

LED Driver

USVI S12 Series

S12

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-020012FA	5.20 x 1.34 x 1.00 inch (132 x 34 x 25.4 mm)
USVI-060012FF	5.50 x 1.70 x 1.18 inch (140.0 x 43.1 x 30.0 mm)
USVI-060012FH	6.50 x 1.70 x 1.18 inch (165.1 x 43.1 x 30.0 mm)
USVI-060012FE/G	5.83 x 1.80 x 1.00 inch (148.2 x 45.6 x 25.4 mm)
USVI-060012DE/G	5.83 x 1.80 x 1.00 inch (148.2 x 45.6 x 25.4 mm)
USVI-120012FA	11.75 x 1.70 x 1.18 inch (298.5 x 43.1 x 30.0 mm)
USVI-180012FA	16.70 x 1.70 x 1.18 inch (424.2 x 43.1 x 30.0 mm)



General Description

Delta USVI S12 series of fixed output voltage LED drivers comes with affordable and reliable features. Compatible with signage from any manufacturer. 12V major output voltage with 1, 2 or 3 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-020012FA	90 - 305Vac	12Vdc	1.7A, 1.7A/ Channel	1
USVI-060012FF	108 - 305Vac		5.0A, 5.0A/ Channel	1
USVI-060012FH			5.0A, 5.0A/ Channel	1
USVI-060012FE/G			5.0A, 5.0A/ Channel	1
USVI-060012DE/G			5.0A, 5.0A/ Channel	1
USVI-120012FA			10.0A, 5.0A/ Channel	2
USVI-180012FA			15.0A, 5.0A/ Channel	3

Model Numbering

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Safety Approval cULus CSA CE	Constant Voltage	Indoor		Output Power 020 – 20W 060 – 60W 120 – 120W 180 – 180W	Output Voltage 012 – 12Vdc	Function D – 0-10V Dimming F – Fixed Output	Variable

LED Driver

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Specifications

Model Number	USVI-020012FA	USVI-060012DG	USVI-060012FG	USVI-060012DE	USVI-060012FE
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Input Ratings / Characteristics

Normal Input Voltage	100-277Vac	120-277Vac	
Input Voltage Range	90-305Vac	108-305Vac	
Normal Input Frequency	50-60 Hz	50-60 Hz	
Input Frequency Range	47-63 Hz	47-63 Hz	
Input Current Max	0.27A	0.60A	
Efficiency ¹⁾	277Vac	80.0% typ.	90.0% typ.
Inrush Current Peak >50% Duration	27A/ 250us	70A/ 250us	
Power Factor @ max. Load.	> 0.9	> 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)	12Vdc	
Max. No Load Output Voltage (per channel)	12.6Vdc	
Output Current Range (per channel)	0.05A – 1.70A	0.05A – 5.00A
Max. Output Power (per channel)	20W	60W
Output Channel	1	
Max. Output Power (total output)	20W	60W
Output Voltage Tolerance	± 3%	
Line Regulation	± 1%	
Load Regulation	± 3%	
Output Ripple Voltage	< 360mVp-p	< 1000mVp-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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USVI S12 Series

Model Number	USVI-020012FA	USVI-060012DG	USVI-060012FG	USVI-060012DE	USVI-060012FE
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Mechanical

Casing	Plastic, 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		
Unit Weight	[lbs] [kg]	0.40 0.18	0.75 0.34		
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	Dim+: Violet, Dim-:Gray, Positive: Red, Negative: Blue, Wires Length 300mm	Positive: Red, Negative: Blue, Wires Length 300mm
Noise (30cm distance)	Sound Pressure Level (SPL) < 24dBA				

Environment

Ambient Temperature	Operating	-40°C to +60°C	-40°C to +55°C
	Storage	-40°C to +85°C	
Case Temperature (for UL)		+90°C	+90°C
Case Temperature (for warranty)		+70°C	+80°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 S12 Series

Model Number	USVI-020012FA*	USVI-060012DG	USVI-060012FG	USVI-060012DE	USVI-060012FE
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Safety Standards / Directives

Electrical Safety	cULus	UL 8750, Class P, type "HL". Class 2 Output			
	CB scheme	IEC 61347-1, IEC 61347-2-13, SELV Output			N/A
CE		In conformance with EMC Directive 2014/30/EU and Low Voltage Directive 2014/35/EU			N/A
Material and Parts		RoHS Directive Compliant			
Isolation		Input	Output	DIM ±	Case
	Input	N/A	3750V	3750V	3750V
	Output	3750V	N/A	1875V	3750V
	DIM ±	3750V	1875V	N/A	1875V
	Case	3750V	3750V	1875V	N/A

* cULus recognized (does not include Class P certification)

EMC

USVI-060012DE / USVI-060012FE

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-020012FA / USVI-060012DG / USVI-060012FG

Emissions (CE & RE)	Compliance to EN 55015 Class B	
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-060012DG/FG Common Mode ³⁾ : 1kV; Differential Mode ⁴⁾ : 1kV for USVI-020012FA 1.2/50µs, 8/20µs 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)

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USVI S12 Series

Specifications

Model Number	USVI-060012FF	USVI-060012FH	USVI-120012FA	USVI-180012FA
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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	120Vac	1.20A	0.59A	1.15A	1.70A
	277Vac	0.70A	0.26A	0.50A	0.75A
Efficiency ¹⁾	120Vac	84.0% typ.	85.0% typ.	86.0% typ.	88.0% typ.
	277Vac	86.0% typ.	85.7% typ.	88.5% typ.	89.0% typ.
Inrush Current Peak / >50% Duration	120Vac	40A / 160uS	40A / 190uS	40A / 190uS	90A / 120uS
	277Vac	105A / 160uS	76A / 205uS	76A / 205uS	195A / 120uS
Power Factor at 100% Load	> 0.5 @ 120Vac		> 0.95 @ 120-277Vac		
Total Harmonic Distortion at 100% Load	< 150% @ 120Vac		10% typ.		
Leakage Current	< 0.75mA @ 277Vac				

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

Output Ratings / Characteristics

Nominal Output Voltage (per channel)	12Vdc			
Max. No Load Output Voltage (per channel)	12.6Vdc			
Output Current Range (per channel)	0.1A – 5.0A			
Max. Output Power (per channel)	60W			
Output Channel	1	1	2	3
Max. Output Power (total output)	60W	60W	120W	180W
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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USVI S12 Series

Model Number	USVI-060012FF	USVI-060012FH	USVI-120012FA	USVI-180012FA
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Mechanical

Casing	Metal sheet, Color : White				
Dimensions (L x W x H)	[inch] [mm]	5.50 x 1.70 x 1.18 140.0 x 43.0 x 30.0	6.50 x 1.70 x 1.18 165.1 x 43.0 x 30.0	11.75 x 1.70 x 1.18 298.5 x 43.0 x 30.0	16.70 x 1.70 x 1.18 424.2 x 43.0 x 30.0
Unit Weight	[lbs] [kg]	0.77 0.35	0.84 0.38	1.59 0.72	2.60 1.18
Cooling System	Convection				
Input Wire	Line: Black, Neutral: White, Wire Length 12.5inch (317mm)				
Output Wire		Positive: Red, Negative: Black, Wire Length 12.5inch (317mm)	Positive: Red, Negative: Black, Wire Length 12.5inch (317mm)	Positive: Red, Negative: Red/White, Wire Length 12.5inch (317mm) Positive: Blue, Negative: Blue/White, Wires Length 18.5inch (470mm)	Positive: Red, Negative: Red/White, Wire Length 12.5inch (317mm) Positive: Blue, Negative: Blue/White, Wires Length 18.5inch (470mm) Positive: Yellow, Negative: Yellow/White, Wires Length 24.5inch (623mm)
Noise (30cm distance)	Sound Pressure Level (SPL) < 24dBA				

Environment

Ambient Temperature	Operating	-40°C to +55°C (-40°F to +131°F)			
	Storage	-40°C to +85°C (-40°F to +185°F)			
Case Temperature (for UL)		+90°C	+90°C	+90°C	+90°C
Case Temperature (for warranty)		+70°C	+75°C	+70°C	+70°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

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-060012FF	USVI-060012FH	USVI-120012FA	USVI-180012FA
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Safety Standards / Directives

Electrical Safety	cULus	UL 8750, Class P, Type HL, Class 2 output		
	CSA	CAN/CSA C22.2 No.250.13		
Material and Parts	RoHS Directive Compliant			
Isolation		Input	Output	Case
	Input	N/A	2500Vac	2500Vac
	Output	2500Vac	N/A	500Vac
	Case	2500Vac	500Vac	N/A

EMC

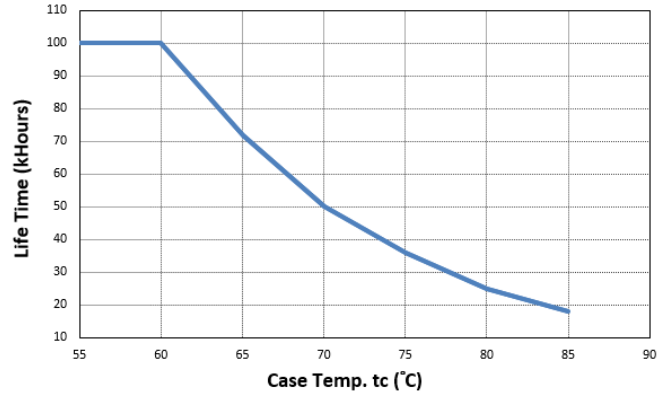
Emissions (EMI & RFI)	Compliance to 47 CFR FCC Part 15, Subpart B, Class A Compliance to CAN ICES-005(A) / NMB-005(A)
Transient Protection	L-N and L-G, N-G, L&N-G, ANSI C62.41-Category A1 with a 2.5kV/100kA ring wave

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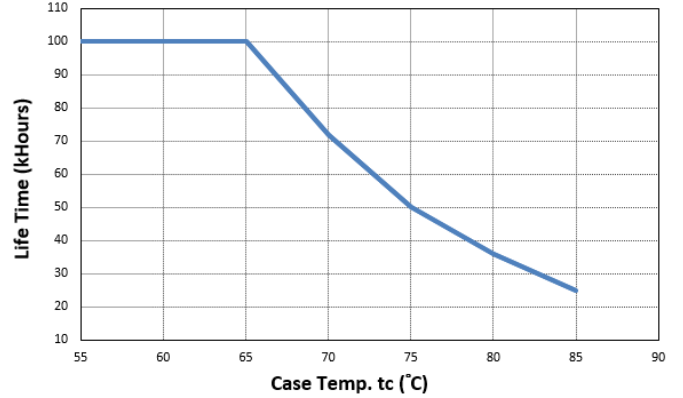
USVI S12 Series

Driver Lifetime vs. Case Temperature

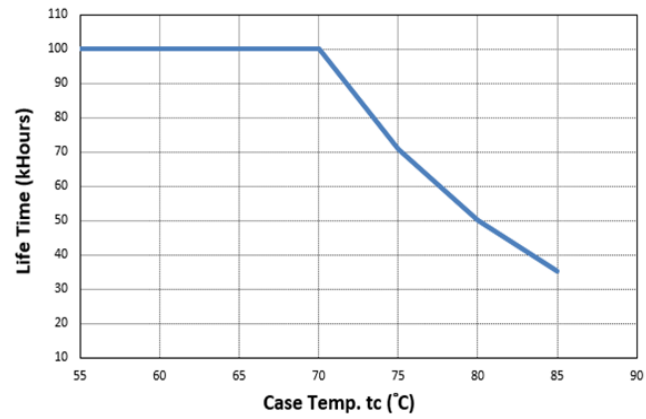
USVI-020012FA/ USVI-060012FF / USVI-120012FA / USVI-180012FA



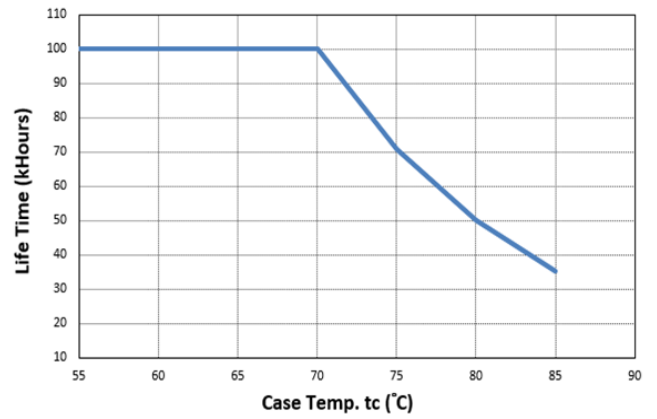
USVI-060012FH



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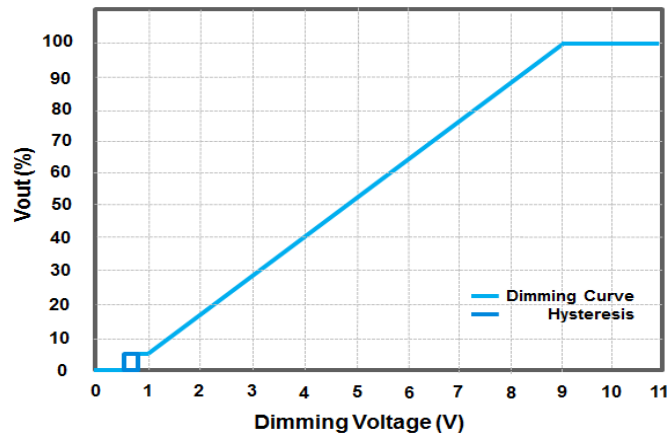


USVI-060012DG / USVI-060012FG

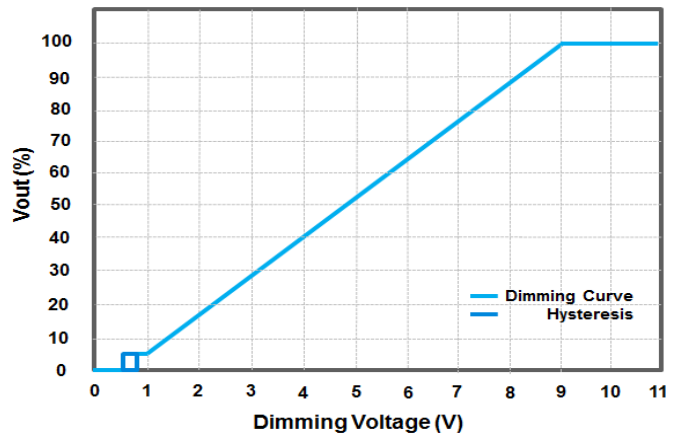


Dimming Curve – dimming voltage vs. output voltage

USVI-060012DE



USVI-060012DG

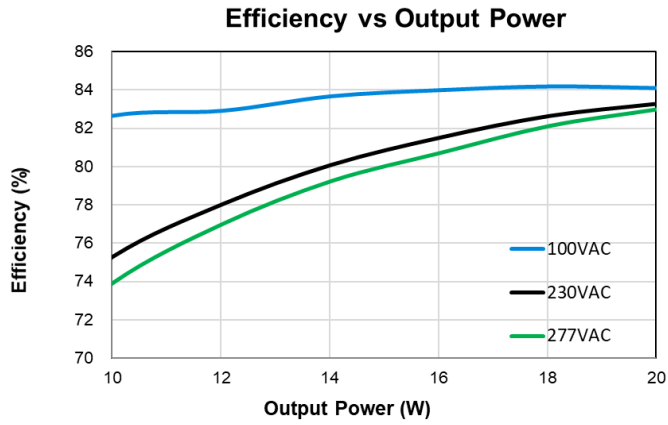


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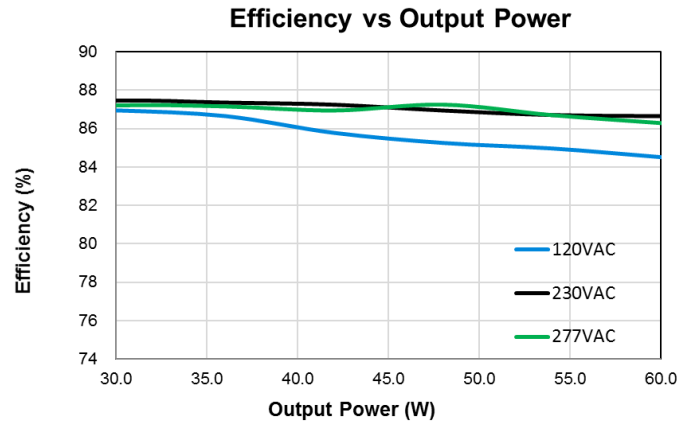
USVI S12 Series

Efficiency vs. Output Power

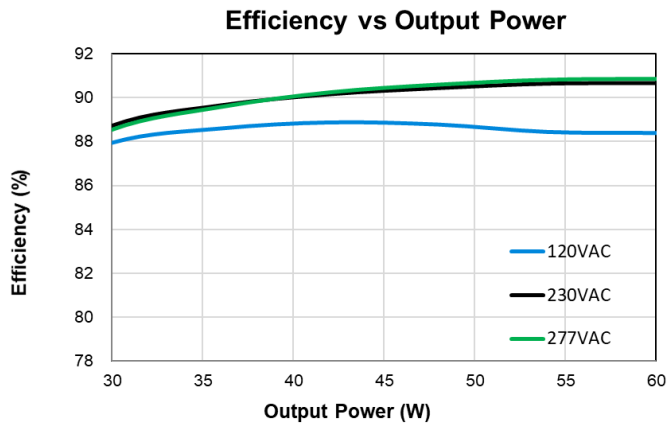
USVI-020012FA



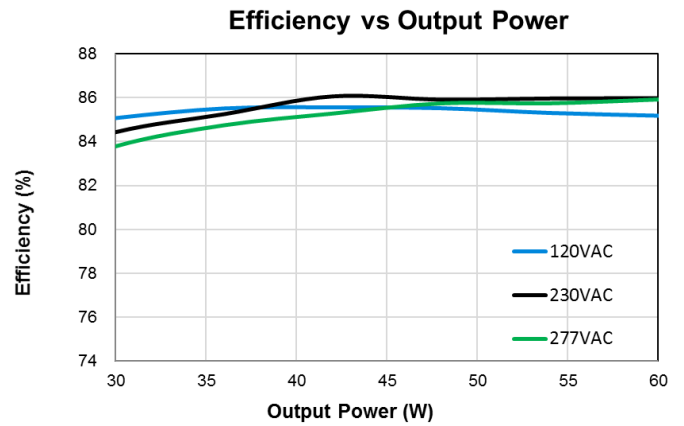
USVI-060012FF



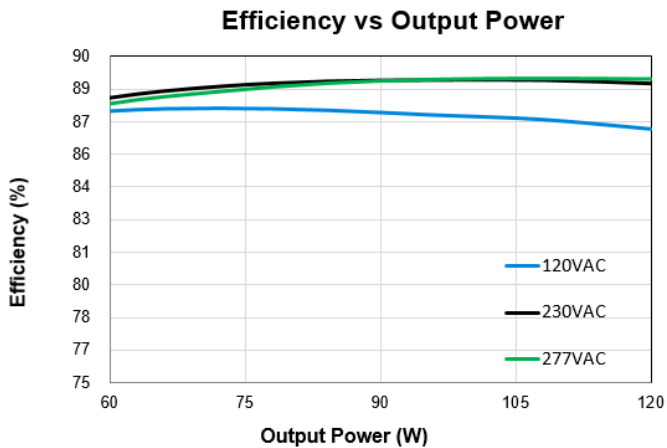
USVI-060012DE / USVI-060012FE / USVI-060012DG / USVI-060012FG



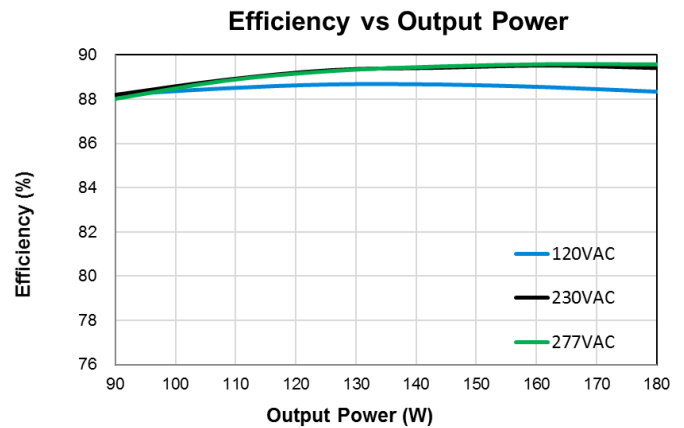
USVI-060012FH



USVI-120012FA



USVI-180012FA

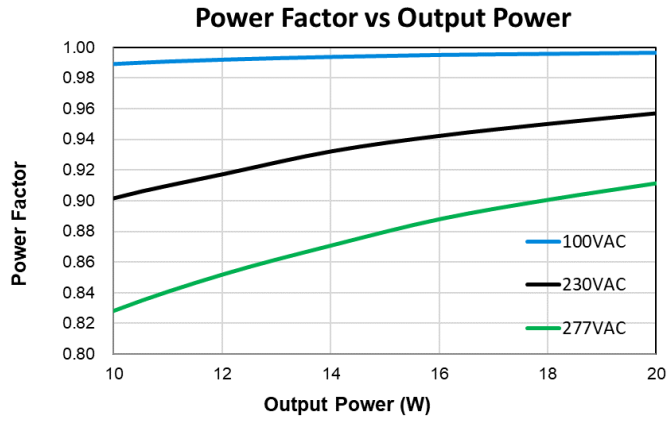


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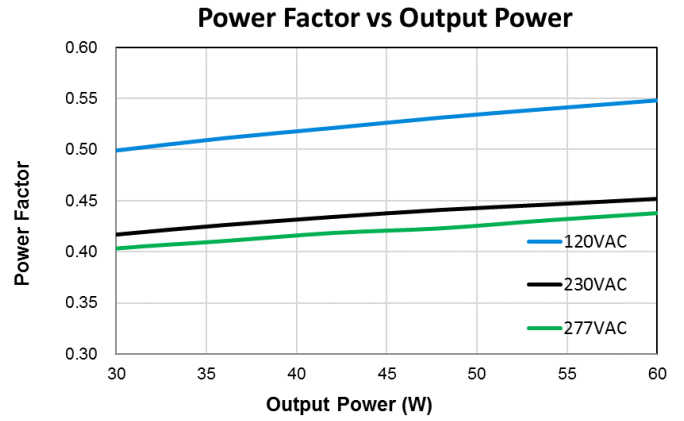
USVI S12 Series

Power Factor vs. Output Power

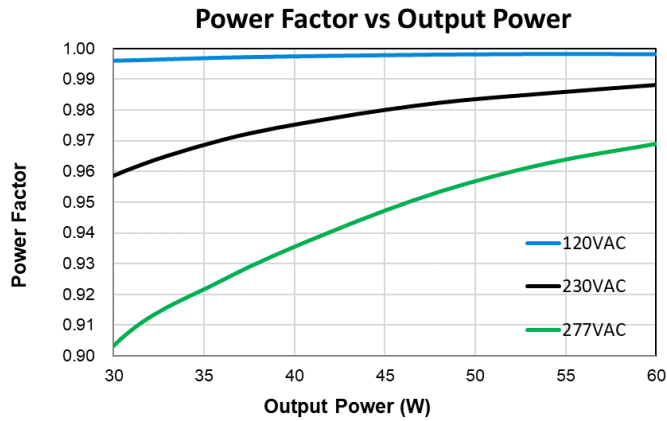
USVI-020012FA



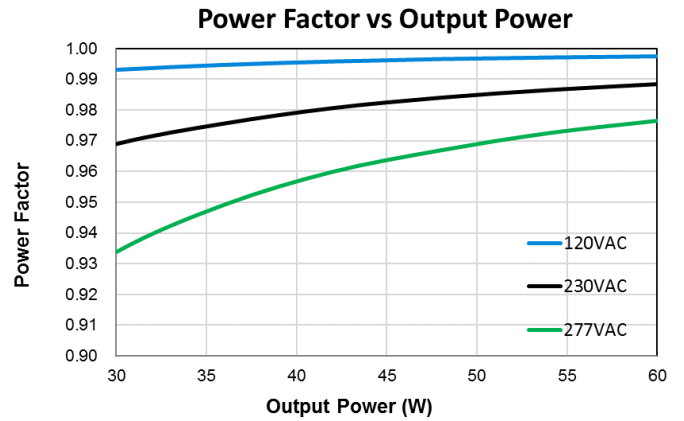
USVI-060012FF



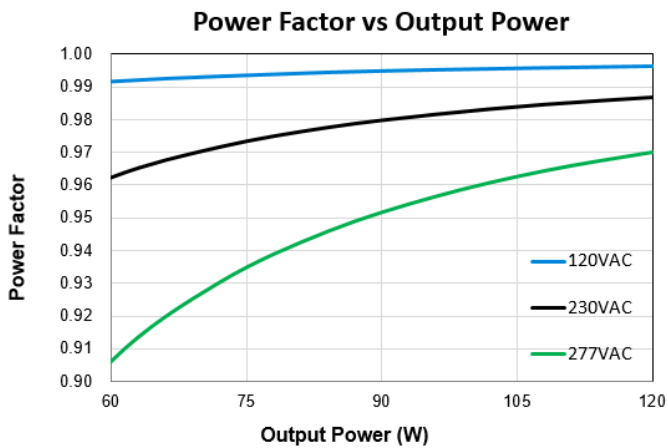
USVI-060012DE / USVI-060012FE / USVI-060012DG / USVI-060012FG



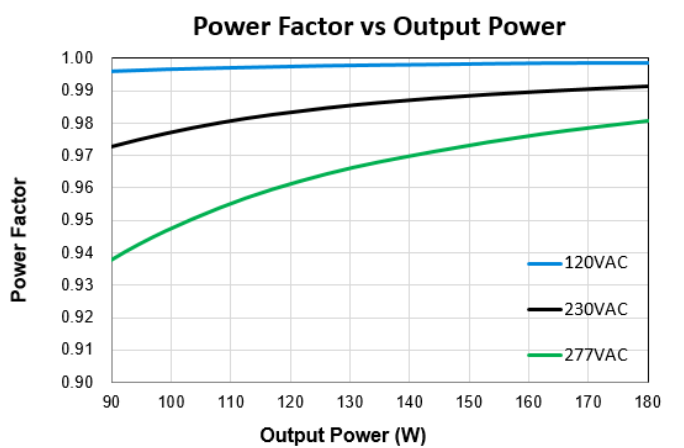
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USVI-120012FA



USVI-180012FA

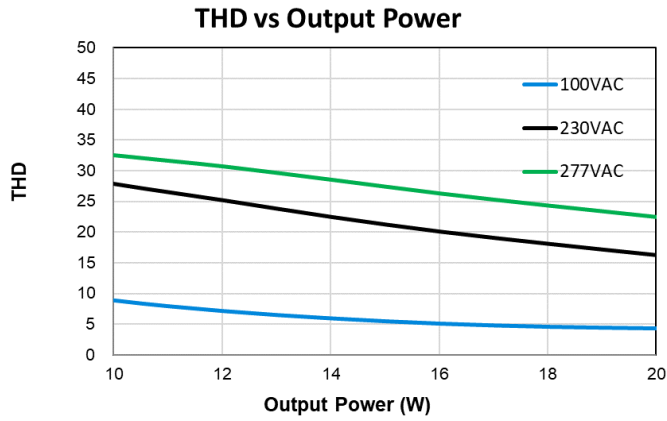


LED Driver

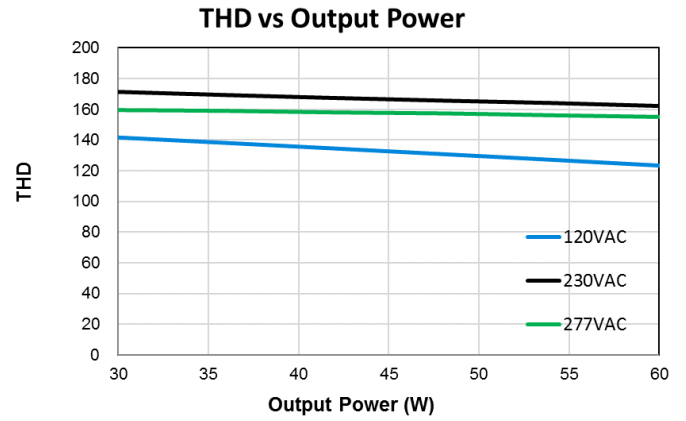
USVI S12 Series

Total Harmonic Distortion vs. Output Power

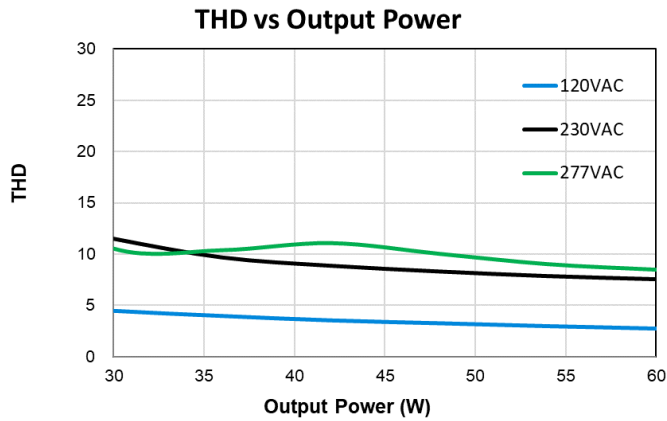
USVI-020012FA



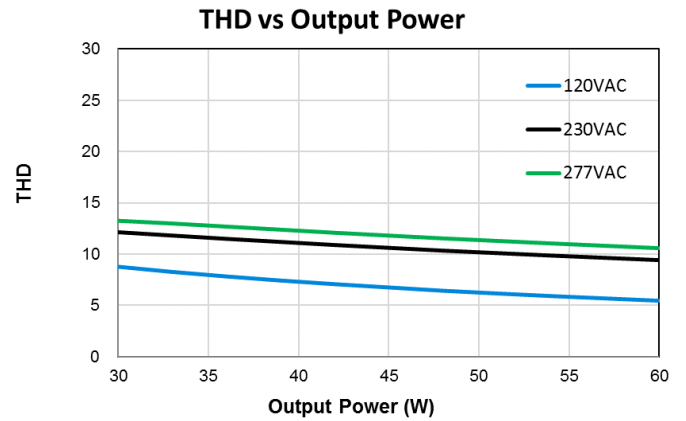
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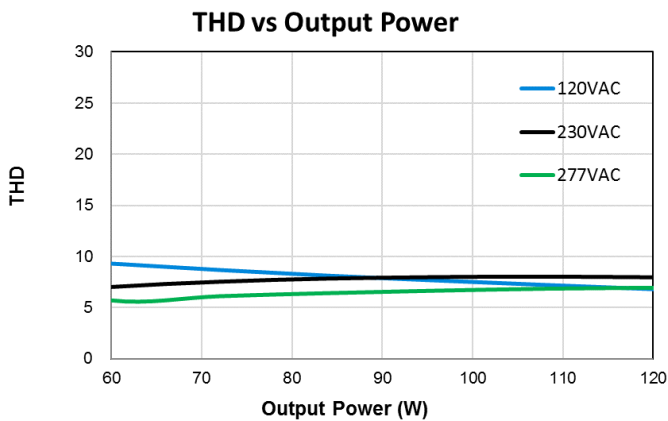
USVI-060012DE / USVI-060012FE / USVI-060012DG / USVI-060012FG



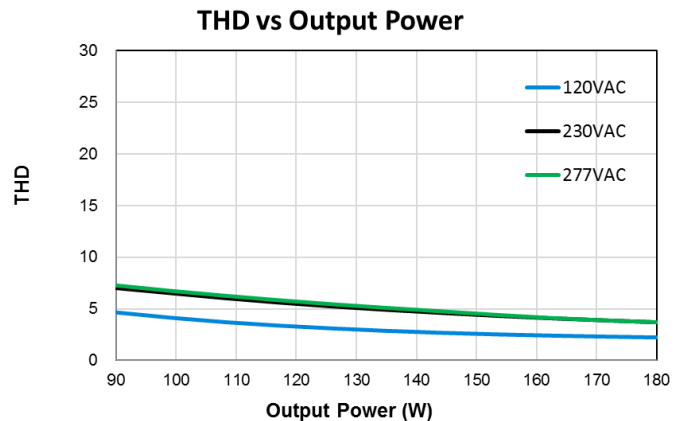
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USVI-120012FA



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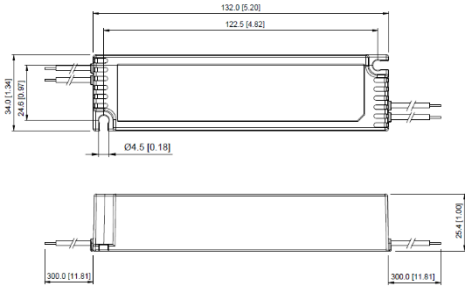


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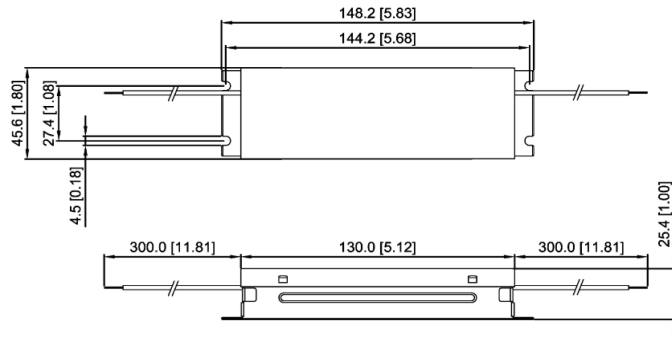
USVI S12 Series

Dimensions

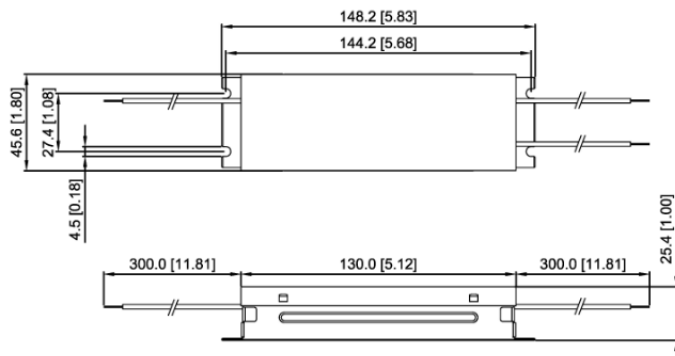
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USVI-060012FE / USVI060012FG



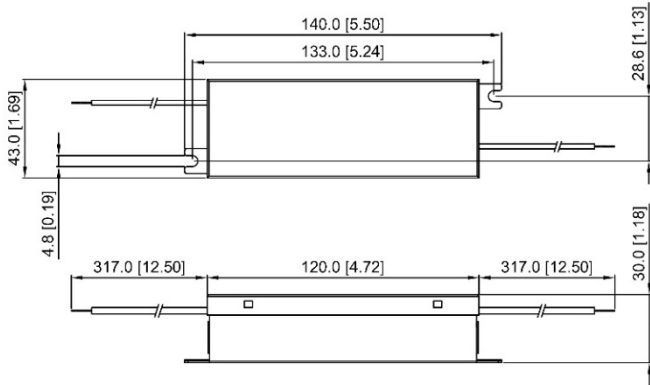
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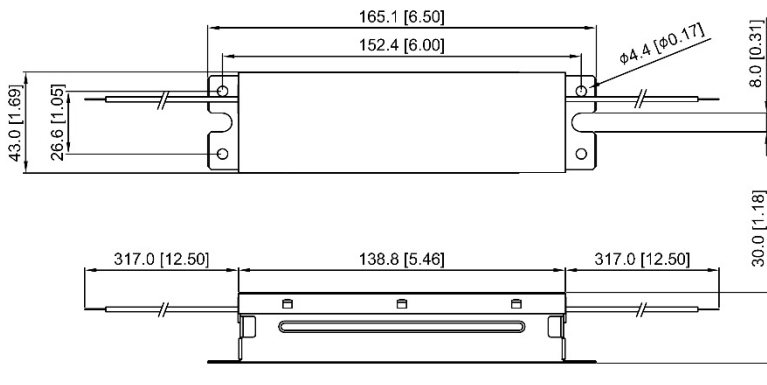
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USVI S12 Series

USVI-060012FF



USVI-060012FH



USVI-120012FA

