

**SERIES: PDQE10 | DESCRIPTION: DC-DC CONVERTER**
**FEATURES**

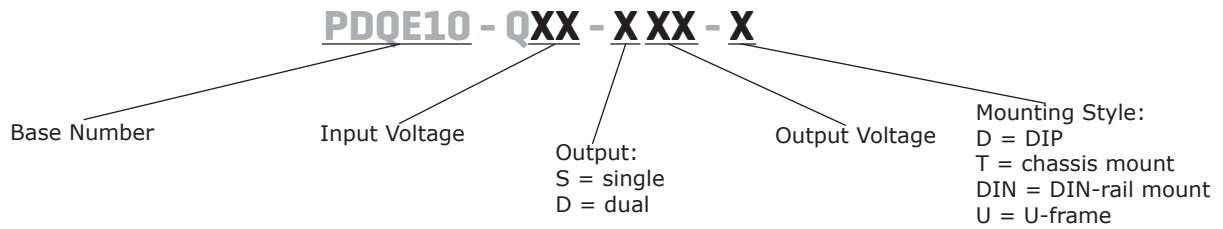
- industry standard footprint
- board, chassis and Din rail versions available
- industrial operating temp -40~+85°C
- 1500 Vdc isolation voltage
- industry standard footprint compatible with CUI legacy PDQ10 series
- high efficiency up to 88%
- 4:1 input rating
- single & dual output models available
- output short circuit, over current & overvoltage protection
- EN/BS EN 62368-1



| MODEL                       | input voltage |             | output voltage<br>(Vdc) | output current |          | output power<br>max (W) | ripple & noise <sup>1</sup><br>max (mVp-p) | efficiency <sup>2</sup><br>typ (%) |
|-----------------------------|---------------|-------------|-------------------------|----------------|----------|-------------------------|--------------------------------------------|------------------------------------|
|                             | typ (Vdc)     | range (Vdc) |                         | min (mA)       | max (mA) |                         |                                            |                                    |
| PDQE10-Q24-S3 <sup>4</sup>  | 24            | 9~36        | 3.3                     | 0              | 2400     | 7.92                    | 80                                         | 79                                 |
| PDQE10-Q24-S5 <sup>4</sup>  | 24            | 9~36        | 5                       | 0              | 2000     | 10                      | 80                                         | 83                                 |
| PDQE10-Q24-S9 <sup>4</sup>  | 24            | 9~36        | 9                       | 0              | 1111     | 10                      | 80                                         | 86                                 |
| PDQE10-Q24-S12 <sup>4</sup> | 24            | 9~36        | 12                      | 0              | 833      | 10                      | 80                                         | 87                                 |
| PDQE10-Q24-S15 <sup>4</sup> | 24            | 9~36        | 15                      | 0              | 667      | 10                      | 80                                         | 87                                 |
| PDQE10-Q24-S24 <sup>4</sup> | 24            | 9~36        | 24                      | 0              | 416      | 10                      | 80                                         | 88                                 |
| PDQE10-Q24-D5 <sup>4</sup>  | 24            | 9~36        | ±5                      | 0              | ±1000    | 10                      | 80                                         | 83                                 |
| PDQE10-Q24-D9 <sup>4</sup>  | 24            | 9~36        | ±9                      | 0              | ±555     | 10                      | 80                                         | 86                                 |
| PDQE10-Q24-D12 <sup>4</sup> | 24            | 9~36        | ±12                     | 0              | ±416     | 10                      | 80                                         | 87                                 |
| PDQE10-Q24-D15 <sup>4</sup> | 24            | 9~36        | ±15                     | 0              | ±333     | 10                      | 80                                         | 87                                 |
| PDQE10-Q24-D24 <sup>4</sup> | 24            | 9~36        | ±24                     | 0              | ±208     | 10                      | 80                                         | 87                                 |
| PDQE10-Q48-S3               | 48            | 18~75       | 3.3                     | 0              | 2400     | 7.92                    | 80                                         | 79                                 |
| PDQE10-Q48-S5               | 48            | 18~75       | 5                       | 0              | 2000     | 10                      | 80                                         | 83                                 |
| PDQE10-Q48-S12              | 48            | 18~75       | 12                      | 0              | 833      | 10                      | 80                                         | 87                                 |
| PDQE10-Q48-S15              | 48            | 18~75       | 15                      | 0              | 667      | 10                      | 80                                         | 87                                 |
| PDQE10-Q48-S24              | 48            | 18~75       | 24                      | 0              | 416      | 10                      | 80                                         | 88                                 |
| PDQE10-Q48-D5               | 48            | 18~75       | ±5                      | 0              | ±1000    | 10                      | 80                                         | 83                                 |
| PDQE10-Q48-D12              | 48            | 18~75       | ±12                     | 0              | ±416     | 10                      | 80                                         | 87                                 |
| PDQE10-Q48-D15              | 48            | 18~75       | ±15                     | 0              | ±333     | 10                      | 80                                         | 87                                 |
| PDQE10-Q48-D24              | 48            | 18~75       | ±24                     | 0              | ±208     | 10                      | 80                                         | 87                                 |

- 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, full load. The typical efficiencies for the chassis mount and DIN-rail mount versions are ~2% less than the DIP versions due to the input reverse polarity protection.
  3. All specifications are measured at Ta=25°C, humidity < 75%, nominal input voltage, and rated output load unless otherwise specified.
  4. Model is not CE certified.
  5. All U-frame models of this series are not UL certified.
  6. Only PDQE10-Q24-DXX parts are UL certified for chassis mount and DIN-rail versions.

## PART NUMBER KEY



## INPUT

| parameter                            | conditions/description                                         |                       | min  | typ   | max    | units |
|--------------------------------------|----------------------------------------------------------------|-----------------------|------|-------|--------|-------|
| operating input voltage <sup>7</sup> | 24 Vdc input models                                            |                       | 9    | 24    | 36     | Vdc   |
|                                      | 48 Vdc input models                                            |                       | 18   | 48    | 75     | Vdc   |
| start-up voltage <sup>7</sup>        | 24 Vdc input models                                            |                       |      |       | 9      | Vdc   |
|                                      | 48 Vdc input models                                            |                       |      |       | 18     | Vdc   |
| surge voltage                        | for maximum of 1 second                                        |                       |      |       |        |       |
|                                      | 24 Vdc input models                                            |                       | -0.7 |       | 50     | Vdc   |
| under voltage shutdown               | 24 Vdc input models                                            |                       | 5.5  | 6.5   |        | Vdc   |
|                                      | 48 Vdc input models                                            |                       | 12   | 15.5  |        | Vdc   |
| current (full load/no load)          | 24 Vdc input models                                            | 3.3 Vdc output models |      | 423/5 | 434/12 | mA    |
|                                      |                                                                | all other models      |      | 502/5 | 514/12 | mA    |
|                                      | 48 Vdc input models                                            | 3.3 Vdc output models |      | 190/4 | 215/8  | mA    |
|                                      |                                                                | all other models      |      | 251/4 | 258/8  | mA    |
| remote on/off (CTRL) <sup>8</sup>    | module ON (3.5~12 Vdc or CTRL pin open circuit or pulled high) |                       |      |       |        |       |
|                                      | module OFF (0~1.2 Vdc CTRL pin pulled low to GND)              |                       |      |       |        |       |
|                                      | converter input current when CTRL pin pulled low               |                       |      | 6     | 10     | mA    |
|                                      | CTRL pin input current when CTRL pin pulled low                |                       |      | 1.5   |        | mA    |
|                                      | start-up time                                                  |                       |      | 2     |        | s     |
| filter                               | Pi filter                                                      |                       |      |       |        |       |
| input reverse polarity protection    | only present on chassis mount and DIN-rail mount models        |                       |      |       |        |       |
| no load power consumption            |                                                                |                       |      | 0.12  |        | W     |

Notes: 7. The minimum input voltage and start-up voltage for the chassis mount and DIN-rail mount versions are 1 Vdc higher than the DIP versions.  
8. The voltage of the Ctrl pin is referenced to input GND pin.

## OUTPUT

| parameter                            | conditions/description                |  | min | typ  | max   | units |
|--------------------------------------|---------------------------------------|--|-----|------|-------|-------|
| maximum capacitive load <sup>9</sup> | 3.3, 5 Vdc output models              |  |     |      | 2,200 | μF    |
|                                      | ±5 Vdc output models                  |  |     |      | 1,000 | μF    |
|                                      | 9, ±9 Vdc output models               |  |     |      | 680   | μF    |
|                                      | ±12 Vdc output models                 |  |     |      | 470   | μF    |
|                                      | ±15 Vdc output models                 |  |     |      | 330   | μF    |
|                                      | all other models                      |  |     |      | 100   | μF    |
| voltage accuracy <sup>10</sup>       | 0% to full load                       |  |     | ±1   | ±3    | %     |
| line regulation                      | from low line to high line, full load |  |     |      |       |       |
|                                      | positive outputs                      |  |     | ±0.2 | ±0.5  | %     |
|                                      | negative outputs                      |  |     | ±0.5 | ±1    | %     |
| load regulation <sup>11</sup>        | from 5% to full load                  |  |     |      |       |       |
|                                      | positive outputs                      |  |     | ±0.5 | ±1    | %     |
|                                      | negative outputs                      |  |     | ±0.5 | ±1.5  | %     |
| voltage balance <sup>12</sup>        | dual output models                    |  |     |      | ±5    | %     |

Note: 9. Tested at input voltage range and full load.  
10. At 0~5% load, the max output voltage accuracy for the ±5 & ±9 Vdc output models is ±5%.  
11. At 0~100% load, the max load regulation is ±5%.  
12. Unbalanced loads should not exceed ±5%. If ±5% is exceeded, the product performance cannot be guaranteed.

## OUTPUT (CONTINUED)

| parameter                         | conditions/description                                                            | min | typ | max   | units |
|-----------------------------------|-----------------------------------------------------------------------------------|-----|-----|-------|-------|
| cross regulation                  | dual output models:<br>main output 50% load<br>secondary output from 10~100% load |     |     | ±5    | %     |
| switching frequency <sup>13</sup> | PWM mode                                                                          |     | 350 |       | kHz   |
| transient recovery time           | 25% load step change, nominal input voltage                                       |     | 300 | 500   | µs    |
| transient response deviation      | PDQE10-Q48-S3 25% load step change, nominal input voltage                         |     | ±5  | ±8    | %     |
|                                   | all other models 25% load step change, nominal input voltage                      |     | ±3  | ±5    | %     |
| temperature coefficient           | at full load                                                                      |     |     | ±0.03 | %/°C  |

Note: 13. Value is based on full load. At loads <10%, the switching frequency decreases with decreasing load

## PROTECTIONS

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

## SAFETY AND COMPLIANCE

| parameter                    | conditions/description                                                                              | min       | typ   | max | units |
|------------------------------|-----------------------------------------------------------------------------------------------------|-----------|-------|-----|-------|
| isolation voltage            | input to output for 1 minute at 1 mA                                                                | 1,500     |       |     | 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             | certified to 60950-1: UL <sup>14,15</sup><br>certified to 62368: EN/BS EN                           |           |       |     |       |
| conducted emissions          | CISPR22/EN55022, class A (no external circuit); class B (external circuit required, see Figure 3-2) |           |       |     |       |
| radiated emissions           | CISPR22/EN55022, class A (no external circuit); class B (external circuit required, see Figure 3-2) |           |       |     |       |
| ESD                          | IEC/EN61000-4-2, contact ± 4kV, class B                                                             |           |       |     |       |
| radiated immunity            | IEC/EN61000-4-3, 10V/m, class A                                                                     |           |       |     |       |
| EFT/burst                    | IEC/EN61000-4-4, ± 2kV, class B (external circuit required, see Figure 3-1)                         |           |       |     |       |
| surge                        | IEC/EN61000-4-5, line-line ± 2kV, class B (external circuit required, see Figure 3-1)               |           |       |     |       |
| conducted immunity           | IEC/EN61000-4-6, 3 Vr.m.s, class A                                                                  |           |       |     |       |
| voltage dips & interruptions | IEC/EN61000-4-29, 0%-70%, class B                                                                   |           |       |     |       |
| MTBF                         | as per MIL-HDBK-217F, 25°C                                                                          | 1,000,000 |       |     | hours |
| RoHS                         | yes                                                                                                 |           |       |     |       |

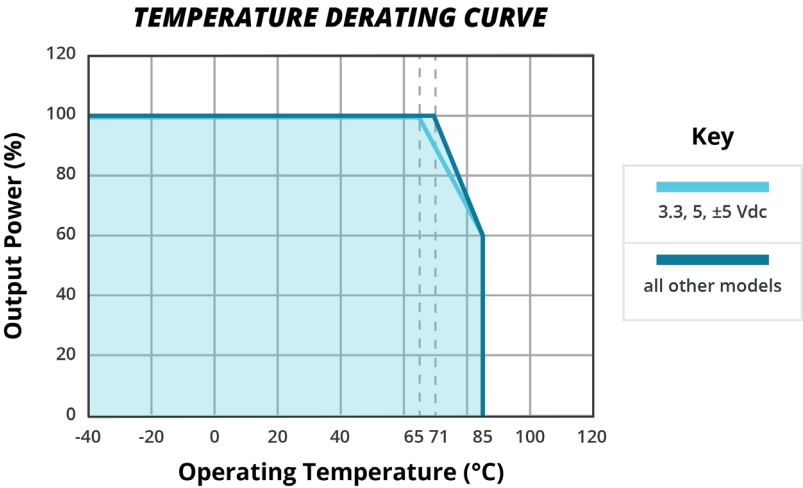
Note: 14. All U-frame models of this series are not UL certified.

15. Only PDQE10-Q24-DXX parts are UL certified for chassis mount and DIN-rail versions.

ENVIRONMENTAL

| parameter             | conditions/description               | min | typ | max | units |
|-----------------------|--------------------------------------|-----|-----|-----|-------|
| operating temperature | see derating curves                  | -40 |     | 85  | °C    |
| storage temperature   |                                      | -55 |     | 125 | °C    |
| storage humidity      | non-condensing                       | 5   |     | 95  | %     |
| vibration             | 10~55 Hz for 30 minutes on each axis |     | 10  |     | G     |

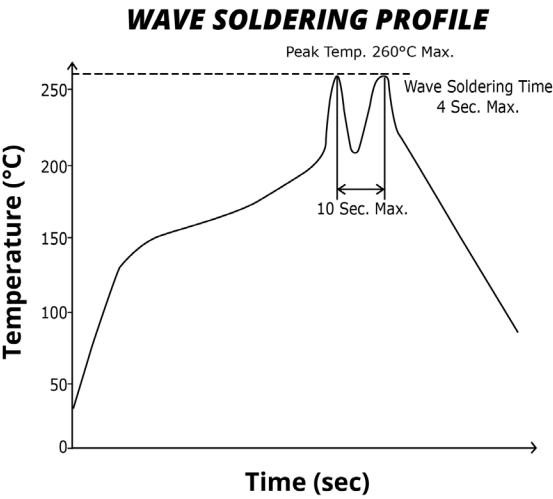
DERATING CURVES



SOLDERABILITY<sup>15</sup>

| parameter      | conditions/description          | min | typ | max | units |
|----------------|---------------------------------|-----|-----|-----|-------|
| hand soldering | 1.5 mm from case for 10 seconds |     |     | 300 | °C    |
| wave soldering | see wave soldering profile      |     |     | 260 | °C    |

Note: 15. For DIP models only.



## MECHANICAL

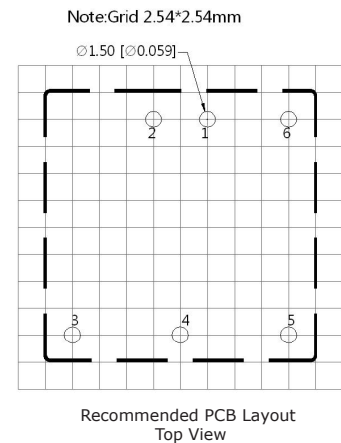
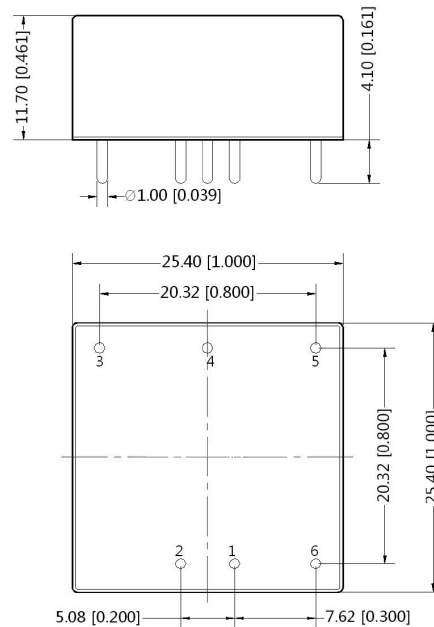
| parameter     | conditions/description | min                                                | typ | max | units |
|---------------|------------------------|----------------------------------------------------|-----|-----|-------|
| dimensions    | DIP                    | 25.40 x 25.40 x 11.70 [1.000 x 1.000 x 0.461 inch] |     |     | mm    |
|               | Chassis                | 76.00 x 31.50 x 21.20 [2.992 x 1.240 x 0.834 inch] |     |     | mm    |
|               | DIN-Rail               | 76.00 x 31.50 x 25.80 [2.992 x 1.240 x 1.016 inch] |     |     | mm    |
|               | U-frame                | 55.00 x 52.30 x 19.00 [2.165 x 2.059 x 0.748 inch] |     |     | mm    |
| case material | aluminum alloy         |                                                    |     |     |       |
| weight        | DIP                    |                                                    | 15  |     | g     |
|               | Chassis mount          |                                                    | 35  |     | g     |
|               | DIN-rail mount         |                                                    | 55  |     | g     |
|               | U-frame                |                                                    | 44  |     | g     |

## MECHANICAL DRAWING (DIP)

units: mm [inch]

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

| PIN CONNECTIONS |          |       |
|-----------------|----------|-------|
| PIN             | Function |       |
|                 | Single   | Dual  |
| 1               | GND      | GND   |
| 2               | Vin      | Vin   |
| 3               | +Vout    | +Vout |
| 4               | No Pin   | 0V    |
| 5               | 0V       | -Vout |
| 6               | CTRL     | CTRL  |



## MECHANICAL DRAWING (CHASSIS)

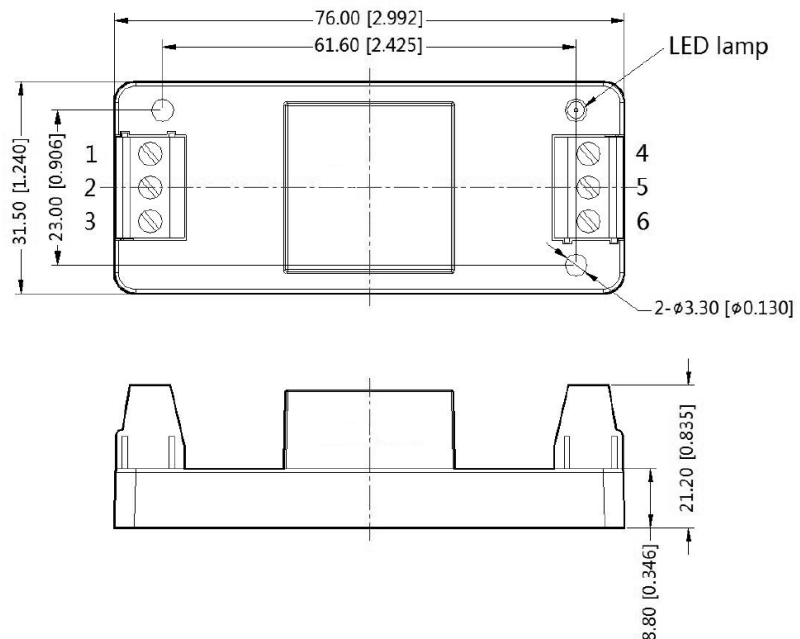
units: mm [inch]

tolerance:  $\pm 0.50[\pm 0.020]$ 

wire range: 24~12 AWG

tightening torque: max 0.4 N·m

| PIN CONNECTIONS |          |       |
|-----------------|----------|-------|
| PIN             | Function |       |
|                 | Single   | Dual  |
| 1               | CTRL     | CTRL  |
| 2               | GND      | GND   |
| 3               | Vin      | Vin   |
| 4               | 0V       | -Vout |
| 5               | NC       | 0V    |
| 6               | +Vout    | +Vout |

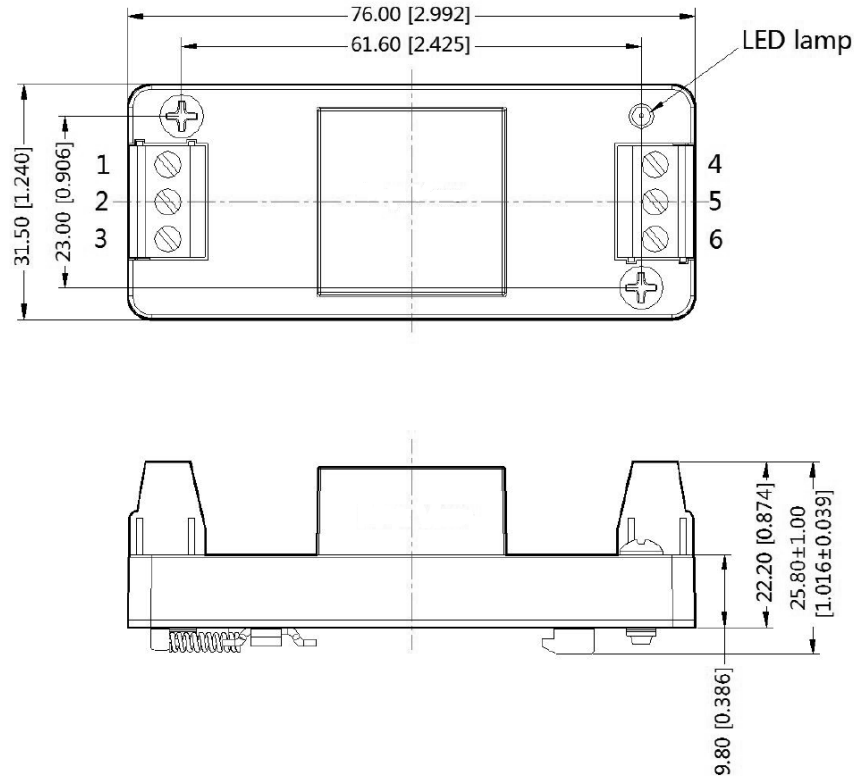


## MECHANICAL DRAWING (DIN-RAIL)

units: mm [inch]  
tolerance:  $\pm 0.50[\pm 0.020]$

installed on DIN rail TS35  
wire range: 24~12 AWG  
tightening torque: max 0.4 N·m

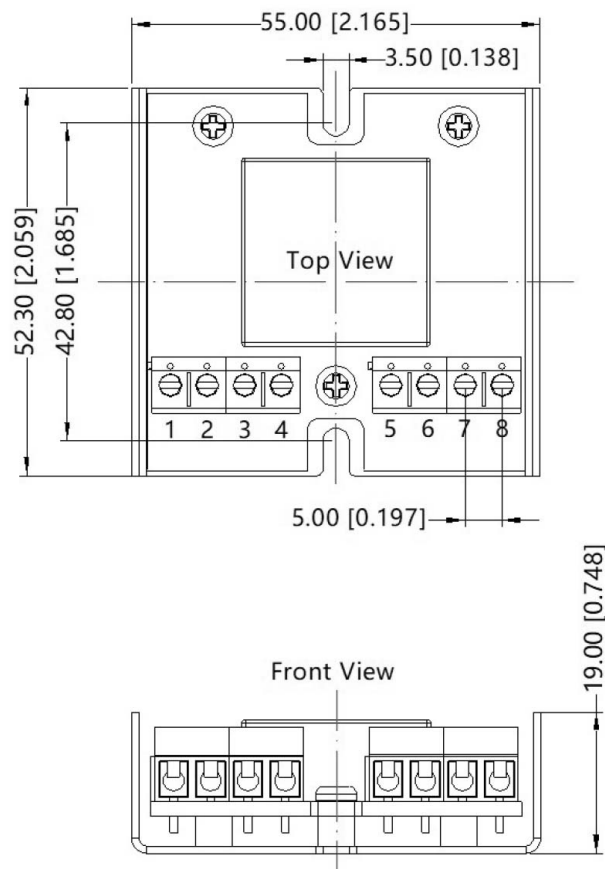
| PIN CONNECTIONS |          |       |
|-----------------|----------|-------|
| PIN             | Function |       |
|                 | Single   | Dual  |
| 1               | CTRL     | CTRL  |
| 2               | GND      | GND   |
| 3               | Vin      | Vin   |
| 4               | 0V       | -Vout |
| 5               | NC       | 0V    |
| 6               | +Vout    | +Vout |



## MECHANICAL DRAWING (U-FRAME)

units: mm [inch]  
wire range: 24-12 AWG  
tolerance:  $\pm 1.00[\pm 0.039]$   
tightening torque: Max 0.4 N·m

| PIN CONNECTIONS |          |      |
|-----------------|----------|------|
| PIN             | Function |      |
|                 | Single   | Dual |
| 1               | GND      | GND  |
| 2               | Vin      | Vin  |
| 3               | Ctrl     | Ctrl |
| 4               | Case     | Case |
| 5               | NC       | NC   |
| 6               | +Vo      | +Vo  |
| 7               | NC       | 0V   |
| 8               | 0V       | -Vo  |



APPLICATION CIRCUIT (DIP, CHASSIS, DIN-RAIL)

This series has been tested according to the following recommended circuits (Figures 1 & 2) before leaving the factory. If you want to further reduce the input and output ripple, you can increase the input and output capacitors or select capacitors of low equivalent impedance provided that the capacitance is less than the maximum capacitive load of the model.

Figure 1  
Single Output Models

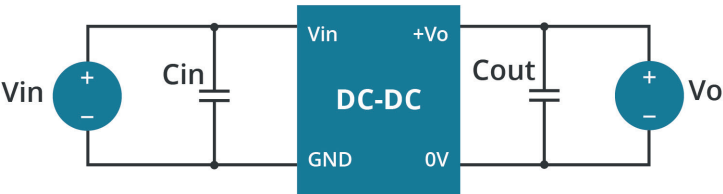
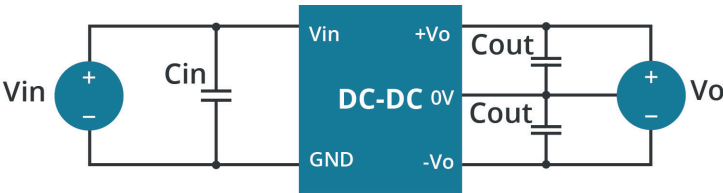


Table 1

| Vin (Vdc) | Cin (μF) | Cout (μF) |
|-----------|----------|-----------|
| 24        | 100      | 10        |
| 48        | 10~47    | 10        |

Figure 2  
Dual Output Models



APPLICATION CIRCUIT (U-FRAME)

Figure 1  
Single Output Models

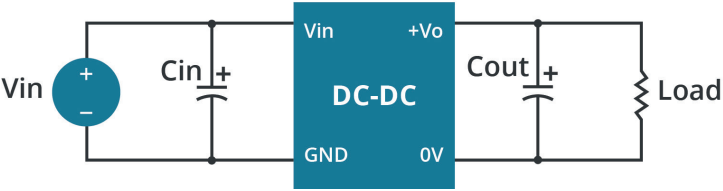
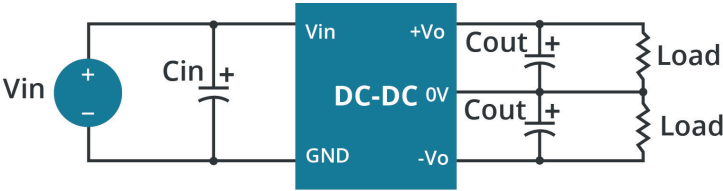


Table 1

| Vin (Vdc) | Cin (μF/V) | Vout (Vdc)    | Cout (μF/V) |
|-----------|------------|---------------|-------------|
| 24        | 100/50     | ±5/±9/3.3/5/9 | 10/16       |
|           |            | ±12/±15/12/15 | 10/25       |
|           |            | ±24/24        | 10/50       |
| 48        | 10~47/100  | ±5/3.3/5      | 10/16       |
|           |            | ±12/±15/12/15 | 10/25       |
|           |            | ±24/24        | 10/50       |

Figure 2  
Dual Output Models



EMC RECOMMENDED CIRCUIT (DIP, CHASSIS, DIN-RAIL)

Figure 3

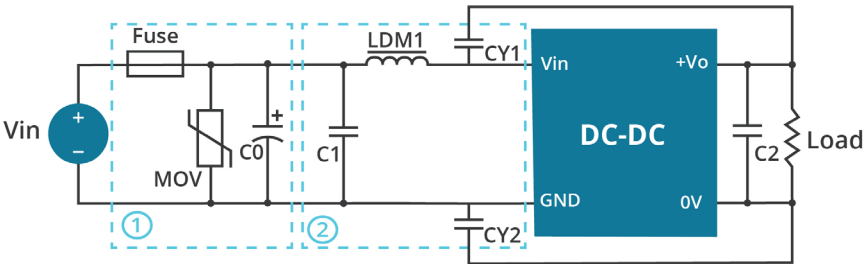


Table 2

| Recommended External Circuit Components |                                          |                     |
|-----------------------------------------|------------------------------------------|---------------------|
| $V_{in}$ (Vdc)                          | 24                                       | 48                  |
| FUSE                                    | choose according to actual input current |                     |
| MOV                                     | S20K30                                   | S14K60              |
| $C_0$                                   | 330 $\mu$ F / 50 V                       | 330 $\mu$ F / 100 V |
| $C_1$                                   | 1 $\mu$ F / 50 V                         | 1 $\mu$ F / 100 V   |
| $C_2$                                   | 10 $\mu$ F                               |                     |
| LDM1                                    | 4.7 $\mu$ H                              |                     |
| CY1, CY2                                | 1 nF / 2 kV                              |                     |

EMC RECOMMENDED CIRCUIT (U-FRAME)

Figure 3

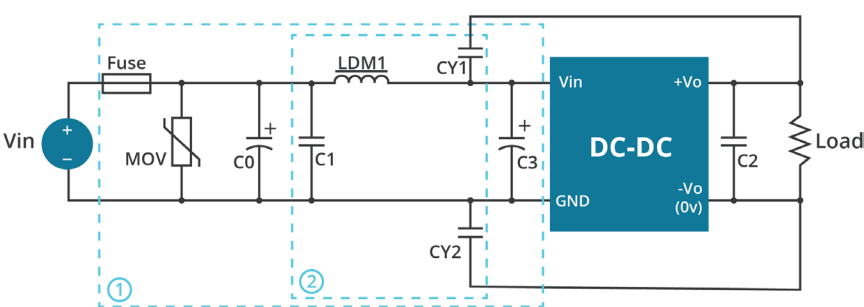


Table 2

| Recommended External Circuit Components |                                          |                    |
|-----------------------------------------|------------------------------------------|--------------------|
| $V_{in}$ (Vdc)                          | 24                                       | 48                 |
| FUSE                                    | choose according to actual input current |                    |
| MOV                                     | S20K30                                   | S14K60             |
| $C_0/C_3$                               | 330 $\mu$ F / 50V                        | 330 $\mu$ F / 100V |
| $C_1$                                   | 1 $\mu$ F / 50V                          | 1 $\mu$ F / 100V   |
| $C_2$                                   | refer to the Cout in Figure 1 & 2        |                    |
| LDM1                                    | 4.7 $\mu$ H                              |                    |
| CY1, CY2                                | 1nF / 2kV                                |                    |



## REVISION HISTORY

| rev. | description                                            | date       |
|------|--------------------------------------------------------|------------|
| 1.0  | initial release                                        | 06/21/2018 |
| 1.01 | features and safety line updated, packaging removed    | 01/19/2021 |
| 1.02 | remote start-up time updated                           | 03/15/2021 |
| 1.03 | derating curve and circuit figure updated              | 07/27/2021 |
| 1.04 | CE removed from 24V models, U-frame option added       | 11/07/2022 |
| 1.05 | ctrl pin information updated                           | 11/11/2022 |
| 1.06 | transient response deviation updated for PDQE10-Q48-S3 | 09/07/2023 |
| 1.07 | updated notes 3 & 13                                   | 01/10/2024 |
| 1.08 | updated notes 5, 6, 14 & 15, UKCA mark added           | 04/05/2024 |

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

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

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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.