

**SERIES: PQME3-M | DESCRIPTION: DC-DC CONVERTER**
**FEATURES**

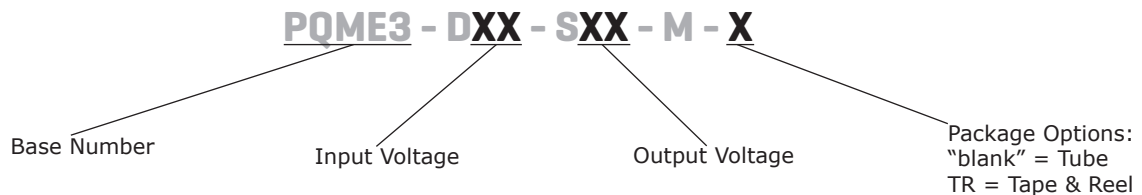
- up to 3 W continuous power
- 14 pin SMT package
- 4:1 input range
- single regulated output
- -40 to +85°C temperature range
- efficiency up to 84%
- no load power consumption under 0.1 W


**MODEL**

|                                 | input voltage |             | output voltage | output current |          | output power max | ripple & noise <sup>3</sup> max | efficiency <sup>4</sup> typ |
|---------------------------------|---------------|-------------|----------------|----------------|----------|------------------|---------------------------------|-----------------------------|
|                                 | typ (Vdc)     | range (Vdc) |                | min (mA)       | max (mA) |                  |                                 |                             |
| PQME3-D24-S3-M                  | 24            | 9~36        | 3.3            | 0              | 728      | 2.4              | 120                             | 75                          |
| PQME3-D24-S5-M <sup>1, 2</sup>  | 24            | 9~36        | 5              | 0              | 600      | 3                | 120                             | 80                          |
| PQME3-D24-S9-M                  | 24            | 9~36        | 9              | 0              | 333      | 3                | 120                             | 80                          |
| PQME3-D24-S12-M <sup>1, 2</sup> | 24            | 9~36        | 12             | 0              | 250      | 3                | 120                             | 82                          |
| PQME3-D24-S15-M <sup>1, 2</sup> | 24            | 9~36        | 15             | 0              | 200      | 3                | 120                             | 83                          |
| PQME3-D24-S24-M <sup>1, 2</sup> | 24            | 9~36        | 24             | 0              | 125      | 3                | 120                             | 82                          |
| PQME3-D48-S3-M <sup>2</sup>     | 48            | 18~75       | 3.3            | 0              | 728      | 2.4              | 120                             | 75                          |
| PQME3-D48-S5-M <sup>2</sup>     | 48            | 18~75       | 5              | 0              | 600      | 3                | 120                             | 79                          |
| PQME3-D48-S12-M <sup>2</sup>    | 48            | 18~75       | 12             | 0              | 250      | 3                | 120                             | 82                          |
| PQME3-D48-S15-M <sup>2</sup>    | 48            | 18~75       | 15             | 0              | 200      | 3                | 120                             | 84                          |
| PQME3-D48-S24-M <sup>2</sup>    | 48            | 18~75       | 24             | 0              | 125      | 3                | 120                             | 82                          |

Notes:

1. UL certified
2. CE certified
3. 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.
4. Measured at nominal input voltage, full load.
5. 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           | 24 Vdc input models  |                       | 9    | 24   | 36  | Vdc   |
|                                   | 48 Vdc input models  |                       | 18   | 48   | 75  | Vdc   |
| start-up voltage                  | 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   |
|                                   | 48 Vdc input models  |                       | -0.7 |      | 100 | Vdc   |
| under voltage shutdown            | 24 Vdc input models  |                       | 5.5  | 6.5  |     | Vdc   |
|                                   | 48 Vdc input models  |                       | 13   | 15.5 |     | Vdc   |
| current                           | 24 Vdc input models  | 3.3 Vdc output models |      |      | 138 | mA    |
|                                   |  | all other models      |      |      | 161 | mA    |
|                                   | 48 Vdc input models  | 3.3 Vdc output models |      |      | 69  | mA    |
|                                   |  | all other models      |      |      | 82  | mA    |
| remote on/off (CTRL) <sup>1</sup> | turn on (control pin floating or connected to TTL high level 3.5~12 Vdc) |                       |      |      |     |       |
|                                   | turn off (control pin connected to GND or low level 0~1.2 Vdc)           |                       |      |      |     |       |
|                                   | input current when switched off  |                       |      | 6    | 10  | mA    |
| filter                            | C type   |                       |      |      |     |       |
| no load power consumption         |  |                       |      |      | 0.1 | W     |

Note: 1. The voltage of the CTRL pin is referenced to GND.

## OUTPUT

| parameter                        | conditions/description                      | min | typ  | max   | units |
|----------------------------------|---|-----|------|-------|-------|
| maximum capacitive load          | 3.3, 5 Vdc output models                    |     |      | 2,200 | μF    |
|                                  | 9 Vdc output models                         |     |      | 1,000 | μF    |
|                                  | 12 Vdc output models                        |     |      | 680   | μF    |
|                                  | 15 Vdc output models                        |     |      | 470   | μF    |
|                                  | 24 Vdc output models                        |     |      | 100   | μF    |
| voltage accuracy                 |   |     | ±1   | ±3    | %     |
| line regulation                  | from low line to high line, full load       |     | ±0.2 | ±0.5  | %     |
| load regulation                  | from 0% to full load                        |     | ±0.5 | ±1    | %     |
| start-up time                    | at nominal input voltage                    |     | 10   |       | ms    |
| switching frequency <sup>2</sup> | PWM mode                                    |     | 350  |       | kHz   |
| transient recovery time          | 25% load step change, nominal input voltage |     | 300  | 500   | μs    |
| transient response deviation     | 25% load step change, nominal input voltage |     | ±3   | ±5    | %     |
| temperature coefficient          | at full load                                |     |      | ±0.03 | %/°C  |

Note: 2. Value is based on full load. At loads <50%, the switching frequency decreases with decreasing load.

## PROTECTIONS

| parameter                | conditions/description | min | typ | max | units |
|--------------------------|------------------------|-----|-----|-----|-------|
| over current protection  |                        |     | 150 | 250 | %     |
| short circuit protection | hiccup                 |     |     |     |       |

## 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 <sup>3</sup> | UL 60950-1   |       |       |     |       |
| conducted emissions           | CISPR22/EN55022, class B (external circuit required, see Figure 2-b) |       |       |     |       |

Note: 3. See specific models noted on page 1.

## SAFETY AND COMPLIANCE (CONTINUED)

| parameter                    | conditions/description  | min       | typ | max | units |
|------------------------------|---|-----------|-----|-----|-------|
| radiated emissions           | CISPR22/EN55022, class B (external circuit required, see Figure 2-b)                      |           |     |     |       |
| ESD                          | IEC/EN61000-4-2, contact $\pm$ 4kV, class B   |           |     |     |       |
| radiated immunity            | IEC/EN61000-4-3, 10V/m, class A   |           |     |     |       |
| EFT/burst                    | IEC/EN61000-4-4, $\pm$ 2kV, class B (external circuit required, see Figure 2-a)           |           |     |     |       |
| surge                        | IEC/EN61000-4-5, line-line $\pm$ 2kV, class B (external circuit required, see Figure 2-a) |           |     |     |       |
| 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                         | 2011/65/EU  |           |     |     |       |

## 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  | %     |
| case temperature rise | Ta=25°C, at nominal input voltage, full load |     | 40  |     | °C    |
| vibration             | 10~55 Hz for 30 minutes on each axis         |     | 10  |     | G     |

## SOLDERABILITY

| parameter        | conditions/description  | min | typ | max | units |
|------------------|---|-----|-----|-----|-------|
| reflow soldering | 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    | 19.20 x 18.10 x 10.16 [0.756 x 0.713 x 0.400 inch] |     |     |     | mm    |
| case material | black flame-retardant heat-proof plastic           |     |     |     |       |
| weight        |  |     | 3.5 |     | g     |

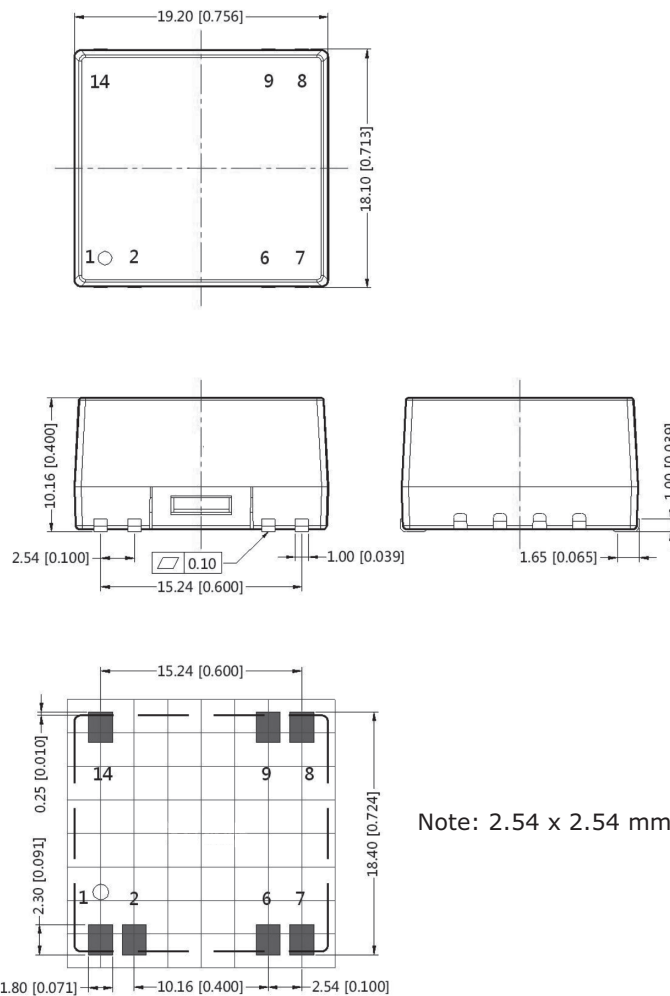
## MECHANICAL DRAWING

units: mm [inch]

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

| PIN CONNECTIONS |          |
|-----------------|----------|
| PIN             | Function |
| 1               | GND      |
| 2               | CTRL     |
| 6               | NC       |
| 7               | NC       |
| 8               | +Vout    |
| 9               | 0V       |
| 14              | Vin      |

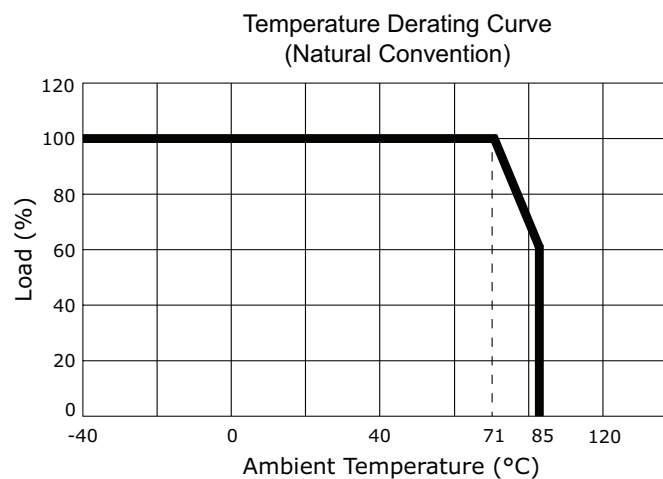
NC=no connection



Note: 2.54 x 2.54 mm grid

Recommended PCB Layout  
Top View

## DERATING CURVE



APPLICATION CIRCUIT

This series has been tested according to the following recommended circuit (Figure 1) 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.

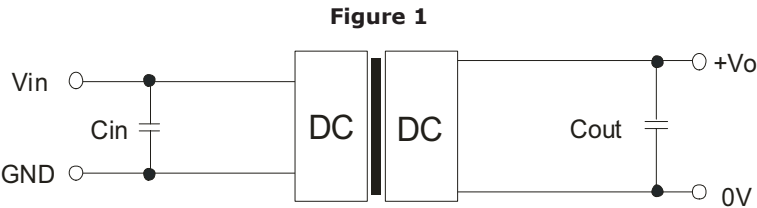


Table 1

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

EMC RECOMMENDED CIRCUIT

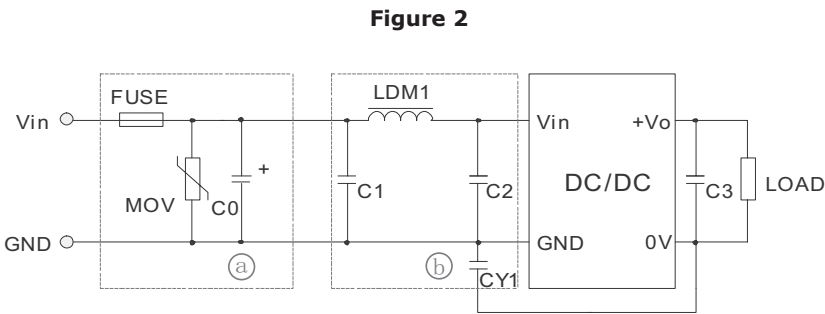


Table 2

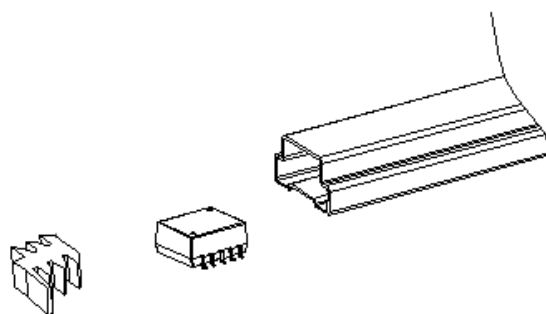
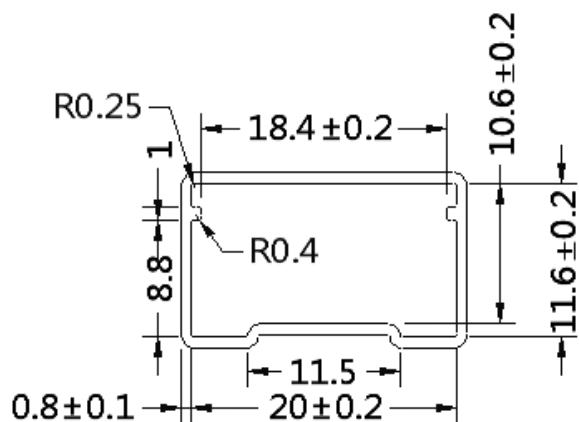
| Recommended external circuit components |  |               |
|---|--|---------------|
| Vin (Vdc)                               | 24                                       | 48            |
| FUSE                                    | choose according to actual input current |               |
| MOV                                     | S20K30                                   | S14K60        |
| C0                                      | 680 μF / 50V                             | 680 μF / 100V |
| C1, C2                                  | 4.7 μF / 50V                             | 4.7 μF / 100V |
| C3                                      | 10 μF                                    |               |
| LDM1                                    | 12 μH                                    |               |
| CY1                                     | 1 nF / 2 kV                              |               |

## PACKAGING (TUBE)

units: mm

Tube Size: 21.6 x 13.2 x 530 mm

QTY: 26 pcs

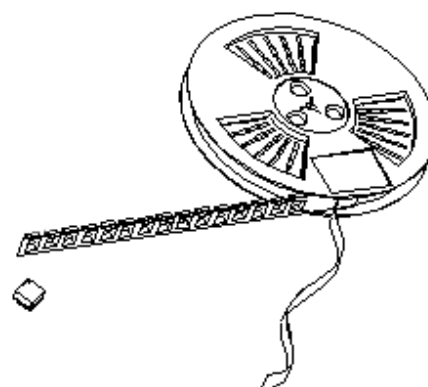
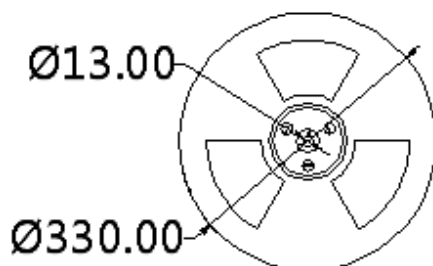
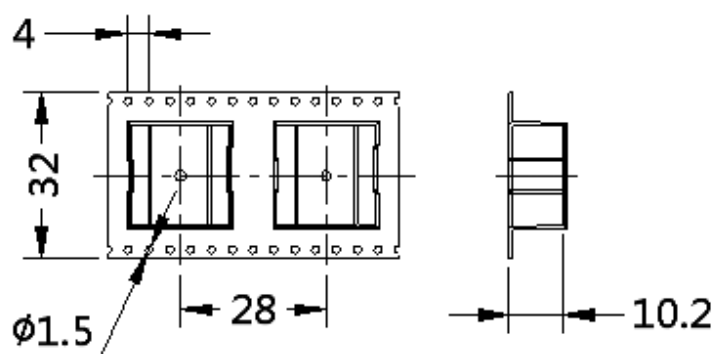


## PACKAGING (TAPE & REEL)

units: mm

Reel Size:  $\varnothing 330$  mm

QTY: 200 pcs per reel



## REVISION HISTORY

| rev. | description     | date       |
|------|-----------------|------------|
| 1.0  | initial release | 04/18/2017 |

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



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