MEGA ELECTRONICS INC.

PD100WQAE Series

QUARTER-BRICK DC-DC CONVERTER

4:1 ULTRA WIDE INPUT RANGE
UP TO 90Watts

FEATURES

- NO MINIMUM LOAD REQUIRED
- LOW STANDBY POWER CONSUMPTION
- 3000VAC REINFORCED INSULATION FOR 110VIN
- 2250VDC BASIC INSULATION FOR 24VIN AND 48VIN
- SAFETY MEETS UL60950-1, EN60950-1, & IEC60950-1
- COMPLIANCE TO EN50155 AND EN45545-2 RAILWAY STANDARD
- CE MARKED
- COMPLIANT TO RoHS II & REACH

APPLICATIONS

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

3000VAC ISOLATION	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	Output Voltage	Output Current @Full Load	Input Current @ No Load	Efficiency	Maximum Capacitor Load
	VDC	VDC	A	mA	%	µF
PD100QAE-24S3P3W	8.5 ~ 36	3.3	25	25	88	75000
PD100QAE-24S05W	8.5 ~ 36	5	18	25	89	36000
PD100QAE-24S12W	8.5 ~ 36	12	7.5	25	89	6250
PD100QAE-24S15W	8.5 ~ 36	15	6	25	89	4000
PD100QAE-24S24W	8.5 ~ 36	24	3.7	25	89	1540
PD100QAE-24S30W	8.5 ~ 36	30	3	25	89	1000
PD100QAE-24S48W	8.5 ~ 36	48	1.8	25	88	380
PD100QAE-48S3P3W	16.5 ~ 75	3.3	25	15	88	75000
PD100QAE-48S05W	16.5 ~ 75	5	18	15	89	36000
PD100QAE-48S12W	16.5 ~ 75	12	7.5	15	89	6250
PD100QAE-48S15W	16.5 ~ 75	15	6	15	90	4000
PD100QAE-48S24W	16.5 ~ 75	24	3.7	15	90	1540
PD100QAE-48S30W	16.5 ~ 75	30	3	15	90	1000
PD100QAE-48S48W	16.5 ~ 75	48	1.8	15	90	380
PD100QAE-110S3P3W	40 ~ 160	3.3	23	8	88	70000
PD100QAE-110S05W	40 ~ 160	5	17	8	89	34000
PD100QAE-110S12W	40 ~ 160	12	7	8	89	5830
PD100QAE-110S15W	40 ~ 160	15	5.5	8	89	3670
PD100QAE-110S24W	40 ~ 160	24	3.5	8	89	1460
PD100QAE-110S30W	40 ~ 160	30	2.8	8	89	930
PD100QAE-110S48W	40 ~ 160	48	1.8	8	89	380

PART NUMBER STRUCTURE

PD100QAE - 48 S 05 W - P HS

- **Series Name**
- **Input Voltage (VDC)**: **24:**8.5~36, **48:**16.5~75, **110:**40~160
- **Output Quantity**: **S:**Single
- **Output Voltage (VDC)**: **3P3:**3.3, **05:**5, **12:**12, **15:**15, **24:**24, **30:**30, **48:**48
- **Input Range**: 4:1
- **Ctrl and Pin Options**: D:Negative logic, P:Positive logic
- **Assembly Option**: D:None, **HS:**H=0.24"Horizontal, 7G-0029B-F, **HS1:**H=0.5"Horizontal, 7G-0030B-F, **HS2:**H=0.24"Vertical, 7G-0031B-F, **HS3:**H=0.5"Vertical, 7G-0032B-F, **TH:**Through hole (No thread) (1)

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

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PD100WQAE

INPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating input voltage range		24Vin(nom)	8.5	24	36	VDC
		48Vin(nom)	16.5	48	75	
		110Vin(nom)	40	110	160	
Start-up voltage		24Vin(nom)			9	VDC
		48Vin(nom)			18	
		110Vin(nom)			43	
Shutdown voltage		24Vin(nom)	7.3		8.1	VDC
		48Vin(nom)	15.5		16.3	
		110Vin(nom)	33.0		36.0	
Start up time	Constant resistive load	Power up		75	100	ms
		Remote ON/OFF		75	100	
Input surge voltage	1 second, max.	24Vin(nom)			50	VDC
		48Vin(nom)			100	
		110Vin(nom)			185	
Input filter [1]				Pi type		
Remote ON/OFF	Referred to –Vin pin	Negative logic (Standard) DC-DC ON		Short or 0 ~ 1.2VDC		
		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 ~ 1.2VDC		
		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					mVp-p
	With a 22µF/25V X7R MLCC	3.3Vout, 5Vout		75		
	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	%/°C
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 (Reinforced insulation)	110Vin(nom)	Input to Output	3000			VAC
			Input (Output) to Base-Plate	1500			
	1 minute (Basic insulation)	Others	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						5.070×10^5 hrs

ENVIRONMENTAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating base-plate temperature		-40		+105	℃
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	
Shock				EN61373, MIL-STD-810F	
Vibration				EN61373, MIL-STD-810F	
Relative humidity				5% to 95% RH	

EMC SPECIFICATIONS

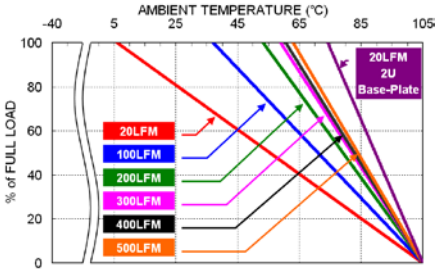
Parameter	Conditions		Level
EMI (3)	EN55011, EN55022		Class A, Class B
ESD	EN61000-4-2	Air ± 8kV and Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3	20 V/m	Perf. Criteria A
Fast transient (4)	EN61000-4-4	± 2kV	Perf. Criteria A
Surge (4)	EN61000-4-5	EN55024:±2kV and EN50155:±2kV	Perf. Criteria A
Conducted immunity	EN61000-4-6	10 Vr.m.s	Perf. Criteria A
Power frequency magnetic field	EN61000-4-8	100A/m continuous; 1000A/m 1 second	Perf. Criteria A

Note:

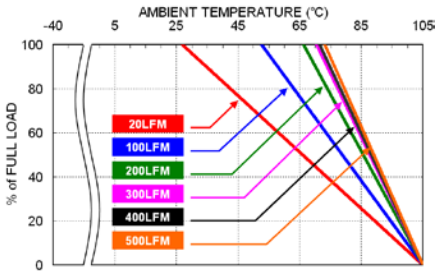
1. Input source impedance: The power module will operate as specifications without external components, assuming that the source voltage has a very low impedance and reasonable input voltage regulation. Highly inductive source impedances can affect the stability of the power module. Since real-world voltage source has finite impedance, performance can be improved by adding external filter capacitor.
   The PD100QAE-24SXXW and PD100QAE-48SXXW recommended Nippon Chemi-con KY series, 100μF/100V.
   The PD100QAE-110SXXW recommended Ruby-con BXF series, 39μF/200V.
2. The heat-sink is optional and P/N: 7G-0029B-F , 7G-0030B-F , 7G-0031B-F , 7G-0032B-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 MEGA.
4. An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5.
   The PD100QAE-24SXXW and PD100QAE-48SXXW recommended 2 pcs of aluminum electrolytic capacitor (Nippon chemi-con KY series,
   220μF/100V) to connect in parallel.
   The PD100QAE-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, the EMI could be reduced.

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

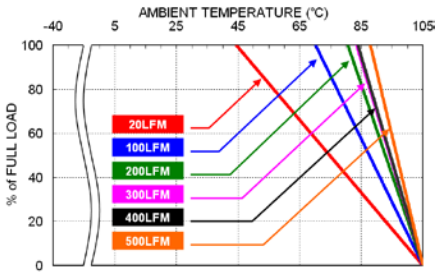
CHARACTERISTIC CURVE



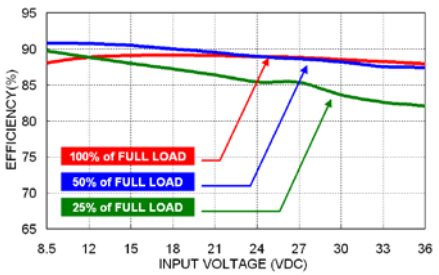
PD100QAE-24S05W Derating Curve



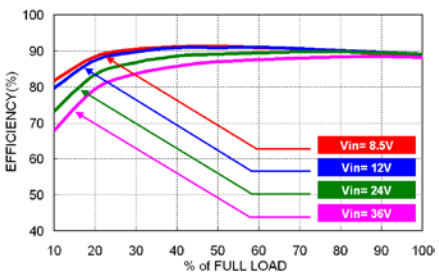
PD100QAE-24S05W Derating Curve
With 0.24" Height Heat-sink



PD100QAE-24S05W Derating Curve
With 0.5" Height Heat-sink



PD100QAE-24S05W Efficiency vs. Input Voltage



PD100QAE-24S05W Efficiency vs. Output Load

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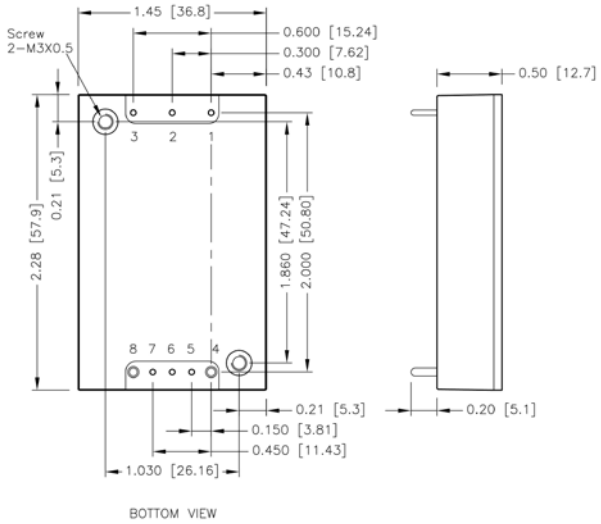
PD100WQAE

MECHANICAL DRAWING

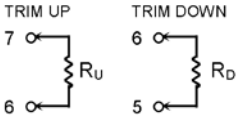


PIN CONNECTION

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

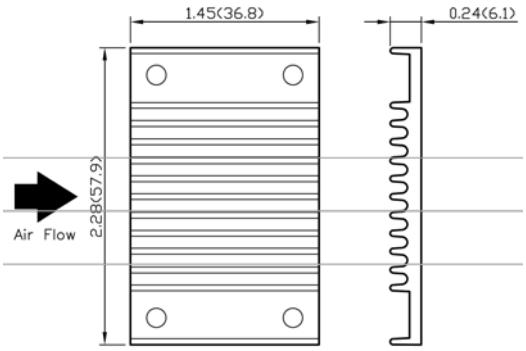
$$R_U = \left(\frac{5.11V_{OUT}(100+\Delta\%)}{1.225\Delta\%} - \frac{(511+10.22\Delta\%)}{\Delta\%}\right) k\Omega$$

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

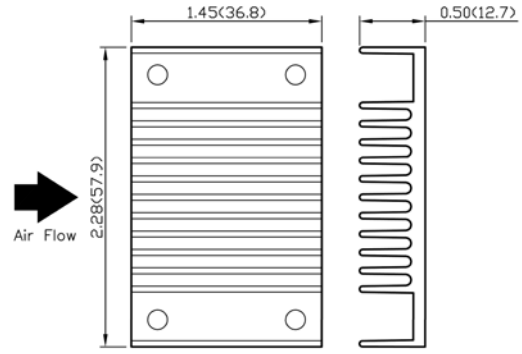
1. All dimensions in inch (mm)
2. Tolerance :x.xx±0.02 (x.x±0.5)
   x.xxx±0.01 (x.xx±0.25)
3. Pin pitch tolerance ±0.01 (0.25)
4. Pin dimension tolerance ±0.004(0.1)
5. The screw locked torque:
   MAX 3.5kgf-cm (0.34N-m)

HEAT-SINK TYPE OPTIONS

7G-0029B-F

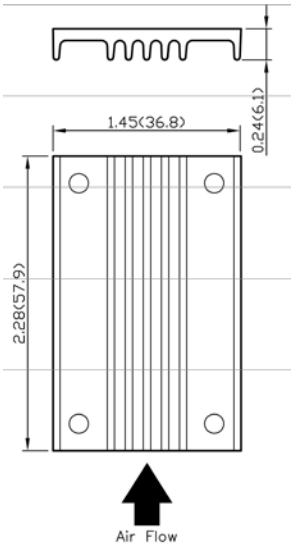


7G-0030B-F

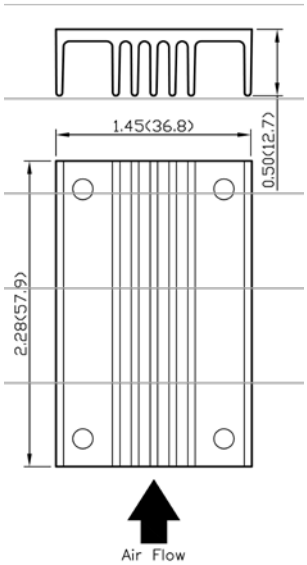


HS:	Height H=0.24" Horizontal fin, 7G-0029B-F
HS1:	Height H=0.5" Horizontal fin, 7G-0030B -F
HS2:	Height H=0.24" Vertical fin, 7G-0031B -F
HS3:	Height H=0.5" Vertical fin, 7G-0032B -F

7G-0031B-F



7G-0032B-F



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

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