QAE100W SERIES

DC / DC Converter Single Output: 100 Watts

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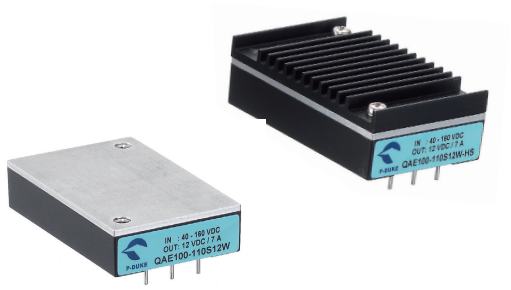

Features

- 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 : -40ºto +100ºC
- Zero load operation
- External Output voltage trim +10% to -20%
- A range of heatsink options (see options page)

Specifications:

Input Voltage	**24VDC** (9 ~ 36), **48VDC** (16.5 ~ 75) **110VDC** (40~160)
Input Filter	Pi type (see note 1)
Start-up Voltage	24V input: 9V typ, 48V input: 18V typ. 110V input: 43V
Shutdown Voltage	24V input:7.3~8V, 48V input: 15.5~16.3V 110V input: 33~36V
Input Surge Voltage.	24V: 50VDC. 48V: 100VDC (1 sec max) 110V: 185VDC (1 sec max)
Input Reverse Voltage Protection	External input fuse required
Start Up time	Typically 75mS constant resistive load
Sync Pin	N/A
Remote ON/OFF Negative Logic	DC-DC ON Short or 0V < Vr < 1.2V DC-DC OFF Open or 3.0V < Vr < 12V
(Positive Logic **-P**)	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
Output power	100 watts
Voltage Accuracy	±1.0%
Voltage Trim	+10% to -20% External voltage trim
Minim Load	Zero
Line Regulation	±0.1%
Load Regulation	±0.1%
Remote Sense	10% of Vout nominal. If not used. SENSE pins should be connected to their respective polarity pins.
Ripple & noise (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
Temp. Coefficient	±0.02% / ºC
Transient Response	250uS (25% load step change)
Over Voltage Protection	Set at 115 ~130% of Voltage output
Overload Protection	Set at 110 ~ 140% of output load
Short Circuit protection	Continuous hiccup mode, auto recovery.
Efficiency	Model dependant 87 ~ 90%
Isolation	input-output 2250Vdc Input-output/case: 225Vdc
Isolation Cap.	1500pF
Switching Freq.	270 ~330kHz
Safety	EN60950-1, UL60950-1, EN50155.
Case Material	Aluminium base with plastic case
Base Material	FR4 PCB (24 & 48V)
Potting	Epoxy UL94-V0
Dimensions	36.8 X 57.9 X 12.7mm
Weight	645g
MTBF	6.658 x 10_5Hrs (MIL-HDBK-217F)
Operating Base Plate Temp.	-40ºC to +100ºC maximum base temperature
Over Temp. Protection	Shutdown approx 115ºC base temperature
Thermal Note: 2) **Impedance.**	Vertical direction by natural convection (20LFM) Module without assembly option 9ºC/W 2.8ºC/W: Mount on 2U x 19in plate 7.1ºC/W: Heat-sink type with 0.24" Height 5.5ºC/W: Heat-sink type with 0.5" Height
Thermal shock	MIL-STD-810F & EN61373
Vibration	MIL-STD-810F & EN61373
Humidity	5-95% RH
EMC (Note 3)	EN55011, EN55022 Class A / Class B
ESD	EN61000-4-2 ±8KV Air ±6KV Contact
Radiated Immunity	EN61000-4-3 20V/m
Fast Transients	EN61000-4-4 ±2kV
Surge	EN61000-4-5 EN55024 ±2kV and EN50155 ±2kV
Conducted Immunity	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 µF
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:

1. 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, 100µF/100V.

   The QAE100-110SXXW recommended Ruby-con BXF series, 39µF/200V.
2. 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.
3. The QAE100W series standard module meets EMI Class A or Class B only with external components. For more detail information, please contact sales office.
4. 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, 220µF/100V) to connect in parallel.

   The QAE100-110SXXW recommended 3 pcs of aluminum electrolytic capacitor (Ruby-con BXF series, 100µF/250V) to connect in parallel.
5. BASE-PLATE GROUNDING: When connect two screw bolts to shield plane, EMI could be reduced.

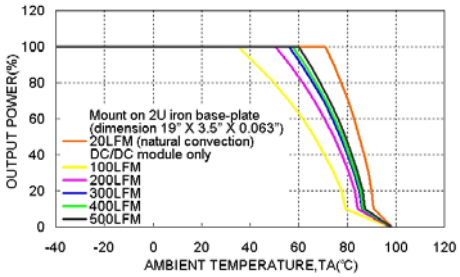
CAUTION: This power module is not internally fused. An input line fuse must always be used.

Model Selection

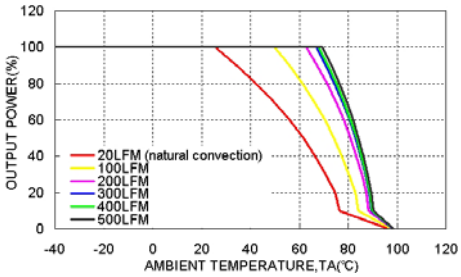
QAE100	- 48	S	05	W	- P	HS
Series Name	**Input Voltage (VDC)**	**Output Quantity**	**Output Voltage (VDC)**	**Input Range**	**Ctrl and Pin Options**	**Heat-sink and Mounting Hole Tread Options**
	24: 8.5~36 **48:** 16.5~75 **110:** 40~160	**S:**Single	**3P3:**3.3 **05:**5 **12:**12 **15:**15 **24:**24 **30:**30 **48:**48	4:1	**□:** Negative logic **P:** Positive logic	**□:** 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)(1)

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

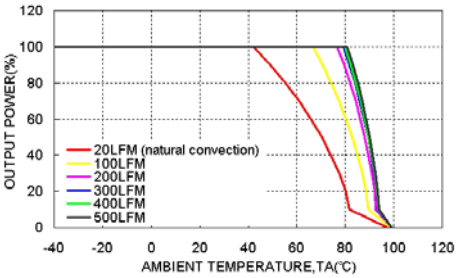
Characteristic Curves



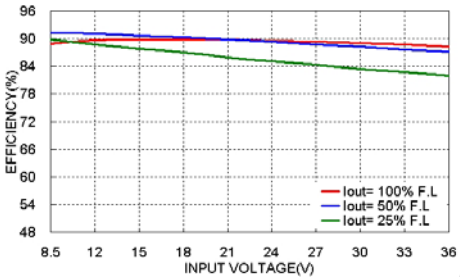
QAE100-24S05W Derating Curve



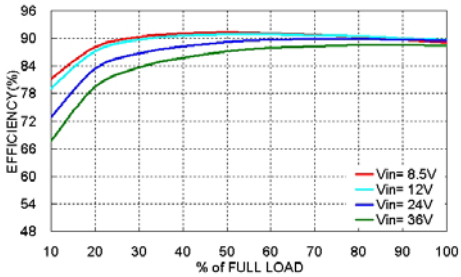
QAE100-24S05W Derating Curve
With 0.24" Height Heat-sink



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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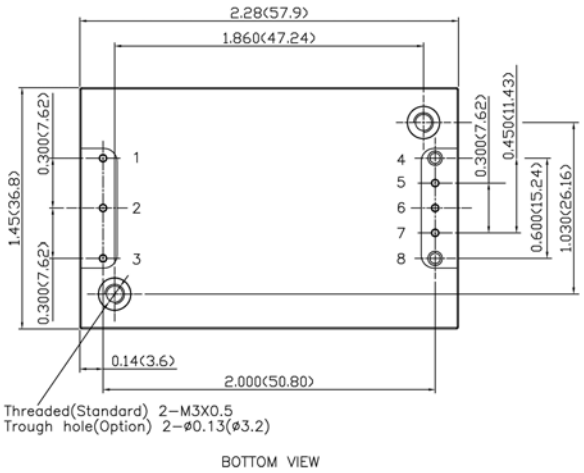
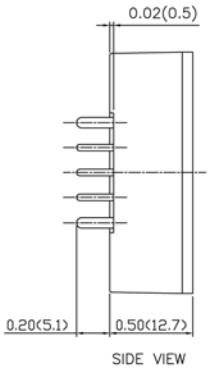
Mechanical Drawings.





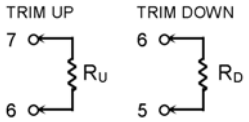
1. All dimensions in inch (mm)
2. Tolerance :x.xx±0.02 (x.x±0.5)
   x.xxx±0.01 (x.xx±0.25)
3. Pin pitch tolerance ±0.01 (0.25)
4. Pin dimension tolerance ±0.004(0.1)

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.

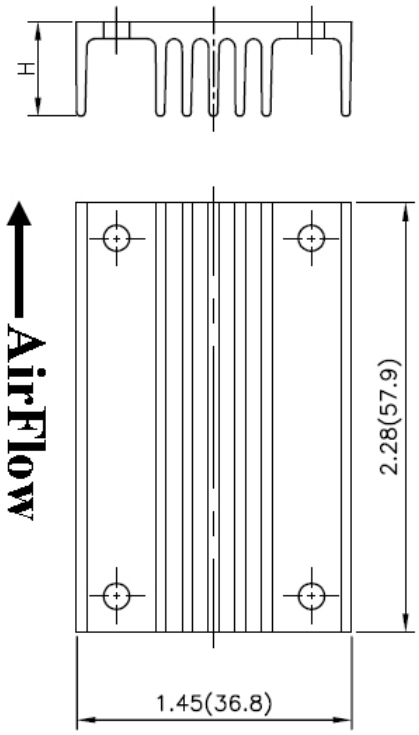


$$R_U = \left(\frac{5.11V_{OUT}(100+\Delta\%)}{1.225\Delta\%} - \frac{(511+10.22\Delta\%)}{\Delta\%} \right) k\Omega$$

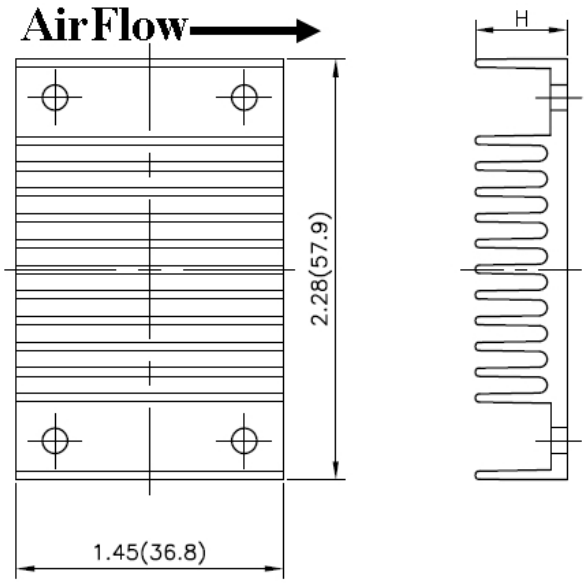
$$R_D = \left(\frac{511}{\Delta\%} - 10.22 \right) k\Omega$$

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)