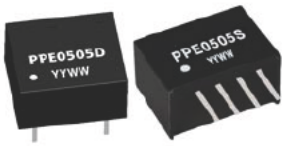
Patron
Passive Elektronic

PPE 3.3V, 5V & 12V Series



DESCRIPTION: **1W 1.5KVDC and 3KVDC Isolated Single Output DC/DC Converters**

The PPE 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.

FEATURES

RoHS compliant, CE certification	Single isolated output	SIP:1.5KVDC isolation/3KVDC isolation DIP: 3KVDC isolation
Efficiency up to 81%	Operating temperature :-40℃ to 105℃	Power density 1.53W/cm^3
UL 94V-0 package material	Industry standard pinout ,Footprint from 0.69cm^2	Maximum operating insulation voltage 1.5 KVDC
Input voltage: 3.3V, 5V, 12V	Output voltage:3.3V,5V, 7.2V,9V, 12V, 15V & 24V	no heat sink required
CTI class I (CTI ≥600)	The creepage distance and electrical gap of the filling device is 4.48mm	

SELECTION GUIDE

Part Number	Nominal Input Voltage V	Output Voltage V	Output Current (Max./Min) mA	Efficiency %(Typ.)	Max. capacity load uF	Package Style
PPE0303D	3.3	3.3	303/30.3	72	2400	DIP
PPE0305D	3.3	5	200/20	74	2400	DIP
PPE0303S	3.3	3.3	303/30.3	72	2400	SIP
PPE0305S	3.3	5	200/20	74	2400	SIP
PPE0309S	3.3	9	110/11	78	220	SIP
PPE0312S	3.3	12	83/8.3	78	220	SIP
PPE0315S	3.3	15	66/6.6	80	220	SIP
PPE0324S	3.3	24	42/4.2	79	220	SIP
PPE0503D	5	3.3	303/30.3	72	2400	DIP
PPE0505D	5	5	200/20	68	2400	DIP
PPE0509D	5	9	110/11	78	220	DIP
PPE0512D	5	12	83/8.3	77	220	DIP
PPE0515D	5	15	66/6.6	81	220	DIP
PPE0524D	5	24	42/4.2	80	220	DIP
PPE0503S	5	3.3	303/30.3	72	2400	SIP
PPE0505S	5	5	200/20	70	2400	SIP
PPE0507S	5	7.2	140/14	70	220	SIP
PPE0509S	5	9	110/11	78	220	SIP
PPE0512S	5	12	83/8.3	78	220	SIP
PPE0515S	5	15	66/6.6	80	220	SIP
PPE0524S	5	24	42/4.2	79	220	SIP
PPE1203D	12	3.3	303/30.3	72	2400	DIP
PPE1205D	12	5	200/20	69	2400	DIP
PPE1209D	12	9	110/11	74	220	DIP
PPE1212D	12	12	83/8.3	76	220	DIP
PPE1215D	12	15	66/6.6	75	220	DIP
PPE1224D	12	24	42/4.2	79	220	DIP
PPE1203S	12	3.3	303/30.3	72	2400	SIP
PPE1205S	12	5	200/20	71	2400	SIP
PPE1207S	12	7.2	140/14	71	220	SIP
PPE1209S	12	9	110/11	73	220	SIP
PPE1212S	12	12	83/8.3	76	220	SIP
PPE1215S	12	15	66/6.6	74	220	SIP
PPE1224S	5	24	42/4.2	79	220	SIP

Add suffix "P" for continuous short circuit protection, for example PPE0505SP. Add suffix "/3H" for 3KVDC isolated for SIP type only, for example PPE0505S/3H.

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	5.0	5.5	V
Voltage range	12V input	10.8	12.0	13.2	V
Reflected ripple current			26	48	mA p-p

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ISOLATION CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation test voltage SIP package	Tested for 1 min	1500			VDC
Isolation test voltage SIP package	Tested for 1 min (breakdown voltage between pin1 and pin3&4 short)	3000			VDC
Isolation test voltage DIP package	Tested for 1 min	2000/3000			VDC
Resistance	Viso= 1000VDC	1			GΩ

OUTPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Rated Power	TA= - 40°C to 85°C			1.0	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)	3.3V output		14	15	%
Load Regulation (10%load to rated load)	5V output		14	15	%
Load Regulation (10%load to rated load)	7V output		9	10	%
Load Regulation (10%load to rated load)	9V output		9	10	%
Load Regulation (10%load to rated load)	12V output		7.5	9.5	%
Load Regulation (10%load to rated load)	15V output		7.0	8.5	%
Load Regulation (10%load to rated load)	24V output		5.5	7.5	%
Ripple &noise	20MHZ bandwidth		70	100	mVp-p

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

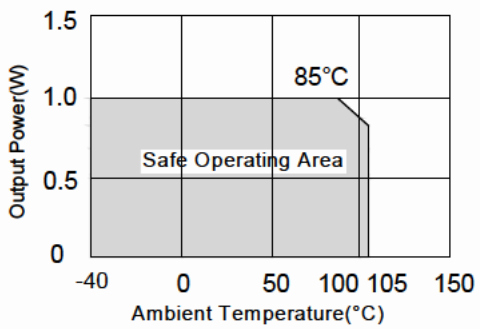
GENERAL CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Switching frequency	3.3V input		95		kHz
Switching frequency	5V input		110		kHz
Switching frequency	12V input		145		kHz
MTBF	MIL-HDBK-217F@25℃		350		10Khrs

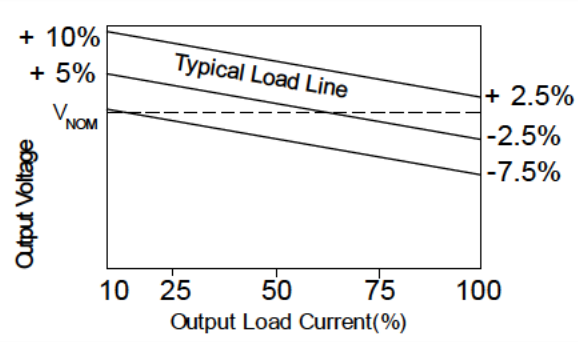
TEMPERATURE CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature	Derating if the temperature ≥85°C	-40		105	℃
Storage Temperature		-55		130	℃
Case Temperature above ambient	5V output			41	℃
Case Temperature above ambient	All other output			32	℃
Cooling	Free air convection				

TEMPERATURE DERATING GRAPHS



TOLERANCE ENVELOPES



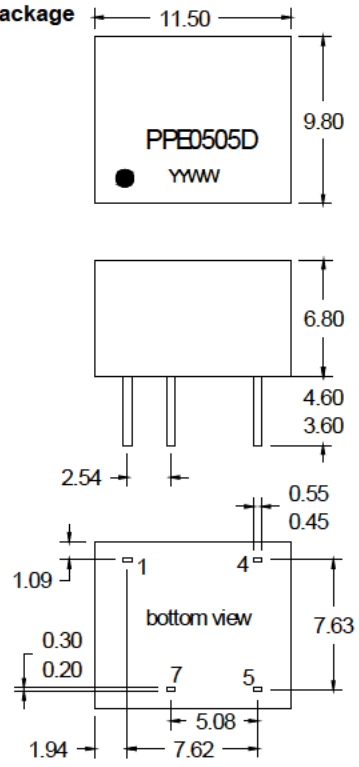
PPE 3.3V, 5V & 12V Series

SOLDERING INFORMATION

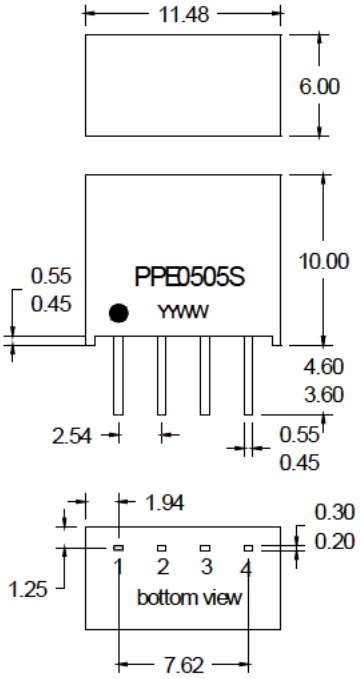
This series is compatible with RoHS soldering systems with a peak wave solder temperature of 300°C for 10 seconds. Both types in this series are backward compatible with Sn/Pb soldering systems.

MECHANICAL DIMENSIONS

DIP Package



SIP Package



All dimensions in mm ±0.25mm. All pins on a 2.54 mm pitch and within ±0.25mm of true position
Weight: 1.30g (SIP) 1.48g (DIP)

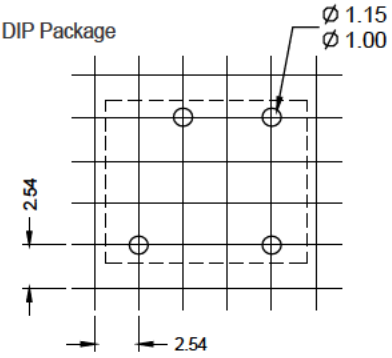
PIN CONNECTIONS

8 PIN DIP	
Pin	Function
1	-Vin
4	+Vin
5	+Vout
7	-Vout

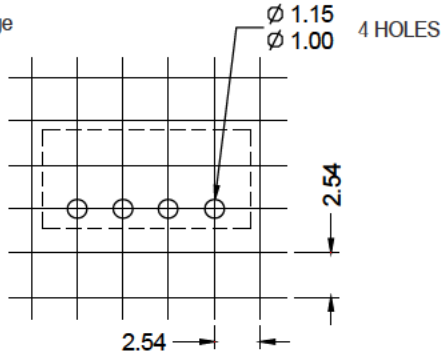
4 PIN SIP	
Pin	Function
1	-Vin
2	+Vin
3	-Vout
4	+Vout

RECOMMENDED FOOTPRINT DETAILS

8Pin DIP Package

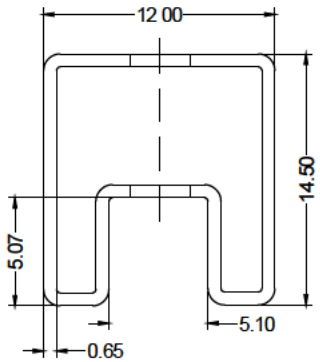


4Pin SIP Package

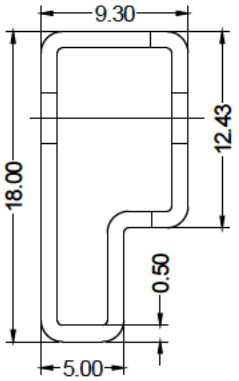


TUBE OUTLINE DIMENSIONS

8Pin DIP Tube



4Pin SIP Tube



Unless otherwise stated all dimensions in mm ±0.5mm.
Tube length (8 Pin DIP) : 520mm ±2mm.
Tube length (4 Pin SIP) : 520mm ±2mm.
Tube Quantity : 17-35PCS

DESIGN REFERENCE

1. 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 Table1

Fig 1

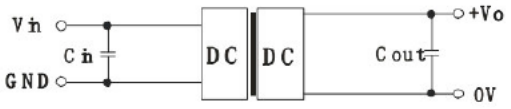


Table 1: Recommended input and output capacitor values

Vin	Cin	Vo	Cout
3.3VDC	10μF/25V	3.3VDC	10μF/16V
5VDC	4.7μF/16V	5VDC	10μF/16V
12VDC	2.2μF/25V	9VDC	2.2μF/16V
15VDC	2.2μF/25V	12VDC	2.2μF/25V
24VDC	1μF/50V	15VDC	1μF/25V
--	--	24VDC	1μF/50V

EMC CHARACTERISTICS

EMI	Conduction Emission	CISPR32/EN55032 CLASS B (see Fig2)
	Radiation Emission	CISPR32/EN55032 CLASS B (see Fig2)
EMS	Electrostatic Discharge	IEC/EN61000-4-2 Air ±8kV, Contact ±6kV per. Criteria B (see Fig2)

EMC recommend circuit

Fig 2

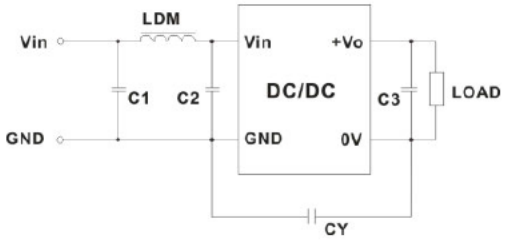


Table 2: Recommended EMC filter values

Input voltage		3.3DVC		5DVC		12/15/24DVC
Output voltage		3.3/5VDC	9/12/15/24VDC	3.3/5/9VDC	12/15/24VDC	--
Emissions	C1/C2	4.7μF /16V	4.7μF/16V	4.7μF/25V	4.7μF/25V	4.7μF/50V
	CY	--	270pF /4kVDC VISHAY HGZ102MBP	100pF/4kV	1000pF/4kV	270pF/2kV
	C3	Refer to the Cout in table 1				
	LDM	6.8μH				