

DESCRIPTION:

1W 3KVDC Isolated Single & Dual Output DC/DC Converters

The PPV 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 and 3KVDC isolation

FEATURES

RoHS compliant, CE certification	Efficiency to 78%	Power density up to 0.85W/cm ³
Operating temperature: -40°C to	Single or dual output	3KVDC isolation (1 minute) /4KVDC isolated optional
Power sharing on dual output	Industry standard pinout	Input voltage: 3.3V,5V,9V,12V,15V,24V, 48V
UL 94V-0 package material	CTI level I	Output voltage: 3.3V,5V,9V,12V,15V,24V ±5V,±9V,±12V,±15V, ±24V

SELECTION GUIDE

certificate	Part Number	Rated Input	Output Voltage	Output current (Max./Min)	Efficiency (full load)%		Max capacity load Nominal value(μF)	Package Style
		V	V	mA	Min	Typ.		
CE	PPV0303DAP	3.3	3.3	303/30.3	71	75	2400	DIP
CE	PPV0305DAP	3.3	5	200/20	65	71	2400	DIP
CE	PPV0503DAP	5	3.3	303/30.3	71	72	2400	DIP
UL\CB\CE	PPV0505DAP	5	5	200/20	72	75	2400	DIP
	PPV0509DAP	5	9	111/11.1	72	75	1000	DIP
UL\CB\CE	PPV0512DAP	5	12	84/8.4	65	67	560	DIP
UL\CB\CE	PPV0515DAP	5	15	67/6.7	72	75	560	DIP
UL\CB\CE	PPV0524DAP	5	24	42/4.2	75	78	220	DIP
CE	PPV0303SAP	3.3	3.3	303/30.3	71	75	2400	SIP
CE	PPV0305SAP	3.3	5	200/20	69	72	2400	SIP
CE	PPV0503SAP	5	3.3	303/30.3	71	72	2400	SIP
UL\CB\CE	PPV0505SAP	5	5	200/20	72	75	2400	SIP
CE	PPV0509SAP	5	9	111/11.1	74	78	1000	SIP
UL\CB\CE	PPV0512SAP	5	12	84/8.4	65	67	560	SIP
UL\CB\CE	PPV0515SAP	5	15	67/6.7	72	75	560	SIP
UL\CB\CE	PPV0524SAP	5	24	42/4.2	75	78	220	SIP
CE	PPV0909SAP	9	9	111/11.1	62	68	1000	SIP
CE	PPV0915SAP	9	15	67/6.7	67	71	560	SIP
CE	PPV1205DAP	12	5	200/20	62	68	2400	DIP
CE	PPV1209DAP	12	9	111/11.1	62	68	1000	DIP
CE	PPV1212DAP	12	12	84/8.4	67	71	560	DIP
CE	PPV1215DAP	12	15	67/6.7	67	71	560	DIP
CE	PPV1203SAP	12	3.3	303/30.3	62	68	2400	SIP
CE	PPV1205SAP	12	5	200/20	62	68	2400	SIP
CE	PPV1209SAP	12	9	111/11.1	62	68	1000	SIP
CE	PPV1212SAP	12	12	84/8.4	67	71	560	SIP
CE	PPV1215SAP	12	15	67/6.7	67	71	560	SIP
CE	PPV1224SAP	12	24	42/4.2	68	73	220	SIP
CE	PPV1505DAP	15	5	200/20	65	67	2400	DIP
CE	PPV1505SAP	15	5	200/20	65	67	2400	SIP
CE	PPV1509SAP	15	9	111/11.1	68	72	1000	SIP
CE	PPV1512SAP	15	12	84/8.4	62	68	560	SIP
CE	PPV1515SAP	15	15	67/6.7	71	72	560	SIP
UL\CB\CE	PPV0505DP	5	±5	±100/±10	72	75	1200	DIP
CE	PPV0509DP	5	±9	±55/±5.5	72	75	470	DIP
UL\CB\CE	PPV0512DP	5	±12	±43/±4.3	65	67	220	DIP
CE	PPV0515DP	5	±15	±33/±3.3	72	75	220	DIP
CE	PPV0305SP	3.3	±5	±100/±10	70	73	1200	SIP
CE	PPV0315SP	3.3	±15	±33/±3.3	70	73	220	SIP
UL\CB\CE	PPV0505SP	5	±5	±100/±10	72	76	1200	SIP
CE	PPV0509SP	5	±9	±55/±5.5	72	75	470	SIP
UL\CB\CE	PPV0512SP	5	±12	±43/4.3	72	75	220	SIP
UL\CB\CE	PPV0515SP	5	±15	±33/±3.3	72	75	220	SIP
UL\CB\CE	PPV0524SP	5	±24	±21/±2.1	75	78	100	SIP
CE	PPV1205DP	12	±5	±100/±10	62	68	1200	DIP
CE	PPV1209DP	12	±9	±55/±5.5	62	68	470	DIP
CE	PPV1212DP	12	±12	±43/±4.3	67	71	220	DIP
CE	PPV1215DP	12	±15	±33/±3.3	67	71	220	DIP

SELECTION GUIDE

certificate	Part Number	Rated Input	Output voltage	Output current (Max./Min)	Efficiency (full load)%		Max capacity load Nominal value(μ F)	Package Style
		V	V	mA	Min	Typ.		
CE	PPV1205SP	12	± 5	$\pm 100/\pm 10$	62	68	1200	SIP
CE	PPV1209SP	12	± 9	$\pm 55/\pm 5.5$	62	68	470	SIP
CE	PPV1212SP	12	± 12	$\pm 43/\pm 4.3$	67	71	220	SIP
CE	PPV1215SP	12	± 15	$\pm 33/\pm 3.3$	67	71	220	SIP
CE	PPV1505SP	15	± 5	$\pm 100/\pm 10$	65	67	1200	SIP
CE	PPV1509SP	15	± 9	$\pm 55/\pm 5.5$	62	68	470	SIP
CE	PPV1512SP	15	± 12	$\pm 43/\pm 4.3$	62	68	220	SIP
CE	PPV1515SP	15	± 15	$\pm 33/\pm 3.3$	62	68	220	SIP
CE	PPV2405DAP	24	5	200/20	65	69	2400	DIP
CE	PPV2409DAP	24	9	111/11.1	69	74	1000	DIP
CE	PPV2412DAP	24	12	84/8.4	71	74	560	DIP
CE	PPV2415DAP	24	15	67/6.7	71	76	560	DIP
CE	PPV2403SAP	24	3.3	303/30.3	62	65	2400	SIP
CE	PPV2405SAP	24	5	200/20	65	69	2400	SIP
CE	PPV2409SAP	24	9	111/11.1	69	74	1000	SIP
CE	PPV2412SAP	24	12	84/8.4	72	76	560	SIP
CE	PPV2415SAP	24	15	67/6.7	71	76	560	SIP
CE	PPV2424SAP	24	24	42/4.2	72	76	220	SIP
CE	PPV4805DAP	48	5	200/20	65	69	2400	DIP
CE	PPV4809DAP	48	9	111/11.1	69	74	1000	DIP
CE	PPV4812DAP	48	12	84/8.4	71	74	560	DIP
CE	PPV4815DAP	48	15	67/6.7	71	76	2400	DIP
CE	PPV4803SAP	48	3.3	303/30.3	65	69	2400	SIP
CE	PPV4805SAP	48	5	200/20	65	69	2400	SIP
CE	PPV4809SAP	48	9	111/11.1	69	74	1000	SIP
CE	PPV4812SAP	48	12	84/8.4	71	74	560	SIP
CE	PPV4815SAP	48	15	67/6.7	71	76	560	SIP
CE	PPV2405DP	24	± 5	$\pm 100/\pm 10$	65	69	1200	DIP
CE	PPV2409DP	24	± 9	$\pm 56/\pm 5.6$	69	74	470	DIP
CE	PPV2412DP	24	± 12	$\pm 41/\pm 4.1$	71	74	220	DIP
CE	PPV2415DP	24	± 15	$\pm 33/\pm 3.3$	71	76	220	DIP
CE	PPV2405SP	24	± 5	$\pm 100/\pm 10$	65	69	1200	SIP
CE	PPV2409SP	24	± 9	$\pm 56/\pm 5.6$	69	74	470	SIP
CE	PPV2412SP	24	± 12	$\pm 41/\pm 4.1$	71	74	220	SIP
CE	PPV2415SP	24	± 15	$\pm 33/\pm 3.3$	75	77	220	SIP
CE	PPV4805DP	48	± 5	$\pm 100/\pm 10$	65	69	1200	DIP
CE	PPV4809DP	48	± 9	$\pm 56/\pm 5.6$	69	74	470	DIP
CE	PPV4812DP	48	± 12	$\pm 41/\pm 4.1$	71	74	220	DIP
CE	PPV4815DP	48	± 15	$\pm 33/\pm 3.3$	71	76	220	DIP
CE	PPV4805SP	48	± 5	$\pm 100/\pm 10$	65	69	1200	SIP
CE	PPV4809SP	48	± 9	$\pm 56/\pm 5.6$	69	74	470	SIP
CE	PPV4812SP	48	± 12	$\pm 41/\pm 4.1$	71	74	220	SIP
CE	PPV4815SP	48	± 15	$\pm 33/\pm 3.3$	71	76	220	SIP

All parts with output continuous short circuit protection, suffix "4H" for 4KVDC isolated, for example: PP0505SAP/4H.

INPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Voltage range	3.3Vin	2.9	3.3	3.6	V
Voltage range	5Vin	4.4	5	5.6	V
Voltage range	9Vin	8.03	9	10	V
Voltage range	12Vin	11	12	13.3	V
Voltage range	15Vin	13.4	15	16.4	V
Voltage range	24Vin	22	24	26.5	V
Voltage range	48Vin	43	48	53	V
Input current (full load)	3.3Vin			432.9	mA
Input current (full load)	5Vin			285.7	mA
Input current (full load)	9Vin			158.7	mA
Input current (full load)	12Vin			119.0	mA
Input current (full load)	15Vin			95.2	mA
Input current (full load)	24Vin			57	mA
Input current (full load)	48Vin			26	mA

ABSOLUTE MAXIMUM RATINGS

Short-circuit protection	Continuous, auto-recovery
Lead temperature 1.5mm from case for 10 seconds	300°C
Internal power consumption	540mW
Input voltage Vin, PPV03	5.5V
Input voltage Vin, PPV05	6.6V
Input voltage Vin, PPV09	11.5V
Input voltage Vin, PPV12	14.5V
Input voltage Vin, PPV15	18V
Input voltage Vin, PPV24	28V
Input voltage Vin, PPV48	54V

OUTPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Rated Power	TA=-45°C to 85°C			1	W
Voltage Set Point Accuracy	See tolerance envelope				
Line regulation	High Vin to low Vin $\pm 5\%$		1.0	1.2	%/%
Ripple & Noise	20MHz bandwidth		80	130	mVp-p
Load regulation(10% load to rated load)	3.3Vout		14	15	%
Load regulation(10% load to rated load)	5Vout		12	15	%
Load regulation(10% load to rated load)	9Vout		9	10	%
Load regulation(10% load to rated load)	12Vout		7.5	10	%
Load regulation(10% load to rated load)	15Vout		7.0	8.5	%
Load regulation(10% load to rated load)	24Vout		10	15	%

ISOLATION CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation test voltage	Tested for 1 minute, leakage current < 1mA	3000/4000			VDC
Isolation Resistance	Viso= 1000VDC	1			GΩ

GENERAL CHARACTERISTICS

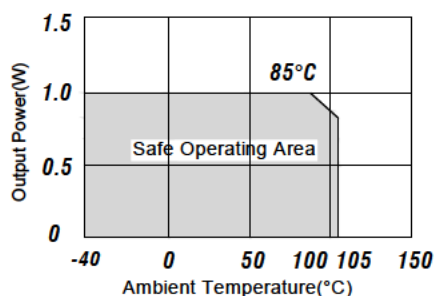
Parameter	Conditions	Min.	Typ.	Max.	Units
Switching frequency	3.3V input		95		kHz
Switching frequency	5V input		120	140	kHz
Switching frequency	9V input		120	140	kHz
Switching frequency	12V input		145	180	kHz
Switching frequency	15V input		90	180	kHz
Switching frequency	24V/48V input		110		kHz
MTBF	MIL-HDBK-217F@25°C		350		10khrs

TEMPERATURE CHARACTERISTICS

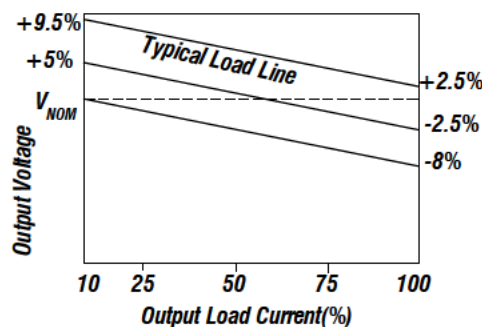
Parameter	Conditions	Min.	Typ.	Max.	Units
Operation temperature	Derating if the temperature $\geq 85^\circ\text{C}$	-40		105	°C
Storage temperature		-50		130	°C
Temperature Rising	5V input			30	°C
	Other input			30	°C
Cooling	Free air convection				

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

TEMPERATURE DERATING

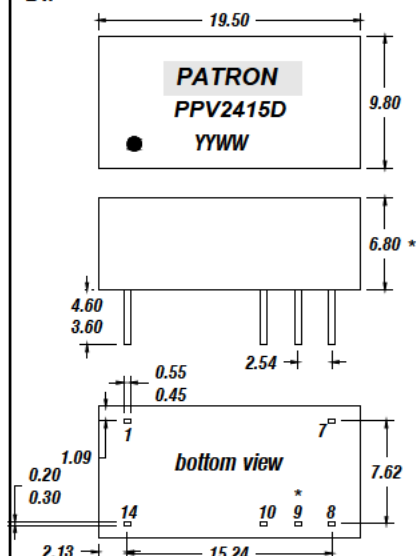


TOLERANCE ENVELOPES

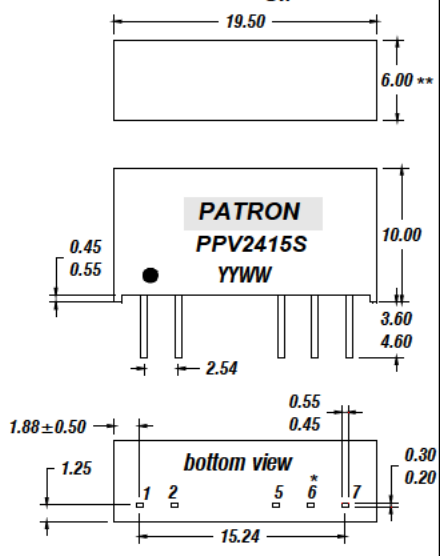


MECHANICAL DIMENSIONS

DIP



SIP



Pin not fitted on single output variants. All dimensions in mm ± 0.25 mm.

*7.70for 48V variants

****7.50 for 48V variants**

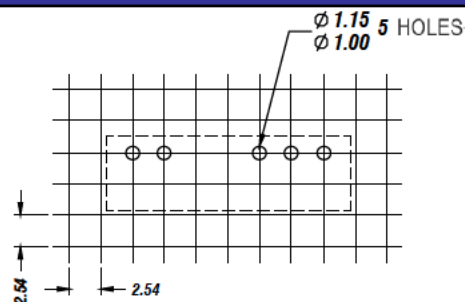
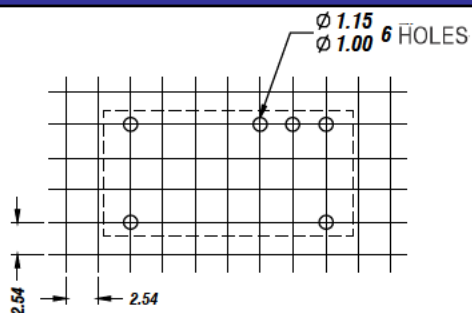
All pins on a 2.54mm pitch and within $\pm 0.25\text{mm}$ of true position Weight: 2.11g (DIP and SIP)

PIN CONNECTIONS

Dual output variants	
14 PIN DIP	
PIN	function
1	-Vin
7	NC
8	+Vout
9	0V
10	-Vout
14	+Vin
7 PIN SIP	
PIN	function
1	+Vin
2	-Vin
5	-Vout
6	0V
7	+Vout

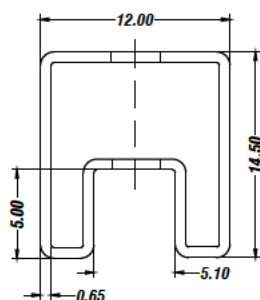
Single output variants	
14 PIN DIP	
PIN	function
1	-Vin
7	NC
8	+Vout
10	-Vout
14	+Vin
7 PIN SIP	
PIN	function
1	+Vin
2	-Vin
5	-Vout
7	+Vout

RECOMMENDED FOOTPRINT DETAILS

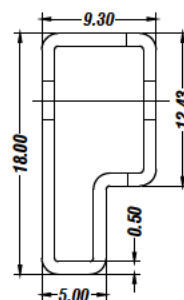


TUBE OUTLINE DIMENSIONS

14Pin DIP



7Pin SIP



Unless otherwise stated all dimensions in mm ± 0.5 mm.

Tube length (14 Pin DIP) : 520mm $\pm$ 2mm.

Tube length (7 Pin DIP) : 520mm $\pm$ 2mm.

Tube Quantity : 10-25PCS

SOLDERING INFORMATION

- 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.
- 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.

TYPICAL APPLIACTION CIRCUIT

If it is required to further reduce input and output ripple, a filter capacitor can be connected to the input and output terminals, see Fig.1. Moreover, choosing suitable filter capacitor is very important, start-up problems may be caused by too large capacitance.

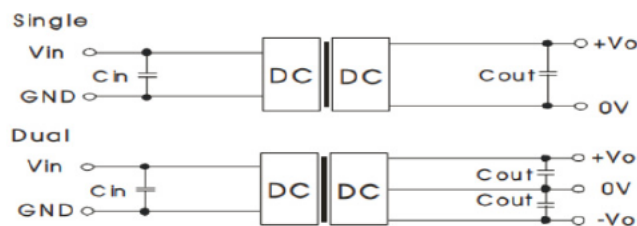


Fig. 1

table1: recommended capacitive load value table

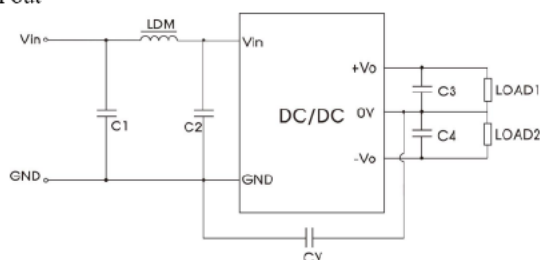
Vin	Cin	single	Cout	Dual	Cout
3.3VDC	10 μ F/16V	3.3VDC	10 μ F/16V	$\pm$ 3.3VDC	4.7 μ F/16V
5VDC	4.7 μ F/16V	5VDC	10 μ F/16V	$\pm$ 5VDC	4.7 μ F/16V
9VDC	2.2 μ F/25V	9VDC	2.2 μ F/16V	$\pm$ 9VDC	1 μ F/16V
12VDC	2.2 μ F/25V	12VDC	2.2 μ F/16V	$\pm$ 12VDC	1 μ F/25V
15VDC	2.2 μ F/25V	15VDC	1 μ F/25V	$\pm$ 15VDC	0.47 μ F/25V
24VDC	1 μ F/50V	24VDC	1 μ F/50V	$\pm$ 24VDC	0.47 μ F/50V

EMC CHARACTERISTICS

EMI	Conduction Emission	CISPR32/EN55032 CLASS
	Radiation Emission	CISPR32/EN55032 CLASS
EMS	Electrostatic Discharge	IEC/EN61000-4-2 Air $\pm$ 8kV, Contact $\pm$ 6kV perf. Criteria B

EMC recommend circuit

dual out



single out

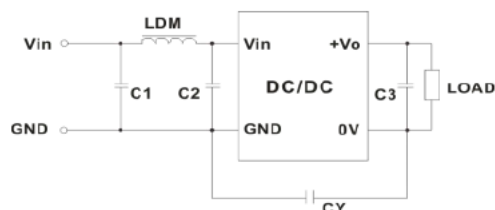


Table 2: Recommended EMC filter values

input voltage		3.3VDC		5VDC		other voltage
output voltage		3.3/5VDC	9/12/15/24VDC	3.3/5/9VDC	12/15/24VDC	--
EMI	C1/C2	4.7uF/16V	4.7uF/16V	4.7uF/25V	4.7uF/25V	4.7uF/50V
	CY	--	270pF /4kVDC VISHAY HGZ102MBP TDK CD45-E2GA102M-GKA	100pF/4kV	1000pF/4kV	270pF /3kVDC
	C3/C4	Refer to the Cout in Fig.1				
	LDM	6.8 μ H				