

**SERIES:** PQD10W-D | **DESCRIPTION:** DC-DC CONVERTER

**FEATURES**

- ultrawide 4:1 input range
- dual positive output with asymmetrical options
- industry standard pinout
- 1500 Vdc isolation
- input under-voltage protection
- output short circuit, over current, and over-voltage protection
- wide operating temp: -40°C to +85°C
- EN62368 approved

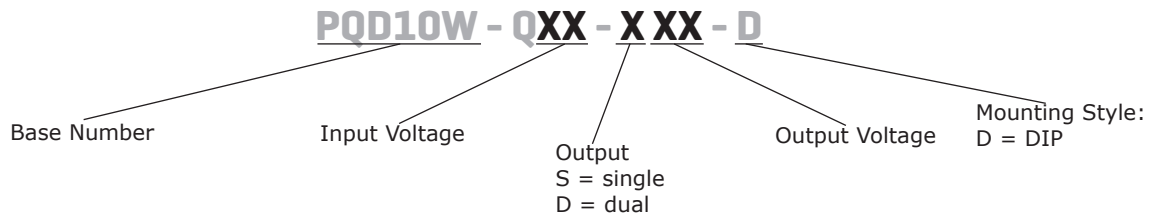


**MODEL**

| MODEL             | input voltage |             | output voltage | output current |           | output power | ripple & noise <sup>1</sup> | efficiency <sup>2</sup> |         |
|-------------------|---------------|-------------|----------------|----------------|-----------|--------------|-----------------------------|-------------------------|---------|
|                   | typ (Vdc)     | range (Vdc) | Vo1/Vo2 (Vdc)  | min (mA)       | max (mA)  | max (W)      | max (mVp-p)                 | min (%)                 | typ (%) |
| PQD10W-Q48-D55-D  | 48            | 18~75       | 5/5            | 0/0            | 1000/1000 | 10           | 150                         | 81                      | 84      |
| PQD10W-Q48-D512-D | 48            | 18~75       | 5/12           | 0/0            | 1000/417  | 10           | 150                         | 82                      | 84      |
| PQD10W-Q48-D524-D | 48            | 18~75       | 5/24           | 0/0            | 1000/209  | 10           | 150                         | 82                      | 84      |

Notes: 1. From 5~100% load, nominal input, 20 MHz bandwidth oscilloscope, with 10  $\mu$ F tantalum and 1  $\mu$ 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   | 48    | 80     | Vdc   |
| start-up voltage        |   |      |       | 18     | Vdc   |
| surge voltage           | for maximum of 1 second   | -0.7 |       | 100    | Vdc   |
| current                 | full load / no load, nominal input voltage  |      | 248/4 | 258/10 | mA    |
| filter                  | Pi filter   |      |       |        |       |
| CTRL <sup>3</sup>       | module on (CTRL open or pulled high 3.5~12 Vdc)<br>module off (CTRL pulled low or to gnd 0~1.2 Vdc) |      |       |        |       |

Note 3: CTRL is referenced to GND

## OUTPUT

| parameter                    | conditions/description   | min | typ  | max   | units |
|------------------------------|--|-----|------|-------|-------|
| maximum capacitive load      | 5 V output   |     |      | 1,000 | μF    |
|                              | 12 V output  |     |      | 470   | μF    |
|                              | 24 V output  |     |      | 100   | μF    |
| voltage accuracy             | 0% to full load, Vo1<br>input voltage, any balanced load, Vo2    |     | ±1   | ±3    | %     |
|                              |  |     | ±3   | ±6    | %     |
| line regulation              | from low line to high line, full load<br>Vo1<br>Vo2              |     | ±0.3 | ±0.5  | %     |
|                              |  |     | ±2   | ±3    | %     |
| load regulation              | from 10% to full load, dual output, balanced power<br>Vo1<br>Vo2 |     | ±0.5 | ±1    | %     |
|                              |  |     | ±3   | ±6    | %     |
| 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                      |     | ±5   | ±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        |                           | 110 | 150  | 200 | %     |
| short circuit protection       | continuous, self recovery |     |      |     |       |
| input under voltage protection |                           | 12  | 15.5 |     | Vdc   |

## SAFETY AND COMPLIANCE

| parameter             | conditions/description   | min          | typ   | max | units      |
|-----------------------|--|--------------|-------|-----|------------|
| isolation voltage     | input to output for 1 minute at 1 mA<br>output to output for 1 minute at 1 mA  | 1,500<br>500 |       |     | Vdc<br>Vdc |
| isolation resistance  | input to output at 500 Vdc   | 1,000        |       |     | MΩ         |
| isolation capacitance | input to output, 100 kHz / 0.1 V   |              | 1,000 |     | pF         |
| safety approvals      | EN/IEC 62368   |              |       |     |            |
| EMI/EMC               | EN 55032: 2015 Class B, EN 55024: 2010+A1: 2015 (see recommended circuit)      |              |       |     |            |
| ESD                   | IEC/EN61000-4-2, Contact ±4KV / Air ±6KV, 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, 10 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 |     | 85  | °C    |
| storage temperature   |                        | -55 |     | 125 | °C    |
| storage humidity      | non-condensing         | 5   |     | 95  | %     |
| vibration             | 10-150Hz               |     | 5   |     | G     |

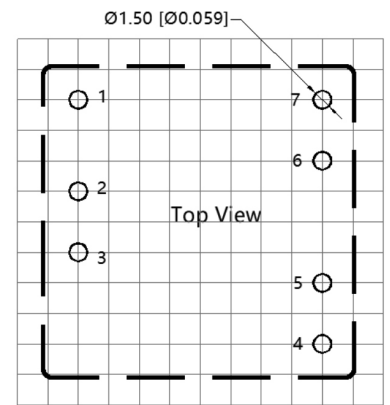
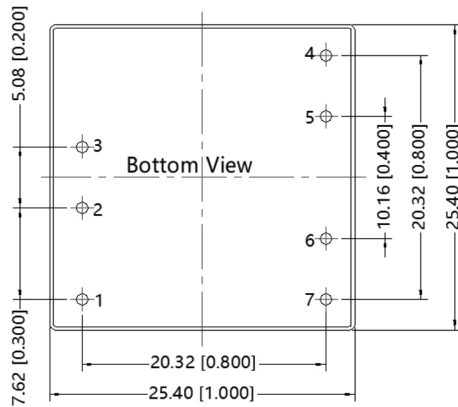
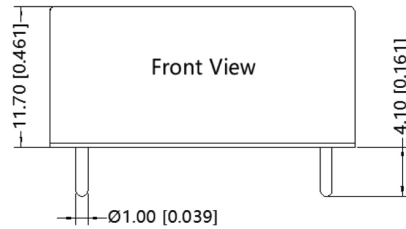
## MECHANICAL

| parameter     | conditions/description                             | min | typ | max | units |
|---------------|--|-----|-----|-----|-------|
| dimensions    | 25.40 x 25.40 x 11.70 [1.000 x 1.000 x 0.461 inch] |     |     |     | mm    |
| case material | aluminum alloy                                     |     |     |     |       |
| weight        |  |     | 13  |     | g     |

## MECHANICAL DRAWING

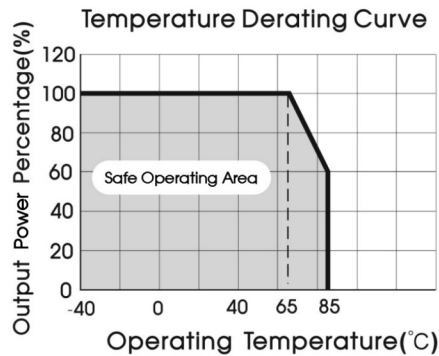
units: mm [inch]  
 tolerance:  $\pm 0.50$  [ $\pm 0.020$ ]  
 pin diameter tolerance:  $\pm 0.10$  [ $\pm 0.004$ ]

| PIN Out |          |
|---------|----------|
| PIN     | Function |
| 1       | Ctrl     |
| 2       | GND      |
| 3       | Vin      |
| 4       | +Vo2     |
| 5       | 0V2      |
| 6       | 0V1      |
| 7       | +Vo1     |



Note: Grid 2.54\*2.54mm

## DERATING CURVE



## 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**

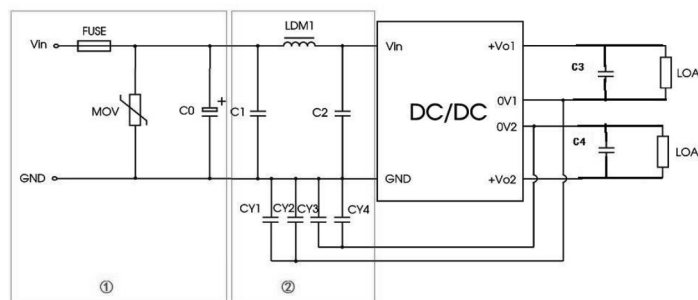


**Table 1**

| Vout (Vdc) | Cin ( $\mu F$ ) | Cout ( $\mu F$ ) |
|------------|-----------------|------------------|
| 5          | 100             | 100              |
| 12         | 100             | 22               |
| 24         | 100             | 22               |

## EMC RECOMMENDED CIRCUIT

**Figure 3**



**Table 2**

| Recommended External Circuit Components |  |
|---|--|
| Model                                   | $V_{in}$ : 48V                           |
| FUSE                                    | Choose according to actual input current |
| MOV                                     | S14K60                                   |
| C0                                      | 330 $\mu F$ /100V                        |
| C1/C2                                   | 4.7 $\mu F$ /100V                        |
| C3/C4                                   | Refer to the $C_{out}$ in Fig.2          |
| LDM1                                    | 15 $\mu H$                               |
| CY1, CY2, CY3, CY4                      | 2.2nF/2000V                              |

## REVISION HISTORY

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| rev. | description     | date       |
|------|-----------------|------------|
| 1.0  | initial release | 06/29/2020 |

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



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