



PHI-CON

2W SMD DC-DC Converter P2JS-Series

- SMD 8 lead package
- Up to 3000 V_{DC} isolation
- MTBF > 3.5 Mio. h at 25 °C
- -40...105 °C operating temperature range
- Efficiency up to 86 %
- Continuous short circuit protection



Model guide

Type	Input voltage range [V _{DC}]	Input current		Output voltage [V _{DC}]	Output current		Output ripple & noise (see note 4) [mVp-p] typ.	Efficiency typ. @ full load [%]	Maximum capacitive load [µF]
		Full load [mA] typ.	No load [mA] typ.		min. [mA]	max. [mA]			
P2JS053R3S	4.5..5.5	506	30	3.3	40	400	100	78	220
P2JS0505S	4.5..5.5	506	30	5.0	40	400	100	79	220
P2JS0509S	4.5..5.5	506	30	9.0	22	220	100	82	220
P2JS0512S	4.5..5.5	506	30	12.0	17	167	100	82	220
P2JS0515S	4.5..5.5	506	30	15.0	13	130	100	83	220
P2JS0524S	4.5..5.5	506	30	24.0	8	83	100	84	220
P2JS123R3S	10.8..13.2	212	25	3.3	40	400	100	78	220
P2JS1205S	10.8..13.2	212	25	5.0	40	400	100	79	220
P2JS1209S	10.8..13.2	212	25	9.0	22	220	100	82	220
P2JS1212S	10.8..13.2	212	25	12.0	17	167	100	82	220
P2JS1215S	10.8..13.2	212	25	15.0	13	130	100	83	220
P2JS1224S	10.8..13.2	212	25	24.0	8	83	100	84	220
P2JS1505S	13.5..16.5	169	18	5.0	40	400	100	79	220
P2JS1512S	13.5..16.5	169	18	12.0	17	167	100	82	220
P2JS1515S	13.5..16.5	169	18	15.0	13	130	100	83	220
P2JS1524S	13.5..16.5	169	18	24.0	8	83	100	84	220
P2JS243R3S	21.6..26.4	105	15	3.3	40	400	100	78	220
P2JS2405S	21.6..26.4	105	15	5.0	40	400	100	79	220
P2JS2409S	21.6..26.4	105	15	9.0	22	220	100	82	220
P2JS2412S	21.6..26.4	105	15	12.0	17	167	100	82	220
P2JS2415S	21.6..26.4	105	15	15.0	13	130	100	83	220
P2JS2424S	21.6..26.4	105	15	24.0	8	83	100	86	220

Specifications

Input	
Voltage range	± 10 % of nominal
Filter	Capacitors
Reflected ripple current	15 mA _{p-p} , typ.
Input / output:	
Isolation voltage tested for 60 sec. @ leakage current < 1mA	3 kV _{DC}
Isolation resistance @ 500 V _{DC}	10 ⁹ Ω, min.
Capacitance	20 pF, typ.
Output	
Output voltage drift @ 3.3V V _{out} models	± 1.5 % @ 1% V _{in} change
Output voltage drift @ all other models	± 1.2 % @ 1% V _{in} change
Output voltage tolerance	± 5 % @ 70 % load, See output voltage tolerance diagram
Output voltage deviation at load change	See output voltage tolerance diagram
Temperature coefficient	0.03 % / °C, max., at full load
Short circuit protection	Continuous, auto recovery
General	
Switching frequency	100 kHz, typ. 300 kHz, max.
Reliability, MTBF (MIL-HDBK-217 @ 25 °C)	3.5 Mio. hours
Physical	
Package material	Epoxy resin (UL94-V0)
Weight	1.5 g, typ.

Environmental		
Operating temperature (ambient)	-40 °C to +105 °C	
Storage temperature	-55 °C to +125 °C	
Derating	See derating curve	
Cooling	Free air convection	
Case temperature rise at full load	25 °C	
Humidity	Up to 95 %, non condensing	
EMC		
EMI	CE	CISPR22 / EN55022 class B (Recommended circuit refer to Fig. 1)
	RE	CISPR22 / EN55022 class B (Recommended circuit refer to Fig. 1)
EMS	ESD	IEC/EN61000-4-2 contact ± 8 kV perf. criteria B
Absolute maximum ratings		
V _{in} 5 V types	-0.7 ~ 9 V _{DC} , max. 1 s	
V _{in} 12 V types	-0.7 ~ 18 V _{DC} , max. 1 s	
V _{in} 15 V types	-0.7 ~ 21 V _{DC} , max. 1 s	
V _{in} 24 V types	-0.7 ~ 30 V _{DC} , max. 1 s	
Manual soldering lead temperature	300 °C max. 10 s max., 1.5 mm distance from body	
Soldering temperature	217 °C for 60 s max., 245 °C peak	
Moisture sensitivity level (MSL)	IPC/JEDEC J-STD-020D.1	

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Input reflected ripple current measure circuit

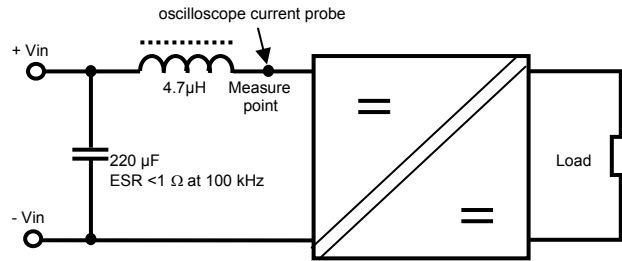
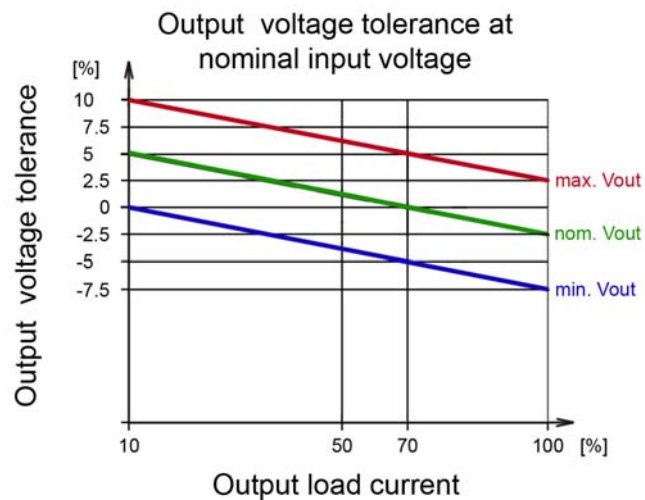
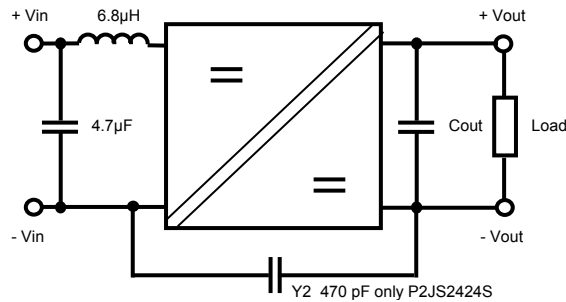
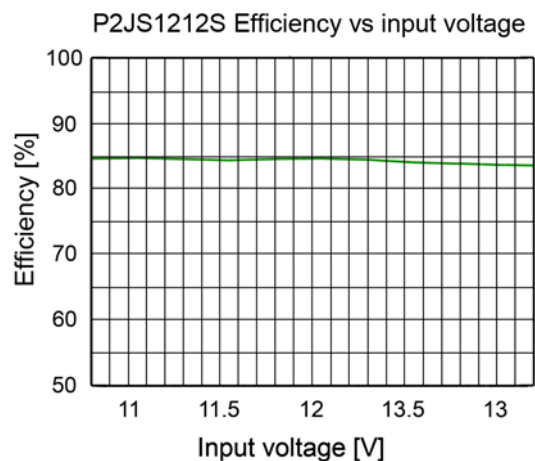
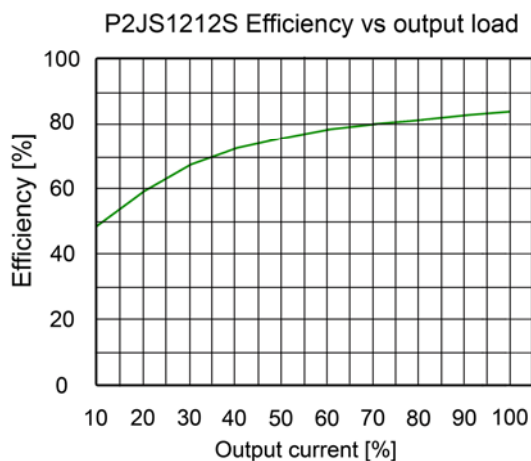
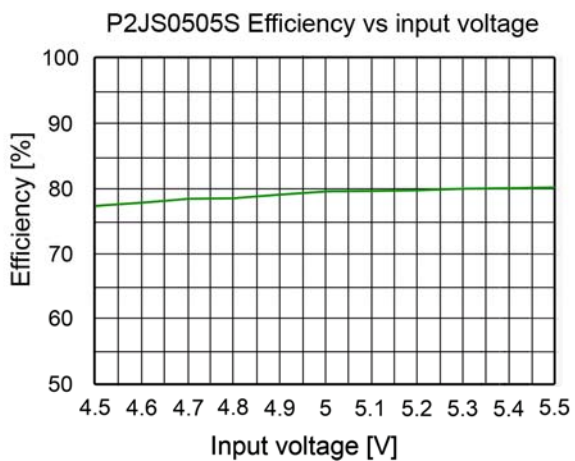
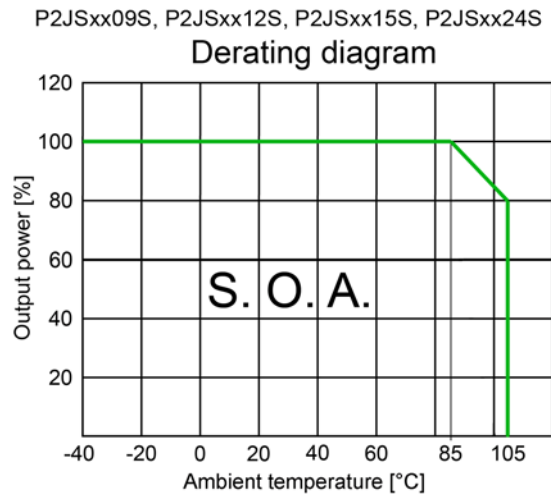
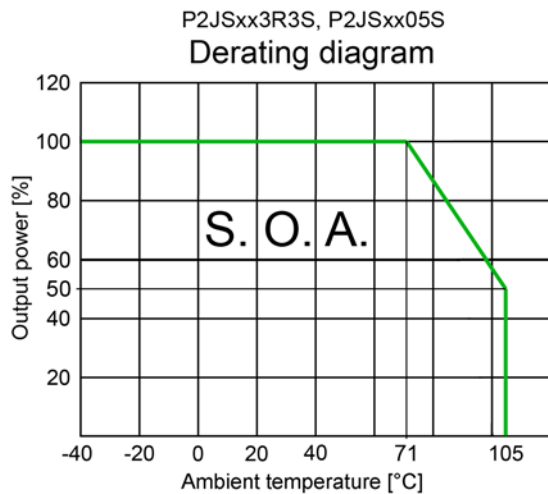


Figure 1 Recommended EMC / EMI circuit for Class B standard



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Note:

1. Operation under minimum load will not damage the converter, however they may not meet all specifications.
2. Max. capacitive load is tested at nominal input voltage and full load.
3. Unless otherwise noted, all specifications are measured at Ta 25 °C, humidity <75 %, nominal input voltage and rated output load.
4. Ripple and noise tested with „parallel cable“ method.
5. P2JS-series is not usable for IGBT driver applications.

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Application notes

1) Requirement on output load

To ensure this module can operate efficiently and reliably during operation, the minimum output load must be **higher than 10 % of the full load**. If the actual output power is very small, please connect a resistor with proper resistance at the output end in parallel to increase the load, or use our company's products with a lower rated output power. Operation with smaller load than minimum load will not damage the converter. However, they may not meet all specification listed, and that will reduce the life time of product.

2) Overload Protection

Under normal operating conditions, the output circuit of these products has no protection against overload. The simplest method is to connect a self recovery fuse in series at the input end or add a circuit breaker to the circuit.

3) Output Voltage Regulation and Over-voltage Protection Circuit

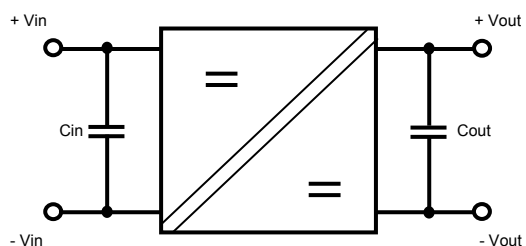
The simplest device for output voltage regulation, over voltage and over current protection is a linear voltage regulator with overheat protection that is connected to the input or output end in series.

4) Recommended circuit

If you want to further decrease the input / output ripple, filter capacitors may be connected to the input and output ends of the DC/DC converter, see (Figure 3).

It should also be noted that the capacitance of the capacitor must be proper. If the capacitance is too large, a startup problem might arise. It should also be noted that the capacitance of the capacitor must be proper. If the capacitance is too large, a startup problem might arise. For an safe and reliable operation of every model, the recommended capacitance of the capacitor refer to table below.

Figure 3



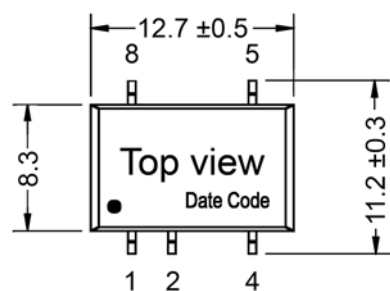
Vin	Cin	Vout	Cout
P2JS05xxS	4.7 μ F	P2JSxx3R3S	10 μ F
P2JS12xxS	2.2 μ F	P2JSxx05S	10 μ F
P2JS15xxS	2.2 μ F	P2JSxx09S	4.7 μ F
P2JS24xxS	1 μ F	P2JSxx12S	2.2 μ F
		P2JSxx15S	1 μ F
		P2JSxx24S	0.47 μ F

It's not recommended to connect any external capacitor in the application field with less than 0.5 W output power!

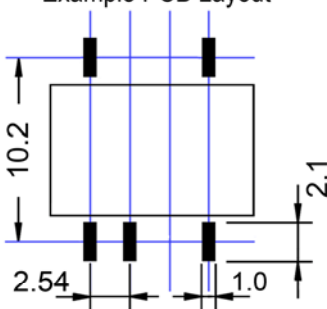
5) The input and the output of the product are recommended to be connected to ceramic capacitor or electrolytic capacitor. Using tantalum capacitor may cause risk of failure

6) Not for parallel connection or plug and play (hot swap) application!

Package dimensions



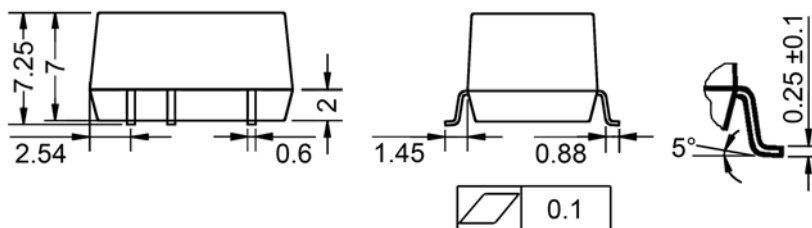
Example PCB Layout



Lead	
1	- Vininput
2	+ Vininput
3	No lead
4	- Voutput
5	+ Voutput
6	No lead
7	No lead
8	Not connected

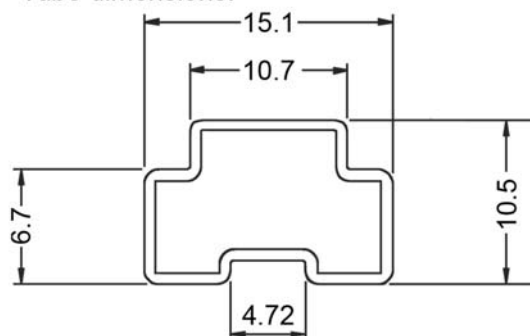
Notes:

All dimensions are in mm
General tolerances ± 0.25 mm
Pin tolerances ± 0.1 mm



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Tube dimensions:



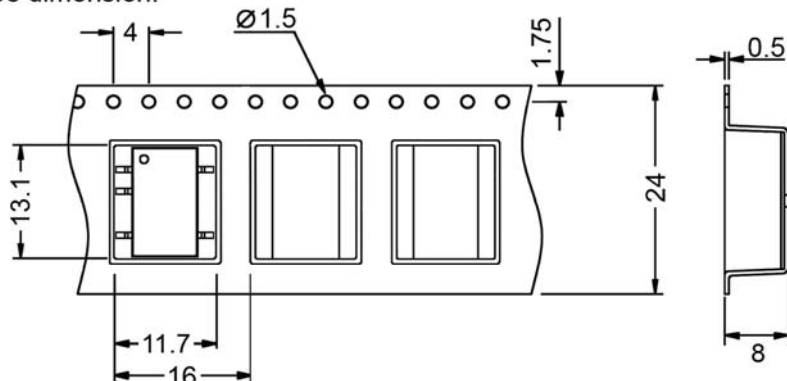
Unit: mm

General tolerances: ± 0.5 mm

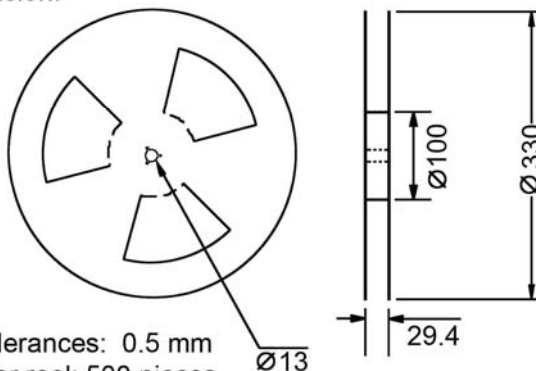
Short tube 220 mm, quantity 15 pieces

Long tube 530 mm, quantity 40 pieces

Tape dimension:



Reel dimension:



Unit: mm

General tolerances: 0.5 mm

Quantity per reel: 500 pieces

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