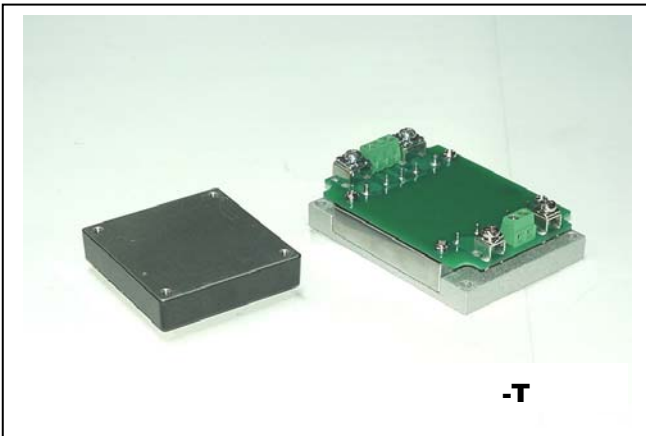


HAE100 SERIES

DC / DC Single Output: 100 Watts



Features

- 2:1 Input range option 18 ~36V & 36 ~75V
- Single output, up to 20A
- Industry Standard Half-Brick package
- High efficiency up to 93%
- Regulated output & Short circuit protection
- 2250V isolation
- Five sided continuous copper shield
- Remote ON / OFF, Negative or Positive Logic
- High operating temperature +84°C
- Zero load operation
- Output voltage trim
- Terminal block option –T
- A range of heatsink options

Specifications:

Input Voltage	24VDC (18 ~ 36) 48VDC (36 ~ 75)
Input Filter	Pi type
Start-up Voltage	24V input: 17.5V typ. 48V input: 35.5V typ.
Input Surge Voltage. (100mS)	24V: 50VDC. 48V: 100VDC
Input Reverse Voltage Protection	External input fuse required
Start Up time	Typically 25mS constant resistive load
Remote ON/OFF Negative Logic - Standard	DC-DC ON Short or 0V < Vr < 1.2V DC-DC OFF Open or 3.0V < Vr < 12V
(Positive Logic - Option)	DC-DC ON Open or 3.0V < Vr < 12V DC-DC OFF Short or 0V < Vr < 1.2V
	Input current of remote control pin: 0.5mA Remote off state input current: 3mA
Output power	100 watts
Voltage Accuracy	±1.0%
Voltage Trim	+10% to -20% External voltage trim
Minim Load	Zero
Line Regulation	See table
Load Regulation	See table
Remote Sense	10% of Vout nominal (Note 8)
Ripple & noise	See table. 20MHZ bandwidth
Temp. Coefficient	±0.02% / °C
Transient Response	200uS (25% load step change)
Over Voltage Protection	Set at 110 ~130% of Voltage output nominal
Overload Protection	Set at 110 ~ 140% of output load
Short Circuit protection	Continuous hiccup mode

Efficiency	Model dependant 92 ~ 93%
Isolation	Input – Output: 2250VDC Input / Output – Case: 1600VDC
Isolation Cap.	2500pF
Switching Freq.	300KHz
Safety	Designed to meet EN60950-1, UL60950-1
Case Material	Metal
Base Material	FR4 PCB
Potting	Epoxy UL94-V0
Dimensions	61 X 57.9 X 12.7mm
Weight	97g
MTBF	7.416 x 10 ⁴ Hrs
Operating Temp	-40°C to +45°C (without derating) +45°C to +79°C (with derating) See derating graphs
Case Temp	+105°C maximum case temperature
Over Temp. Protection	Shutdown approx 115°C case temperature
Thermal Impedance	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
Thermal shock	MIL-STD-810F
Vibration	MIL-STD-810F
Humidity	5-95% RH
EMC	EN55022 Class A (see note 12)
ESD	EN61000-4-2
Radiated Immunity	EN61000-4-3
Fast Transients	EN61000-4-4
Surge	EN61000-4-5
Conducted Immunity	EN61000-4-6

HAE100 SERIES

DC / DC Single Output: 100 Watts

Model Number	Input Range	Output Voltage	Output Current		Line Regulation	Load Regulation	Output ^{(4) (5)} Ripple & Noise	Input Current		Eff ⁽⁴⁾ (%)
			Min. load	Full load				No Load ⁽³⁾	Full Load ⁽²⁾	
HAE100-24S05	18 – 36 V	5 V	0mA	20 A	10mV	15mV	75mVp-p	185mA	4.554 A	93
HAE100-24S12	18 – 36 V	12 V	0mA	8.4 A	24mV	30mV	100mVp-p	185mA	4.590A	93
HAE100-24S15	18 – 36 V	15 V	0mA	6.7 A	30mV	38mV	100mVp-p	185mA	4.577 A	93
HAE100-24S24	18 – 36 V	24 V	0mA	4.2 A	48mV	48mV	200mVp-p	85mA	4.641A	92
HAE100-24S28	18 – 36 V	28 V	0mA	3.6 A	56mV	56mV	200mVp-p	85mA	4.641A	92
HAE100-24S48	18 – 36 V	48 V	0mA	2.1 A	96mV	72mV	300mVp-p	85mA	4.641A	92
HAE100-48S05	36 – 75 V	5 V	0mA	20 A	10mV	15mV	75mVp-p	90mA	2.277 A	93
HAE100-48S12	36 – 75 V	12 V	0mA	8.4 A	24mV	30mV	100mVp-p	90mA	2.295A	93
HAE100-48S15	36 – 75 V	15 V	0mA	6.7 A	30mV	38mV	100mVp-p	90mA	2.288 A	93
HAE100-48S24	36 – 75 V	24 V	0mA	4.2 A	48mV	48mV	200mVp-p	40mA	2.320A	92
HAE100-48S28	36 – 75 V	28 V	0mA	3.6 A	56mV	56mV	200mVp-p	40mA	2.320A	92
HAE100-48S48	36 – 75 V	48 V	0mA	2.1 A	96mV	72mV	300mVp-p	40mA	2.320A	92

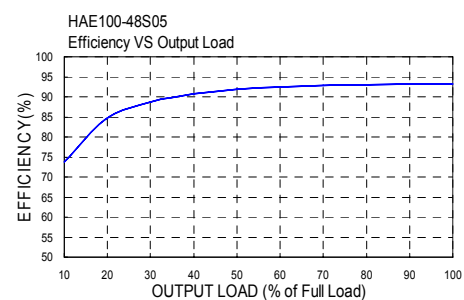
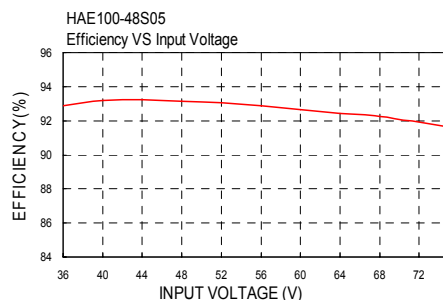
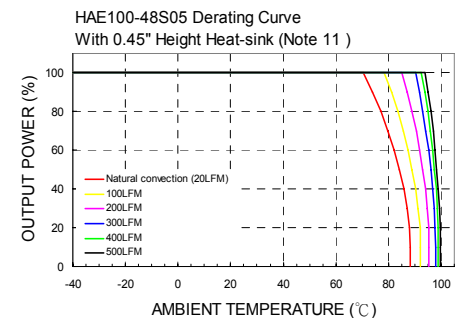
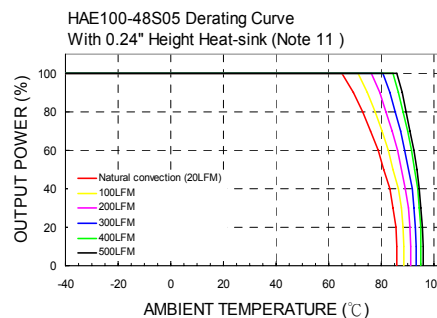
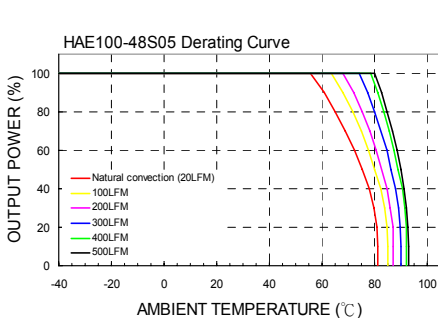
Note

- 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).
- 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.
- The ripple and noise of output voltage 48V is measured with a 2.2µF/100V X7R MLCC;
The ripple and noise of other output voltage is measured with a 4.7µF/50V X7R MLCC.
- The remote ON/OFF control pin voltage is referenced to -Vin. The positive logic and pin length (DIM.) are optional.
To order positive logic ON-OFF control add the suffix -P (Ex: HAE100-48S05-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:

$$R_U = \left(\frac{V_{OUT}(100 + \Delta\%)}{1.225\Delta\%} - \frac{(100 + 2\Delta\%)}{\Delta\%} \right) K\Omega$$

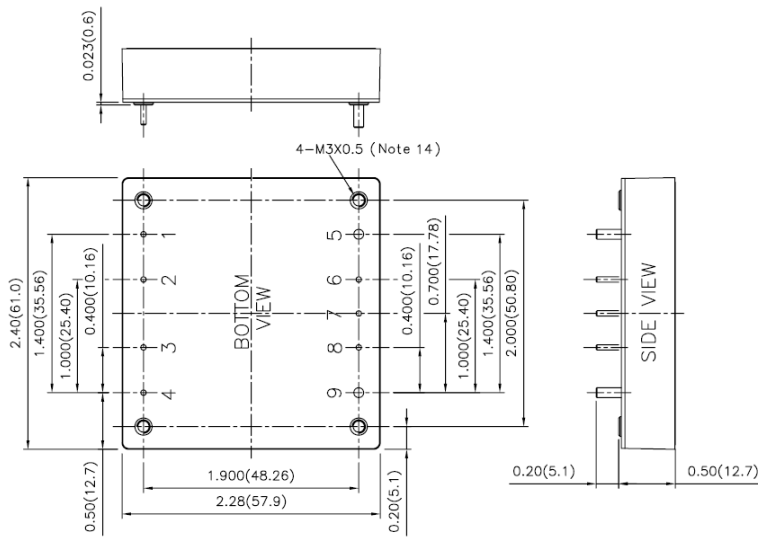
$$R_D = \left(\frac{100}{\Delta\%} - 2 \right) K\Omega$$

- Maximum output deviation is +10% inclusive of remote sense. 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.
- Internal fusing is not included, so we suggest to use an input line fuse.
- 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 HAE100 series meets EN55022 Class A only with external components connected before the input pin to the converter.
- 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: Nippon chemi-con KY series, 220µF /100V, ESR 48mΩ.
- CASE GROUNDING : When you connect the case pin and the four screw bolts to ground, the EMI could be better reduced.



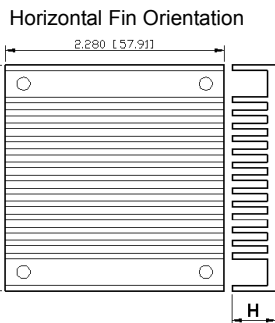
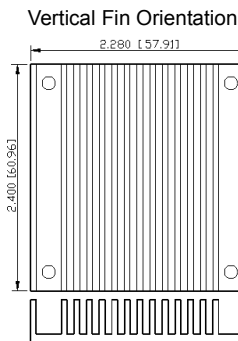
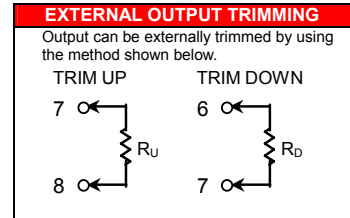
HAE100 SERIES

DC / DC Single Output: 100 Watts



PRODUCT OPTIONS TABLE	
Option	Suffix
Negative remote ON/OFF logic 0.20" pin length (standard)	-
Negative remote ON/OFF logic 0.145" pin length	-L
Negative remote ON/OFF logic 0.11" pin length	-K
Positive remote ON/OFF logic 0.20" pin length	-P
Positive remote ON/OFF logic 0.145" pin length	-S
Positive remote ON/OFF logic 0.11" pin length	-M

PIN CONNECTION		
PIN	Define	Diameter
1	- INPUT	0.04 Inches
2	CASE	0.04 Inches
3	CTRL	0.04 Inches
4	+ INPUT	0.04 Inches
5	- OUTPUT	0.08 Inches
6	- SENSE	0.04 Inches
7	TRIM	0.04 Inches
8	+ SENSE	0.04 Inches
9	+ OUTPUT	0.08 Inches



FIN ORIENTATION		P / N
Vertical	H=0.240(6.10)	7G-0023A-F
	H=0.450(11.43)	7G-0021A-F
Horizontal	H=0.240(6.10)	7G-0022A-F
	H=0.450(11.43)	7G-0024A-F

Option : Terminal Block (Suffix-T)

