



P-DUKE POWER

MAD65 Single Series

2 X 3 Inch AC-DC POWER SUPPLIES
Up to 65 Watts

5
YEARS
WARRANTY

ROHS
COMPLIANT

REACH
COMPLIANT

+85°C
-40°C
AMBIENT TEMP.



Medical



Automation



Datacom



IPC



Industry



Measurement



Telecom



Automobile



Boat



Charger



PV



Railway



2
X
MOPP

4000
VAC
Reinforced
Insulation

ADJ.
Output
Voltage

Internal
EN55032
Class
Filter **B**

LOW
Leakage
Current

LOW
Standby
Power

Operating
Altitude
5000
meter

Protection
Class I
Class II

OCP

OVP

SCP

PART NUMBER STRUCTURE

M	A	D	65	U	S	12	B	-	□
Application	Package Code	Dimension Code	Output Power (W)	Input Voltage (VAC)	Output Quantity	Output Voltage (VDC)	Protection Type		Connector Option
Medical Application	A: Open type U: U chassis type E: Enclosed type D: Din rail type			U: Universal 85 ~ 264	S: Single	05: 5 7P5: 7.5 09: 9 12: 12 15: 15 18: 18 24: 24 241: 24 28: 28 281: 28 36: 36 48: 48 53: 53	B: CLASS II Blank: CLASS I		Blank: 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	Max. Output Power	Input Power @ No Load	Efficiency
	VAC	VDC	A	W	W	%
MAD65US05B MUD65US05B MED65US05B MDD65US05B	85 ~ 264	5	10	50	0.11	90
MAD65US7P5B MUD65US7P5B MED65US7P5B MDD65US7P5B						
MAD65US09B MUD65US09B MED65US09B MDD65US09B						
MAD65US12B MUD65US12B MED65US12B MDD65US12B						
MAD65US15B MUD65US15B MED65US15B MDD65US15B	85 ~ 264	15	4.34	65	0.11	93.5
MAD65US18B MUD65US18B MED65US18B MDD65US18B						
MAD65US24B MUD65US24B MED65US24B MDD65US24B						
MAD65US241B MUD65US241B MED65US241B MDD65US241B						
MAD65US28B MUD65US28B MED65US28B MDD65US28B	85 ~ 264	28	2.33	65	0.11	93.5
MAD65US281B MUD65US281B MED65US281B MDD65US281B						
MAD65US36B MUD65US36B MED65US36B MDD65US36B						

Model Number	Input Range	Output Voltage	Output Current Natural convection	Max. Output Power	Input Power @ No Load	Efficiency
	VAC	VDC	A	W	W	%
MAD65US48B MUD65US48B MED65US48B MDD65US48B	85 ~ 264	48	1.36	65	0.11	93
MAD65US53B MUD65US53B MED65US53B MDD65US53B	85 ~ 264	53	1.24	65	0.11	92.5

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	100VAC and Full Load			1.6	A
	240VAC and Full Load			0.9	
No load input power	230VAC		0.11		Watts
Leakage current	264VAC			75	μA
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				65	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	-0.7		+0.7	%
	5Vout	-0.5		+0.5	
	Others	-0.6		+0.6	
	10% Load to 90% Load	-0.4		+0.4	
Voltage adjustability	Single output	53Vout	-20	+10	%
		Others	-10	+10	
Minimum load			0		%
Ripple and noise	Measured by 20MHz bandwidth				mVp-p
	With a 10μF/25V 1206 X7R MLCC	5Vout, 7.5Vout, 9Vout	75		
		12Vout, 15Vout, 18Vout	75		
	With a 1μF/50V 1206 X7R MLCC	24Vout, 28Vout, 36Vout	75		
	With a 0.1μF/100V 1206 X7R MLCC	48Vout, 53Vout	150		
Temperature coefficient		-0.02		+0.02	%/°C
Transient response	Load step from 50 ~ 75% change at 2.5A/μs	Peak deviation		3	% Vout
		Recovery time	600		μs
Over voltage protection	% of Vout(nom); Latch mode	125		140	%
Over load protection	% of Iout rated; Hiccup mode		145		%
Short circuit protection					Continuous, automatic recovery

GENERAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Isolation voltage	1 minute (2MOPP insulation)	4000			VAC
Isolation resistance	500VDC	2500			GΩ
Switching frequency	230VAC		60		
	5Vout		80		
	7.5Vout		70		
	9Vout		120		
	Others				
Safety approvals	IEC/ EN/ ANSI/AAMI ES 60601-1 IEC/ EN/ UL 60950-1			UL:E360199 CB:UL(Demko)	
Weight	MAD MUD MED MDD			117g (4.13oz) 157g (5.54oz) 172g (6.07oz) 193g (6.81oz)	
MTBF	MIL-HDBK-217F, Full load			1.494 x 10 ⁶ hrs	

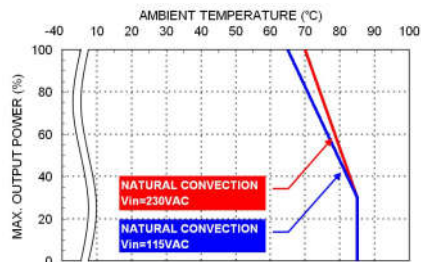
ENVIRONMENTAL SPECIFICATIONS

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

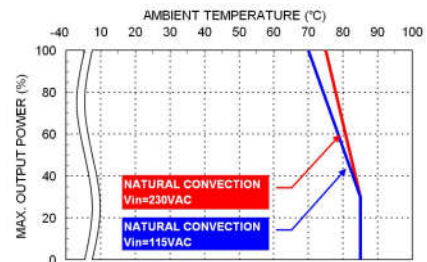
EMC SPECIFICATIONS

Parameter	Conditions	Level
EMI	EN55011, EN55032, EN60601-1-2 and FCC Part 18 / 15	Conducted Class B Radiated Class B
	External components may be required for class I application.	
Harmonic currents	EN61000-3-2	Class A
Voltage flicker	EN61000-3-3	
EMS	EN55024, EN60601-1-2 and Complies with EN 61850-3	
ESD	EN61000-4-2	Perf. Criteria A
Radiated immunity	EN61000-4-3	Perf. Criteria A
Fast transient	EN61000-4-4	Perf. Criteria A
Surge	EN61000-4-5	Perf. Criteria A
Conducted immunity	EN61000-4-6	Perf. Criteria A
Power frequency magnetic field	EN61000-4-8	Perf. Criteria A
Dip and interruptions	EN61000-4-11	

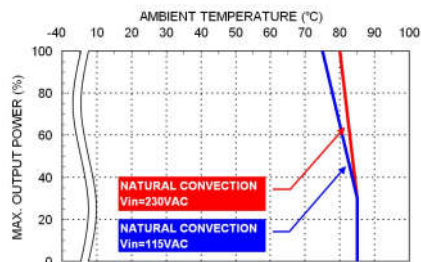
CHARACTERISTIC CURVE



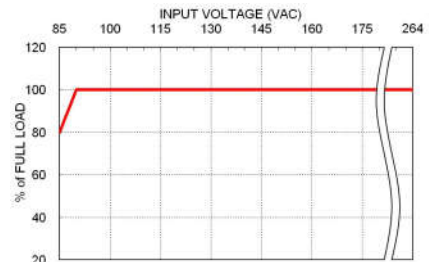
Derating Curve vs. Ambient Temperature
M□D65USxxB xx=7P5/9/281



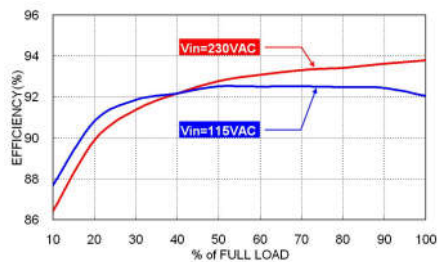
Derating Curve vs. Ambient Temperature
M□D65USxxB xx=5/12/24/36/48/53



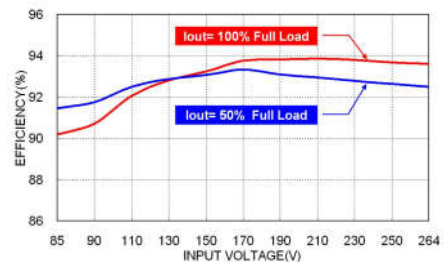
Derating Curve vs. Ambient Temperature
M□D65USxxB xx=15/24/28



Derating Curve vs. Input Voltage
M□D65



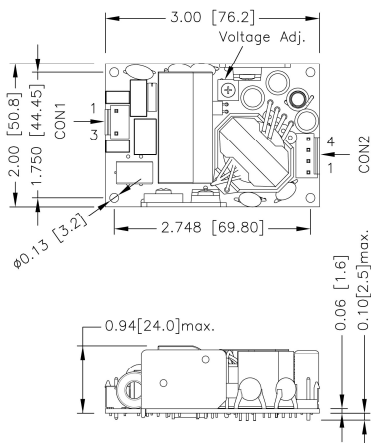
Efficiency VS Output Load
M□D65US24B



Efficiency VS Input Voltage
M□D65US24B

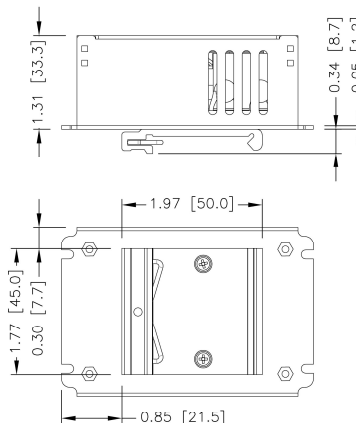
MECHANICAL DRAWING

MAD Open type



FRONT VIEW

MDD Din rail type



BOTTOM VIEW

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. M3×0.5 screw locked torque MAX 5Kgf.cm/0.49N.m

CONNECTORS CONNECTIONS

CON1 – Input Connector

Pin 1	Line
Pin 3	Neutral

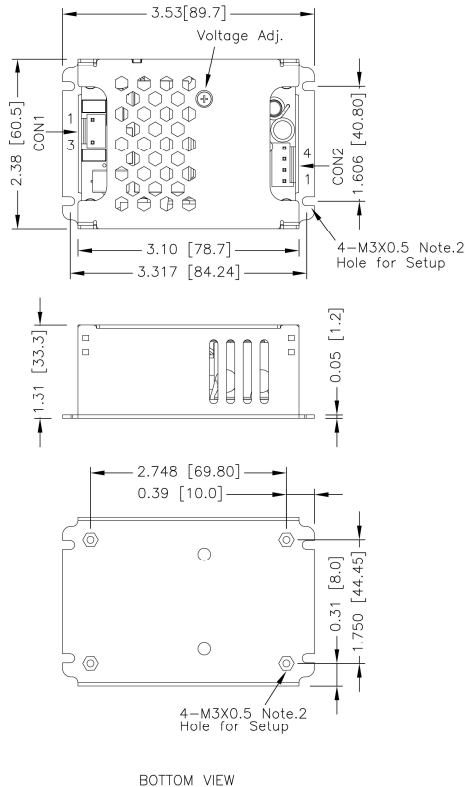
CON2 – Output Connector

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

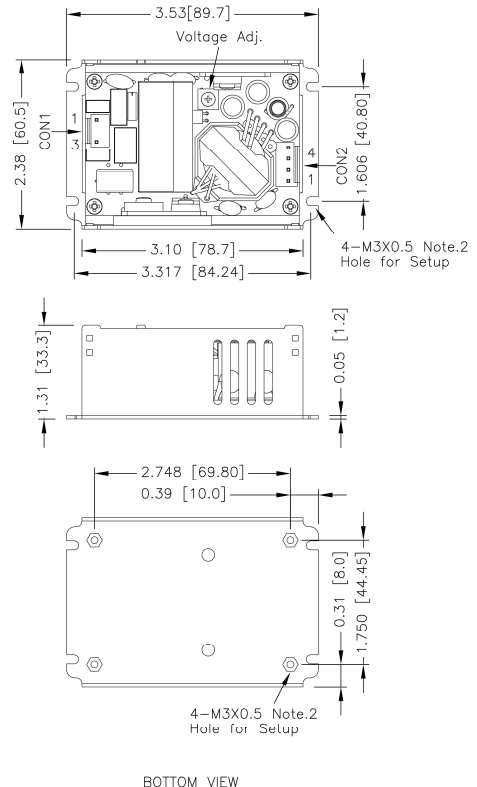
*Either one of four screws holes of Open / Chassis type can be considered as PE connection for CLASS I application.

MECHANICAL DRAWING (CONTINUED)

ME Enclosed type



MU U chassis 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. M3×0.5 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

Mates with housing
 CON1: **VHR-3N**
 CON2: **VHR-4N**



Crimp terminals
 CON1: **SVH-21T-P1.1**
 CON2: **SVH-21T-P1.1**

-M

Molex Type

Mates with housing
 CON1: **09-50-8031**
 CON2: **09-50-8041**



Crimp terminals
 CON1: **SD-2478**
 CON2: **SD-2478**

-T

Terminal Block

Mates with
Screw locked torque
MAX 2Kgf.cm/0.2N.m



Wire dimension range
26 ~ 16AWG