



P-DUKE POWER

MSD40 Single Series

AC-DC POWER SUPPLIES
Up to 40 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



POWER
SAVE

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	POWER GOOD Indicator	Protection Class I Class II	OCP	OVP	SCP
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PART NUMBER STRUCTURE

M	S	D	40	U	S	12	□	-	□	□
Application		Dimension Code	Output Power (W)	Input Voltage (VAC)	Output Quantity	Output Voltage (VDC)	Protection Type		Connector Option	Package Option
Medical Application				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	□: CLASS I B: CLASS II		□: JST D: Pin Type M: Molex T: Terminal Block	□: None D1: Din rail type

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	Maximum Capacitor Load
	VAC	VDC	A	W	W	%	μF
MSD40US05-D MSD40US05-T	85 ~ 264	5	8	40	0.11	90	16000
MSD40US7P5-D MSD40US7P5-T	85 ~ 264	7.5	5.34	40	0.11	90	7120
MSD40US09-D MSD40US09-T	85 ~ 264	9	4.45	40	0.11	91	4945
MSD40US12-D MSD40US12-T	85 ~ 264	12	3.34	40	0.11	92	2785
MSD40US121-D MSD40US121-T	85 ~ 264	12	3.34	40	0.11	90	2785
MSD40US15-D MSD40US15-T	85 ~ 264	15	2.67	40	0.11	92	1780
MSD40US151-D MSD40US151-T	85 ~ 264	15	2.67	40	0.11	90	1780
MSD40US18-D MSD40US18-T	85 ~ 264	18	2.23	40	0.11	91	1250
MSD40US24-D MSD40US24-T	85 ~ 264	24	1.67	40	0.11	92	700
MSD40US28-D MSD40US28-T	85 ~ 264	28	1.43	40	0.11	91	510
MSD40US36-D MSD40US36-T	85 ~ 264	36	1.12	40	0.11	92	310
MSD40US48-D MSD40US48-T	85 ~ 264	48	0.84	40	0.11	93	175
MSD40US53-D MSD40US53-T	85 ~ 264	53	0.77	40	0.11	92.5	140

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				1.0	A
	240VAC and Full Load				0.5	
No load input power	230VAC	Connector type		0.15		Watts
		Pin type		0.11		
Leakage current	264VAC			75		μA
Start up time					1000	ms
Rise time				20		ms
Hold up time	115VAC and Full Load			25		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					40	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	5Vout	-0.7		+0.7	%
		Others	-0.5		+0.5	
	10% Load to 90% Load	5Vout	-0.6		+0.6	
		Others	-0.4		+0.4	
Voltage adjustability	Connector type	53Vout	-20		+10	%
		Others	-10		+10	
	Pin type		-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 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)	Input to Output	4000			VAC
		Input (Output) to F.G.	2500			
Isolation resistance	500VDC		0.1			GΩ
Switching frequency	230VAC	5Vout		70		kHz
		Others		120		
Safety approvals (Pending)			IEC/ EN/ ANSI/AAMI ES 60601-1 IEC/ EN/ UL 62368-1			
Weight		Connector type			295g (10.41oz)	
		Pin type			265g (9.35oz)	
MTBF	MIL-HDBK-217F, Full load				1.257 x 10 ⁶ hrs	

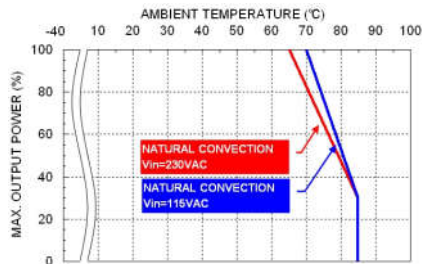
ENVIRONMENTAL SPECIFICATIONS

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

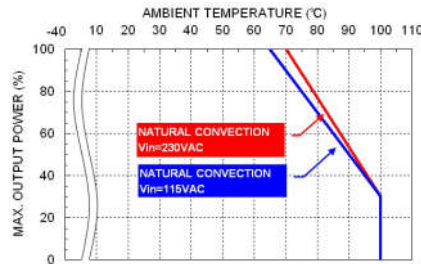
EMC SPECIFICATIONS

Parameter	Conditions	Level
EMI	EN60601-1-2, EN55011, EN55032 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	

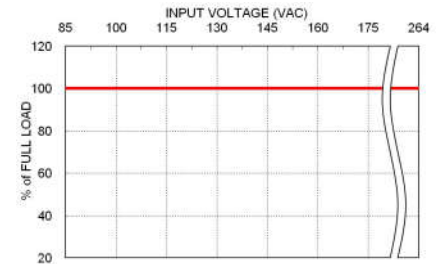
CHARACTERISTIC CURVE



Derating Curve vs. Ambient Temperature
Connector Option : (□): JST)



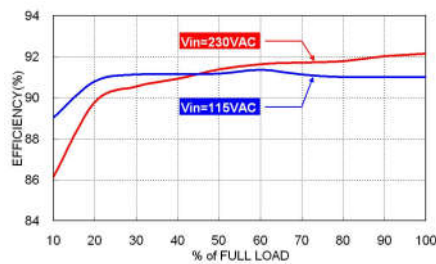
Derating Curve vs. Ambient Temperature
Connector Option : (-M / -T / -D)



MSD40 Derating Curve vs. Input Voltage



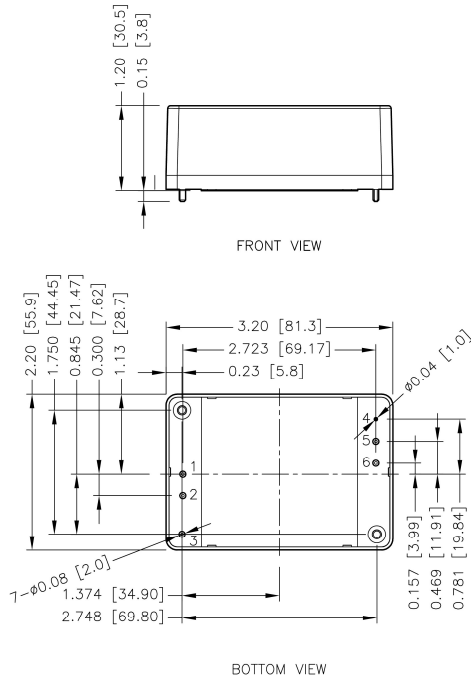
MSD40US24 Efficiency VS Input Voltage



MSD40US24 Efficiency VS Output Load

MECHANICAL DRAWING

MSD -D Pin Type



PIN CONNECTION

FOR CLASS I : (MSD40USXX-D)

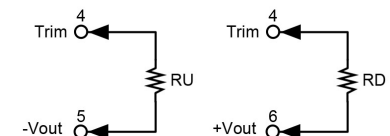
PIN	SINGLE	DIAMETER
1	Neutral	0.08 Inch
2	Line	0.08 Inch
3	PE	0.08 Inch
4	Trim	0.04 Inch
5	-Vout	0.08 Inch
6	+Vout	0.08 Inch

FOR CLASS II: (MSD40USXXB-D)

PIN	SINGLE	DIAMETER
1	Neutral	0.08 Inch
2	Line	0.08 Inch
3	No Pin	No Pin
4	Trim	0.04 Inch
5	-Vout	0.08 Inch
6	+Vout	0.08 Inch

EXTERNAL OUTPUT TRIMMING

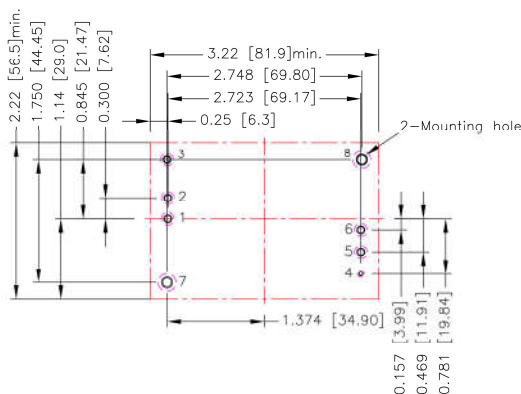
Output can be externally trimmed by using the method shown below.



1. All dimensions in inch [mm]
2. Tolerance :x.xx±0.02 [x.xx±0.5]
x.xxx±0.01 [x.xx±0.25]

RECOMMENDED PAD LAYOUT

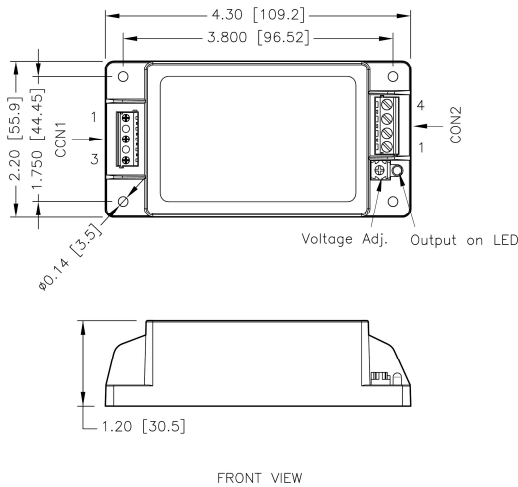
MSD -D Pin type



1. All dimensions in inch [mm]
Pad size (lead free recommended)
Through hole 4: \varnothing 0.051 [1.30]
Through hole 1, 2, 3, 5, 6: \varnothing 0.091 [2.30]
Through hole of mounting: \varnothing 0.126 [3.20]
Top view pad 4: \varnothing 0.064 [1.63]
Top view pad 1, 2, 3, 5, 6: \varnothing 0.113 [2.88]
Top view pad of mounting: \varnothing 0.157 [4.00]
Bottom view pad 4: \varnothing 0.102 [2.60]
Bottom view pad 1, 2, 3, 5, 6: \varnothing 0.181 [4.60]
Bottom view pad of mounting: \varnothing 0.252 [6.40]
2. The screw locked torque: MAX 3.5Kgf.cm / 0.34N.m

MECHANICAL DRAWING (CONTINUED)

MSD-**T** Connector type



CONNECTORS CONNECTION

FOR CLASS I: (MSD40USXX-T)

CON1 – Input Connector	
Pin 1	PE
Pin 2	Line
Pin 3	Neutral
CON2 – Output Connector	
Pin 1,2	-Vout
Pin 3,4	+Vout

FOR CLASS II: (MSD40USXXB-T)

CON1 – Input Connector	
Pin 2	Line
Pin 3	Neutral
CON2 – Output Connector	
Pin 1,2	-Vout
Pin 3,4	+Vout

1. All dimensions in inch [mm]
Tolerance : x.xx±0.02 [x.x±0.5]
x.xxx±0.010 [x.xx±0.25]


CONNECTOR OPTIONS

FOR CLASS I

Blank: JST Type

Mates with housing
CON1: **VHR-5N**
CON2: **VHR-4N**


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



-M Molex Type

Mates with housing
CON1: **09-50-8051**
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




FOR CLASS II

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

