

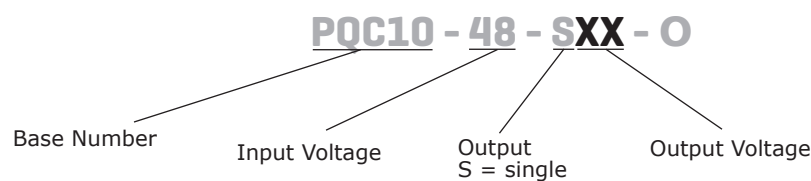
SERIES: PQC10-0 | DESCRIPTION: DC-DC CONVERTER
FEATURES

- 10 W isolated output
- 2:1 input range (36~75 Vdc)
- single regulated outputs
- 1,500 Vdc isolation
- industry standard 1/16th brick
- over-current, input under-voltage, over-voltage and output short-circuit protection
- EN/BS EN 62368 certified



| MODEL | input voltage | | output voltage (Vdc) | output current | | output power max (W) | ripple and noise ¹ max (mVp-p) | efficiency ² typ (%) |
|----------------|---------------|----------------|-------------------------|----------------|-------------|----------------------------|---|---------------------------------------|
| | typ (Vdc) | range (Vdc) | | min (mA) | max (mA) | | | |
| PQC10-48-S5-O | 48 | 36~75 | 5 | 0 | 2,000 | 10 | 120 | 83 |
| PQC10-48-S12-O | 48 | 36~75 | 12 | 0 | 833 | 10 | 120 | 87 |
| PQC10-48-S15-O | 48 | 36~75 | 15 | 0 | 667 | 10 | 120 | 88 |
| PQC10-48-S24-O | 48 | 36~75 | 24 | 0 | 417 | 10 | 120 | 88 |

Notes: 1. Ripple and noise are measured at 20 MHz BW, 5%~100% load by "parallel cable" method with 1 μ F ceramic and 10 μ F electrolytic capacitors on the output.
 2. Efficiency is measured at nominal input voltage and rated output load.

PART NUMBER KEY


INPUT

| parameter | conditions/description | min | typ | max | units |
|-----------------------------|---|------|-------|-------|-------|
| operating input voltage | | 36 | 48 | 80 | Vdc |
| current (full load/no load) | at nominal input voltage | | 252/4 | 258/8 | mA |
| reflected ripple current | at nominal input voltage | | 50 | | mA |
| start-up voltage | | | | 36 | Vdc |
| under-voltage protection | | 26 | 29 | | Vdc |
| start-up time | at nominal input voltage & constant resistance load | | | 100 | ms |
| surge voltage | for maximum of 1 second | -0.7 | | 100 | Vdc |
| CTRL ³ | module on (CTRL pin open or pulled high (TTL 3.5~12Vdc) | | | | |
| | module off (CTRL pin pulled low to GND (0~1.2Vdc) | | | | |
| | input current when off | | 6 | 10 | mA |
| filter | C filter | | | | |

Notes: 3. The CTRL pin voltage is referenced to input GND.

OUTPUT

| parameter | conditions/description | min | typ | max | units |
|----------------------------------|---|-----|------|-------|-------|
| maximum capacitive load | 5 Vdc output | | | 2,200 | μF |
| | 12 Vdc output | | | 470 | μF |
| | 15 Vdc output | | | 330 | μF |
| | 24 Vdc output | | | 100 | μF |
| line regulation | full load, input voltage from low to high | | ±0.2 | ±0.5 | % |
| load regulation | 5% to 100% load | | ±0.5 | ±1 | % |
| voltage accuracy | 5% to 100% load | | ±1 | ±3 | % |
| switching frequency ⁴ | PWM mode | | 300 | | kHz |
| transient recovery time | 25% load step change | | 300 | 500 | μs |
| transient response deviation | 25% load step change | | ±5 | ±8 | % |
| | 5 Vdc output voltage all other output models | | ±3 | ±5 | % |
| temperature coefficient | full load | | | ±0.03 | %/°C |

Notes: 4. Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

PROTECTIONS

| parameter | conditions/description | min | typ | max | units |
|--------------------------|---------------------------|-----|-----|-----|-------|
| over voltage protection | | 110 | | 160 | % |
| over current protection | | 110 | 140 | 190 | % |
| short circuit protection | auto recovery, continuous | | | | |

SAFETY AND COMPLIANCE

| parameter | conditions/description | min | typ | max | units |
|-----------------------|---|-------|-------|-----|-------|
| isolation voltage | input to output for 1 minute at 1 mA max. | 1,500 | | | Vdc |
| isolation resistance | input to output at 500 Vdc | 1,000 | | | MΩ |
| isolation capacitance | input to output at 100kHz/0.1V | | 1,000 | | pF |
| vibration | 10-150Hz, 5G, 0.75mm. along X, Y and Z | | | | |
| safety approvals | certified to 62368: EN/BS EN | | | | |
| conducted emissions | CISPR32/EN55032 CLASS B (see Fig.2-2 for recommended circuit) | | | | |
| radiated emissions | CISPR32/EN55032 CLASS B (see Fig.2-2 for recommended circuit) | | | | |
| ESD | IEC/EN61000-4-2 Contact ±4kV, perf. Criteria B | | | | |
| radiated immunity | IEC/EN61000-4-3 10V/m, perf. Criteria A | | | | |

SAFETY AND COMPLIANCE

| parameter | conditions/description | min | typ | max | units |
|--------------------|---|-----------|-----|-----|-------|
| EFT/burst | IEC/EN61000-4-4 ±2kV (see Fig.2-1 for recommended circuit), perf Criteria B | | | | |
| surge | IEC/EN61000-4-5 line to line ±2kV (see Fig.2-1 for recommended circuit), perf. Criteria B | | | | |
| conducted immunity | IEC/EN61000-4-6 3Vrms, perf. Criteria A | | | | |
| MTBF | as per MIL-HDBK-217F @ 25°C | 1,000,000 | | | hours |
| RoHS | yes | | | | |

ENVIRONMENTAL

| parameter | conditions/description | min | typ | max | units |
|-----------------------|------------------------|-----|-----|-----|-------|
| operating temperature | see derating curve | -40 | | 85 | °C |
| storage temperature | | -55 | | 125 | °C |
| storage humidity | non-condensing | 5 | | 95 | % |

MECHANICAL

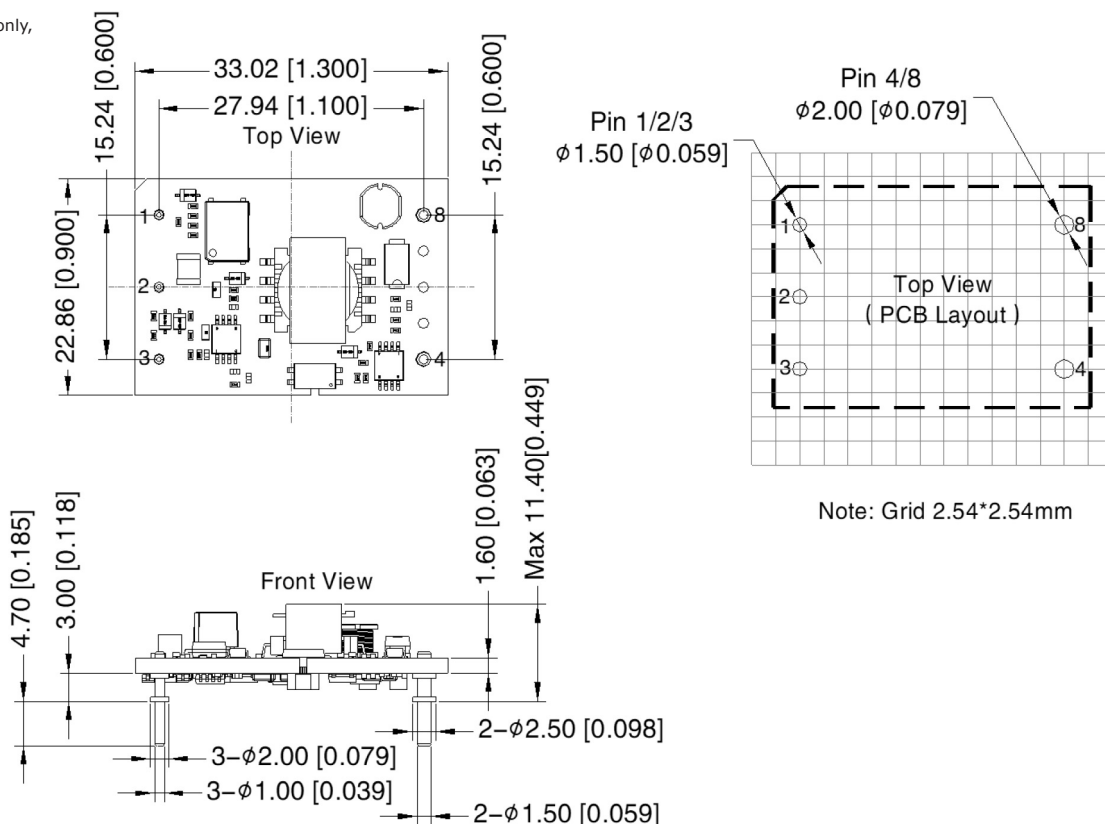
| parameter | conditions/description | min | typ | max | units |
|----------------|--|-----|-----|-----|-------|
| dimensions | 33.02 x 22.86 x 11.40 (1.300 x 0.900 x 0.449 inch) | | | | mm |
| weight | | | 5.8 | | g |
| cooling method | natural convection | | | | |

MECHANICAL DRAWING

units: mm[inch]
 tolerance: ±0.50[±0.020]
 pin section tolerance: ±0.10[±0.004]
 pin 1,2,3: Ø1.5mm
 pin 4,8: Ø2mm

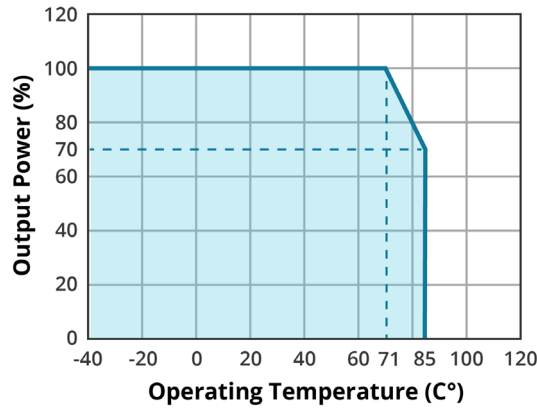
Note: The layout of the device is for reference only, please refer to the actual product.

| PIN CONNECTIONS | |
|-----------------|----------|
| PIN | Function |
| 1 | Vin |
| 2 | CTRL |
| 3 | GND |
| 4 | 0V |
| 8 | +Vo |



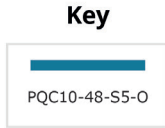
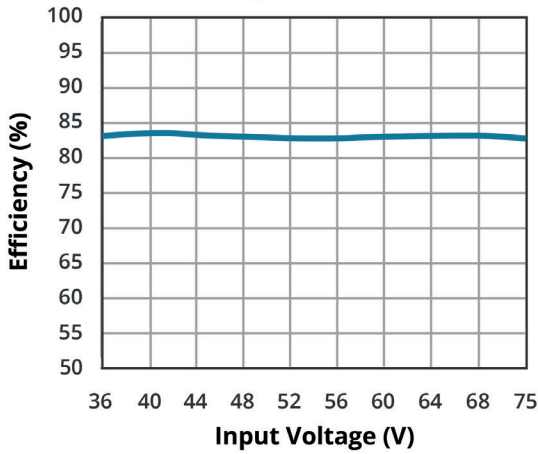
DERATING CURVE

TEMPERATURE DERATING CURVE

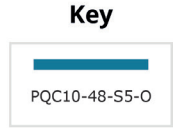
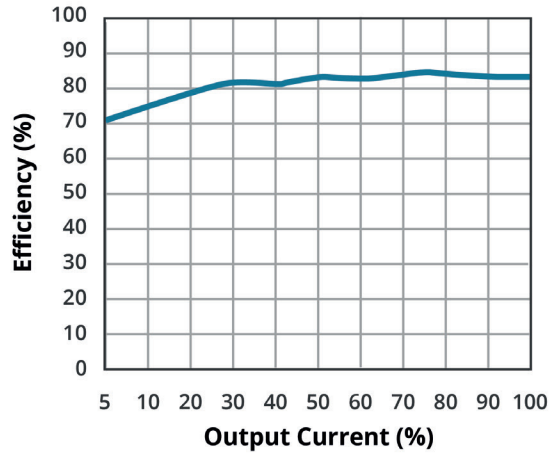


EFFICIENCY CURVES

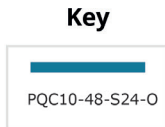
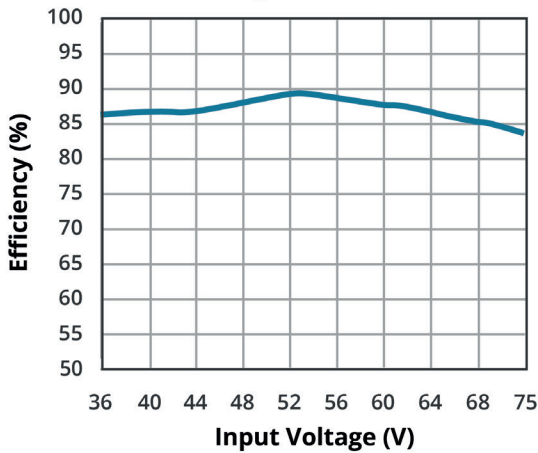
EFFICIENCY VS INPUT VOLTAGE (full load)



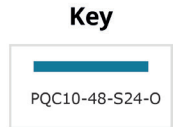
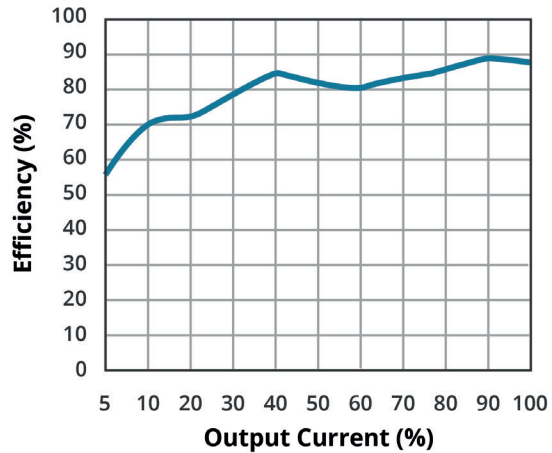
EFFICIENCY VS OUTPUT LOAD (Vin = 48V)



EFFICIENCY VS INPUT VOLTAGE (full load)



EFFICIENCY VS OUTPUT LOAD (Vin = 48V)



APPLICATION NOTES

All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 1. Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values C_{in} and C_{out} and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the specified max. capacitive load value of the product.

Figure 1

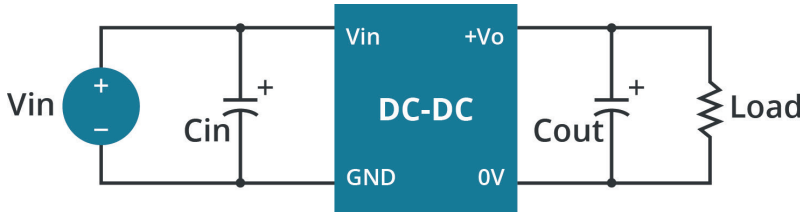
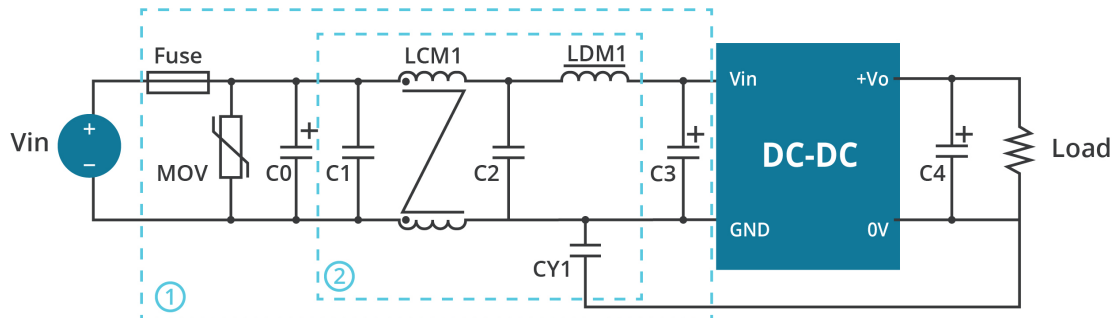


Table 1

| V_{in} (Vdc) | V_{out} (Vdc) | C_{in} ($\mu\text{F}/\text{V}$) | C_{out} (μF) |
|----------------|-----------------|-------------------------------------|-----------------------------|
| 48 | 5 | 100 $\mu\text{F}/100\text{V}$ | 10 $\mu\text{F}/16\text{V}$ |
| | 12/15 | | 10 $\mu\text{F}/25\text{V}$ |
| | 24 | | 10 $\mu\text{F}/50\text{V}$ |

EMC RECOMMENDED CIRCUIT

Figure 2



Notes: For EMC tests we use Part 1 in Fig. 3 for immunity and part 2 for emissions test. Selecting based on needs.

Table 2

| Recommended external circuit components | |
|---|---|
| FUSE | choose according to practical input current |
| MOV | S14K60 |
| C0 | 680 $\mu\text{F}/100\text{V}$ |
| C1/C2 | 4.7 $\mu\text{F}/100\text{V}$ |
| C3 | 330 $\mu\text{F}/100\text{V}$ |
| C4 | refer to the C_{out} in Fig. 1 |
| LCM1 | 4.7mH |
| LDM1 | 10 μH |
| CY1 | 1nF/2kV |

Note: 1. Maximum capacitive load is tested at input voltage range and full load.
2. All specifications are measured at $T_a=25^\circ\text{C}$, humidity<75%, nominal input voltage and rated output load unless otherwise specified.

REVISION HISTORY

| rev. | description | date |
|------|-----------------|------------|
| 1.0 | initial release | 12/21/2022 |

The revision history provided is for informational purposes only and is believed to be accurate.



CUI INC
a bel group

Headquarters
20050 SW 112th Ave.
Tualatin, OR 97062
800.275.4899

Fax 503.612.2383
cui.com
techsupport@cui.com

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