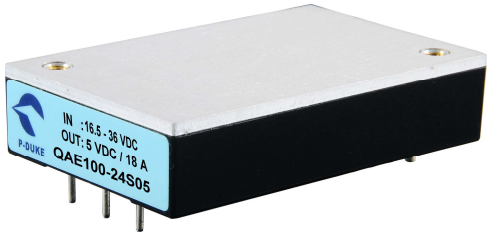
POWER MATE TECHNOLOGY CO., LTD.

QAE100 SERIES

QUARTER-BRICK DC-DC CONVERTER

2:1 ULTRA WIDE INPUT RANGE
UP TO 108Watts



FEATURES

- NO MINIMUM LOAD REQUIRED
- LOW STANDBY POWER CONSUMPTION
- 2250VDC INPUT TO OUTPUT BASIC INSULATION
- SAFETY MEETS UL60950-1, EN60950-1, & IEC60950-1
- CE MARKED
- COMPLIANT TO RoHS II & REACH

APPLICATIONS

- WIRELESS NETWORK
- TELECOM/DATACOM
- INDUSTRY CONTROL SYSTEM
- DISTRIBUTED POWER ARCHITECTURES
- SEMICONDUCTOR EQUIPMENT

2250VDC ISOLATION	REMOTE CONTROL	UVP	OCP	SCP	OVP	OTP	LOW STANDBY POWER

TECHNICAL SPECIFICATION All specifications are typical at nominal input, full load and 25℃ otherwise noted

Model Number	Input Range VDC	Output Voltage VDC	Output Current @Full Load A	Input Current @ No Load mA	Efficiency %	Maximum Capacitor Load μF
QAE100-12S3P3	8.5 ~ 22	3.3	25	50	89	75000
QAE100-12S05	8.5 ~ 22	5	18	50	90	36000
QAE100-12S12	8.5 ~ 22	12	7.5	50	91	6250
QAE100-12S15	8.5 ~ 22	15	6	50	91	4000
QAE100-12S24	8.5 ~ 22	24	3.7	50	90	1540
QAE100-12S30	8.5 ~ 22	30	3	50	90	1000
QAE100-12S48	8.5 ~ 22	48	1.8	50	89	380
QAE100-24S3P3	16.5 ~ 36	3.3	25	25	89	75000
QAE100-24S05	16.5 ~ 36	5	18	25	90	36000
QAE100-24S12	16.5 ~ 36	12	7.5	25	91	6250
QAE100-24S15	16.5 ~ 36	15	6	25	91	4000
QAE100-24S24	16.5 ~ 36	24	3.7	25	92	1540
QAE100-24S30	16.5 ~ 36	30	3	25	91	1000
QAE100-24S48	16.5 ~ 36	48	1.8	25	89	380
QAE100-48S3P3	33 ~ 75	3.3	25	15	89	75000
QAE100-48S05	33 ~ 75	5	21	15	91	42000
QAE100-48S12	33 ~ 75	12	9	15	90	7500
QAE100-48S15	33 ~ 75	15	7	15	91	4600
QAE100-48S24	33 ~ 75	24	4.5	15	93	1870
QAE100-48S30	33 ~ 75	30	3.5	15	92	1160
QAE100-48S48	33 ~ 75	48	2.2	15	91	460

PART NUMBER STRUCTURE

QAE100	-	48	S	05	-	P	HS
Series Name		**Input Voltage (VDC)**	**Output Quantity**	**Output Voltage (VDC)**		**Ctrl and Pin Options**	**Heat-sink and Mounting Hole Tread Options**
		12:8.5~22 **24:**16.5~36 **48:**33~75	**S:**Single	**3P3:**3.3 **05:**5 **12:**12 **15:**15 **24:**24 **30:**30 **48:**48		□: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.

INPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating input voltage range		12Vin(nom)	8.5	12	22	VDC
		24Vin(nom)	16.5	24	36	
		48Vin(nom)	33	48	75	
Start-up voltage		12Vin(nom)			9	VDC
		24Vin(nom)			18	
		48Vin(nom)			36	
Shutdown voltage		12Vin(nom)	7.3		8.1	VDC
		24Vin(nom)	15.5		16.3	
		48Vin(nom)	31.6		32.5	
Start up time	Constant resistive load	Power up		75	100	ms
		Remote ON/OFF		75	100	
Input surge voltage	1 second, max.	12Vin(nom)			30	VDC
		24Vin(nom)			50	
		48Vin(nom)			100	
Input filter (1)				Pi type		
Remote ON/OFF	Referred to –Vin pin	Negative logic (Standard) DC-DC ON		Short or 0 ~ 1.2 VDC		
		Negative logic (Standard) DC-DC OFF		Open or 3 ~ 12 VDC		
		Positive logic (Option) DC-DC ON		Open or 3 ~ 12 VDC		
		Positive logic (Option) DC-DC OFF		Short or 0 ~ 1.2 VDC		
		Input current of Ctrl pin	-0.5		1	mA
		Remote off input current		3		mA

OUTPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Voltage accuracy			-1.0		+1.0	%
Line regulation	Low Line to High Line at Full Load		-0.1		+0.1	%
Load regulation	No Load to Full Load	3.3 & 5Vout	-0.2		+0.2	%
		Others	-0.1		+0.1	
Voltage adjustability	Maximum output deviation is inclusive of remote sense		-20		+10	%
Remote sense	% of Vout(nom). If remote sense is not being used, sense pins should connect to the output pins with the same polarity.				10	%
Ripple and noise	Measured by 20MHz bandwidth					
	With a 22μF/25V X7R MLCC	3.3Vout, 5Vout		75		mVp-p
	With a 22μF/25V X7R MLCC	12Vout, 15Vout		100		
	With a 4.7μF/50V X7R MLCC	24Vout, 30Vout		200		
	With a 2.2μF/100V X7R MLCC	48Vout		300		
Temperature coefficient			-0.02		+0.02	%/℃
Transient response recovery time	25% load step change			250		μs
Over voltage protection	% of Vout(nom); Hiccup mode		115		130	%
Over load protection	% of Iout rated; Hiccup mode		110		140	%
Short circuit protection				Continuous, automatics recovery		

GENERAL SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Isolation voltage	1 minute (Basic insulation)	Input to Output	2250			VDC
		Input (Output) to Base-Plate	2250			
Isolation resistance	500VDC		1			GΩ
Isolation capacitance					1500	pF
Switching frequency			270	300	330	kHz
Safety meets						UL60950-1 EN60950-1 IEC60950-1
Case material						Aluminum base-plate with plastic case
Potting material						Silicone (UL94 V-0)
Weight						64g (2.26oz)
MTBF	MIL-HDBK-217F, Full load					3.873 x 10^5 hrs

ENVIRONMENTAL SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating base-plate temperature			-40		+100	℃
Over temperature protection				+110		℃
Storage temperature range			-55		+125	℃
Thermal impedance (2)	Vertical direction by natural convection (20LFM)	Without Heat-sink Mount on 2U iron base-plate With 0.24" Height Heat-sink With 0.5" Height Heat-sink		9 2.8 7.1 5.5		℃/W
Thermal shock						MIL-STD-810F
Vibration						MIL-STD-810F
Relative humidity						5% to 95% RH

EMC SPECIFICATIONS

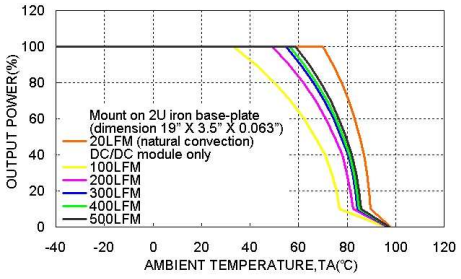
Parameter	Conditions		Level
EMI (3)	EN55022		Class A Class B
ESD	EN61000-4-2	Air ± 8kV Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3	20 V/m	Perf. Criteria A
Fast transient (4)	EN61000-4-4	± 2kV	Perf. Criteria A
Surge (4)	EN61000-4-5	EN55024:±2kV	Perf. Criteria A
Conducted immunity	EN61000-4-6	10 Vr.m.s	Perf. Criteria A

Note:

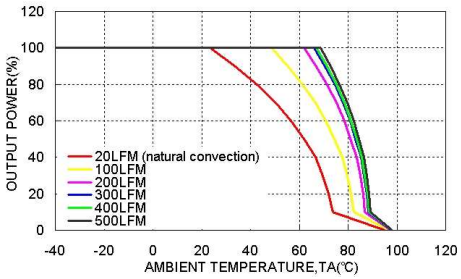
1. Input source impedance: The power modules will operate as specifications without external components, assuming that the source voltage has a very low impedance and reasonable input voltage regulation. Highly inductive source impedances can affect the stability of the power module. Since real-world voltage source has finite impedance, performance can be improved by adding external filter capacitor. Recommended Nippon Chemi-con KY series, 100μF/100V.
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 standard modules meet EMI Class A or Class B with external components. For further information, please contact with P-DUKE.
4. An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. Recommended 2 pcs of aluminum electrolytic capacitor (Nippon chemi-con KY series, 220μF/100V) to connect in parallel.
5. BASE-PLATE GROUNDING: When connect two screw bolts to shield plane, the EMI could be reduced.

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

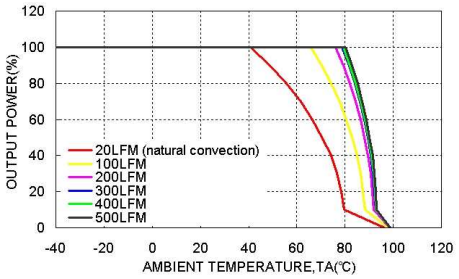
CHARACTERISTIC CURVE



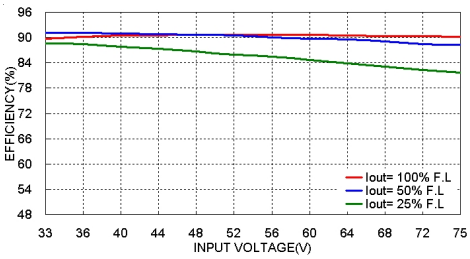
QAE100-48S05 Derating Curve



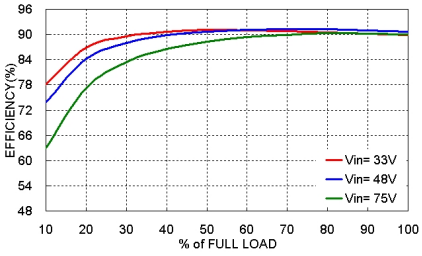
QAE100-48S05 Derating Curve
With 0.24" Height Heat-sink



QAE100-48S05 Derating Curve
With 0.5" Height Heat-sink

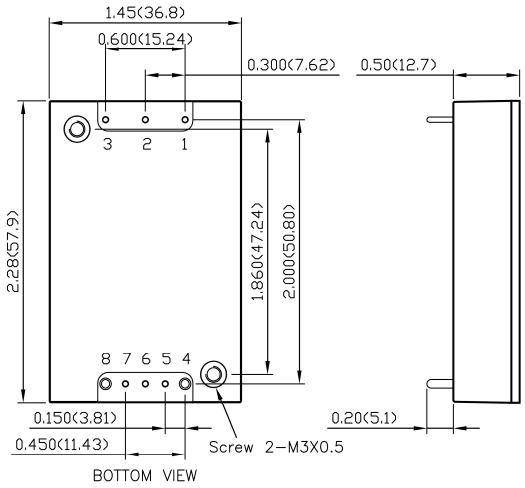


QAE100-48S05 Efficiency vs. Input Voltage



QAE100-48S05 Efficiency vs. Output Load

MECHANICAL DRAWING



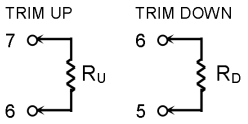
1. All dimensions in inch (mm)
2. Tolerance :x.xx±0.02 (x.x±0.5)
   x.xxx±0.01 (x.xx±0.25)
3. Pin pitch tolerance ±0.01 (0.25)
4. Pin dimension tolerance ±0.004(0.1)
5. The screw locked torque:
   MAX 3.5kgf-cm (0.34N-m)

PIN CONNECTION

PIN	DEFINE	DIAMETER
1	- Vin	0.04 Inch
2	Ctrl	0.04 Inch
3	+ Vin	0.04 Inch
4	- Vout	0.06 Inch
5	- Sense	0.04 Inch
6	Trim	0.04 Inch
7	+ Sense	0.04 Inch
8	+ Vout	0.06 Inch

EXTERNAL OUTPUT TRIMMING

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

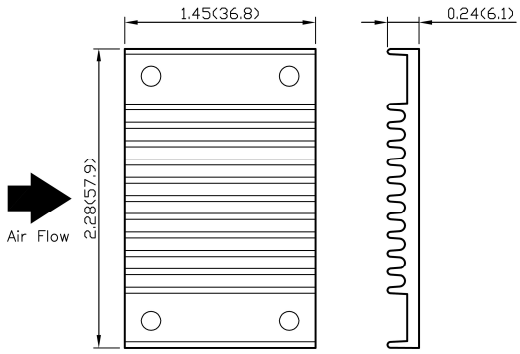


$$R_U = \left(\frac{5.11V_{OUT}(100+\Delta\%)}{1.225\Delta\%} - \frac{(511+10.22\Delta\%)}{\Delta\%}\right)k\Omega$$

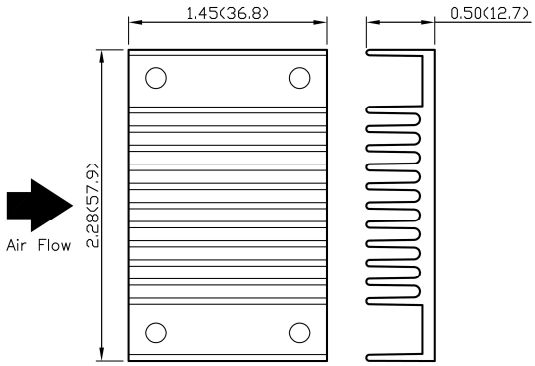
$$R_D = \left(\frac{511}{\Delta\%} - 10.22\right)k\Omega$$

HEAT-SINK TYPE OPTIONS

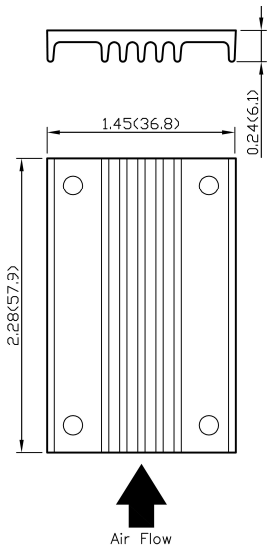
7G-0029A-F



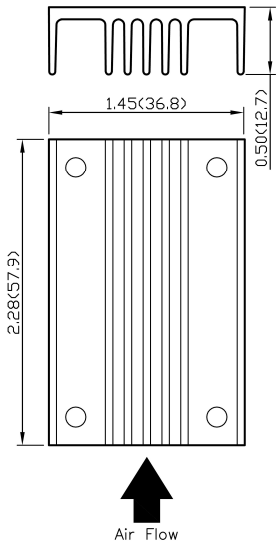
7G-0030A-F



7G-0031A-F



7G-0032A-F



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