



# P-DUKE POWER

## MAD100 Series

2 X 3 Inch AC-DC POWER SUPPLIES  
Up to 100 Watts

**5**  
YEARS  
WARRANTY

ROHS  
COMPLIANT

REACH  
COMPLIANT



Medical



Automation



Datacom



IPC



Industry



Measurement



Telecom



Automobile



Boat



Charger



PV



Railway

UL US CB CE UK CA



**2**  
x  
MOPP

**4000**  
VAC  
Reinforced  
Insulation

**ADJ.**  
Output  
Voltage

Internal  
EN55032  
Class  
Filter **B**

**LOW**  
Leakage  
Current

**LOW**  
Standby  
Power

Protection  
Class I  
Class II

Operating  
Altitude  
**5000**  
meter

**OCP**

**OVP**

**SCP**

### PART NUMBER STRUCTURE

<b>M</b>	<b>A</b>	<b>D</b>	<b>100</b>	<b>U</b>	<b>S</b>	<b>12</b>	<b>B</b>	-	<b>□</b>
Application	Package Code	Dimension Code	Output Power (W)	Input Voltage (VAC)	Output Quantity	Output Voltage (VDC)	Protection Type		Connector Options
<b>Medical Application</b>	A: Open type U: U chassis type E: Enclosed type D: Din rail type			U: Universal 85 ~ 264VAC	S: Single	12: 12V 15: 15V 18: 18V 24: 24V 28: 28V 36: 36V 48: 48V	B: CLASS II □: CLASS I		□: JST M: Molex T: Terminal Block

**TECHNICAL SPECIFICATION** All specifications are typical at 230VAC input, full load and 25°C unless otherwise noted

Model Number	Input Range	Output Voltage	Output Current Natural Convection	Input Power No Load	Efficiency	Maximum Capacitor Load
	VAC	VDC	A	W	%	µF
MAD100US12B MUD100US12B MED100US12B MDD100US12B	85 ~ 264	12	8.34	0.3	91	6950
MAD100US15B MUD100US15B MED100US15B MDD100US15B	85 ~ 264	15	6.67	0.3	92	4450
MAD100US18B MUD100US18B MED100US18B MDD100US18B	85 ~ 264	18	5.56	0.3	92	3100
MAD100US24B MUD100US24B MED100US24B MDD100US24B	85 ~ 264	24	4.17	0.3	92	1750
MAD100US28B MUD100US28B MED100US28B MDD100US28B	85 ~ 264	28	3.58	0.3	92	1280
MAD100US36B MUD100US36B MED100US36B MDD100US36B	85 ~ 264	36	2.78	0.3	91	770
MAD100US48B MUD100US48B MED100US48B MDD100US48B	85 ~ 264	48	2.09	0.3	91	430

INPUT SPECIFICATIONS						
Parameter	Conditions	Min.	Typ.	Max.	Unit	
Operating input voltage range	AC input	85		264	VAC	
	DC input	120		370	VDC	
Input frequency	AC input	47		63	Hz	
Input current	115VAC and Full Load			1.15	A	
	230VAC and Full Load			0.55	A	
No load input power	230VAC			0.3	Watts	
Leakage current	264VAC			75	µA	
Power Factor		0.95				
Start up time				1000	ms	
Rise time			20		ms	
Hold up time	115VAC and Full Load	16			ms	
Input inrush current	230VAC			60	A	
Input protection	Internal fuse in line and neutral			T3.15A/250VAC		

OUTPUT SPECIFICATIONS						
Parameter	Conditions		Min.	Typ.	Max.	Unit
Output power					100	Watts
Initial set voltage accuracy	230VAC and Full Load		-1.0		+1.0	%
Line regulation	Low Line to High Line at Full Load		-0.2		+0.2	%
Load regulation	No Load to Full Load		-0.5		+0.5	%
	10% Load to 90% Load		-0.4		+0.4	
Voltage adjustability			-10		+10	%
Minimum load				0		%
Ripple and noise	Measured by 20MHz bandwidth					mVp-p
	With a 10 $\mu$ F/25V 1206 X7R MLCC		12Vout	120		
			15Vout	150		
			18Vout	160		
	With a 1 $\mu$ F/50V 1206 X7R MLCC		24Vout	160		
			28Vout	180		
		36Vout	190			
		48Vout	340			
Temperature coefficient			-0.02		+0.02	%/°C
Transient response	Load step from 50 ~ 75% change at 2.5A/ $\mu$ s	Peak deviation			3	% Vout
		Recovery time		500		$\mu$ s
Over voltage protection	% of Vout(nom); Latch mode		115		135	%
Over load protection	% of Iout rated; Hiccup mode		115		150	%
Short circuit protection			Continuous, automatic recovery			

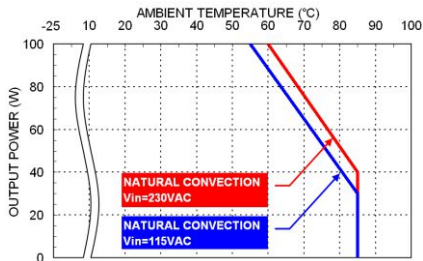
GENERAL SPECIFICATIONS						
Parameter	Conditions		Min.	Typ.	Max.	Unit
Isolation voltage	1 minute (2MOPP insulation)	Input to Output	4000			VAC
		Input (Output) to F.G.	1500			
Isolation resistance	500VDC		0.1			G $\Omega$
Switching frequency				60		kHz
				80		
Safety approvals	IEC/ EN/ ANSI/AAMI ES 60601-1 IEC/ EN/ UL 62368-1					UL:E360199 UL:E193009 CB:UL(Demko)
Weight						156g (5.50oz)
			MAD			194g (6.84oz)
			MUD			210g (7.41oz)
			MED			232g (8.18oz)
MTBF	MIL-HDBK-217F Ta=25°C, Full load					7.903 x 10 <sup>5</sup> hrs

ENVIRONMENTAL SPECIFICATIONS						
Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating ambient temperature	Natural convection	With derating	-25		+85	°C
Storage temperature range			-40		+85	°C
Operating altitude					5000	m
Shock						IEC60068-2-27
Vibration						IEC60068-2-6
Relative humidity	Non-condensing					5% to 95% RH

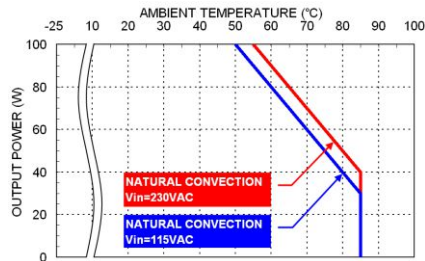
## EMC SPECIFICATIONS

Parameter	Conditions	Level
EMI	EN55011, EN55032, EN60601-1-2 and FCC Part 18 / 15	Conducted ClassB Radiated ClassA
	External components may be required for class I application.	
Harmonic currents	EN61000-3-2 Full Load	Class A and D
Voltage flicker	EN61000-3-3	
EMS	EN55035 and EN60601-1-2	
ESD	EN61000-4-2	Perf. Criteria A
Radiated immunity	EN61000-4-3 20 V/m	Perf. Criteria A
Fast transient	EN61000-4-4 ± 2kV	Perf. Criteria A
Surge	EN61000-4-5 DM ± 1kV and CM ± 2kV	Perf. Criteria A
Conducted immunity	EN61000-4-6 20 Vr.m.s	Perf. Criteria A
Power frequency magnetic field	EN61000-4-8 30A/m	Perf. Criteria A
Dip and interruptions	EN61000-4-11	

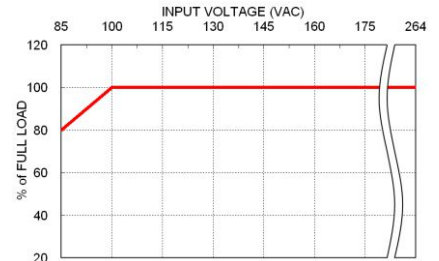
## CHARACTERISTIC CURVE



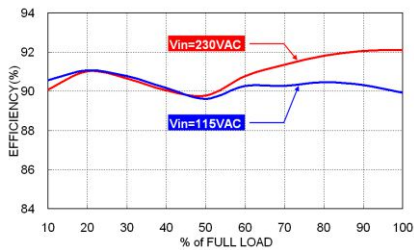
Derating Curve vs. Ambient Temperature  
MED100 & MDD100



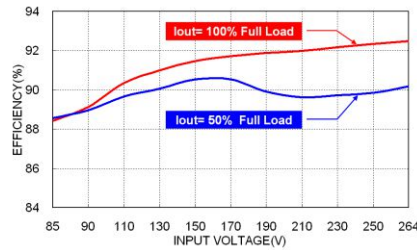
Derating Curve vs. Ambient Temperature  
MAD100 & MUD100



Derating Curve vs. Input Voltage  
M□D100



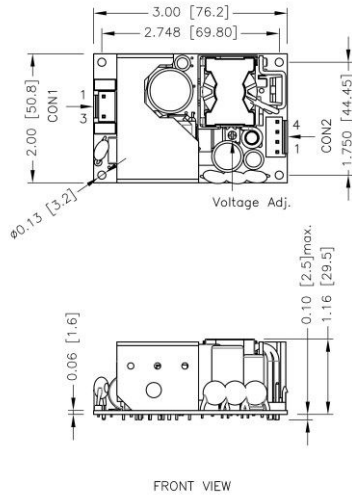
Efficiency vs. Output Load  
M□D100US24B



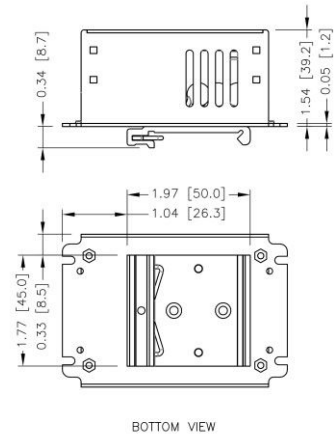
Efficiency vs. Input Voltage  
M□D100US24B

**MECHANICAL DRAWING**

**MAD** Open type



**MDD** Din rail type



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. M3x0.5 screw locked torque MAX 5Kgf.cm/0.49N.m

**CONNECTORS CONNECTIONS**

**CON1 – Input Connector**

Pin 1	Line
Pin 3	Neutral

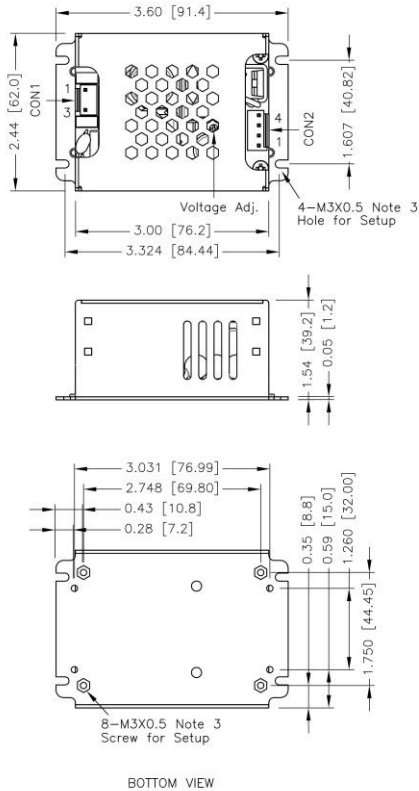
**CON2 – Output Connector**

Pin 1,2	-Vout
Pin 3,4	+Vout

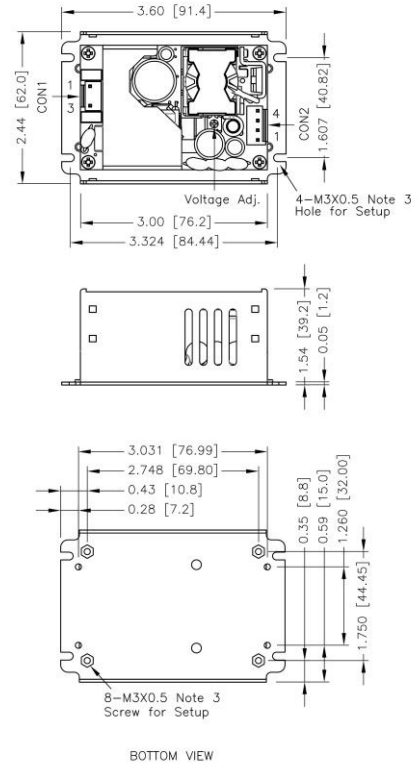
\*Either one of four screws holes of Open / Chassis type can be considered as PE connection for CLASS I application.

## MECHANICAL DRAWING(CONTINUED)

**MED** Open type



**MUD** Din rail type



1. All dimensions in inch [mm]
2. Tolerance :  $x.xx \pm 0.02$  [ $x.x \pm 0.5$ ]  $x.xxx \pm 0.01$  [ $x.xx \pm 0.25$ ]
3. M3x0.5 screw locked torque MAX 5Kgf.cm/0.49N.m

### CONNECTORS CONNECTIONS

#### CON1 – Input Connector




Pin 1	Line
Pin 3	Neutral

#### CON2 – Output Connector

Pin 1,2	-Vout
Pin 3,4	+Vout

\*Either one of four screws holes of Open / Chassis type can be considered as PE connection for CLASS I application.

### CONNECTOR OPTIONS

Blank:	JST Type	-M	Molex Type	-T	Terminal Block
	Mates with housing CON1: VHR-3N CON2: VHR-4N		Mates with housing CON1: 09-50-8031 CON2: 09-50-8041		Screw locked torque MAX 2Kgf.cm/0.2N.m
	Crimp terminals CON1: SVH-21T-P1.1 CON2: SVH-21T-P1.1		Crimp terminals CON1: SD-2478 CON2: SD-2478		Wire dimension range 26 ~ 16AWG