



# CFB600W-110S SERIES 600 WATT 4:1 INPUT ISOLATED DC-DC CONVERTER

## Features

- Efficiency Up to 88%
- Fixed Switching Frequency
- Regulated Outputs
- Remote On/Off
- Fully Protected (OTP/OCP/OVP/UVLO)
- 2250Vdc I/O Isolation
- Operating Case Temperature -40 to +100°C
- Full-Brick Size Meet Industrial Standard  
4.60"x2.40"x0.5"
- UL 60950-1 2nd (Basic Insulation) Approval
- EN50155 Compliant with External Circuits
- Shock & Vibration EN50155 (EN61373) Compliant
- Fire & Smoke EN45545-2 Compliant
- 2000m Operating Altitude
- Safety Meets IEC/EN 62368-1



MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.	CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD		
CFB600W-110S12	43-160 VDC	12 VDC	0 mA	50 A	25 mA	6.3 A	87	10000uF
CFB600W-110S24	43-160 VDC	24 VDC	0 mA	25 A	25 mA	6.2 A	88	10000uF
CFB600W-110S28	43-160 VDC	28 VDC	0 mA	21.4 A	25 mA	6.2 A	88	10000uF
CFB600W-110S48	43-160 VDC	48 VDC	0 mA	12.5 A	25 mA	6.2 A	88	10000uF

**NOTE:**

1. Nominal Input Voltage 110 VDC
2. Measure at Nominal Input Voltage.
3. An External Input Capacitor 220uF For All Models Are Recommended To Reduce Input Ripple Voltage.
3. The Output Terminal Required a Minimum Capacitor 470uF to Maintain Specified Regulation.

## PART NUMBER

Series	Nominal Input Voltage	Number of Outputs	Nominal Output Voltage	Remote On/Off Logic	Mounting Inserts
CFB600W-	II	O	XX	L	-Y (Option)
CFB600W	110 : 110 VDC	S : Single	12 : 12VDC 24 : 24VDC 28 : 28VDC 48 : 48VDC	None: Negative P: Positive	None: Clear Mounting Inserts (3.5mm DIA.) -C0: M3x0.5 Mounting Inserts

**Part Number Example:**

**CFB600W-24S28P:** Full Brick, 600W, 4:1 43-160Vdc Input, Single 28Vdc Output, Positive Logic, Clear Mounting Insert



# CFB600W-110S Series

## TECHNICAL SPECIFICATIONS

(All specifications are typical at nominal input, full load at 25°C unless otherwise noted.)

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Input Voltage	Continuous	All	-0.3		160	V <sub>dc</sub>
Input Surge Voltage	100ms max.	All			180	V <sub>dc</sub>
Operating Case Temperature	At the center part of base plate	All	-40		100	°C
Storage Temperature		All	-55		105	°C

### INPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units	
Operating Input Voltage		All	43	110	160	V <sub>dc</sub>	
Input Under Voltage Lockout							
Turn-On Voltage Threshold	Full load	All	41	42	43	V <sub>dc</sub>	
Turn-Off Voltage Threshold	Full load	All	39	40	41	V <sub>dc</sub>	
Lockout Hysteresis Voltage	Full load	All		2.0		V <sub>dc</sub>	
Maximum Input Current	V <sub>in</sub> =43, Full load	All		16		A	
No-Load Input Current	V <sub>in</sub> =110V, I <sub>o</sub> =0A	See Model Number Table					mA
Input Filter	Pi Filter.	All					
Inrush Current (I <sup>2</sup> t)	As per ETS300 132-2	All			1.0	A <sup>2</sup> s	
Input Reflected Ripple Current	P-P Thru 12uH Inductor, 5Hz to 20MHz.	All		90		mA	

### OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Voltage Set Point Accuracy	V <sub>in</sub> =110V, Full load, T <sub>c</sub> =25°C	All	-1.0		+1.0	%
Output Voltage Regulation						
Load Regulation	Full load to no load	All			±0.5	%
Line Regulation	V <sub>in</sub> =High line to low line, full load	All			±0.2	%
Temperature Coefficient	T <sub>c</sub> =-40°C to 100°C	All			±0.03	%/°C
Output Voltage Ripple and Noise (5Hz to 20MHz Bandwidth)						
Peak-to-Peak	Full Load, 10uF tantalum capacitor and 1uF ceramic capacitors, 48Vo: 10uF aluminum capacitor and 1.0uF ceramic capacitors	12Vo			120	mV
		24Vo			240	
		28Vo			280	
		48Vo			480	
RMS.	Full Load, 10uF tantalum capacitor and 1uF ceramic capacitors, 48Vo: 10uF aluminum capacitor and 1.0uF ceramic capacitors	12Vo			60	mV
		24Vo			100	
		28Vo			100	
		48Vo			200	
Output Current Range	V <sub>in</sub> = 43 to 160V	See Model Number Table				A
Over Current Protection	Continuous Current. Auto Recovery	All	105		140	%
Over Voltage Protection	Limited voltage, % of nominal V <sub>o</sub>	All	115	125	140	%
Short Circuit Protection		All	Continuous, Auto Recovery.			
External Load Capacitance	Full Load (Resistive)	See Model Number Table				uF
Auxiliary Output Voltage		All	7	10	13	V
Auxiliary Output Current		All			20	mA
Power Good Signal (IOG)	V <sub>out</sub> Ready: Low level, sink current	All			20	mA
	V <sub>out</sub> not Ready: Open drain output, applied voltage				50	V
Output Voltage Trim Range	P <sub>o</sub> ≤ max. Rated Power, I <sub>o</sub> ≤ I <sub>o,max</sub> .	All	-40		+10	%
Output Voltage Remote Sense Range	P <sub>o</sub> ≤ max. rated power, I <sub>o</sub> ≤ I <sub>o,max</sub> . % of nominal V <sub>o</sub>	All			+10	%



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PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Load Share Accuracy (50%-100% load)		All	-10		+10	%

## EFFICIENCY

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
100% Load	$V_{in}=110V$	See Model Number Table				%

## DYNAMIC CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Output Voltage Current Transient						
Error Band	75% to 100% of $I_{o\_max}$ . Step load change $dI/dt=0.1A/us$ (within 1% $V_{out}$ nominal)	All		$\pm 3$	$\pm 5$	%
Recovery Time		All			500	us
Turn-On Delay and Rise Time						
Full load (constant resistive load)						
Turn-On Delay Time, From On/Off Control	$V_{on/off}$ to 10% $V_{o\_set}$ , Remote on	All			75	ms
Turn-On Delay Time, From Input	$V_{in\_min.}$ to 10% $V_{o\_set}$ , Power up	All		135	250	ms
Output Voltage Rise Time	10% $V_{o\_set}$ to 90% $V_{o\_set}$	All		25	50	ms

## ISOLATION CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Isolation Voltage (100% Factory Hi-Pot tested @2sec.)	1 Minute; input to output	All			2250	$V_{dc}$
	1 Minute; input to case (base plate)				2250	
	1 Minute; output to case (base plate)				1500	
Isolation Resistance	Input to output	All	20			M $\Omega$
Isolation Capacitance	Input to output	All			4000	pF
	Input to case (base plate)				None	
	Output to case (base plate)				None	

## FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Pulse width modulation (PWM), fixed	All	225	250	275	KHz
On/Off Control, Positive Remote On/Off Logic, Refer to -Vin Pin.						
Logic Low (Module Off)	$V_{on/off}$ at $I_{on/off}=1.0mA$	All	1		10	mA
Logic High (Module On)	$V_{on/off}$ at $I_{on/off}=0.0uA$ , Pin open=On	All	0		0.01	mA
On/Off Control, Negative Remote On/Off Logic, Refer to -Vin Pin						
Logic High (Module Off)	$V_{on/off}$ at $I_{on/off}=0.0uA$ , Pin open=Off	All	0		0.01	mA
Logic Low (Module On)	$V_{on/off}$ at $I_{on/off}=1.0mA$	All	1		10	mA
Off Converter Input Current	Shutdown Input Idle Current	All			50	mA
Over Temperature Shutdown	Temperature at the center part of base plate, non-latching	All		110		$^{\circ}C$
Over Temperature Recovery		All		90		$^{\circ}C$

## GENERAL SPECIFICATIONS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	$I_o=100%$ of $I_{o\_max.}$ ; MIL-HDBK - 217F_Notice 1, GB, 25 $^{\circ}C$	All		450		K hours
Weight		All		220		grams
Case Material	Plastic, DAP					
Base plate Material	Aluminum					
Potting Material	UL 94V-0					
Pin Material	Base: Copper Plating: Nickel with Matte Tin					
Shock/Vibration	EN61373 Compliant					



# CFB600W-110S Series

## GENERAL SPECIFICATIONS

Humidity	95% RH max. Non Condensing		
Altitude	2000m Operating Altitude, 12000m Transport Altitude		
Thermal Shock	MIL-STD-810F		
Fire & Smoke	EN 45545-2 Compliant		
EMI	Meets EN 50155 Compliant (with external filter)		
ESD	EN 61000-4-2	Level 3: Air $\pm 8$ kV, Contact $\pm 6$ kV	Perf. Criteria B
Radiated immunity	EN 61000-4-3	Level 3: 80~1000MHz, 20V/m	Perf. Criteria A
Fast Transient	EN 61000-4-4	Level 3: On power input port, $\pm 2$ kV, external input capacitor required	Perf. Criteria A
Surge	EN 61000-4-5	Level 2: Line to earth, $\pm 2$ kV, Line to line, $\pm 1$ kV	Perf. Criteria B
Conducted immunity	EN 61000-4-6	Level 3: 0.15~80MHz, 10V	Perf. Criteria A
Interruptions of Voltage Supply	EN 50155	Class S3: 20ms with external hold up circuit	Perf. Criteria A
Supply Change Over	EN 50155	Class C2: 30ms with external hold up circuit	Perf. Criteria B
Application Note Link	<a href="#">CFB600W-110S Series App Notes</a>		
Packaging Information Link	<a href="#">Packaging Information</a>		



# CFB600W-110S Series

## Immunity to Environmental Conditions

Phenomenon	EN50155; 2017 Reference Clause(s)	Reference Standard	Test Conditions	Result
Low Temperature Start-up test	13.4.4	EN 60068-2-1	Class OT4 Temperature: -40°C Duration: 2 hrs	Pass
Dry Heat Test	13.4.5	EN 60068-2-2	Class OT4 Temperature: 70°C Dry heat thermal test Cycle A	Pass
Low Temperature Storage Test	13.4.6	EN 60068-2-1	Temperature: -40°C Duration: 16 hrs	Pass
Cyclic Damp Heat Test	13.4.7	EN 60068-2-30	Temperature: +55°C and +25°C Humidity: 90~96% RH Duration: 48 hrs	Pass
Random Vibration Test	13.4.11	EN 61373	Temperature: 25°C±10°C Humidity: 50% ±25% RH Frequency range: 5 ~ 150 Hz X axis: 0.44 $m/s^2$ Y axis: 0.69 $m/s^2$ Z axis: 0.98 $m/s^2$ Duration: 10 min / axis	Pass
Simulated Long Life Test at Increased Random Vibration Levels	13.4.11	EN 61373	Temperature: 25°C±10°C Humidity: 50% ±25% RH Frequency range: 5 ~ 150 Hz X axis: 2.5 $m/s^2$ Y axis: 3.96 $m/s^2$ Z axis: 5.72 $m/s^2$ Duration: 5 hrs / axis	Pass
Shock Test	13.4.11	EN 61373	Temperature: 25°C±10°C Humidity: 50% ±25% RH a. Test Condition 1 (±X axes) Units are non-operating. Pulse shape: Half-sine waveform Impact acceleration: 50 m/s <sup>2</sup> Pulse duration: 30 ms Number of shocks / Orientation: 6 shocks (3 shocks for ±X axis) b. Test Condition 2 (±Y and ±Z axes) Units are non-operating. Pulse shape : Half-sine waveform Impact acceleration : 30 m/s <sup>2</sup> Pulse duration : 30 ms Number of shocks : 12 shocks (3 shocks for each ±axis) Orientation : ±Y and ±Z axes	Pass

## EN45545-2 Fire & Smoke Test Conditions

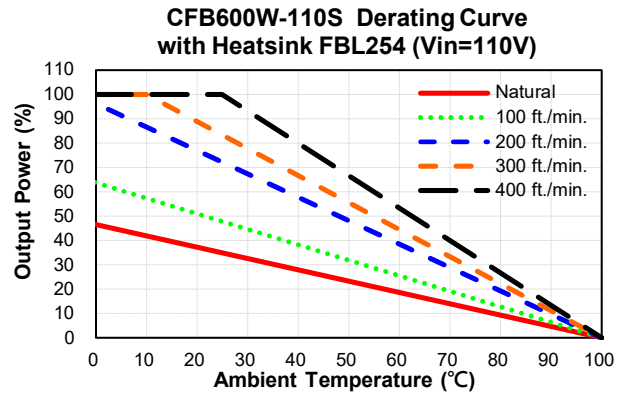
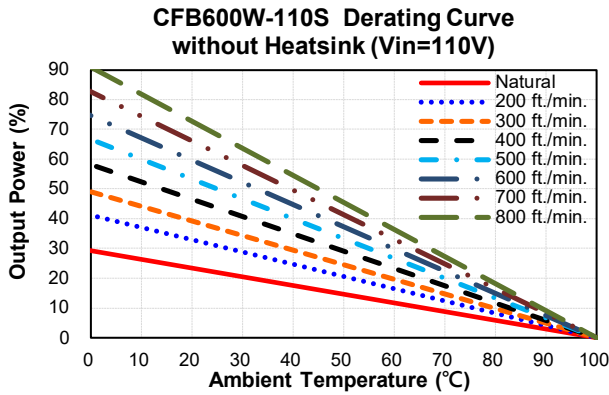
Item		Standard	Hazard Level
R22	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1, HL2, HL3
	Smoke Density Test	EN 45545-2: 2013 EN ISO 5659-2: 2013	HL1, HL2, HL3
	Smoke Toxicity Test	EN 45545-2: 2013 NF X70-100: 2006	HL1, HL2, HL3
R23	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1, HL2, HL3
	Smoke Density Test	EN 45545-2: 2013 EN ISO 5659-2: 2013	HL1, HL2, HL3
	Smoke Toxicity Test	EN 45545-2: 2013 NF X70-100: 2006	HL1, HL2, HL3
R24	Oxygen Index Test	EN45545-2: 2013 EN ISO 4589-2	HL1, HL2, HL3
R25	Glow - Wire Test	EN 45545-2:2013 EN 60695-2-11:2001	HL1, HL2, HL3
R26	Vertical Flame Test	EN 45545-2: 2013 EN 60695-11-10: 2013	HL1, HL2, HL3



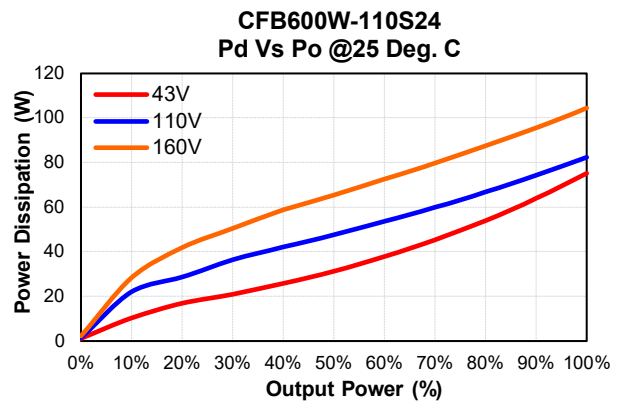
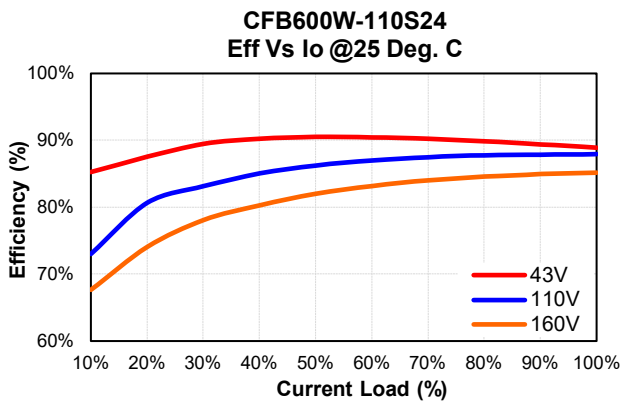
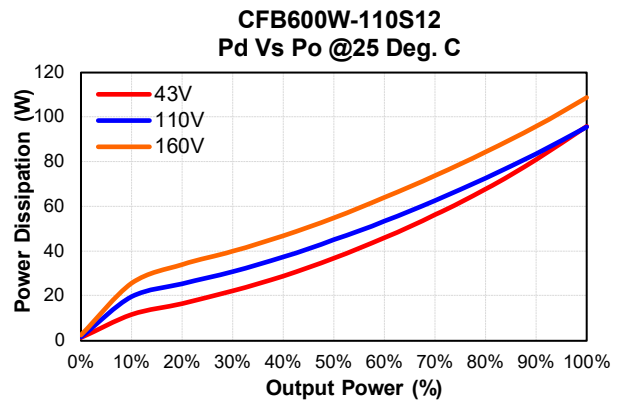
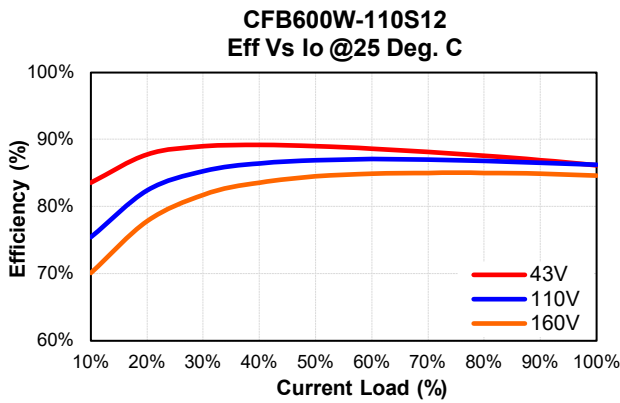
# CFB600W-110S Series

## CHARACTERISTIC CURVE

### Power Derating Curve



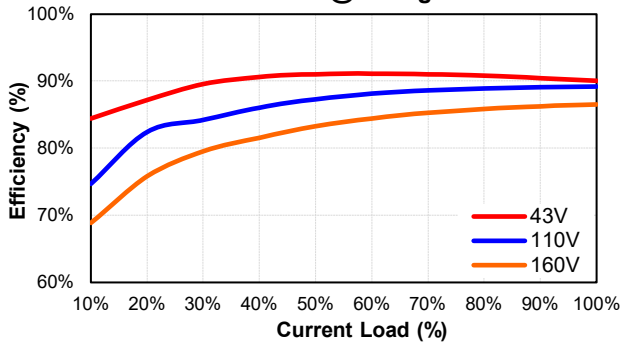
### Performance Data



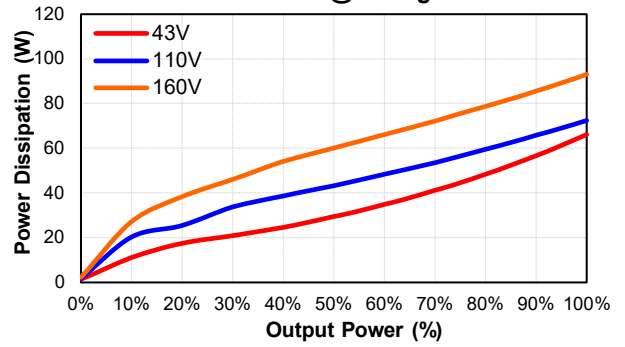


# CFB600W-110S Series

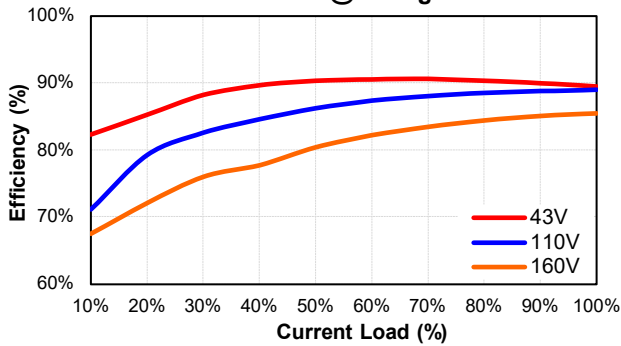
**CFB600W-110S28**  
Eff Vs Io @25 Deg. C



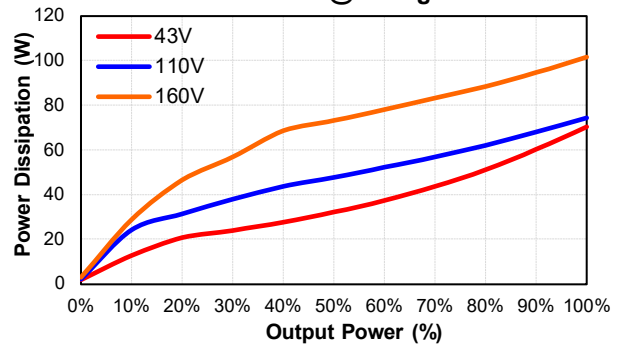
**CFB600W-110S28**  
Pd Vs Po @25 Deg. C



**CFB600W-110S48**  
Eff Vs Io @25 Deg. C



**CFB600W-110S48**  
Pd Vs Po @25 Deg. C





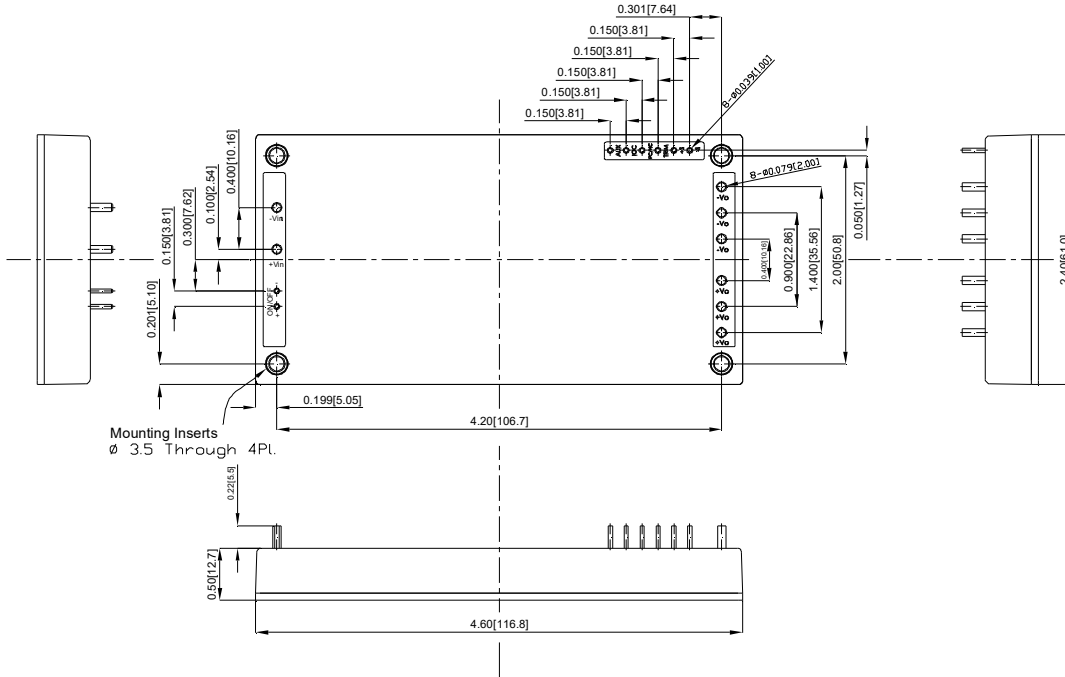
# CFB600W-110S Series

## MECHANICAL SPECIFICATION

All Dimensions in Inches[mm]

Tolerance Inches:x.xx=±0.02 , x.xxx=±0.01  
 Millimeters:x.x=±0.5 , x.xx=±0.25

Pin  
 ±0.004  
 ±0.1



PIN CONNECTION

PIN NUMBER	CONNECTION
1	-V Input
2	+V Input
3	-On/Off
4	+On/Off
5~7	+V Output
8~10	-V Output
11	-Sense
12	+Sense
13	TRIM
14	PC
15	IOC
16	AUX