



# CFB600-300S SERIES 600 WATT 2:1 INPUT ISOLATED DC-DC CONVERTER

## Features

- Efficiency to 91%
- Fixed Switching Frequency
- Remote On/Off
- Fully Protected (OTP/OCP/OVP/UVLO)
- 3000Vac 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 Approval
- Shock & Vibration MIL-STD-810F(EN 61373) Compliant
- Fire & Smoke EN 45545-2 Compliant
- 2000m Operating Altitude
- Safety Meets UL/IEC/EN 62368-1



| MODEL NUMBER  | INPUT VOLTAGE | OUTPUT VOLTAGE | OUTPUT CURRENT |        | INPUT CURRENT |           | % EFF.<br>(1) | CAPACITOR<br>LOAD MAX. |
|---------------|---------------|----------------|----------------|--------|---------------|-----------|---------------|------------------------|
|               |               |                | MIN.           | MAX.   | NO LOAD       | FULL LOAD |               |                        |
| CFB600-300S12 | 180-425 VDC   | 12 VDC         | 0 mA           | 50 A   | 10 mA         | 2.24 A    | 89.5          | 10000uF                |
| CFB600-300S24 | 180-425 VDC   | 24 VDC         | 0 mA           | 25 A   | 10 mA         | 2.21 A    | 90.5          | 10000uF                |
| CFB600-300S48 | 180-425 VDC   | 48 VDC         | 0 mA           | 12.5 A | 10 mA         | 2.20 A    | 91            | 8000uF                 |

### NOTE:

1. Nominal Input Voltage 300 VDC.
2. The output terminal required a minimum capacitor 470uF to maintain specified regulation.
3. An external input capacitor 330uF for all models are recommended to reduce input ripple voltage.
4. Measure at Nominal Input Voltage.

## PART NUMBER

| Series  | Nominal Input Voltage | Number of Outputs | Nominal Output Voltage                 | Remote On/Off Logic             | Mounting Inserts                          |
|---------|-----------------------|-------------------|----------------------------------------|---------------------------------|-------------------------------------------|
| CFB600- | II                    | O                 | XX                                     | L                               | -Y (Option)                               |
| CFB600  | 300 : 300 VDC         | S : Single        | 12 : 12VDC<br>24 : 24VDC<br>48 : 48VDC | None : Positive<br>N : Negative | None : Clear Mounting Insert (3.5mm DIA.) |

### Part Number Example:

**CFB600-300S24N:** Full Brick, 600W, 2:1 180-425Vdc Input, Single 24Vdc Output, Negative Logic, Clear Mounting Insert



# CFB600-300S 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 |      | 425  | V <sub>dc</sub> |
| Input Surge Voltage        | 100ms max.                       | All    |      |      | 475  | 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                    | 180  | 300  | 425  | V <sub>dc</sub>  |
| Input Under Voltage Lockout       |                                           |                        |      |      |      |                  |
| Turn-On Voltage Threshold         |                                           | All                    | 160  | 170  | 180  | V <sub>dc</sub>  |
| Turn-Off Voltage Threshold        |                                           | All                    | 150  | 160  | 170  | V <sub>dc</sub>  |
| Lockout Hysteresis Voltage        |                                           | All                    |      | 10   |      | V <sub>dc</sub>  |
| Input Over Voltage Protection     |                                           |                        |      |      |      |                  |
| Module-On Voltage                 |                                           |                        |      | 480  |      | V <sub>dc</sub>  |
| Module -Off Voltage               |                                           |                        |      | 500  |      | V <sub>dc</sub>  |
| Maximum Input Current             | V <sub>in</sub> =180V, Full load          | All                    |      | 3.8  |      | A                |
| No-Load Input Current             | V <sub>in</sub> =300V, I <sub>o</sub> =0A | See Model Number Table |      |      |      | mA               |
| Input Filter                      | Capacitance filter                        | All                    |      |      |      |                  |
| Inrush Current (I <sup>2</sup> t) | As per ETS300 132-2                       | All                    |      | 0.1  |      | A <sup>2</sup> s |
| Input Reflected Ripple Current    | P-P Thru 12uH Inductor, 5Hz to 20MHz      | All                    |      | 60   |      | mA               |

### OUTPUT CHARACTERISTICS

| PARAMETER                                                | NOTES and CONDITIONS                                                                                  | Device                 | Min.                      | Typ. | Max.  | Units |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------|------------------------|---------------------------|------|-------|-------|
| Voltage Set Point Accuracy                               | V <sub>in</sub> =300V, 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, 470uF aluminum and 1.0uF ceramic capacitors                                                | V <sub>o</sub> =12V    |                           |      | 150   | mV    |
|                                                          |                                                                                                       | V <sub>o</sub> =24V    |                           |      | 400   |       |
|                                                          |                                                                                                       | V <sub>o</sub> =48V    |                           |      | 480   |       |
| RMS.                                                     |                                                                                                       | V <sub>o</sub> =12V    |                           |      | 75    |       |
|                                                          |                                                                                                       | V <sub>o</sub> =24V    |                           |      | 120   |       |
|                                                          |                                                                                                       | V <sub>o</sub> =48V    |                           |      | 200   |       |
| Output Current Range                                     | V <sub>in</sub> = 180 to 425V                                                                         | See Model Number Table |                           |      |       | A     |
| Over Current Protection                                  | Continuous current. Auto recovery                                                                     | All                    | 105                       | 115  | 125   | %     |
| Short Circuit Protection                                 |                                                                                                       | All                    | Continuous, Auto Recovery |      |       |       |
| External Load Capacitance                                | Full load (resistive)                                                                                 | See Model Number Table |                           |      |       | uF    |
| 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><br>% of nominal V <sub>o</sub> | All                    |                           |      | +10   | %     |
| Over Voltage Protection                                  | Limited voltage, % of nominal V <sub>o</sub>                                                          | All                    | 115                       | 125  | 140   | %     |
| 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                                        | All                    |                           |      | 50    | V     |



# CFB600-300S Series

| PARAMETER                           | NOTES and CONDITIONS                                                                | Device | Min. | Typ. | Max. | Units |
|-------------------------------------|-------------------------------------------------------------------------------------|--------|------|------|------|-------|
| Load Share Accuracy (50%-100% load) | The condition is to use two modules. If you use more modules, please contact cincon | All    | -10  |      | +10  | %     |

## EFFICIENCY

| PARAMETER | NOTES and CONDITIONS | Device                 | Min. | Typ. | Max. | Units |
|-----------|----------------------|------------------------|------|------|------|-------|
| 100% Load | $V_{in}=300V$        | 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 $dI/dt=0.1A/us$ | All    |      |      | $\pm 5$ | %     |
| Recovery Time                           | (within 1% $V_{out}$ nominal)                                  | 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    |      | 100  |         | ms    |
| Turn-On Delay Time, From Input          | $V_{in\_min.}$ to 10% $V_{o\_set}$ , Power up                  | All    |      | 700  |         | ms    |
| Output Voltage Rise Time                | 10% $V_{o\_set}$ to 90% $V_{o\_set}$                           | All    |      | 40   |         | ms    |

## ISOLATION CHARACTERISTICS

| PARAMETER                                                | NOTES and CONDITIONS                  | Device | Min. | Typ. | Max. | Units    |
|----------------------------------------------------------|---------------------------------------|--------|------|------|------|----------|
| Isolation Voltage<br>(100% Factory Hi-Pot tested @2sec.) | 1 Minute; input to output             | All    |      |      | 3000 | $V_{ac}$ |
|                                                          |                                       |        |      |      | 4200 | $V_{dc}$ |
|                                                          | 1 Minute; input to case (base plate)  |        |      |      | 2500 | $V_{ac}$ |
|                                                          |                                       |        |      |      | 3500 | $V_{dc}$ |
|                                                          | 1 Minute; output to case (base plate) |        |      |      | 500  | $V_{ac}$ |
|                                                          |                                       |        |      |      | 700  | $V_{dc}$ |
| Isolation Resistance                                     | Input to output                       | All    | 10   |      |      | MΩ       |
| Isolation Capacitance                                    | Input to output                       | All    |      | NC   |      | pF       |
|                                                          | Input to case (base plate)            |        |      | NC   |      |          |
|                                                          | Output to case (base plate)           |        |      | 9400 |      |          |

## FEATURE CHARACTERISTICS

| PARAMETER                                                       | NOTES and CONDITIONS                                       | Device | Min.                | Typ. | Max. | Units |
|-----------------------------------------------------------------|------------------------------------------------------------|--------|---------------------|------|------|-------|
| Switching Frequency                                             | Pulse width modulation (PWM), fixed                        | All    | 170                 | 200  | 230  | 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    | 0                   |      | 1.2  | V     |
| Logic High (Module On)                                          | $V_{on/off}$ at $I_{on/off}=0.0uA$ ,                       | All    | 3.5 or Open Circuit |      | 75   | V     |
| On/Off Control, Negative Remote On/Off Logic, Refer to -Vin Pin |                                                            |        |                     |      |      |       |
| Logic High (Module Off)                                         | $V_{on/off}$ at $I_{on/off}=0.0uA$ ,                       | All    | 3.5 or Open Circuit |      | 75   | V     |
| Logic Low (Module On)                                           | $V_{on/off}$ at $I_{on/off}=1.0mA$                         | All    | 0                   |      | 1.2  | V     |
| On/Off Current (for Both Remote On/Off Logic)                   | $I_{on/off}$ at $V_{on/off}=0.0V$                          |        |                     | 0.3  | 1    | mA    |
| Leakage Current (for Both Remote On/Off Logic)                  | Logic high, $V_{on/off}=15V$                               |        |                     |      | 30   | uA    |
| Off Converter Input Current                                     | Shutdown input idle current                                | All    |                     | 5    | 10   | mA    |
| Over Temperature Shutdown                                       | Temperature at the center part of base plate, non-latching | All    |                     | 105  |      | °C    |
| Over Temperature Recovery                                       |                                                            | All    |                     | 90   |      | °C    |



# CFB600-300S Series

## 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    |      | 420  |      | K hours |
| Weight              |                                                                     | All    |      | 230  |      | grams   |
| Case Material       | Plastic, DAP, UL 94V-0                                              |        |      |      |      |         |
| Base Plate Material | Aluminum                                                            |        |      |      |      |         |
| Potting Material    | UL 94V-0                                                            |        |      |      |      |         |
| Pin Material        | Base: Copper<br>Plating: Nickel with Matte Tin                      |        |      |      |      |         |
| Shock/Vibration     | MIL-STD-810F/EN 61373 Compliant                                     |        |      |      |      |         |
| Humidity            | 95% RH max. Non condensing                                          |        |      |      |      |         |
| Altitude            | 2000m Operating altitude, 12000m Transport altitude                 |        |      |      |      |         |
| Thermal Shock       | MIL-STD-810F                                                        |        |      |      |      |         |

## EMC SPECIFICATIONS (External components required, please refer to application note.)

|                                         |                                                                                                           |                                              |                  |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------|----------------------------------------------|------------------|
| EMI                                     | Meets EN 55032 (with external filter)                                                                     |                                              | Class A          |
| ESD                                     | Meets IEC/EN 61000-4-2                                                                                    | Air ± 8kV, Contact ± 4kV                     | Perf. Criteria A |
| Radiated Immunity                       | Meets IEC/EN 61000-4-3                                                                                    | 3 V/m                                        | Perf. Criteria A |
| Fast Transient                          | Meets IEC/EN 61000-4-4                                                                                    | ± 1kV, external components required          | Perf. Criteria A |
| Surge                                   | Meets IEC/EN 61000-4-5<br>EN 55024: Line to earth ± 2kV, Line to line ± 2kV, external components required |                                              | Perf. Criteria A |
| Conducted Immunity                      | Meets IEC/EN 61000-4-6                                                                                    | 3Vrms                                        | Perf. Criteria A |
| Power Frequency Magnetic Field Immunity | Meets IEC/EN 61000-4-8                                                                                    | 50/60Hz, 3A/m (r.m.s.)                       | Perf. Criteria A |
| Application Note Link                   |                                                                                                           | <a href="#">CFB600-300S Series App Notes</a> |                  |
| Packaging Information Link              |                                                                                                           | <a href="#">Packaging Information</a>        |                  |

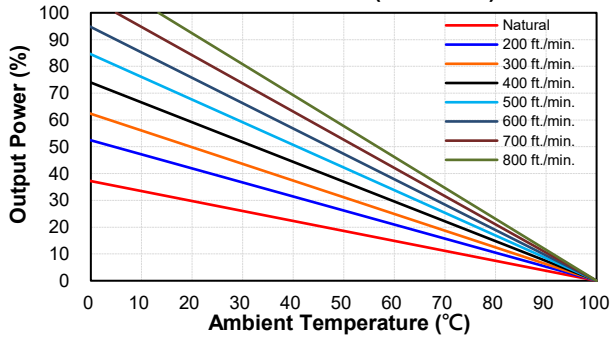


# CFB600-300S Series

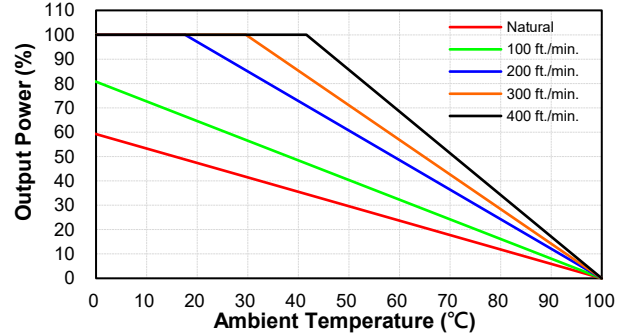
## CHARACTERISTIC CURVE

### Power Derating Curve

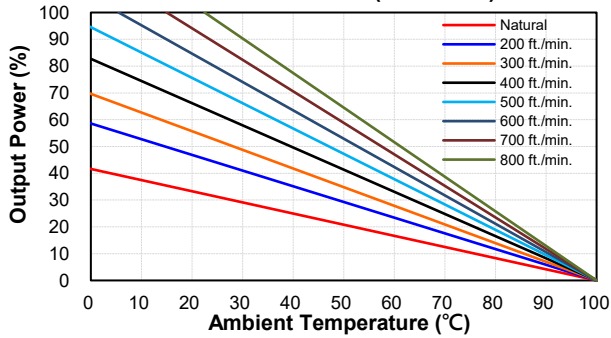
**CFB600-300S12 Derating Curve  
without Heatsink (Vin=300V)**



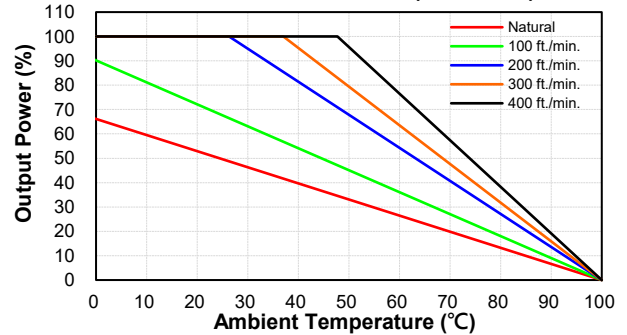
**CFB600-300S12 Derating Curve  
with Heatsink FBL254 (Vin=300V)**



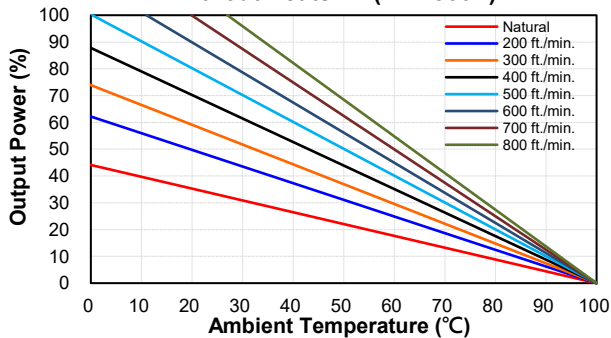
**CFB600-300S24 Derating Curve  
without Heatsink (Vin=300V)**



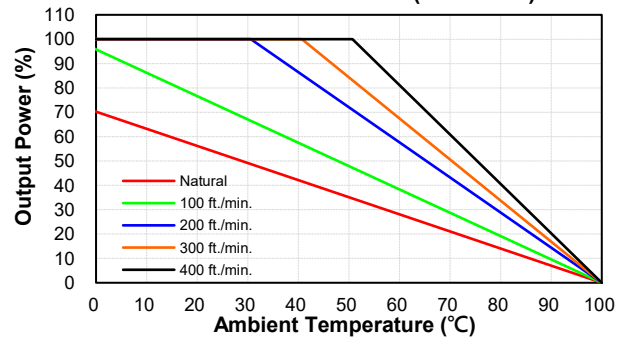
**CFB600-300S24 Derating Curve  
with Heatsink FBL254 (Vin=300V)**



**CFB600-300S48 Derating Curve  
without Heatsink (Vin=300V)**



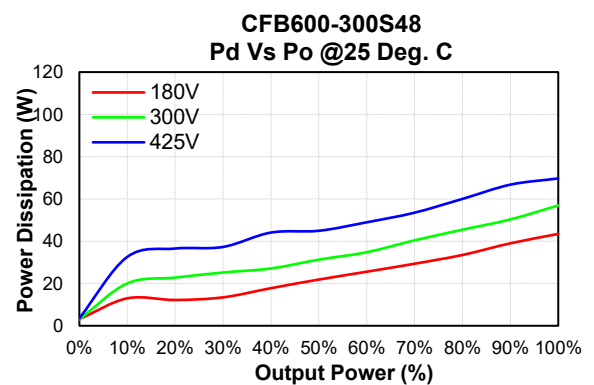
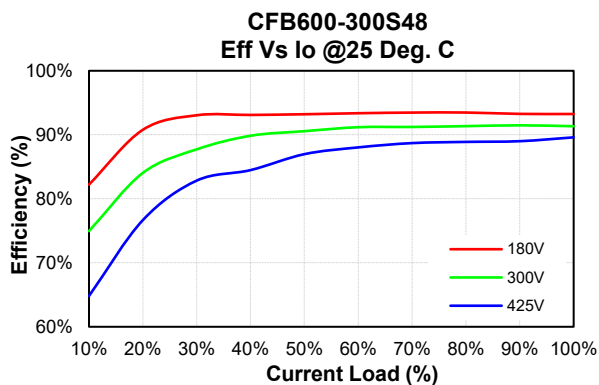
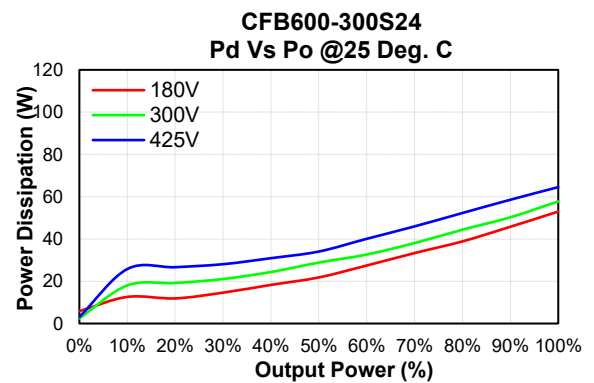
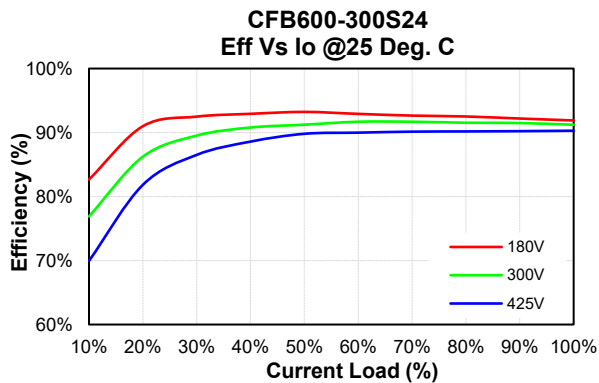
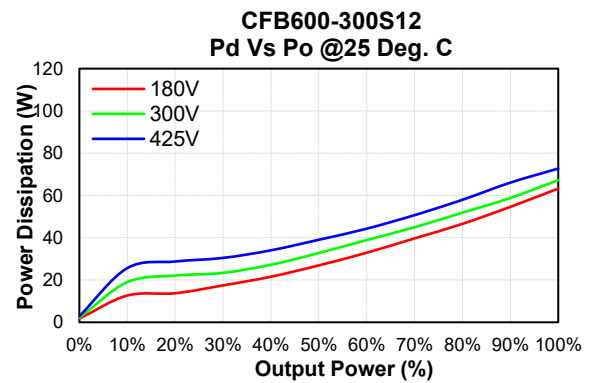
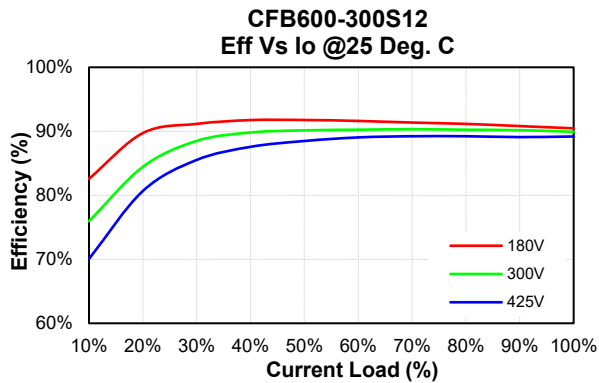
**CFB600-300S48 Derating Curve  
with Heatsink FBL254 (Vin=300V)**





# CFB600-300S Series

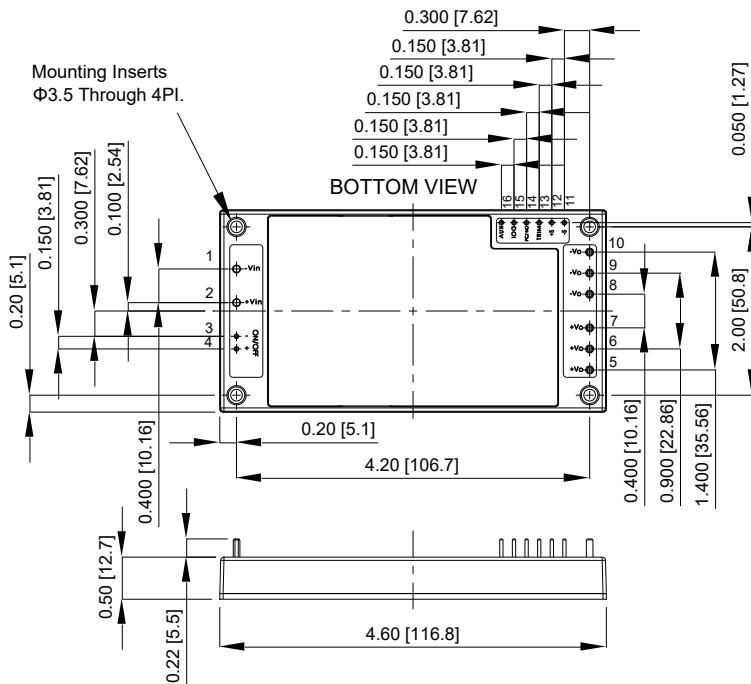
## Performance Data





# CFB600-300S Series

## MECHANICAL SPECIFICATION



| PIN CONNECTION |           |
|----------------|-----------|
| PIN            | Function  |
| 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             | IOG       |
| 16             | AUX       |

NOTE: Pin Size is 0.04±0.004 Inch [1.0±0.1 mm] DIA  
Pin Size is 0.08±0.004 Inch [2.0±0.1 mm] DIA  
All Dimensions In Inches [mm]  
Tolerances Inches: X.XX= ±0.02 , X.XXX= ±0.010  
Millimeters: X.X= ±0.5 , X.XX=±0.25