

# QAE100W SERIES

DC / DC Converter Single Output: 100 Watts



## Features

- ◆ 4:1 wide Input range option 9~36V, 16~75V & 40~160V
- ◆ Rail **EN50155** compliance
- ◆ Single output options, 3.3 ~ 48vdc
- ◆ Industry Standard **quarter brick** package
- ◆ High efficiency up to 90%
- ◆ Regulated output & Short circuit protection
- ◆ 2250VDC isolation
- ◆ Remote ON / OFF, Negative or Positive Logic
- ◆ High operating base plate temperature : -40°to +100°C
- ◆ Zero load operation
- ◆ External Output voltage trim +10% to -20%
- ◆ A range of heatsink options ( see options page )

## Specifications:

<b>Input Voltage</b>	<b>24VDC</b> ( 9 ~ 36 ), <b>48VDC</b> ( 16.5 ~ 75 ) <b>110VDC</b> ( 40~160 )	
<b>Input Filter</b>	Pi type ( see note 1 )	
<b>Start-up Voltage</b>	24V input: 9V typ, 48V input: 18V typ. 110V input: 43V	
<b>Shutdown Voltage</b>	24V input: 7.3~8V, 48V input: 15.5~16.3V 110V input: 33~36V	
<b>Input Surge Voltage.</b>	24V: 50VDC. 48V: 100VDC ( 1 sec max ) 110V: 185VDC ( 1 sec max )	
<b>Input Reverse Voltage Protection</b>	External input fuse required	
<b>Start Up time</b>	Typically 75mS constant resistive load	
<b>Sync Pin</b>	N/A	
<b>Remote ON/OFF Negative Logic</b>	DC-DC ON	Short or 0V < Vr < 1.2V
	DC-DC OFF	Open or 3.0V < Vr < 12V
<b>( Positive Logic -P )</b>	DC-DC ON	Open or 3.0V < Vr < 12V
	DC-DC OFF	Short or 0V < Vr < 1.2V
	Input current of remote control pin: 0.5~1mA. Remote off state input current: 3mA	
<b>Output power</b>	100 watts	
<b>Voltage Accuracy</b>	±1.0%	
<b>Voltage Trim</b>	+10% to -20% External voltage trim	
<b>Minim Load</b>	Zero	
<b>Line Regulation</b>	±0.1%	
<b>Load Regulation</b>	±0.1%	
<b>Remote Sense</b>	10% of Vout nominal. If not used, SENSE pins should be connected to their respective polarity pins.	
<b>Ripple &amp; noise</b> (pk-pk)	With a 1µF/25V X7R MLCC & a 22µF/25V POS-CAP	3.3V& 5V 75mV
	With a 22µF/25V X7R MLCC & a 22µF/25V POS-CAP	12V&15V 100mV
	With a 4.7µF/50V X7R MLCC	24V&30V 200mV
	With a 2.2µF/100V X7R MLCC	48V 300mV
<b>Temp. Coefficient</b>	±0.02% / °C	
<b>Transient Response</b>	250uS ( 25% load step change )	
<b>Over Voltage Protection</b>	Set at 115 ~130% of Voltage output	

<b>Overload Protection</b>	Set at 110 ~ 140% of output load
<b>Short Circuit protection</b>	Continuous hiccup mode, auto recovery.
<b>Efficiency</b>	Model dependant 87 ~ 90%
<b>Isolation</b>	input-output 2250Vdc Input-output/case: 225Vdc
<b>Isolation Cap.</b>	1500pF
<b>Switching Freq.</b>	270 ~330kHz
<b>Safety</b>	EN60950-1, UL60950-1, EN50155.
<b>Case Material</b>	Aluminium base with plastic case
<b>Base Material</b>	FR4 PCB ( 24 & 48V )
<b>Potting</b>	Epoxy UL94-V0
<b>Dimensions</b>	36.8 X 57.9 X 12.7mm
<b>Weight</b>	645g
<b>MTBF</b>	6.658 x 10 <sup>5</sup> Hrs ( MIL-HDBK-217F )
<b>Operating Base Plate Temp.</b>	-40°C to +100°C maximum base temperature
<b>Over Temp. Protection</b>	Shutdown approx 115°C base temperature
<b>Thermal Impedance.</b> <small>Note: 2)</small>	Vertical direction by natural convection (20LFM) Module without assembly option 9°C/W 2.8°C/W: Mount on 2U x 19in plate 7.1°C/W: Heat-sink type with 0.24" Height 5.5°C/W: Heat-sink type with 0.5" Height
<b>Thermal shock</b>	MIL-STD-810F & EN61373
<b>Vibration</b>	MIL-STD-810F & EN61373
<b>Humidity</b>	5-95% RH
<b>EMC</b> <small>(Note 3)</small>	EN55011, EN55022 Class A / Class B
<b>ESD</b>	EN61000-4-2 ±8KV Air ±6KV Contact
<b>Radiated Immunity</b>	EN61000-4-3 20V/m
<b>Fast Transients</b>	EN61000-4-4 ±2kV
<b>Surge</b>	EN61000-4-5 EN55024 ±2kV and EN50155 ±2kV
<b>Conducted Immunity</b>	EN61000-4-6 10V.r.m.s

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Model Number	Input V	Output V	Output Current @Full Load	Input Current @ No Load	Efficiency %	Max. Capacitor Load $\mu$ F
QAE100-24S3P3WP	8.5 ~ 36V	3.3V	25A	25mA	88	75000
QAE100-24S05WP	8.5 ~ 36V	5V	18A	25 mA	89	36000
QAE100-24S12WP	8.5 ~ 36V	12V	7.5A	25 mA	89	6250
QAE100-24S15WP	8.5 ~ 36V	15V	6A	25 mA	89	4000
QAE100-24S24WP	8.5 ~ 36V	24V	3.7A	25 mA	89	1540
QAE100-24S30WP	8.5 ~ 36V	30V	3A	25 mA	89	1000
QAE100-24S48WP	8.5 ~ 36V	48V	1.8A	25 mA	88	380
QAE100-48S3P3WP	16.5 ~ 75V	3.3V	25A	15 mA	88	75000
QAE100-48S05WP	16.5 ~ 75V	5V	18A	15 mA	89	36000
QAE100-48S12WP	16.5 ~ 75V	12V	7.5A	15 mA	89	6250
QAE100-48S15WP	16.5 ~ 75V	15V	6A	15 mA	90	4000
QAE100-48S24WP	16.5 ~ 75V	24V	3.7A	15 mA	90	1540
QAE100-48S30WP	16.5 ~ 75V	30V	3A	15 mA	90	1000
QAE100-48S48WP	16.5 ~ 75V	48V	1.8A	15 mA	90	380
QAE100-110S3P3WP	40 ~ 160V	3.3V	23A	8 mA	88	70000
QAE100-110S05WP	40 ~ 160V	5V	17A	8 mA	89	34000
QAE100-110S12WP	40 ~ 160V	12V	7A	8 mA	89	5830
QAE100-110S15WP	40 ~ 160V	15V	5.5A	8 mA	89	3670
QAE100-110S24WP	40 ~ 160V	24V	3.5A	8 mA	89	1460
QAE100-110S30WP	40 ~ 160V	30V	2.8A	8 mA	89	930
QAE100-110S48WP	40 ~ 160V	48V	1.8A	8 mA	89	380

## Notes:

- Input source impedance: The power modules will operate as specifications without external components, assuming that the source voltage has a very low impedance and reasonable input voltage regulation. Highly inductive source impedances can affect the stability of the power module. Since real-world voltage source has finite impedance, performance can be improved by adding external filter capacitor.  
The QAE100-24SXXW and QAE100-48SXXW recommended Nippon Chemi-con KY series, 100 $\mu$ F/100V.  
The QAE100-110SXXW recommended Ruby-con BXF series, 39 $\mu$ F/200V.
- The heat-sink is optional and P/N: 7G-0029A-F , 7G-0030A-F , 7G-0031A-F , 7G-0032A-F. Please refer to heat-sink selection guide.
- The QAE100W series standard module meets EMI Class A or Class B only with external components. For more detail information, please contact sales office.
- An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5.  
The QAE100-24SXXW and QAE100-48SXXW recommended 2 pcs of aluminum electrolytic capacitor (Nippon chemi-con KY series, 220 $\mu$ F/100V) to connect in parallel.  
The QAE100-110SXXW recommended 3 pcs of aluminum electrolytic capacitor (Ruby-con BXF series, 100 $\mu$ F/250V) to connect in parallel.
- BASE-PLATE GROUNDING: When connect two screw bolts to shield plane, EMI could be reduced.

**CAUTION:** This power module is not internally fused. An input line fuse must always be used.

## Model Selection

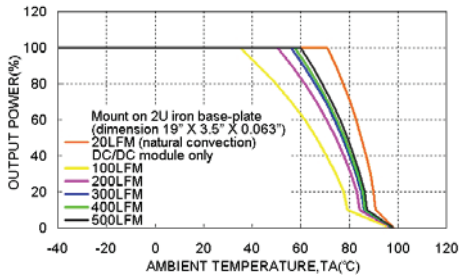
Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Input Range	Ctrl and Pin Options	Heat-sink and Mounting Hole Tread Options
QAE100 - 48 S 05 W - P HS	24: 8.5~36 48: 16.5~75 110: 40~160	S:Single	3P3:3.3 05:5 12:12 15:15 24:24 30:30 48:48	4:1	<input type="checkbox"/> : Negative logic <input type="checkbox"/> : Positive logic	<input type="checkbox"/> : NC HS: H=0.24" Horizontal, 7G-0029A-F HS1: H=0.5" Horizontal, 7G-0030A-F HS2: H=0.24" Vertical, 7G-0031A-F HS3: H=0.5" Vertical, 7G-0032A-F TH: Through hole (No thread) <sup>(1)</sup>

(1) The module can't equip Heat-sink with TH option.

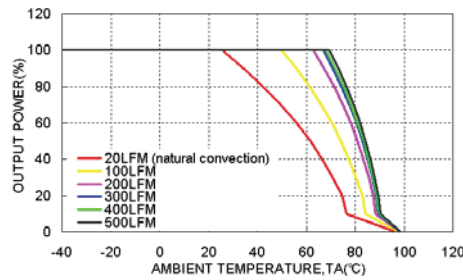
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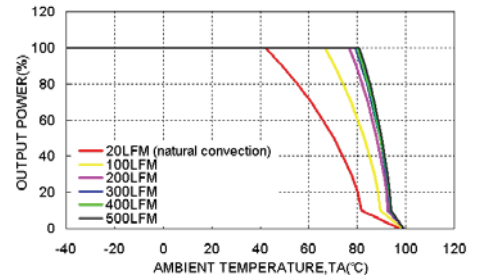
## Characteristic Curves



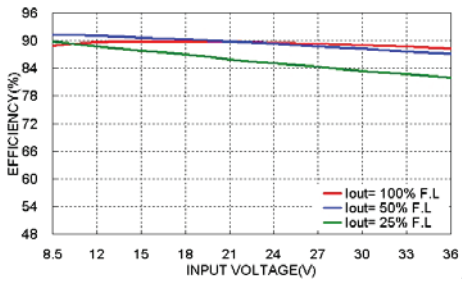
QAE100-24S05W Derating Curve



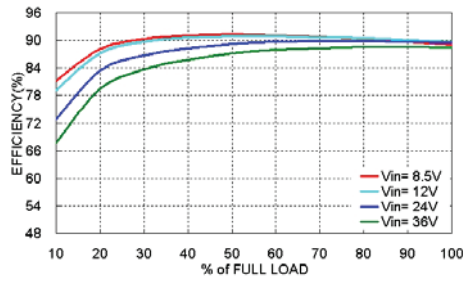
QAE100-24S05W Derating Curve  
With 0.24" Height Heat-sink



QAE100-24S05W Derating Curve  
With 0.5" Height Heat-sink



QAE100-24S05W Efficiency VS Input Voltage

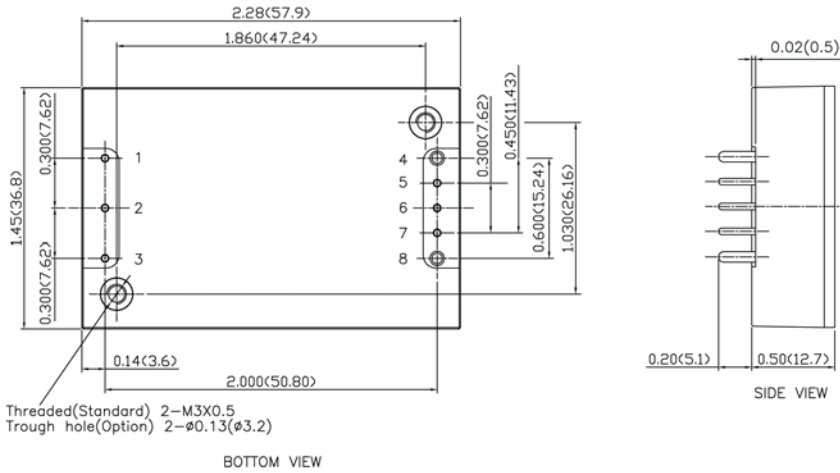


QAE100-24S05W Efficiency VS Output Load

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## Mechanical Drawings.



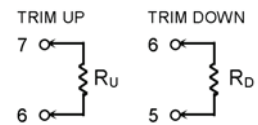
1. All dimensions in inch (mm)
2. Tolerance :x.xx±0.02 (x.x±0.5)  
x.xxx±0.01 (x.xx±0.25)
3. Pin pitch tolerance ±0.01 (0.25)
4. Pin dimension tolerance ±0.004(0.1)

### PIN CONNECTION

PIN	DEFINE	DIAMETER
1	- INPUT	0.04 Inch
2	CTRL	0.04 Inch
3	+ INPUT	0.04 Inch
4	- OUTPUT	0.06 Inch
5	- SENSE	0.04 Inch
6	TRIM	0.04 Inch
7	+ SENSE	0.04 Inch
8	+ OUTPUT	0.06 Inch

### EXTERNAL OUTPUT TRIMMING

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

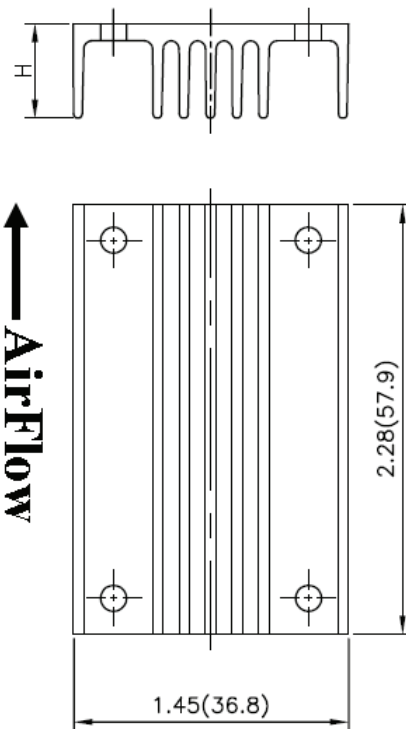


$$R_U = \frac{5.11V_{OUT} - 100}{1.225\Delta\%} \Delta\% = \frac{511}{10.22\Delta\%} \Delta\% \text{ k}\Omega$$

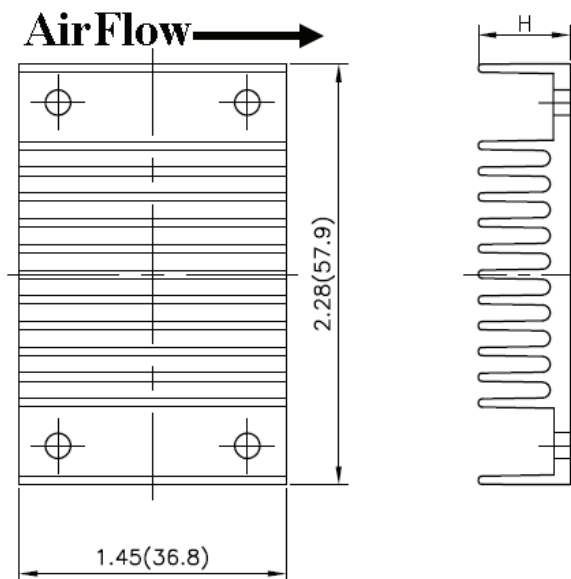
$$R_D = \frac{511}{\Delta\%} 10.22 \text{ k}\Omega$$

## Heat-Sink Options.

Vertical Fin Orientation, Suffix:-HS2, -HS3



Horizontal Fin Orientation, Suffix:-HS, -HS1



1. All dimensions in inch (mm)
2. Tolerance :x.xx±0.02 (x.x±0.5)