



P-DUKE POWER

TSD65 Single Series

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

3
YEARS
WARRANTY

ROHS
COMPLIANT

REACH
COMPLIANT

+85°C
-40°C
AMBIENT TEMP.



Automation



Datacom



IPC



Industry



Measurement



Telecom



Medical



Automobile



Boat



Charger



PV



Railway



3000 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

PART NUMBER STRUCTURE

T	S	D	65	U	S	12		-			
Application	Dimension Code	Output Power (W)	Input Voltage (VAC)	Output Quantity	Output Voltage (VDC)	Protection Type	Connector Option	Package Code	Application Option		
Industry 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	<input type="checkbox"/> : CLASS I <input type="checkbox"/> : CLASS II	<input type="checkbox"/> : JST D : Pin Type M : Molex T : Terminal Block	<input type="checkbox"/> : None D1 : Din rail type	<input type="checkbox"/> : None C : OVCIII A : DC IN		

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

Model Number	Input Range VAC	Output Voltage VDC	Output Current Natural convection A	Max. Output Power W	Input Power @ No Load W	Efficiency %	Maximum Capacitor Load μF
TSD65US05-D TSD65US05-T	85 ~ 264	5	10	50	0.11	90	20000
TSD65US7P5-D TSD65US7P5-T	85 ~ 264	7.5	8.67	65	0.11	90	11560
TSD65US09-D TSD65US09-T	85 ~ 264	9	7.23	65	0.11	91	8033
TSD65US12-D TSD65US12-T	85 ~ 264	12	5.42	65	0.11	92.5	4520
TSD65US15-D TSD65US15-T	85 ~ 264	15	4.34	65	0.11	93.5	2900
TSD65US18-D TSD65US18-T	85 ~ 264	18	3.62	65	0.11	93.0	2015
TSD65US24-D TSD65US24-T	85 ~ 264	24	2.71	65	0.11	93.5	1130
TSD65US241-D TSD65US241-T	85 ~ 264	24	2.71	65	0.11	92	1130
TSD65US28-D TSD65US28-T	85 ~ 264	28	2.33	65	0.11	93.5	830
TSD65US281-D TSD65US281-T	85 ~ 264	28	2.33	65	0.11	91.5	830
TSD65US36-D TSD65US36-T	85 ~ 264	36	1.81	65	0.11	92.5	520
TSD65US48-D TSD65US48-T	85 ~ 264	48	1.36	65	0.11	93	285
TSD65US53-D TSD65US53-T	85 ~ 264	53	1.24	65	0.11	92.5	235

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	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			16		ms
Input inrush current	230VAC			60		A
Input protection	Internal fuse				T3.15A/250VAC	

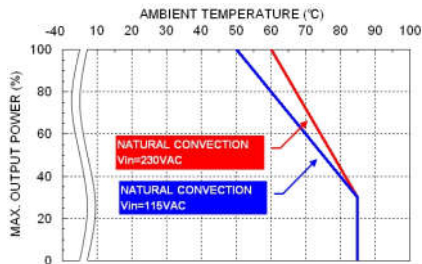
OUTPUT SPECIFICATIONS						
Parameter	Conditions		Min.	Typ.	Max.	Unit
Output power					65	Watts
Initial set voltage accuracy	230VAC and Full Load		-1.0		+1.0	%
Line regulation	Low Line to High Line at Full Load		-0.2		+0.2	%
Load regulation	No Load to Full Load	5Vout	-0.7		+0.7	%
		Others	-0.5		+0.5	
	10% Load to 90% Load	5Vout	-0.6		+0.6	
		Others	-0.4		+0.4	
Voltage adjustability	Connector type	53Vout	-20		+10	%
	Pin type	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 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 Recovery time		600	3	% 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 (Reinforced insulation)	Input to Output Input (Output) to F.G.	3000 2500			VAC
Isolation resistance	500VDC		0.1			GΩ
Switching frequency	230VAC	5Vout 7.5Vout 9Vout Others		60 80 70 120		kHz
Safety approvals (Pending)						IEC/ EN/ UL 62368-1
Weight		Connector type Pin type				295g (10.41oz) 265g (9.35oz)
MTBF	MIL-HDBK-217F, Full load					1.257 x 10 ⁶ hrs

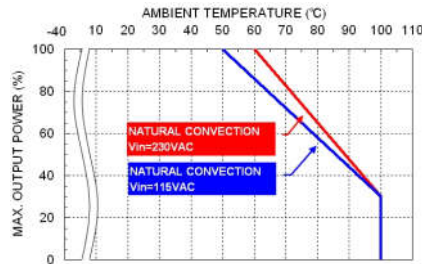
ENVIRONMENTAL SPECIFICATIONS						
Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating ambient temperature	Natural convection	With derating	-40		+85	°C
Storage temperature range			-40		+85	°C
Operating altitude					5000	m
Shock						IEC60068-2-27
Vibration						IEC60068-2-6
Relative humidity	Non-condensing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

EMC SPECIFICATIONS						
Parameter	Conditions		Level			
EMI	EN55032 and FCC Part 15		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					
EMS	EN55024					
ESD	EN61000-4-2	Air ± 15kV and Contact ± 6kV				Perf. Criteria A
Radiated immunity	EN61000-4-3	20 V/m				Perf. Criteria A
Fast transient	EN61000-4-4	± 4kV				Perf. Criteria A
Surge	EN61000-4-5	DM ± 2kV and CM ± 4kV				Perf. Criteria A
Conducted immunity	EN61000-4-6	20 Vr.m.s				Perf. Criteria A
Power frequency magnetic field	EN61000-4-8	100 A/m				Perf. Criteria A
Dip and interruptions	EN61000-4-11					

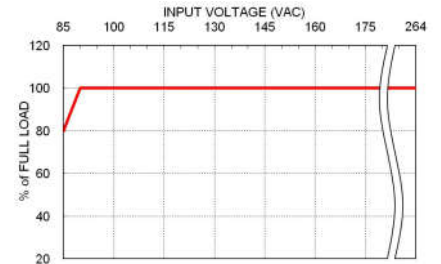
CHARACTERISTIC CURVE



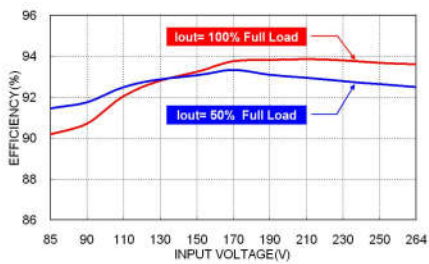
Derating Curve vs. Ambient Temperature
Connector Option : (□: JST)



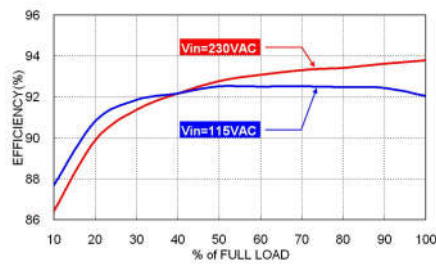
Derating Curve vs. Ambient Temperature
Connector Option : (-M / -T / -D)



TSD65 Derating Curve vs. Input Voltage



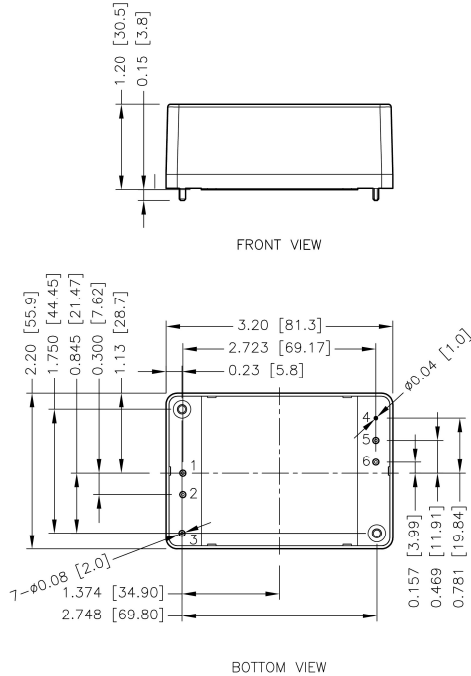
TSD65US24 Efficiency VS Input Voltage



TSD65US24 Efficiency VS Output Load

MECHANICAL DRAWING

TSD -D Pin Type



PIN CONNECTION FOR CLASS I : (TSD65USXX-D)

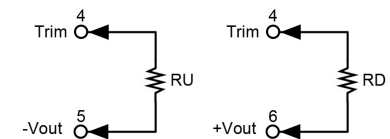
PIN	SINGLE	DIAMETER
1	Neutral	0.08 Inch
2	Line	0.08 Inch
3	PE	0.08 Inch
4	Trim	0.04 Inch
5	-Vout	0.08 Inch
6	+Vout	0.08 Inch

FOR CLASS II: (TSD65USXXB-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

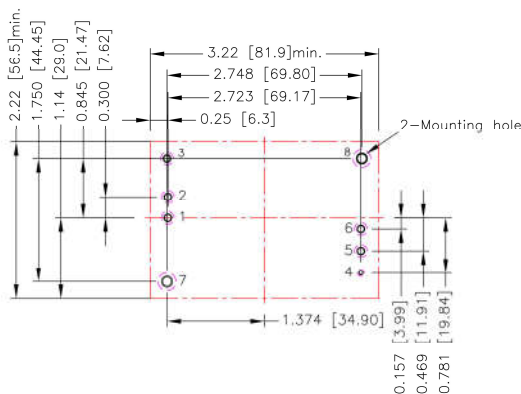
Output can be externally trimmed by using the method shown below.



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

RECOMMENDED PAD LAYOUT

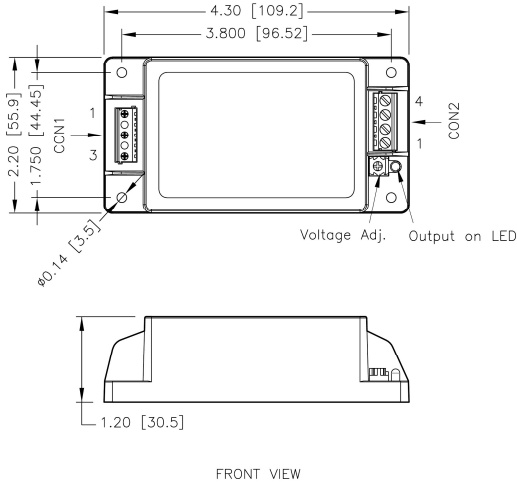
TSD -D Pin type



1. All dimensions in inch [mm]
- Pad size (lead free recommended)
- Through hole 4: ∅0.051 [1.30]
- Through hole 1.2.3.5.6: ∅0.091 [2.30]
- Through hole of mounting: ∅0.126 [3.20]
- Top view pad 4: ∅0.064 [1.63]
- Top view pad 1.2.3.5.6: ∅0.113 [2.88]
- Top view pad of mounting: ∅0.157 [4.00]
- Bottom view pad 4: ∅0.102 [2.60]
- Bottom view pad 1.2.3.5.6: ∅0.181 [4.60]
- Bottom view pad of mounting: ∅0.252 [6.40]
2. The screw locked torque: MAX 3.5Kgf.cm/0.34N.m

MECHANICAL DRAWING

TSD-**T** Connector type



CONNECTORS CONNECTION

FOR CLASS I: (TSD65USXX-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: (TSD65USXXB-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

