



# 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<br>24 : 24VDC<br>28 : 28VDC<br>48 : 48VDC | None: Negative<br>P: Positive | None: Clear Mounting Inserts (3.5mm DIA.)<br>-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.                                                     |                                                                                                                           | 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   | %     |



# CFB600W-110S Series

| 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<br>1 Minute; input to case (base plate)<br>1 Minute; output to case (base plate) | All    |      |                      | 2250<br>2250<br>1500 | $V_{dc}$ |
| Isolation Resistance                                  | Input to output                                                                                            | All    | 20   |                      |                      | MΩ       |
| Isolation Capacitance                                 | Input to output<br>Input to case (base plate)<br>Output to case (base plate)                               | All    |      | 4000<br>None<br>None |                      | pF       |

## 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  |      | °C    |
| Over Temperature Recovery                                        |                                                            | All    |      | 90   |      | °C    |

## GENERAL SPECIFICATIONS

| PARAMETER           | NOTES and CONDITIONS                                                 | Device | Min. | Typ. | Max. | Units   |
|---------------------|----------------------------------------------------------------------|--------|------|------|------|---------|
| MTBF                | $I_o=100\%$ of $I_{o\_max.}$ ;<br>MIL-HDBK - 217F_Notice 1, GB, 25°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<br>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 $\pm 8\text{kV}$ , Contact $\pm 6\text{kV}$                           | 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, $\pm 2\text{kV}$ , external input capacitor required | Perf. Criteria A                              |
| Surge                           | EN 61000-4-5                                        | Level 2: Line to earth, $\pm 2\text{kV}$ , Line to line, $\pm 1\text{kV}$          | 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<br>Temperature: -40°C<br>Duration: 2 hrs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Pass   |
| Dry Heat Test                                                 | 13.4.5                            | EN 60068-2-2       | Class OT4<br>Temperature: 70°C<br>Dry heat thermal test Cycle A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Pass   |
| Low Temperature Storage Test                                  | 13.4.6                            | EN 60068-2-1       | Temperature: -40°C<br>Duration: 16 hrs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Pass   |
| Cyclic Damp Heat Test                                         | 13.4.7                            | EN 60068-2-30      | Temperature: +55°C and +25°C<br>Humidity: 90~96% RH<br>Duration: 48 hrs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Pass   |
| Random Vibration Test                                         | 13.4.11                           | EN 61373           | Temperature: 25°C±10°C<br>Humidity: 50% ±25% RH<br>Frequency range: 5 ~ 150 Hz<br>X axis: 0.44 $m/s^2$<br>Y axis: 0.69 $m/s^2$<br>Z axis: 0.98 $m/s^2$<br>Duration: 10 min / axis                                                                                                                                                                                                                                                                                                                                                                                      | Pass   |
| Simulated Long Life Test at Increased Random Vibration Levels | 13.4.11                           | EN 61373           | Temperature: 25°C±10°C<br>Humidity: 50% ±25% RH<br>Frequency range: 5 ~ 150 Hz<br>X axis: 2.5 $m/s^2$<br>Y axis: 3.96 $m/s^2$<br>Z axis: 5.72 $m/s^2$<br>Duration: 5 hrs / axis                                                                                                                                                                                                                                                                                                                                                                                        | Pass   |
| Shock Test                                                    | 13.4.11                           | EN 61373           | Temperature: 25°C±10°C<br>Humidity: 50% ±25% RH<br>a. Test Condition 1 (±X axes)<br>Units are non-operating.<br>Pulse shape: Half-sine waveform<br>Impact acceleration: 50 m/s <sup>2</sup><br>Pulse duration: 30 ms<br>Number of shocks / Orientation:<br>6 shocks (3 shocks for ±X axis)<br>b. Test Condition 2 (±Y and ±Z axes)<br>Units are non-operating.<br>Pulse shape : Half-sine waveform<br>Impact acceleration : 30 m/s <sup>2</sup><br>Pulse duration : 30 ms<br>Number of shocks : 12 shocks<br>(3 shocks for each ±axis)<br>Orientation : ±Y and ±Z axes | Pass   |

## EN45545-2 Fire & Smoke Test Conditions

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

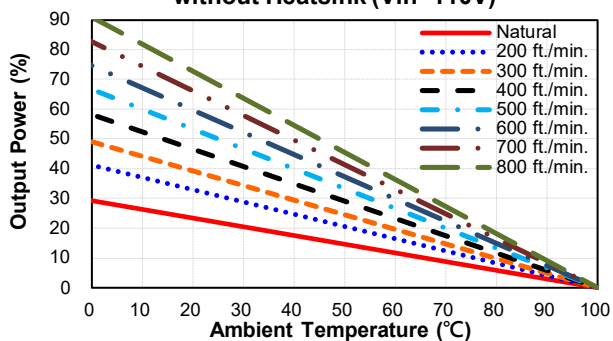


# CFB600W-110S Series

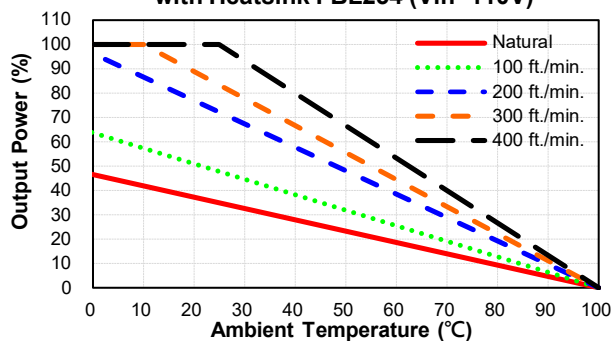
## CHARACTERISTIC CURVE

### Power Derating Curve

**CFB600W-110S Derating Curve  
without Heatsink (Vin=110V)**

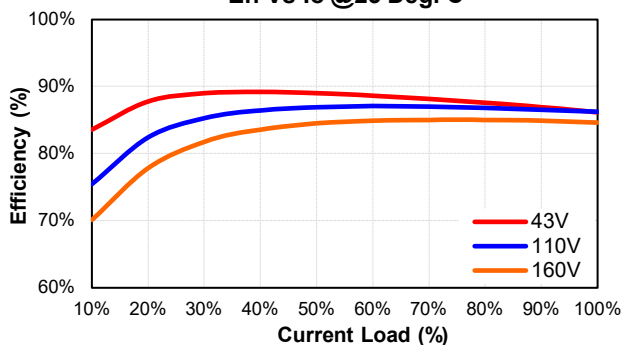


**CFB600W-110S Derating Curve  
with Heatsink FBL254 (Vin=110V)**

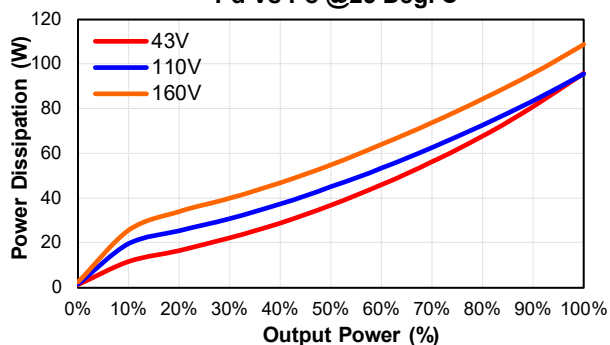


### Performance Data

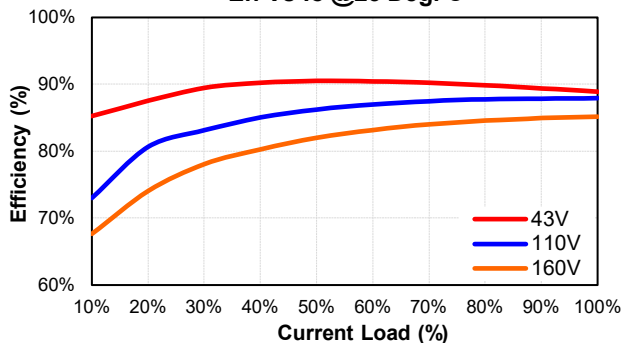
**CFB600W-110S12  
Eff Vs Io @25 Deg. C**



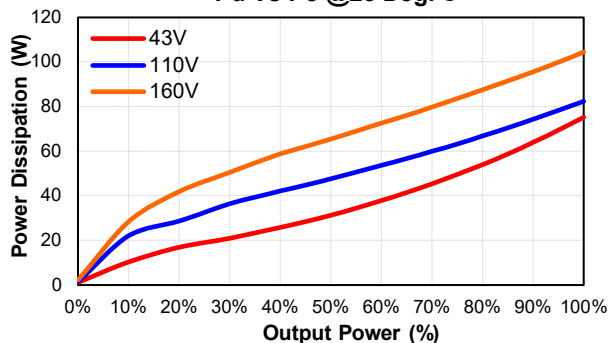
**CFB600W-110S12  
Pd Vs Po @25 Deg. C**



**CFB600W-110S24  
Eff Vs Io @25 Deg. C**



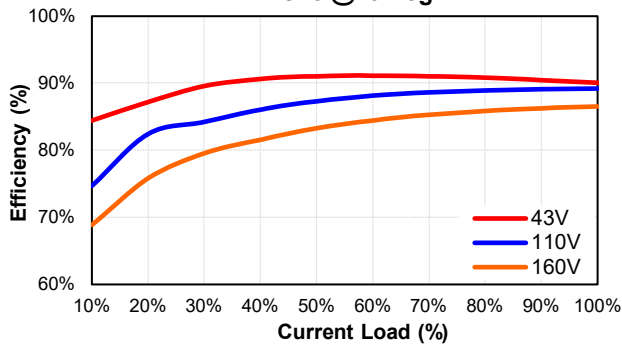
**CFB600W-110S24  
Pd Vs Po @25 Deg. C**



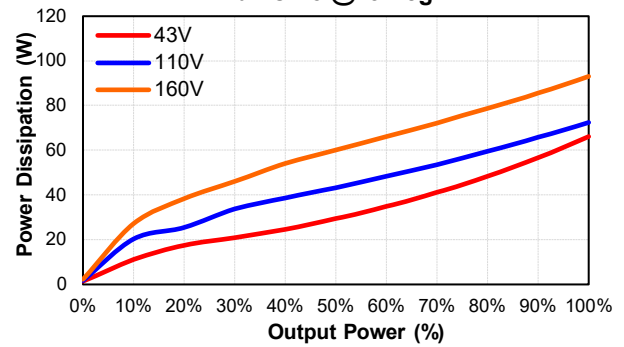


## CFB600W-110S Series

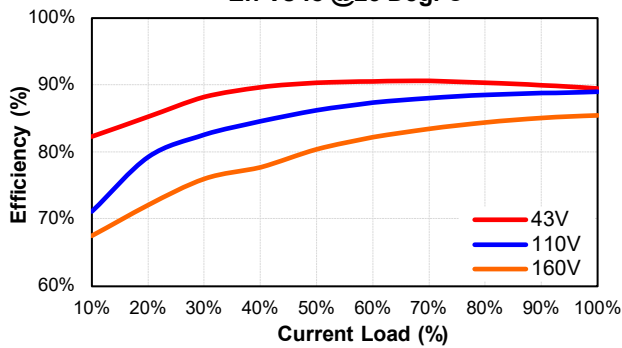
**CFB600W-110S28**  
**Eff Vs Io @25 Deg. C**



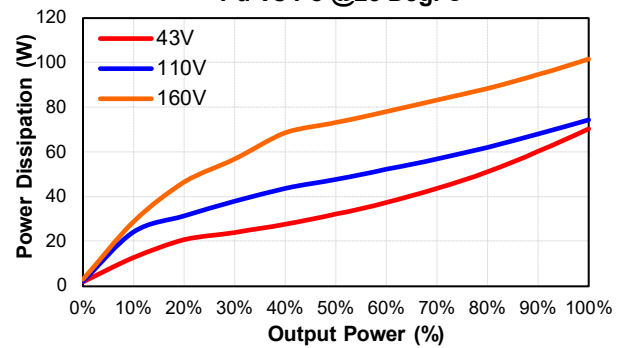
**CFB600W-110S28**  
**Pd Vs Po @25 Deg. C**

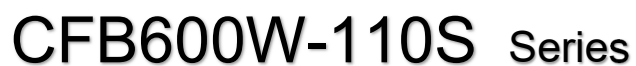


**CFB600W-110S48**  
**Eff Vs Io @25 Deg. C**

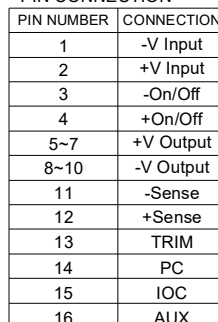


**CFB600W-110S48**  
**Pd Vs Po @25 Deg. C**





Pin  
±0.004  
±0.1



REVISION: V11

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Cincon:

[CFB600W-110S12P-C0](#) [CFB600W-110S24](#) [CFB600W-110S24-C0](#) [CFB600W-110S24P](#) [CFB600W-110S24P-C0](#)  
[CFB600W-110S28](#) [CFB600W-110S28-C0](#) [CFB600W-110S28P](#) [CFB600W-110S28P-C0](#) [CFB600W-110S48](#)  
[CFB600W-110S48-C0](#) [CFB600W-110S48P](#) [CFB600W-110S48P-C0](#) [CFB600W-110S12P](#) [CFB600W-110S12-C0](#)  
[CFB600W-110S12](#)