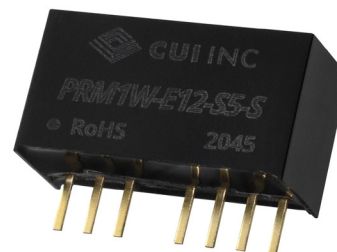


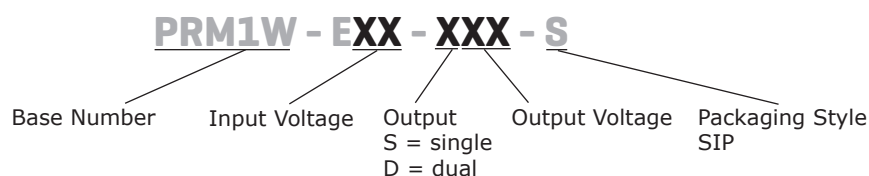
**SERIES: PRM1W-S | DESCRIPTION: DC-DC CONVERTER**
**FEATURES**

- 1 W isolated output
- 8:1 input range (4.5~36)
- single & dual regulated output
- 3k Vdc isolation
- short circuit, over current, input under voltage protection
- wide operating temperature range -40~105°C
- efficiency up to 74%
- designed to meet EN/BS EN 62368


**MODEL**

| MODEL           | input voltage |                | output voltage<br>(Vdc) | output current<br>max<br>(mA) | output power<br>max<br>(W) | ripple and noise <sup>1</sup><br>max<br>(mVp-p) | efficiency<br>typ <sup>2</sup><br>(%) |
|-----------------|---------------|----------------|-------------------------|-------------------------------|----------------------------|-------------------------------------------------|---------------------------------------|
|                 | typ<br>(Vdc)  | range<br>(Vdc) |                         |                               |                            |                                                 |                                       |
| PRM1W-E12-S5-S  | 12            | 4.5~36         | 5                       | 200                           | 1.0                        | 100                                             | 71                                    |
| PRM1W-E12-S9-S  | 12            | 4.5~36         | 9                       | 111                           | 1.0                        | 100                                             | 72                                    |
| PRM1W-E12-S12-S | 12            | 4.5~36         | 12                      | 83                            | 1.0                        | 100                                             | 74                                    |
| PRM1W-E12-S15-S | 12            | 4.5~36         | 15                      | 67                            | 1.0                        | 100                                             | 74                                    |
| PRM1W-E12-D5-S  | 12            | 4.5~36         | ±5                      | ±100                          | 1.0                        | 100                                             | 71                                    |
| PRM1W-E12-D12-S | 12            | 4.5~36         | ±12                     | ±42                           | 1.0                        | 100                                             | 74                                    |
| PRM1W-E12-D15-S | 12            | 4.5~36         | ±15                     | ±33                           | 1.0                        | 100                                             | 74                                    |

Notes: 1. Ripple & noise testing condition at nominal input voltage and 5%-100% load, the "parallel cable" method is used for ripple and noise test, please refer to DC-DC Converter Application Notes for specific information.  
 2. Measured at nominal input voltage and full load.

**PART NUMBER KEY**


## INPUT

| parameter        | conditions/description     | min  | typ    | max    | units |
|------------------|----------------------------|------|--------|--------|-------|
| input voltage    |                            | 4.5  | 12     | 40     | Vdc   |
| start-up voltage |                            |      |        | 4.5    | Vdc   |
| surge voltage    | 1 second max               | -0.7 |        | 50     | Vdc   |
| filter           | capacitance filter         |      |        |        |       |
| current          | full load/no load          |      |        |        |       |
|                  | 5 Vdc/±5 Vdc output models |      | 117/10 | 123/15 | mA    |
|                  | other output models        |      | 114/10 | 120/15 | mA    |

## OUTPUT

| parameter               | conditions/description                            | min | typ | max   | units |
|-------------------------|---------------------------------------------------|-----|-----|-------|-------|
| line regulation         | min to max Vin, full load                         |     |     | ±0.5  | %     |
|                         | +Vo<br>-Vo                                        |     |     | ±1    | %     |
| load regulation         | 5% ~ 100% load                                    |     |     | ±1    | %     |
|                         | +Vo<br>-Vo                                        |     |     | ±1.5  | %     |
| set-point accuracy      | 0% ~ 100% load                                    |     | ±1  | ±3    | %     |
| switching frequency     | PWM mode                                          |     | 300 |       | kHz   |
| transient response      | 25% load step change                              |     | ±5  | ±8    | %     |
|                         | 5 Vdc/±5 Vdc output models<br>other output models |     | ±3  | ±5    | %     |
| temperature coefficient | full load                                         |     |     | ±0.03 | %/°C  |

## PROTECTIONS

| parameter                | conditions/description    | min | typ | max | units |
|--------------------------|---------------------------|-----|-----|-----|-------|
| over current protection  |                           | 110 |     | 300 | %     |
| short circuit protection | continuous, self-recovery |     |     |     |       |

## SAFETY AND COMPLIANCE

| parameter             | conditions/description                                                                   | min   | typ | max | units  |
|-----------------------|------------------------------------------------------------------------------------------|-------|-----|-----|--------|
| isolation voltage     | input to output 1mA max for 1 minute                                                     | 3,000 |     |     | Vdc    |
| isolation resistance  | input to output at 500 Vdc                                                               | 1,000 |     |     | MΩ     |
| isolation capacitance | input to output capacitance at 100 KHz / 0.1 V                                           |       | 40  |     | pF     |
| safety approvals      | designed to meet 62368: EN, BS EN                                                        |       |     |     |        |
| EMC/EMC               | CISPR32/EN55032 CLASS B (see Fig.3-2 for recommended circuit)                            |       |     |     |        |
| ESD                   | IEC/EN61000-4-2 Contact ±6KV perf. Criteria B                                            |       |     |     |        |
| radiated immunity     | IEC/EN61000-4-3 10V/m perf. Criteria A                                                   |       |     |     |        |
| EFT/burst             | IEC/EN61000-4-4 ±2KV (see Fig.3-1 for recommended circuit) perf. Criteria B              |       |     |     |        |
| surge                 | IEC/EN61000-4-5 line to line ±2KV (see Fig.3-1 for recommended circuit) perf. Criteria B |       |     |     |        |
| conducted immunity    | IEC/EN61000-4-6 3 Vr.m.s perf. Criteria A                                                |       |     |     |        |
| RoHS                  | yes                                                                                      |       |     |     |        |
| MTBF                  | as per MIL-HDBK-217F at 25°C                                                             | 1,000 |     |     | kHours |

## ENVIRONMENTAL

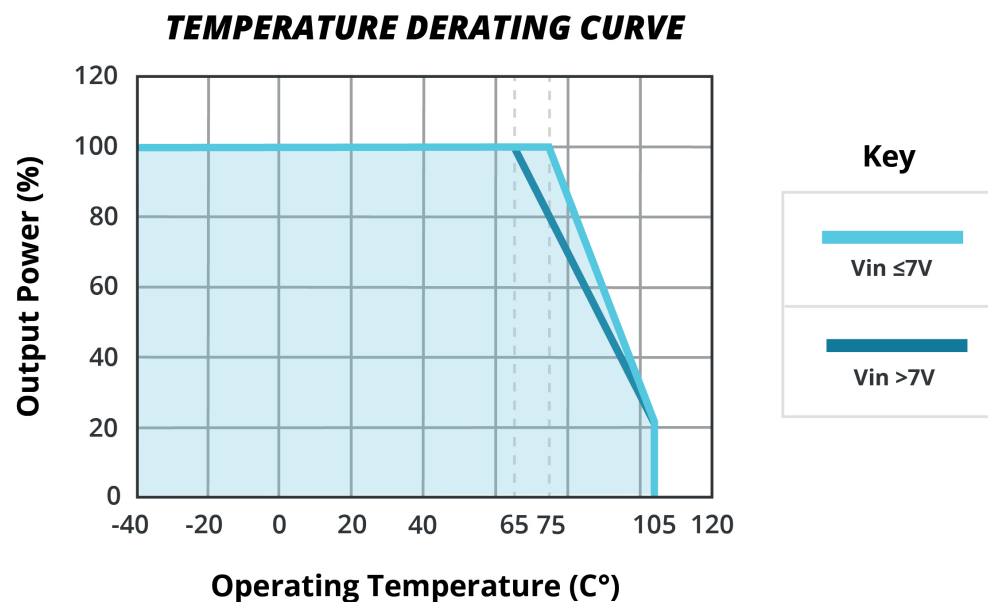
| parameter             | conditions/description | min | typ | max | units |
|-----------------------|------------------------|-----|-----|-----|-------|
| operating temperature | see derating curve     | -40 |     | 105 | °C    |
| storage temperature   |                        | -55 |     | 125 | °C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

## SOLDERABILITY

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

## DERATING CURVE

Figure 1



## MECHANICAL

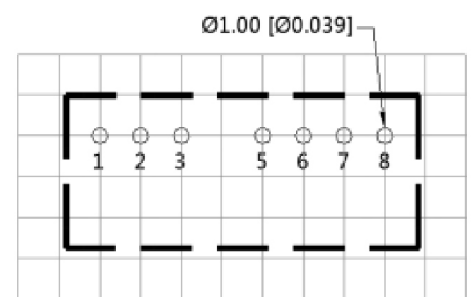
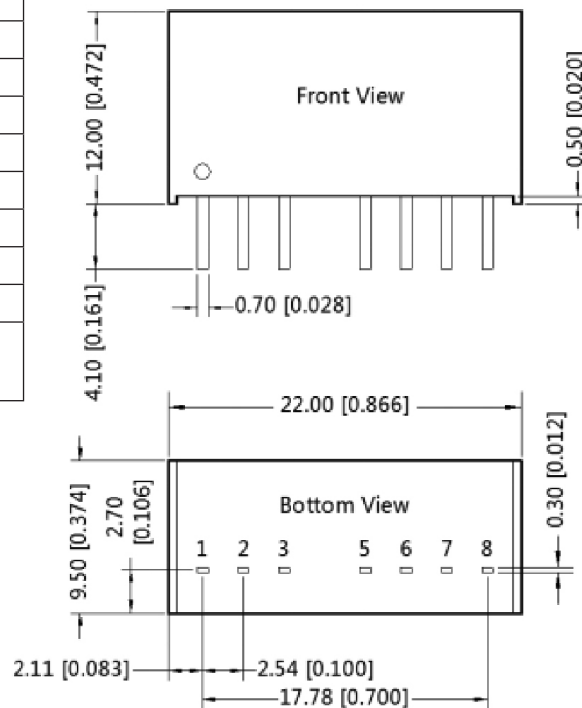
| parameter     | conditions/description                                      | min | typ | max | units |
|---------------|-------------------------------------------------------------|-----|-----|-----|-------|
| dimensions    | 22.00 × 9.50 × 12.00                                        |     |     |     | mm    |
| case material | Black plastic; flame-retardant and heat-resistant (UL94-V0) |     |     |     |       |
| weight        |                                                             |     | 4.6 |     | g     |

## MECHANICAL DRAWING

units: mm [inches]

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

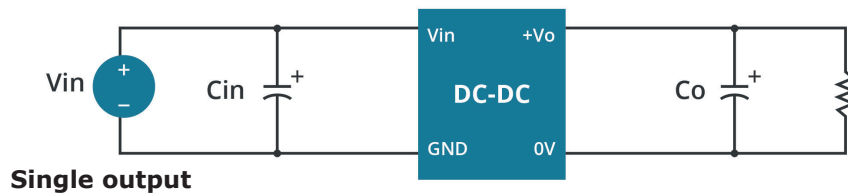
| PIN CONNECTIONS                                   |        |      |
|---------------------------------------------------|--------|------|
| PIN                                               | Single | Dual |
| 1                                                 | GND    | GND  |
| 2                                                 | Vin    | Vin  |
| 3                                                 | NC     | NC   |
| 5                                                 | NC     | NC   |
| 6                                                 | +Vo    | +Vo  |
| 7                                                 | 0V     | 0V   |
| 8                                                 | NC     | -Vo  |
| Note: NC not available for electrical connection. |        |      |



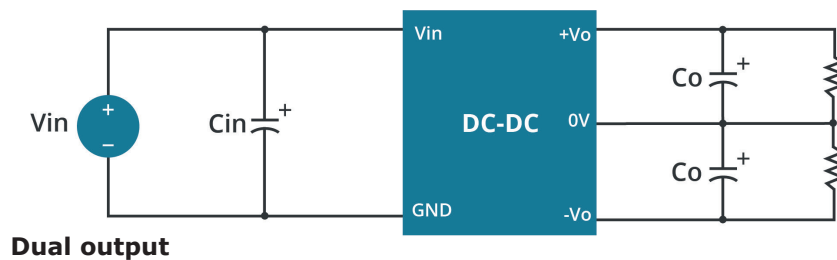
Note: Grid 2.54\*2.54mm

## RECOMMENDED CIRCUITS

Figure 2



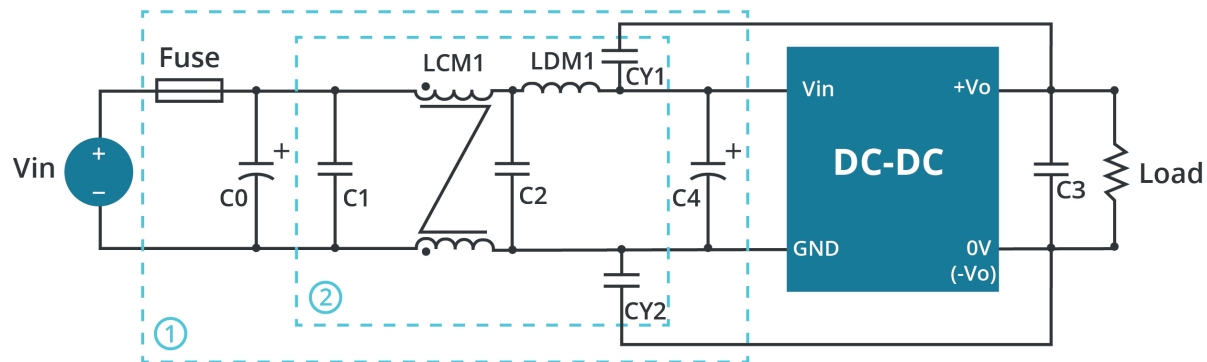
| Parameter Description |           |           |
|-----------------------|-----------|-----------|
| Single Vout (Vdc)     | Cout (μF) | Cin (μF)  |
| 5/9/12/15             | 22 (25V)  | 100 (50V) |



| Parameter Description |           |           |
|-----------------------|-----------|-----------|
| Dual Vout (Vdc)       | Cout (μF) | Cin (μF)  |
| ±5/±12/±15            | 22 (25V)  | 100 (50V) |

## EMC COMPLIANCE CIRCUITS

Figure 3



Note: For EMC tests was used Part①in Figure 3 for immunity and Part②for emissions test. Selecting based on needs.

| Parameter Description |                                                     |
|-----------------------|-----------------------------------------------------|
| FUSE                  | Select fuse value according to actual input current |
| C0                    | 1000μF/50V                                          |
| C4                    | 100μF/50V                                           |
| C1/C2                 | 4.7μF/50V                                           |
| C3                    | 22μF/50V                                            |
| LCM1                  | 2.2mH                                               |
| LDM1                  | 4.7μH                                               |
| CY1/CY2               | 1nF/KV                                              |

## REVISION HISTORY

| rev. | description              | date       |
|------|--------------------------|------------|
| 1.0  | initial release          | 11/23/2020 |
| 1.01 | CE certification updated | 11/25/2022 |

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



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