## Features

- Hot-plugging Protection
- Parallel LED Protection
- Adjustable Output Current (AOC) with Programmability
- Isolated 0-10V/PWM/Resistor Dimmable
- Adjustable Dimming Curve
- INV Digital Dimming, UART Based Communication Protocol
- Dim-to-Off
- Minimum Dimming Level with 5% or 10% Selectable
- Hold time Adjustable
- Fade Time Adjustable
- Always-on Auxiliary Power: 12Vdc, 250mA
- Low Inrush Current
- Output Lumen Compensation
- End-of-Life Indicator
- Input Surge Protection: DM 6kV, CM 10kV
- All-Around Protection: IOVP, IUVP, OVP, SCP, OTP
- IP66/IP67 and UL Dry/Damp/Wet Location
- TYPE HL, for Use in a Class I, Division 2 Hazardous (Classified) Location
- 5 Years Warranty

## Description

The *ESM-480SxxxMx* series is a 480W, constant-current, programmable and IP66/IP67 rated LED driver that operates from 249-528Vac input with excellent power factor. Created for many lighting applications including high mast, sports, UV-LED, aquaculture and horticulture, etc. It provides an auxiliary voltage and dim-to-off functionality for powering low voltage, wireless controls. The dimming control supports 0-10V dimming as well as two-way communication via Digital Dimming, a UART based communication protocol. The high efficiency of these drivers and compact metal case enables them to run cooler, significantly improving reliability and extending product life. To ensure trouble-free operation, protection is provided against input surge, input under voltage, input over voltage, output over voltage, short circuit, and over temperature.

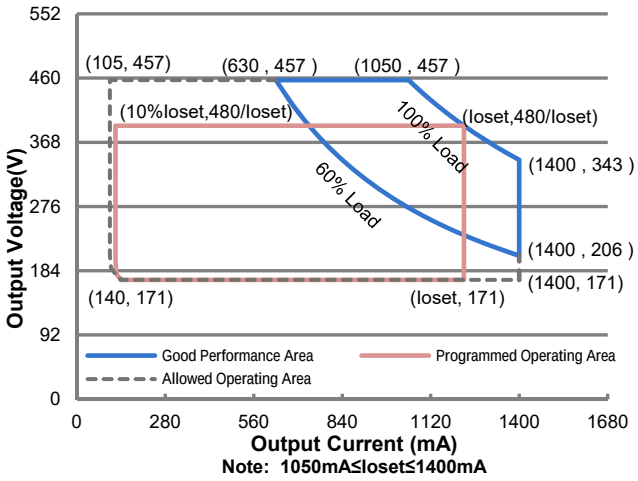
## Models

| Adjustable Output Current Range | Full-Power Current Range(1) | Default Output Current | Input Voltage Range(2) | Output Voltage Range | Max. Output Power | Typical Efficiency (3) | Typical Power Factor | | Model Number (4) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 277Vac | 480Vac | |
| 0.105-1.4A | 1.05-1.4A | 1.4 A | 249~528Vac<br>352~500Vdc | 171 ~ 457Vdc | 480 W | 95.5% | 0.99 | 0.96 | ESM-480S140Mx |
| 0.21-2.8A | 2.1-2.8A | 2.8 A | 249~528Vac<br>352~500Vdc | 86 ~ 228Vdc | 480 W | 95.5% | 0.99 | 0.96 | ESM-480S280Mx |
| 0.315-4.2A | 3.15-4.2A | 4.2 A | 249~528Vac<br>352~500Vdc | 57 ~ 152Vdc | 480 W | 95.0% | 0.99 | 0.96 | ESM-480S420Mx |
| 0.435-5.6A | 4.35-5.6A | 5.6 A | 249~528Vac<br>352~500Vdc | 43 ~ 110Vdc | 480 W | 95.0% | 0.99 | 0.96 | ESM-480S560Mx |
| 0.86-10A | 8.6-10A | 10 A | 249~528Vac<br>352~500Vdc | 24 ~ 56Vdc | 480 W | 95.0% | 0.99 | 0.96 | ESM-480S10AMx |

**Notes:** (1) Output current range with constant power at 480W.
(2) Certified voltage range: 277-480Vac
(3) Measured at 100% load and 480Vac input (see below “General Specifications” for details).
(4) x = G are UL Recognized, ENEC etc. models; x = T are UL Class P, etc. models.

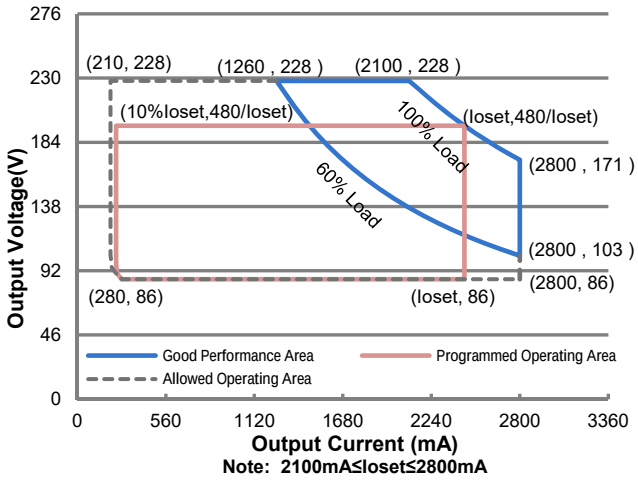
## I-V Operating Area

### ESM-480S140Mx



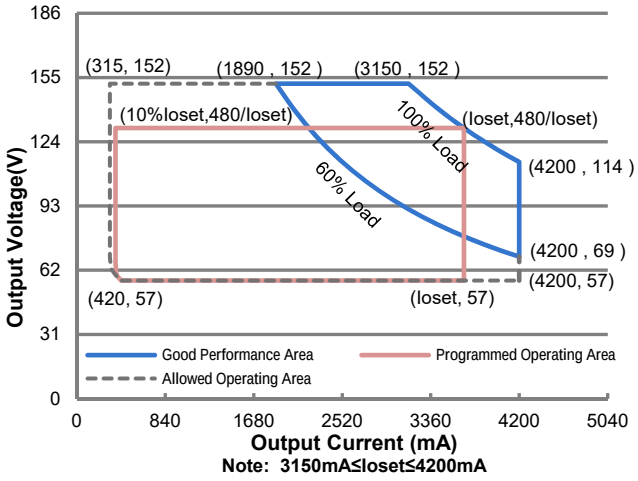

Note: 1050mA≤Ioset≤1400mA

### ESM-480S280Mx



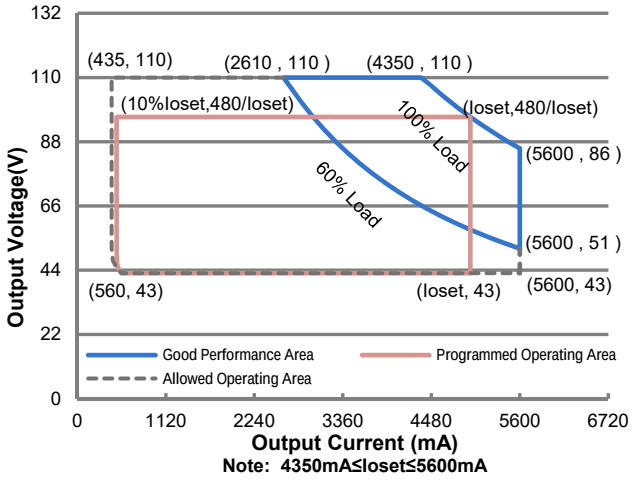

Note: 2100mA≤Ioset≤2800mA

### ESM-480S420Mx



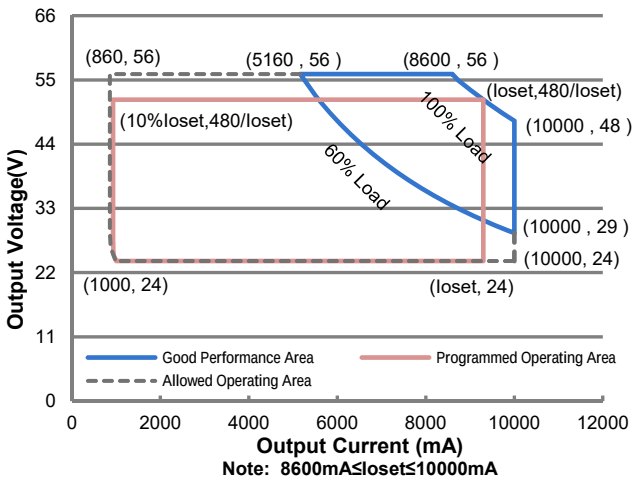

Note: 3150mA≤Ioset≤4200mA

### ESM-480S560Mx




Note: 4350mA≤Ioset≤5600mA

### ESM-480S10AMx




Note: 8600mA≤Ioset≤10000mA

## Input Specifications

| Parameter | Min. | Typ. | Max. | Notes |
|---|---|---|---|---|
| Input AC Voltage | 249 Vac | - | 528 Vac | |
| Input DC Voltage | 352 Vdc | - | 500 Vdc | |
| Input Frequency | 47Hz | - | 63Hz | |
| Leakage Current | - | - | 0.75 MIU | UL 8750; 480Vac/ 60Hz |
| | - | - | 0.70 mA | IEC 60598-1; 480Vac/ 60Hz, grounding effectively |
| Input AC Current | - | - | 2.02 A | Measured at 100% load and 277 Vac input. |
| | - | - | 1.18 A | Measured at 100% load and 480 Vac input. |
| Inrush Current($I^2t$) | - | - | 1.75 $A^2s$ | At 480Vac input, 25℃ cold start, duration=6.96 ms, 10%Ipk-10%Ipk. See Inrush Current Waveform for the details. |
| PF | 0.90 | - | - | At 277-480Vac, 50-60Hz, 60%-100% Load (288- 480W) |
| THD | - | - | 20% | |

## Output Specifications

| Parameter | Min. | Typ. | Max. | Notes |
|---|---|---|---|---|
| Output Current Tolerance | -5%Ioset | - | 5%Ioset | 100% load |
| Output Current Setting(Ioset) Range | | | | |
| ESM-480S140Mx | 105 mA | - | 1400 mA | |
| ESM-480S280Mx | 210 mA | - | 2800 mA | |
| ESM-480S420Mx | 315 mA | - | 4200 mA | |
| ESM-480S560Mx | 435 mA | - | 5600 mA | |
| ESM-480S10AMx | 860 mA | - | 10000 mA | |
| Output Current Setting Range with Constant Power | | | | |
| ESM-480S140Mx | 1050 mA | - | 1400 mA | |
| ESM-480S280Mx | 2100 mA | - | 2800 mA | |
| ESM-480S420Mx | 3150 mA | - | 4200 mA | |
| ESM-480S560Mx | 4350 mA | - | 5600 mA | |
| ESM-480S10AMx | 8600 mA | - | 10000 mA | |
| Total Output Current Ripple (pk-pk) | - | 5%Iomax | 10%Iomax | 100% load, 20 MHz BW |
| Output Current Ripple at < 200 Hz (pk-pk) | - | 2%Iomax | | 100% load |
| Startup Overshoot Current | - | - | 10%Iomax | 100% load |
| No Load Output Voltage | | | | |
| ESM-480S140Mx | - | - | 500 V | |
| ESM-480S280Mx | - | - | 280 V | |
| ESM-480S420Mx | - | - | 190 V | |
| ESM-480S560Mx | - | - | 120 V | |
| ESM-480S10AMx | - | - | 60 V | |
| Line Regulation | - | - | ±0.5% | 100% load |
| Load Regulation | - | - | ±1.5% | |

## Output Specifications (Continued)

| Parameter | Min. | Typ. | Max. | Notes |
|---|---|---|---|---|
| Turn-on Delay Time | - | - | 0.5 s | 277-480Vac input, 60%-100% Load |
| Temperature Coefficient of Ioset | - | 0.03%/°C | - | Case temperature = 0°C ~Tc max |
| 12V Auxiliary Output Voltage | 10.8 V | 12 V | 13.2 V | |
| 12V Auxiliary Output Source Current | 0 mA | - | 250 mA | Return terminal is "Dim−" |
| 12V Auxiliary Output Transient Peak Current@6W | - | - | 500 mA | 500mA peak for a maximum duration of 2.2ms in a 6.0ms period during which time the average should not exceed 250mA. |
| 12V Auxiliary Output Transient Peak Current@10W | - | - | 850 mA | 850mA peak for a maximum duration of 1.3ms in a 5.2ms period during which time the average should not exceed 250mA. |

## General Specifications

| Parameter | Min. | Typ. | Max. | Notes |
|---|---|---|---|---|
| Efficiency at 277 Vac input: | | | | |
| ESM-480S140Mx | | | | |
| Io= 1050 mA | 92.5% | 94.5% | - | |
| Io= 1400 mA | 92.5% | 94.5% | - | |
| ESM-480S280Mx | | | | |
| Io= 2100 mA | 92.5% | 94.5% | - | |
| Io= 2800 mA | 92.5% | 94.5% | - | Measured at 100% load and steady-state temperature in 25°C ambient; (Efficiency will be about 2.0% lower if measured immediately after startup.) |
| ESM-480S420Mx | | | | |
| Io= 3150 mA | 92.0% | 94.0% | - | |
| Io= 4200 mA | 92.0% | 94.0% | - | |
| ESM-480S560Mx | | | | |
| Io= 4350 mA | 92.0% | 94.0% | - | |
| Io= 5600 mA | 91.5% | 93.5% | - | |
| ESM-480S10AMx | | | | |
| Io= 8600 mA | 92.0% | 94.0% | - | |
| Io= 10000 mA | 92.0% | 94.0% | - | |
| Efficiency at 400 Vac input: | | | | |
| ESM-480S140Mx | | | | |
| Io= 1050 mA | 93.0% | 95.0% | - | |
| Io= 1400 mA | 93.5% | 95.5% | - | |
| ESM-480S280Mx | | | | |
| Io= 2100 mA | 93.0% | 95.0% | - | |
| Io= 2800 mA | 93.0% | 95.0% | - | Measured at 100% load and steady-state temperature in 25°C ambient; (Efficiency will be about 2.0% lower if measured immediately after startup.) |
| ESM-480S420Mx | | | | |
| Io= 3150 mA | 92.5% | 94.5% | - | |
| Io= 4200 mA | 92.5% | 94.5% | - | |
| ESM-480S560Mx | | | | |
| Io= 4350 mA | 92.5% | 94.5% | - | |
| Io= 5600 mA | 92.0% | 94.0% | - | |
| ESM-480S10AMx | | | | |
| Io= 8600 mA | 92.5% | 94.5% | - | |
| Io= 10000 mA | 93.0% | 95.0% | - | |

## General Specifications (Continued)

| Parameter | Min. | Typ. | Max. | Notes |
|---|---|---|---|---|
| Efficiency at 480 Vac input:<br>ESM-480S140Mx<br>Io= 1050 mA<br>Io= 1400 mA<br>ESM-480S280Mx<br>Io= 2100 mA<br>Io= 2800 mA<br>ESM-480S420Mx<br>Io= 3150 mA<br>Io= 4200 mA<br>ESM-480S560Mx<br>Io= 4350 mA<br>Io= 5600 mA<br>ESM-480S10AMx<br>Io= 8600 mA<br>Io= 10000 mA | <br><br>93.5%<br>93.5%<br><br>93.5%<br>93.5%<br><br>93.0%<br>92.5%<br><br>93.0%<br>92.5%<br><br>93.0%<br>93.0% | <br><br>95.5%<br>95.5%<br><br>95.5%<br>95.5%<br><br>95.0%<br>94.5%<br><br>95.0%<br>94.5%<br><br>95.0%<br>95.0% | <br><br>-<br>-<br><br>-<br>-<br><br>-<br>-<br><br>-<br>-<br><br>-<br>- | Measured at 100% load and steady-state temperature in 25°C ambient;<br>(Efficiency will be about 2.0% lower if measured immediately after startup.) |
| Standby Power | - | 1.5 W | - | Measured at 480Vac/50Hz; Dimming off |
| MTBF | | 300,000 Hours | - | Measured at 480Vac input, 80%Load and 25°C ambient temperature (MIL-HDBK-217F) |
| Lifetime | | 100,000 Hours | - | Measured at 480Vac input, 80%Load and 70°C case temperature; See lifetime vs. Tc curve for the details |
| | | 50,000 Hours | - | Measured at 277Vac input, 100%Load and 40°C ambient temperature |
| Operating Case Temperature for Safety Tc_s | -40°C | - | +90°C | |
| Operating Case Temperature for Warranty Tc_w | -40°C | - | +80°C | Case temperature for 5 years warranty<br>Humidity: 10%RH to 95%RH |
| Storage Temperature | -40°C | - | +85°C | Humidity: 5%RH to 95%RH |
| Dimensions<br>Inches (L × W × H)<br>Millimeters (L × W × H) | 9.57 × 3.54 × 1.71<br>243 × 90 × 43.5 | | | With mounting ear<br>10.31 × 3.54 × 1.71<br>262 × 90 × 43.5 |
| Net Weight | - | 1900 g | - | |

## Dimming Specifications

| Parameter | | Min. | Typ. | Max. | Notes |
|---|---|---|---|---|---|
| Absolute Maximum Voltage on the Vdim (+) Pin | | -20 V | - | 20 V | |
| Source Current on Vdim (+)Pin | | 90 uA | 100 uA | 110 uA | Vdim(+) = 0 V |
| Dimming Output Range with 10%-100% (Default) | ESM-480S140Mx<br>ESM-480S280Mx<br>ESM-480S420Mx<br>ESM-480S560Mx<br>ESM-480S10AMx | 10%Ioset | - | Ioset | 1050 mA ⩽ Ioset ⩽ 1400 mA<br>2100 mA ⩽ Ioset ⩽ 2800 mA<br>3150 mA ⩽ Ioset ⩽ 4200 mA<br>4350 mA ⩽ Ioset ⩽ 5600 mA<br>8600 mA ⩽ Ioset ⩽ 10000 mA |
| | ESM-480S140Mx<br>ESM-480S280Mx<br>ESM-480S420Mx<br>ESM-480S560Mx<br>ESM-480S10AMx | 105 mA<br>210 mA<br>315 mA<br>435 mA<br>860 mA | - | Ioset | 105 mA ⩽ Ioset < 1050 mA<br>210 mA ⩽ Ioset < 2100 mA<br>315 mA ⩽ Ioset < 3150 mA<br>435 mA ⩽ Ioset < 4350 mA<br>860 mA ⩽ Ioset < 8600 mA |

## Dimming Specifications (Continued)

| Parameter | | Min. | Typ. | Max. | Notes |
|---|---|---|---|---|---|
| Dimming Output Range with 5%-100% (Settable) | ESM-480S140Mx<br>ESM-480S280Mx<br>ESM-480S420Mx<br>ESM-480S560Mx<br>ESM-480S10AMx | 5%Ioset | - | Ioset | 1050 mA ⩽ Ioset ⩽ 1400 mA<br>2100 mA ⩽ Ioset ⩽ 2800 mA<br>3150 mA ⩽ Ioset ⩽ 4200 mA<br>4350 mA ⩽ Ioset ⩽ 5600 mA<br>8600 mA ⩽ Ioset ⩽ 10000 mA |
| | ESM-480S140Mx<br>ESM-480S280Mx<br>ESM-480S420Mx<br>ESM-480S560Mx<br>ESM-480S10AMx | 53 mA<br>105 mA<br>158 mA<br>218 mA<br>430 mA | - | Ioset | 105 mA ⩽ Ioset < 1050 mA<br>210 mA ⩽ Ioset < 2100 mA<br>315 mA ⩽ Ioset < 3150 mA<br>435 mA ⩽ Ioset < 4350 mA<br>860 mA ⩽ Ioset < 8600 mA |
| Recommended Dimming Input Range | | 0 V | - | 10 V | Default 0-10V dimming mode. |
| Dim off Voltage | | 0.35 V | 0.5 V | 0.65 V | |
| Dim on Voltage | | 0.55 V | 0.7 V | 0.85 V | |
| Hysteresis | | - | 0.2 V | - | |
| PWM_in High Level | | 3 V | - | 10 V | Dimming mode set to PWM in Inventronics Programing software. |
| PWM_in Low Level | | -0.3 V | - | 0.6 V | |
| PWM_in Frequency Range | | 200 Hz | - | 3 KHz | |
| PWM_in Duty Cycle | | 1% | - | 99% | |
| PWM Dimming off (Positive Logic) | | 3% | 5% | 8% | |
| PWM Dimming on (Positive Logic) | | 5% | 7% | 10% | |
| PWM Dimming off ( Negative Logic) | | 92% | 95% | 97% | |
| PWM Dimming on ( Negative Logic) | | 90% | 93% | 95% | |
| Hysteresis | | - | 2% | - | |

## Safety &EMC Compliance

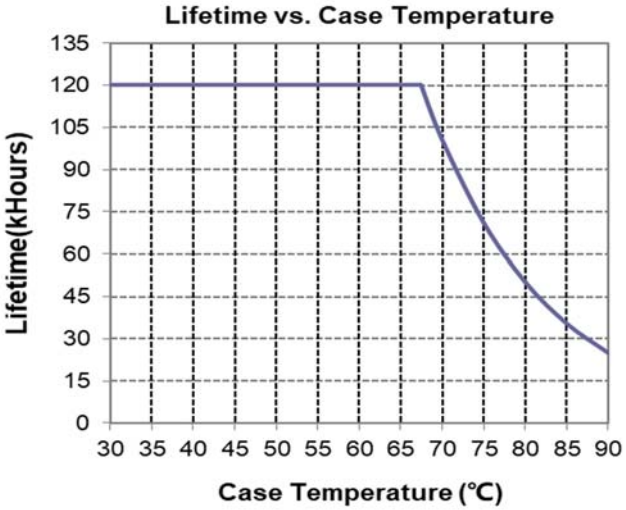
| Safety Category | Standard |
|---|---|
| UL/CUL | UL 8750,CAN/CSA-C22.2 No. 250.13 |
| ENEC & CE | EN 61347-1, EN 61347-2-13 |
| UKCA | BS EN 61347-1, BS EN 61347-2-13 |
| CB | IEC 61347-1, IEC 61347-2-13 |
| global-mark | AS/NZS 61347.1, AS/NZS 61347.2.13 |
| **Performance** | **Standard** |
| ENEC | EN 62384 |
| **EMI Standards** | **Notes** |
| BS EN/EN IEC 55015(1) | Conducted emission Test &Radiated emission Test |

## Safety &EMC Compliance (Continued)

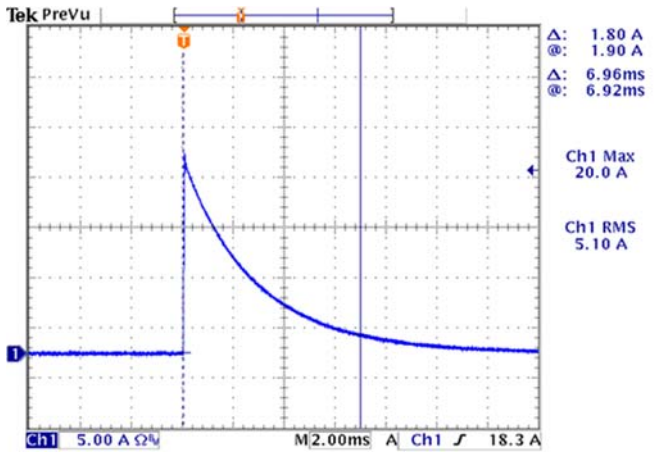
| EMI Standards | Notes |
|---|---|
| BS EN/EN IEC 61000-3-2 | Harmonic current emissions |
| BS EN/EN 61000-3-3 | Voltage fluctuations & flicker |
| FCC Part 15(1) | ANSI C63.4 Class B |
| | This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: [1] this device may not cause harmful interference, and [2] this device must accept any interference received, including interference that may cause undesired operation. |
| **EMS Standards** | **Notes** |
| BS EN/EN 61000-4-2 | Electrostatic Discharge (ESD): 8 kV air discharge, 4 kV contact discharge |
| BS EN/EN 61000-4-3 | Radio-Frequency Electromagnetic Field Susceptibility Test-RS |
| BS EN/EN 61000-4-4 | Electrical Fast Transient / Burst-EFT |
| BS EN/EN 61000-4-5 | Surge Immunity Test: AC Power Line: Differential Mode 6 kV, Common Mode 10 kV |
| BS EN/EN 61000-4-6 | Conducted Radio Frequency Disturbances Test-CS |
| BS EN/EN 61000-4-8 | Power Frequency Magnetic Field Test |
| BS EN/EN 61000-4-11 | Voltage Dips |
| BS EN/EN 61547 | Electromagnetic Immunity Requirements Applies To Lighting Equipment |

**Note:** (1) 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.

## Lifetime vs. Case Temperature

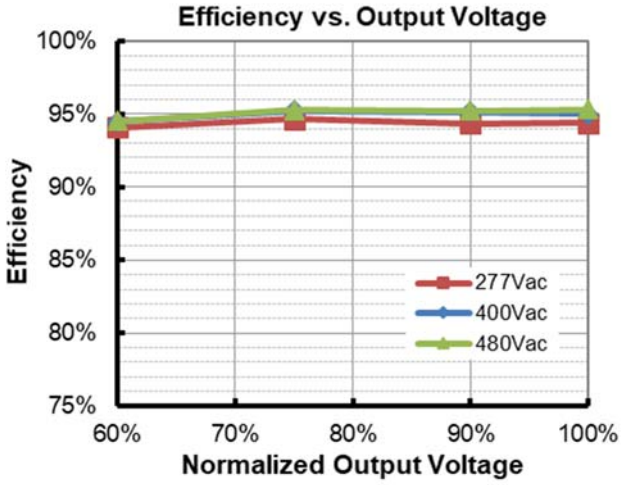


## Inrush Current Waveform

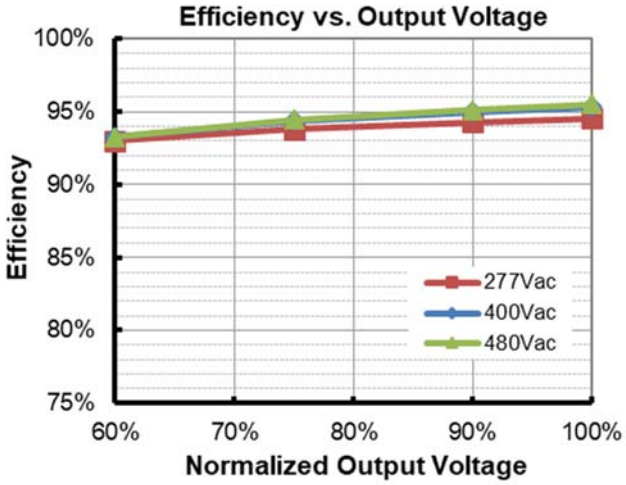



## Efficiency vs. Load

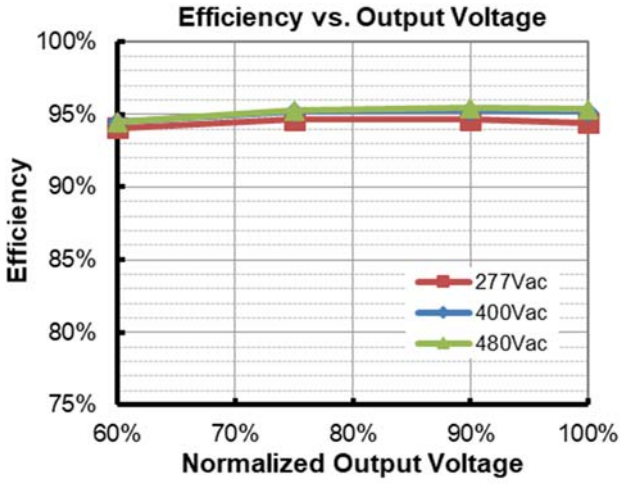
*ESM-480S140Mx(Io=1050mA)*



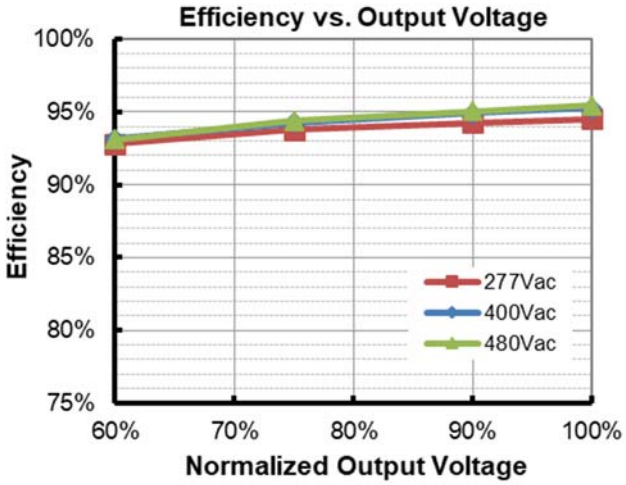

*ESM-480S140Mx(Io=1400mA)*



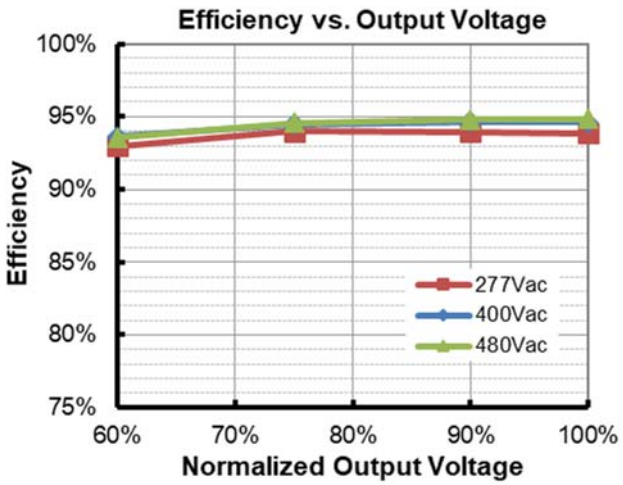

*ESM-480S280Mx(Io=2100mA)*



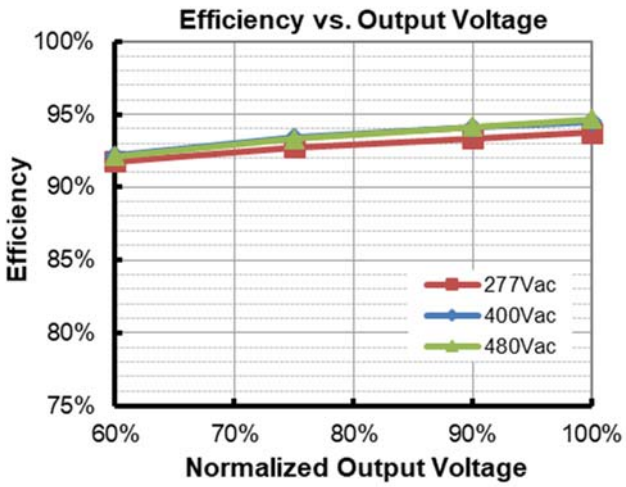

*ESM-480S280Mx(Io=2800mA)*



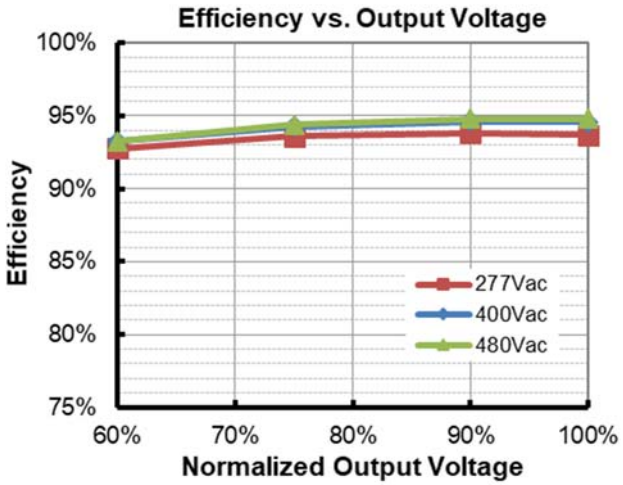
*ESM-480S420Mx(Io=3150mA)*



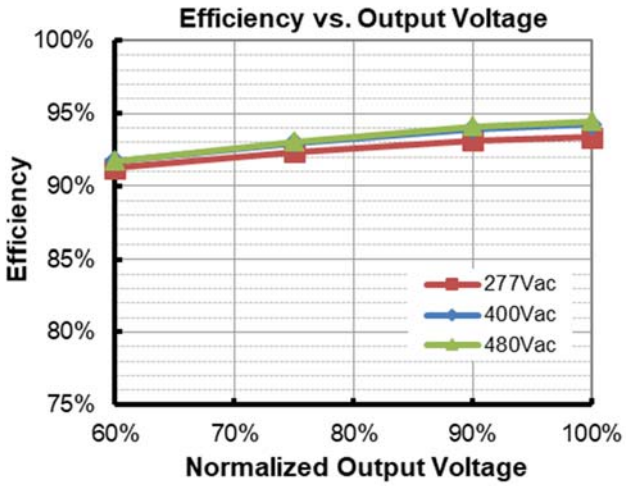

*ESM-480S420Mx(Io=4200mA)*



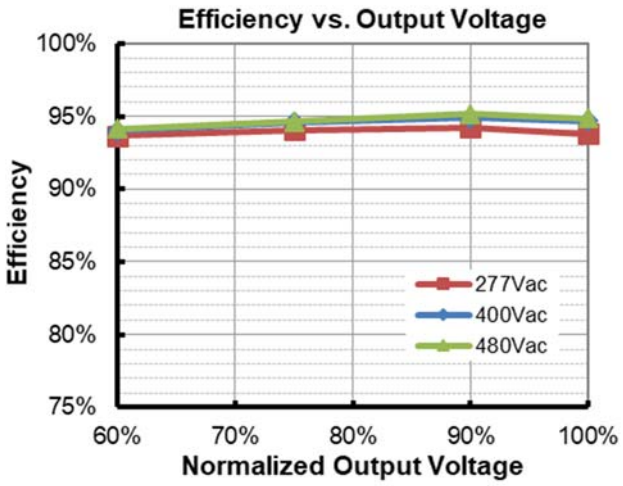

*ESM-480S560Mx(Io=4350mA)*



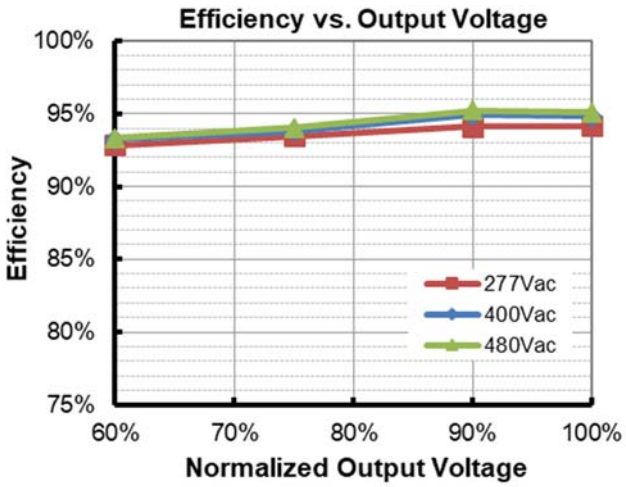

*ESM-480S560Mx(Io=5600mA)*




*ESM-480S10AMx(Io=8600mA)*




*ESM-480S10AMx(Io=10000mA)*






*Specifications are subject to changes without notice.* *All specifications are typical at 25℃ unless otherwise stated.*

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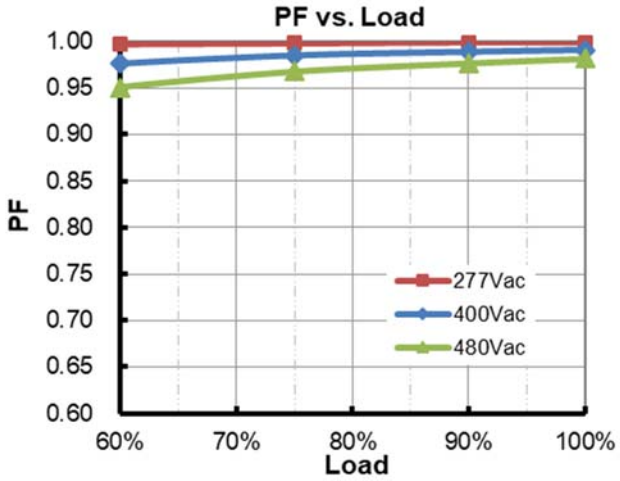
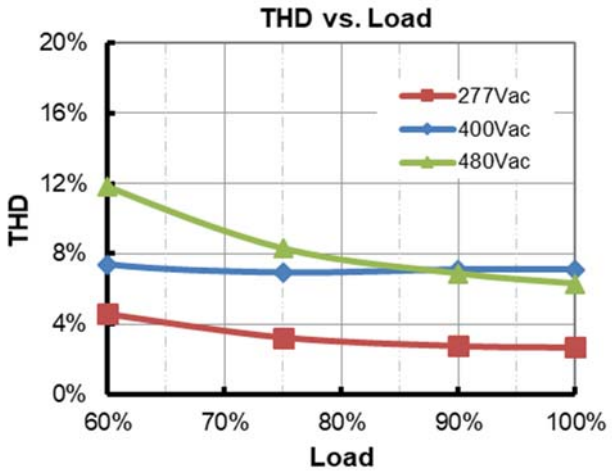
## Power Factor

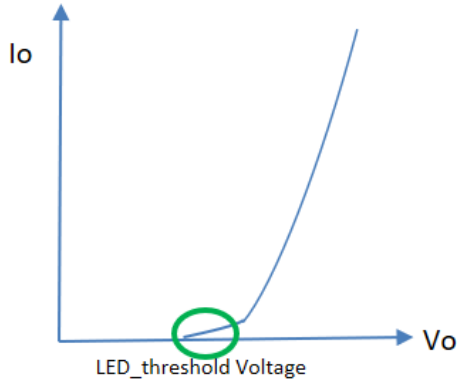



## Total Harmonic Distortion




## Hot-plugging Protection

This feature protects LEDs when connecting to a driver that is already powered on. This is disabled by default and can be enabled through the Inventronics Programing software.




LED threshold voltage (Vth) is the minimum voltage required for current to flow through the LED load. After this threshold is met, the LED forward voltage (Vf) increases as the current increases.

Set Vth close to, but higher than the actual LED threshold voltage for optimized performance. The greater the difference between the Vth setting and the actual LED threshold voltage, the higher the overshoot current will be. The Vth setting must be lower than Vf.

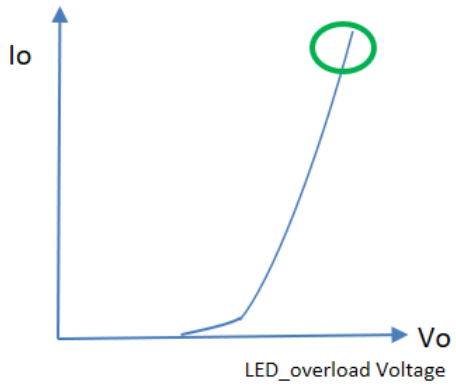
Please test, program, and tune this feature for each LED load design.

## Hot-plugging Protection (Continued)

| Parameter | | | Min. | Typ. | Max. | Notes |
|---|---|---|---|---|---|---|
| Hot-plugging Protection | LED Threshold Voltage Setting Range | ESM-480S140Mx | 257V | - | 457V | Set Vth close to, but higher than the actual LED threshold voltage |
| | | ESM-480S280Mx | 129V | - | 228V | |
| | | ESM-480S420Mx | 86V | - | 152V | |
| | | ESM-480S560Mx | 64V | - | 110V | |
| | | ESM-480S10AMx | 36V | - | 56V | |
| | Setting Tolerance | | -2% | - | 2% | |

## Parallel LED Protection

This feature helps protect parallel LEDs from a high, overcurrent condition by limiting the voltage. This is disabled by default and can be enabled through the Inventronics Programing software.




Set V_overload close to, but higher than the maximum forward voltage for optimized performance. The greater the difference between the V_overload setting and the maximum forward voltage, the higher the overload stress will be. The V_overload setting must be higher than Vf.

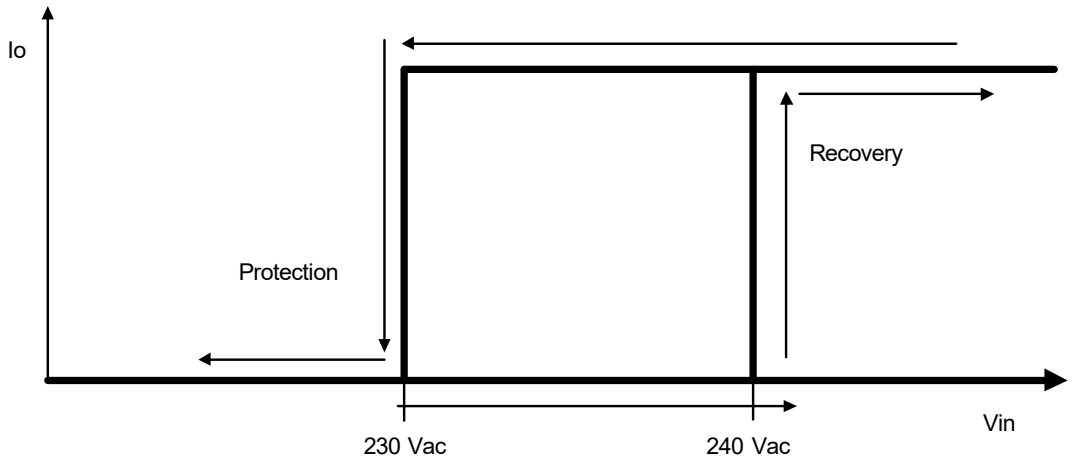
Please test, program, and tune this feature for each LED load design.

| Parameter | | | Min. | Typ. | Max. | Notes |
|---|---|---|---|---|---|---|
| Parallel LED Protection | Overload Voltage Setting Range | ESM-480S140Mx | 257V | - | 480V | Set V_overload close to, but higher than the maximum LED forward voltage |
| | | ESM-480S280Mx | 129V | | 240V | |
| | | ESM-480S420Mx | 86V | | 160V | |
| | | ESM-480S560Mx | 64V | | 115V | |
| | | ESM-480S10AMx | 36V | | 57V | |
| | Setting Tolerance | | -2% | - | 2% | |

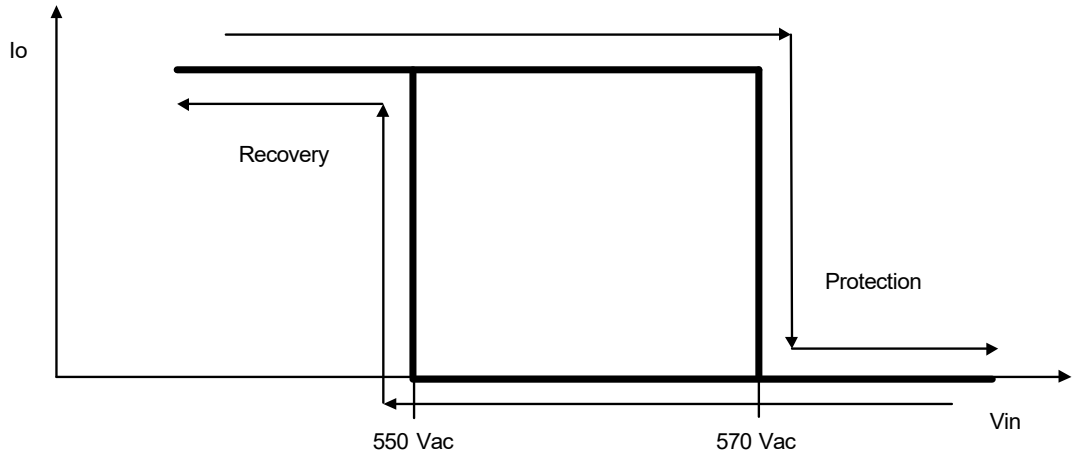
## Protection Functions

| Parameter | | Min. | Typ. | Max. | Notes |
|---|---|---|---|---|---|
| Over Temperature Protection | | Decreases output current, returning to normal after over temperature is removed. | | | |
| Short Circuit Protection | | Auto Recovery. No damage will occur when any output is short circuited. The output shall return to normal when the fault condition is removed. | | | |
| Over Voltage Protection | | Limits output voltage at no load and in case the normal voltage limit fails. | | | |
| Input Under Voltage Protection (IUVP) | Input Protection Voltage | 220 Vac | 230 Vac | 240 Vac | Turn off the output when the input voltage falls below protection voltage. |
| | Input Recovery Voltage | 230 Vac | 240 Vac | 250 Vac | Auto Recovery. The driver will restart when the input voltage exceeds recovery voltage. |
| Input Over Voltage Protection (IOVP) | Input Over Voltage Protection | 550 Vac | 570 Vac | 590 Vac | Turn off the output when the input voltage exceeds protection voltage. |
| | Input Over Voltage Recovery | 530 Vac | 550 Vac | 570 Vac | Auto Recovery. The driver will restart when the input voltage falls below recovery voltage. |
| | Max. of Input Over Voltage | - | - | 590 Vac | The driver can survive for 8 hours with a stable input voltage stress of 590Vac. |

- **Input Under Voltage Protection Diagram**



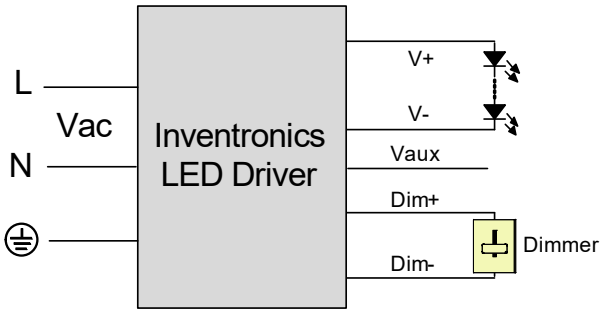

- **Input Over Voltage Protection Diagram**

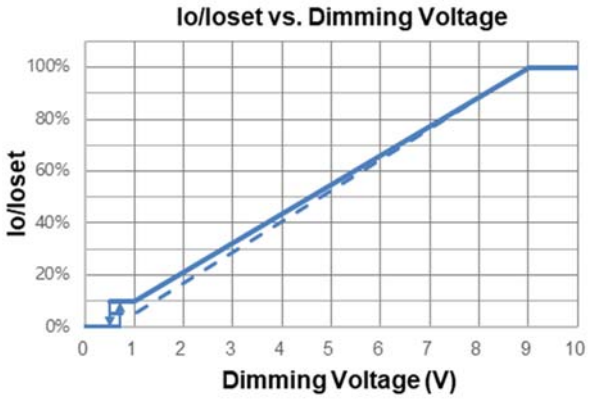


## Dimming

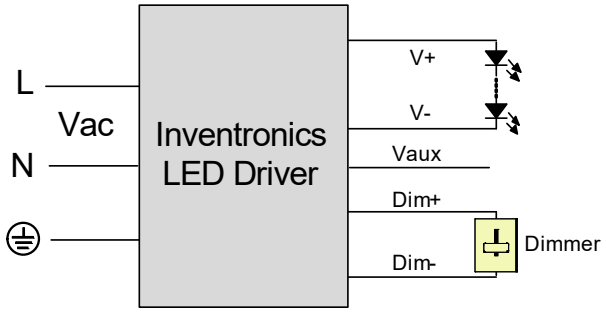
### ● 0-10V Dimming

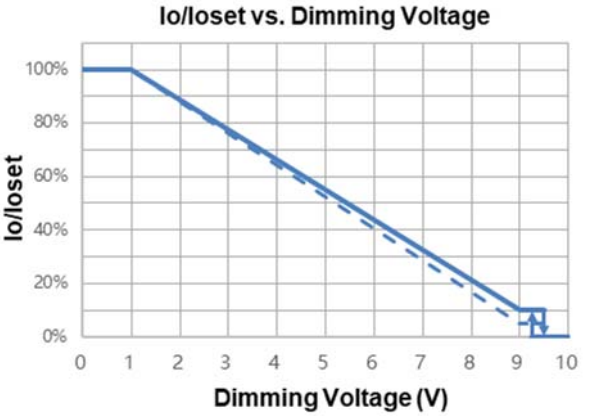
The recommended implementation of the dimming control is provided below




**Implementation 1: Positive logic**



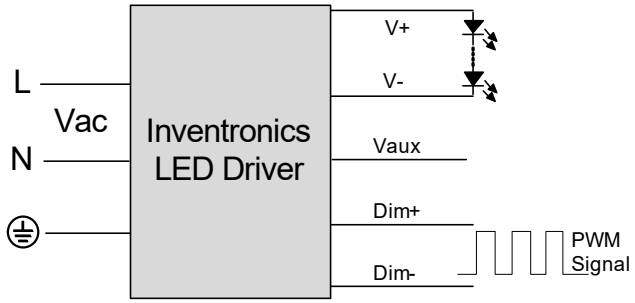

**Implementation 2: Negative logic**

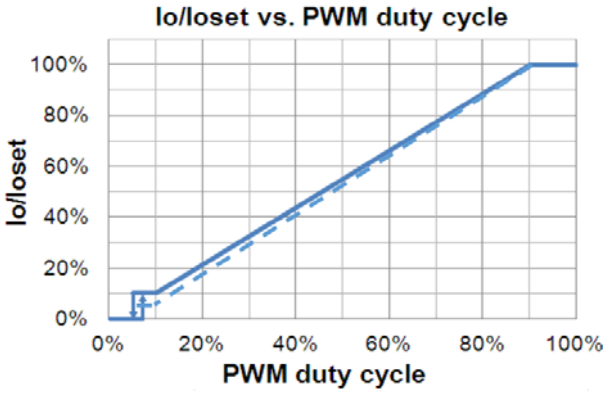
**Notes:**

1. Do NOT connect Dim− to the output V− or V+, otherwise the driver will not work properly.
2. The dimmer can also be replaced by an active 0-10V voltage source signal or passive components like zener.
3. When 0-10V negative logic dimming mode and Dim+ is open, the driver will dim to off and be standby.

### ● PWM Dimming

The recommended implementation of the dimming control is provided below.




**Implementation 3: Positive logic**



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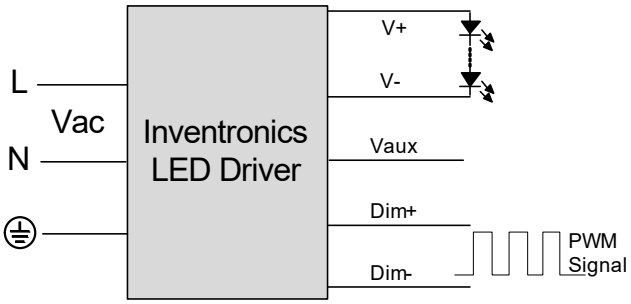
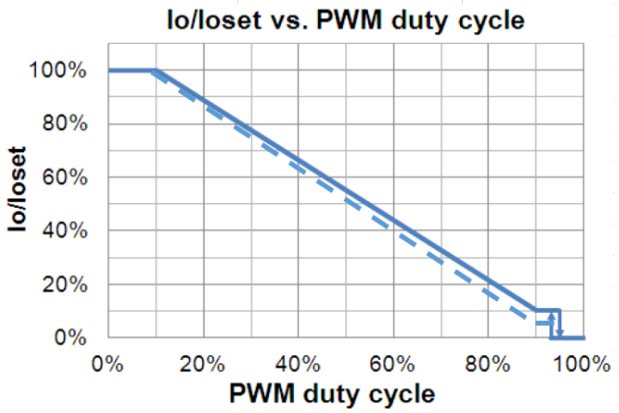


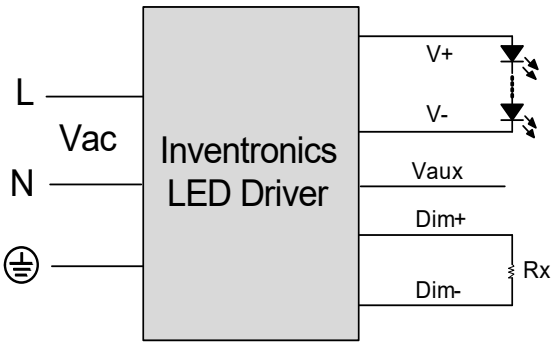

**Implementation 4: Negative logic**

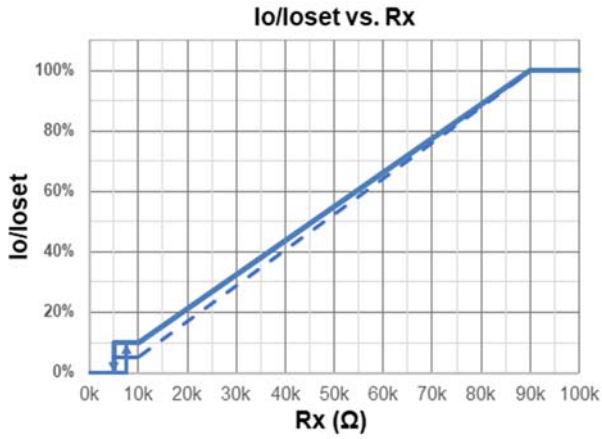
**Notes:**

1. Do NOT connect Dim− to the output V− or V+, otherwise the driver will not work properly.
2. When PWM negative logic dimming mode and Dim+ is open, the driver will dim to off and be standby.

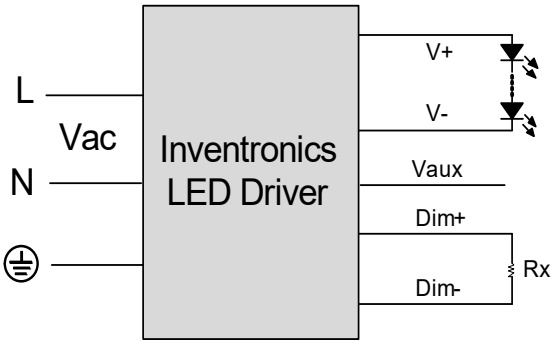
## ● Resistor Dimming

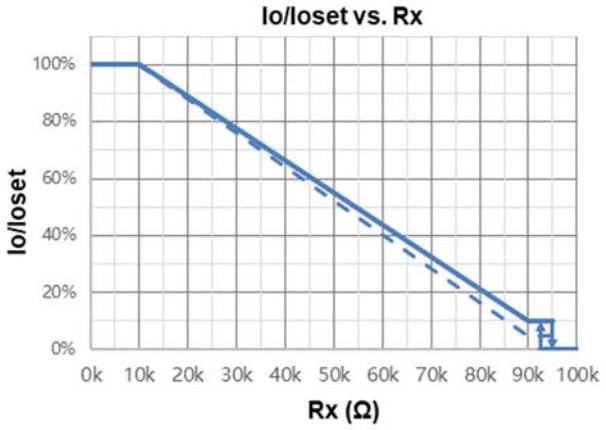
The recommended implementation of the dimming control is provided below.




**Implementation 5: Positive logic**



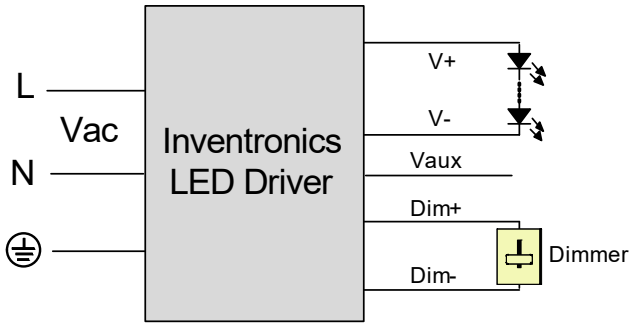

**Implementation 6: Negative logic**

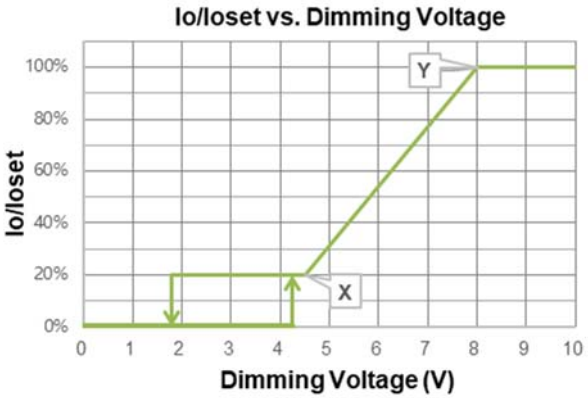
**Notes:**

1. Do NOT connect Dim− to the output V− or V+, otherwise the driver will not work properly.
2. When resistor negative logic dimming mode and Dim+ is open, the driver will dim to off and be standby.

## Adjustable Dimming Curve

0-10V, PWM and resistor dimming curve can be set as corresponding dimming voltage by Inventronics Multi Programmer. Take the 0-10V positive logic dimming mode as an example, the recommended implementation of the dimming control is provided below.




**Implementation 7: Positive logic**

**Notes:**

1. Do NOT connect Dim− to the output V− or V+, otherwise the driver will not work properly.
2. The dimmer can also be replaced by an active 0-10V voltage source signal or passive components like zener.
3. When dimming voltage X point is set to be smaller than Y point, the dimming curve is positive logic; conversely, when X point is set to be bigger than Y point, the dimming curve is negative logic.
4. For best dimming accuracy, the difference between X point and Y point is advised not less than 4V.

## Output Lumen Compensation

Output Lumen Compensation (OLC) may be used to maintain constant light output over the life of the LEDs by driving them at a reduced current when new, then gradually increasing the drive current over time to counteract LED lumen degradation.

## Minimum Dimming Level with 5% or 10% Selectable

The minimum dimming level can be set as 5% or 10% by Inventronics Multi Programmer,10% is default.

## Hold Time Adjustable

When AC power is first applied to the LED driver, enabling a “Hold” period can allow devices powered by the Auxiliary voltage to stabilize before the driver fades up to the maximum dimming level. During this period, the driver will not respond to external dimming commands but will respond again after the hold time ends. Both the initial dimming percentage and the duration of this hold period can be adjusted by the Inventronics Multi Programmer. This function is disabled by default

## Fade Time Adjustable

There is a “Fade” period after the “Hold” period. The soft-start time and dimming slope applied to all dimming transitions can be adjusted individually. It is adjusted by the Inventronics Multi Programmer. This function is disabled by default.

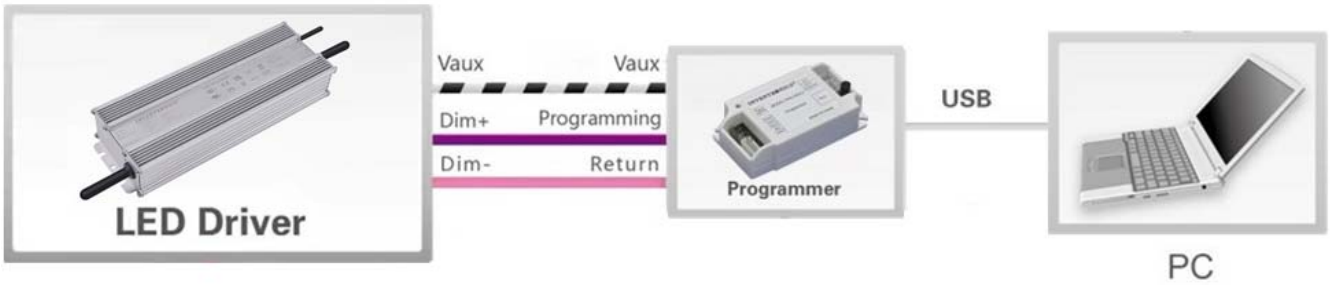
## End Of Life

End-of-Life (EOL) is providing a visual notification to a user that the LED module has reached the end of manufacturer-specified life and that the replacement is recommended. Once active, an indication is given at each power-up of the driver, which the driver indicates this through a lower light output during the first 1 minute before normal operation is continued.

## Digital Dimming

Inventronics Digital Dimming is a UART (Universal Asynchronous Receive Transmitter) based communication protocol. Please refer to Inventronics Digital Dimming file for details

## Programming Connection Diagram

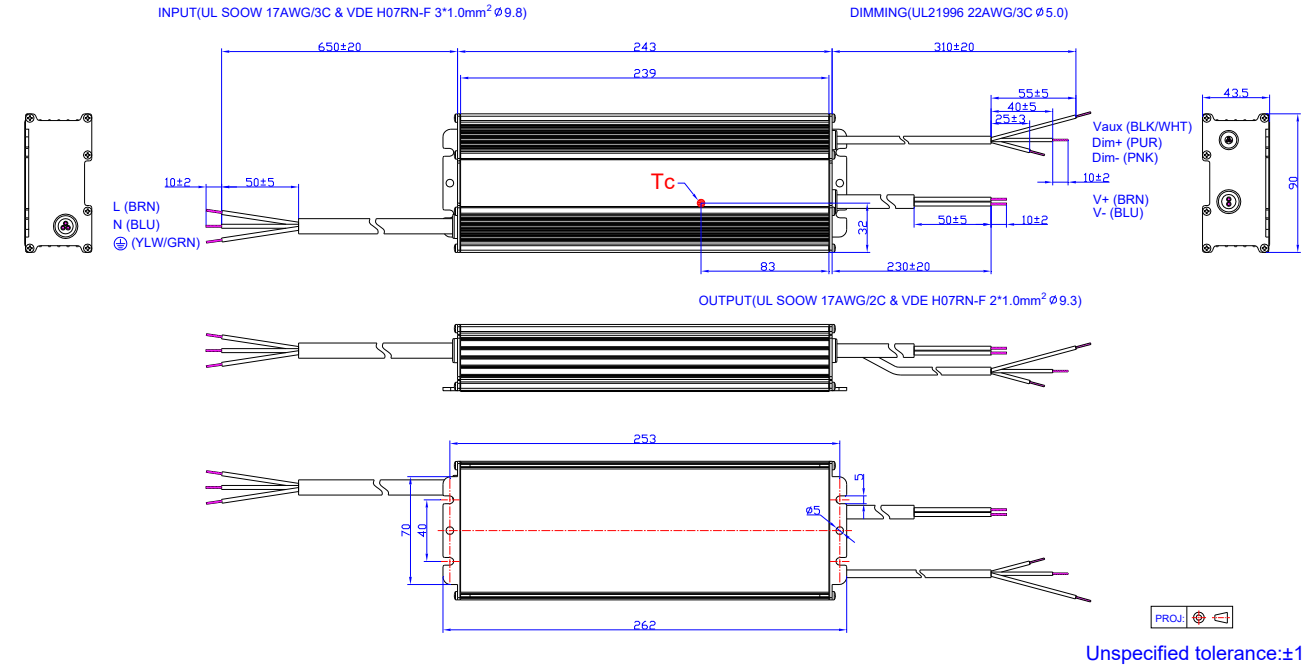



**Note:** The driver does not need to be powered on during the programming process.

- **Please refer to PRG-MUL2 (Programmer) datasheet for details.**

## Mechanical Outline

*ESM-480S140MG*



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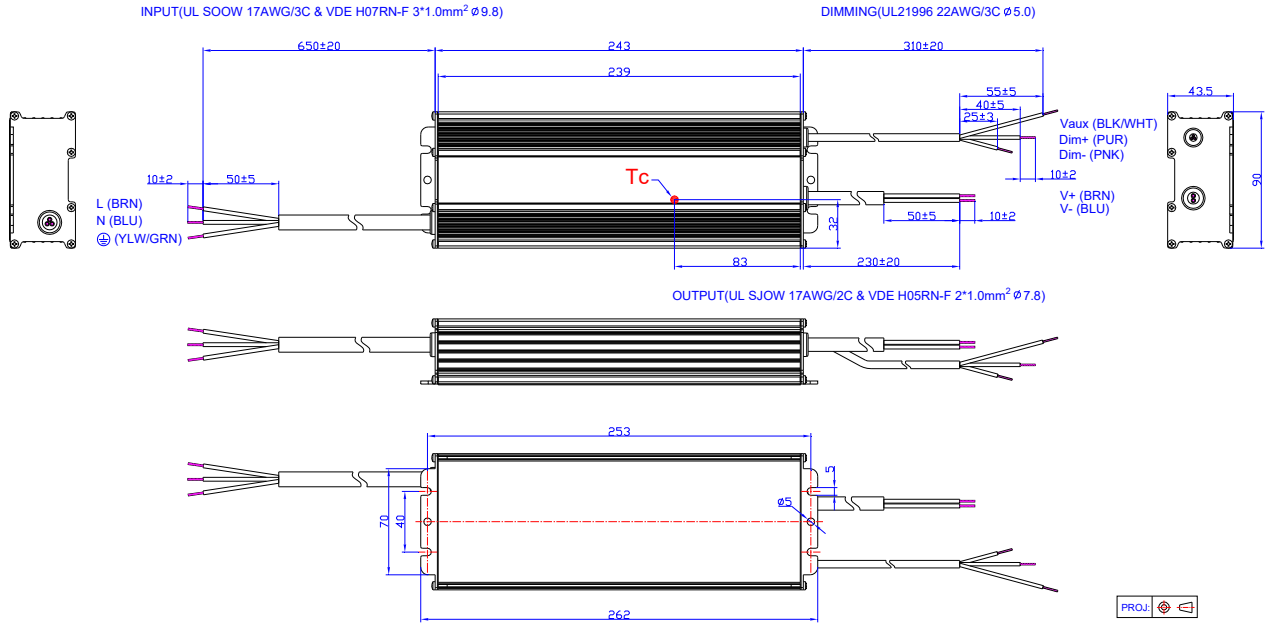
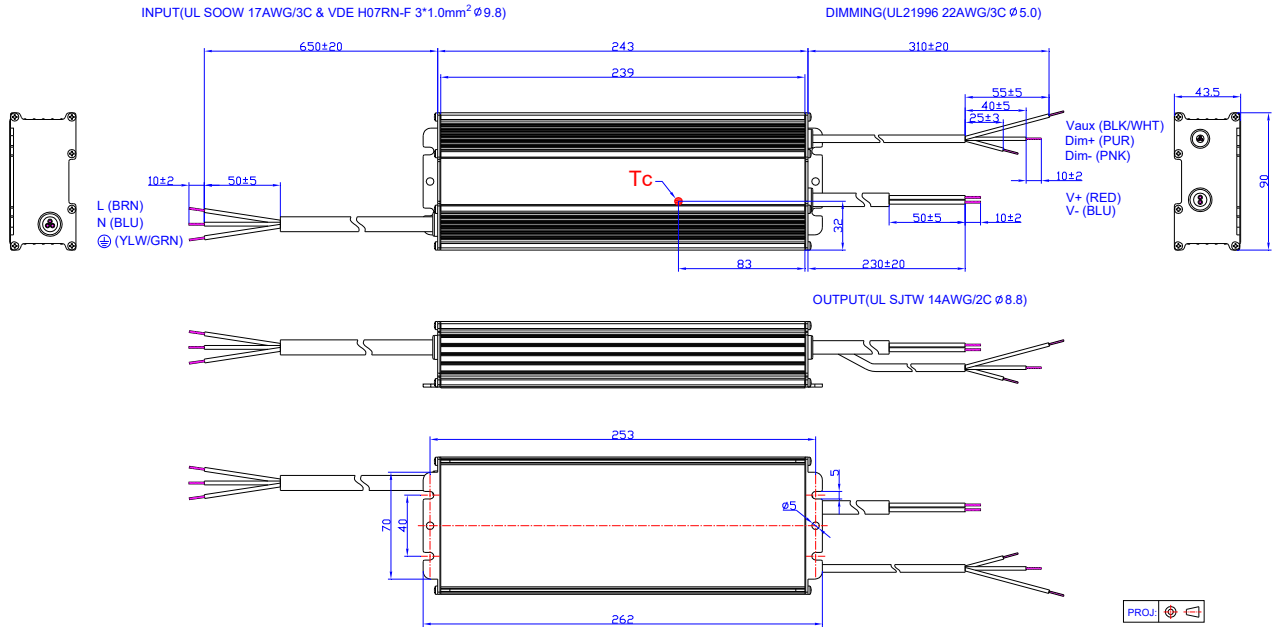
## ESM-480S280MG/ESM-480S420MG/ESM-480S560MG




Unspecified tolerance:±1

## ESM-480S10AMG




Unspecified tolerance:±1



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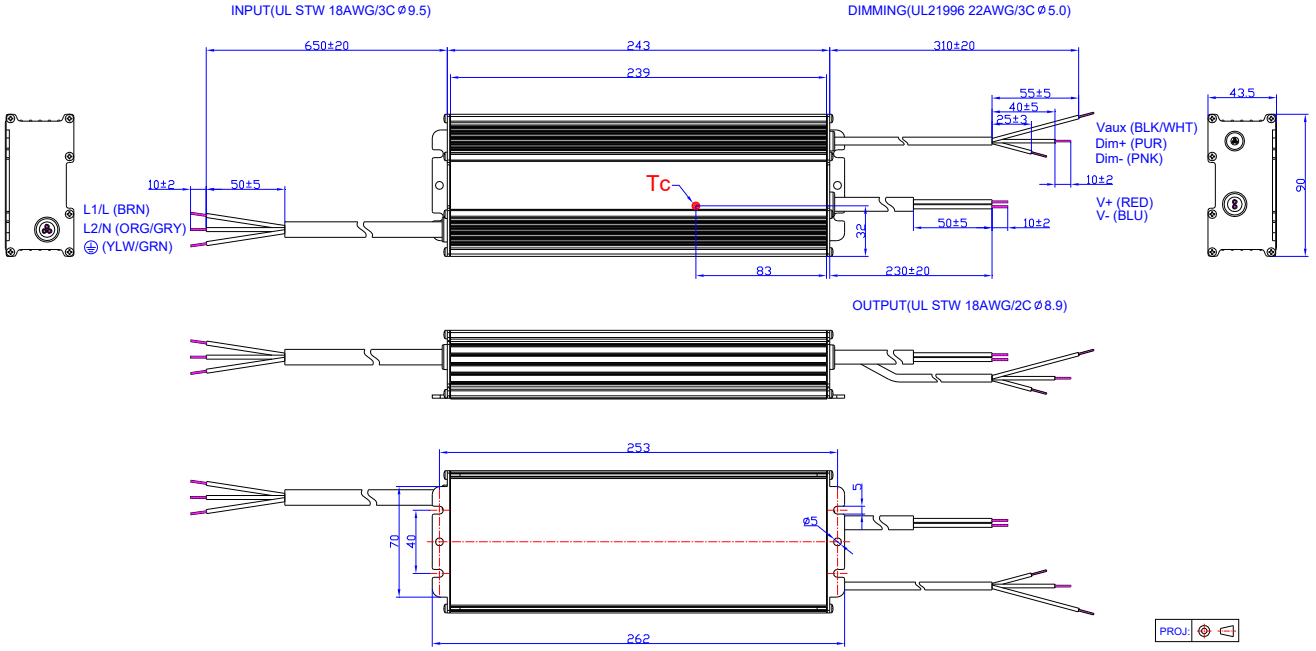
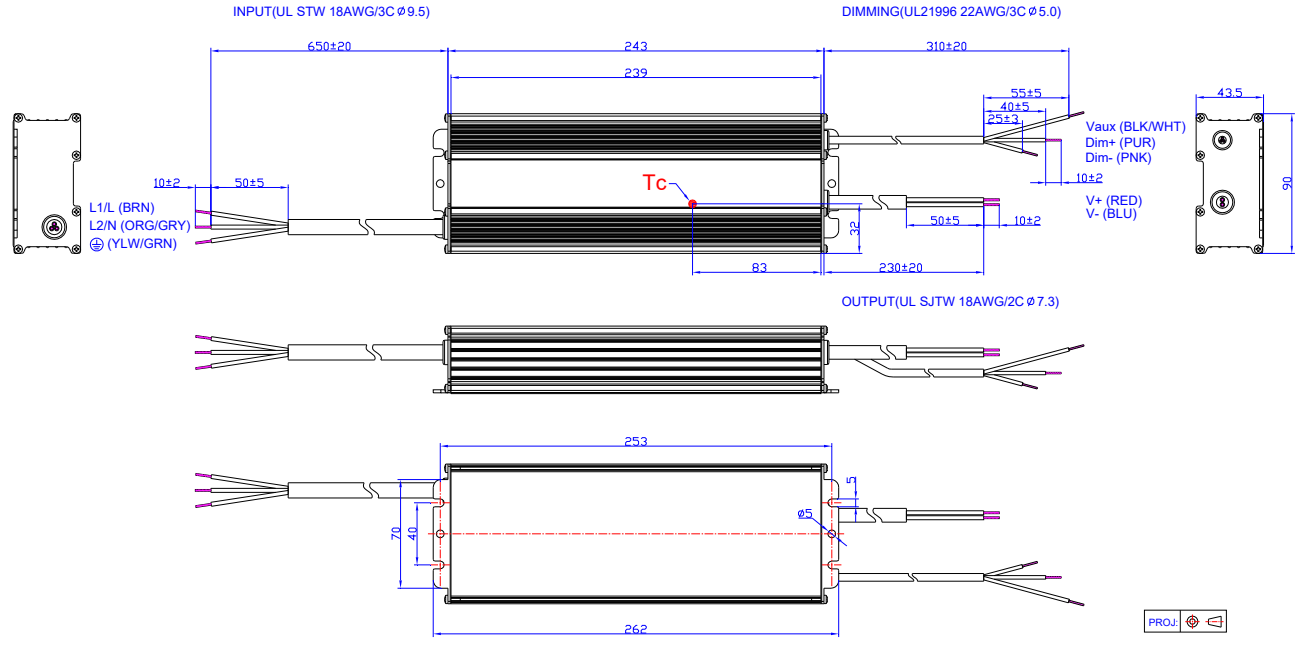
*ESM-480S140MT*




Unspecified tolerance:±1

*ESM-480S280MT/ESM-480S420MT/ESM-480S560MT*




Unspecified tolerance:±1



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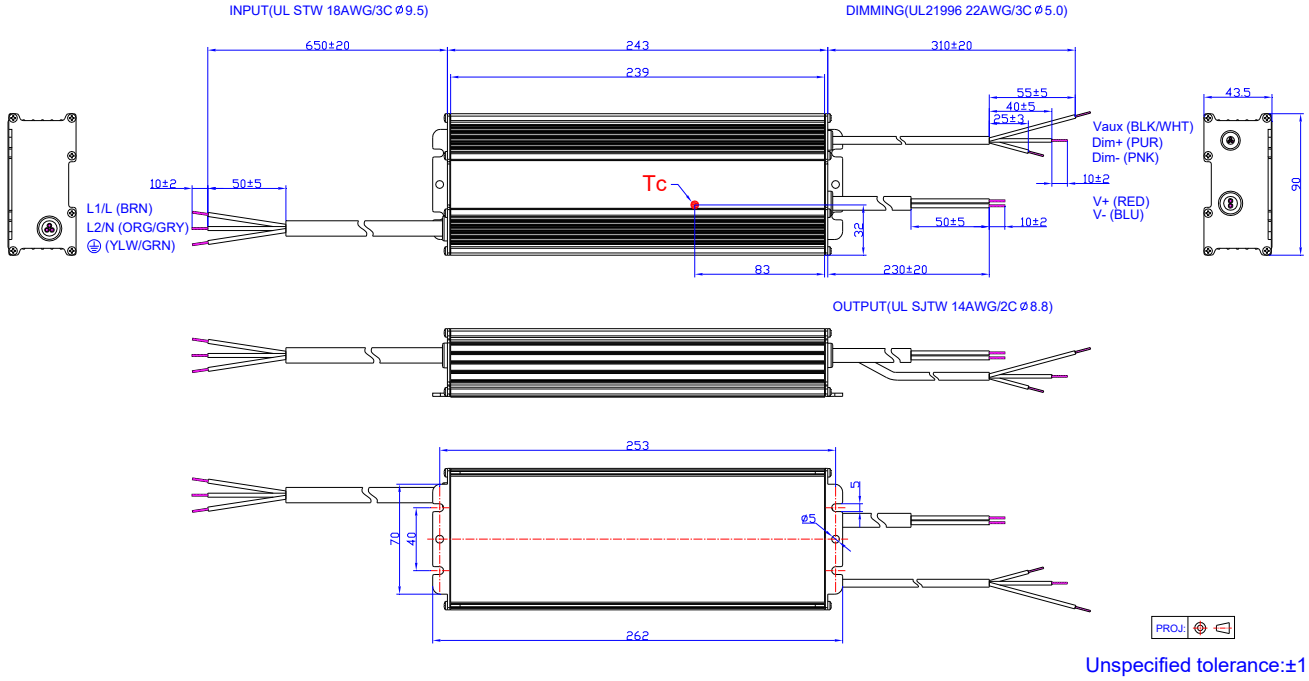
*ESM-480S10AMT*




Unspecified tolerance:±1

## RoHS Compliance

Our products comply with reference to RoHS Directive (EU) 2015/863 amending 2011/65/EU, calling for the elimination of lead and other hazardous substances from electronic products.

## Revision History

| Change Date | Rev. | Description of Change | | |
|---|---|---|---|---|
| | | Item | From | To |
| 2023-09-01 | A | Datasheet Release | / | / |