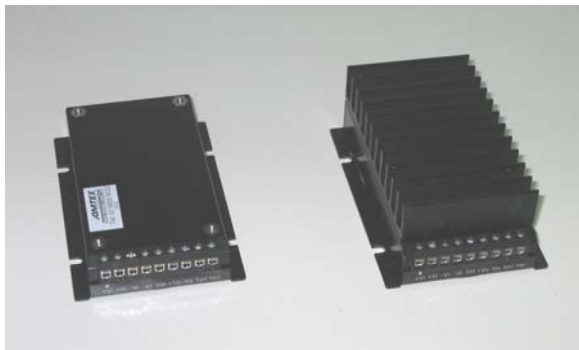


WAF150(D) SERIES

DC / DC Single Output: 150 Watts



WAF150-24S12W

WAF150-24S12W/HC

Features

- 4:1 wide Input range: 9~36V & 18~75V
- Single output, up to 12.5A / 150 watts
- High power density package
- High efficiency up to 88%
- Regulated output & Short circuit protection
- 2250VDC isolation
- Remote ON / OFF, Positive Logic (Negative Logic option)
- High operating temperature up to +85°C
- Zero load operation
- External Output voltage trim
- Heatsink option
- EMC EN55022 Class A (Class B option)
- WAF Flange mounting, WAD Rear panel mounting

Specifications

| | |
|---|---|
| Input Voltage | 24VDC (9 ~ 36) 48VDC (18 ~ 75) |
| Input Filter | Common choke +Pi type |
| Start-up Voltage | 24V input: 8.8V typ. 48V input: 17.6V typ. |
| Shutdown Voltage | 24V input: 8.2V typ. 48V input: 16.2V typ. |
| Input Surge Voltage. | 24V: 50VDC. 48V: 100VDC (100ms) |
| Input Reverse Voltage Protection | Input Parallel Diode External input fuse required |
| Start Up time | Typically 25mS constant resistive load |
| Remote ON/OFF Positive Logic - Standard | DC-DC ON Open or $3.0V < V_r < 12V$ DC-DC OFF Short or $0V < V_r < 1.2V$ |
| Negative Logic -Option) | DC-DC ON Short or $0V < V_r < 1.2V$ DC-DC OFF Open or $3.0V < V_r < 12V$ |
| | Input current of remote control pin: 0.5mA~ 1.0mA Remote off state input current: 3.5mA |
| Output power | 150 watts |
| Voltage Accuracy | ±1.0% |
| Output Voltage Trim | +0% to +20% External voltage trim |
| Minim Load | Zero |
| Line Regulation | ±0.2% Low line to High Line @ FL |
| Load Regulation | ±0.4% No load to Full load |
| Remote Sense | N/A |
| Ripple & noise | See table. 20MHZ bandwidth |
| Temp. Coefficient | ±0.02% / °C |
| Transient Response | 200uS (25% load step change) |
| Over Voltage Protection | Set at 125 ~140% of Voltage output nominal. Hiccup type |
| Overload Protection | Set at 105 ~ 120% of output current Constant current. |
| Short Circuit protection | Continuous hicc-up mode |

| | |
|------------------------------|--|
| Efficiency | Model dependant 86 ~ 88% |
| Isolation | Input – Output: 2250VDC Input / Output – Case: 1600VDC |
| Isolation Cap. | 3500pF |
| Switching Freq. | 220-330KHz |
| Safety | Designed to meet EN60950-1, UL60950-1 |
| Case Material | Metal |
| Base Material | Metal |
| Potting | Silicon UL94-V0 |
| Dimensions | 98 x 65 x 17mm (excluding heatsink option) 98 X 65 X 35mm (including heatsink) |
| Weight | 225~280g |
| MTBF | 1.353 x 10 ⁵ Hrs |
| Operating Temp | -40°C to +85°C (with derating) See derating graphs. Units must be mounted on metal plate for conduction cooling. |
| Case Temp | +100°C maximum case temperature |
| Over Temp. Protection | Shutdown approx 110°C case temperature |
| Thermal Impedance | 2.73°C / watt without heatsink 2.18°C / watt with optional heatsink & base plate. |
| Thermal shock | MIL-STD-810F |
| Vibration | MIL-STD-810F |
| Humidity | 5-95% RH |
| EMC | EN55022 Class A (see note 7) |
| ESD | EN61000-4-2 |
| Radiated Immunity | EN61000-4-3 |
| Fast Transients | EN61000-4-4 |
| Surge | EN61000-4-5 |
| Conducted Immunity | EN61000-4-6 |

WAF150(D) SERIES

DC / DC Single Output: 150 Watts

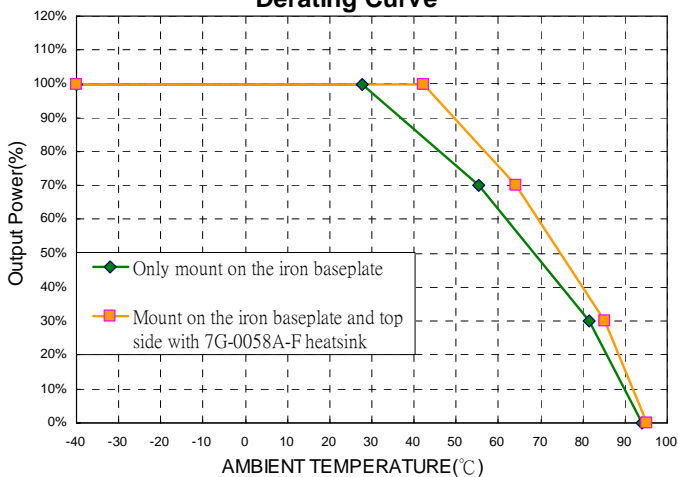
| Model Number | Input Range | Output Voltage | Output Current | | Output ⁽⁴⁾ Ripple & Noise | Input Current | | Eff ⁽⁴⁾ (%) |
|--------------------------------|-------------|----------------|----------------|-----------|---|------------------------|--------------------------|---------------------------|
| | | | Min. load | Full load | | No load ⁽³⁾ | Full load ⁽²⁾ | |
| WAF150-24S12W WAD150-24S12W | 9 – 36 VDC | 12 VDC | 0mA | 12.5 A | 100mVp-p | 70mA | 7.53A | 86 |
| WAF150-24S15W WAD150-24S15W | 9 – 36 VDC | 15 VDC | 0mA | 10 A | 100mVp-p | 80mA | 7.53A | 86 |
| WAF150-24S24W WAD150-24S24W | 9 – 36 VDC | 24 VDC | 0mA | 6.3 A | 200mVp-p | 95mA | 7.50A | 87 |
| WAF150-24S28W WAD150-24S28W | 9 – 36 VDC | 28 VDC | 0mA | 5.4 A | 200mVp-p | 120mA | 7.50A | 87 |
| WAF150-24S48W WAD150-24S48W | 9 – 36 VDC | 48 VDC | 0mA | 3.2 A | 350mVp-p | 130mA | 7.71A | 86 |
| WAF150-48S12W WAD150-48S12W | 18 – 75 VDC | 12 VDC | 0mA | 12.5 A | 100mVp-p | 50mA | 3.72A | 87 |
| WAF150-48S15W WAD150-48S15W | 18 – 75 VDC | 15 VDC | 0mA | 10 A | 100mVp-p | 60mA | 3.72A | 87 |
| WAF150-48S24W WAD150-48S24W | 18 – 75 VDC | 24 VDC | 0mA | 6.3 A | 200mVp-p | 60mA | 3.71A | 88 |
| WAF150-48S28W WAD150-48S28W | 18 – 75 VDC | 28 VDC | 0mA | 5.4 A | 200mVp-p | 70mA | 3.71A | 88 |
| WAF150-48S48W WAD150-48S48W | 18 – 75 VDC | 48 VDC | 0mA | 3.2 A | 350mVp-p | 70mA | 3.81A | 87 |

- Add /HC for top mounted heatsink

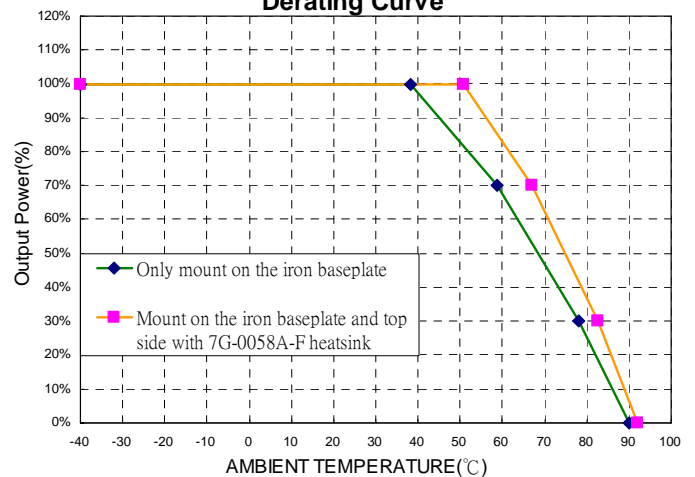
Notes:

- BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40°C.
MIL-HDBK-217F Notice2 @ Ta=40 °C, Full load, Air Flow = 400LFM (Ground, Benign, controlled environment).
- Maximum value at nominal input voltage and full load.
- Typical value at nominal input voltage and no load.
- Typical value at nominal input voltage and full load. (20MHZ BW.)
- The remote ON/OFF control pin voltage is referenced to -Vin. The negative logic is optional.
To order negative logic ON-OFF control adds the suffix -N (Ex: WAF150-24S24W-N).
- The WAF(D)150 series meets EN55022 class A, without external components.
- An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5.
The filter capacitor Power Mate suggest: 24Vin : Nippon chemi-con KY series, 470µF/50V, ESR 45mΩ.
48Vin : Nippon chemi-con KY series, 220µF/100V, ESR 48mΩ
- Internal fusing is not included, so we suggest to use an input line fuse.
- Use a resistor across on the Trim1 and Trim2 to adjust the output voltage.
- The CC Mode is Constant Current Mode. And test by nominal input voltage.
- Thermal test at WAF(D)150 mount on the iron base-plate. (The iron base-plate dimension is 19" * 3.5" * 0.063" The height is EIA standard 2U.)
Heatsink is optional and P/N is "7G-0058A-F".

WAF(D)150-24S12W
Derating Curve



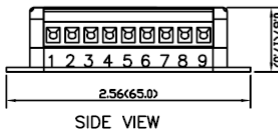
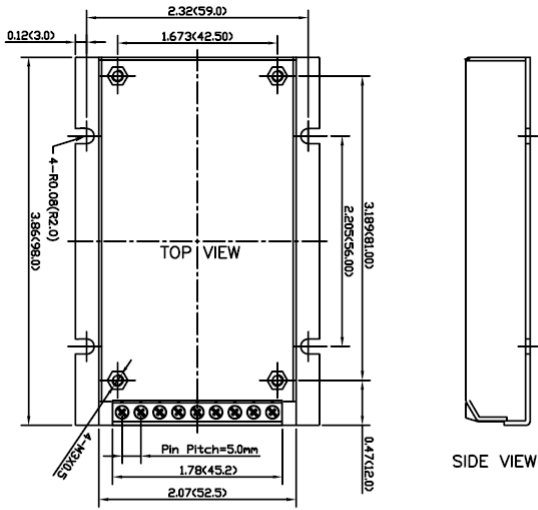
WAF(D)150-48S24W
Derating Curve



WAF150(D) SERIES

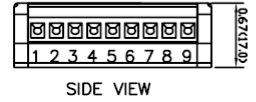
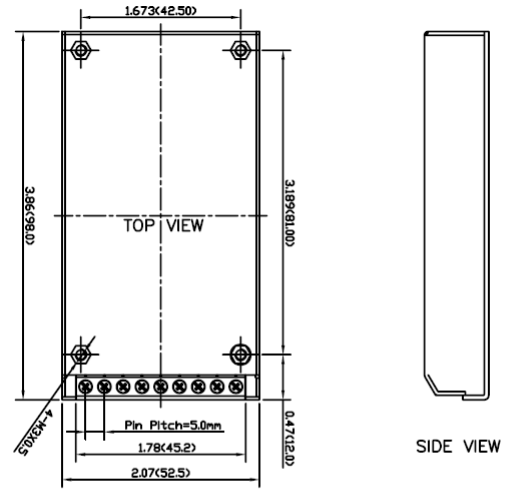
DC / DC Single Output: 150 Watts

WAF150 DIMENSIONS



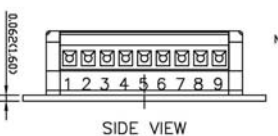
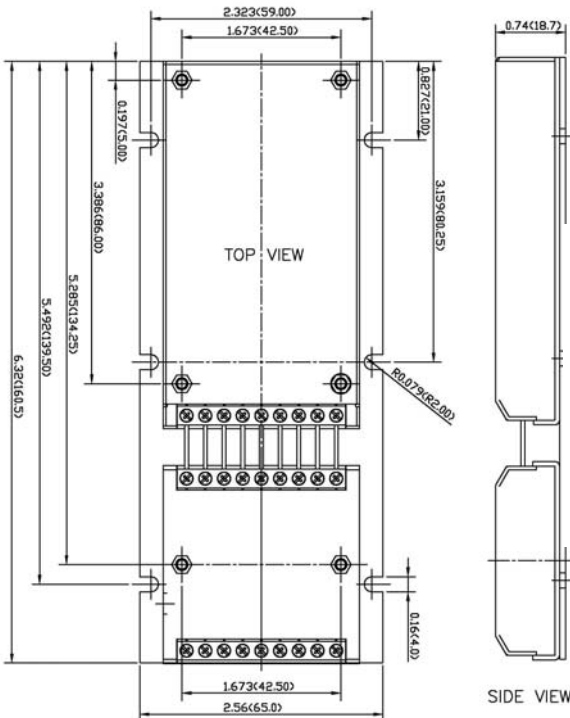
Note: 1.All dimensions in Inches (mm)
 2.Pin pitch tolerance $\pm 0.25\text{mm}$
 3.Tolerance : $x.xx \pm 0.02(x.xx \pm 0.5)$
 $x.xxx \pm 0.01(x.xxx \pm 0.25)$
 4.Terminal Block Pin Pitch:5.0mm

WAD150 DIMENSIONS

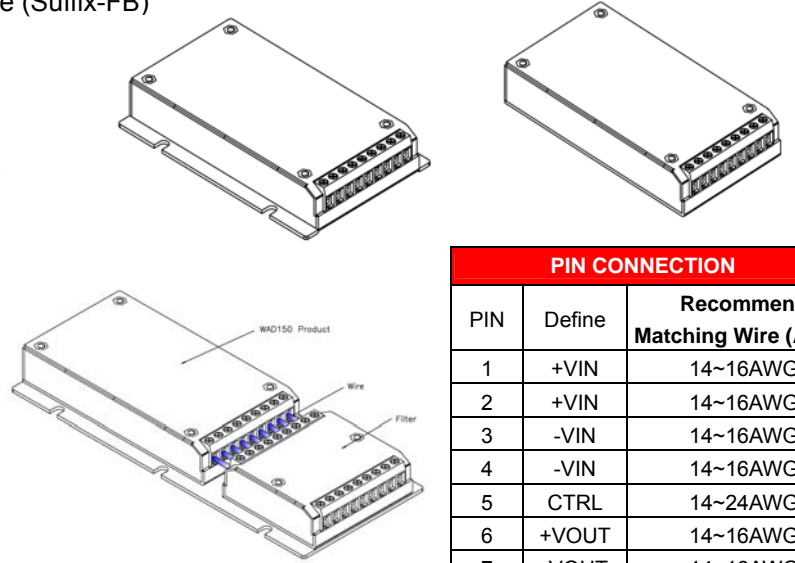


Note: 1.All dimensions in Inches (mm)
 2.Pin pitch tolerance $\pm 0.25\text{mm}$
 3.Tolerance : $x.xx \pm 0.02(x.xx \pm 0.5)$
 $x.xxx \pm 0.01(x.xxx \pm 0.25)$
 4.Terminal Block Pin Pitch:5.0mm

WAD150 with meets EN55022 class B Filter Module (Suffix-FB)



Note: 1.All dimensions in Inches (mm)
 2.Pin pitch tolerance $\pm 0.25\text{mm}$
 3.Tolerance : $x.xx \pm 0.02(x.xx \pm 0.5)$
 $x.xxx \pm 0.01(x.xxx \pm 0.25)$
 4.Terminal Block Pin Pitch:5.0mm



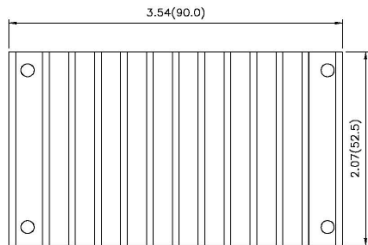
| PIN CONNECTION | | |
|----------------|--------|--------------------------------|
| PIN | Define | Recommend Matching Wire (AWG.) |
| 1 | +VIN | 14~16AWG |
| 2 | +VIN | 14~16AWG |
| 3 | -VIN | 14~16AWG |
| 4 | -VIN | 14~16AWG |
| 5 | CTRL | 14~24AWG |
| 6 | +VOUT | 14~16AWG |
| 7 | -VOUT | 14~16AWG |
| 8 | TRIM 1 | 14~24AWG |
| 9 | TRIM 2 | 14~24AWG |

EXTERNAL OUTPUT TRIMMING
 Output can be externally trimmed by using the method shown below.

TRIM

8 9

HEATSINK 7G-0058A-F DIMENSIONS: 90 x 52.5 x 17mm



unit: inch(mm)

| OPTIONS | |
|------------------------------------|--------|
| Option | Suffix |
| Positive remote ON/OFF logic | - |
| Negative remote ON/OFF logic | -N |
| With 7G-0058A-F Heatsink | -HC |
| With EN55022 class B Filter Module | -FB |

Example :

WAF150-48S12W

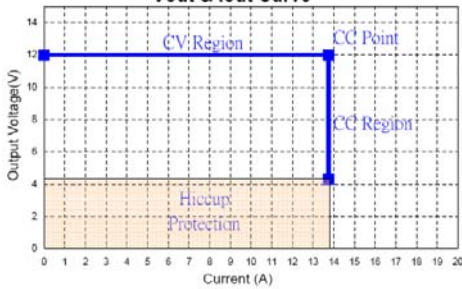
WAD150-48S28W

WAF150-24S24W-N

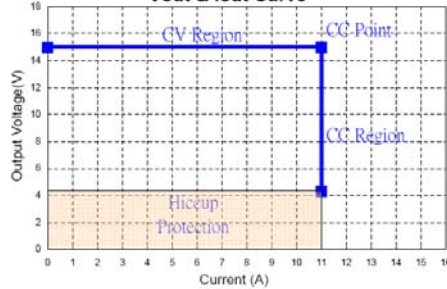
WAF150-48S24W-HC

WAD150-48S28W-FB

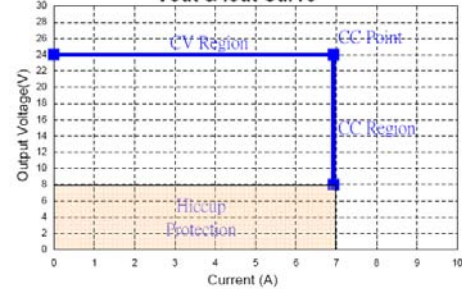
**WAF(D)150-24S12W
WAF(D)150-48S12W
Vout & Iout Curve**



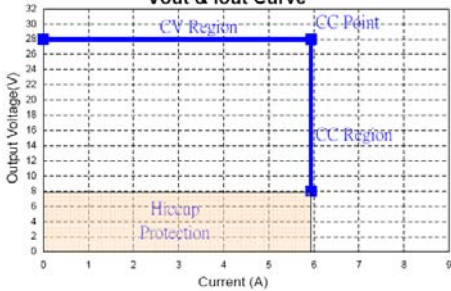
**WAF(D)150-24S15W
WAF(D)150-48S15W
Vout & Iout Curve**



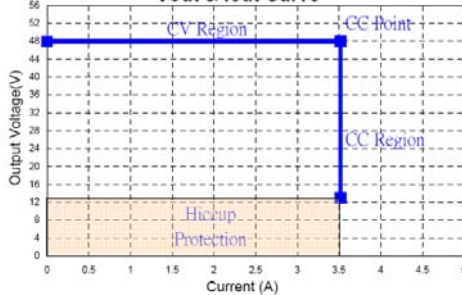
**WAF(D)150-24S24W
WAF(D)150-48S24W
Vout & Iout Curve**



**WAF(D)150-24S28W
WAF(D)150-48S28W
Vout & Iout Curve**



**WAF(D)150-24S48W
WAF(D)150-48S48W
Vout & Iout Curve**



Notes:

- CV Region: In normal operation. The output current in spec.
Condition: Resistance Load > Vout / Iout (CC Point)
- CC Region: If the output load current are over rating. The output current will keep in a constant value. And output voltage will fall.
Condition: Resistance Load < Vout / Iout (CC Point)
- Hiccup Protection: If the output resistance is become short. It will operate in hiccup protection.
Condition: Vout < 4.3V (typ.) to Output Short. (WAF(D)150-xxS12W,WAF(D)150-xxS15W)
Vout < 8.0V(typ.) to Output Short. (WAF(D)150-xxS24W,WAF(D)150-xxS28W)
Vout < 13V(typ.) to Output Short. (WAF(D)150-xxS48W)