P-DUKE POWER

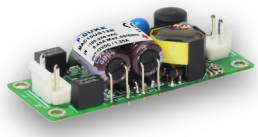
MAC15 Series

AC-DC POWER SUPPLIES
Up to 15 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

CE POWER SAVE

2 x MOPP | 4000 VAC Reinforced Insulation | ADJ. Output Voltage | Internal EN55032 Class B Filter | LOW Leakage Current | LOW Standby Power | Operating Altitude 5000 meter | Protection Class I Class II | OCP | OVP | SCP

PART NUMBER STRUCTURE

M	A	C	15	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:** Universal 85 ~ 264	**S:** Single	**3P3:**3.3 **05:**5 **7P5:**7.5 **09:**9 **12:**12 **15:**15 **18:**18 **24:**24 **28:**28 **36:**36 **48:**48 **53:**53	**B:**CLASS II **Blank:**CLASS I (for Connector Type)		**Blank:** JST **M:** Molex **T:** Terminal Block **D:** Pin Type

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

Model Number	Input Range VAC	Output Voltage VDC	Output Current Natural convection mA	Max. Output Power W	Input Power @ No Load mW	Efficiency %
MAC15US3P3B	85 ~ 264	3.3	4000	13.2	25	84
MAC15US05B	85 ~ 264	5	3000	15	25	86
MAC15US7P5B	85 ~ 264	7.5	2000	15	25	86
MAC15US09B	85 ~ 264	9	1670	15	25	86
MAC15US12B	85 ~ 264	12	1250	15	35	87
MAC15US15B	85 ~ 264	15	1000	15	35	87
MAC15US18B	85 ~ 264	18	834	15	35	87
MAC15US24B	85 ~ 264	24	625	15	35	88
MAC15US28B	85 ~ 264	28	536	15	35	88
MAC15US36B	85 ~ 264	36	417	15	35	88
MAC15US48B	85 ~ 264	48	313	15	50	88.5
MAC15US53B	85 ~ 264	53	284	15	50	89

INPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating input voltage range	AC input DC input		85 120		264 370	VAC VDC
Input frequency	AC input		47		63	Hz
Input current	100VAC and Full Load 240VAC and Full Load				0.45 0.30	A
No load input power	230VAC	3P3Vout to 9Vout 12Vout to 36Vout 48Vout to 53 Vout		25 35 50		mW
Leakage current	264VAC				75	μA
Start up time					500	ms
Rise time				20		ms
Hold up time	115VAC and Full Load			8		ms
Input inrush current	230VAC				40	A
Input protection	Internal fuse in line and neutral			T1.6A/250VAC		

OUTPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Output power					15	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	3.3Vout, 5Vout Others	-0.7 -0.5		+0.7 +0.5	%
	10% Load to 90% Load	3.3Vout, 5Vout Others	-0.6 -0.4		+0.6 +0.4	
Voltage adjustability			-10		+10	%
Minimum load				0		%
Ripple and noise	Measured by 20MHz bandwidth With a 10μF/50V 1206 X5R MLCC	3.3Vout, 5Vout 7.5Vout, 9Vout, 12Vout, 15Vout 18Vout, 24Vout, 28Vout, 36Vout		40 70 100		mVp-p
	With a 1μF/100V 1206 X7R MLCC	48Vout, 53Vout		140		
Temperature coefficient			-0.02		+0.02	%/℃
Transient response	Load step from 75 ~ 100% change at 2.5A/μs	Peak deviation Recovery time		5 500		%Vout μs
Over voltage protection	% of Vout(nom); Latch mode		125		140	%
Over load protection	% of Iout rated; Hiccup mode			145		%
Short circuit protection				Continuous, automatics recovery		

GENERAL SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Isolation voltage	1 minute (2MOPP insulation)	Input to Output	4000			VAC
Isolation resistance	500VDC		0.1			GΩ
Switching frequency	230VAC		75	85	95	kHz
Design meet safety standard						EN / IEC /ANSI/AAMI ES60601-1 IEC/ EN/ UL 60950-1
Weight		Connector type Pin type				19.0 (0.67oz) 16.5g (0.58oz)
MTBF	MIL-HDBK-217F, Full load					3.063 x 10^6 hrs

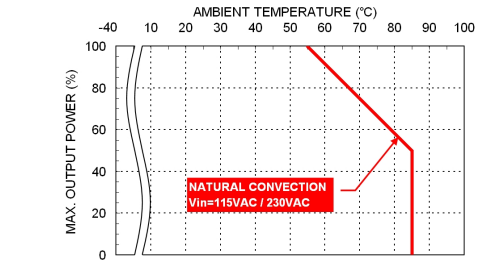
ENVIRONMENTAL SPECIFICATIONS

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

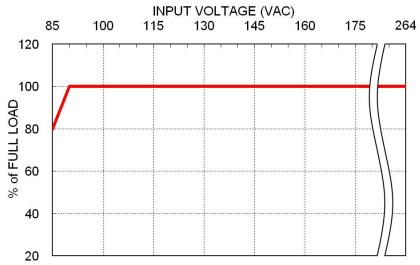
EMC SPECIFICATIONS

Parameter	Conditions		Level
EMI	EN55011, EN55032, EN60601-1-2 and FCC Part 18 / 15		Conducted Class B Radiated Class B
Harmonic currents	EN61000-3-2	Full Load	Class A
Voltage flicker	EN61000-3-3		
EMS	EN55024 and EN60601-1-2		
ESD	EN61000-4-2	Air ± 15kV and Contact ± 8kV	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	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		

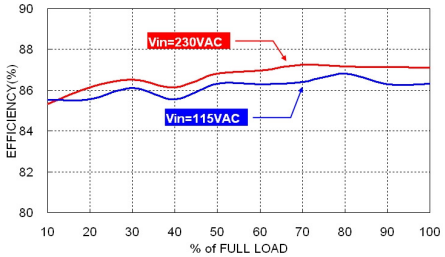
CHARACTERISTIC CURVE



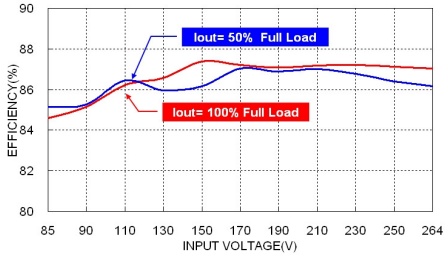
MAC15US12B Derating Curve vs. Ambient Temperature



Derating Curve vs. Input Voltage



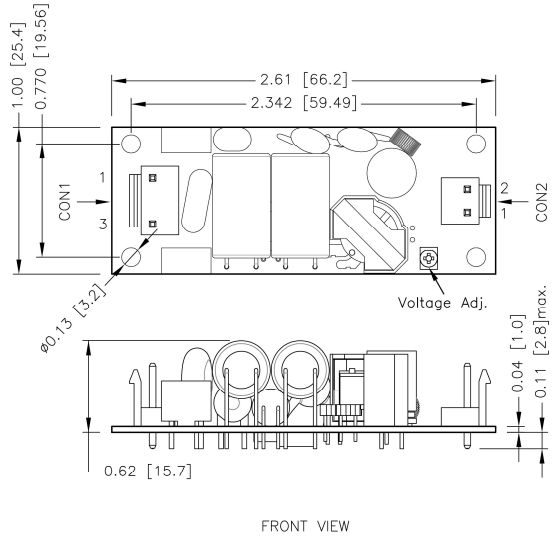
MAC15US12B Efficiency vs. Output Load



MAC15US12B Efficiency vs. Input Voltage

MECHANICAL DRAWING

MAC Connector type



FRONT VIEW

CONNECTORS CONNECTION

CON1 – Input Connector	
Pin 1	Line
Pin 3	Neutral

CON2 – Output Connector	
Pin 1	- Vout
Pin 2	+Vout

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

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

CONNECTOR OPTIONS

Blank: JST Type

Housing
CON1: **VHR-3N**
CON2: **VHR-2N**

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

-M Molex Type

Housing
CON1: **09-50-8031**
CON2: **09-50-8021**

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

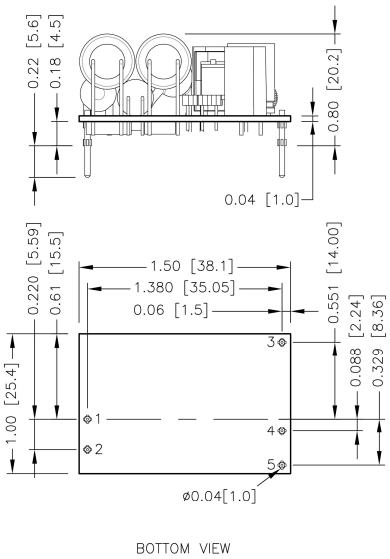
-T Terminal Block

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

Wire dimension range
26 ~ 16AWG

MECHANICAL DRAWING

MAC –**D** Pin type



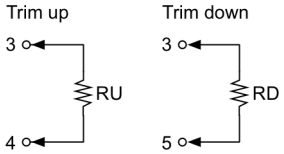
BOTTOM VIEW

PIN CONNECTION

PIN	SINGLE
1	Neutral
2	Line
3	Trim
4	-Vout
5	+Vout

EXTERNAL OUTPUT TRIMMING

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



1. All dimensions in inch [mm]
   Tolerance :x.xx±0.02 [x.x±0.5]
   x.xxx±0.01 [x.xx±0.25]
2. Pin pitch tolerance ±0.01 [0.25]
3. Pin dimension tolerance ±0.004[0.10]

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