

**CUI INC**

a bel group

date 01/11/2023

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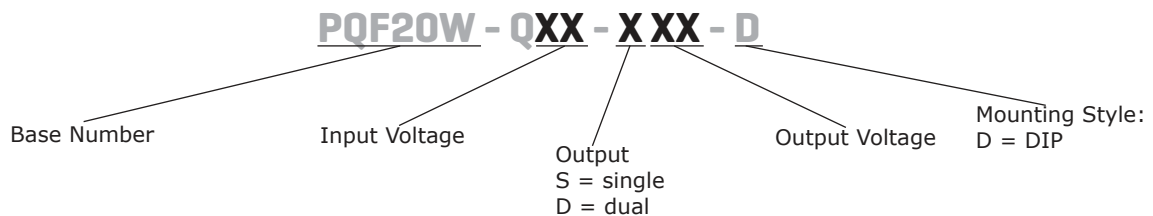
SERIES: PQF20W-D | **DESCRIPTION:** DC-DC CONVERTER**FEATURES**

- ultrawide 4:1 input range
- dual positive output with asymmetrical options
- 3000 Vdc isolation
- input under-voltage protection
- output short circuit and over current protection
- wide operating temp: -40°C to +105°C
- EN 62368 approved
- meets UL 62368 standards
- remote on/off



| MODEL | input voltage | | output voltage | output current | | output power | ripple & noise ¹ | efficiency ² |
|-------------------|---------------|-------------|----------------|----------------|-----------|--------------|-----------------------------|-------------------------|
| | typ (Vdc) | range (Vdc) | Vo1/Vo2 (Vdc) | min (mA) | max (mA) | max (W) | max (mVp-p) Vo1/Vo2 | min/typ (%) |
| PQF20W-Q48-D55-D | 48 | 18~75 | 5/5 | 0/0 | 2000/2000 | 20 | 100/100 | 82/84 |
| PQF20W-Q48-D512-D | 48 | 18~75 | 5/12 | 0/0 | 2000/833 | 20 | 100/100 | 82/84 |
| PQF20W-Q48-D524-D | 48 | 18~75 | 5/24 | 0/0 | 2000/417 | 20 | 100/100 | 82/84 |

Notes: 1. From 5~100% load, nominal input, 20 MHz bandwidth oscilloscope, with 10 μ F tantalum and 1 μ F ceramic capacitors on the output. From 0~5% load, ripple and noise is <5% Vo.
2. Measured at nominal input voltage and rated output load.

PART NUMBER KEY

INPUT

| parameter | conditions/description | min | typ | max | units |
|-------------------------|--|------|-------|--------|-------|
| operating input voltage | | 18 | | 80 | Vdc |
| start-up voltage | | | | 18 | Vdc |
| surge voltage | for maximum of 1 second | -0.7 | | 100 | Vdc |
| current | full load / no load | | 496/6 | 509/12 | mA |
| filter | Pi filter | | | | |
| CTRL | module on: CTRL open or pulled high (3.5~12 V) module off: CTRL pulled low to GND (0~1.2 V) | | | | |

OUTPUT

| parameter | conditions/description | min | typ | max | units |
|------------------------------|---|-----|-----------|-------|-------|
| maximum capacitive load | output voltage | | | | |
| | 5 Vdc | | | 2000 | μF |
| | 12 Vdc | | | 680 | μF |
| | 24 Vdc | | | 220 | μF |
| voltage accuracy | Vo1/Vo2 5% to full load | | ±1/±3 | ±3/±5 | % |
| | 0%~5% load | | ±1/±3 | ±3/±5 | % |
| line regulation | from low line to high line, full load | | | | |
| | Vo1 | | ±0.5 | ±1 | % |
| | Vo2 | | ±2 | ±3 | % |
| load regulation | Vo1/Vo2 5% to full load | | ±0.5/±1.5 | ±1/±3 | % |
| | 0%~5% load | | ±3/±3 | ±4/±5 | % |
| switching frequency | PWM mode | | 300 | | kHz |
| transient recovery time | 25% load step change, nominal input voltage | | 300 | 500 | μs |
| transient response deviation | 25% load step change, nominal input voltage | | ±4 | ±8 | % |
| temperature coefficient | at full load | | | ±0.03 | %/°C |

PROTECTIONS

| parameter | conditions/description | min | typ | max | units |
|--------------------------------|--------------------------------|-----|-----|-----|-------|
| over voltage protection | | 110 | | 160 | %Vo |
| over current protection | | 120 | | 210 | % |
| short circuit protection | output shutdown, auto recovery | | | | |
| input under voltage protection | | 12 | 15 | | Vdc |

SAFETY AND COMPLIANCE

| parameter | conditions/description | min | typ | max | units |
|-----------------------|--|------|------|-----|---------|
| isolation voltage | input to output | 3000 | | | Vdc |
| | output to output | 1500 | | | Vdc |
| | input/output to case | 1500 | | | Vdc |
| isolation resistance | input to output at 500 Vdc | 1000 | | | MΩ |
| isolation capacitance | input to output, 100 kHz / 0.1 V | | 2200 | | pF |
| safety approvals | EN/IEC 62368 | | | | |
| EMI/EMC | CISPR32/EN55032, Class A (without external components) / Class B (see recommended circuit) | | | | |
| ESD | IEC/EN61000-4-2, Contact ±4KV / perf. Criteria B | | | | |
| radiated immunity | IEC/EN61000-4-3, 10V/m, perf. Criteria A | | | | |
| EFT/burst | IEC/EN61000-4-4, ±2KV (see recommended circuit), perf. Criteria B | | | | |
| surge | IEC/EN61000-4-5, line to line ±2KV (see recommended circuit), perf. Criteria B | | | | |
| conducted immunity | IEC/EN61000-4-6, 3 Vr.m.s, perf. Criteria A | | | | |
| MTBF | as per MIL-HDBK-217F, 25°C | 1000 | | | K hours |
| RoHS | yes | | | | |

ENVIRONMENTAL

| parameter | conditions/description | min | typ | max | units |
|-----------------------|------------------------|-----|-----|-----|-------|
| operating temperature | see derating curve | -40 | | 105 | °C |
| storage temperature | | -55 | | 125 | °C |
| storage humidity | non-condensing | 5 | | 95 | % |
| vibration | 10-55Hz | | 2 | | G |

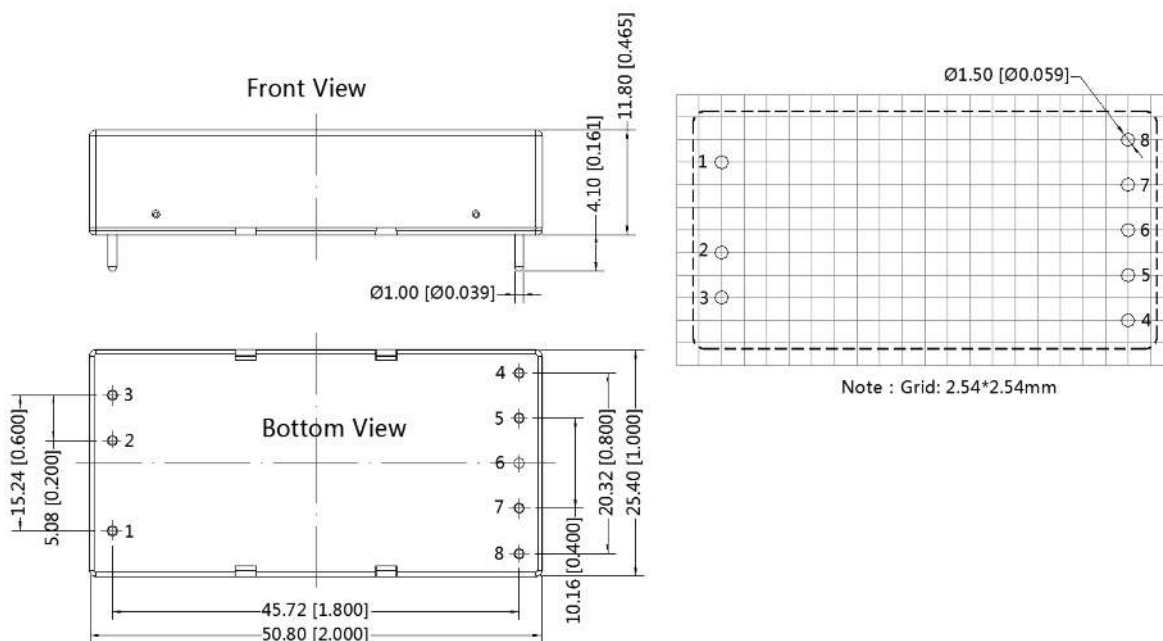
MECHANICAL

| parameter | conditions/description | min | typ | max | units |
|---------------|--|-----|-----|-----|-------|
| dimensions | 50.80 x 25.40 x 11.80 [2 x 1.000 x 0.464 inch] | | | | mm |
| case material | aluminum alloy | | | | |
| weight | | | 28 | | g |

MECHANICAL DRAWING

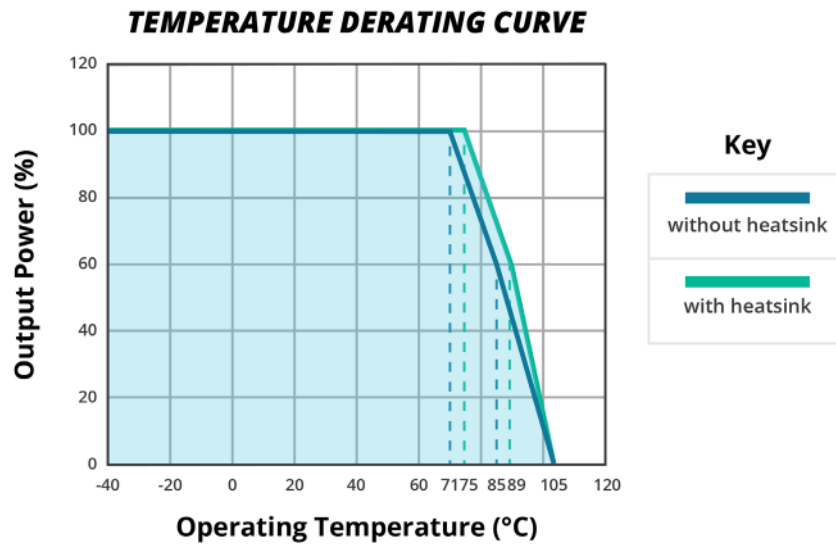
units: mm [inch]
 tolerance: ± 0.50 [± 0.020]
 pin diameter tolerance: ± 0.10 [± 0.004]

| PIN Out | |
|---------|----------|
| PIN | Function |
| 1 | Ctrl |
| 2 | GND |
| 3 | Vin |
| 4 | +Vo2 |
| 5 | 0V2 |
| 6 | no pin |
| 7 | 0V1 |
| 8 | +Vo1 |



DERATING CURVES

Figure 1



APPLICATION CIRCUIT

All the DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2. 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 max. capacitive load value of the product.

Figure 2

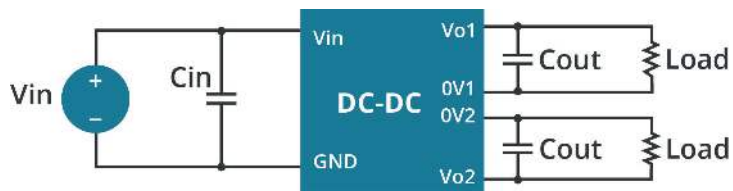


Table 1

| Vout (Vdc) | Cin (μ F) | Cout (μ F) |
|------------|----------------|-----------------|
| 5 | 100 | 100 |
| 12 | 100 | 22 |
| 24 | 100 | 22 |

EMC RECOMMENDED CIRCUIT

Figure 3

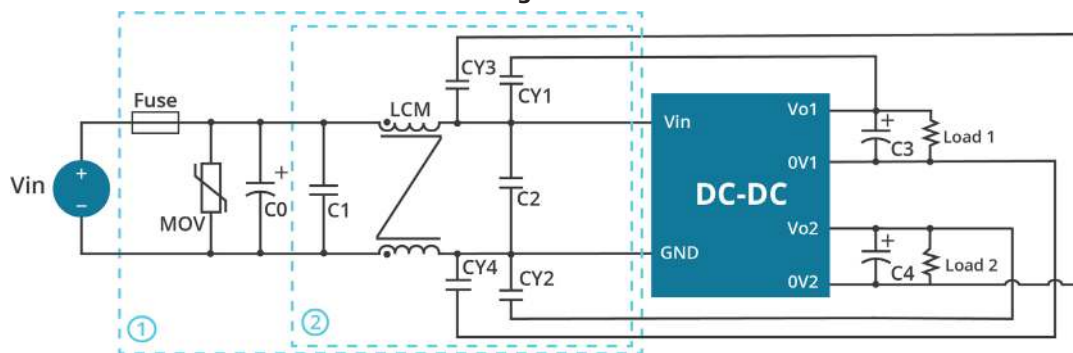


Table 2

| Recommended External Circuit Components | |
|---|--|
| Model | Vin: 48V |
| FUSE | Choose according to actual input current |
| MOV | S14K60 |
| C0 | 680 μ F/100V |
| C1, C2, C3, C4 | Y1/102M/400 Vac |
| LCM | 1mH (FL2D-30-102) |
| CY1, CY2, CY3, CY4 | 2.2nF/2000V |

REVISION HISTORY

| rev. | description | date |
|------|--|------------|
| 1.0 | initial release | 06/29/2020 |
| 1.02 | derating curve and circuit figures updated | 08/23/2021 |
| 1.03 | EMI/EMC information updated | 09/09/2021 |
| 1.04 | EMC circuit & table 2 updated | 04/06/2022 |
| 1.05 | EMC circuit updated | 01/11/2023 |

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



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CUI offers a two (2) year limited warranty. Complete warranty information is listed on our website.

CUI reserves the right to make changes to the product at any time without notice. Information provided by CUI is believed to be accurate and reliable. However, no responsibility is assumed by CUI for its use, nor for any infringements of patents or other rights of third parties which may result from its use.

CUI products are not authorized or warranted for use as critical components in equipment that requires an extremely high level of reliability. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.