

**Preliminary**

# 25 W DC-DC Converter P25E-Series



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- Very wide input range 10:1
- 3000 V<sub>DC</sub> isolation
- Aluminium heat sink case
- Continuous short circuit protection
- Over current protection
- Over continuous short circuit protection
- Output over voltage protection
- Over temperature protection
- Wide operation temperature range -40...100 °C
- Adjustable output voltage
- On / Off remote control input
- EN 50155 standard



## Model guide

Type	Input voltage		Input current		Output voltage [V <sub>DC</sub> ]	Output current		Efficiency [%] typ.	Capacitor load (note2) [μF] max.
	Nominal [V <sub>DC</sub> ]	Range [V <sub>DC</sub> ]	no load [mA] typ.	full load [mA] typ.		[mA] min.	[mA] max.		
P25E7205SK	72	16...160	10	410	5.0	0	5000	85	6800
P25E7212SK	72	16...160	10	415	12.0	0	2080	84	1000
P25E7215SK	72	16...160	10	410	15.0	0	1670	85	820
P25E7224SK	72	16...160	10	410	24.0	0	1040	85	470

## Specifications

<b>Input</b>	
Start up voltage	P25E72xxSK: 13.8 V <sub>DC</sub>
Under voltage lockout	P25E72xxSK: 12 V <sub>DC</sub>
Filter	PI Network
Start up time with R-load	60 ms, typ.
Reflected ripple current	20 mA <sub>p-p</sub> , (see figure 1)
ON / OFF Control threshold (see figures 6)	On: 3...12 V <sub>DC</sub> or open input Off: 0...1.2 V <sub>DC</sub> Standby idle current 3 mA, typ.
<b>Isolation:</b>	
Input / output voltage for 60 s	3000 V <sub>DC</sub>
Input or output to case for 60 s	1600 V <sub>DC</sub>
Resistance	10 <sup>9</sup> Ω
Capacitance	2000 pF, typ.
<b>Output</b>	
Voltage accuracy	± 1 %, max.
Voltage trim range (see fig. 5)	± 10 %
Over voltage protection via Z-Diode clamping	P25E7205S: 6.2 V P25E7212S: 15 V P25E7215S: 18 V P25E7224S: 30 V
Line voltage regulation	± 0.2 %, max.
Load regulation 0...100 % load	± 0.5 %, max.
Transient recovery time	500 μs, typ.
Transient response deviation @ 25 % load change steps	± 4 %, max.
Temperature coefficient	± 0.02 % / °C
Ripple and noise (at 20 MHz BW)	≤ 100 mV <sub>p-p</sub> , (see figure 2)
Short circuit protection	Indefinite (hiccup), automatic restart
Over current protection	150 % of I <sub>out</sub> , typ.
<b>General</b>	
Switching frequency	250 kHz, typ.
Safety Standard	EN 50155 EN-, IEC-, UL 60950-1, EN-, IEC-, UL 62368-1,
Reliability calculated MTBF MIL-HDBK-217F at 25 °C	230.000 h

<b>EMC Characteristics</b>	
Radiated Emissions, EN50121-3-2	40 dBμV at 20...230 MHz 47 dBμV at 230 MHz...1 GHz
Conducted Emissions EN 50121-3-2 (see figure 3)	99 dBμV at 150...500 kHz 93 dBμV at 500 kHz...30 MHz
ESD, EN 50121-3-2, perf. crit. A	Air ± 8 kV Contact ± 6 kV
RS, EN 50121-3-2 perf. crit. A	20 V/m
EFT, EN 50121-3-2, perf. crit. A (see figure 3)	2 kV
Surge, EN 50121-3-2, perf. crit. A (see figure 3)	2 kV
CS, EN 50121-3-2 perf. crit. A	10 V
PFMF, EN 61000-4-8 perf. crit. A	100 A/m
<b>Environmental</b>	
Operating ambient temperature (see derating diagram)	-40...58 °C, without derating -40...100 °C, with derating
Storage temperature	-55...125 °C
Case temperature	105 °C, max.
Over temperature protection	115 °C surface, typ.
Thermal resistance mounted on FR4 PCB 150 mm x 70 mm	8 K/W, typ.
Humidity	95 %, max. non condensing
Thermal shock	IEC 60068
Mechanical shock and vibration	EN 61373
Free air convection cooling	30...65 LFM (15...35 cm/s)
<b>Physical</b>	
Dimensions	53 x 27.6 x 16.6 mm
Weight	48 g
Case material	Aluminium
Potting material	Epoxy (UL94V-0 rated)
<b>Absolute maximum ratings</b>	
Input voltage P25E72xxSK	176 V <sub>DC</sub> , 100 ms, max.
Pin soldering temperature	≤ 260 °C, ≤ 10 s, ≥ 1.5 mm distance from body

### Notes:

1. All parameter are typical at 25 °C, nominal input voltage and full load specified, unless otherwise noted.
2. Capacitive load tested by minimal input voltage and constant resistive load.

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## 25 W DC-DC Converter P25E-Series

Figure 1 Measure circuit reflected input ripple current

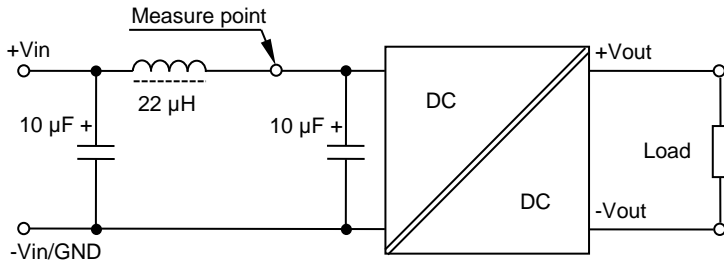
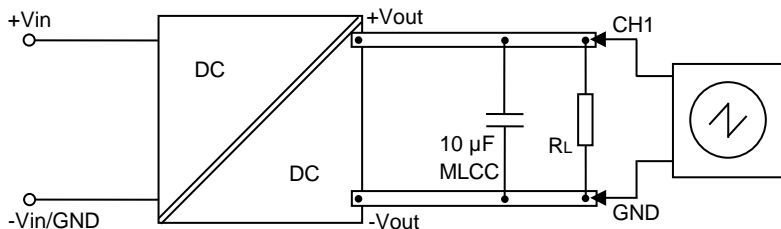
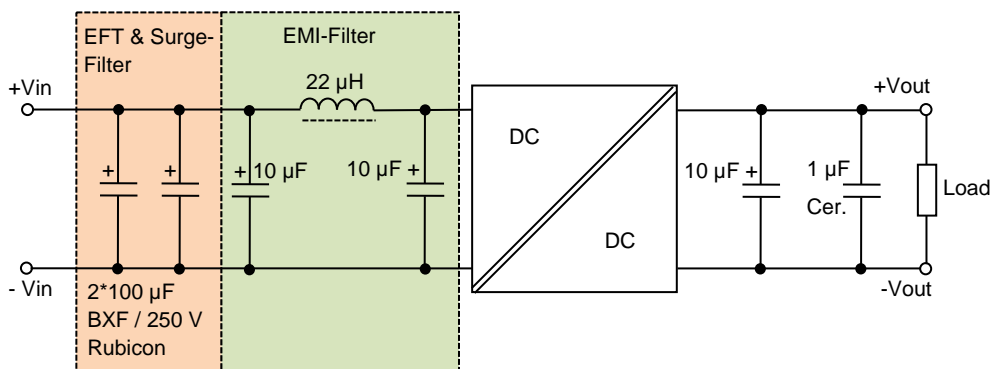


Figure 2 Measure circuit for output ripple & noise voltage, measure band wide 20 MHz



To meet the specified ripple and noise level are for the output filter circuit multilayer ceramic capacitors necessary.

Figure 3 Application circuit to meet EN 50121-3-2 and ripple & noise reduction

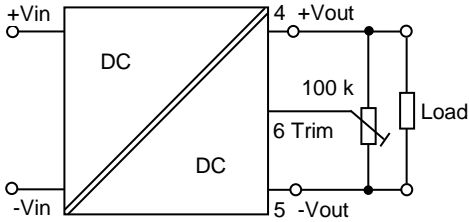


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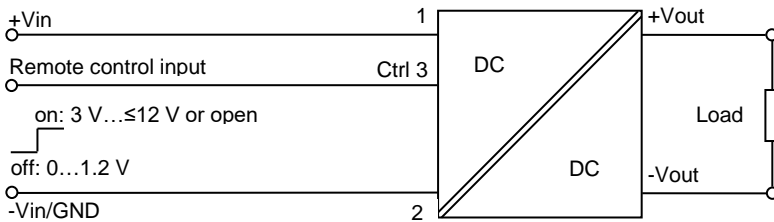
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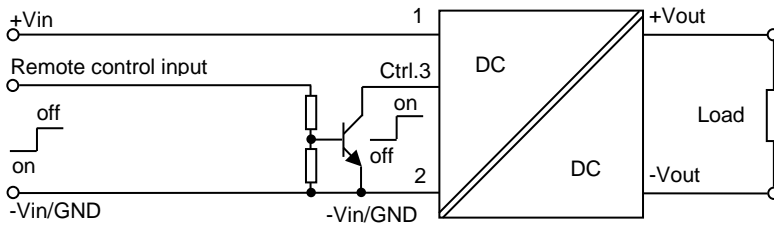
Figure 4 Output voltage trimming application



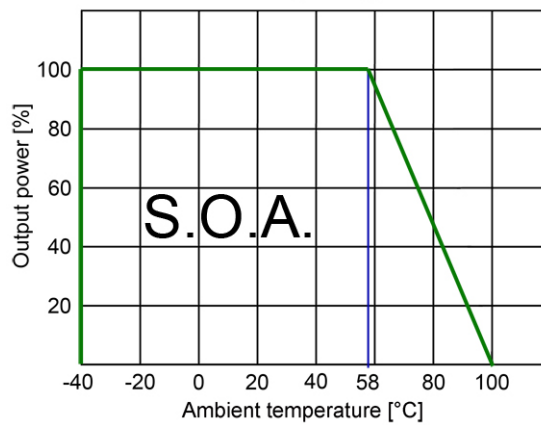
Figures 5 ON/OFF remote control application circuit



ON/OFF remote control application circuit for inverse logic and higher input level possibility



Derating diagram



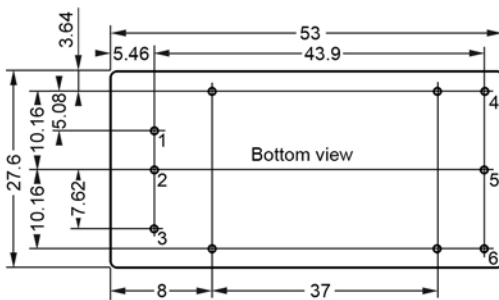
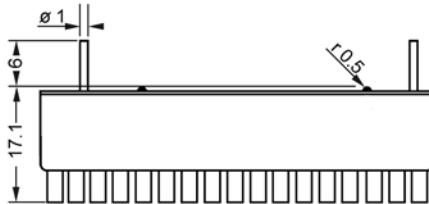
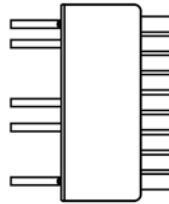
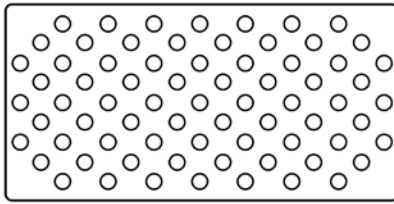
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## Dimensions



### Note:

All dimensions in mm

1. Pin diameter tolerance  $\pm 0.05$  mm
2. Pin pitch and length tolerance  $\pm 0.35$  mm
3. Pin to case tolerance  $\pm 0.5$  mm
4. Case tolerance  $\pm 0.5$  mm
5. Stand off tolerance  $\pm 0.1$  mm
6. Recommended Pin hole diameter 1.5 mm

Pin assignment	
Pin	Single out
1	+Vin
2	-Vin
3	Rem. Ctrl.
4	+Vout
5	-Vout
6	Trim

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