Subject : About Acriche

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Date : 07.01.08

By In kyu Park

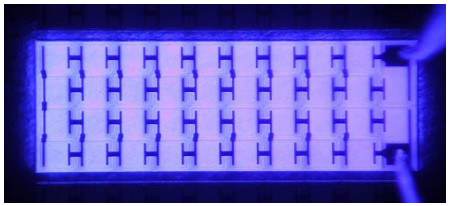
About Acriche

1. Acriche?

- semiconductor lighting source which can be connected directly to AC 110V or 220V outlets without additional converters.

2. Feature and advantage

- AC high voltage operation
- No energy loss in conversion, No inductor and capacitor
- Environmentally friendly
- Long life time
- more energy efficient than conventional light source
- more flexible to design lighting fixture



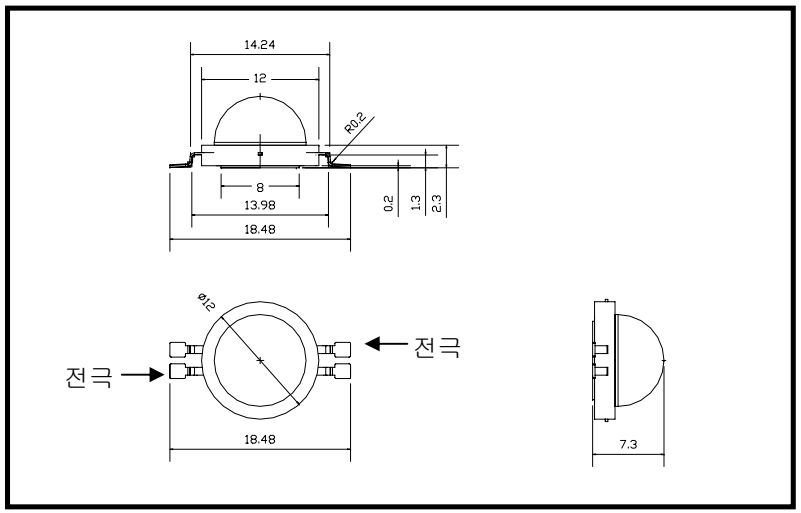
3. Product

PRODUCT	2W emitter	2W PCB	4W emitter	4W PCB
				
Operating Voltage 100V	AW2200	AW2204	AW3200 AN3200	AW3201 AN3201
Operating Voltage 110V		AW2214		AW3211 AN3211
Operating Voltage 220V			AW3220 AN3220	AW3221 AN3221
Operating Voltage 230V				AW3231 AN3231

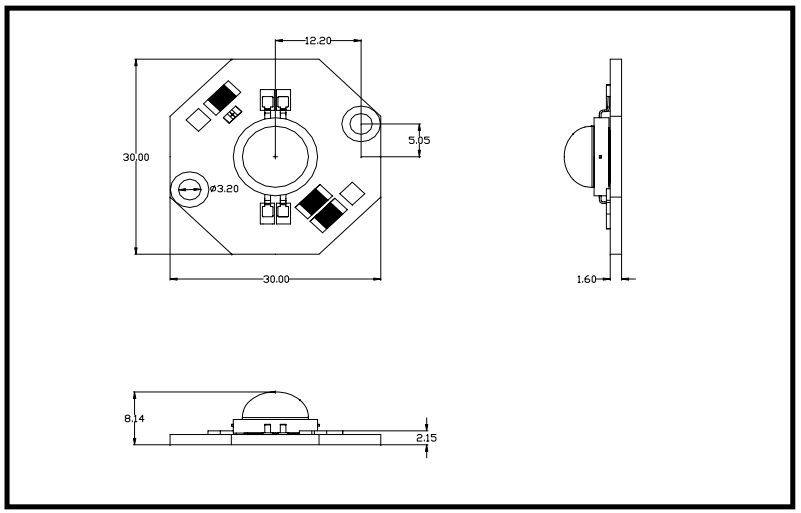
W: WHITE N: Warm WHITE

4. A3 Product feature

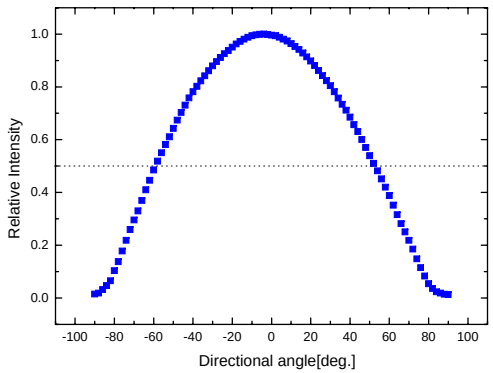
<Emitter type>



<PCB type>



Radiant pattern



Typical Viewing angle 110°

Optical characteristics

	110V (100V)	220V (230V)
Luminous Flux [lm]	195	195
Illuminance [lux]	220	220
Current [mA]	40	20

Main Advantage : Available at 220~240V

Design flexibility

5. Part number

Part Number form : A X_1 X_2 X_3 X_4 X_5

1. Part Number

- A : Acriche
- X_1: Color
- X_2 : Acriche series number
- X_3 : LENS type
- X_4 : Operating Voltage
- X_5 : Type of PCB

X_1	Color
W	Pure White
N	Warm White

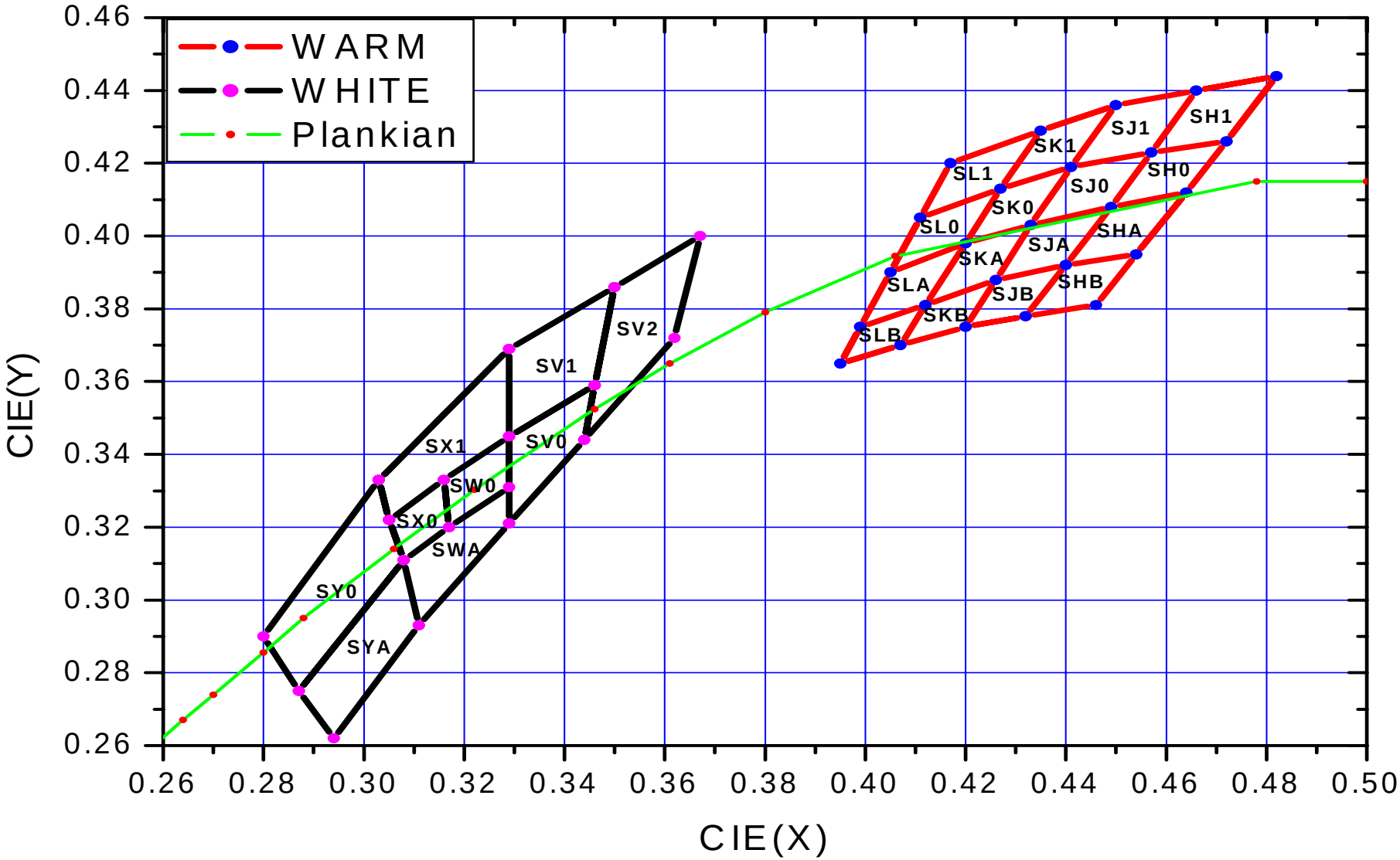
X_2	Acriche Series
2	A2
3	A3

X_3	LENS Type
2	Dome Type

X_4	Operating Voltage [V]
0	100
1	110
2	220
3	230

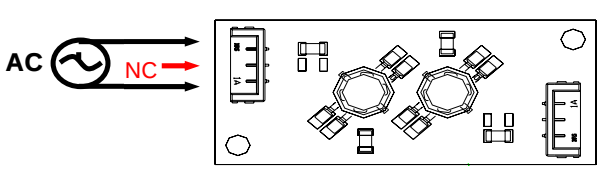
X_5	Pcb Type
0	Emitter
1	4W PCB (A3)
4	2W PCB (A2)

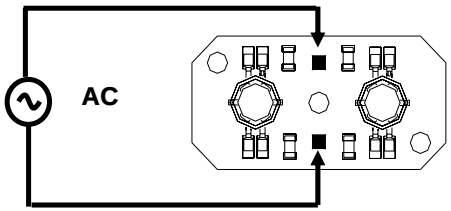
6. Color bin

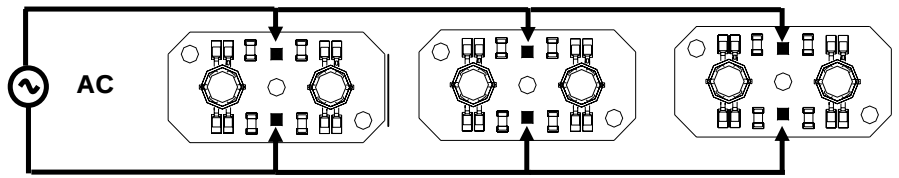

WARM
WHITE
Plankian
SH1
SJ1
SK1
SL1
SH0
SJ0
SK0
SL0
SHA
SJA
SKA
SLA
SHB
SJB
SKB
SLB
SV2
SV1
SV0
SX1
SW0
SX0
SWA
SY0
SYA
CIE(Y)
CIE(X)
0.26
0.28
0.30
0.32
0.34
0.36
0.38
0.40
0.42
0.44
0.46
0.48
0.50

1. Acriche connection.

- PCB type
- wire the connectors or electrodes on the PCB directly for AC source

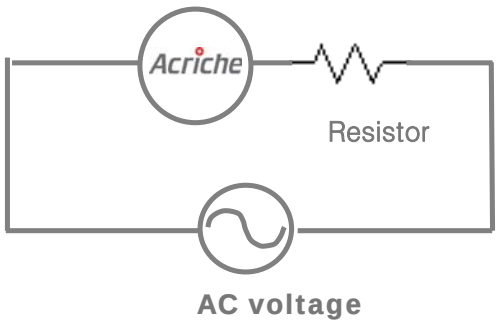






- Emitter type

Use the resistor which is recommended according to Vf rank of emitter.



VF BIN code	220V	230V
A	2.2KΩ	2.7KΩ
B	2KΩ	2.4KΩ
C	1.8KΩ	2.2KΩ
D	1.6KΩ	2KΩ

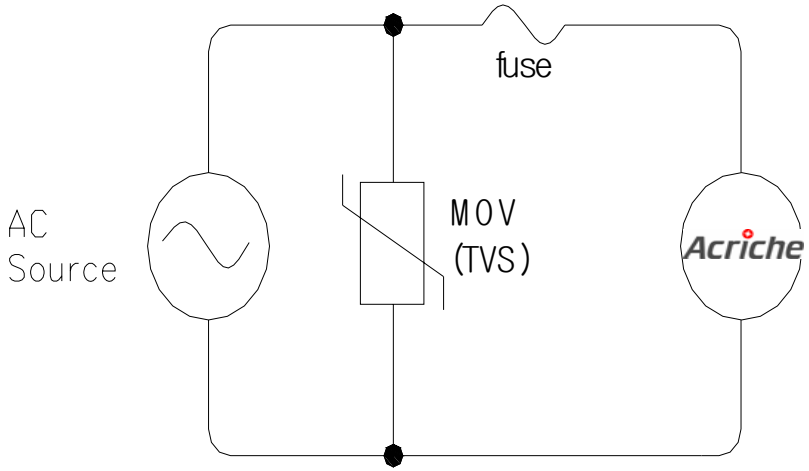
< AW3220 >

VF BIN code	100V	110V
A	360Ω	560Ω
B	270Ω	510Ω
C	220Ω	470Ω
D	200Ω	430Ω

< AW3200 >

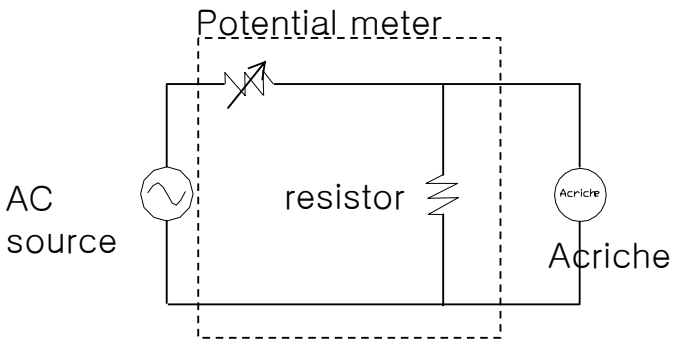
2. Recommended circuit

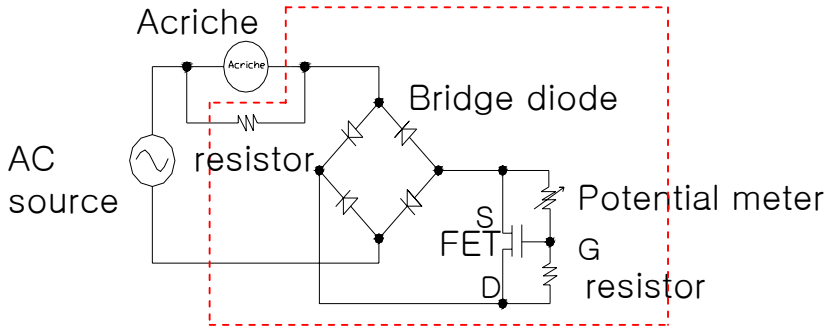
- For stable use, some devices can be added in the circuit.
- Fuse : protect from over current.
  MOV or TVS: Protect from Transient voltage such as surge.



3. Dimming circuit

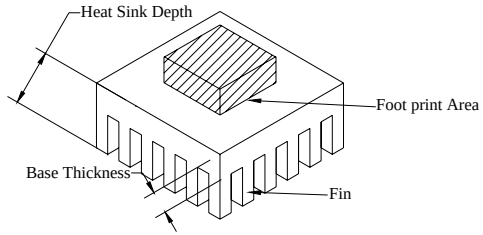
- Acriche is dimmable with simple circuit.





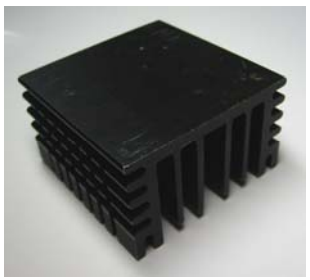
4. Thermal management

- To use Acriche efficiently, apply a proper heat management
- recommend to use Acriche with board temp below 70℃



< AX2200 – 2W product >

Parameter	Value	Unit
$R\Theta_{JS}$	9 ~ 10	℃/W
TJ max	125	℃
TB max	100	℃

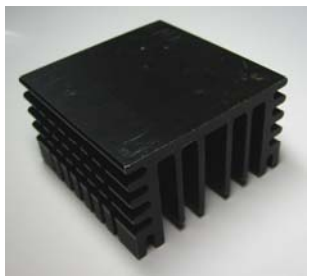


Size	T_B (°C)	$R\Theta_{BA}$ (°C /W)
Size : 44 x 44 mm 20t	54.6	10

Size	T_B (°C)	$R\Theta_{BA}$ (°C /W)
Size : 50 x 50 mm 25 t	46.1	5

< AX3200, AX3220 –4W product >

Parameter	Value	Unit
$R\Theta_{JS}$	6 ~ 7	℃/W
TJ max	125	℃
TB max	100	℃



Size	T_B (°C)	$R\Theta_{BA}$ (°C /W)
Size : 44 x 44 mm 20t	73.8	10

Size	T_B (°C)	$R\Theta_{BA}$ (°C /W)
Size : 50 x 50 mm 25 t	56.2	5

Acriche Q & A

1. Certification

-Our primary concern about Acriche is safety issue because of high voltage operation.

- Our material which is used in Acriche (PCB, connector, resistor, wire) is approved by UL.
- Acriche is approved by CE & TUV in November 2007.
- We are also proceeding UL certification about Acriche.
  We expect to get approval in the first half of year 2008

2. About flicker

- Flicker is phenomenon that people can recognize the fluctuation of brightness.
- In the conventional lamp, flicker occurs when the light source is old or when the ballast or input voltage condition is not good.
- Acriche operates by AC 50~ 60 Hz, but it turns on and off 100~120 times a sec, so human can't feel flicker.

3. Electrostatic, Surge, Insulation Voltage or EMC

- With 4KV electrostatic discharge(EN61000-6-1 standard), it shows normal operating property (Criterion A)
- With 1KV surge, during the test, Acriche flickered temporarily, but it was recovered after test by itself (Criterion B)
- In case of insulation voltage test, Emitter type is 2000V and PCB type is 6000V.
- About EMC Test, there is no EMI problem from Acriche and there is no EMS problem.

4. Rated current

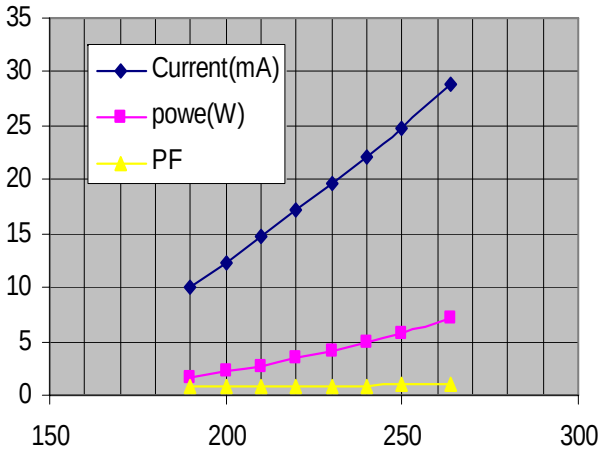
- A rated current of Acriche emitter is 20mA RMS. RMS (root mean square) is way to express energy amount of AC source.
- Current in Acriche is varied by input voltage from AC source. If over current occurs from over voltage, it can destroy Emitter or resistor.

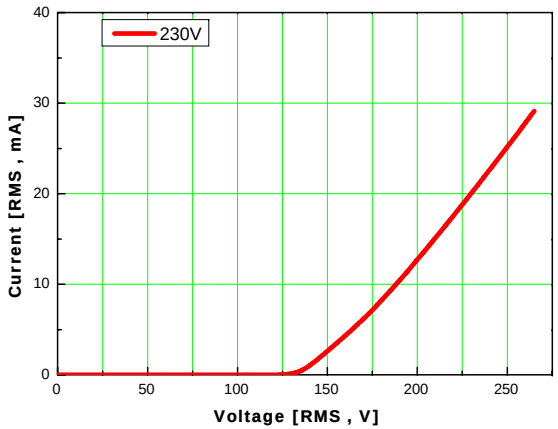
5. PCB

- In Acriche, there is no limitation about using PCB.
- We just recommend to use Acriche with Tj 90℃ below. If Tj is lower, the lifetime would be longer.
- We don't recommend to use FR4 PCB If there isn't special thermal management system.
- To design a PCB for Acriche, refer to the foot print in the spec.
- Check a insulation voltage of PCB.

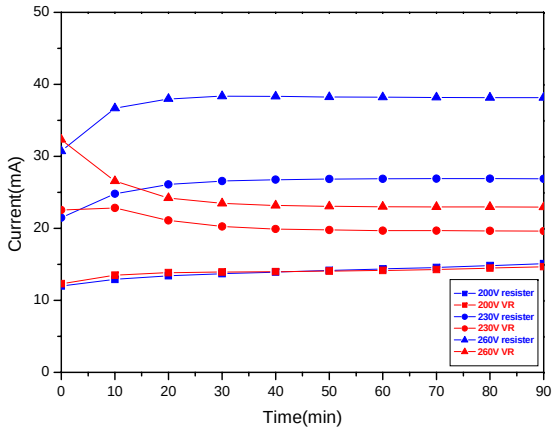
6. About voltage fluctuation

- As input voltage changes, current and brightness of Acriche also change.
  When input voltage changes 10%, current and light output change about 25%.
- In voltage vs current graph, as voltage varies from 230V to 260V, current changes from 20mA to 26mA.
- In unstable voltage application, we can reduce current fluctuation and power consumption by using PTC (Positive Thermal Coefficient)





<Acriche datasheet>

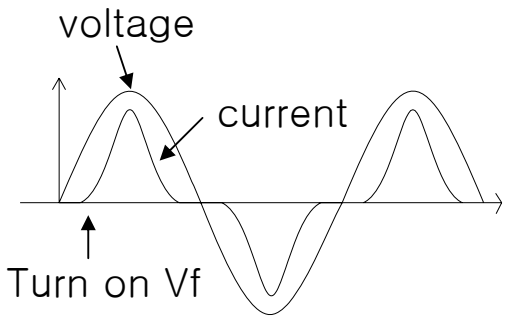


<Input Voltage vs Current>

7. SAG, Power Factor, THD

- Voltage SAG : brief reductions in voltage, typically lasting from a cycle to a second
  During the dips, interruption test, Acriche flickered temporarily, but it was recovered after test by itself. (Criterion B)
- Power Factor: the ratio of the real power to the apparent power, and is a number between 0 and 1

  Acriche Power factor : 0.9



- THD (Total Harmonic Distortion): a measurement of the harmonic distortion present and is defined as the ratio of the sum of the powers of all harmonic components to the power of the fundamental.

$$THD = \frac{\text{Sum of Harmonic powers}}{\text{Fundamental frequency power}}$$

8. High Input Voltage test (AW2214)

Input voltage [V] RMS	110	150	180	200	220	230	240
Current [mA] RMS	20	46.6	66.7	73.8	93.8	100.5	107.5

⟶ start to smoke from resistor

- If we operate 277V product with 400V for a while, current may be 50~60mA
  we expect that it will be fine, but it depend on thermal management condition.

Thank you

감사합니다