



P-DUKE POWER

MAD65 Multi Series

2 X 3.5 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
Isolation
Voltage

ADJ.
Output
Voltage

Internal
EN55032
Class
Filter **B**

LOW
Cross
Reg.

LOW
Leakage
Current

LOW
Standby
Power

Operating
Altitude
5000
meter

Protection
Class I
Class II

OPP

OVP

SCP

PART NUMBER STRUCTURE

MAD	65	U						B	- xx	yy	-	
Series Name	Output Power (W)	Input Voltage (VAC)	Output Quantity	Output Voltage 1 (VDC)	Output Voltage 2 (VDC)	Output Voltage 3 polarity	Output Voltage 3 (VDC)	Protection Type	Vo2 Voltage Code	Vo3 Voltage Code		Connector Option
MAD: Open type MUD: U chassis type MED: Enclosed type MDD: Din rail type		U: Universal 85 ~ 264VAC	D: Dual T: Triple	3: 5V 4: 7.5V 5: 9V 6: 12V 7: 15V 8: 18V 9: 24V 0: 28V	1: 2.5V 2: 3.3V 3: 5V x: refer to Suffix xx	M: Minus _: Positive	Vo3 (Triple only) 1: 2.5V 2: 3.3V 3: 5V 4: 7.5V 5: 9V 6: 12V 7: 15V 8: 18V 9: 24V y: refer to Suffix yy	B: CLASS II No: 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	Output 1			Output 2			Output 3		Max. Output Power W	Efficiency %
	Voltage	Current (Normal)	Current (MAX)	Voltage	Current (Normal)	Current (MAX)	Voltage	Current (MAX)		
	VDC	A	A	VDC	A	A	VDC	A		
MAD65UD32B MUD65UD32B MED65UD32B MDD65UD32B	+5	6	10	+3.3	6	8			50	88.5
MAD65UD63B MUD65UD63B MED65UD63B MDD65UD63B	+12	3	5.42	+5	6	8			65	90
MAD65UD62B MUD65UD62B MED65UD62B MDD65UD62B	+12	3	5.42	+3.3	6	8			65	89.5
MAD65UD73B MUD65UD73B MED65UD73B MDD65UD73B	+15	2.4	4.34	+5	6	8			65	90.5
MAD65UD93B MUD65UD93B MED65UD93B MDD65UD93B	+24	1.5	2.71	+5	6	8			65	89
MAD65UD03B MUD65UD03B MED65UD03B MDD65UD03B	+28	1.25	2.33	+5	6	8			65	88
MAD65UT32M3B MUD65UT32M3B MED65UT32M3B MDD65UT32M3B	+5	6	10	+3.3	6	8	-5	0.6	50	88
MAD65UT326B MUD65UT326B MED65UT326B MDD65UT326B	+5	6	10	+3.3	6	8	+12	0.6	50	88
MAD65UT32M6B MUD65UT32M6B MED65UT32M6B MDD65UT32M6B	+5	6	10	+3.3	6	8	-12	0.6	50	88
MAD65UT63M3B MUD65UT63M3B MED65UT63M3B MDD65UT63M3B	+12	3	5.42	+5	6	8	-5	0.6	65	89.5
MAD65UT63M6B MUD65UT63M6B MED65UT63M6B MDD65UT63M6B	+12	3	5.42	+5	6	8	-12	0.6	65	89
MAD65UT623B MUD65UT623B MED65UT623B MDD65UT623B	+12	3	5.42	+3.3	6	8	+5	0.6	65	89

Model Number	Output 1			Output 2			Output 3		Max. Output Power W	Efficiency %
	Voltage	Current (Normal)	Current (MAX)	Voltage	Current (Normal)	Current (MAX)	Voltage	Current (MAX)		
	VDC	A	A	VDC	A	A	VDC	A		
MAD65UT62M6B MUD65UT62M6B MED65UT62M6B MDD65UT62M6B	+12	3	5.42	+3.3	6	8	-12	0.6	65	88.5
MAD65UT73M7B MUD65UT73M7B MED65UT73M7B MDD65UT73M7B	+15	2.4	4.34	+5	6	8	-15	0.6	65	89.5
MAD65UT936B MUD65UT936B MED65UT936B MDD65UT936B	+24	1.5	2.71	+5	6	8	+12	0.6	65	88.5
MAD65UT93M6B MUD65UT93M6B MED65UT93M6B MDD65UT93M6B	+24	1.5	2.71	+5	6	8	-12	0.6	65	88.5

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			1.65	A
	240VAC			0.95	
No load input power	230VAC			0.15	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	Pout1+Pout2+Pout3 Vout 1 5V Others			50 65	Watts
Initial set voltage accuracy	230VAC and Full Load Vout 1 Vout 2 - Vout 3	-1.0 -2.0		+1.0 +2.0	%
Line regulation	Low Line to High Line at Full Load	-0.2		+0.2	%
Load regulation	No Load to Full Load Vout 1 Vout 3	-0.5 -0.7		+0.5 +0.7	%
	No Load to Full Load 0.1W Load to Full Load Vout 2	-1.5 -0.7		+1.5 +0.7	%
Cross regulation	Asymmetrical load 25%/100% FL	-1.5		+1.5	%
Voltage adjustability	Vout 1	-10		+10	%
Minimum load	M□D65UD□□ M□D65UT□□□□; Vout 3 is full load Vout 1 + Vout 2		0 0.5		W
Ripple and noise	Measured by 20MHz bandwidth				mVp-p
	With a 10μF/25V 1206 X7R MLCC Vout 1 5V		100		
	With a 1μF/50V 1206 X7R MLCC Vout 1 12V 15V 24V 28V		120 150 240 280		
	With a 10μF/25V 1206 X7R MLCC Vout 2 All		100		
	With a 10μF/25V 1206 X7R MLCC Vout 3 5V 12V 15V		100 120 150		
Temperature coefficient		-0.02		+0.02	%/°C
Transient response	Load step from 50 ~ 75% change at 2.5A/μs Vout 1 Peak deviation Recovery time		600	3	% Vout μs
Over voltage protection	% of Vout(nom); Latch mode Vout 1	125		140	%
Over power protection	% of nominal output power; Hiccup mode Pout 1 + Pout 2		145		%
Short circuit protection					Continuous, automatic recovery

GENERAL SPECIFICATIONS

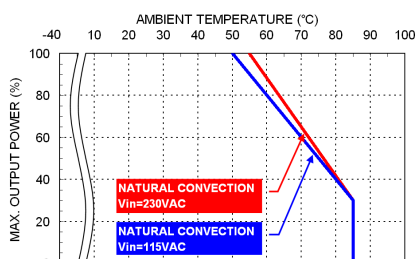
Parameter	Conditions	Min.	Typ.	Max.	Unit
Isolation voltage	1 minute (2MOPP insulation) Input to Output Input (Output) to F.G.	4000 2500			VAC
Isolation resistance	500VDC	0.1			GΩ
Switching frequency	230VAC Vout 1 5V Others Vout 2 Vout 3		60 115 750 510		kHz
Safety approvals	IEC/ EN/ ANSI/AAMI ES 60601-1			UL:E360199 CB:UL(Demko)	
Weight	MAD MUD MED MDD			155g (5.47oz) 203g (7.16oz) 221g (7.80oz) 243g (8.57oz)	
MTBF	MIL-HDBK-217F, Full load			1.059 x 10 ⁶ hrs	

ENVIRONMENTAL SPECIFICATIONS

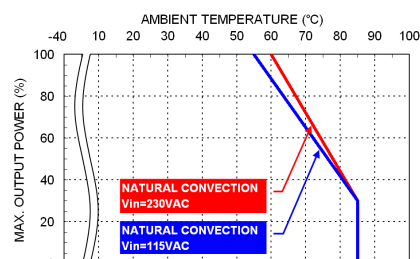
Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	Natural convection With derating	-40		+85	°C
Storage temperature range		-40		+85	°C
Operating altitude				5000	m
Shock				IEC60068-2-27	
Vibration				IEC60068-2-6	
Relative humidity	Non-condensing			5% to 95% RH	

EMC SPECIFICATIONS

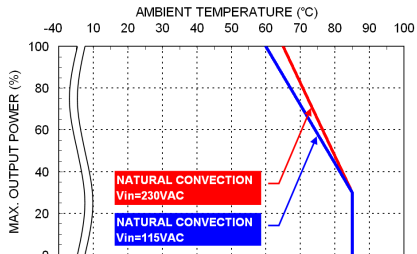
Parameter	Conditions		Level	
EMI	EN55011, EN55032 and FCC Part 18		Conducted	Class B
	External components may be required for class I application		Radiated	Class B
Harmonic currents	EN61000-3-2	Full Load		Class A
Voltage flicker	EN61000-3-3			
ESD	EN61000-4-2	Air $\pm 15\text{kV}$ and Contact $\pm 8\text{kV}$		Perf. Criteria A
Radiated immunity	EN61000-4-3	20 V/m		Perf. Criteria A
Fast transient	EN61000-4-4	$\pm 2\text{kV}$		Perf. Criteria A
Surge	EN61000-4-5	DM $\pm 1\text{kV}$		Perf. Criteria A
Conducted immunity	EN61000-4-6	20 Vr.m.s		Perf. Criteria A
Power frequency magnetic field	EN61000-4-8	30 A/m		Perf. Criteria A
Dip and interruptions	EN61000-4-11			

CHARACTERISTIC CURVE


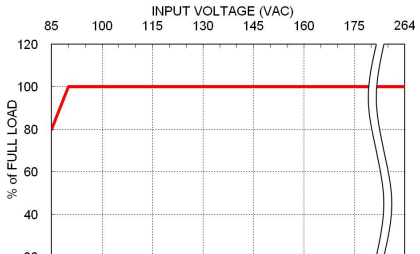
M□D65UDxxB xx=03
M□D65UTxxxB xxx=32M3/326/32M6



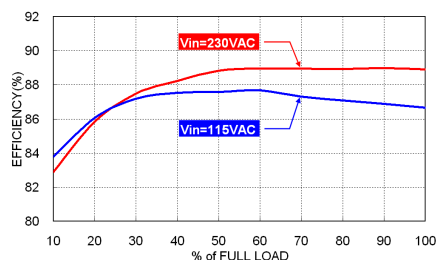
M□D65UDxxB xx=32/62/93
M□D65UTxxxB xxx=623/62M6/936/93M6



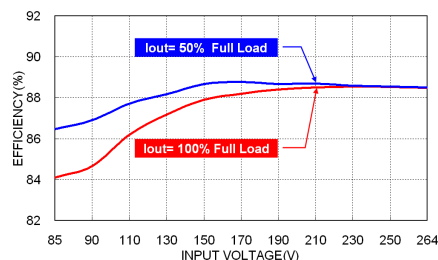
M□D65UDxxB xx=63/73
M□D65UTxxxB xxx=63M3/63M6/73M7



Derating Curve vs. Input Voltage
M□D65



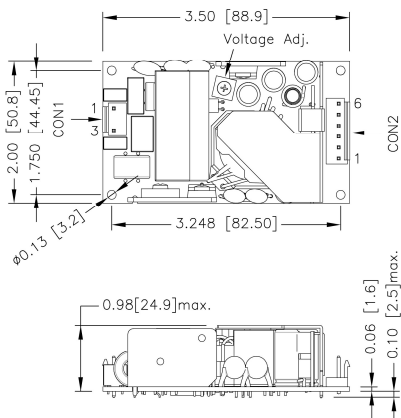
Efficiency VS Output Load
M□D65UT63M6B



Efficiency VS Input Voltage
M□D65UT63M6B

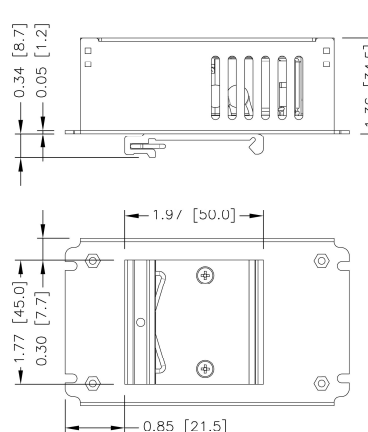
MECHANICAL DRAWING

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

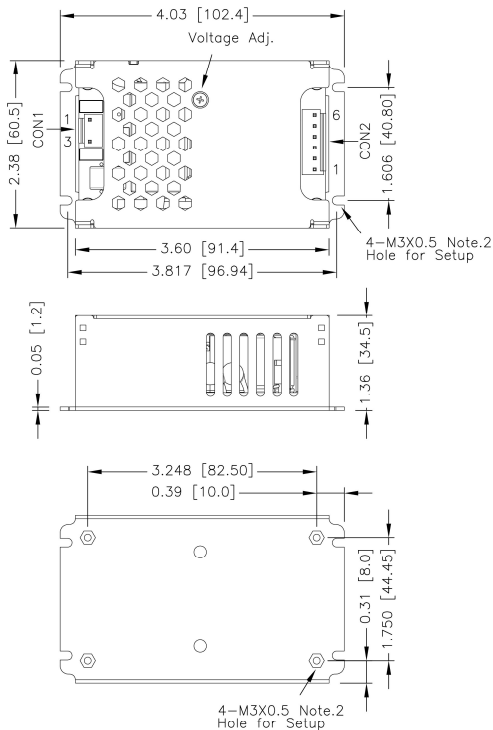
CON2 – Output Connector

Pin 1	Vout3
Pin 2,3	Com
Pin 4,5	Vout2
Pin 6	Vout1

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

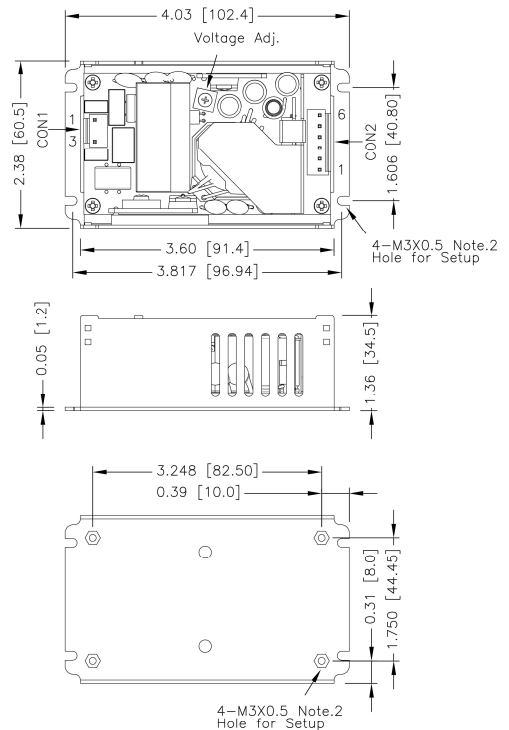
MECHANICAL DRAWING(CONTINUED)

MED Enclosed type



BOTTOM VIEW

MUD U chassis type



BOTTOM VIEW

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	Vout3
Pin 2,3	Com
Pin 4,5	Vout2
Pin 6	Vout1

*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-6N



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

-M

Molex Type

Mates with housing
CON1: 09-50-8031
CON2: 09-50-8061



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

-T

Terminal Block

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



Wire dimension range
26 ~ 16AWG