



DESCRIPTION: 1W 3KVDC Isolated Single and Dual Output DC/DC Converters

The PPA series are miniature, isolated 1W DC/DC converters in a SIP and DIP package. They offer the ideal solution in many space critical applications for board level power distribution. The internal SMD construction makes it possible to offer a product with high performance at low cost. The series offers smaller size, improved efficiency, lower output ripple noise and 3KVDC isolation.

FEATURES

RoHS compliant, CE certification	Efficiency up to 81%	Power density up to 0.86W/cm ³
Single and dual output from a single input rail	UL 94V-0 package material	No heat sink required
3KVDC isolation	Industry standard pinout	Power sharing on output
Input voltage: 24V, 48V	Output voltage: 5V, 9V, 12V, 15V, 24V / ±5V, ±9V, ±12V, ±15V, ±24V	Operating temperature: -40°C to 105°C

SELECTION GUIDE

Part Number	Nominal Input Voltage	Output Voltage	Output Current (Max./Min)	Efficiency	Package Style
	V	V	mA	%	
PPA2405DA	24	5	200/20	69	DIP
PPA2409DA	24	9	111/11.1	78	DIP
PPA2412DA	24	12	83/8.3	81	DIP
PPA2415DA	24	15	66/6.6	81	DIP
PPA2424DA	24	24	42/4.2	81	DIP
PPA4805DA	48	5	200/20	69	DIP
PPA4809DA	48	9	111/11.1	80	DIP
PPA4812DA	48	12	83/8.3	80	DIP
PPA4815DA	48	15	66/6.6	79	DIP
PPA2405D	24	±5	±100/±10	69	DIP
PPA2409D	24	±9	±56/±5.6	78	DIP
PPA2412D	24	±12	±41/±4.1	81	DIP
PPA2415D	24	±15	±32/±3.2	81	DIP
PPA2424D	24	±24	±21/±2.1	81	DIP
PPA2405S	24	±5	±100/±10	69	SIP
PPA2409S	24	±9	±56/±5.6	78	SIP
PPA2412S	24	±12	±42/±4.2	81	SIP
PPA2415S	24	±15	±34/±3.4	80	SIP
PPA2424S	24	±24	±21/±2.1	81	SIP
PPA4805D	48	±5	±100/±10	69	DIP
PPA4809D	48	±9	±56/±5.6	80	DIP
PPA4812D	48	±12	±42/±4.2	80	DIP
PPA4815D	48	±15	±34/±3.4	79	DIP
PPA4805S	48	±5	±100/±10	70	SIP
PPA4809S	48	±9	±56/±5.6	79	SIP
PPA4812S	48	±12	±43/±4.3	79	SIP
PPA4815S	48	±15	±33/±3.3	79	SIP

Add suffix "P" for continuous short circuit protection, for example PPA2405SP.

INPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Voltage range	24V input variants	22	24	27	V
Voltage range	48V input variants	44	48	53	V

OUTPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Rated Power	TA=-40°C to 85°C			1	W
Voltage Set Point Accuracy	See tolerance envelope				
Line regulation	High VIN to low VIN (voltage variation +/-5%)		1.0	1.2	%/%
Load Regulation(10% load to rated load)	5V output			14	%
Load Regulation(10% load to rated load)	all other output			12	%
Ripple & Noise	20MHz bandwidth		50	150	mvp-p

All specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified.

ABSOLUTE MAXIMUM RATINGS

Short-circuit protection	1 second
Lead temperature 1.5mm from case for 10 seconds	300°C
Internal power dissipation	450mW
Input voltage $V_{in,PPA24}$	28V
Input voltage $V_{in,PPA48}$	54V

ISOLATION CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation test voltage	Tested for 1 second	3000			VDC
Resistance	Viso= 1000VDC	1			GΩ

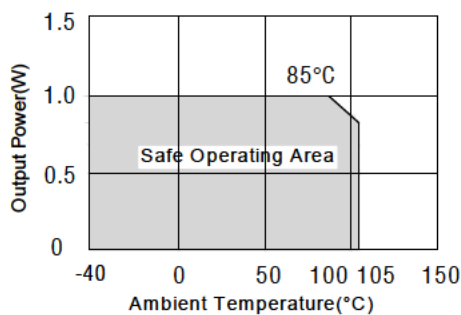
GENERAL CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Switching frequency	All input		110		kHz
case material	black DUPONT PRT-SK643FR UL94V-0				

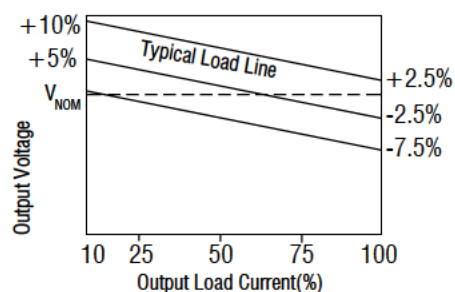
TEMPERATURE CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Specification	Derating if the temperature $\geq 85^\circ\text{C}$	-40		105	°C
Storage		-55		150	°C
Cooling	Free air convection				

TEMPERATURE DERATING GRAPHS



TOLERANCE ENVELOPES



SOLDERING INFORMATION

This series is compatible with RoHS soldering systems with a peak wave solder temperature of 300°C for 10 seconds. Both types in this series are backward compatible with Sn/Pb soldering systems.

ELECTROMAGNETIC COMPATIBILITY (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B (see Fig. 2 for recommended circuit)
Emissions	RE	CISPR32/EN55032 CLASS B (see Fig. 2 for recommended circuit)
Immunity	ESD	IEC/EN61000-4-2 Contact $\pm 6\text{KV}$ perf. Criteria B

DESIGN REFERENCE

Typical application

Input and/or output ripple can be further reduced, by connecting a filter capacitor from the input and/or output terminals to ground as shown in Fig.1. Choosing suitable filter capacitor values is very important for a smooth operation of the modules, particularly to avoid start-up problems caused by capacitor values that are too high. For recommended input and output capacitor values refer to Table 1.

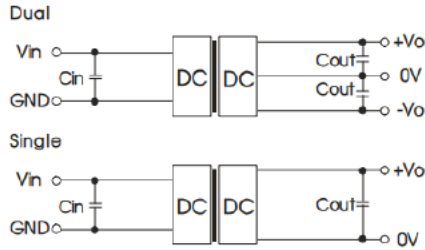


Fig 1

Table 1: Recommended input and output capacitor values

Vin (VDC)	Cin (µF)	Single Vout (VDC)	Cout (µF)	Dual Vout (VDC)	Cout (µF)
3.3/5	4.7	3.3/5	10	±3.3/±5	4.7
9/12	2.2	9/12	2.2	±9/±12	1
15	2.2	15/24	1	±15/±24	0.47
24	1	--	--	--	--

Minimum Output Load Requirement

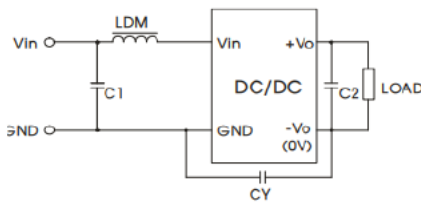


Fig 2

Input voltage (VDC)	3.3/5/9/12		15/24	
	EMI	C1	4.7µF /50V	
	C2	Refer to Cout in Fig 1		
	CY	1nF/2kV		
	LDM	6.8µH		

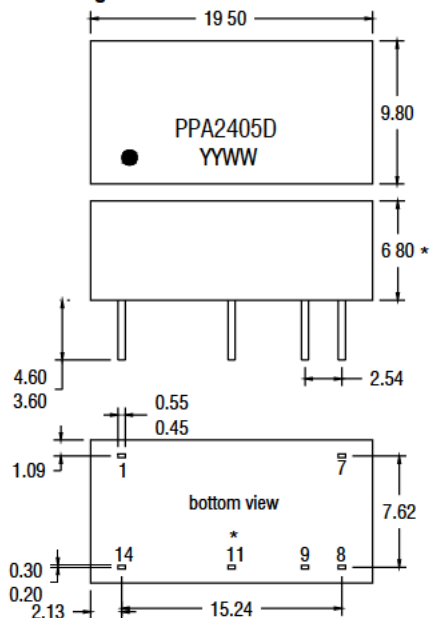
Note: For 15V/24V input models use a Y-capacitor CY of 1nF/2kV.

Minimum Output Load Requirement For a reliable and efficient operation of the converter, the minimum load should never be less than 10% of the rated output load. If the total required output power is below 10%, a parallel bleeding resistor is required on the output, ensuring that the sum of the power consumption is always maintained at 10% minimum.

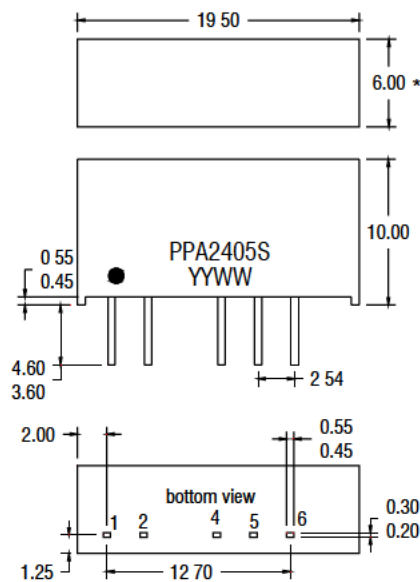
MECHANICAL DIMENSIONS

PIN CONNECTIONS

DIP Package



SIP Package



14 PIN DIP	
Pin	Function
1	-Vin
7	NC
8	OV
9	+Vout
11*	-Vout
14	+Vin

7 PIN SIP	
Pin	Function
1	+Vin
2	-Vin
4	-Vout
5	OV
6	+Vout

All dimensions in mm ±0.25mm. All pins on a 2.54 mm pitch and within ±0.25 mm of true position.

*7.70 for 48V variants

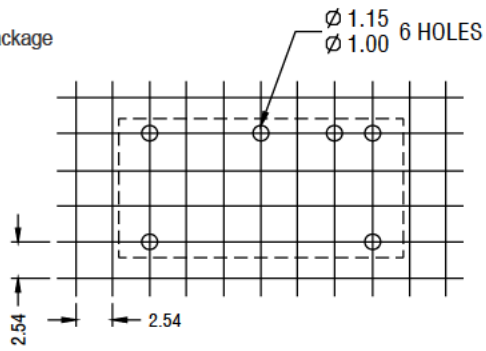
**7.50 for 48V

Weight: 2.4g (24V DIP) 2.9g (48V DIP) 2.2 g(24V SIP) 2.9g(48V SIP)

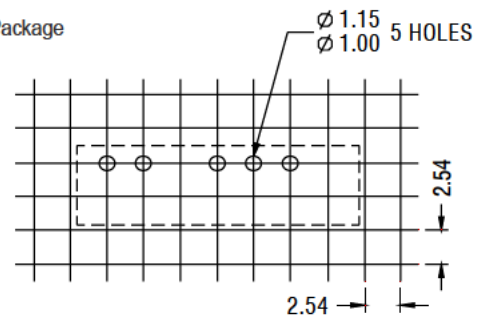
*Pin not fitted on single output variants

RECOMMENDED FOOTPRINT DETAILS

14 Pin DIP Package

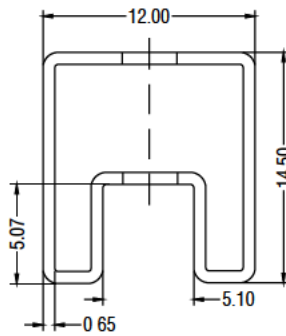


7 Pin SIP Package

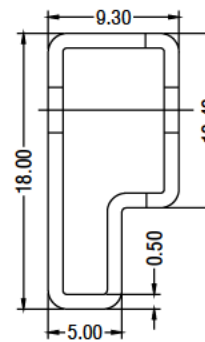


RoHS COMPLIANCE INFORMATION

14 Pin DIP Tube



7 Pin SIP Tube



Unless otherwise stated all dimensions in mm ± 0.5 mm.

Tube length (14 Pin DIP) : 520mm ± 2 mm.

Tube length (7 Pin SIP) : 520mm ± 2 mm.

Tube Quantity : 25PCS