10 W DC-DC Converter P10E-Series

PHI-CON

- Wide 2:1 input range
- 1500 V_{DC} isolation
- MTBF > 1 Mio. h
- Continuous short circuit protection
- Over current protection



Model guide

Type	Input voltage		Input current		Output voltage	Output current		Efficiency	Capacitor load (see 1)
	Nominal [V_{DC}]	Range [V_{DC}]	No load [mA] max.	Full load [mA] typ.	[V_{DC}] nom.	[mA] min.	[mA] max.	[%] typ.	[mA] max.
Single output									
P10E122R5S	12	9...18	10	790	2.5	0	3000	81	2200
P10E123R3S	12	9...18	10	1005	3.3	0	3000	84	2200
P10E1205S	12	9...18	10	990	5.0	0	2000	86	2200
P10E1212S	12	9...18	10	980	12.0	0	833	87	820
P10E1215S	12	9...18	10	960	15.0	0	667	89	470
P10E242R5S	24	18...36	10	380	2.5	0	3000	84	2200
P10E243R3S	24	18...36	10	495	3.3	0	3000	85	2200
P10E2405S	24	18...36	10	480	5.0	0	2000	89	2200
P10E2412S	24	18...36	10	485	12.0	0	833	88	820
P10E2415S	24	18...36	10	485	15.0	0	667	88	470
P10E482R5S	48	36...75	10	190	2.5	0	3000	84	2200
P10E483R3S	48	36...75	10	250	3.3	0	3000	85	2200
P10E4805S	48	36...75	10	240	5.0	0	2000	88	2200
P10E4812S	48	36...75	10	245	12.0	0	833	87	820
P10E4815S	48	36...75	10	240	15.0	0	667	88	470
Dual output									
P10E1212D	12	9...18	10	980	±12.0	0	±416	87	2 x 220
P10E1215D	12	9...18	10	970	±15.0	0	±333	88	2 x 150
P10E2412D	24	18...36	10	485	±12.0	0	±416	88	2 x 220
P10E2415D	24	18...36	10	475	±15.0	0	±333	90	2 x 150
P10E4812D	48	36...75	10	245	±12.0	0	±416	87	2 x 220
P10E4815D	48	36...75	10	245	±15.0	0	±333	87	2 x 150

Specifications

Input	
Filter	Pi Network
Reflected input ripple current	20 mAp-p (Figure 1)
Start up time	20 ms, typ.
Isolation:	
In / Out Rated voltage (60 s)	1500 V_{DC}, Standard
Input or output to case	1000 V_{DC}
Resistance	10^9 Ω
Capacitance	1000 pF, typ.
Output	
Voltage accuracy	± 1 %
Line regulation	± 0.5 %, max.
Load regulation @ 0…100 % load change	± 0.5 % @ P10ExxxxS ± 1% @ P10ExxxxD & P10Exx3R3x
Over current protection	150 %, typ. of max. current
Short circuit protection	Continuous (automatic restart)
Ripple and noise (at 20 MHz BW)	75 mVp-p, max.
Dual output cross deviation @ 75 % load difference	5 %, max.
Temperature coefficient	± 0.02 % / °C
Transient recovery time	200 µs, typ.@ 25 % load steps
Output over voltage protection, Z-diode clamping	
P10Exx2R5S, P10Exx3R3S	3.9 V
P10Exx05S	6.2 V
P10Exx12x	15 V
P10Exx15x	18 V
General	
Switching frequency	330 kHz, typ.
Safety standards	IEC, EN, UL, cUL60950-1 IEC, EN, UL, cUL62368-1
Reliability calc. MTBF (MIL-HDBK-217F)	1 Mio. h @ Ta 25 °C

EMC specifications	
Radiated emissions	EN55032 Class A
Conducted emissions	EN55032 Class A (see Fig. 3)
ESD	IEC61000-4-2 perf. criteria A
RS	IEC61000-4-3 perf. criteria A
EFT (see Fig. 3)	IEC61000-4-4 perf. criteria A
Surge (see Fig. 3)	IEC61000-4-5 perf. criteria A
CS	IEC61000-4-6 perf. criteria A
PFMF	IEC61000-4-8 perf. criteria A
Environmental	
Operating ambient temperature	-40 … 85 °C
Case temperature	100 °C, max.
Storage temperature	-40 … 125 °C
Derating	See SOA diagram
Humidity	95 % max., non condensing
Cooling	Air convection 30..60 LFM
Physical	
Weight	17 g
Potting material	Epoxy (UL94V-0 rated)
Case material	Nickel coated copper
Absolute maximum ratings	
Input voltage < 100 ms	
P10E12xxx	25 V_{DC}
P10E24xxx	50 V_{DC}
P10E48xxx	100 V_{DC}
Lead soldering Temperature	260 °C for 10 s, distance from package 1.5 mm

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1. Specified by nominal in voltage and constant resistive load.
2. Parallel operation of DC/DC-Converter outputs is not recommendet.
3. The P10E-series is not usable in IGBT and MOSFET driver applications.

Figure 1 Measure circuit input reflected ripple current

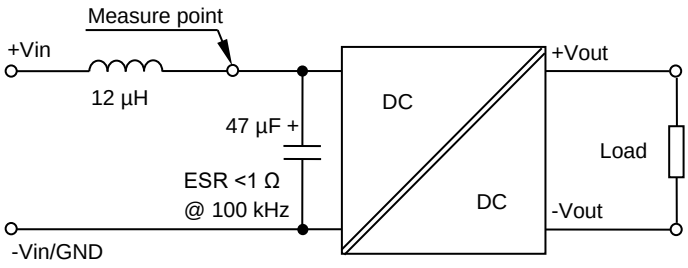


Figure 2 Measure circuit output ripple & noise voltage

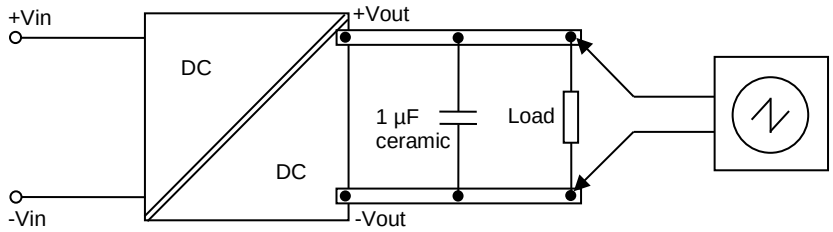
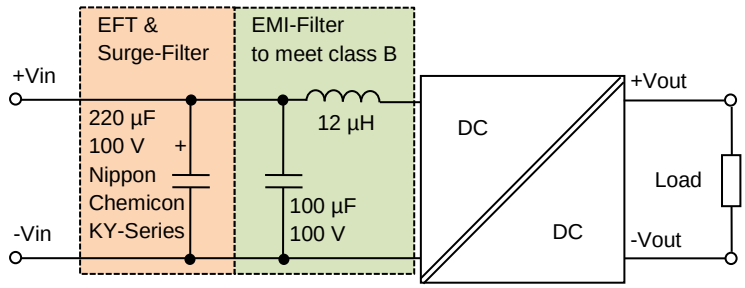


Figure 3
Application circuit to meet EFT IEC61000-4-4 class A, Surge IEC61000-4-5 class A and EMI conducted emission EN55032 Class A



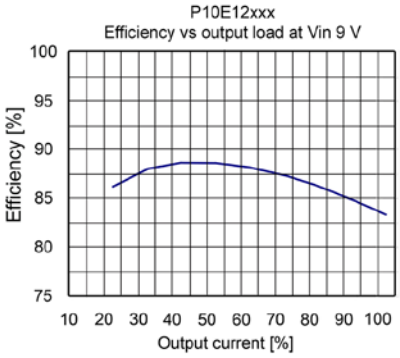
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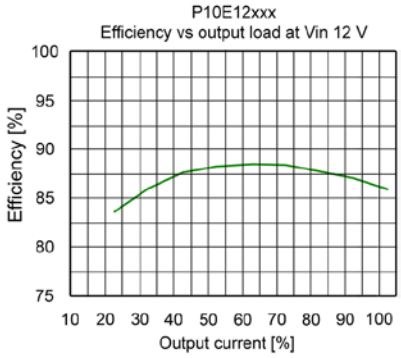
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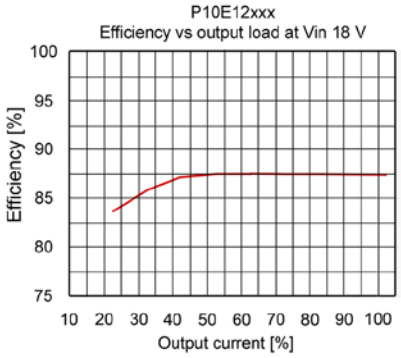
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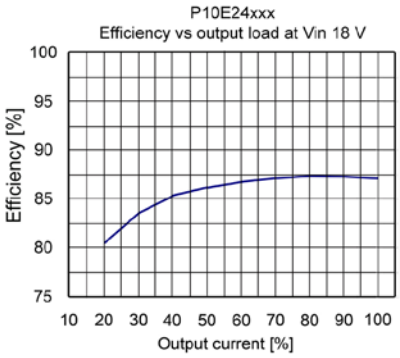
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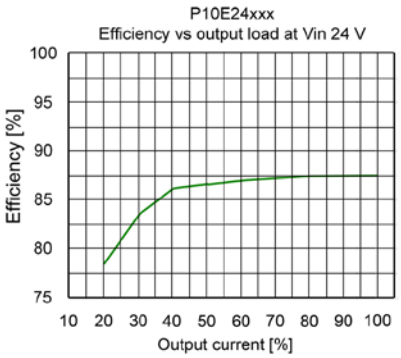
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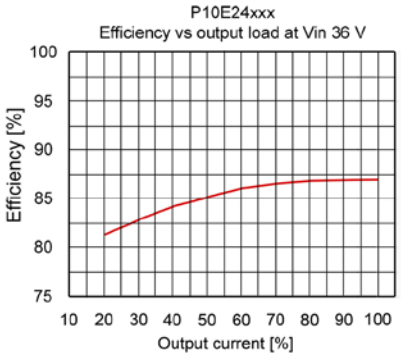


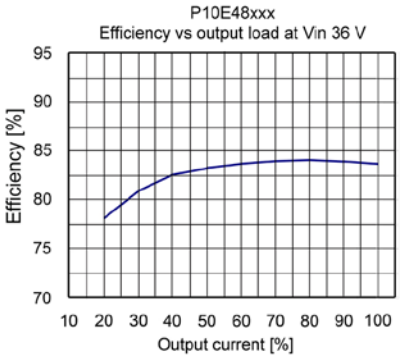


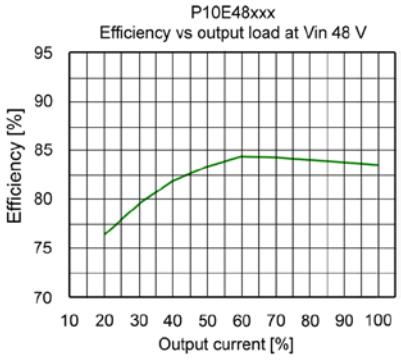


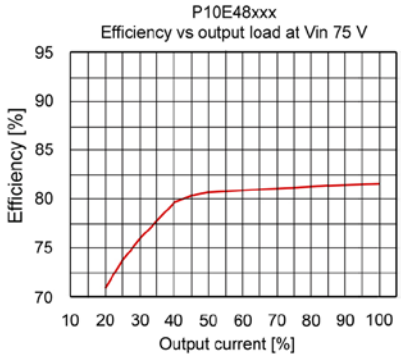


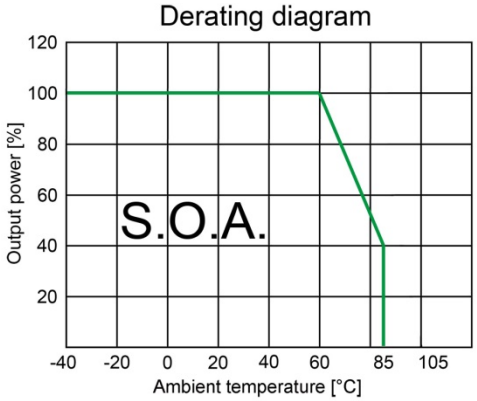












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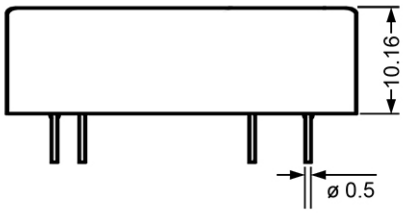
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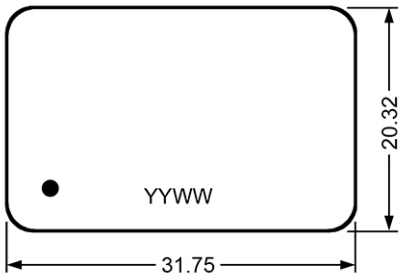
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Dimensions

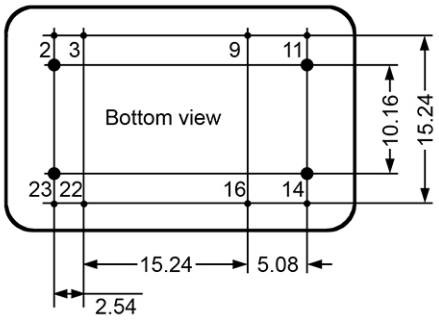


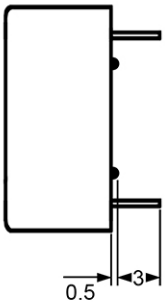
All units in mm

1. Pin diameter tolerance ±0.05 mm
2. Pin pitch tolerance ±0.35 mm
3. Case tolerance ±0.5 mm



Pin assignment		
Pin	Single	Dual
2	-V Input	-V Input
3	-V Input	-V Input
9	No Pin	Common
11	Not Connected.	-V Output
14	+V Output	+V Output
16	-V Output	Common
22	+V Input	+V Input
23	+V Input	+V Input





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