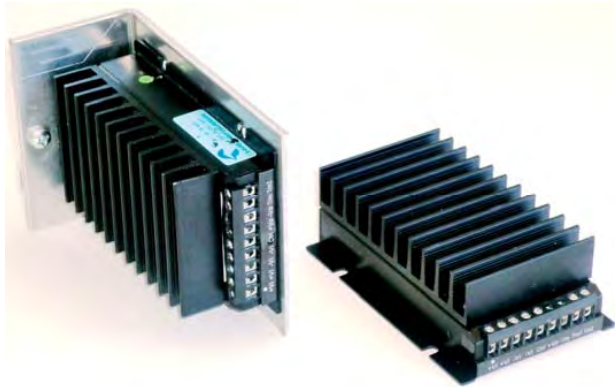


WAF150 SERIES

DC / DC Single Output: 150 Watts



DIN Rail -Option

STD-Panel Mount / 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 –HC or DIN Rail Mount option - DN
- EMC EN55022 Class A (Class B option)

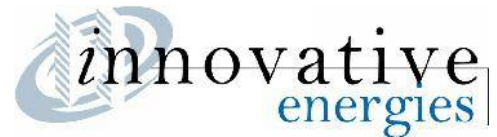
Specifications

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	DC-DC ON Open or $3.0V < V_r < 12V$ DC-DC OFF Short or $0V < V_r < 1.2V$
Positive Logic - Standard	
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. (note 9)
Short Circuit protection	Continuous hiccup 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)
Weight	225g
MTBF	1.353 x 10 5Hrs
Operating Temp	-40°C to +85°C (with derating) See derating graphs
	Note: Unit must be mounted on metal plate fro conduction cooling at maximum power.
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
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 SERIES

DC / DC Single Output: 150 Watts



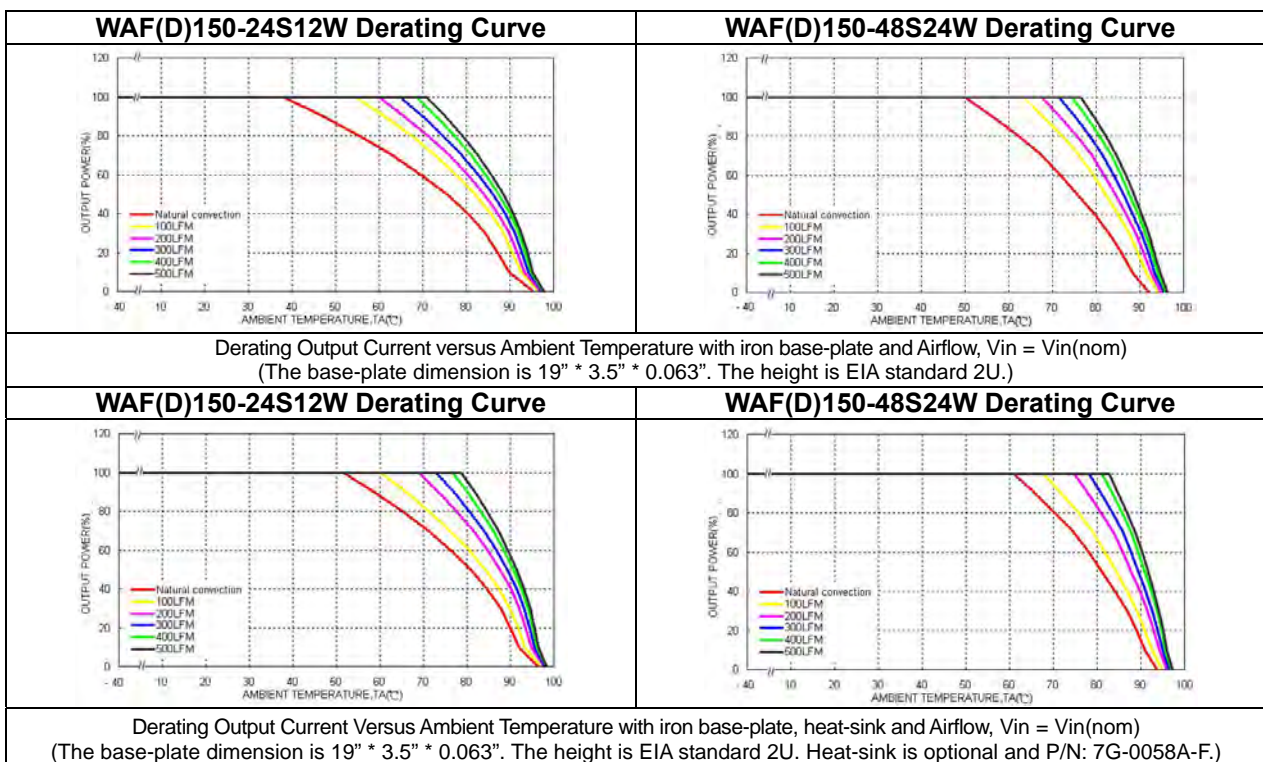
Model Number	Input Range	Output Voltage	Output Current		Output ⁽³⁾ Ripple & Noise	No load ⁽²⁾ Input Current	Eff ⁽³⁾ (%)	Capacitor ⁽⁴⁾ Load max.
			Min. load	Full load				
WAF150-24S12W-HC	9 ~ 36 V	12 V	0mA	12.5 A	100mVp-p	70mA	86	40000µF
WAF150-24S15W-HC	9 ~ 36 V	15 V	0mA	10 A	100mVp-p	80mA	86	26000µF
WAF150-24S24W-HC	9 ~ 36 V	24 V	0mA	6.3 A	200mVp-p	95mA	87	10000µF
WAF150-24S28W-HC	9 ~ 36 V	28 V	0mA	5.4 A	200mVp-p	120mA	87	7600µF
WAF150-24S48W-HC	9 ~ 36 V	48 V	0mA	3.2 A	350mVp-p	130mA	86	2600µF
WAF150-48S12W-HC	18 ~ 75 V	12 V	0mA	12.5 A	100mVp-p	50mA	87	40000µF
WAF150-48S15W-HC	18 ~ 75 V	15 V	0mA	10 A	100mVp-p	60mA	87	26000µF
WAF150-48S24W-HC	18 ~ 75 V	24 V	0mA	6.3 A	200mVp-p	60mA	88	10000µF
WAF150-48S28W-HC	18 ~ 75 V	28 V	0mA	5.4 A	200mVp-p	70mA	88	7600µF
WAF150-48S48W-HC	18 ~ 75 V	48 V	0mA	3.2 A	350mVp-p	70mA	87	2600µF

a) **WAF150-xxxx-HC** is standard / stock line model. b) **WAF150-xxxx-DN** optional DIN Rail mounting

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).
- Typical value at nominal input and no load.
- Typical value at nominal input and full load. (20MHZ BW.)
- Test by minimum input and constant resistive load.
- The CTRL 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: 24VDC input : Nippon chemi-con KY series, 470µF/50V, ESR 45mΩ. 48VDC input : Nippon chemi-con KY series, 220µF/100V, ESR 48mΩ.
- 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.
- Thermal test at WAF150 mount on the iron base-plate. (The iron base-plate dimension is 19" x 3.5"x 0.063" The height is EIA standard 2U.) Heat-sink is optional and P/N is "7G-0058A-F".

CAUTION: This power module is not internally fused, an input line fuse must always be used. If the load was having sourcing capability (Ex: Battery or Super Capacitor), an output line fuse must always be used.

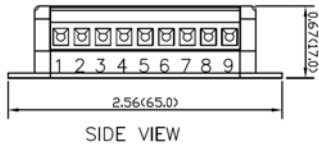
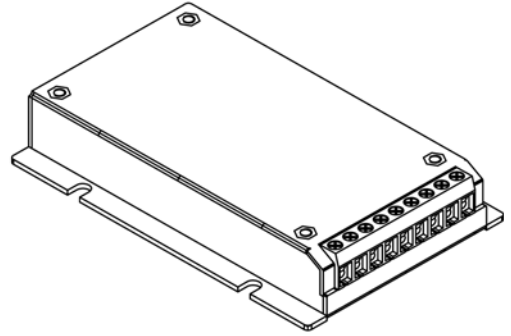
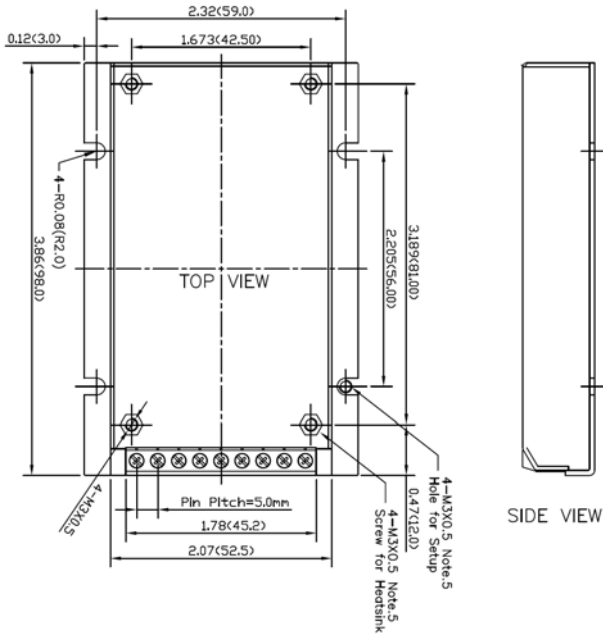


WAF150 SERIES

DC / DC Single Output: 150 Watts

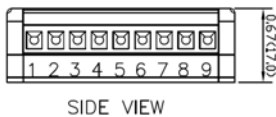
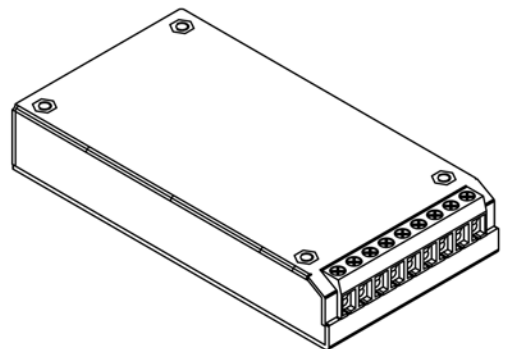
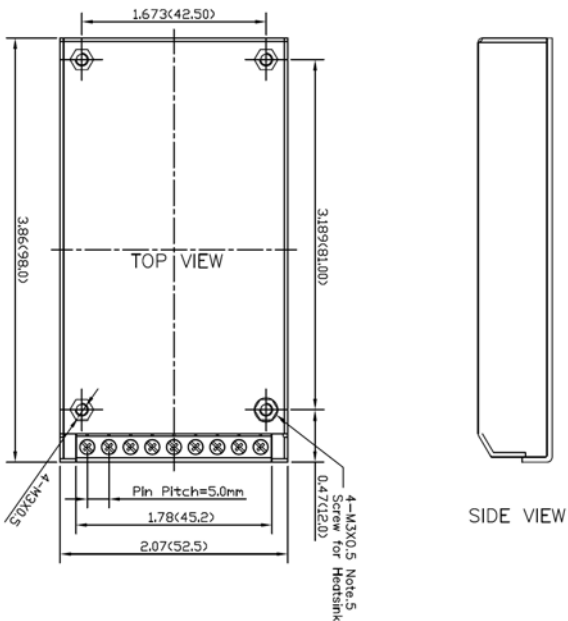
Mechanical Drawing:

WAF150 dimensions (standard model)



- Note: 1.All dimensions in Inches (mm)
 2.Pin pitch tolerance ± 0.25 mm
 3.Tolerance : $x.xx \pm 0.02$ ($x.x \pm 0.5$)
 $x.xxx \pm 0.01$ ($x.xx \pm 0.25$)
 4.Terminal Block Pin Pitch: 5.0mm
 5.The screw locked torque: MAX 0.49N.M (5.0kgf.cm)

WAD150 dimensions (optional) – no flanges



- Note: 1.All dimensions in Inches (mm)
 2.Pin pitch tolerance ± 0.25 mm
 3.Tolerance : $x.xx \pm 0.02$ ($x.x \pm 0.5$)
 $x.xxx \pm 0.01$ ($x.xx \pm 0.25$)
 4.Terminal Block Pin Pitch: 5.0mm
 5.The screw locked torque: MAX 0.49N.M (5.0kgf.cm)

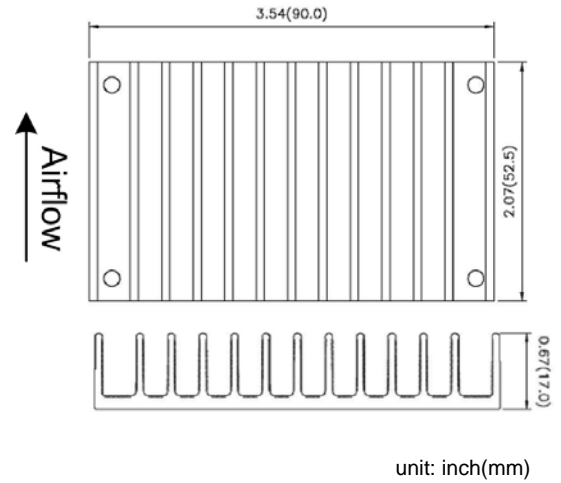
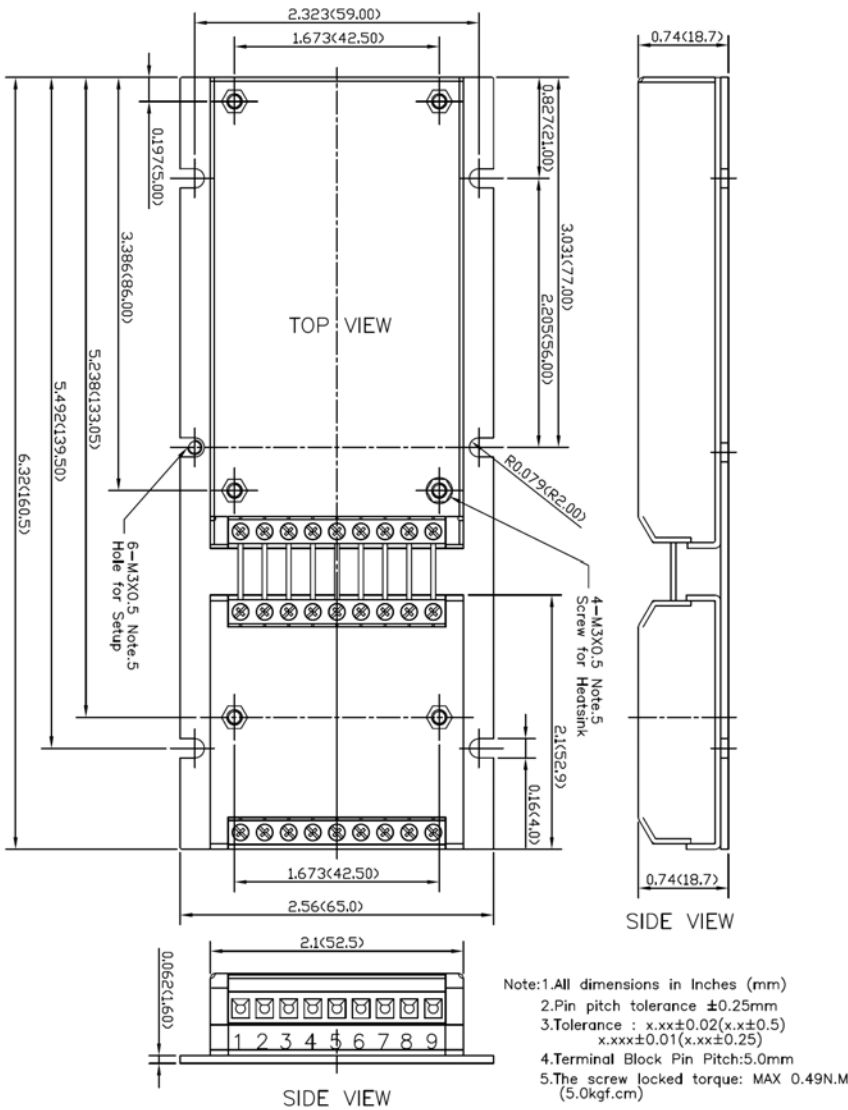
WAF150 SERIES

DC / DC Single Output: 150 Watts

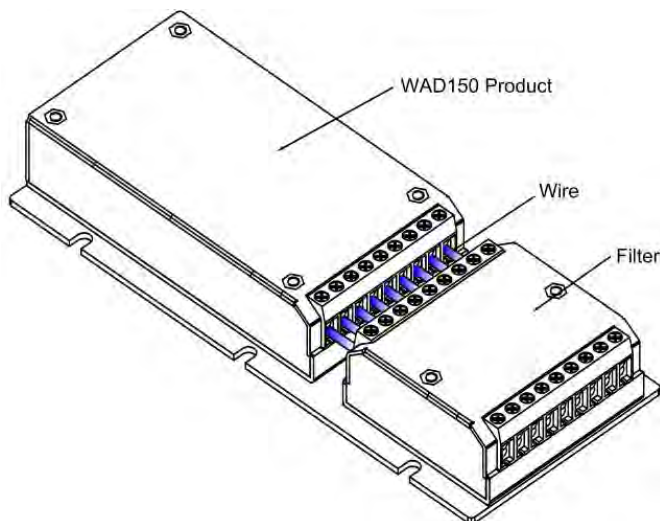
WAD150 with EN55022 class B Filter Module dimensions - Option

Heat-sink Type: 7G-0058A-F

Suffix:-HC

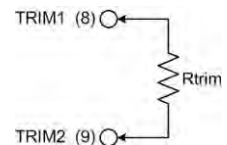


PIN CONNECTION			
PIN	Define	Recommend Matching Wire	Recommend Screwing Torque
1	+VIN	14~16AWG	0.25N.M(2.5kgf.cm)
2	+VIN	14~16AWG	0.25N.M(2.5kgf.cm)
3	-VIN	14~16AWG	0.25N.M(2.5kgf.cm)
4	-VIN	14~16AWG	0.25N.M(2.5kgf.cm)
5	CTRL	14~24AWG	0.25N.M(2.5kgf.cm)
6	+VOUT	14~16AWG	0.25N.M(2.5kgf.cm)
7	-VOUT	14~16AWG	0.25N.M(2.5kgf.cm)
8	TRIM 1	14~24AWG	0.25N.M(2.5kgf.cm)
9	TRIM 2	14~24AWG	0.25N.M(2.5kgf.cm)



EXTERNAL OUTPUT TRIMMING

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



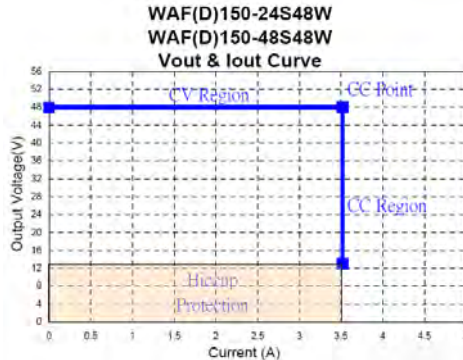
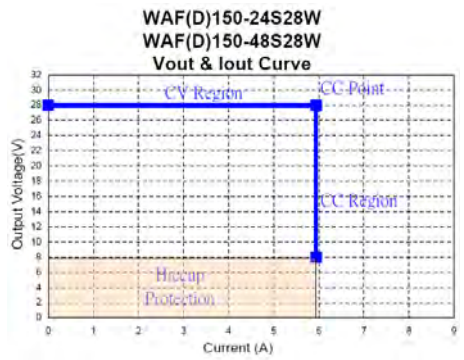
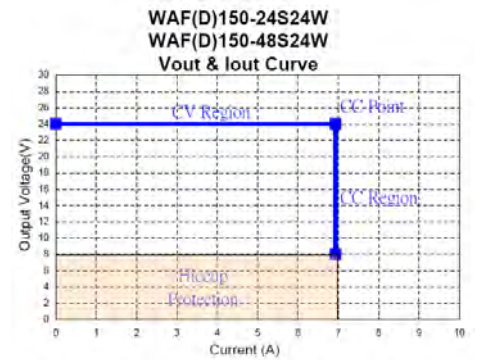
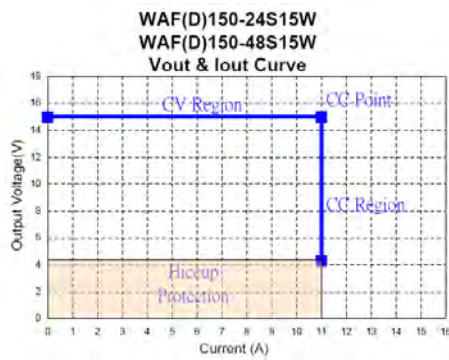
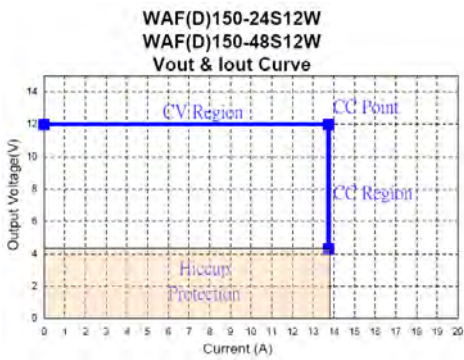
WAF150 SERIES

DC / DC Single Output: 150 Watts

Part number structure:

WAF	150	-	48	S	12	W	-	N	F	HC
SERIES NAME	Output Power		Input Voltage	Output Quantity	Output Voltage	4:1 Input Range		Remote ON/OFF	EN55022 Class B Filter Module	HC: Top Heatsink DN: Din Rail
WAF WAD	150Watts		24: 9~36VDC 48:18~75VDC	S: Single	12: 12V 15: 15V 24: 24V 28: 28V 48: 48V			P: Positive logic: -- (standard) N: Negative logic:		

Note: The EN55022 Class B filter module (suffix –F) for WAD150 series adds only, not for WAF150 series. (Ex: WAD150-24S24W-F)



Note:

- 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)