

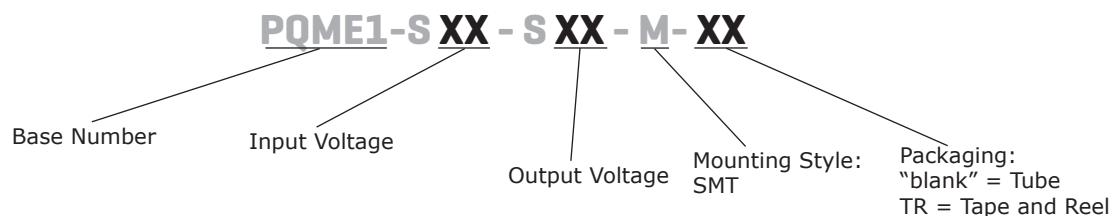
**SERIES: PQME1-M | DESCRIPTION: DC-DC CONVERTER**
**FEATURES**

- 0.75 W isolated output
- regulated output
- compact SMT package
- single output models
- continuous short circuit protection
- -40~85 °C temperature range
- 1500 Vdc isolation
- no load input current as low as 5 mA
- industry standard pin-out
- efficiency up to 74%
- EN 62368-1


**MODEL**

|                 | input voltage |             | output voltage | output current |          | output power max | ripple & noise <sup>1</sup> max | efficiency <sup>2</sup> typ |
|-----------------|---------------|-------------|----------------|----------------|----------|------------------|---------------------------------|-----------------------------|
|                 | typ (Vdc)     | range (Vdc) |                | min (mA)       | max (mA) |                  |                                 |                             |
| PQME1-S5-S3-M   | 5             | 4.75~5.25   | 3.3            | 20             | 200      | 0.66             | 75                              | 68                          |
| PQME1-S5-S5-M   | 5             | 4.75~5.25   | 5              | 15             | 150      | 0.75             | 75                              | 72                          |
| PQME1-S5-S9-M   | 5             | 4.75~5.25   | 9              | 9              | 83       | 0.75             | 75                              | 72                          |
| PQME1-S5-S12-M  | 5             | 4.75~5.25   | 12             | 7              | 62       | 0.75             | 75                              | 73                          |
| PQME1-S5-S15-M  | 5             | 4.75~5.25   | 15             | 5              | 50       | 0.75             | 75                              | 74                          |
| PQME1-S12-S5-M  | 12            | 11.4~12.6   | 5              | 15             | 150      | 0.75             | 75                              | 72                          |
| PQME1-S12-S12-M | 12            | 11.4~12.6   | 12             | 7              | 62       | 0.75             | 75                              | 73                          |
| PQME1-S12-S15-M | 12            | 11.4~12.6   | 15             | 5              | 50       | 0.75             | 75                              | 74                          |

Notes: 1. Measured at nominal input, 20 MHz bandwidth oscilloscope, with 10  $\mu$ F tantalum and 1  $\mu$ F 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.

**PART NUMBER KEY**


## INPUT

| parameter               | conditions/description |                         | min  | typ | max  | units |
|-------------------------|------------------------|-------------------------|------|-----|------|-------|
| operating input voltage | 5 Vdc input model      |                         | 4.75 | 5   | 5.25 | Vdc   |
|                         | 12 Vdc input model     |                         | 11.4 | 12  | 12.6 | Vdc   |
| current                 | 5 Vdc input model      | 3.3, 5 Vdc output model |      |     | 234  | mA    |
|                         |                        | 9, 12 Vdc output model  |      |     | 221  | mA    |
|                         |                        | 15 Vdc output models    |      |     | 215  | mA    |
|                         | 12 Vdc input model     | 5 Vdc output model      |      |     | 92   | mA    |
|                         |                        | 12 Vdc output model     |      |     | 91   | mA    |
|                         |                        | 15 Vdc output model     |      |     | 90   | mA    |
| filter                  | filter capacitor       |                         |      |     |      |       |

## OUTPUT

| parameter                            | conditions/description           | min | typ   | max   | units |
|--------------------------------------|----------------------------------|-----|-------|-------|-------|
| maximum capacitive load <sup>4</sup> | 3.3, 5 Vdc output models         |     |       | 2,400 | μF    |
|                                      | 9 Vdc output models              |     |       | 1,000 | μF    |
|                                      | 12, 15 Vdc output models         |     |       | 560   | μF    |
| voltage accuracy                     |                                  |     |       | ±3    | %     |
| line regulation                      | for Vin change of 1%             |     |       | ±0.25 | %     |
| load regulation                      | from 10% to full load            |     |       | ±3    | %     |
|                                      | 3.3 Vdc output models            |     |       | ±2    | %     |
|                                      | all other models                 |     |       |       | %     |
| switching frequency                  | 100% load, nominal input voltage |     | 270   |       | kHz   |
| temperature coefficient              | at full load                     |     | ±0.02 |       | %/°C  |

Note: 4. Tested at input voltage range and full load.

## PROTECTIONS

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

## SAFETY AND COMPLIANCE

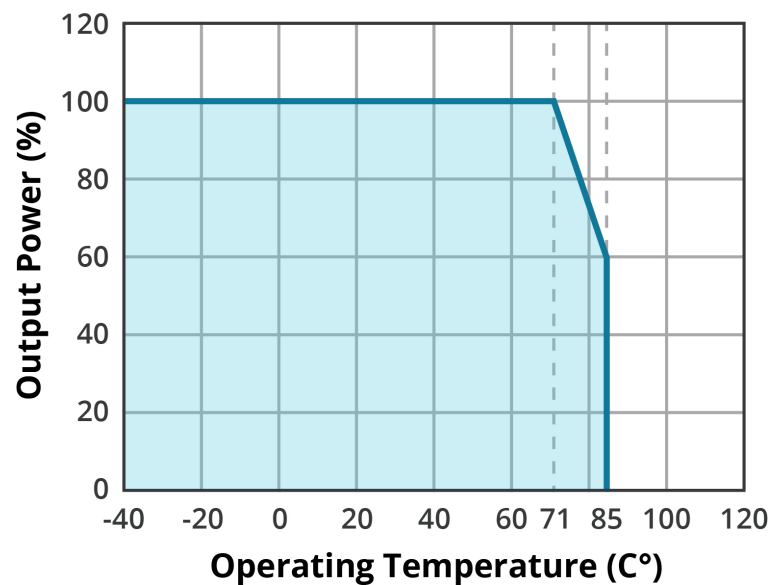
| parameter             | conditions/description                                             | min       | typ | max | units |
|-----------------------|--------------------------------------------------------------------|-----------|-----|-----|-------|
| isolation voltage     | input to output for 1 minute at 1 mA                               | 1,500     |     |     | Vdc   |
|                       | input to output for 1 second 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 62368-1: EN                                           |           |     |     |       |
| conducted emissions   | CISPR32/EN55032, class B (external circuit required, see Figure 2) |           |     |     |       |
| radiated emissions    | CISPR32/EN55032, class B (external circuit required, see Figure 2) |           |     |     |       |
| ESD                   | IEC/EN61000-4-2, air ± 8 kV; contact ± 4 kV, class B               |           |     |     |       |
| 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 |     | 85  | °C    |
| storage temperature   |                              | -55 |     | 125 | °C    |
| storage humidity      | non-condensing               |     |     | 95  | %     |
| case temperature rise | 3.3 Vdc output model at 25°C |     | 30  |     | °C    |
|                       | all other models at 25°C     |     | 25  |     | °C    |

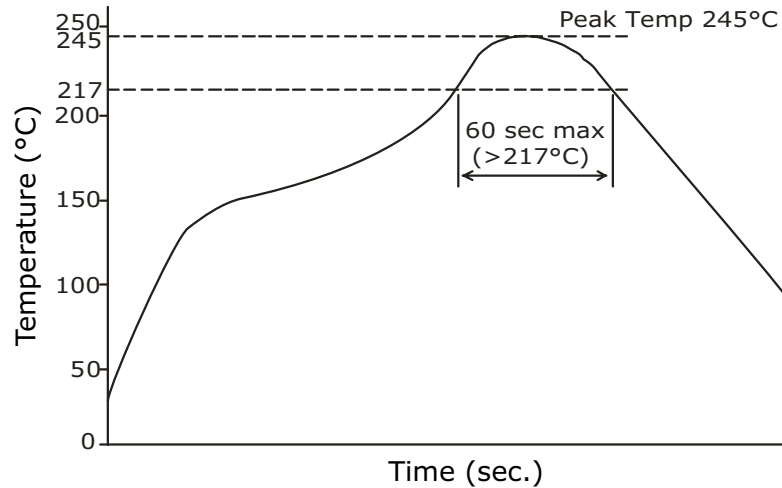
## DERATING CURVE

### TEMPERATURE DERATING CURVE



## SOLDERABILITY

| parameter        | conditions/description                                                                                                            | min | typ | max | units |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-------|
| reflow soldering | see reflow soldering profile<br>Maximum duration >217°C is 60 seconds.<br>For actual application, refer to IPC/JEDEC J-STD-020D.1 |     |     | 245 | °C    |



## MECHANICAL

| parameter     | conditions/description                                     | min | typ | max | units |
|---------------|------------------------------------------------------------|-----|-----|-----|-------|
| dimensions    | 13.20 x 8.50 x 7.25 [0.520 x 0.335 x 0.285 inch]           |     |     |     | mm    |
| case material | black flame-retardant and heat-resistant plastic (UL94V-0) |     |     |     |       |
| weight        |                                                            |     | 1.4 |     | g     |

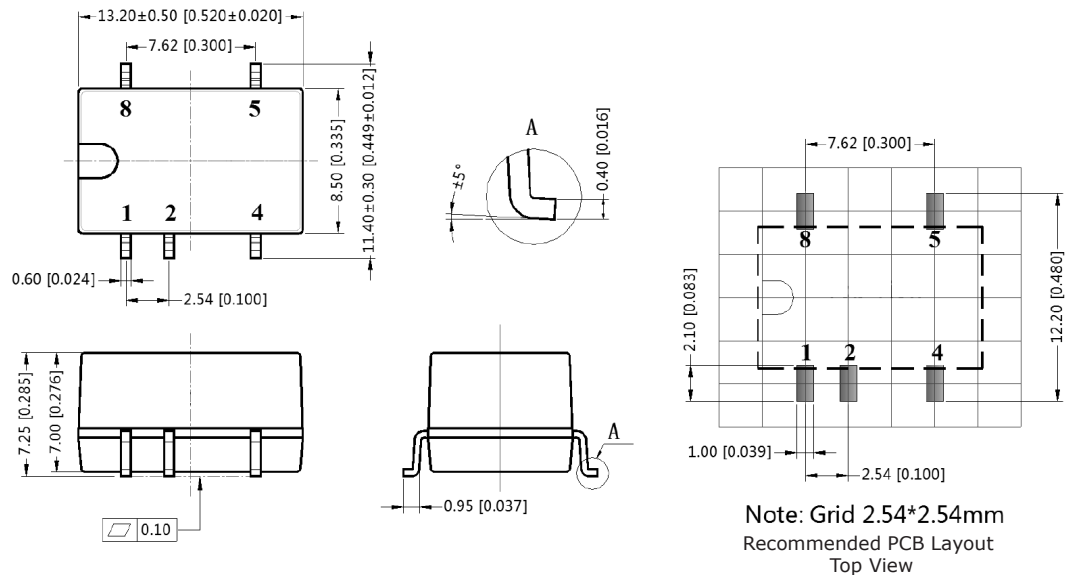
## MECHANICAL DRAWING

units: mm [inch]

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

| PIN CONNECTIONS |          |
|-----------------|----------|
| PIN             | Function |
| 1               | GND      |
| 2               | Vin      |
| 4               | 0V       |
| 5               | +Vout    |
| 8               | NC       |

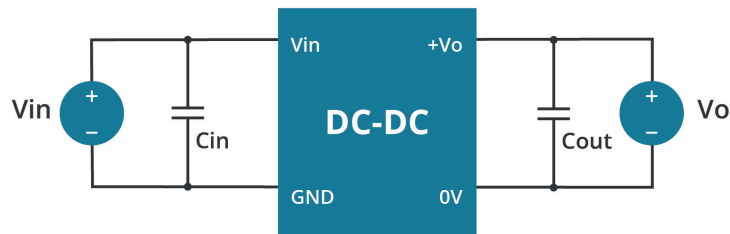
NC = No connect



## 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 (Figure 1) 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**

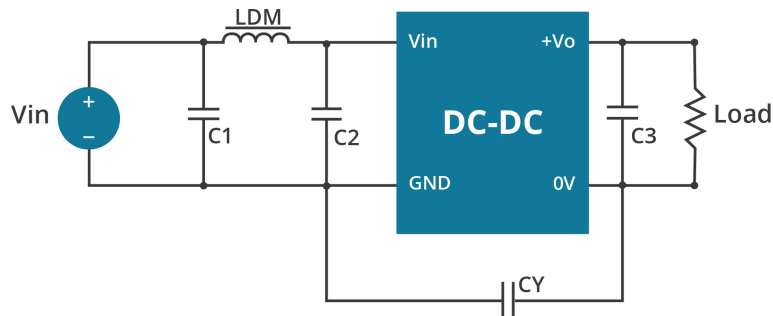


**Table 1**

| Vin (Vdc) | Cin (μF) | Vo (Vdc) | Cout (μF) |
|-----------|----------|----------|-----------|
| 5         | 4.7      | 3.3, 5   | 10        |
|           |          | 9, 12    | 2.2       |
|           |          | 15       | 1         |

## EMC RECOMMENDED CIRCUIT

**Figure 2**



**Table 2**

| Recommended External Circuit Components |                              |               |
|-----------------------------------------|------------------------------|---------------|
| Vo (Vdc)                                | 3.3, 5, 9                    | 12, 15        |
| CY                                      | --                           | 1 nF / 2 kVdc |
| C3                                      | refer to the Cout in Table 1 |               |
| C1, C2                                  | 4.7 μF / 25 V                | 4.7 μF / 25 V |
| LDM                                     | 6.8 μH                       | 6.8 μH        |

## REVISION HISTORY

| rev. | description                                                     | date       |
|------|-----------------------------------------------------------------|------------|
| 1.0  | initial release                                                 | 05/10/2019 |
| 1.01 | safeties updated in features and safety line, packaging removed | 01/14/2021 |
| 1.02 | model table updated                                             | 03/29/2021 |
| 1.03 | product image updated                                           | 04/20/2021 |
| 1.04 | derating curve and circuits updated                             | 06/29/2021 |

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



**Headquarters**  
20050 SW 112th Ave.  
Tualatin, OR 97062  
**800.275.4899**

Fax 503.612.2383  
**cui.com**  
techsupport@cui.com

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