

Description

The U7 series is constant-current, NFC programmable and IP20 rated LED driver that operates from 176~305Vac input with excellent power factor. The NFC interface implemented enables an easy and safe way for programming LED drivers during the production process and in the field. The parameters can be transferred without powering on the LED driver. U7 series integrate AC power monitoring with an auxiliary voltage and dim-to-off functionality for powering low voltage. The dimming control supports two-way communication via DALI-2 and complies with D4i. The better thermal design and high efficiency enables the driver to operate with high reliability and extend product lifetime. Overall protection is provided against lightening surge, output over voltage, short circuit, and over temperature to ensure low failure rate.



Product Features

- Universal input voltage / Full range: 176~305Vac;
- Constant power design, output current programming adjustable;
- DALI-2 & D4i Certified;
- Adjustable Output Current (AOC) with NFC programmable;
- Over temperature protection via external NTC;
- Constant lumen output(CLO);
- Suitable for luminaires with protection Class I and II;
- Integrated 16Vdc Bus Power Supply Based on DALI-2;
- Auxiliary power supply: 24V/125mA;
- Output and Dimming Signal Isolating;
- Surge protection: 6KV line-line, 10KV line-earth(Class I);
- Complies with Zhaga Interface Specification Book 13;
- Protections: SCP/UVP/OVP/OTP;
- IP20 design for indoor and outdoor applications
- Suitable for dry / damp / wet locations;
- 7 years warranty.

Application

Roadway lighting,
Industrial lighting,

Models

| Model Number | Input Voltage Range(Vac) | Max Output Power(W) | Output Voltage Range(Vdc) | Full Power Output Current Range(A) | Default Current(A) | Eff.(Typ.) | PF(Typ.) | THD |
|--------------|--------------------------|---------------------|---------------------------|------------------------------------|--------------------|------------|----------|-----|
| U7-060D086+ | 176-305 | 60 | 38-86 | 0.70-1.05 | 0.70 | 89% | 0.98 | 5% |

NOTES:

[1]. All specifications are measured at 25℃ ambient temperature, input voltage 230Vac, and the typical value tested by full load, if no specific note.

Input Specifications

| Parameter | Min | Typ. | Max | Notes |
|--------------------------------|--------|------------|--------|---|
| Input Voltage | 176Vac | 220~240Vac | 305Vac | |
| Input Frequency AC | 47Hz | 50/60Hz | 63Hz | |
| Max Input Current | - | - | 0.5A | 176Vac&Full Load |
| Max Input Power | - | - | 70W | 176Vac&Full Load |
| Leakage Current | - | - | 0.70mA | IEC 60598-1;240Vac/60Hz |
| Inrush Current | - | - | 50A | 230Vac&Full Load, Cold Start |
| Standby Power Consumption | - | - | 0.5W | 230Vac&50Hz, Auxiliary Power Without Load and 16Vdc Bus Power Supply Shut Off |
| Power Factor(PF) | 0.96 | 0.98 | - | 220-240Vac, 50-60Hz, 100% Load |
| Power Factor(PF) | 0.90 | 0.92 | - | 220-240Vac, 50-60Hz, 60%-100% Load |
| Total Harmonic Distortion(THD) | - | 5% | 10% | 220-240Vac, 50-60Hz, 100% Load |
| Total Harmonic Distortion(THD) | - | - | 10% | 220-240Vac, 50-60Hz, 60%-100% Load |
| MCB(B16) | - | 12 | - | 230Vac |

Output Specifications

| Parameter | Min | Typ. | Max | Notes |
|-------------------------------------|----------------------|------|----------------------|---|
| Output Voltage Range | 38Vdc | - | 86Vdc | The full power cannot be lower than 58Vdc |
| Open Circuit Voltage | - | - | 120Vdc | The open circuit protection is locked, and the AC needs to be powered on again |
| Output Current Range | 70%I _{set} | - | 100%I _{set} | The NFC or Dali programmer regulates the I _{set} current |
| Full Power Current Range | 0.70A | - | 1.05A | |
| Current Accuracy | -5% I _{set} | - | +5% I _{set} | I _{set} >0.70A |
| Total Output Current Ripple (pk-pk) | - | 5% | 10% | 20MHz BW, full load& LED load, the ripple would be tiny different under different LED load. |
| Startup Overshoot Current | - | 5% | 10% | 220~240Vac & 100% Load, load is LED |
| Line Regulation | -1% | - | +1% | 25℃±10℃ ambient temperature, input voltage changes from 200Vac to 240Vac. |
| Load Regulation | -3% | - | +3% | 25℃±10℃ ambient temperature, Input Voltage 230Vac, load changes from 60% to 100%. |
| Turn-on Delay Time | - | 1.0s | 1.5s | 230Vac |
| Isolation input to output | SELV | - | - | |
| Output P _{stLM} | - | - | 0.03 | In entire operating window |
| Output SVM | - | - | 0.03 | In entire operating window |
| Power Monitoring Accuracy | -5% | - | 5% | Measured at 230Vac input and 100% load |

General Specifications

| Parameter | Min | Typ. | Max | Notes |
|---|--|---------------------------------|------------------------|--|
| Efficiency@230Vac $I_o=1.05A$ $I_o=0.70A$ | 88% 88% | 89% 89% | - | Measured at full load and 25°C ambient temperature 24V No Load |
| Mean Time Between Failure | - | 200Khours | - | 25°C±10°C ambient temperature, 230Vac, 80% load (MIL-HDBK-217F) |
| Life Time | - | 100Khours | - | Tc=75°C, 230Vac&100% load, |
| Operating Temperature | -40°C | - | +55°C | 230Vac&100% load |
| Operating Tc for Safety Tc_s | -40°C | - | +85°C | |
| Operating Tc for Warranty Tc_s | -40°C | - | +75°C | 5 years warranty case temperature Humidity: 10% to 80% RH No condensation |
| Storage Temperature | -40°C | - | +85°C | Humidity: 5% to 50% RH No condensation |
| Altitude | -60m | - | 4000m | |
| Input Under voltage Protection | 130Vac | 150Vac | 170Vac | When the input voltage is lower than the protection voltage, the driver will turn off automatically. When the input voltage exceeds the recovery voltage, the driver will restart automatically. |
| Input Over voltage Protection | 305Vac | 325Vac | 345Vac | The input voltage exceeds the protection voltage, the output is turned off. Automatic recovery. When the input voltage falls below the recovery voltage, the drive will restart. |
| External NTC (R1) | - | 20.05K ohm (Set by software) | - | When the R-NTC is reduced to R1, the external thermal protection is triggered and the output current gradually decreases. |
| External NTC (R2) | - | 10.27K ohm (Set by software) | - | When the R-NTC is reduced to R2, the output current is reduced to the programmed protection current value. |
| External NTC (Protection Circuit) | 10% $I_{o\text{set}}$ | 60% $I_{o\text{set}}$ | 100% $I_{o\text{set}}$ | 10% $I_{o\text{set}} > I_{o\text{min}}$ (Default setting 60%). |
| External NTC (Protection Circuit) | $I_{o\text{min}}$ | 60% $I_{o\text{set}}$ | 100% $I_{o\text{set}}$ | 10% $I_{o\text{set}} \leq I_{o\text{min}}$ (Default setting 60%). |
| Output over voltage Protection | - | - | - | AC needs to be powered on again |
| Over Temp Protection Tc | - | 90°C | - | Tc; 230Vac&100% load |
| Short Circuit Protection | - | - | - | self-recovery after 30 seconds |
| Dimensions (L*W*H)mm | 132.5*77*40mm | | | |
| Net Weight | 500±50g/PCS | | | |
| Package (L*W*H)mm | 494*335*177mm; 30PCS/CTN, Gross Weight: 18±0.5kg | | | |

Notes:

NTC:100K NTC B value: 4050, 10 K NTC B value: 3380, the tolerance is within 2°C, Other NTC tolerance are within 5°C Celsius.

DALI Specifications

| Parameter | Min | Typ. | Max | Notes |
|--|----------------------|------|-----------------------|---|
| 24V Auxiliary Output Voltage | 21.6V | 24V | 26.4V | 220-240Vac, P load>0.1W |
| 24V Auxiliary Output Source Current | 0mA | - | 125mA | Return terminal is "24V-" |
| 24V Auxiliary Output Transient Peak Current @6W | - | - | 250mA | 250mA peak for a maximum duration of 2.2ms in a 6.0ms period during which time the average should not exceed 125mA. |
| 24V Auxiliary Output Transient Peak Current @10W | - | - | 425mA | 425mA peak for a maximum duration of 1.3ms in a 5.2ms period during which time the average should not exceed 125mA. |
| Integrated DALI-2 Bus Power Supply Voltage | 12V | 16V | 20V | Voltage is depending on loading. |
| Integrated DALI-2 Bus Power Supply Current | 50mA | - | 60mA | Return terminal is "DA-" |
| DALI-2 (High Voltage Level) | 9.5V | 16V | 22.5V | |
| DALI-2 (Lower Voltage Level) | -6.5V | 0V | 6.5V | Return terminal is "DA-" |
| DALI-2 (Dimming Output Range) | 10% I_{set} | - | 100% I_{set} | $I_{\text{set}}=0.70\sim1.05A$ |
| DALI-2 (Sink Current) | - | - | 2.0mA | |

Insulation

| Insulation | Mains | EQUI | LED +/- NTC | DA+ / Vaux |
|-------------|--------|---------------|---------------|---------------|
| Mains | - | Double | SELV | SELV |
| EQUI | Double | - | Supplementary | Supplementary |
| LED +/- NTC | SELV | Supplementary | - | Supplementary |
| DA+ / Vaux | SELV | Supplementary | Supplementary | - |

Notes:

[1] DALI-2 bus power supply is enabled by default and can be disabled via programming interface.

[2] DALI-2 bus power supply supports automatic shut-down and restart after short-circuit.

[3] DALI signal line shall not be connected to the five core terminal shared by input and dimming

[4] The DALI signal line shares the negative with the 24V auxiliary source. The 24V auxiliary source can be used alone or share the negative pole with the DALI line

Safety Specification

| Parameter | Min | Typ. | Max | Notes |
|------------------------------------|------|---------|-----|--|
| Dielectric Strength(Input-Output) | - | 3750Vac | - | 60s, Current not exceeding 5mA |
| Dielectric Strength(Input-Ground) | - | 3750Vac | - | 60s, Current not exceeding 5mA |
| Dielectric Strength(Output-Ground) | - | 500Vac | - | 60s, Current not exceeding 5mA |
| Insulation Resistance | 10MΩ | - | - | Input-Output, Input-PE, Output-PE, 500Vdc/60s/25°C/70%RH |

Safety Compliance

| Safety Category | Standards | Approved | Notes |
|-----------------|----------------------------------|----------|-------|
| CCC | GB19510.1, GB19510.14 | | |
| CE | EN61347-1, EN61347-2-13, EN62493 | √ | |
| ENEC | EN61347-1, EN61347-2-13, EN62384 | √ | |
| CB | IEC61347-1, IEC61347-2-13 | √ | |
| BIS | IS 15885(PART 2/SEC 13) | | |
| UL | UL 8750 | | |
| CUL | CSA C22.2 No.250.13 | | |
| KC | K61347-1, K61347-2-13 | | |
| PSE | J61347-1, J61347-2-13 | | |
| SAA | AS/NZS IEC 61347.2.13 | | |
| SAA | AS/NZS 61347.1 | | |

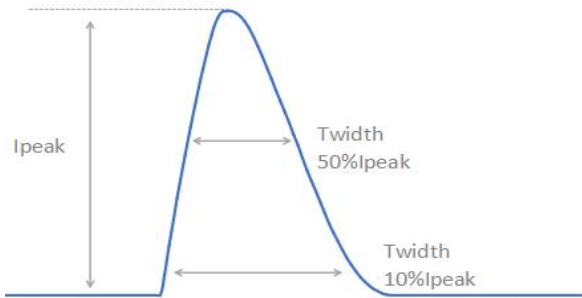
EMC Compliance

| EMC Category | Standards | Approved | Notes |
|----------------------|----------------------------|----------|-------|
| CCC | GB/T 17743, GB 17625.1 | | |
| CE | EN 55015 | √ | |
| CE | EN 61000-3-2, EN 61000-3-3 | √ | |
| CE | EN61000-4-2,3,4,5,6,11 | √ | |
| CE | EN 61547 | √ | |
| KC | K61547 | | |
| KC | K00015 | | |
| PSE | J55015 | | |
| FCC | FCC part 15 | | |
| Surge Shock Immunity | ANSI/C82.77-5-2017 | | |
| Ringing Wave | | | |

RoHS

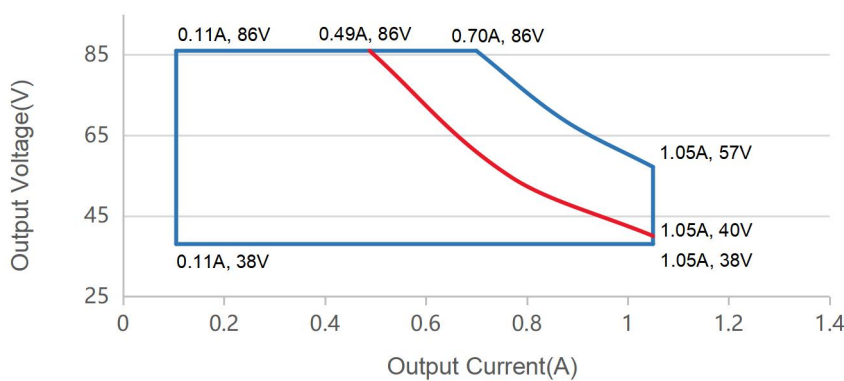
Our products comply with RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

Inrush Current



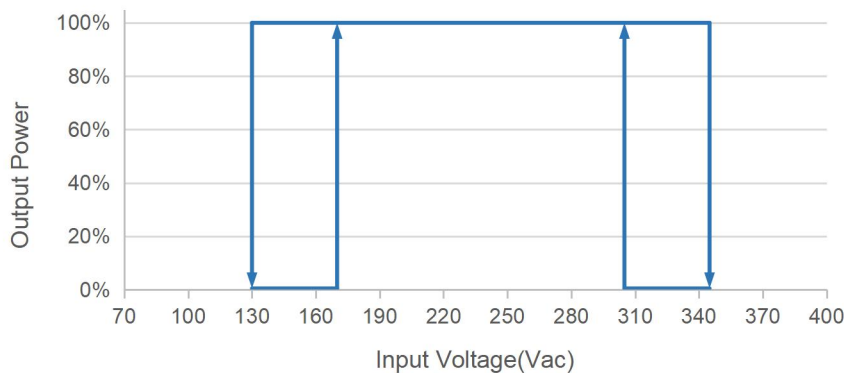
| V_{in} | I_{peak} | $T(@10\% \text{ of } I_{peak})$ | $T(@50\% \text{ of } I_{peak})$ |
|----------|------------|---------------------------------|---------------------------------|
| 220Vac | 43A | 620uS | 300uS |

Output Voltage vs. Output Current

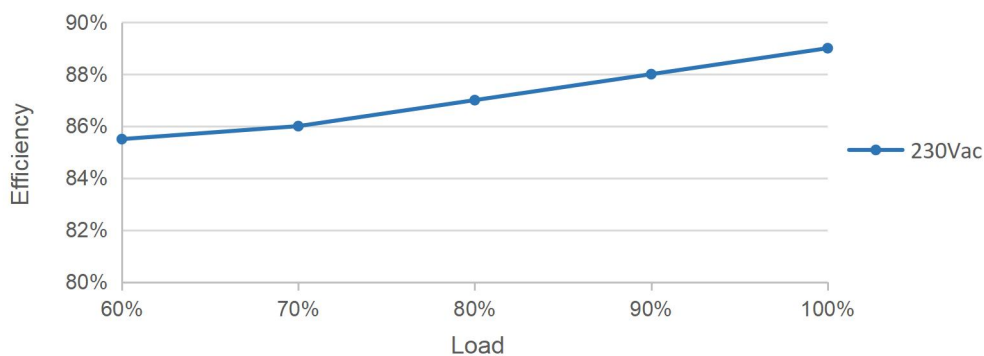


Red curve: good performance area

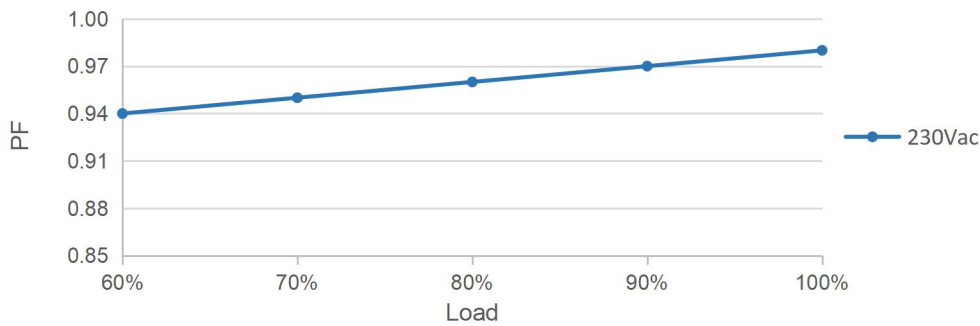
Output Power vs. Input Voltage



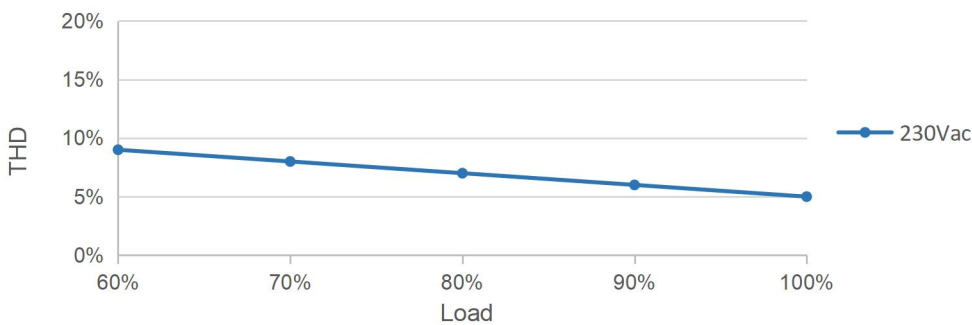
Efficiency vs. load



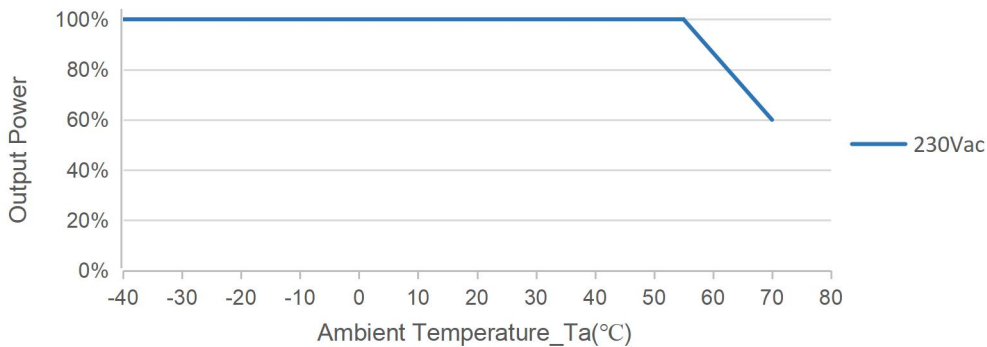
PF vs. Load



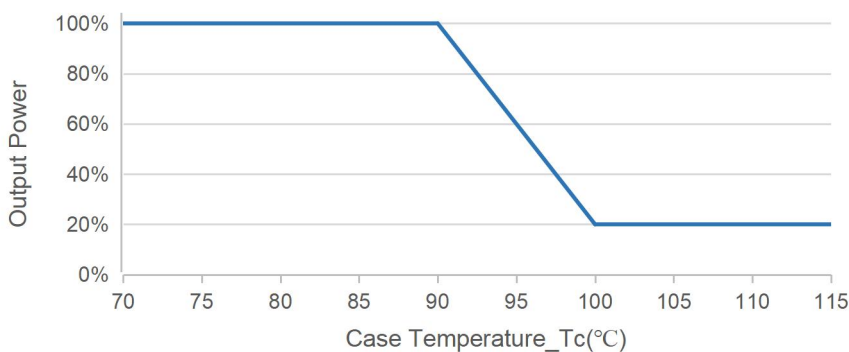
THD vs. Load



Output Power vs. Ambient Temperature



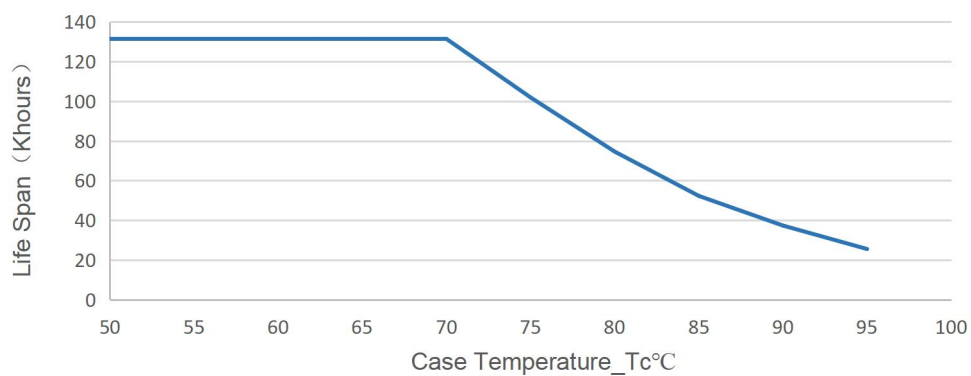
Over Temperature Protection Curve



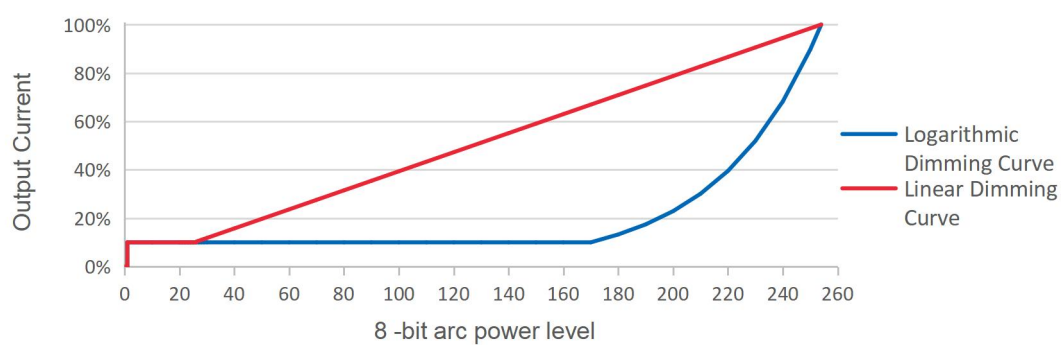
Notes:

Customers can set the start derating temperature and end derating temperature. This curve is the default factory protection curve. When the temperature rises to the normal operating temperature, the drive will resume output.

Lifetime vs. Case Temperature



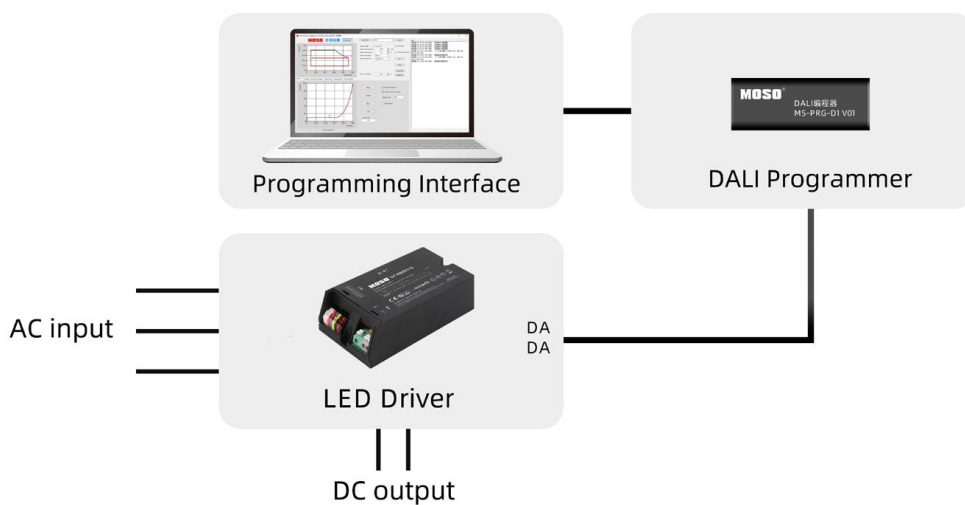
DALI-2 Dimming



Note: Factory Default Output Logarithmic Curve

Programming Link (DALI-2)

Programming mode 1



Programming mode 2



Notes:

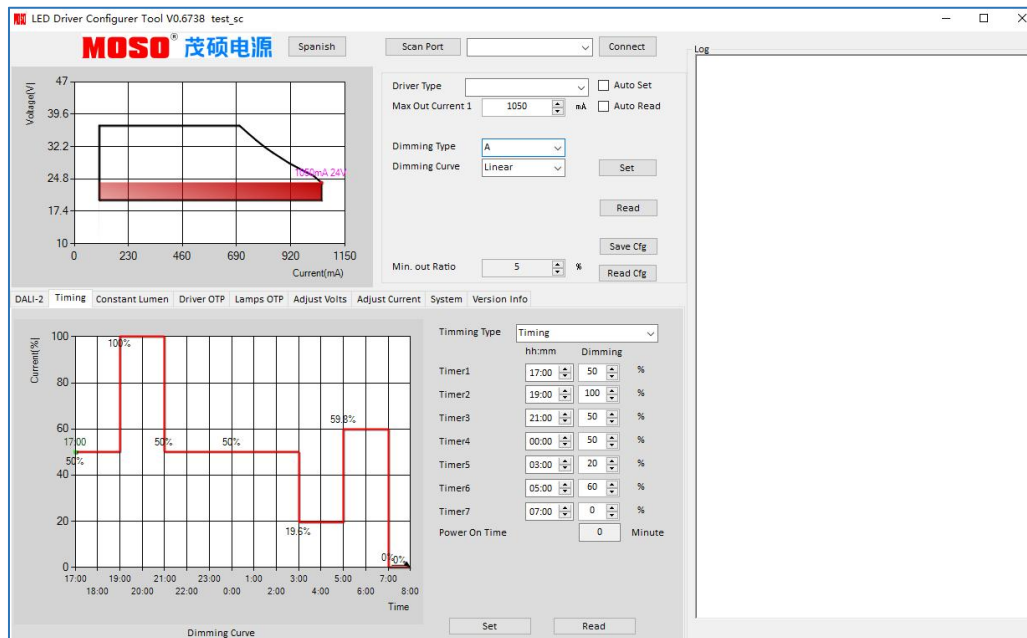
1. The driver does not need to be powered on during the programming process.
2. Please refer to MS-PRG-D1 or MS-PRG-N1 (Programmer) datasheet for details.
3. Applicable to FEIG programmer: ISC PRH101 and CPR30-USB

Time Dimming

Time-controlled dimming is divided into three modes: Timing dimming, Virtual Midnight dimming, Self-Adaptive dimming.

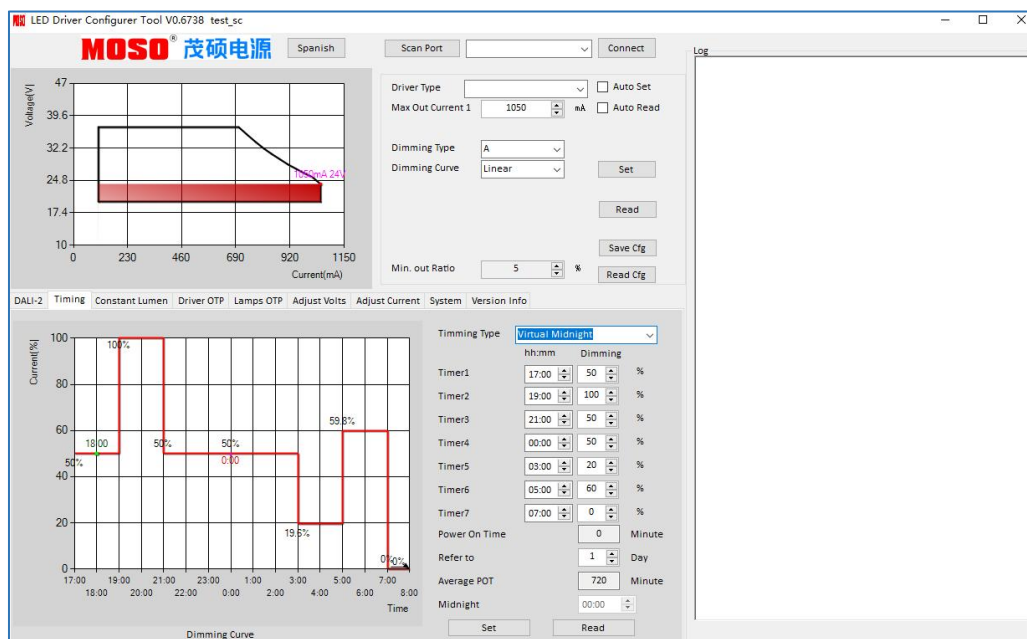
Timing Dimming

After the driver is powered on, the driver will change in sequence according to the programmed seven periods, and maintain the brightness of timer 7 after running to the last timer.



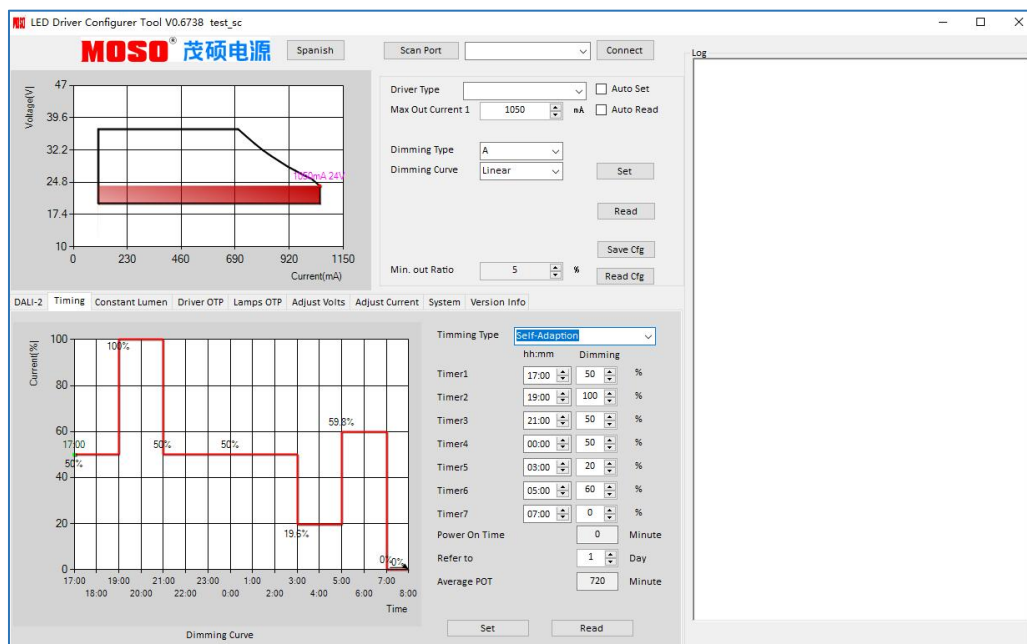
Virtual Midnight Dimming

The power-on point and power-off point usually correspond to sunset time and sunrise time respectively, so their midpoint is the virtual midnight point. The driver will automatically sample the corresponding effective working days according to the reference days set by the customer, and automatically adjust the dimming curve according to the average working hours.



◆ Self - Adaption Dimming

Depending on the customer setup, the drive automatically calculates the effective mean operating time and calculates the ratio to the customer's set parameter time length, automatically making this computational ratio adjustment at each step.

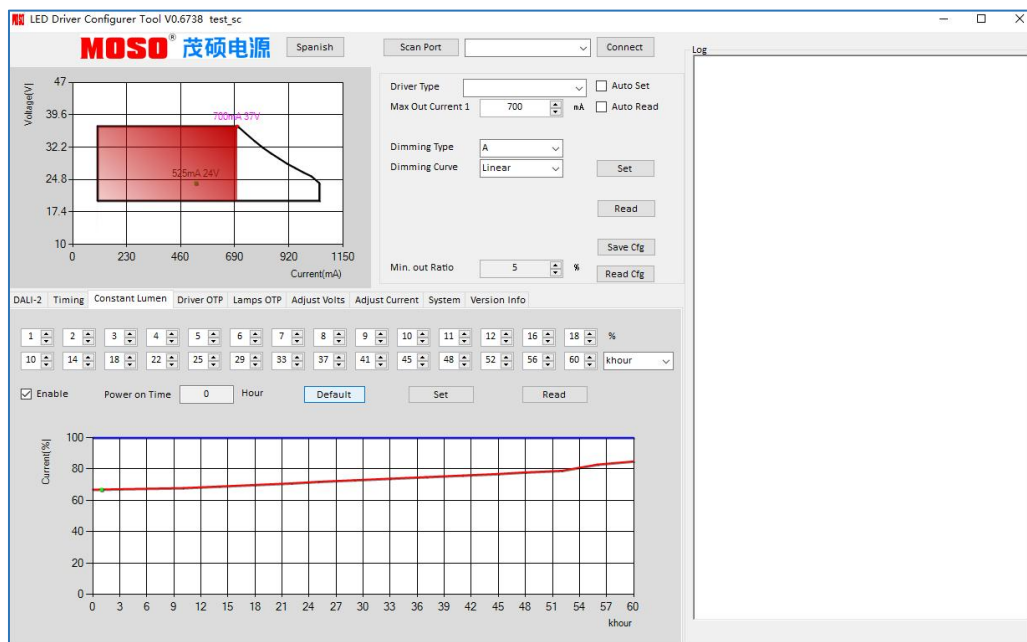


Note: Drives were judged only as valid working days if they were greater than 4 hours and less than 24 hours, and an effective on-off cycle was considered a day

CLO

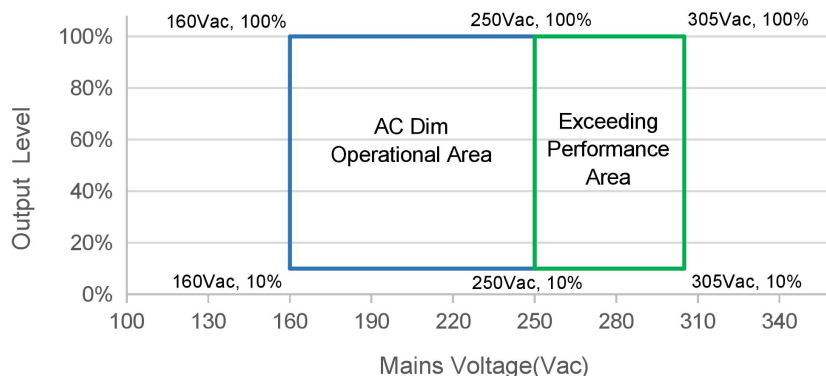
CLO: With the increase of cumulative illumination time of LED light source, the LED driving can automatically increase its output current, and then realize the increasing of light flux output of LED light source with the increase of cumulative illumination time to achieve the purpose of light decay compensation. Thus the road surface illumination level is basically constant.

Note: Compensated current values are calculated as a percentage based on IMAX. The minute setting column is only used by the customer to test the CLO function. The driver will reset the hour setting column after power failure and power on again. The "ENABLE check box" must be checked to enable the CLO function



AC Dimming

AC Dimming: The maximum adjustable range of AC DIMMING is 160Vac-250Vac. The specific dimming range can be set by software, and the voltage difference between the starting input voltage and the cut-off input voltage should be guaranteed to be 20Vac. The customer can manually adjust the under voltage protection range and over voltage protection range. There must be a minimum voltage difference of 5V from the initial input voltage before the drive begins to enter AC dimming.



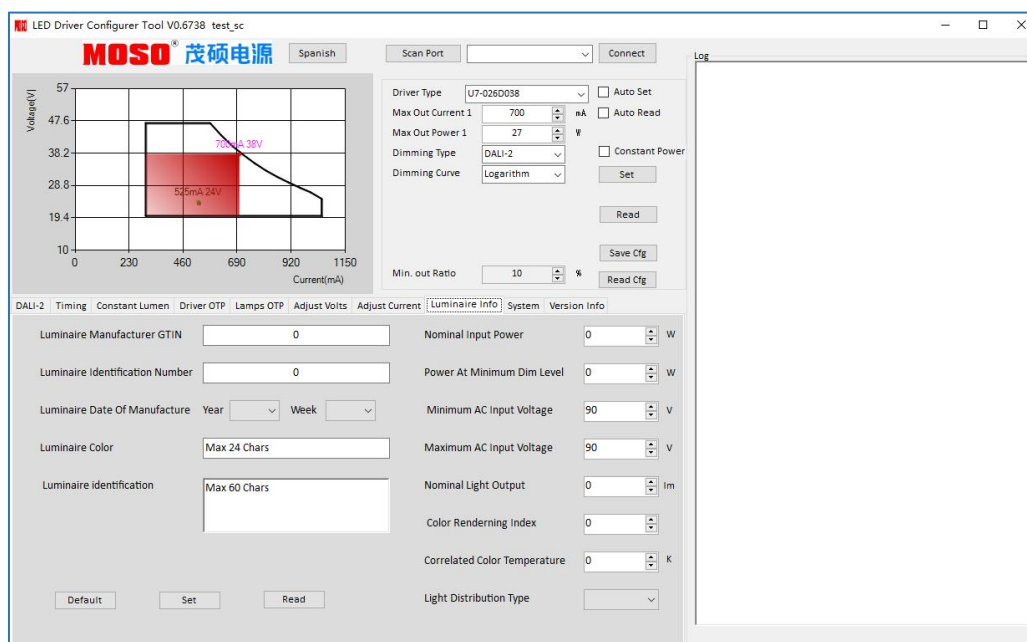
AC Dimming

| Arameter | Min | Typ. | Max |
|--|--------|------|--------|
| AC DIMMING (Start input Voltage) | 180Vac | - | 250Vac |
| AC DIMMING (Start output Current) | 10% | - | 100% |
| AC DIMMING (Cut off input Voltage) | 160Vac | - | 230Vac |
| AC DIMMING (Cutoff output Current) | 10% | - | 100% |
| AC DIMMING (gap between the starting and cut-off voltages) | 20V | - | - |
| AC DIMMING (Starting and cut-off voltage increments) | - | 1V | - |
| AC DIMMING (Starting and cut-off current increments) | - | 1% | - |

Luminaire Information

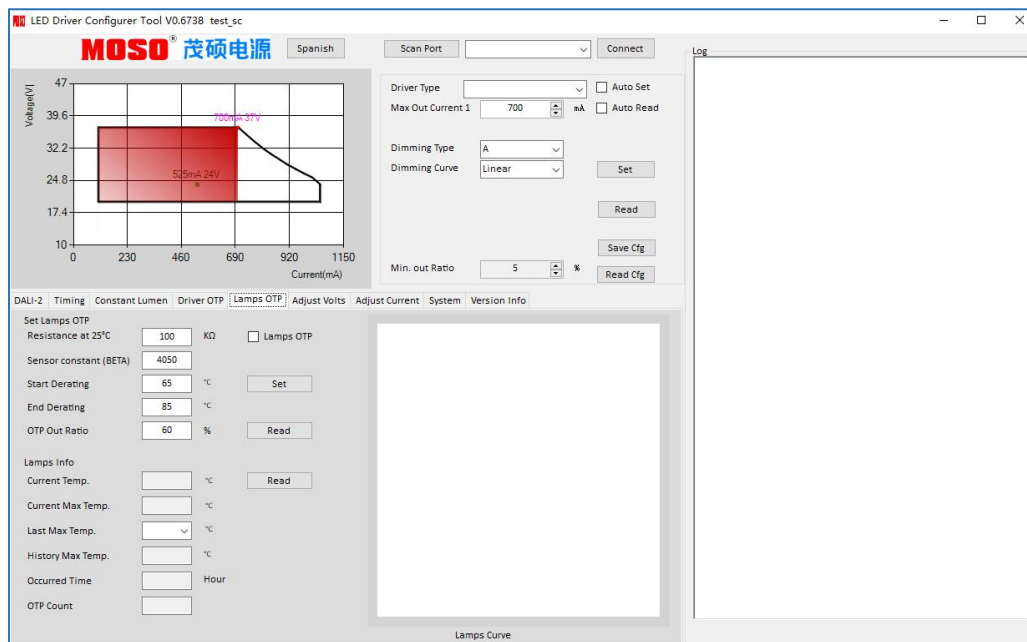
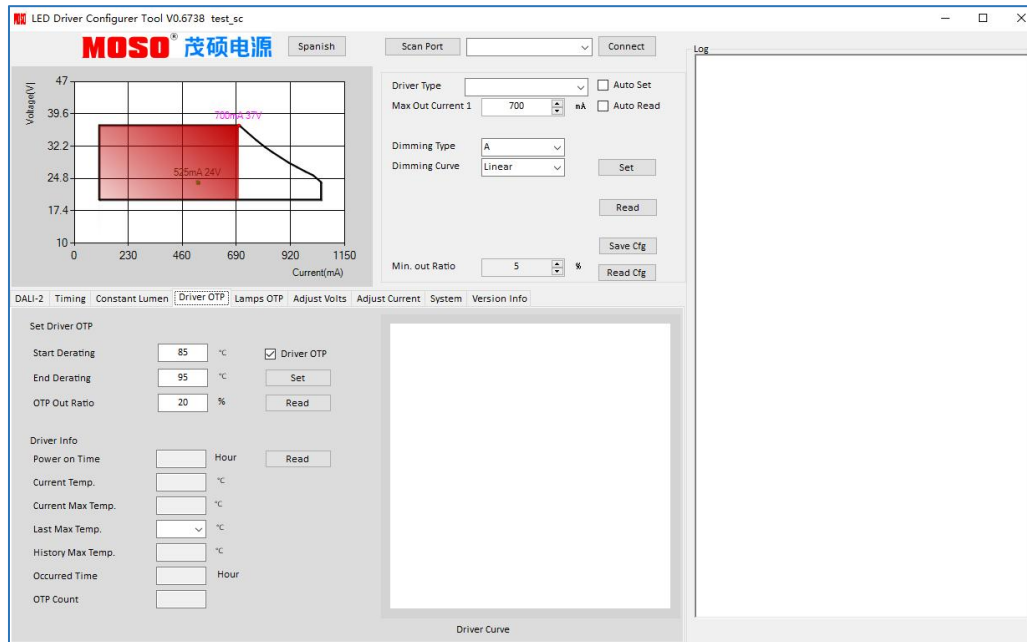
Customer can program the drive through Dali line control programmer (MS-PRG-D1 V01) and NFC programmer (MS-PRG-N1;ISC-PRH101; CPR30-USB) use "set button" in Luminaire information function bar for writing information as follows graphic.

According to the provisions of DALI part 253, the driver needs to realize the operation information of lamps Data storage. This information is filled in by the lighting equipment manufacturer.

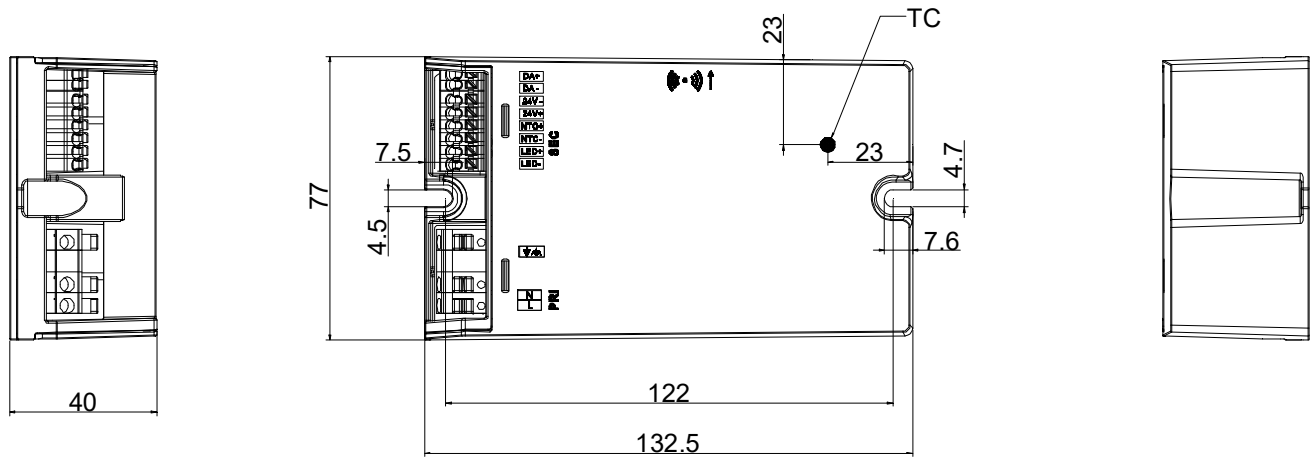


Drive Protection and Luminaire Protection

The one with the faster rate of decrease in preferential current during over- temperature protection. At the end of over-temperature protection, the lower the “OTP out Ratio” current value is set, the higher the priority is.



Mechanical Outline

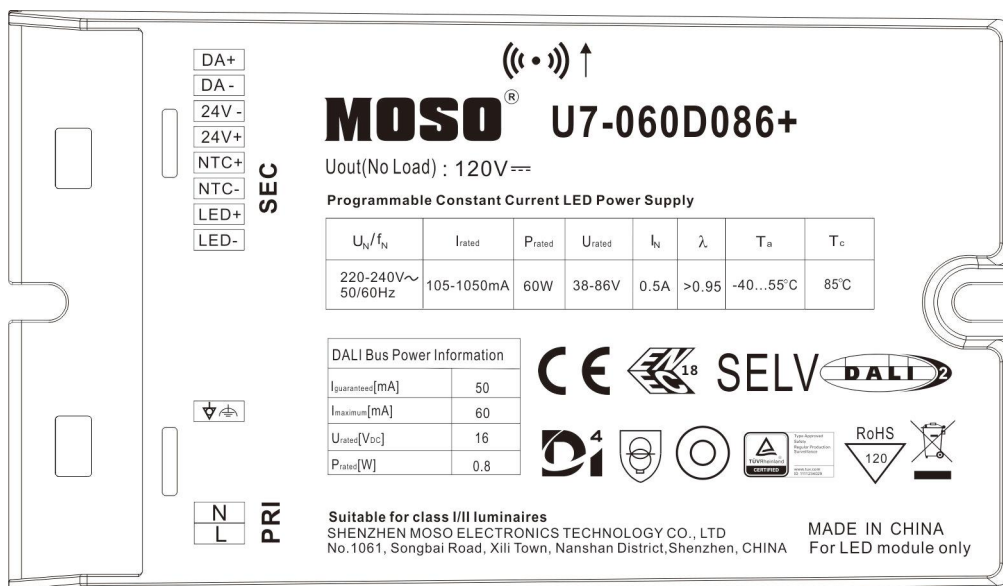


Note: The TC point is at the bottom of the driver

Connections

| | | | |
|---------------------------------|---|------|--|
| Input (L,N,G) | Wire Cross-section 0.5 mm ² - 1.5 mm ² /20 AWG - 16 AWG | | Push-in at 45°angle, solid and stranded wire |
| Output | Wire Cross-section 0.2 mm ² - 1.5 mm ² /22 AWG - 16 AWG | | Push-in at 45°angle, solid and stranded wire |
| Dimming | Wire Cross-section 0.2 mm ² - 0.5 mm ² /22 AWG - 20 AWG | | Push-in at 45°angle, solid and stranded wire |
| Specification item | Value | Unit | type |
| Maximum cable length | 1.5 | M | |
| Maximum NTC Output cable length | 0.6 | M | |

Label



Version

| | | |
|-----|---------------|------------|
| A.1 | First release | 2024-03-25 |
| B.2 | ECL202406017 | 2024-06-20 |
| C.3 | DCGL202410004 | 2024-10-17 |
| | | |
| | | |
| | | |

Specification for Approval

Product Name: 60W Class I/II Programmable D4i Driver

Product Model: U7-060D086+

Rev : C.3

Address: XiLi Songbai Road 1061, Nanshan District, Shenzhen City, Guangdong, China

Tel: 0755-27657000

FAX: 755-27657908

E-mail: info@mosopower.com

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

| Prepared By | Checked By | Approved By |
|-------------|------------|-------------|
| | | |

Specification for Approval

Product Name: 60W Class I/II Programmable D4i Driver

Product Model: U7-060D086+

Rev: C.3

CUSTOMER AUTHORIZED SIGNATURE

| Tested By | Checked By | Approved By |
|---|------------|-------------|
| | | |
| (Company seal)Return one copy to MOSO with approved signature and company seal. | | |

Address: XiLi Songbai Road 1061, Nanshan District, Shenzhen City, Guangdong, China

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FAX: 755-27657908

E-mail: info@mosopower.com

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

| Prepared By | Checked By | Approved By |
|-------------|------------|-------------|
| | | |