



PHI-CON

1 W DC-DC Converter P1T-Series

- DIL16 package
- Wide 2:1 input range
- Isolation 1 kV_{DC} optional 3 kV_{DC}
- Continuous short circuit protection



Model guide

Type	Input voltage		Input current no load [mA] typ.	Input current full load [mA] typ.	Output voltage [V _{DC}]	Output current		Efficiency typ. [%] typ.	Capacitive load (See note 1) [μF] max.
	Nominal [V _{DC}]	Range [V _{DC}]				[mA] min.	[mA] max.		
Single output									
P1T053R3S	5	4.5...9	15	300	3.3	76	303	67	3300
P1T0505S	5	4.5...9	15	300	5.0	50	200	67	3300
P1T0509S	5	4.5...9	40	285	9.0	28	111	70	470
P1T0512S	5	4.5...9	55	285	12.0	21	83	70	470
P1T0515S	5	4.5...9	55	285	15.0	17	67	70	470
P1T0524S	5	4.5...9	70	295	24.0	10	42	68	220
P1T123R3S	12	9...18	15	120	3.3	76	303	70	3300
P1T1205S	12	9...18	15	115	5.0	50	200	72	3300
P1T1209S	12	9...18	15	110	9.0	28	111	77	470
P1T1212S	12	9...18	15	110	12.0	21	83	77	470
P1T1215S	12	9...18	15	110	15.0	17	67	77	470
P1T1224S	12	9...18	15	115	24.0	10	42	73	220
P1T243R3S	24	18...36	8	60	3.3	76	303	70	3300
P1T2405S	24	18...36	8	55	5.0	50	200	72	3300
P1T2409S	24	18...36	8	55	9.0	28	111	75	470
P1T2412S	24	18...36	8	55	12.0	21	83	75	470
P1T2415S	24	18...36	8	55	15.0	17	67	75	470
P1T2424S	24	18...36	8	55	24.0	10	42	75	220
P1T483R3S	48	36...72	6	30	3.3	76	303	66	3300
P1T4805S	48	36...72	6	30	5.0	50	200	68	3300
P1T4809S	48	36...72	6	30	9.0	28	111	70	470
P1T4812S	48	36...72	6	30	12.0	21	83	70	470
P1T4815S	48	36...72	6	30	15.0	17	67	70	470
P1T4824S	48	36...72	6	30	24.0	10	42	68	220
Dual output									
P1T053R3D	5	4.5...9	15	285	±3.3	±38	±152	70	2 x 1000
P1T0505D	5	4.5...9	15	270	±5.0	±25	±100	74	2 x 1000
P1T0509D	5	4.5...9	20	270	±9.0	±14	±56	74	2 x 220
P1T0512D	5	4.5...9	20	265	±12.0	±10	±42	75	2 x 220
P1T0515D	5	4.5...9	40	285	±15.0	±8	±33	70	2 x 220
P1T0524D	5	4.5...9	70	300	±24.0	±5	±21	67	2 x 100
P1T123R3D	12	9...18	15	120	±3.3	±38	±152	70	2 x 1000
P1T1205D	12	9...18	15	115	±5.0	±25	±100	72	2 x 1000
P1T1209D	12	9...18	15	110	±9.0	±14	±56	76	2 x 220
P1T1212D	12	9...18	15	110	±12.0	±10	±42	76	2 x 220
P1T1215D	12	9...18	15	110	±15.0	±8	±33	74	2 x 220
P1T1224D	12	9...18	40	125	±24.0	±5	±21	67	2 x 100
P1T243R3D	24	18...36	8	60	±3.3	±38	±152	70	2 x 1000
P1T2405D	24	18...36	8	60	±5.0	±25	±100	70	2 x 1000
P1T2409D	24	18...36	8	55	±9.0	±14	±56	76	2 x 220
P1T2412D	24	18...36	8	55	±12.0	±10	±42	77	2 x 220
P1T2415D	24	18...36	8	55	±15.0	±8	±33	75	2 x 220
P1T2424D	24	18...36	20	60	±24.0	±5	±21	70	2 x 100
P1T483R3D	48	36...72	6	30	±3.3	±38	±152	70	2 x 1000
P1T4805D	48	36...72	6	30	±5.0	±25	±100	70	2 x 1000
P1T4809D	48	36...72	6	30	±9.0	±14	±56	74	2 x 220
P1T4812D	48	36...72	6	25	±12.0	±10	±42	76	2 x 220
P1T4815D	48	36...72	6	30	±15.0	±8	±33	72	2 x 220
P1T4824D	48	36...72	12	30	±24.0	±5	±21	70	2 x 100

Part number structure										
Output power		Series	Input voltage		Output voltage		Outputs		Isolation	
P1	1 W	T	05		3R3		D		H	
P1	1 W		05	4.5...9 V	3R3	3.3 V	S	single	blanc	1 kV
			12	9...18 V	05	5 V	D	dual	H	3 kV
			24	18...36 V	09	9 V				
			48	36...72 V	12	12 V				
					15	15 V				
					24	24 V				



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Specifications

Input	
Filter	Capacitor
Reflected input ripple current	35 mA _{p-p} (see Figure 1)
Isolation:	
Rated voltage	Standard: 1 kV _{DC} , Suffix "H": 3 kV _{DC}
Resistance	10 ⁹ Ω, min.
Capacitance	60 pF, typ.
Output	
Voltage accuracy	± 2 %, max.
Ripple and noise, (at 20 MHz bandwidth)	80 mV _{p-p} , max., (see Figure 2)
Short circuit protection	Continuous
Short circuit restart	Automatic
Line regulation	± 0.5 %, max.
Load regulation @ 25 % to 100 % load	± 1 %, max.
Temperature coefficient	± 0.02 % / °C
Dual output cross regulation @ 25 %..75 % load difference	± 5 %
General	
Switching frequency	100...650 kHz
Safety standard	EN-, IEC-, UL 60950-1 EN-, IEC-, UL 62368-1
Reliability calculated MTBF, MIL_HDBK-217 F @ 25 °C	> 1.66 Mio. h

EMC		
RE	EN 55032	Class A
CE	EN 55032	Class A (see Figure 3)
ESD	EN-, IEC 61000-4-2	Perf. criteria B
RS	EN-, IEC 61000-4-3	Perf. criteria A
EFT	EN-, IEC 61000-4-4	Perf. criteria B (see Figure 3)
Surge	EN-, IEC 61000-4-5	Perf. criteria B (see Figure 3)
CS	EN-, IEC 61000-4-6	Perf. criteria A
PFMF	EN-, IEC 61000-4-8	Perf. criteria A
Environmental		
Operating ambient temperatur	-40...85 °C	
Storage temperature	-40...125 °C	
Case temperature	100 °C, max.	
Derating	None required	
Storage humidity	Up to 95 %, non condensing	
Cooling	Free air convection, 35...60 LFM	
Physical		
Weight	6 g	
Case material, plastic version	non conductive plastic, UL94V-0 rated	
Potting material	Epoxy UL94V-0 rated	
Absolute maximum ratings		
V _{input} voltage surge	P1T05xxx: ≤ 12 V _{DC} , ≤ 100 ms P1T12xxx: ≤ 24 V _{DC} , ≤ 100 ms P1T24xxx: ≤ 40 V _{DC} , ≤ 100 ms P1T48xxx: ≤ 80 V _{DC} , ≤ 100 ms	
Soldering Temperature	≤ 260 °C, duration ≤ 10 s ≥ 1.5 mm distance from package	

Note 1:

- Maximum capacitive load tested at nominal input voltage and resistive load
- All specifications typical at Ta 25 °C, nominal input voltage and full load unless otherwise specified
- Operation at < 25 % load will not damage these devices, however they may not meet all listed parameters

Figure 1 Input ripple & noise current measure circuit

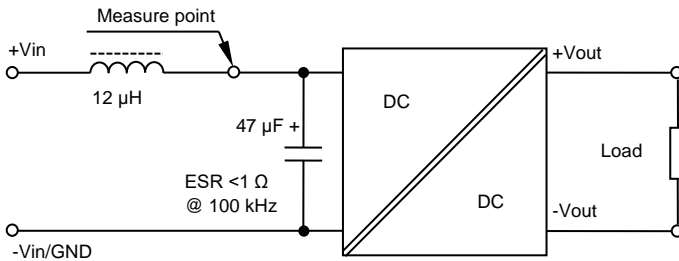
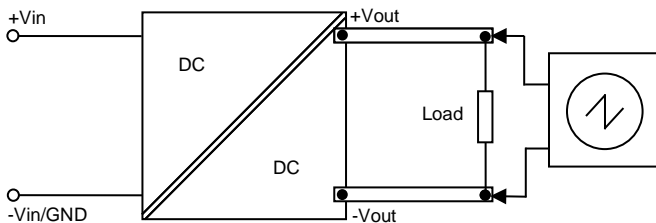
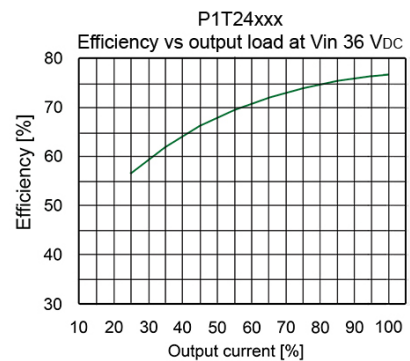
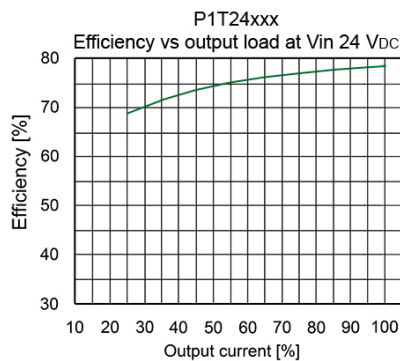
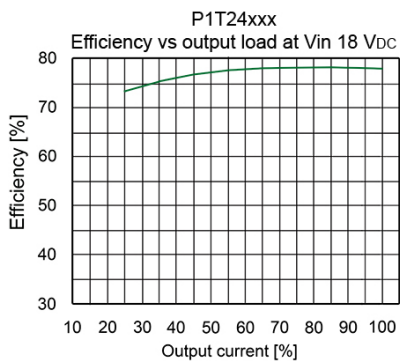
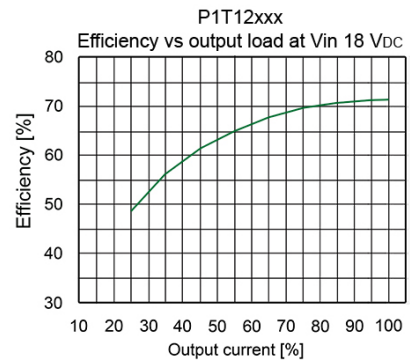
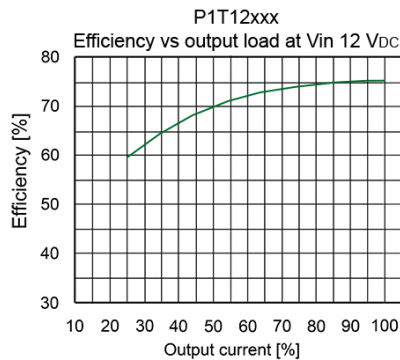
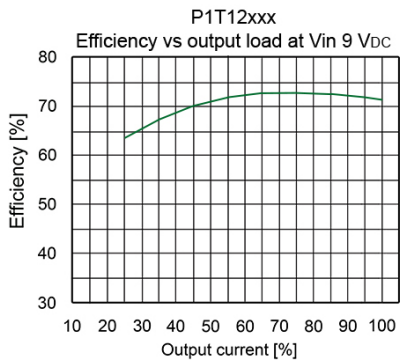
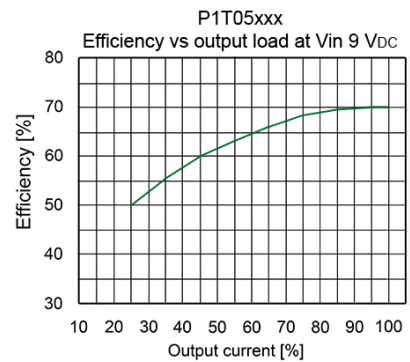
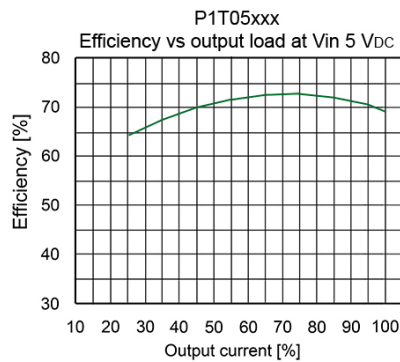
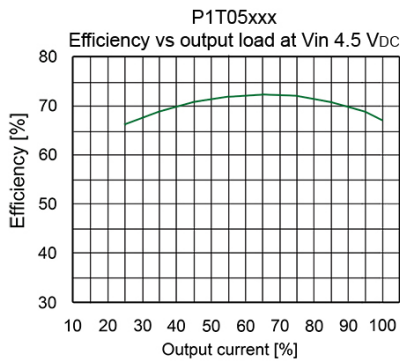
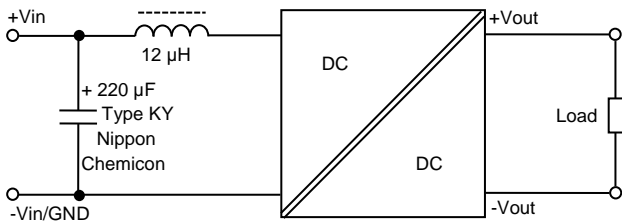


Figure 2 Output ripple & noise measure circuit

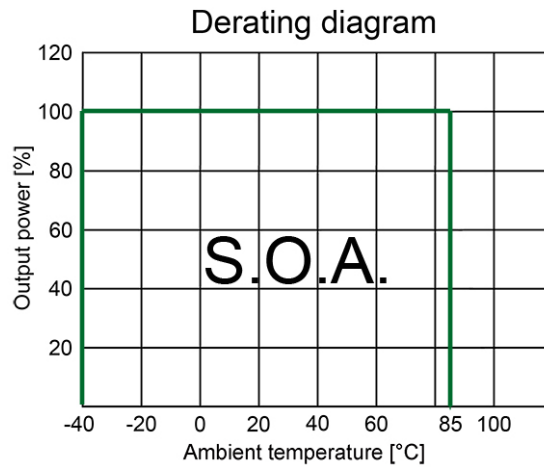


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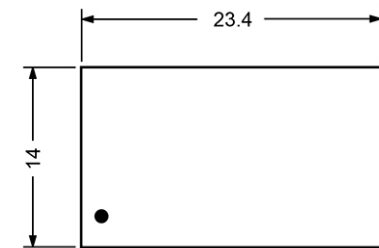
Figure 3 EMI Filter circuit to meet EN 61000-4-4 and EN 61000-4-5 Class B and EN 55032 conducted emissions



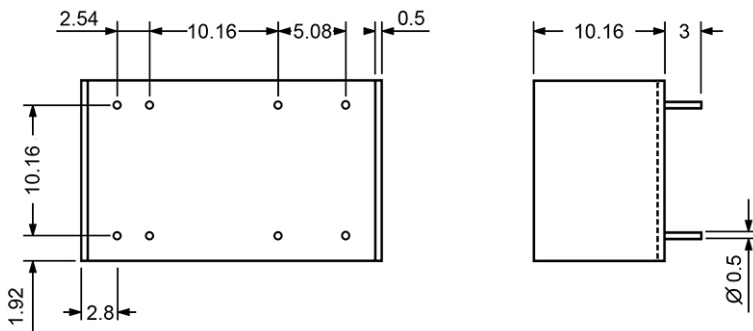
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Dimensions plastic package



Notes:
 Dimensions in mm
 Pin diameter tolerance ± 0.05 mm
 Pin pitch tolerance ± 0.35 mm
 Case tolerance ± 0.5 mm



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