

LED Driver

USVI S24 Series

USVI S24

Highlights & Features

- Constant voltage design
- Universal input voltage from 120-277Vac
- Multi-Channel output and independent operating
- Class 2 output
- Wide operating temperature range -40°C to +55°C
- Dry & Damp location rated for signage application

Safety Standards



Dimensions (L x W x D):

USVI-020024FA	5.20 x 1.34 x 1.00 inch (132.0 x 34.1 x 25.4 mm)
USVI-060024FG	5.83 x 1.80 x 1.00 inch (148.2 x 45.6 x 25.4 mm)
USVI-060024DG	5.83 x 1.80 x 1.00 inch (148.2 x 45.6 x 25.4 mm)
USVI-060024FH	9.50 x 1.70 x 1.18 inch (241.3 x 43.1 x 30.0 mm)
USVI-100024FE/G	9.50 x 1.70 x 1.00 inch (241.3 x 43.1 x 25.4 mm)
USVI-100024DE/G	9.50 x 1.70 x 1.00 inch (241.3 x 43.1 x 25.4 mm)
USVI-100024FH	9.50 x 1.70 x 1.18 inch (241.3 x 43.1 x 30.0 mm)
USVI-200024FA	16.70 x 1.70 x 1.18 inch (424.2 x 43.1 x 30.0 mm)

General Description

Delta USVI S24 series of fixed output voltage LED drivers comes with affordable and reliable features. Compatible with signage from any manufacturer. 24V major output voltage with 1 or 2 multi-channel selection for different lumen application. Meet North America safety certifications, and compliant with FCC Immunity/Emissions/Harmonic requirements. The products are designed and rigorously tested to work in various indoor/signage LED lighting conditions.

Model Information

Model Number	Input Voltage Range	Rated Output Voltage	Rated Output Current	Output Channels
USVI-020024FA	90 - 305Vac	24Vdc	0.85A, 0.85A/ Channel	1
USVI-060024FG	108 - 305Vac		2.50A, 2.50A/ Channel	1
USVI-060024DG			2.50A, 2.50A/ Channel	1
USVI-060024FH			2.50A, 2.50A/ Channel	1
USVI-100024FE/G			4.15A, 4.15A/ Channel	1
USVI-100024DE/G			4.15A, 4.15A/ Channel	1
USVI-100024FH			4.00A, 4.00A/ Channel	1
USVI-200024FA			8.00A, 4.00A/ Channel	2

Model Numbering

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Safety Approval cULus CSA CE	Constant Voltage	Indoor		Output Power 020 – 20W 060 – 60W 100 – 100W 200 – 200W	Output Voltage 024 – 24Vdc	Function D – 0-10V Dimming F – Fixed Output	Variable

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Specifications

Model Number	USVI-020024FA	USVI-060024DG	USVI-060024FG	USVI-060024FH
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Input Ratings / Characteristics

Normal Input Voltage		100-277Vac	120-277Vac	120-277Vac	120-277Vac
Input Voltage Range		90-305Vac	108-305Vac	108-305Vac	108-305Vac
Normal Input Frequency		50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz
Input Frequency Range		47-63 Hz	47-63 Hz	47-63 Hz	47-63 Hz
Input Current Max		0.27A	0.58A	0.58A	0.59A
Efficiency ¹⁾	277Vac	80.0% typ.	90.0% typ.	90.0% typ.	87.0% typ.
Inrush Current Peak >50% Duration		32A/ 150us	70A/ 250us	70A/ 250us	50A/ 250us
Power Factor @ max. Load.		> 0.9	> 0.95	> 0.95	> 0.95
Total Harmonic Distortion @ max. Load.		< 20%			
Leakage Current		< 0.75mA @ 277Vac			

1) 100% Load (typical) and tested after 30 minutes warm up.

Output Ratings / Characteristics

Nominal Output Voltage (per channel)	24Vdc			
Max. No Load Output Voltage (per channel)	25.2Vdc			
Output Current Range (per channel)	0.05A – 0.83A	0.10A – 2.50A	0.10A – 2.50A	0.10A – 2.50A
Max. Output Power (per channel)	20W	60W	60W	60W
Output Channel	1			
Max. Output Power (total output)	20W	60W	60W	60W
Output Voltage Tolerance	± 3%			
Line Regulation	± 1%			
Load Regulation	± 3%			
Output Ripple Voltage	< 720mVp-p	< 500mVp-p	< 500mVp-p	<400mVp-p
Rise Time	< 50ms			
Start-up Time	< 1s			

Dimming Characteristics (For DE and DG model only)

Dimming Method	0 ~ 10Vdc for 0 ~100%. Internal PWM Dimming (1kHz). Source current is 120uA. 1) 1V (5%) – 9V (100%) 2) Dimming terminal Open (100%) 3) Dimming terminal Short (0%) 4) Dim= 0.4V OFF
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Model Number	USVI-020024FA	USVI-060024DG	USVI-060024FG	USVI-060024FH
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Mechanical

Casing		Plastic, Color : White	Metal sheet, Color : White	Metal sheet, Color : White	Metal sheet, Color : White
Dimensions (L x W x H)	[inch] [mm]	5.20*1.34*1.00 132.0*34.0*25.4	5.83 x 1.80 x 1.00 148.2 x 45.6 x 25.4	5.83 x 1.80 x 1.00 148.2 x 45.6 x 25.4	9.50 x 1.70 x 1.18 241.3 x 43.1 x 30.0
Unit Weight	[lbs] [kg]	0.40 0.18	0.75 0.34	0.75 0.34	1.32 0.60
Cooling System		Convection			
Input Wire		Line: Black, Neutral: White, Wire Length 300mm			
Output Wire		Positive: Red, Negative: Blue, Wires Length 300mm	Dim+: Violet, Dim-: Gray, Positive: Red, Negative: Blue, Wires Length 300mm	Positive: Red, Negative: Blue, Wires Length 300mm	Positive: Red, Negative: Black, Wires Length 300mm
Noise (30cm distance)		Sound Pressure Level (SPL) < 24dBA			

Environment

Ambient Temperature	Operating	-40°C to +60°C	-25°C to +55°C	-25°C to +55°C	-40°C to +55°C
	Storage	-40°C to +85°C			
Case Temperature (for UL)		+90°C	+90°C	+90°C	+85°C
Case Temperature (for warranty)		+70°C	+80°C	+80°C	+75°C
Relative Humidity	Operating	10 to 90% RH (Non-Condensing)			
	Storage	5 to 95% RH (Non-Condensing)			
Environmental Locations		UL Dry & Damp			

Protections

Over Voltage	Auto-Recovery when the fault is removed
Overload / Overcurrent	Auto-Recovery when the fault is removed
Short Circuit	Auto-Recovery when the fault is removed
Over Temperature	Auto-Recovery when the fault is removed
Suitable for Luminaires Class	Class II. Insulation Class according to IEC 60598

Reliability Data

Lifetime	50,000 hrs. at lifetime case temperature
MTTF	500,000 hrs. @ 40°C ambient temperature (as per Telcordia SR-332 , survival rate more than 90%)

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Model Number	USVI-020024FA*	USVI-060024DG	USVI-060024FG	USVI-060024FH
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Safety Standards / Directives

Electrical Safety	cULus	UL 8750, Class P, type “HL”. Class 2 Output			
	CSA	N/A			CAN/CSA C22.2 No.250.13
	CB scheme	IEC 61347-1, IEC 61347-2-13, SELV Output			
CE		In conformance with EMC Directive 2014/30/EU and Low Voltage Directive 2014/35/EU			
Material and Parts		RoHS Directive Compliant			
Isolation		Input	Output	DIM ±	Case
	Input	N/A	3000V	3000V	3000V
	Output	3000V	N/A	N/A	500V
	DIM ±	3000V	N/A	N/A	500V
	Case	3000V	500V	500V	N/A

* cULus recognized (does not include Class P certification)

EMC

USVI-060024DE / USVI-060024FE

Emissions (CE & RE)	Compliance to 47 CFR FCC Part 15, Subpart B, Class B	
Surge	ANSI C62.41	Category A1 with a 2.5kV/100kA ring wave

USVI-060024FH

Emissions (CE & RE)	Compliance to 47 CFR FCC Part 15, Subpart B, Class A	
Surge	ANSI C62.41	Category A1 with a 2.5kV/100kA ring wave

USVI-020024FA / USVI-060024DG / USVI-060024FG / USVI-060024FH

Emissions (CE & RE)	Compliance to EN 55015	
Immunity	Compliance to EN 61547	
Electrostatic Discharge	IEC 61000-4-2	Air Discharge: 8kV; Contact Discharge: 4kV Criteria A ¹⁾ or B ²⁾
Radiated Disturbance	IEC 61000-4-3	80MHz-1GHz, 3V/m with 1kHz Sine Wave / 80% AM Modulation Criteria A ¹⁾
Electrical Fast Transient / Burst	IEC 61000-4-4	1kV, Criteria A ¹⁾ or B ²⁾
Surge	IEC 61000-4-5	Common Mode ³⁾ : 4kV; Differential Mode ⁴⁾ : 2kV for USVI-060024DG/FG Common Mode ³⁾ : 1kV; Differential Mode ⁴⁾ : 1kV for USVI-020024FA 1.2/50 μ s, 8/20 μ s Combination Wave with 2ohms (L-N), 12ohms (L-PE & N-PE) source impedance Criteria A ¹⁾ or B ²⁾
Conducted Disturbance	IEC 61000-4-6	150kHz-80MHz, 3Vrms, Criteria A ¹⁾
Power Frequency Magnetic Fields	IEC 61000-4-8	3A/Meter, Criteria A ¹⁾
Voltage Dips	IEC 61000-4-11	100% dip; 0.5 cycle; Self Recoverable 30% dip; 10 cycle; Self Recoverable, Criteria A ¹⁾ or B ²⁾
Harmonic Current Emission	IEC 61000-3-2	Class C (230Vac @ 100% load)
Voltage Fluctuation and Flicker	IEC 61000-3-3	$P_{st} \leq 1.0$; $d_{max} \leq 4\%$; $P_{lt} \leq 0.65$; $d_c \leq 3.3\%$; $T_{max} \leq 500ms$

1) Criteria A: Normal performance within the specification limits

3) Asymmetrical: Common mode (Line to earth)

2) Criteria B: Temporary degradation or loss of function, which is self-recoverable

4) Symmetrical: Differential mode (Line to line)

LED Driver

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Specifications

Model Number	USVI-100024DG	USVI-100024FG	USVI-100024DE	USVI-100024FE	USVI-100024FH	USVI-200024FA
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Input Ratings / Characteristics

Normal Input Voltage		120-277Vac					
Input Voltage Range		108-305Vac					
Normal Input Frequency		50-60 Hz					
Input Frequency Range		47-63 Hz					
Input Current Max		0.95A				0.91A	1.83A
Efficiency ¹⁾	277Vac	89.5% typ.	89.5% typ.	89.5% typ.	89.5% typ.	90.0% typ.	90.5% typ.
Inrush Current Peak >50% Duration		150A/ 250us				70A / 200uS	170A / 110uS
Power Factor @ max. Load.		> 0.95					
Total Harmonic Distortion @ max. Load.		< 20%					
Leakage Current		< 0.75mA @ 277Vac					

1) 100% Load (typical) and tested after 30 minutes warm up.

Output Ratings / Characteristics

Nominal Output Voltage (per channel)	24Vdc		
Max. No Load Output Voltage (per channel)	25.2Vdc		
Output Current Range (per channel)	0.10A – 4.15A	0.10A – 4.00A	0.10A – 4.00A
Max. Output Power (per channel)	99.6W	96W	96W
Output Channel	1	1	2
Max. Output Power (total output)	99.6W	96W	192W
Output Voltage Tolerance	± 3%		
Line Regulation	± 1%		
Load Regulation	± 3%		
Output Ripple Voltage	< 1000mVp-p		
Rise Time	< 50ms		
Start-up Time	< 1s		

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Model Number	USVI-100024DG	USVI-100024FG	USVI-100024DE	USVI-100024FE	USVI-100024FH	USVI-200024FA
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Mechanical

Casing	Metal sheet, Color : White					
Dimensions (L x W x H)	[inch] [mm]	9.50 x 1.70 x 1.00 241.3 x 43.1 x 25.4		9.50 x 1.70 x 1.18 241.3 x 43.1 x 30.0	16.70 x 1.70 x 1.18 424.0 x 43.1 x 30.0	
Unit Weight	[lbs] [kg]	1.08 0.49		1.32 0.60	2.6 1.18	
Cooling System	Convection					
Input Wire	Line: Black, Neutral: White, Wire Length 300mm					
Output Wire		Dim+: Violet, Dim-: Gray, Positive: Red, Negative: Blue, Wires Length 300mm	Positive: Red, Negative: Blue, Wires Length 300mm	Dim+: Violet, Dim-: Gray, Positive: Red, Negative: Blue, Wires Length 300mm	Positive: Red, Negative: Blue, Wires Length 300mm	Positive: Red, Negative: Red/White, Wire Length 12.5inch (317mm) Positive: Blue, Negative: Blue/White, Wires Length 18.5inch (470mm)
Noise (30cm distance)	Sound Pressure Level (SPL) < 24dBA					

Environment

Ambient Temperature	Operating	-40°C to +55°C		
	Storage	-40°C to +85°C		
Case Temperature (for UL)		+90°C		
Case Temperature (for warranty)		+80°C	+80°C	+75°C
Relative Humidity	Operating	10 to 90% RH (Non-Condensing)		
	Storage	5 to 95% RH (Non-Condensing)		
Environmental Locations		UL Dry & Damp		

Protections

Over Voltage	Auto-Recovery when the fault is removed
Overload / Overcurrent	Auto-Recovery when the fault is removed
Short Circuit	Auto-Recovery when the fault is removed
Over Temperature	Auto-Recovery when the fault is removed
Suitable for Luminaires Class	Class II. Insulation Class according to IEC 60598

Reliability Data

Lifetime	50,000 hrs. at lifetime case temperature
MTTF	500,000 hrs. @ 40°C ambient temperature (as per Telcordia SR-332 , survival rate more than 90%)

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USVI S24 Series

Model Number	USVI-100024DG	USVI-100024FG	USVI-100024DE	USVI-100024FE	USVI-100024FH	USVI-200024FA
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Safety Standards / Directives

Electrical Safety	cULus	UL 8750, Class P, type “HL”. Class 2 Output				
	CSA	N/A			CAN/CSA C22.2 No.250.13	CAN/CSA C22.2 No.250.13
	CE	IEC 61347-1, IEC 61347-2-13, SELV Output	N/A		IEC 61347-1, IEC 61347-2-13, SELV Output	N/A
Material and Parts		RoHS Directive Compliant				
Isolation		Input	Output	DIM ±	Case	
	Input	N/A	3000V	3000V	3000V	
	Output	3000V	N/A	N/A	500V	
	DIM ±	3000V	N/A	N/A	500V	
	Case	3000V	500V	500V	N/A	
Isolation for USVI-200024FA	Input	N/A	2500Vac	N/A	2500Vac	
	Output	2500Vac	N/A	N/A	500Vac	
	Case	2500Vac	500Vac	N/A	N/A	

EMC

USVI-100024DE / USVI-100024FE

Emissions (CE & RE)	Compliance to 47 CFR FCC Part 15, Subpart B, Class B	
Surge	ANSI C62.41	Category A1 with a 2.5kV/100kA ring wave

USVI-100024FH / USVI-200024FA

Emissions (CE & RE)	Compliance to 47 CFR FCC Part 15, Subpart B, Class A	
Surge	ANSI C62.41	Category A1 with a 2.5kV/100kA ring wave

LED Driver

USVI S24 Series

EMC

USVI-100024DG / USVI-100024FG / USVI-100024FH

Emissions (CE & RE)	Compliance to EN 55015	
Immunity	Compliance to EN 61547	
Electrostatic Discharge	IEC 61000-4-2	Air Discharge: 8kV; Contact Discharge: 4kV Criteria A ¹⁾ or B ²⁾
Radiated Disturbance	IEC 61000-4-3	80MHz-1GHz, 3V/m with 1kHz Sine Wave / 80% AM Modulation Criteria A ¹⁾
Electrical Fast Transient / Burst	IEC 61000-4-4	1kV, Criteria A ¹⁾ or B ²⁾
Surge	IEC 61000-4-5	Common Mode ³⁾ : 4kV; Differential Mode ⁴⁾ : 2kV 1.2/50 μ s, 8/20 μ s Combination Wave with 2ohms (L-N), 12ohms (L-PE & N-PE) source impedance Criteria A ¹⁾ or B ²⁾
Conducted Disturbance	IEC 61000-4-6	150kHz-80MHz, 3Vrms, Criteria A ¹⁾
Power Frequency Magnetic Fields	IEC 61000-4-8	3A/Meter, Criteria A ¹⁾
Voltage Dips	IEC 61000-4-11	100% dip; 0.5 cycle; Self Recoverable 30% dip; 10 cycle; Self Recoverable, Criteria A ¹⁾ or B ²⁾
Harmonic Current Emission	IEC 61000-3-2	Class C (230Vac @ 100% load)
Voltage Fluctuation and Flicker	IEC 61000-3-3	$P_{st} \leq 1.0$; $d_{max} \leq 4\%$; $P_{It} \leq 0.65$; $d_c \leq 3.3\%$; $T_{max} \leq 500ms$

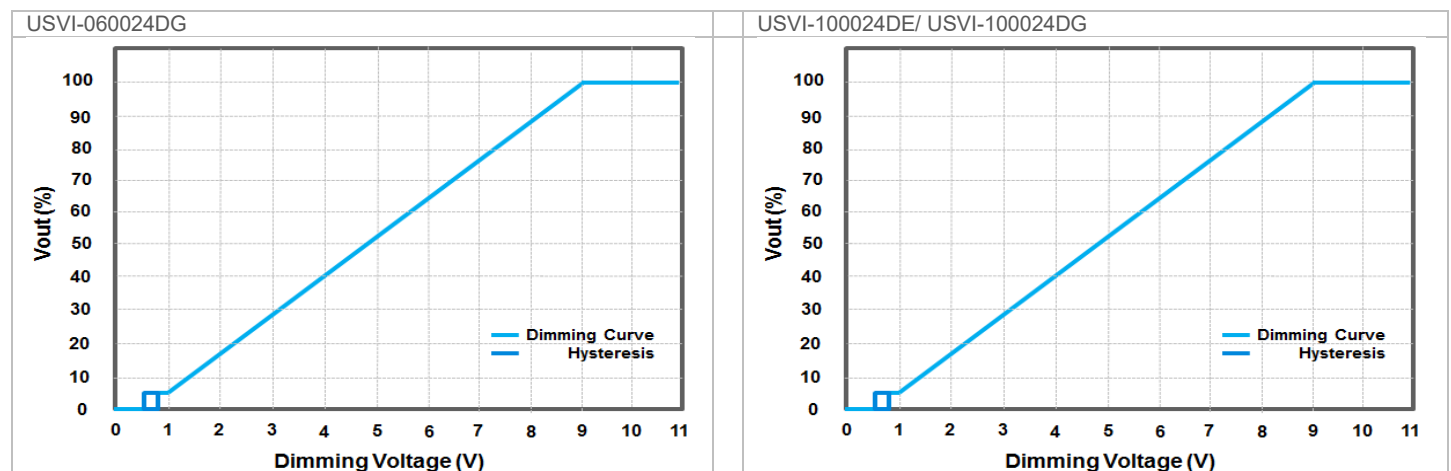
1) Criteria A: Normal performance within the specification limits

2) Criteria B: Temporary degradation or loss of function, which is self-recoverable

3) Asymmetrical: Common mode (Line to earth)

4) Symmetrical: Differential mode (Line to line)

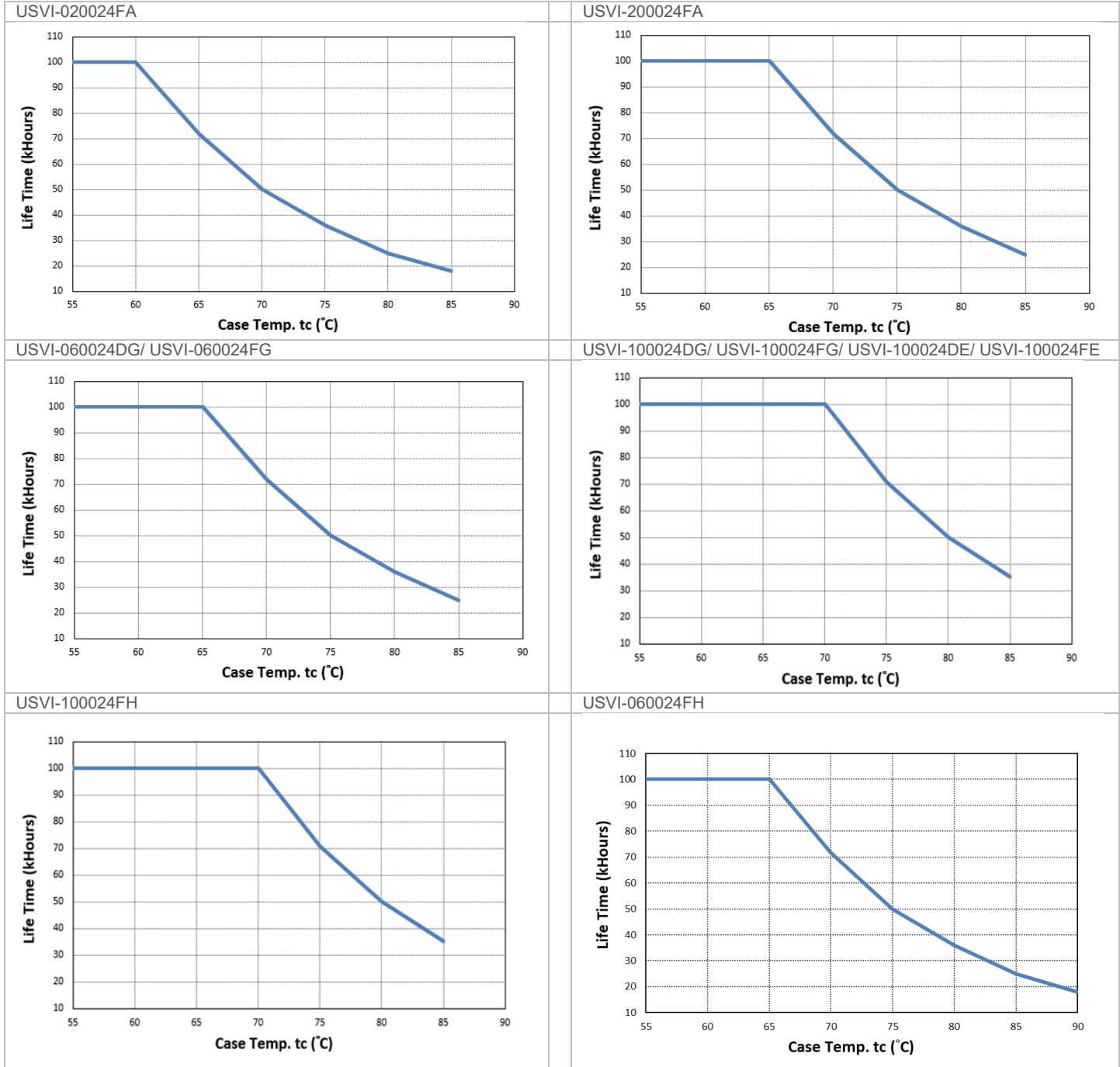
Dimming Curve – dimming voltage vs. output voltage



LED Driver

USVI S24 Series

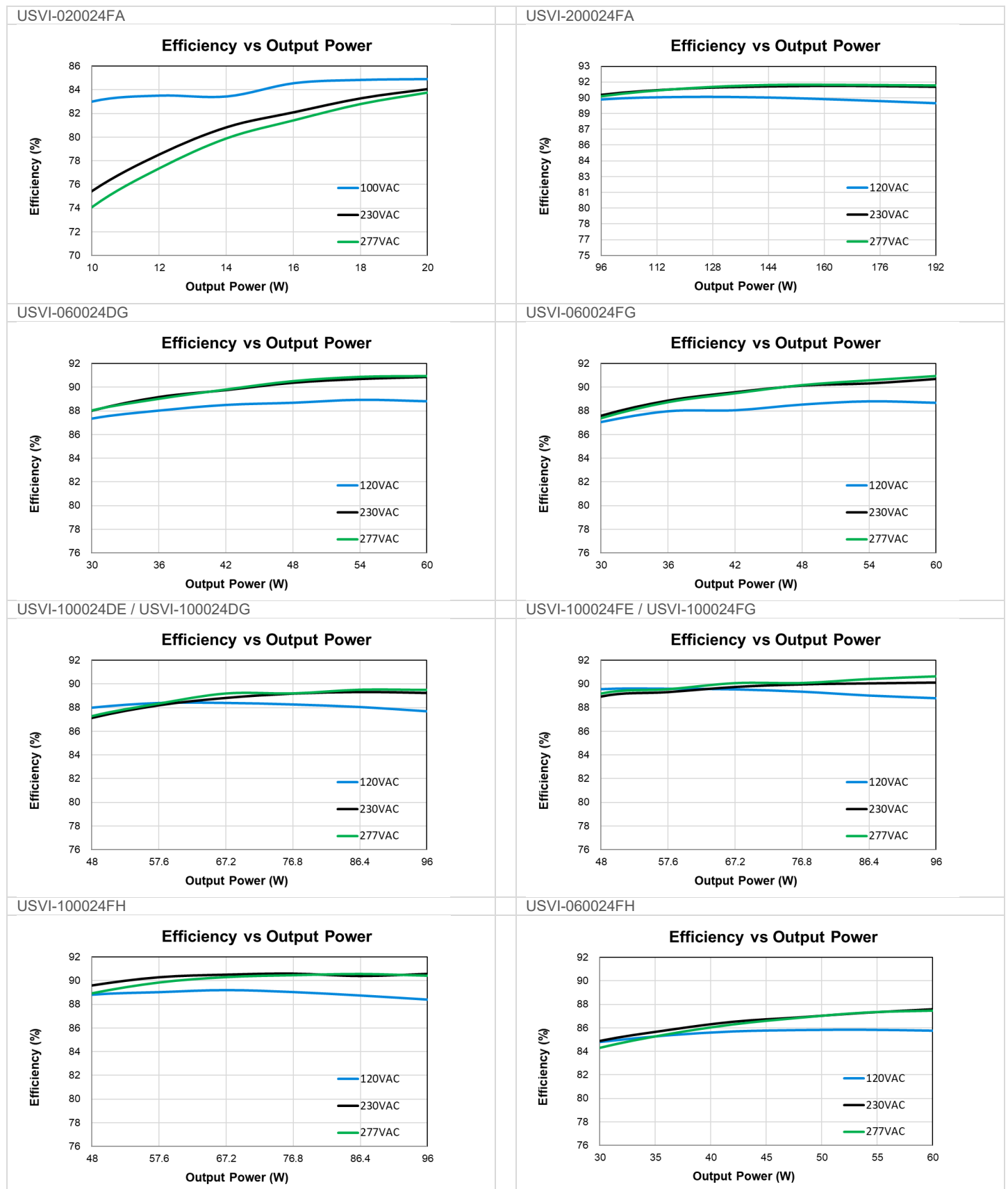
Driver Lifetime vs. Case Temperature



LED Driver

USVI S24 Series

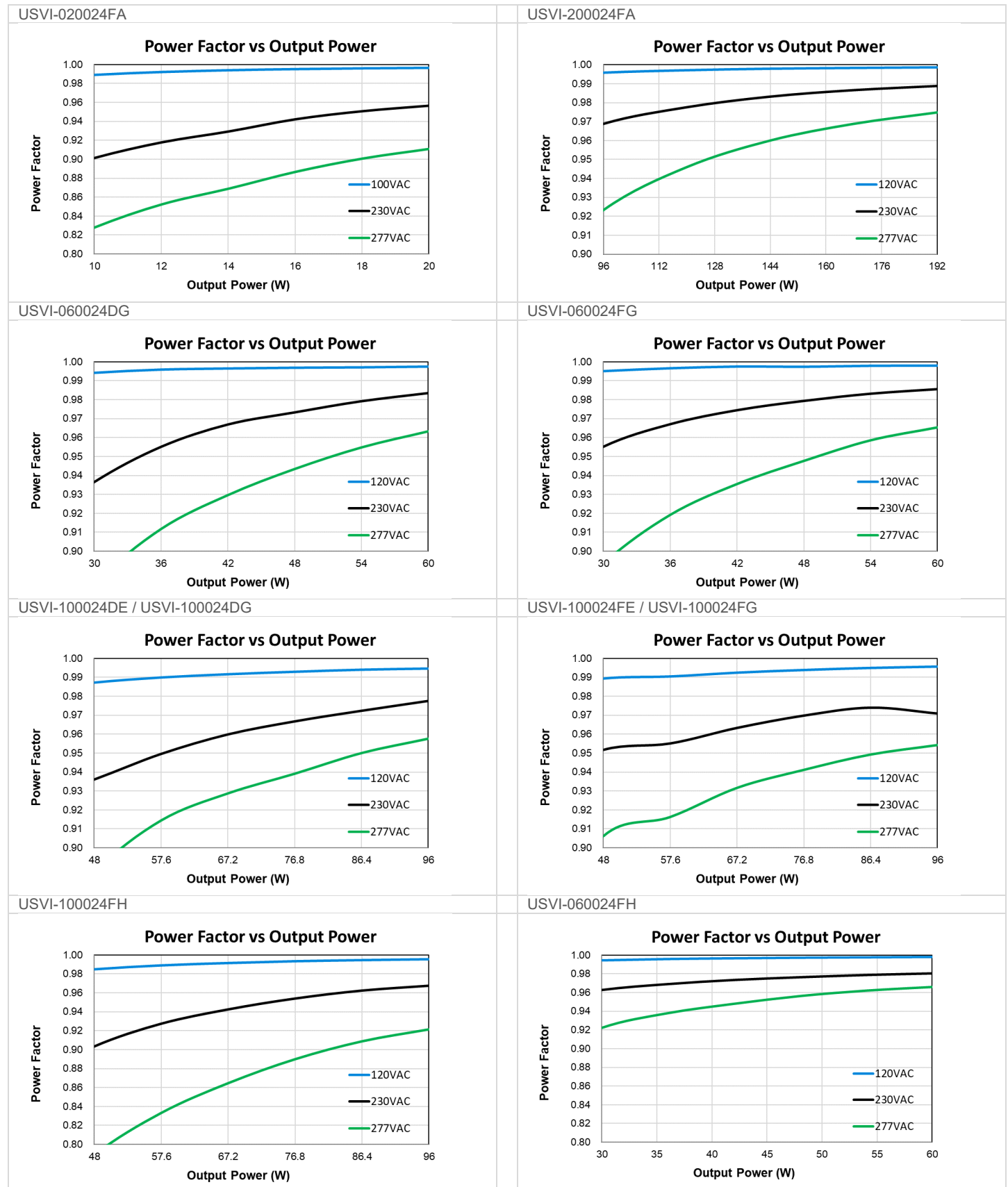
Efficiency vs. Output Power



LED Driver

USVI S24 Series

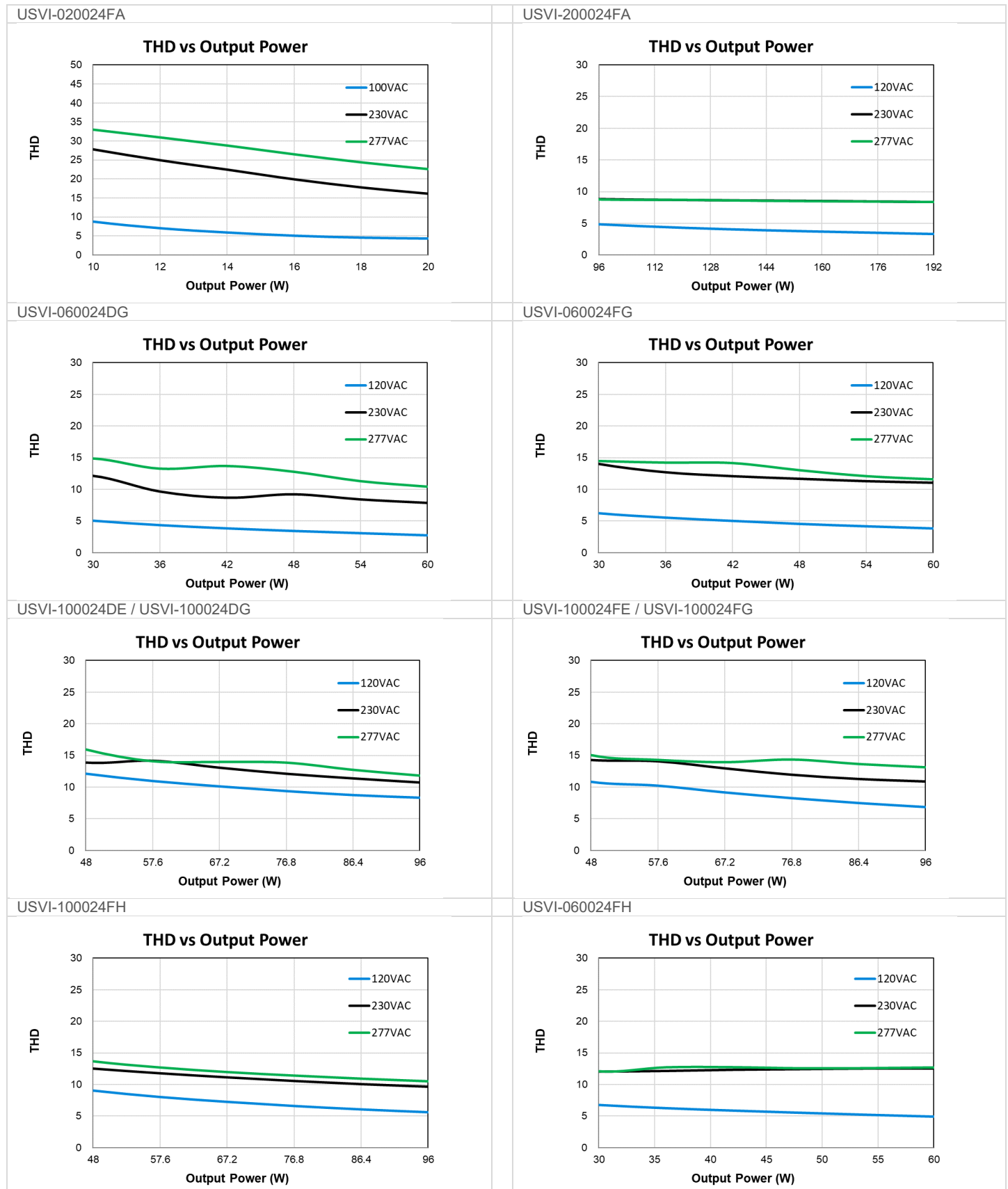
Power Factor vs. Output Power



LED Driver

USVI S24 Series

Total Harmonic Distortion vs. Output Power

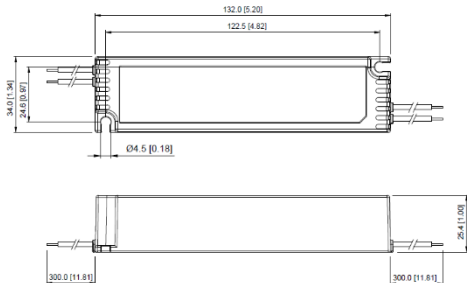


LED Driver

USVI S24 Series

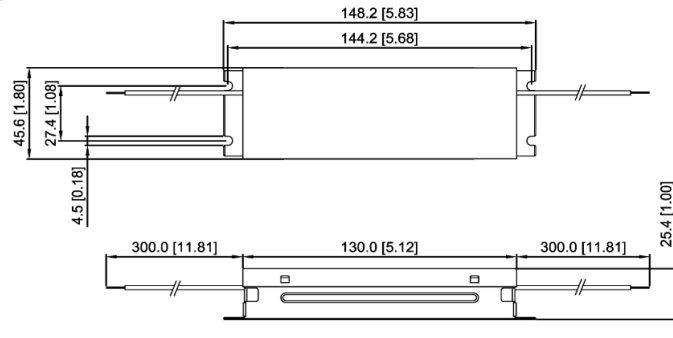
Dimensions

USVI-020024FA



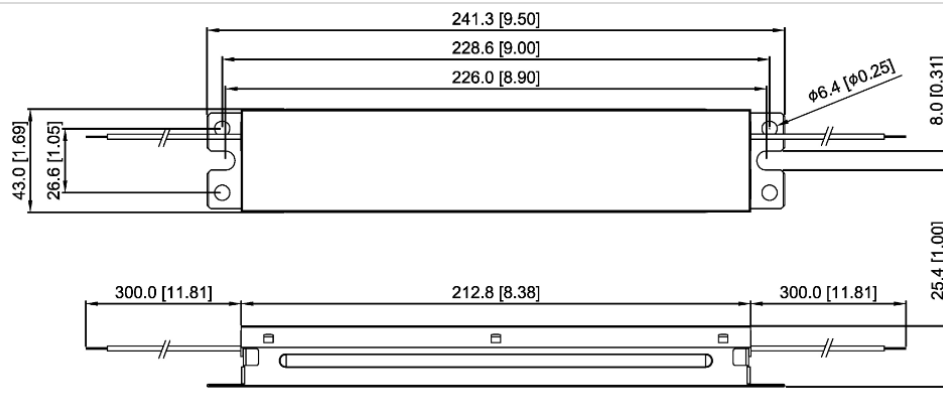
Unit:mm

USVI060024FG



Unit:mm

USVI-100024FE / USVI100024FG

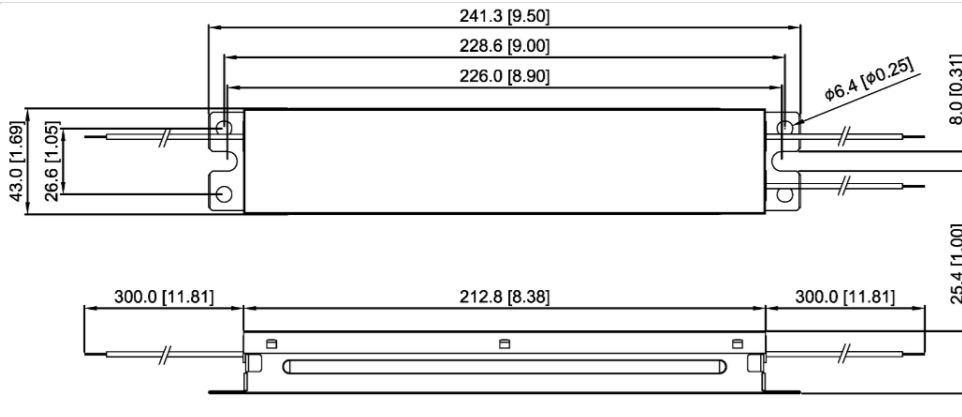


Unit:mm

LED Driver

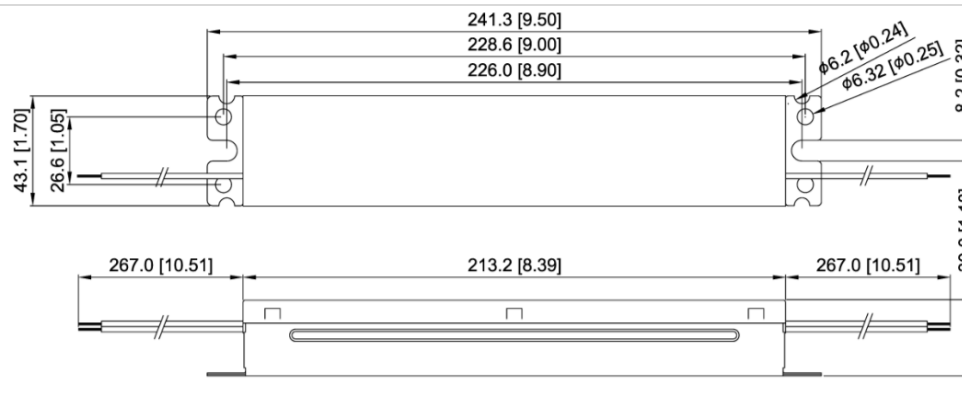
USVI S24 Series

USVI-100024DE / USVI100024DG



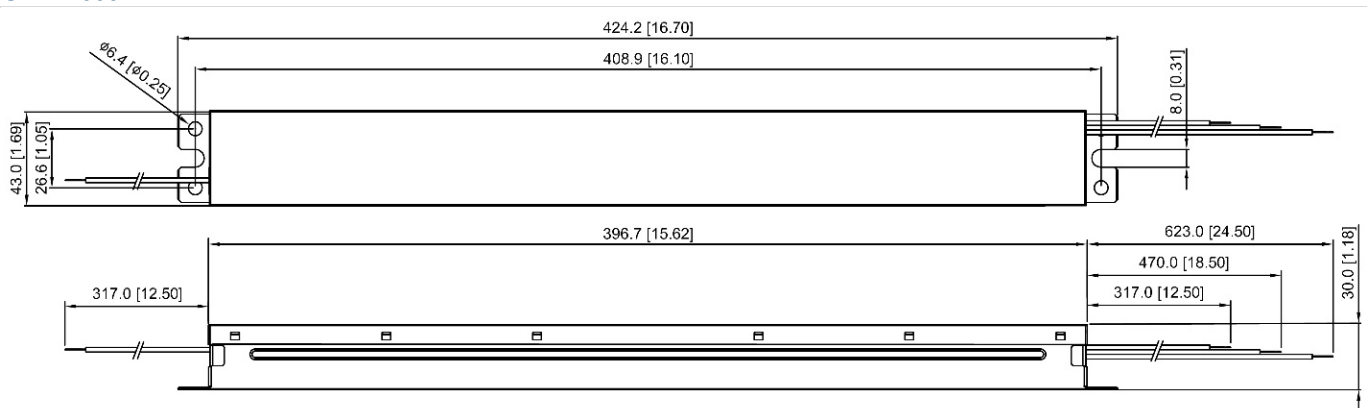
Unit:mm

USVI-060024FH / USVI-100024FH



Unit:mm

USVI-200024FA



Unit:mm