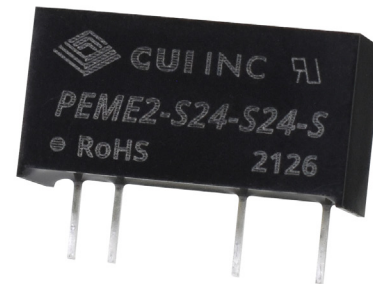


**SERIES:** PEME2-S | **DESCRIPTION:** DC-DC CONVERTER**FEATURES**

- 2 W isolated output
- single/dual unregulated output
- 3000 Vdc isolation
- continuous short circuit protection
- extended temperature range (-40~105°C)
- no-load input current as low as 8mA
- efficiency up to 86%
- UL 62368-1
- designed to meet EN/BS EN 62368



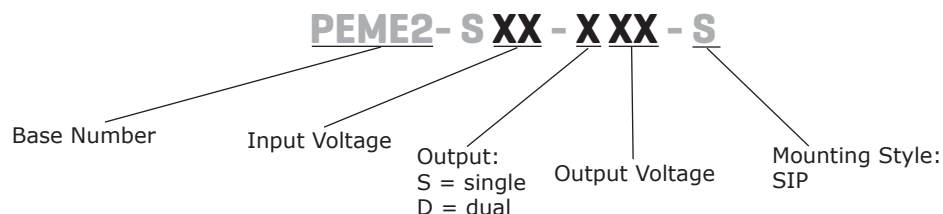
| MODEL                        | input voltage |                | output voltage<br>(Vdc) | output current |             | output power<br>max<br>(W) | ripple & noise <sup>1</sup><br>max<br>(mVp-p) | efficiency <sup>2</sup><br>typ<br>(%) |
|------------------------------|---------------|----------------|-------------------------|----------------|-------------|----------------------------|-----------------------------------------------|---------------------------------------|
|                              | typ<br>(Vdc)  | range<br>(Vdc) |                         | min<br>(mA)    | max<br>(mA) |                            |                                               |                                       |
| PEME2-S5-D3-S <sup>4</sup>   | 5             | 4.5~5.5        | ±3.3                    | ±30            | ±303        | 2                          | 200                                           | 75                                    |
| PEME2-S5-D5-S <sup>4</sup>   | 5             | 4.5~5.5        | ±5                      | ±20            | ±200        | 2                          | 200                                           | 84                                    |
| PEME2-S5-D9-S <sup>4</sup>   | 5             | 4.5~5.5        | ±9                      | ±11            | ±111        | 2                          | 200                                           | 85                                    |
| PEME2-S5-D12-S <sup>4</sup>  | 5             | 4.5~5.5        | ±12                     | ±8             | ±83         | 2                          | 200                                           | 85                                    |
| PEME2-S5-D15-S <sup>4</sup>  | 5             | 4.5~5.5        | ±15                     | ±7             | ±67         | 2                          | 200                                           | 86                                    |
| PEME2-S5-D24-S <sup>4</sup>  | 5             | 4.5~5.5        | ±24                     | ±4             | ±42         | 2                          | 200                                           | 86                                    |
| PEME2-S5-S3-S <sup>4</sup>   | 5             | 4.5~5.5        | 3.3                     | 40             | 400         | 1.32                       | 200                                           | 78                                    |
| PEME2-S5-S5-S <sup>4</sup>   | 5             | 4.5~5.5        | 5                       | 40             | 400         | 2                          | 200                                           | 84                                    |
| PEME2-S5-S7-S <sup>4</sup>   | 5             | 4.5~5.5        | 7.2                     | 28             | 278         | 2                          | 200                                           | 84                                    |
| PEME2-S5-S9-S <sup>4</sup>   | 5             | 4.5~5.5        | 9                       | 22             | 222         | 2                          | 200                                           | 85                                    |
| PEME2-S5-S12-S <sup>4</sup>  | 5             | 4.5~5.5        | 12                      | 17             | 167         | 2                          | 200                                           | 85                                    |
| PEME2-S5-S15-S <sup>4</sup>  | 5             | 4.5~5.5        | 15                      | 13             | 133         | 2                          | 200                                           | 86                                    |
| PEME2-S5-S24-S <sup>4</sup>  | 5             | 4.5~5.5        | 24                      | 8              | 83          | 2                          | 200                                           | 86                                    |
| PEME2-S12-D3-S               | 12            | 10.8~13.2      | ±3.3                    | ±30            | ±303        | 2                          | 180                                           | 75                                    |
| PEME2-S12-D5-S               | 12            | 10.8~13.2      | ±5                      | ±20            | ±200        | 2                          | 180                                           | 80                                    |
| PEME2-S12-D9-S <sup>4</sup>  | 12            | 10.8~13.2      | ±9                      | ±11            | ±111        | 2                          | 180                                           | 82                                    |
| PEME2-S12-D12-S              | 12            | 10.8~13.2      | ±12                     | ±8             | ±83         | 2                          | 180                                           | 83                                    |
| PEME2-S12-D15-S              | 12            | 10.8~13.2      | ±15                     | ±7             | ±67         | 2                          | 180                                           | 83                                    |
| PEME2-S12-D24-S <sup>4</sup> | 12            | 10.8~13.2      | ±24                     | ±4             | ±42         | 2                          | 180                                           | 83                                    |
| PEME2-S12-S5-S               | 12            | 10.8~13.2      | 5                       | 40             | 400         | 2                          | 180                                           | 82                                    |
| PEME2-S12-S9-S <sup>4</sup>  | 12            | 10.8~13.2      | 9                       | 22             | 222         | 2                          | 180                                           | 82                                    |
| PEME2-S12-S12-S              | 12            | 10.8~13.2      | 12                      | 17             | 167         | 2                          | 180                                           | 84                                    |
| PEME2-S12-S15-S              | 12            | 10.8~13.2      | 15                      | 13             | 133         | 2                          | 180                                           | 85                                    |
| PEME2-S12-S24-S              | 12            | 10.8~13.2      | 24                      | 8              | 83          | 2                          | 180                                           | 86                                    |
| PEME2-S15-D5-S <sup>4</sup>  | 15            | 13.5~16.5      | ±5                      | ±20            | ±200        | 2                          | 180                                           | 80                                    |
| PEME2-S15-D15-S <sup>4</sup> | 15            | 13.5~16.5      | ±15                     | ±7             | ±67         | 2                          | 180                                           | 82                                    |
| PEME2-S15-S5-S <sup>4</sup>  | 15            | 13.5~16.5      | 5                       | 40             | 400         | 2                          | 180                                           | 80                                    |
| PEME2-S15-S9-S <sup>4</sup>  | 15            | 13.5~16.5      | 9                       | 22             | 222         | 2                          | 180                                           | 80                                    |

## MODEL (CONTINUED)

|                              | input voltage |                | output voltage<br>(Vdc) | output current |             | output power<br>max<br>(W) | ripple & noise <sup>1</sup><br>max<br>(mVp-p) | efficiency <sup>2</sup><br>typ<br>(%) |
|------------------------------|---------------|----------------|-------------------------|----------------|-------------|----------------------------|-----------------------------------------------|---------------------------------------|
|                              | typ<br>(Vdc)  | range<br>(Vdc) |                         | min<br>(mA)    | max<br>(mA) |                            |                                               |                                       |
| PEME2-S15-S12-S <sup>4</sup> | 15            | 13.5~16.5      | 12                      | 17             | 167         | 2                          | 180                                           | 81                                    |
| PEME2-S15-S15-S <sup>4</sup> | 15            | 13.5~16.5      | 15                      | 13             | 133         | 2                          | 180                                           | 81                                    |
| PEME2-S15-S24-S <sup>4</sup> | 15            | 13.5~16.5      | 24                      | 8              | 83          | 2                          | 180                                           | 81                                    |
| PEME2-S24-D3-S <sup>4</sup>  | 24            | 21.6~26.4      | ±3.3                    | ±30            | ±303        | 2                          | 180                                           | 76                                    |
| PEME2-S24-D5-S               | 24            | 21.6~26.4      | ±5                      | ±20            | ±200        | 2                          | 180                                           | 80                                    |
| PEME2-S24-D9-S <sup>4</sup>  | 24            | 21.6~26.4      | ±9                      | ±11            | ±111        | 2                          | 180                                           | 81                                    |
| PEME2-S24-D12-S              | 24            | 21.6~26.4      | ±12                     | ±8             | ±83         | 2                          | 180                                           | 83                                    |
| PEME2-S24-D15-S              | 24            | 21.6~26.4      | ±15                     | ±7             | ±67         | 2                          | 180                                           | 83                                    |
| PEME2-S24-D24-S <sup>4</sup> | 24            | 21.6~26.4      | ±24                     | ±4             | ±42         | 2                          | 180                                           | 83                                    |
| PEME2-S24-S3-S <sup>4</sup>  | 24            | 21.6~26.4      | 3.3                     | 40             | 400         | 1.32                       | 180                                           | 76                                    |
| PEME2-S24-S5-S               | 24            | 21.6~26.4      | 5                       | 40             | 400         | 2                          | 180                                           | 80                                    |
| PEME2-S24-S9-S <sup>4</sup>  | 24            | 21.6~26.4      | 9                       | 22             | 222         | 2                          | 180                                           | 81                                    |
| PEME2-S24-S12-S              | 24            | 21.6~26.4      | 12                      | 17             | 167         | 2                          | 180                                           | 84                                    |
| PEME2-S24-S15-S              | 24            | 21.6~26.4      | 15                      | 13             | 133         | 2                          | 180                                           | 86                                    |
| PEME2-S24-S24-S              | 24            | 21.6~26.4      | 24                      | 8              | 83          | 2                          | 180                                           | 86                                    |

- Notes:
1. Measured at nominal input, 20 MHz bandwidth oscilloscope, with 10 µF tantalum and 1 µF ceramic capacitors on the output.
  2. Measured at nominal input voltage, full load.
  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 UL certified.

## PART NUMBER KEY



**INPUT**

| parameter               | conditions/description  | min                | typ | max  | units |
|-------------------------|-------------------------|--------------------|-----|------|-------|
| operating input voltage | 5 Vdc input models      | 4.5                | 5   | 5.5  | Vdc   |
|                         | 12 Vdc input models     | 10.8               | 12  | 13.2 | Vdc   |
|                         | 15 Vdc input models     | 13.5               | 15  | 16.5 | Vdc   |
|                         | 24 Vdc input models     | 21.6               | 24  | 26.4 | Vdc   |
| surge voltage           | for maximum of 1 second |                    |     |      |       |
|                         | 5 Vdc input models      | -0.7               |     | 9    | Vdc   |
|                         | 12 Vdc input models     | -0.7               |     | 18   | Vdc   |
|                         | 15 Vdc input models     | -0.7               |     | 21   | Vdc   |
| current                 | 5 Vdc input models      | 3.3 Vdc output     |     | 564  | mA    |
|                         |                         | 5 & 7.2 Vdc output |     | 500  |       |
|                         |                         | 9 & 12 Vdc output  |     | 494  |       |
|                         |                         | 15 & 24 Vdc output |     | 488  |       |
|                         | 12 Vdc input models     |                    |     | 208  | mA    |
|                         | 15 Vdc input models     |                    |     | 167  | mA    |
|                         | 24 Vdc input models     |                    |     | 104  | mA    |
| filter                  | filter capacitor        |                    |     |      |       |

**OUTPUT**

| parameter                            | conditions/description           | min                   | typ   | max   | units |  |
|--------------------------------------|----------------------------------|-----------------------|-------|-------|-------|--|
| maximum capacitive load <sup>5</sup> | 3.3, 5 Vdc output models         |                       |       | 2,400 | μF    |  |
|                                      | ±3.3, ±5 Vdc output models       |                       |       | 1,200 | μF    |  |
|                                      | 7, 9 Vdc output models           |                       |       | 1,000 | μF    |  |
|                                      | 12, 15 Vdc output models         |                       |       | 560   | μF    |  |
|                                      | 24, ±12, ±15 Vdc output models   |                       |       | 220   | μF    |  |
|                                      | ±9 Vdc output models             |                       |       | 470   | μF    |  |
|                                      | ±24 Vdc output models            |                       |       | 100   | μF    |  |
| voltage accuracy                     | see output regulation curves     |                       |       |       |       |  |
| line regulation                      | for Vin change of 1%             |                       |       |       |       |  |
|                                      | 3.3 Vdc output models            |                       |       | ±1.5  | %     |  |
|                                      | all other output models          |                       |       | ±1.2  | %     |  |
| load regulation                      | 5 Vdc input models               | from 10% to full load |       |       |       |  |
|                                      |                                  | 3.3 Vdc output        |       | 10    | %     |  |
|                                      |                                  | 5 & 7.2 Vdc output    |       | 8     | %     |  |
|                                      |                                  | 9, 12 & 15 Vdc output |       | 7     | %     |  |
|                                      |                                  | 24 Vdc output         |       | 5     | %     |  |
|                                      | all other input models           | from 10% to full load |       |       |       |  |
|                                      |                                  | 3.3 Vdc output        |       | 15    | %     |  |
|                                      |                                  | 5 Vdc output          |       | 7     | %     |  |
| 9, 12 Vdc output                     |                                  |                       | 5     | %     |       |  |
|                                      | 15 Vdc output                    |                       | 4     | %     |       |  |
|                                      | 24 Vdc output                    |                       | 3     | %     |       |  |
| switching frequency                  | 100% load, nominal input voltage |                       |       |       |       |  |
|                                      | 5 Vdc input models               |                       | 220   |       | kHz   |  |
|                                      | all other input models           |                       | 260   |       | kHz   |  |
| temperature coefficient              | at full load                     |                       | ±0.02 |       | %/°C  |  |

Note: 5. Tested at input voltage range and full load.

**PROTECTIONS**

| parameter                | conditions/description    | min | typ | max | units |
|--------------------------|---------------------------|-----|-----|-----|-------|
| short circuit protection | continuous, auto recovery |     |     |     |       |

## SAFETY AND COMPLIANCE

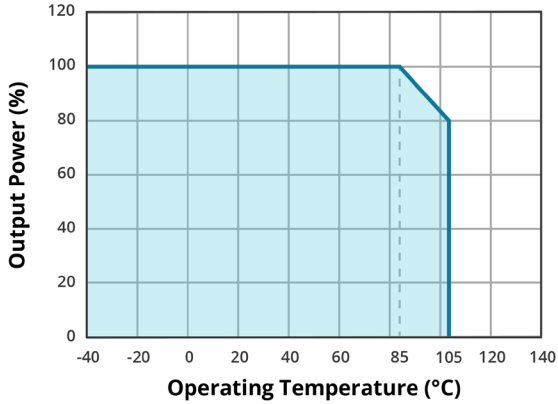
| parameter             | conditions/description                                      | min       | typ | max | units |
|-----------------------|-------------------------------------------------------------|-----------|-----|-----|-------|
| isolation voltage     | input to output for 1 minute at 1 mA                        | 3,000     |     |     | Vdc   |
| isolation resistance  | input to output at 500 Vdc                                  | 1,000     |     |     | MΩ    |
| isolation capacitance | input to output, 100 kHz / 0.1 V                            |           | 20  |     | pF    |
| safety approvals      | certified to 62368: UL<br>designed to meet 62368: EN, BS EN |           |     |     |       |
| conducted emissions   | CISPR 32/EN 55032 Class B                                   |           |     |     |       |
| radiated emissions    | CISPR 32/EN 55032 Class B                                   |           |     |     |       |
| ESD                   | IEC/EN 61000-4-2 Air ±8kV, Contact ±6kV                     |           |     |     |       |
| MTBF                  | as per MIL-HDBK-217F, 25°C                                  | 3,500,000 |     |     | hours |
| RoHS                  | yes                                                         |           |     |     |       |

## ENVIRONMENTAL

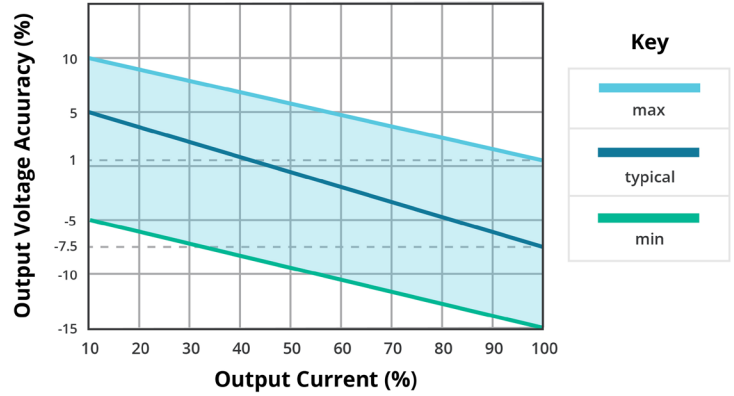
| parameter             | conditions/description | min | typ | max | units |
|-----------------------|------------------------|-----|-----|-----|-------|
| operating temperature | see derating curves    | -40 |     | 105 | °C    |
| storage temperature   |                        | -55 |     | 125 | °C    |
| storage humidity      | non-condensing         | 5   |     | 95  | %     |
| case temperature rise | at 25°C                |     | 25  |     | °C    |

## DERATING CURVES

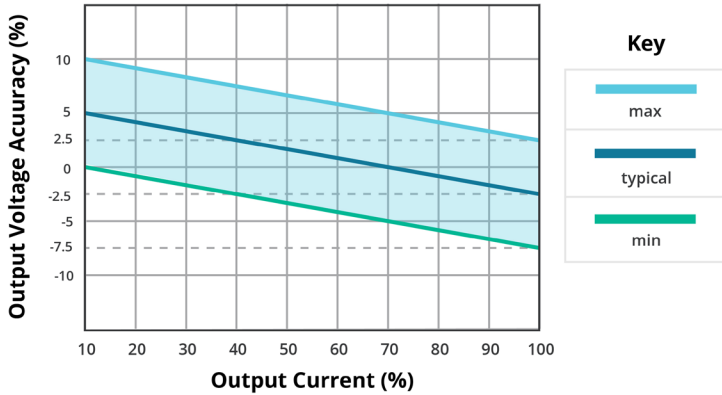
**TEMPERATURE DERATING CURVE**



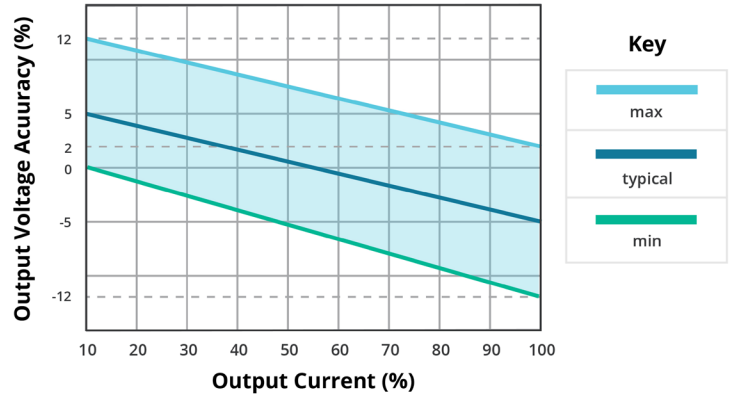
**OUTPUT REGULATION CURVE**  
5 Vdc input / 3.3 Vdc output  
(nominal input)



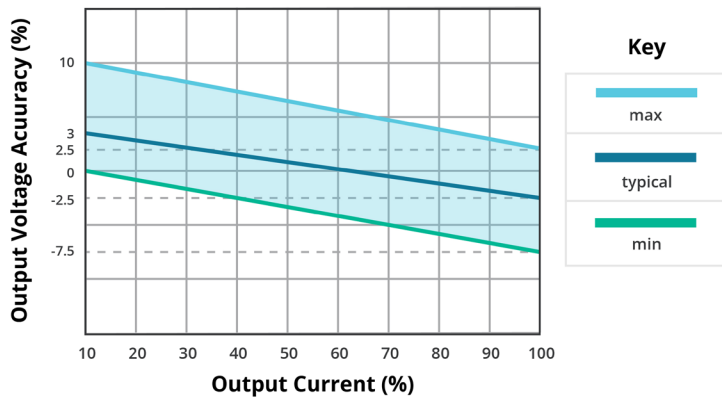
**OUTPUT REGULATION CURVE**  
5 Vdc input / all other output models  
(nominal input)



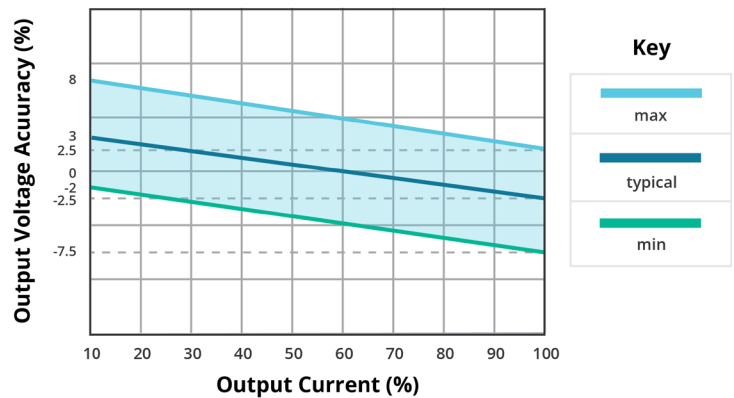
**OUTPUT REGULATION CURVE**  
all other input models / 3.3 Vdc output models  
(nominal input)



**OUTPUT REGULATION CURVE**  
all other input models / 5 Vdc output models  
(nominal input)



**OUTPUT REGULATION CURVE**  
all other input models / all other output models  
(nominal input)



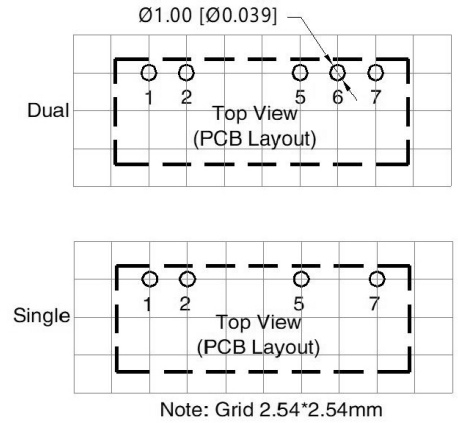
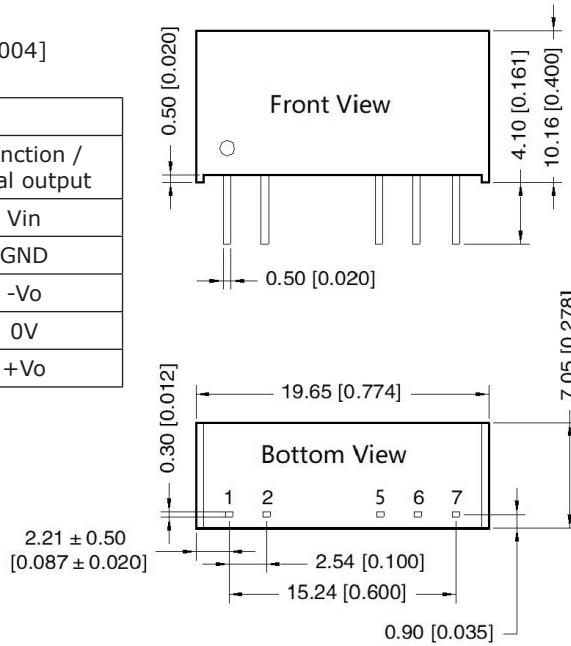
## MECHANICAL

| parameter     | conditions/description                                     | min | typ | max | units |
|---------------|------------------------------------------------------------|-----|-----|-----|-------|
| dimensions    | 19.65 x 7.05 x 10.16 [0.773 x 0.277 x 0.400 inch]          |     |     |     | mm    |
| case material | black flame-retardant and heat-resistant plastic (UL94V-0) |     |     |     |       |
| weight        |                                                            |     | 2.4 |     | g     |

## MECHANICAL DRAWING

units: mm [inch]  
 tolerance:  $\pm 0.25[\pm 0.010]$   
 pin section tolerance:  $\pm 0.10[\pm 0.004]$

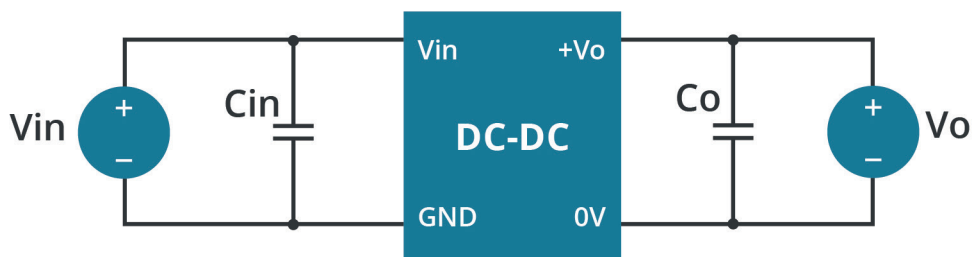
| PIN CONNECTIONS |                          |                        |
|-----------------|--------------------------|------------------------|
| PIN             | Function / Single output | Function / Dual output |
| 1               | Vin                      | Vin                    |
| 2               | GND                      | GND                    |
| 5               | 0V                       | -Vo                    |
| 6               | No pin                   | 0V                     |
| 7               | +Vo                      | +Vo                    |



## APPLICATION CIRCUIT

If you want to further reduce the input and output ripple, a filter capacitor may be connected to the input and output terminals (Figures 1 & 2) provided that the capacitance is less than the maximum capacitive load of the model, otherwise start-up problems may be caused if the capacitance is too large.

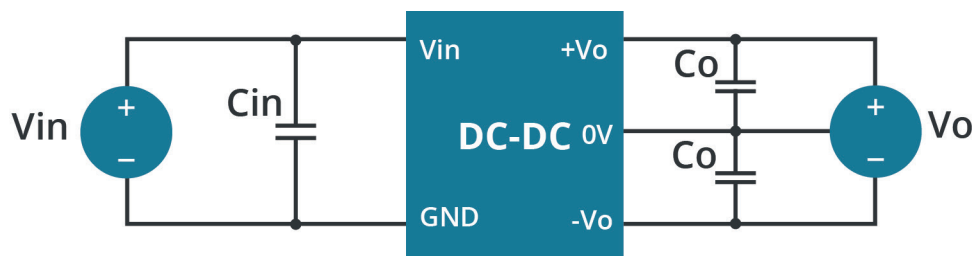
**Figure 1**  
Single Output Models



**Table 1**

| Vin (Vdc) | Cin (μF / V) | Vo (Vdc) | Co (μF / V) |
|-----------|--------------|----------|-------------|
| 5         | 10 / 16      | 3.3      | 10 / 16     |
| --        | --           | 5        | 10 / 16     |
| --        | --           | 7.2      | 10 / 16     |
| --        | --           | 9        | 2.2 / 25    |
| --        | --           | 12       | 2.2 / 25    |
| --        | --           | 15       | 1 / 25      |
| --        | --           | 24       | 1 / 50      |
| 12        | 2.2 / 25     | 3.3      | 10 / 16     |
| 15        | 2.2 / 25     | 5        | 10 / 16     |
| 24        | 1 / 50       | 9        | 2.2 / 25    |
| --        | --           | 12       | 2.2 / 25    |
| --        | --           | 15       | 1 / 25      |
| --        | --           | 24       | 1 / 50      |

**Figure 2**  
Dual Output Models



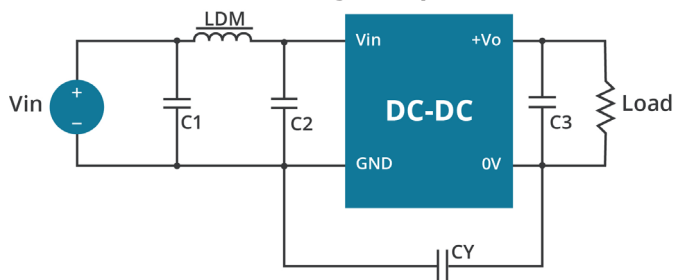
**Table 2**

| Vin (Vdc) | Cin (μF / V) | Vo (Vdc) | Co <sup>6</sup> (μF / V) |
|-----------|--------------|----------|--------------------------|
| 5         | 10 / 16      | ±3.3     | 4.7 / 16                 |
| --        | --           | ±5       | 4.7 / 16                 |
| --        | --           | ±9       | 1 / 25                   |
| --        | --           | ±12      | 1 / 25                   |
| --        | --           | ±15      | 0.47 / 25                |
| --        | --           | ±24      | 0.47 / 50                |
| 12        | 2.2 / 25     | ±3.3     | 4.7 / 16                 |
| 15        | 2.2 / 25     | ±5       | 4.7 / 16                 |
| 24        | 1 / 50       | ±9       | 2.2 / 25                 |
| --        | --           | ±12      | 1 / 25                   |
| --        | --           | ±15      | 1 / 25                   |
| --        | --           | ±24      | 0.47 / 50                |

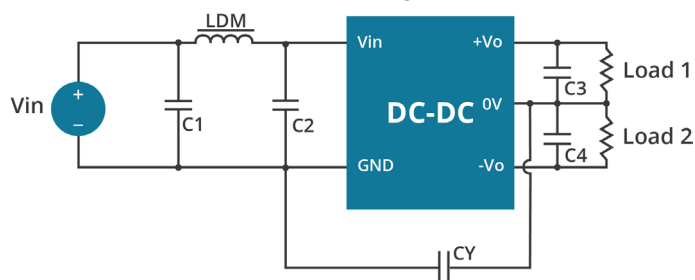
Note: 6. The capacitor value of the positive and the negative output is identical.

## EMC RECOMMENDED CIRCUIT

**Figure 3**  
Single Output Models



**Figure 4**  
Dual Output Models



**Table 3**

| Recommended External Circuit Components |                                |               |               |
|-----------------------------------------|--------------------------------|---------------|---------------|
| Vin (Vdc)                               | 5                              | 12, 15, 24    |               |
| Vo (Vdc)                                | all output models              | 12, 15, 24    | ±12, ±15, ±24 |
| C1 / C2                                 | 4.7 μF / 16 V                  | 4.7 μF / 50 V | 4.7 μF / 50 V |
| CY                                      | 270 pF / 4 kV                  | 270 pF / 3 kV | 270 pF / 3 kV |
| C3 / C4                                 | refer to the Co in Tables 1, 2 |               |               |
| LDM                                     | 6.8 μH                         | 6.8 μH        | 6.8 μH        |



## REVISION HISTORY

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| rev. | description                             | date       |
|------|-----------------------------------------|------------|
| 1.0  | initial release                         | 07/23/2021 |
| 1.01 | series expanded with 5 Vdc input models | 06/21/2022 |
| 1.02 | CE certification removed                | 11/07/2022 |

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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