



E-Star Power Development Co., Ltd. (E-STAR)

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Phone : 886-2-2957 5580 Fax : 886-2-2957 7473

60W LED Driver power supply < NPF-60D



Features

- Rastic housing with class II design
- Built-in active PFC function
- Class 2 power unit
- Standby power consumption <0.5W
- P67 rating for indoor or outdoor installations
- Function: 3 in 1 dimming (dim-to-off)
- Typical lifetime >50000hours
- 5 years warranty

Applications

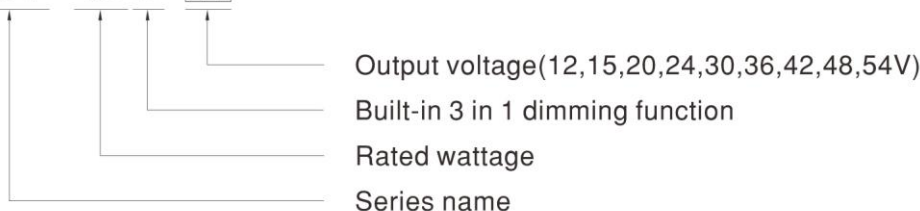
- LED panel lighting
- LED downlight
- LED decorative lighting
- LED tunnel lighting
- Moving sign
- Type "HL" for use in Class I, Division 2 hazardous (Classified) location

Description

NPF-60D series is a 60W AC/DC LED driver featuring the constant current mode output. NPF-60D operates from 90~305VAC and offers models with different rated voltage ranging between 12V and 54V. Thanks to the high efficiency up to 90%, with the fanless design, the entire series is able to operate for -40~+85°C case temperature under free air convection. The entire series is rated with IP67 ingress protection level and is suitable to work for a variety of applications at dry, damp or wet locations. NPF-60D is equipped with the 3 in 1 dimming function so as to provide the design flexibility for LED lighting system.

Model Encoding

NPF - 60 D - 24





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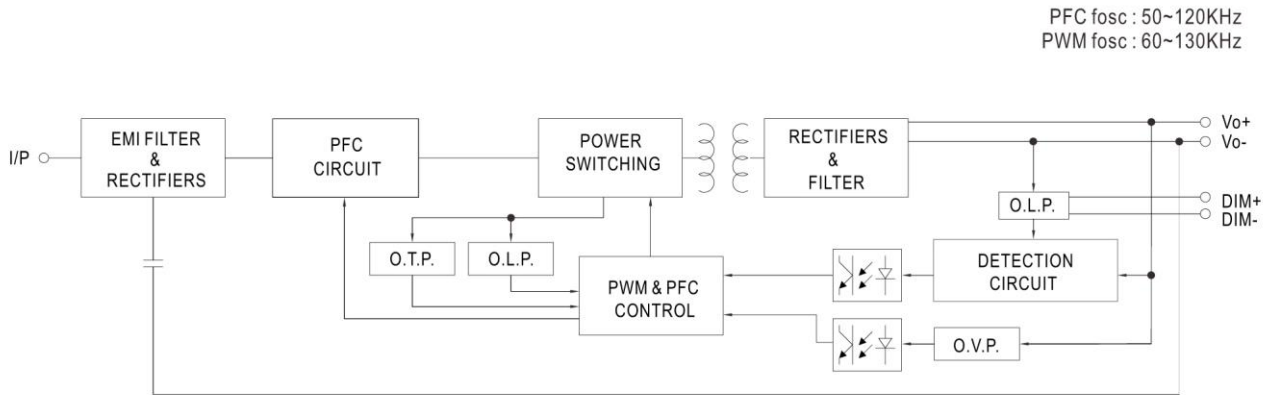
SPECIFICATION

MODEL		NPF-60D-12 <input type="checkbox"/>	NPF-60D-15 <input type="checkbox"/>	NPF-60D-20 <input type="checkbox"/>	NPF-60D-24 <input type="checkbox"/>	NPF-60D-30 <input type="checkbox"/>	NPF-60D-36 <input type="checkbox"/>	NPF-60D-42 <input type="checkbox"/>	NPF-60D-48 <input type="checkbox"/>	NPF-60D-54 <input type="checkbox"/>	
OUTPUT	RATED CURRENT	5A	4A	3A	2.5A	2A	1.67A	1.43A	1.25A	1.12A	
	RATED POWER	60W	60W	60W	60W	60W	60.12W	60.06W	60W	60.48W	
	CONSTANT CURRENT REGION	7.2 ~ 12V	9 ~ 15V	12 ~ 20V	14.4 ~ 24V	18 ~ 30V	21.6 ~ 36V	25.2 ~ 42V	28.8 ~ 48V	32.4 ~ 54V	
	CURRENT RIPPLE	5.0% max. @rated current									
	CURRENT TOLERANCE	±5.0%									
	SET UP TIME <small>Note.3</small>	500ms/115VAC, 230VAC									
INPUT	VOLTAGE RANGE <small>Note.2</small>	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 (THD)" section)									
	EFFICIENCY (Typ.)	86%	87%	88%	89%	90%	90%	90%	90%	90%	90%
	AC CURRENT (Typ.)	0.8A / 115VAC			0.4A / 230VAC			0.32A / 277VAC			
	INRUSH CURRENT (Typ.)	COLD START 50A (twid=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									
	STANDBY POWER CONSUMPTION	<0.5W									
PROTECTION	OVER CURRENT	95 ~ 108% Constant current limiting, recovers automatically after fault condition is removed									
	SHORT CIRCUIT	Hiccup mode, recovers automatically after fault condition is removed									
	OVER VOLTAGE	15 ~ 17V	17.5 ~ 21V	23 ~ 27V	28 ~ 34V	34 ~ 40V	41 ~ 46V	46 ~ 54V	54 ~ 60V	59 ~ 66V	
	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	UL8750(type"HL"), CSA C22.2 No. 250.13-12, ENEC EN61347-1, EN61347-2-13, EN62384 independent, IP67 approved ; Design refer to EN60335-1									
	WITHSTAND VOLTAGE	I/P-O/P:3.75KVAC									
	ISOLATION RESISTANCE	I/P-O/P:100M Ohms / 500VDC / 25°C / 70% RH									
	EMC EMISSION	Compliance to EN55015, EN61000-3-2 Class C (@ load ≥ 60%) ; EN61000-3-3									
	EMC IMMUNITY	Compliance to EN61000-4-2,3,4,5,6,8,11; EN61547, light industry level(surge immunity Line-Line 2KV)									
OTHERS	MTBF	1016.1K hrs min. Telcordia SR-332 (Bellcore) ; 314.05K 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"> 1. All parameters NOT specially mentioned are measured at 230VAC input, rated current and 25°C of ambient temperature. 2. De-rating may be needed under low input voltages. Please refer to "STATIC CHARACTERISTIC" sections for details. 3. 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. 4. The standby power consumption is specified for 230VAC. 5. 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. 6. The model certified for CCC(GB19510.14, GB19510.1, GB17743 and GB17625.1) is an optional model . 7. This series meets the typical life expectancy of >50,000 hours of operation when Tcase, particularly (Tc) point (or TMP, per DLC), is about 75°C or less. 										



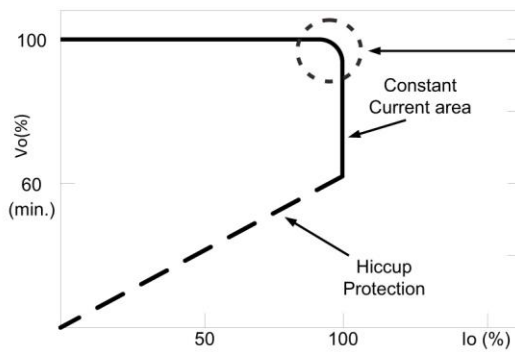
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■ BLOCK DIAGRAM



■ DRIVING METHODS OF LED MODULE

※ This series works in constant current mode to directly drive the LEDs.

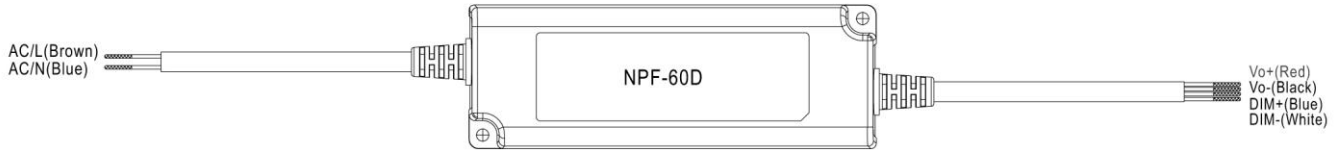


Typical LED power supply I-V curve

In the constant current region, the highest voltage at the output of the driver depends on the configuration of the end systems.

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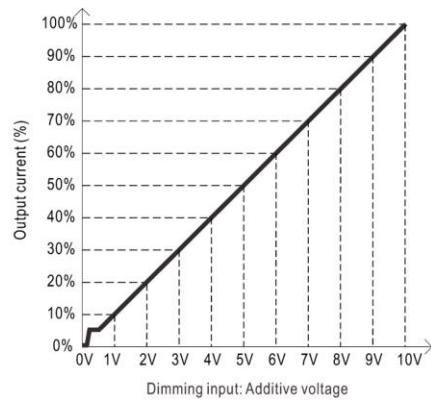
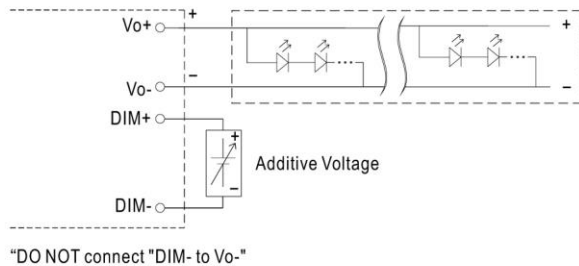
■ DIMMING OPERATION



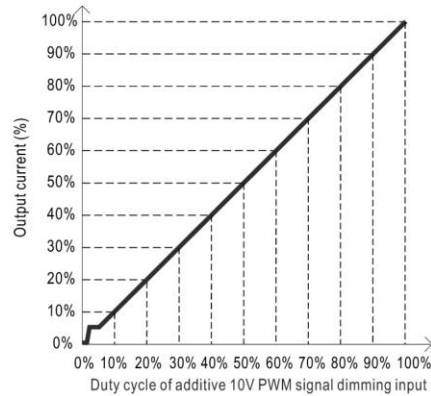
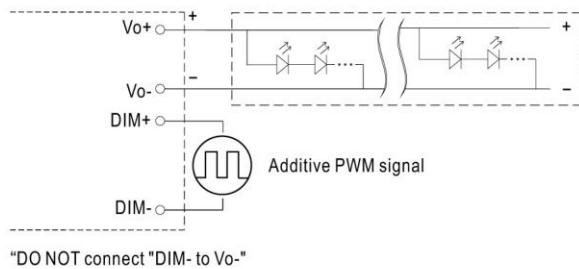
※ 3 in 1 dimming function

- Output constant current level can be adjusted by applying one of the three methodologies between DIM+ and DIM-:
 0 ~ 10VDC, or 10V PWM signal or resistance.
- Direct connecting to LEDs is suggested. It is not suitable to be used with additional drivers.
- Dimming source current from power supply: 100 μ A (typ.)

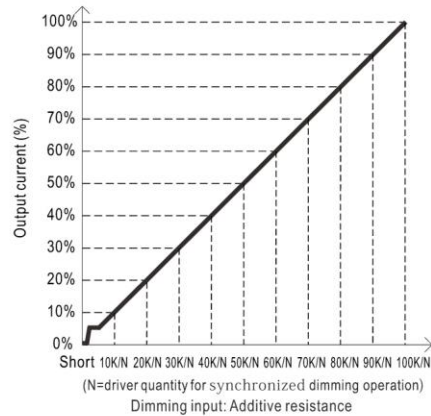
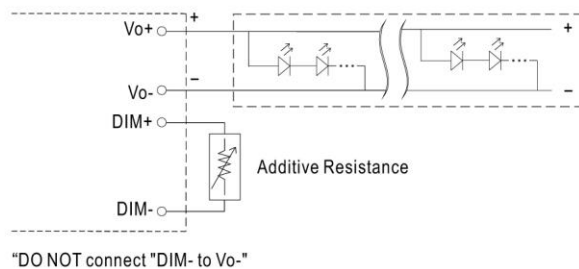
⊙ Applying additive 0 ~ 10VDC



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



⊙ Applying additive resistance:

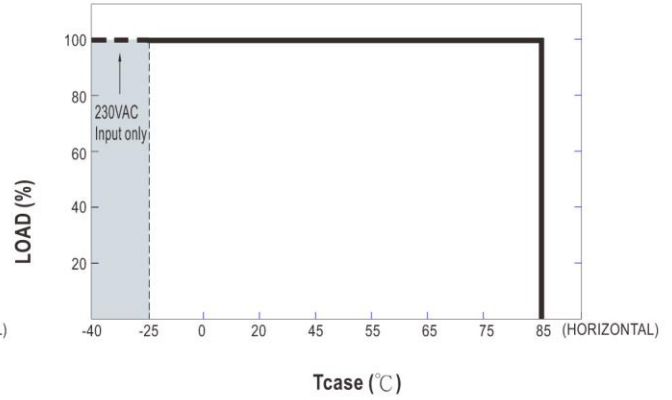
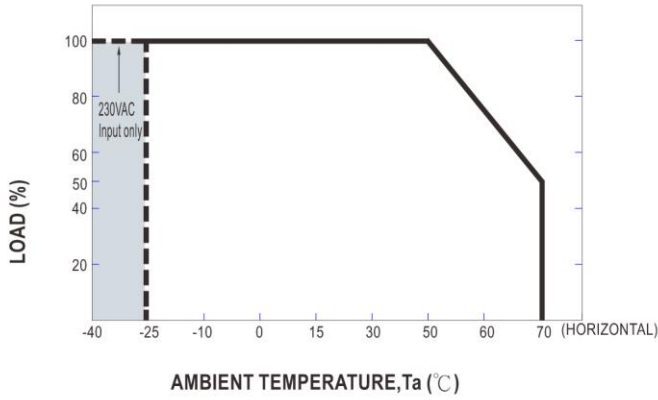


Note : 1. Min. dimming level is about 6% and the output current is not defined when 0% < Iout < 6%.
 2. The output current could drop down to 0% when dimming input is about 0k Ω or 0Vdc, or 10V PWM signal with 0% duty cycle.

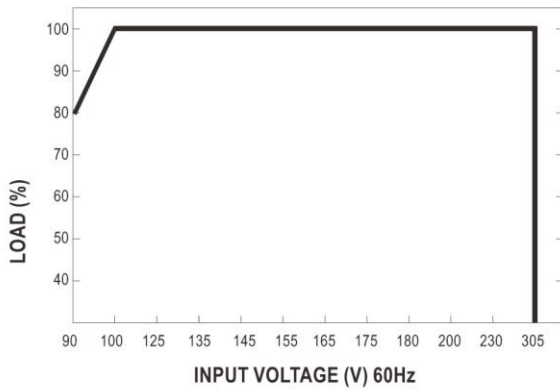


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OUTPUT LOAD vs TEMPERATURE



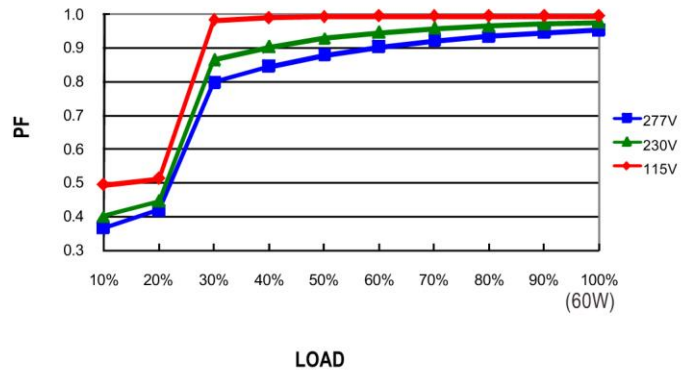
STATIC CHARACTERISTIC



※ De-rating is needed under low input voltage.

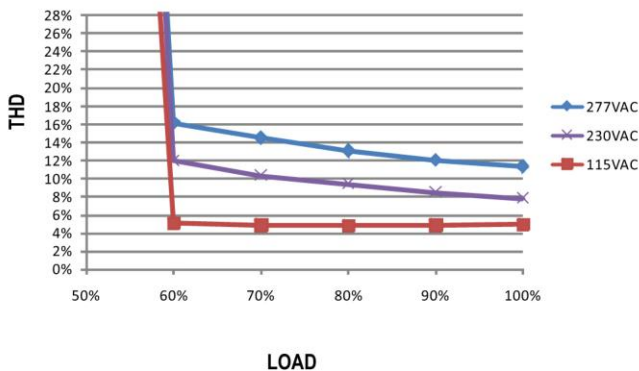
POWER FACTOR (PF) CHARACTERISTIC

※ T_{case} at 75°C



TOTAL HARMONIC DISTORTION (THD)

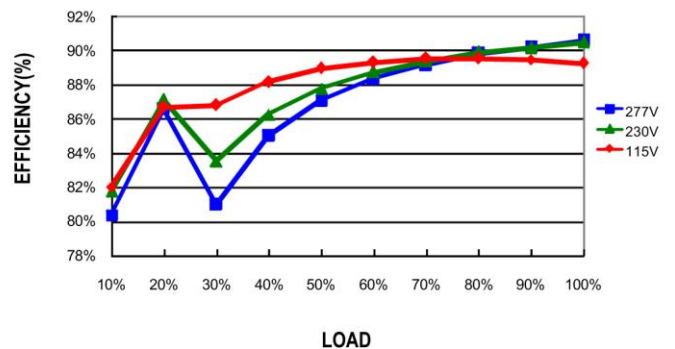
※ 48V Model, T_{case} at 75°C



EFFICIENCY vs LOAD

NPF-60D series possess superior working efficiency that up to 90% can be reached in field applications.

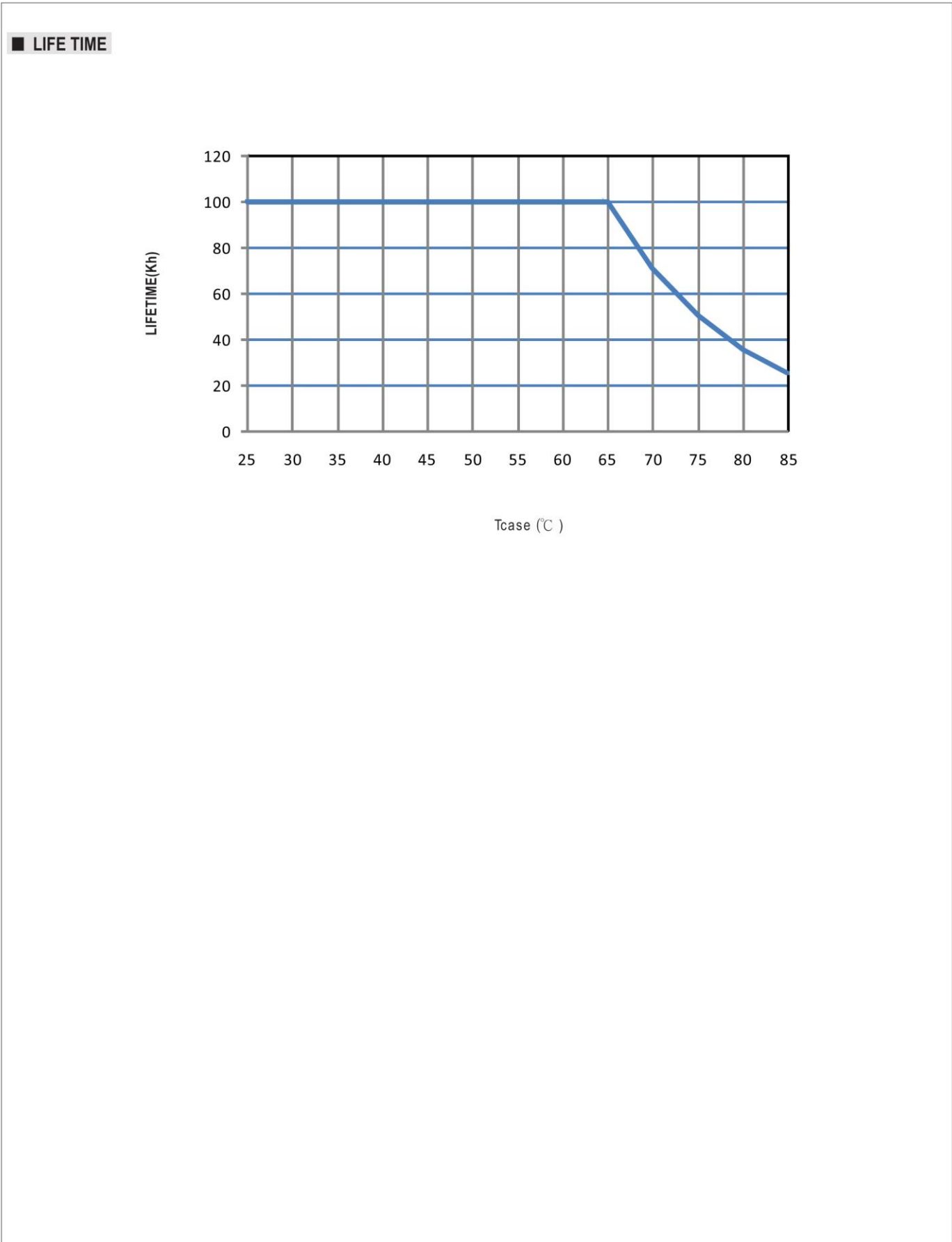
※ 48V Model, T_{case} at 75°C





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MECHANICAL SPECIFICATION

Case No. NPF-60A Unit:mm

