

# HAE75W SERIES

DC / DC Single Output: 75 Watts



PCB Model

Terminal Block Model

## Features

- 4:1 wide Input range option 9~36V & 18~75V
- Single output, up to 15A
- Industry Standard Half-Brick package
- High efficiency up to 90%
- Regulated output & Short circuit protection
- 2250VDC isolation
- Five sided continuous copper shield
- Remote ON / OFF, Negative or Positive Logic
- High operating temperature +84°C
- Zero load operation
- External Output voltage trim
- Terminal block option -T ( see options )
- A range of heatsink options ( see options page )

## Specifications:

<b>Input Voltage</b>	<b>24VDC</b> ( 9 ~ 36 ) <b>48VDC</b> ( 18 ~ 75 )	<b>Efficiency</b>	Model dependant 86 ~ 88%
<b>Input Filter</b>	Pi type ( see note 15 )	<b>Isolation</b>	Input – Output: 2250VDC Input / Output – Case: 1600VDC
<b>Start-up Voltage</b>	24V input: 8.5V typ. 48V input: 17.7V typ.	<b>Isolation Cap.</b>	2500pF
<b>Shutdown Voltage</b>	24V input: 7.5V typ. 48V input: 16V typ.	<b>Switching Freq.</b>	300KHz
<b>Input Surge Voltage.</b>	24V: 50VDC. 48V: 100VDC ( 100mS )	<b>Safety</b>	Designed to meet EN60950-1, UL60950-1
<b>Input Reverse Voltage Protection</b>	External input fuse required	<b>Case Material</b>	Metal
<b>Start Up time</b>	Typically 25mS constant resistive load	<b>Base Material</b>	FR4 PCB
<b>Remote ON/OFF Negative Logic:</b>	DC-DC ON Short or $0V < V_r < 1.2V$ DC-DC OFF Open or $3.0V < V_r < 12V$	<b>Potting</b>	Epoxy UL94-V0
<b>Positive Logic: -P</b>	DC-DC ON Open or $3.0V < V_r < 12V$ DC-DC OFF Short or $0V < V_r < 1.2V$	<b>Dimensions</b>	61 X 57.9 X 12.7mm
	Input current of remote control pin: 0.5mA Remote off state input current: 3mA	<b>Weight</b>	97g
<b>Output power</b>	75 watts	<b>MTBF</b>	7.416 x 104Hrs
<b>Voltage Accuracy</b>	±1.0%	<b>Operating Temp</b>	-40°C to +85°C ( without derating ) +35°C to +84°C ( with derating ) See derating graphs
<b>Voltage Trim</b>	+10% to -20% External voltage trim	<b>Case Temp</b>	+105°C maximum base / case temperature
<b>Minim Load</b>	Zero	<b>Over Temp. Protection</b>	Shutdown approx 115°C case temperature
<b>Line Regulation</b>	See table	<b>Thermal Impedance</b>	6.7°C / watt without heatsink 5.4°C / watt with 0.24" height optional heatsink 4.7°C / watt with 0.45" height optional heatsink
<b>Load Regulation</b>	See table	<b>Thermal shock</b>	MIL-STD-810F
<b>Remote Sense</b>	10% of Vout nominal ( Note 8 )	<b>Vibration</b>	MIL-STD-810F
<b>Ripple &amp; noise</b>	See table. 20MHZ bandwidth	<b>Humidity</b>	5-95% RH
<b>Temp. Coefficient</b>	±0.02% / °C	<b>EMC</b>	EN55022 Class A ( see note 12 )
<b>Transient Response</b>	200uS ( 25% load step change )	<b>ESD</b>	EN61000-4-2 Air / Contact: ±8KV
<b>Over Voltage Protection</b>	Set at 110 ~130% of Voltage output nominal	<b>Radiated Immunity</b>	EN61000-4-3 10V /m
<b>Overload Protection</b>	Set at 110 ~ 150% of output load	<b>Fast Transients</b>	EN61000-4-4 ±2KV
<b>Short Circuit protection</b>	Continuous hicc-up mode	<b>Surge</b>	EN61000-4-5 ±1KV
		<b>Conducted Immunity</b>	EN61000-4-6

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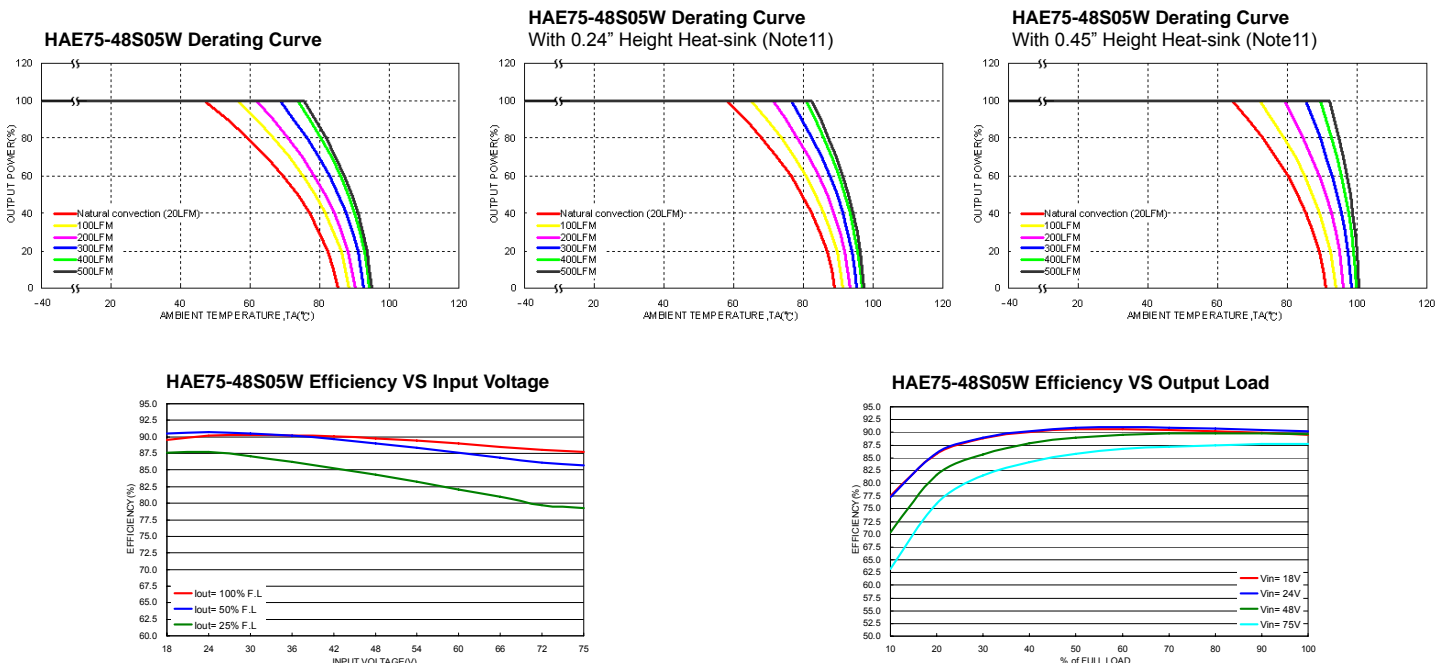
Model Number	Input Range	Output Voltage	Output Current		Output <sup>(3) (4)</sup> Ripple & Noise	No Load <sup>(2)</sup> Input Current	Eff <sup>(3)</sup> (%)	Capacitor <sup>(5)</sup> Load max.
			Min. load	Full load				
HAE75-24S3P3WP	9 ~ 36 V	3.3 V	0 mA	20 A	75 mVp-p	85mA	87	60600μF
HAE75-24S05WP	9 ~ 36 V	5 V	0 mA	15 A	75 mVp-p	120mA	88	30000μF
HAE75-24S12WP	9 ~ 36 V	12 V	0 mA	6.3 A	100 mVp-p	185mA	88	5250μF
HAE75-24S15WP	9 ~ 36 V	15 V	0 mA	5 A	100 mVp-p	185mA	88	3330μF
HAE75-24S24WP	9 ~ 36 V	24 V	0 mA	3.2 A	200 mVp-p	85mA	87	1330μF
HAE75-24S28WP	9 ~ 36 V	28 V	0 mA	2.7 A	200 mVp-p	85mA	87	960μF
HAE75-24S48WP	9 ~ 36 V	48 V	0 mA	1.6 A	300 mVp-p	85mA	87	330μF
HAE75-48S3P3WP	18 ~ 75 V	3.3 V	0 mA	20 A	75 mVp-p	60mA	88	60600μF
HAE75-48S05WP	18 ~ 75 V	5 V	0 mA	15 A	75 mVp-p	60mA	90	30000μF
HAE75-48S12WP	18 ~ 75 V	12 V	0 mA	6.3 A	100 mVp-p	90mA	90	5250μF
HAE75-48S15WP	18 ~ 75 V	15 V	0 mA	5 A	100 mVp-p	50mA	89	3330μF
HAE75-48S24WP	18 ~ 75 V	24 V	0 mA	3.2 A	200 mVp-p	50mA	88	1330μF
HAE75-48S28WP	18 ~ 75 V	28 V	0 mA	2.7 A	200 mVp-p	50mA	88	960μF
HAE75-48S48WP	18 ~ 75 V	48 V	0 mA	1.6 A	300 mVp-p	50mA	87	330μF

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Note

- BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40°C.  
MIL-HDBK-217F Notice2 @Ta=25°C, Full load(Ground, Benign, controlled environment).
- Typical value at nominal input and no load.
- Typical value at nominal input and full load.
- The ripple and noise of output voltage 48VDC is measured with a 2.2μF/100V X7R 1812 MLCC,  
The ripple and noise of other output voltage is measured with a 4.7μF/50V X7R 1812 MLCC.
- Test by minimum input and constant resistive load.
- The CTRL pin voltage is referenced to -INPUT. The positive logic and pin length are optional.  
To order positive logic ON-OFF control add the suffix -P (Ex: HAE75-48S05W-P).
- Output voltage is adjustable for 10% trim up or -20% trim down of nominal output voltage by connecting a single resistor between TRIM and +SENSE pins for trim up or between TRIM and -SENSE pins for trim down. To calculate the value of the resistor RU and RD for a particular output voltage uses the following equation:
 
$$R_U = \left( \frac{V_{OUT}(100 + \Delta\%)}{1.225\Delta\%} - \frac{(100 + 2\Delta\%)}{\Delta\%} \right) K\Omega$$

$$R_D = \left( \frac{100}{\Delta\%} - 2 \right) K\Omega$$
- Maximum output deviation is +10% inclusive of remote sense and trim. If remote sense is not being used, the +SENSE should be connected to its corresponding +OUTPUT and likewise the -SENSE should be connected to its corresponding -OUTPUT.
- CAUTION:** This power module is not internally fused. An input line fuse must always be used.
- Test condition with vertical direction by natural convection (20LFM).
- Heat-sink is optional and P/N: 7G-0021A-F, 7G-0022A-F, 7G-0023A-F, 7G-0024A-F.
- The HAE75W series meets EN 55022 Class A or Class B only with external components. For more detail information, please contact office.
- An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5.  
Recommended 1 pcs of aluminum electrolytic capacitor (Nippon Chemi-con KY series, 220μF/100V, ESR 48mΩ) to connect in parallel.
- CASE GROUNDING : When connect the case pin and four screw bolts to shield plane, the EMI could be reduced.
- An external input capacitor is recommended for 24VDC input model. P-DUKE suggest: 4.7μF/50V X7R MLCC or Nippon chemi-con KY series, 68μF /100V, ESR 110mΩ or better capacitor. For terminal block version, the capacitor has included in as standard, it isn't required external capacitor.



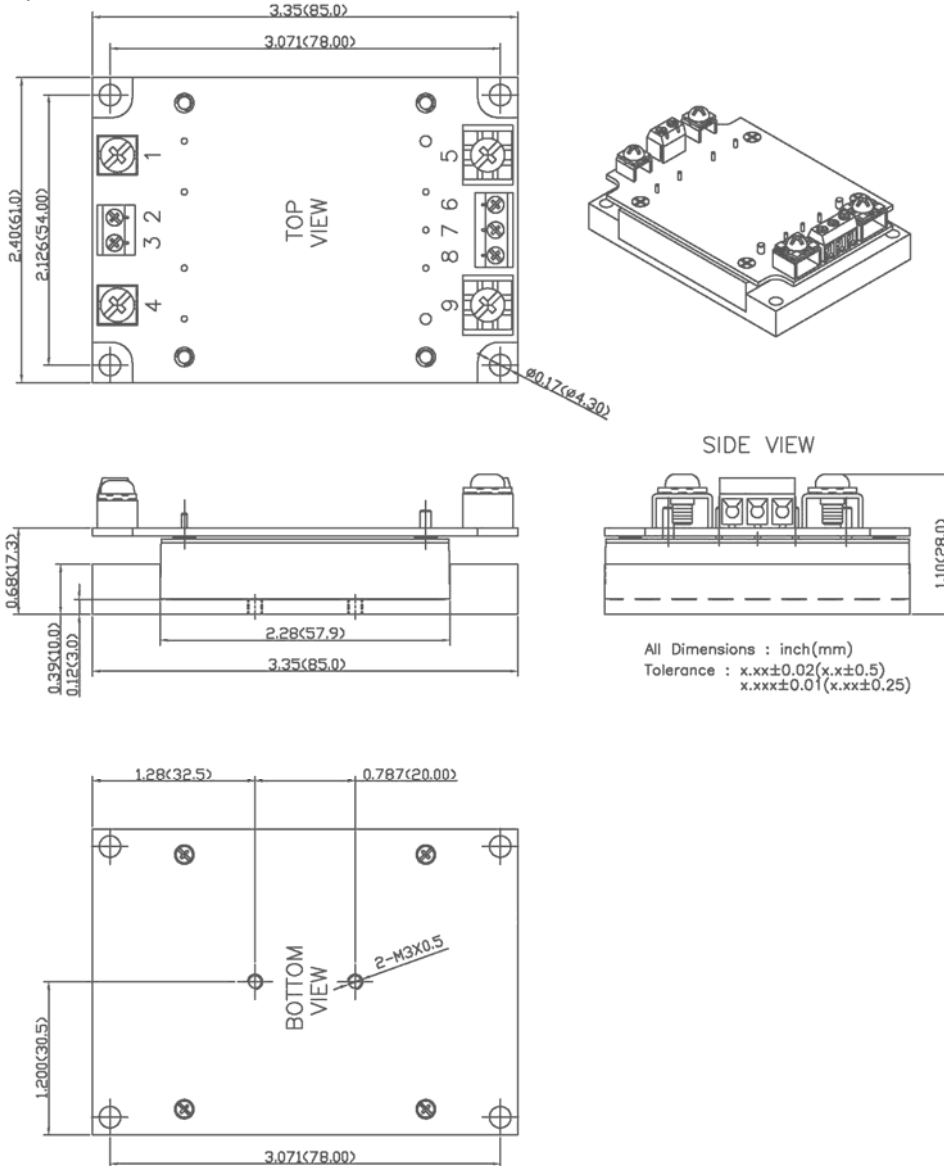


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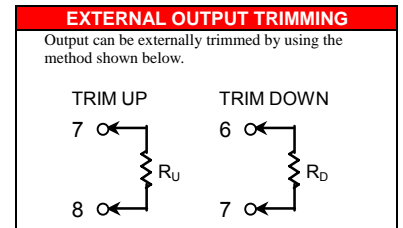
## Terminal Block Type:

### 1) Terminal Block without EMC Filter, Suffix: -T



All Dimensions : inch(mm)  
Tolerance : x.xx±0.02(x.x±0.5)  
              x.xxx±0.01(x.xx±0.25)

TERMINAL CONNECTION		
Terminal	Define	wire range
1	- INPUT	14 AWG to 16 AWG
2	CASE	14 AWG to 18 AWG
3	CTRL	14 AWG to 18 AWG
4	+ INPUT	14 AWG to 16 AWG
5	- OUTPUT	10 AWG to 12 AWG
6	- SENSE	14 AWG to 18 AWG
7	TRIM	14 AWG to 18 AWG
8	+ SENSE	14 AWG to 18 AWG
9	+ OUTPUT	10 AWG to 12 AWG

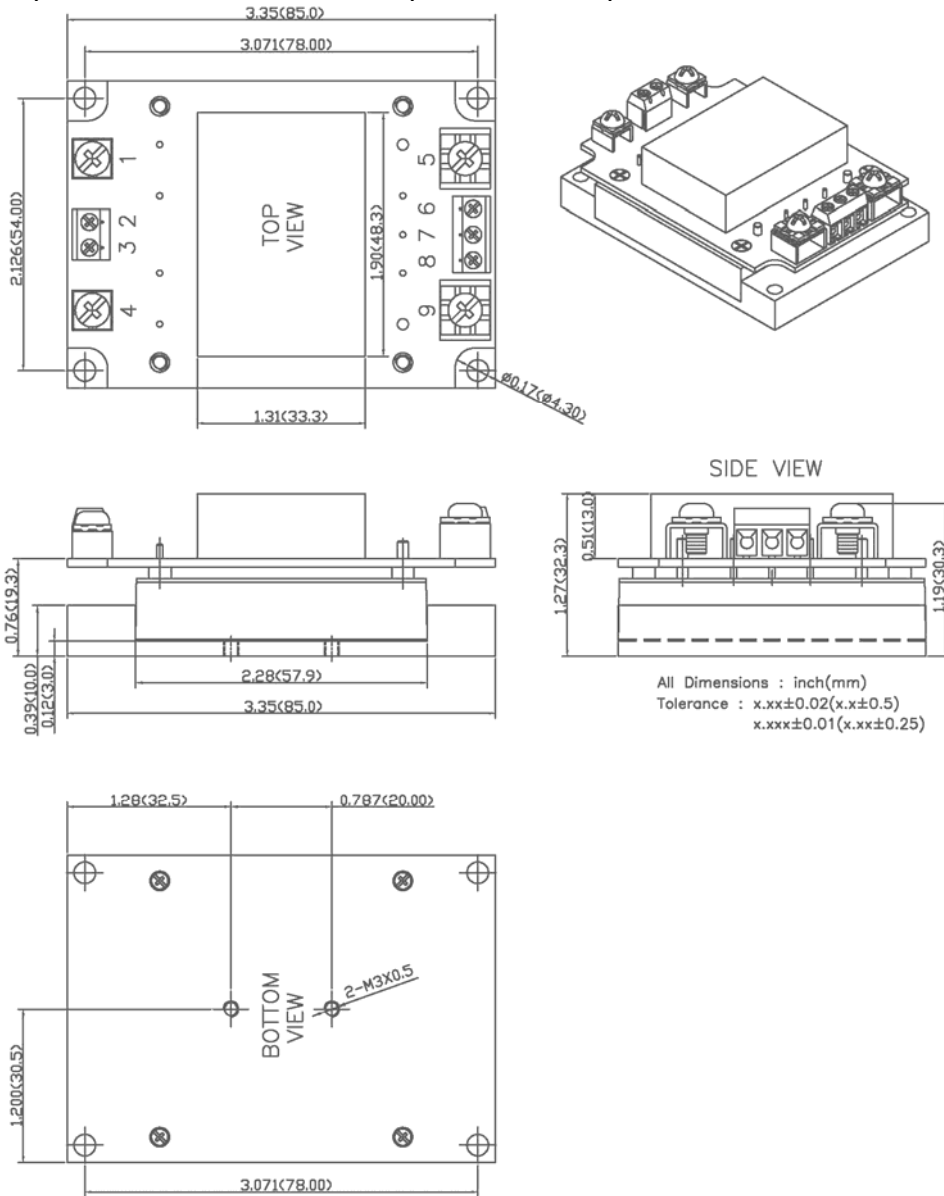


Note: These two M3×0.5 threaded holes are designed for Din Rail Clip assembly. The depth of heat-sink is allowed to be screwed into 2.8mm maximum. Customer shall take care as select the screw to avoid damaging the converter.

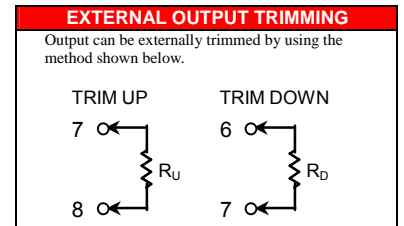
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## 2) Terminal Block with EMC Filter (EN55022 Class A), Suffix:-TF



TERMINAL CONNECTION		
Terminal	Define	wire range
1	- INPUT	14 AWG to 16 AWG
2	CASE	14 AWG to 18 AWG
3	CTRL	14 AWG to 18 AWG
4	+ INPUT	14 AWG to 16 AWG
5	- OUTPUT	10 AWG to 12 AWG
6	- SENSE	14 AWG to 18 AWG
7	TRIM	14 AWG to 18 AWG
8	+ SENSE	14 AWG to 18 AWG
9	+ OUTPUT	10 AWG to 12 AWG



Note: These two M3×0.5 threaded holes are designed for Din Rail Clip assembly. The depth of heat-sink is allowed to be screwed into 2.8mm maximum. Customer shall take care as select the screw to avoid damaging the converter.

## 3) Terminal Block with Din Rail Clip, Suffix: -TDR, -TFDR

