(twidth=550μs measured at 50% Ipeak) at 230VAC; Per NEMA 410			
	MAX. NO. of PSUs on 16A CIRCUIT BREAKER	3 units (circuit breaker of type B) / 6 units (circuit breaker of type C) at 230VAC			
	LEAKAGE CURRENT	<0.25mA / 277VAC			
	NO LOAD POWER CONSUMPTION	<0.5W			
PROTECTION	OVERLOAD	108 ~ 130% rated output power Hiccup mode, recovers automatically after fault condition is removed			
	SHORT CIRCUIT	Shut down o/p voltage, re-power on to recover			
	OVER VOLTAGE	15 ~ 17V	28 ~ 34V	41 ~ 46V	54 ~ 60V
	OVER TEMPERATURE	Shut down o/p voltage, re-power on to recover			
	WORKING TEMP.	Tcase=-40 ~ +85°C (Please refer to "OUTPUT LOAD vs TEMPERATURE" section)			
ENVIRONMENT	MAX. CASE TEMP.	Tcase=+85°C			
	WORKING HUMIDITY	20 ~ 95% RH non-condensing			
	STORAGE TEMP., HUMIDITY	-40 ~ +80°C, 10 ~ 95% RH			
	TEMP. COEFFICIENT	±0.03%/°C (0 ~ 50°C)			
	VIBRATION	10 ~ 500Hz, 5G 12min./1cycle, period for 72min. each along X, Y, Z axes			
SAFETY & EMC	SAFETY STANDARDS Note.5	UL8750(except for DA-Type), CSA C22.2 No. 250.13-12; ENEC EN61347-1, EN61347-2-13 independent, EN62384, IP67, BIS IS15885(for 12,24,48 Blank Type only), EAC TP TC 004, GB19510.1, GB19510.14 approved; Design refer to EN60335-1			
	DALI STANDARDS	Comply with IEC62386-101, 102, 207 for DA-Type only, Device type 6(DT6)			
	WITHSTAND VOLTAGE	I/P-O/P:3.75KVAC			
	ISOLATION RESISTANCE	I/P-O/P:100M Ohms / 500VDC / 25°C / 70% RH			
	EMC EMISSION Note.6	Compliance to EN55015, EN61000-3-2 Class C (@load≥60%); EN61000-3-3, GB17743 and GB17625.1, EAC TP TC 020			
OTHERS	EMC IMMUNITY	Compliance to EN61000-4-2,3,4,5,6,8,11; EN61547, light industry level (surge immunity Line-Line 2KV), EAC TP TC 020			
	MTBF	902.4K hrs min. Telcordia SR-332 (Bellcore); 224.2K hrs min. MIL-HDBK-217F (25°C)			
	DIMENSION	171*63*37.5mm (L*W*H)			
	PACKING	0.77Kg; 18pcs/14.9Kg/0.97CUFT			
NOTE	<ol style="list-style-type: none"> All parameters NOT specially mentioned are measured at 230VAC input, rated current and 25°C of ambient temperature. De-rating may be needed under low input voltages. Please refer to "STATIC CHARACTERISTIC" sections for details. Length of set up time is measured at first cold start. Turning ON/OFF the driver may lead to increase of the set up time. The driver is considered as a component that will be operated in combination with final equipment. Since EMC performance will be affected by the complete installation, the final equipment manufacturers must re-qualify EMC Directive on the complete installation again. This series meets the typical life expectancy of >50,000 hours of operation when Tcase, particularly (⊙) point (or TMP, per DLC), is about 75°C or less. Please refer to the warranty statement on MEAN WELL's website The ambient temperature derating of 3.5°C/1000m with fanless models and of 5°C/1000m with fan models for operating altitude higher than 2000m(6500ft). For any application note and IP water proof function installation caution, please refer our user manual before using. 				



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■ DIMMING OPERATION

※ Dimming principle for PWM style output

- Dimming is achieved by varying the duty cycle of the output current.

Output DC current

Duty cycle(%) = $\frac{T_{ON}}{T} \times 100\%$

Output PWM frequency : 1.47kHz fixed (Typ.)

※ 3 in 1 dimming function (for Blank-Type)

- Apply one of the three methodologies between DIM+ and DIM-: 0 ~ 10VDC, or 10V PWM signal or resistance.
- Dimming source current from power supply: 100µA (typ.)

© Applying additive 0 ~ 10VDC

© Applying additive 10V PWM signal (frequency range 100Hz ~ 3KHz):

*** DIM+ for Blank-Type
DA+ for DA-type
** DIM- for Blank-Type
DA- for DA-type
NOTE: DA Type is no distinction between "+" and "-" poles**



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MEAN WELL PWM-90 Series

© Applying additive resistance:

LED Strips

Vo+ +

Vo- -

DIM+ o

DIM- o

Additive Resistance

"DO NOT connect DIM- to Vo-"

Duty cycle of output current (%)

Dimming input: Additive resistance

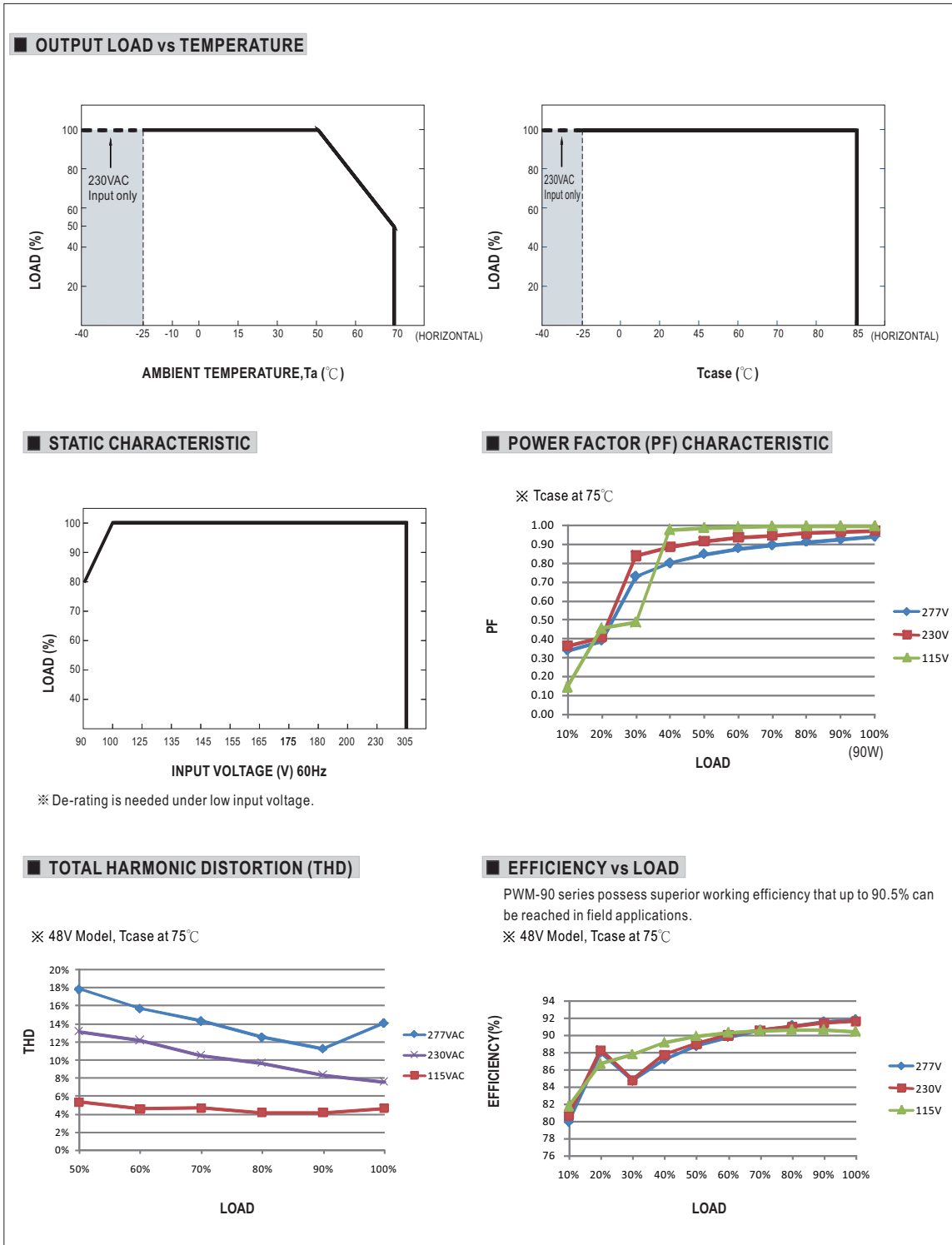
Note : 1. Min. duty cycle of output current is about 0.15%, and the dimming input is about 6KΩ or 0.6VDC, or 10V PWM signal with 6% duty cycle.
2. The duty cycle of output current could drop down to 0% when dimming input is less than 6KΩ or less than 0.6VDC, or 10V PWM signal with duty cycle less than 6%.

※ DALI Interface (primary side; for DA-Type)

- Apply DALI signal between DA+ and DA-.
- DALI protocol comprises 16 groups and 64 addresses.
- First step is fixed at 0.2% of output

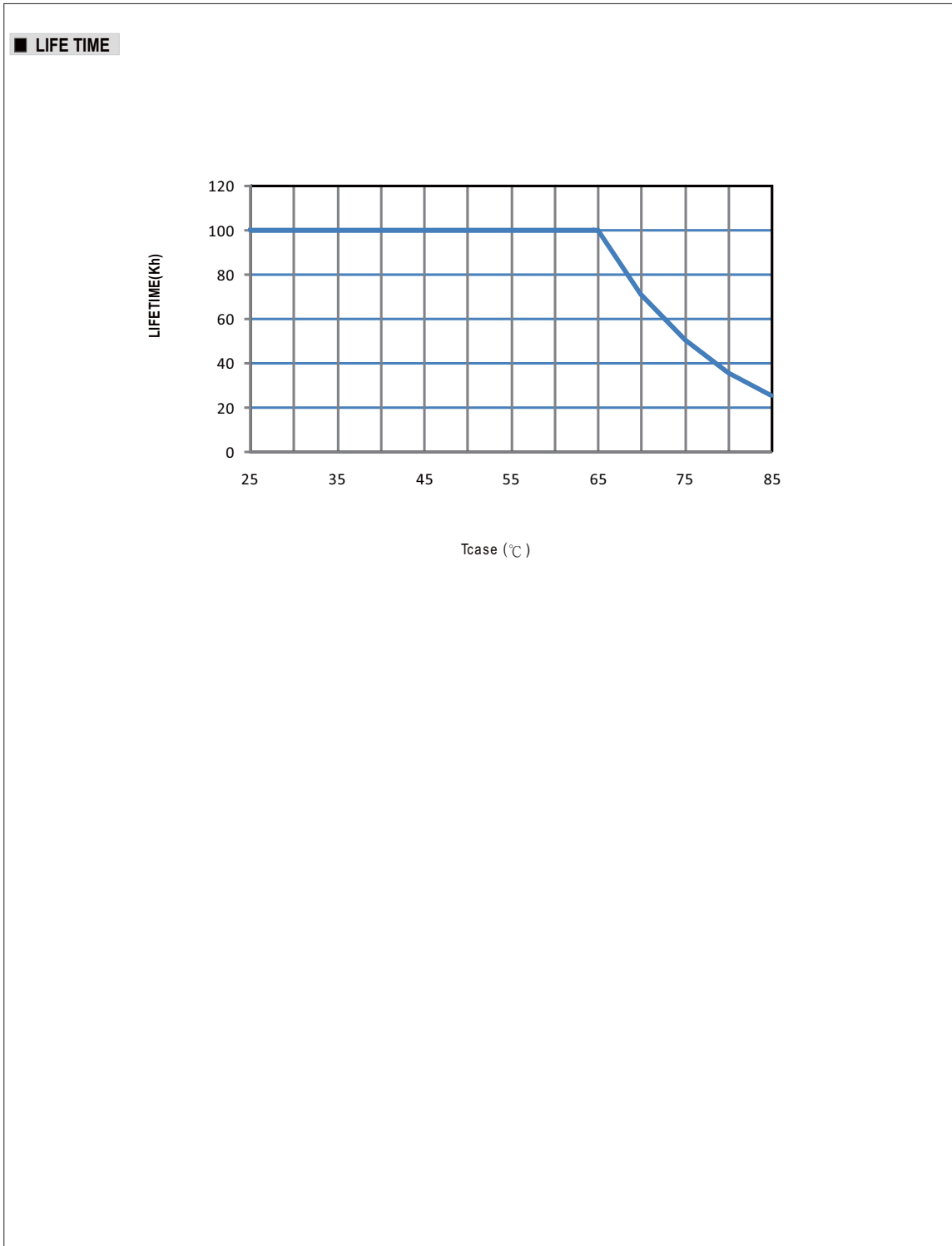


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XFL Driver Compatibility Matrix									
Driver Manufacturer		Meanwell	Meanwell	Meanwell	Meanwell	Meanwell	Meanwell	Meanwell	Meanwell
Driver Part Number		XLD-ND-MD-OWA-90U-24-P1M	XLD-ND-MW-OWA-60U-24-P1M	XLD-D010-PWM-60-24	PWM-60-24-DA ³	XLD-D010-MW-PWM-90-24	PWM-90-24-DA ³	XLD-ND-MW-LPV-60-24	XLD-ND-MW-LPV-100-24
Input	Voltage Range	90-264VAC	90-264VAC	90-305VAC	90-305VAC	90-305VAC	90-305VAC	90-264VAC	90-264VAC
Output	Rated Current (A)	2.5	3.75A	2.5	2.5	3.75	3.75	2.5	4.2
	Rated Power (W)	90	60	60	60	90	90	60	100.8
Dimmable		No	No	Yes [PWM Freq. 1.47 kHz]				No	No
Dimming Options	1-10V Signal Input (Analog)			✓		✓			
	10V PWM Input (Digital)			✓		✓			
	DALI (DT6)				✓		✓		
Lighting Safety		UL8750	UL8750	UL8750	UL8750	UL8750	UL8750	UL8750	UL8750
IP rating		IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67
Static White	XFL-SWxx95-2401	27.4	18.3	18.3	18.3	27.4	27.4	18.3	30.7
	XFL-SWxx95-2403	9.1	6.1	6.1	6.1	9.1	9.1	6.1	10.2
	XFL-SWxx95-2404	6.2	4.2	4.2	4.2	6.2	6.2	4.2	7.0
	XFL-SWxx95-2405	5.5	3.7	3.7	3.7	5.5	5.5	3.7	6.4
	XFL-SWxx95-2406	4.6	3.0	3.0	3.0	4.6	4.6	3.0	5.1
High Density	XFL-HDxx95-2403	9.1	6.1	6.1	6.1	9.1	9.1	6.1	10.2
	XFL-HDxx95-2404	6.2	4.2	4.2	4.2	6.2	6.2	4.2	7.0
	XFL-HDxx95-2405	5.5	3.7	3.7	3.7	5.5	5.5	3.7	6.1
	XFL-HDxx95-2407	4.2	2.8	2.8	2.8	4.2	4.2	2.8	4.7
Full Spectrum	XFL-FSxx95-2403	9.1	6.1	6.1	6.1	9.1	9.1	6.1	10.2
	XFL-FSxx95-2404	6.2	4.2	4.2	4.2	6.2	6.2	4.2	7.0
	XFL-FSxx95-2405	5.5	3.7	3.7	3.7	5.5	5.5	3.7	6.1
	XFL-FSxx95-2406	4.6	3.0	3.0	3.0	4.6	4.6	3.0	5.1
Side Emmiting	XFL-SExx95-2403	9.1	6.1	6.1	6.1	9.1	9.1	6.1	10.2
Ultra Slim	XFL-USxx95-2403	7.4	4.9	4.9	4.9	7.4	7.4	4.9	8.3
Warm Dim	XFL-DWT3D5-2403	N/A	N/A	5.7	5.7	8.6	8.6	N/A	N/A
Tunable White	XFL-TWTx95-2409	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	XFL-TWTx95-2414	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	XFL-TWTx95-2417	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	XFL-TWTx95-2419	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Notes:
 1. Data listed herein is for reference only and does not imply warranty to the led strip or power supply. Xicato recommends consulting with power supply manufacturers to determine compatibility. Data above only suggests initial electrical compatibility and does not guarantee performance over life. Xicato recommends independently verifying all relevant performance parameters.
 2. Maximum strip length values do not account for voltage drop within the LED strip itself or voltage drop from wiring between the strip and the power supply. Maximum strip length value does not guarantee uniformity in lumen output or color across entirety of LED strip.