

# Features

# Power Module

- Wide Vin 4.3 to 65VDC
- High power density (LxWxH = 12.19x12.19x3.75)
- Wide operating temperature -40°C to +95°C at full load
- Efficiency up to 89%, no need for heatsinks
- 6-sided shielding
- Thermally and EMI enhanced 25 pad LGA package
- Low profile

# RECOM DC/DC Converter

## RPMH-0.5

### 0.5 Amp Single Output



EN55032 compliant

### Description

The RPMH-0.5 series is a wide input voltage, 0.5A non-isolated switching regulator power module. The module accepts with up to 65VDC input and provides a trimmable output from 2.6 up to 28VDC and comes complete with a full set of features including adjustable output, sequencing, soft-start control, on/off control, and power good signals. The ultra-compact module has a profile of only 3.75mm, but with an efficiency of up to 89%, the device can operate at full load in ambient temperatures as high as +95°C and with power derating up to 105°C without forced air cooling. The package is complete with 6-sided shielding for optimal EMC performance and excellent heat management.

### Selection Guide

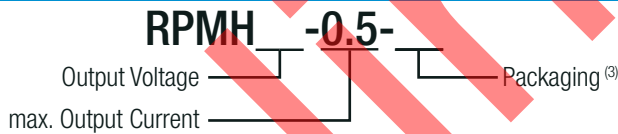
| Part Number | Input Voltage Range <sup>(1)</sup> [VDC] | Output Voltage [VDC] | Vout Adjust Range [VDC] | Output Current max. [A] | Efficiency typ. [%] | Max Capacitive typ. Load <sup>(2)</sup> [µF] |
|-------------|--|----------------------|-------------------------|-------------------------|---------------------|--|
| RPMH3.3-0.5 | 4.3 - 65                                 | 3.3                  | 2.64 - 3.63             | 0.5                     | 72                  | 80000  |
| RPMH5.0-0.5 | 6 - 65                                   | 5                    | 4 - 5.5                 | 0.5                     | 77                  | 50000  |
| RPMH12-0.5  | 13.5 - 65                                | 12                   | 7.2 - 13.2              | 0.5                     | 82                  | 20000  |
| RPMH15-0.5  | 16.5 - 65                                | 15                   | 9 - 16.5                | 0.5                     | 85                  | 13200  |
| RPMH24-0.5  | 25.5 - 65                                | 24                   | 15 - 28                 | 0.5                     | 89                  | 9400   |

#### Notes:

Note1: Input voltage must be higher than desired output voltage. Check buck mode and 100% duty cycle mode

Note2: Max. Cap Load is tested at nominal input and full resistive load

### Model Numbering



#### Notes:

Note3: Add suffix "-CT" for tube packaging for more details refer to "PACKAGING INFORMATION" without suffix, standard tape and reel packaging

### Specifications @ Ta= 25°C, nom. Vin, full load, with output cap <sup>(4)</sup> after warm-up unless otherwise stated

| BASIC CHARACTERISTICS               |                   |         |           |      |         |
|-------------------------------------|-------------------|---------|-----------|------|---------|
| Parameter                           | Condition         |         | Min.      | Typ. | Max.    |
| Internal Input Filter               |                   |         | capacitor |      |         |
| Input Voltage Range                 | Buck mode         | 3.3Vout | 4.3VDC    |      | 65VDC   |
|                                     |                   | 5.0Vout | 6VDC      |      |         |
|                                     |                   | 12Vout  | 13.5VDC   |      |         |
|                                     |                   | 15Vout  | 16.5VDC   |      |         |
|                                     |                   | 24Vout  | 25.5VDC   |      |         |
| 100% duty cycle mode <sup>(5)</sup> | Vout= Vin - Vdrop | 3.3Vout | 3VDC      |      | 4.3VDC  |
|                                     |                   | 5.0Vout |           |      | 6VDC    |
|                                     |                   | 12Vout  |           |      | 13.5VDC |
|                                     |                   | 15Vout  |           |      | 16.5VDC |
|                                     |                   | 24Vout  |           |      | 25.5VDC |
| Absolute Maximum Input Voltage      |                   |         |           |      | 68VDC   |
| Undervoltage Lockout (UVLO)         | DC-DC ON          |         | 2.6VDC    |      | 2.95VDC |
|                                     | DC-DC OFF         |         | 2.35VDC   |      | 2.6VDC  |

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#### Notes:

Note4: Output capacitor required. Please refer to "Output Capacitor".

**Specifications** (@ Ta= 25°C, nom. Vin, full load, with output cap <sup>(4)</sup> after warm-up unless otherwise stated)

| Parameter                                      | Condition  |                  | Min.  | Typ.                       | Max.     |
|--|--|------------------|---|----------------------------|----------|
| Input Current                                  | nom. Vin= 48VDC  | 3.3Vout          |   | 48mA                       |          |
|  |  | 5.0Vout          |   | 68mA                       |          |
|  |  | 12Vout           |   | 152mA                      |          |
|  |  | 15Vout           |   | 184mA                      |          |
|  |  | 24Vout           |   | 281mA                      |          |
| Quiescent Current                              | nom. Vin= 48VDC  | 3.3Vout, 5.0Vout |   | 16µA                       | 150µA    |
|  |  | others           |   | 50µA                       |          |
| Internal Power Dissipation                     | nom. Vin= 48VDC  | 3.3Vout          |   | 0.64W                      |          |
|  |  | 5.0Vout          |   | 0.75W                      |          |
|  |  | 12Vout, 15Vout   |   | 1.32W                      |          |
|  |  | 24Vout           |   | 1.48W                      |          |
| Output Voltage Trimming <sup>(6)</sup>         |  |                  | 2.64VDC   |                            | 28VDC    |
| Minimum Dropout Voltage (Vdrop) <sup>(7)</sup> | Vin min. = Vdrop + Vout  | 3.3Vout, 5Vout   |   | 2V/A                       |          |
|  |  | others           |   | 3V/A                       |          |
| Minimum Load                                   |  |                  | 0%  |                            |          |
| Start-up Time                                  | without using soft start function/ power up by using CTRL function |                  |   | 1.5ms                      |          |
| Rise-time                                      |  |                  |   | 900µs                      |          |
| ON/OFF CTRL                                    | DC-DC ON<br>DC-DC OFF  |                  | Open or 1.22V < V <sub>CTRL</sub> < Vin<br>Short or -0.3V < V <sub>CTRL</sub> < 1.14VDC |                            |          |
| Standby Current                                | DC-DC OFF  |                  | 15µA  |                            |          |
| Internal Operating Frequency                   | 3.3Vout<br>5.0Vout<br>12Vout, 15Vout, 24Vout                       |                  |   | 300kHz<br>400kHz<br>600kHz |          |
| Output Ripple and Noise <sup>(8)</sup>         | 20MHz BW   | 3.3Vout          |   | 20mVp-p                    | 100mVp-p |
|  |  | 5.0Vout          |   | 35mVp-p                    |          |
|  |  | 12Vout           |   | 40mVp-p                    |          |
|  |  | 15Vout, 24Vout   |   | 30mVp-p                    |          |

**Notes:**

Note5: As input approaches output voltage set point, device enters 100% duty cycle mode. In 100% duty cycle mode, Vout equals Vin minus dropout voltage (refer to **"Dropout Voltage vs. Load"**)

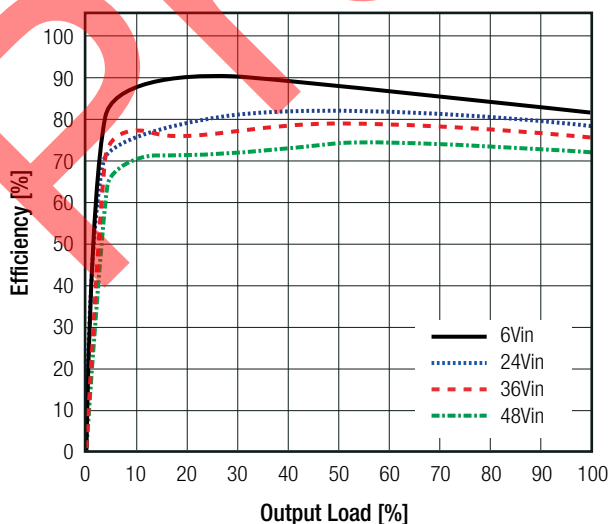
Note6: For more detailed information, please refer to **"OUTPUT VOLTAGE TRIMMING"**

Note7: Required dropout voltage per 1A output current to be within accuracy (refer to **"Dropout Voltage vs. Load"**)

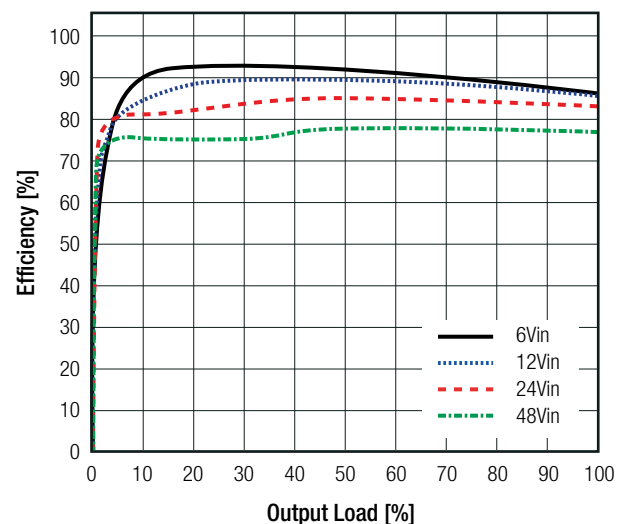
Note8: Measurements are made with a 22µF MLCC across output (low ESR)

**Efficiency vs. Load**

RPMH3.3-0.5



RPMH5.0-0.5



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