



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	Efficiency up to 78%	Power density up to 0.85W/cm ³
Operating temperature :-40°C to 105°C	Single and dual output	UL 94V-0 package material
CE certification	3KVDC isolation	Industry standard pinout
Input voltage 3.3V,5V,12V,15V,24V,48V	Output voltage:3.3V,5V,9V,12V,15V ,24V/ 5V,±9V,±12V,±15V,±24V	/

SELECTION GUIDE

Part Number	Rated Input	Output voltage	Output current(Max./Min)	Efficiency (full load) %		Maximum capacity	Package
	V	V	mA	Min	Typ.	load (μF)	type
PPA0303DAP	3.3	3.3	303/30.3	64	68	2400	DIP
PPA0305DAP	3.3	5	200/20	64	70	2400	DIP
PPA0505DAP	5	5	200/20	64	68	2400	DIP
PPA0509DAP	5	9	111/11.1	65	71	1000	DIP
PPA0512DAP	5	12	83/8.3	69	74	560	DIP
PPA0515DAP	5	15	67/6.7	70	75	560	DIP
PPA0524DAP	5	24	42/4.2	74	77	220	DIP
PPA1203DAP	12	3.3	303/30.3	63	68	2400	DIP
PPA1205DAP	12	5	200/20	63	68	2400	DIP
PPA1209DAP	12	9	111/11.1	63	68	1000	DIP
PPA1212DAP	12	12	83/8.3	76	78	560	DIP
PPA1215DAP	12	15	67/6.7	70	75	560	DIP
PPA1505DAP	15	5	200/20	63	68	2400	DIP
PPA1512DAP	15	12	111/11.1	76	78	560	DIP
PPA1515DAP	15	15	67/6.7	70	75	560	DIP
PPA0505DP	5	±5	±100/±10	63	67	1200	DIP
PPA0509DP	5	±9	±56/±5.6	66	71	470	DIP
PPA0512DP	5	±12	±43/±4.3	76	78	200	DIP
PPA0515DP	5	±15	±33/±3.3	70	75	200	DIP
PPA0524DP	5	±24	±21/±2.1	74	77	100	DIP
PPA0303SP	3.3	±3.3	±151/±15.1	63	68	1200	SIP
PPA0305SP	3.3	±5	±100/±10	69	75	1200	SIP
PPA0312SP	5	±12	±43/±4.3	66	73	200	SIP
PPA0505SP	5	±5	±100/±10	63	67	1200	SIP
PPA0509SP	5	±9	±56/±5.6	66	71	470	SIP
PPA0512SP	5	±12	±43/±4.3	77	79	200	SIP
PPA0515SP	5	±15	±33/±3.3	70	75	200	SIP
PPA0524SP	5	±24	±21/±2.1	74	77	100	SIP
PPA1205DP	12	±5	±100/±10	69	73	1200	DIP
PPA1209DP	12	±9	±56/±5.6	66	71	470	DIP
PPA1212DP	12	±12	±43/±4.3	76	78	200	DIP
PPA1215DP	12	±15	±33/±3.3	70	75	200	DIP
PPA1224DP	12	±24	±21/±2.1	74	77	100	DIP
PPA1203SP	12	±3.3	±151/±15.1	63	68	1200	SIP
PPA1205SP	12	±5	±100/±10	63	68	1200	SIP
PPA1209SP	12	±9	±56/±5.6	63	69	470	SIP
PPA1212SP	12	±12	±43/±4.3	76	78	200	SIP
PPA1215SP	12	±15	±33/±3.3	70	75	200	SIP
PPA1224SP	12	±24	±21/±2.1	74	77	100	SIP
PPA1505DP	15	±5	±100/±10	63	68	1200	DIP
PPA1509DP	15	±9	±56/±5.6	64	69	470	DIP
PPA1512DP	15	±12	±43/±4.3	76	78	200	DIP
PPA1515DP	15	±15	±33/±3.3	70	75	200	DIP
PPA1524DP	15	±24	±21/±2.1	74	77	100	DIP
PPA1505SP	15	±5	±100/±10	63	68	1200	SIP
PPA1512SP	15	±12	±43/±4.3	76	78	200	SIP
PPA1515SP	15	±15	±33/±3.3	70	75	200	SIP

SELECTION GUIDE

Part Number	Rated Input	Output voltage	Output current(Max./Min)	Efficiency (full load) %		Maximum capacity load (μF)	Package type
	V	V	mA	Min	Typ.		
PPA2405DAP	24	5	200/20	63	68	2400	DIP
PPA2409DAP	24	9	111/11.1	68	73	1000	DIP
PPA2412DAP	24	12	83/8.3	68	73	560	DIP
PPA2415DAP	24	15	66/6.6	68	73	560	DIP
PPA2424DAP	24	24	42/4.2	72	76	220	DIP
PPA4805DAP	48	5	200/20	63	68	2400	DIP
PPA4809DAP	48	9	111/11.1	72	76	1000	DIP
PPA4812DAP	48	12	83/8.3	72	75	560	DIP
PPA4815DAP	48	15	66/6.6	72	75	560	DIP
PPA2405DP	24	±5	±100/±10	63	68	1200	DIP
PPA2409DP	24	±9	±56/±5.6	72	76	470	DIP
PPA2412DP	24	±12	±41/±4.1	72	75	200	DIP
PPA2415DP	24	±15	±32/±3.2	68	73	200	DIP
PPA2424DP	24	±24	±21/±2.1	72	75	100	DIP
PPA2405SP	24	±5	±100/±10	63	68	1200	SIP
PPA2409SP	24	±9	±56/±5.6	72	76	470	SIP
PPA2412SP	24	±12	±42/±4.2	72	75	200	SIP
PPA2415SP	24	±15	±34/±3.4	68	73	200	SIP
PPA2424SP	24	±24	±21/±2.1	72	75	100	SIP
PPA4805DP	48	±5	±100/±10	63	68	1200	DIP
PPA4809DP	48	±9	±56/±5.6	72	76	470	DIP
PPA4812DP	48	±12	±42/±4.2	72	75	200	DIP
PPA4815DP	48	±15	±34/±3.4	68	73	200	DIP
PPA4805SP	48	±5	±100/±10	63	68	1200	SIP
PPA4809SP	48	±9	±56/±5.6	72	76	470	SIP
PPA4812SP	48	±12	±43/±4.3	68	73	200	SIP
PPA4815SP	48	±15	±33/±3.3	68	73	200	SIP

Above parts are With continuous Output Short-circuit protection

INPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Voltage range	3.3V input	2.9	3.3	3.6	V
Voltage range	5V input	4.5	5	5.5	V
Voltage range	12V input	10.7	12	13.1	V
Voltage range	15V input	13.5	15	16.5	V
Voltage range	24V input	22	24	27	V
Voltage range	48V input	44	48	53	V
reflected ripple current			22	45	mA p-p

ABSOLUTE MAXIMUM RATINGS

Output Short-circuit protection	Continuous
Lead temperature 1.5mm from case for 10 seconds	<300°C
Internal power dissipation	450mW
Input voltage Vin, PPA03 variants	5.5V
Input voltage Vin, PPA05 variants	7V
Input voltage Vin, PPA12 variants	15V
Input voltage Vin, PPA15 variants	18V
Input voltage Vin, PPA24 variants	28V
Input voltage Vin, PPA48 variants	54V

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

OUTPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Load Regulation(10% load to rated load)	TA=-40°C to 85°C			1	W
Load Regulation(10% load to rated load)	See tolerance envelope				
Load Regulation(10% load to rated load)	High VIN to low VIN (voltage variation +/-5%)		1.0	1.2	%/%
Load Regulation(10% load to rated load)	5V & 12V input	5V output	10	13	%
Load Regulation(10% load to rated load)	5V & 12V input	9V output	9	10	%
Load Regulation(10% load to rated load)	5V & 12V input	12V output	7	8	%
Load Regulation(10% load to rated load)	5V & 12V input	15V output	6	7.0	%
Load Regulation(10% load to rated load)	15V input	5V output	6	10	%
Load Regulation(10% load to rated load)	15V input	12V output	3	4	%
Load Regulation(10% load to rated load)	15V input	15V output	3	4	%
Load Regulation(10% load to rated load)	24V & 48V input	5V output		14	%
Load Regulation(10% load to rated load)	24V & 48V input	others		12	%
Ripple & Noise	20MHz bandwidth		50	150	mvp-p

ISOLATION CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation test voltage	Tested for 1 minute,leakage current <1mA	3000			VDC
Resistance	Viso= 1000VDC	1			GΩ

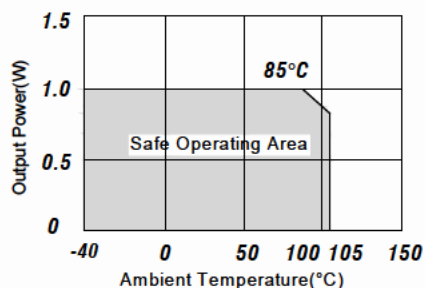
GENERAL CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Switching frequency	3.3V input		95		kHz
Switching frequency	5V, 24V,48 input		110		kHz
Switching frequency	12V input		130		kHz
Switching frequency	15V input		90		kHz
Case materials	PRT-SK643FR UL94V-0				
MTBF	MIL-HDBK-217F@25°C 3500khrs				

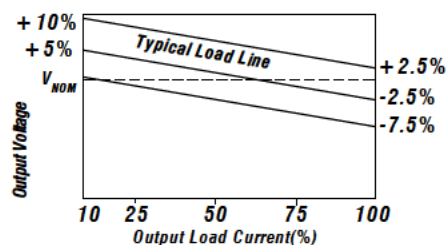
TEMPERATURE CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Operation temperature	Derating if the temperature ≥85°C	-40		105	°C
Storage Temperature		-50		130	°C
CASE Temperature rising	<25°C		25		°C
Cooling	Free air convection				

TEMPERATURE DERATING GRAPHS



TOLERANCE ENVELOPES



EMC CHARACTERISTICS

EMI	Conduction Emission	CISPR32/EN55032 CLASS B (see Fig. 2)
EMI	Radiation Emission	CISPR32/EN55032 CLASS B (see Fig. 2)
EMS	Electrostatic Discharge	IEC/EN61000-4-2 Contact $\pm 6\text{KV}$ perf. Criteria B

DESIGN REFERENCE

Typical application circuit

If it is required to further reduce input and output ripple, a filter capacitor may be connected to the input and output terminals, see Fig.1. Moreover, choosing a suitable filter capacitor is very important, start-up problems may be caused if the capacitance is too large. Under the condition of safe and reliable operation, the recommended capacitive load values are shown in Table 1.

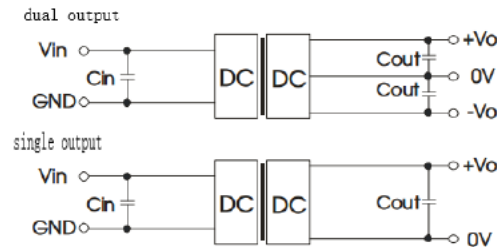


Fig 1

Recommended capacitive load value table (Table 1)

Vin (VDC)	Cin (μF)	single output (VDC)	Cout (μF)	dual output (VDC)	Cout (μF)
3.3/5	4.7	3.3/5	10	$\pm 3.3/\pm 5$	4.7
9/12	2.2	9/12	2.2	$\pm 9/\pm 12$	1
15	2.2	15/24	1	$\pm 15/\pm 24$	0.47
24/48	1	-	-	-	-

EMC solution-recommended circuit

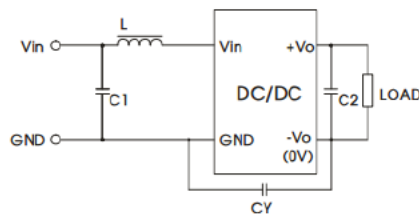


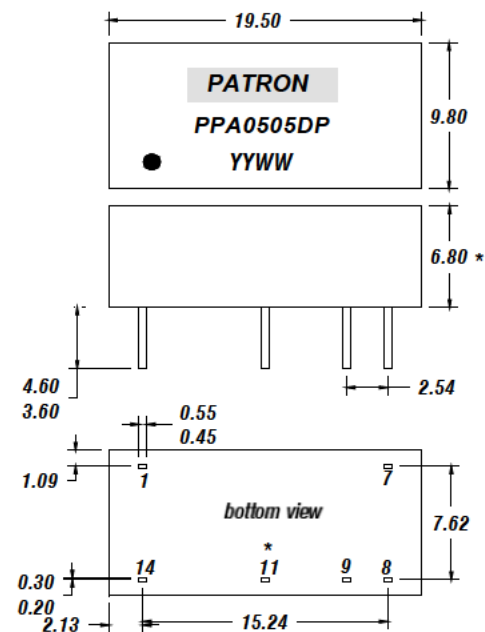
Fig 2

Input voltage	3.3/5/9/12	15/24/48
C1	4.7 μF /50V	
CY	-	1nF/2KV
C2	refer to the Cout in fig 1	
L	6.8 μH	

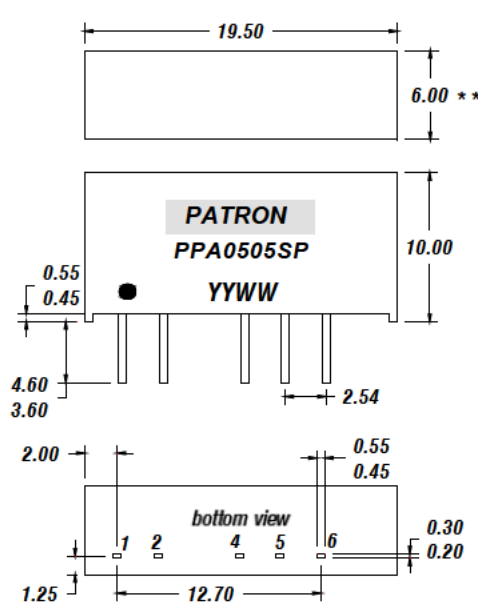
Output load should be at min. load 10%

MECHANICAL DIMENSIONS

DIP



SIP



All dimensions in mm $\pm 0.25\text{mm}$. All pins on a 2.54 mm pitch and within $\pm 0.25\text{ mm}$ 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

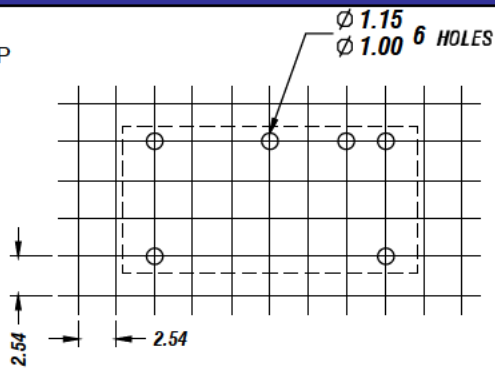
PIN CONNECTIONS

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

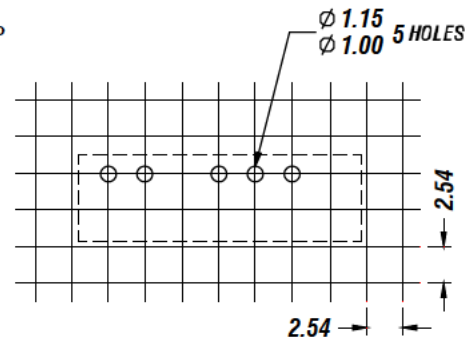
7 PIN SIP	
PIN	FUNCTION
1	+Vin
2	-Vin
4	-Vout
5	OV
6	+Vout

RECOMMENDED FOOTPRINT DETAILS

14 Pin DIP

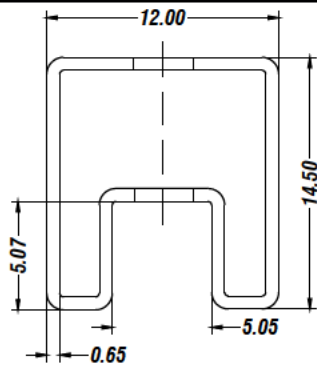


7 Pin SIP

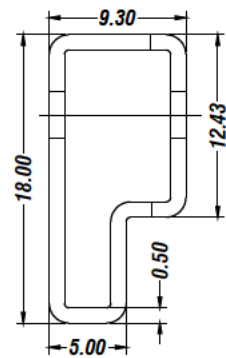


TUBE OUTLINE DIMENSIONS

14 Pin DIP



7 Pin SIP



All dimensions in mm±0.25mm

Tube Quantity : 10-25PCS

SOLDERING INFORMATION

1. This series is compatible with RoHS soldering systems with a peak wave solder temperature of 300°C for 10 seconds. Both SIP and DIP types in this series are backward compatible with Sn/Pb soldering systems.
2. The minimum output load cannot be less than 10% of the rated load. If the actual output power of the load in your circuit is indeed small, please parallel a resistor with an appropriate resistance value at the output end to increase the load, or choose our company's product with a smaller rated output power.