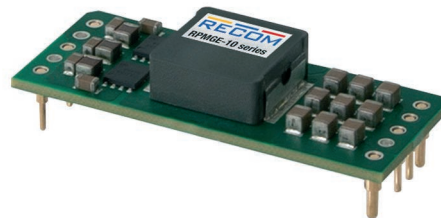


# RPMGE-10 Series $\diamond$ Power Module

10A  $\diamond$  Input:18-75VDC  $\diamond$  Eighth Brick

## FEATURES

- 10A non isolated eighth brick
- 18 to 75VDC (90VDC, transient) wide input range
- 3.3 to 15VDC adjustable output
- Standard eighth brick format
- High efficiency up to 95%
- Operating temperature derates to 120°C
- 3 years Warranty



Dimensions (LxWxH): 56.4 x 22.9 x 12.0mm (2.22 x 0.9 x 0.47 inch)  
20.5 g (0.045 lbs)

## APPLICATIONS



## SAFETY & EMC



## DESCRIPTION

The RPMGE-10 series is a non-isolated 10A DC/DC converter in a eighth-brick package. The high efficiency and thermal design of the product mean that minimal derating is required, even at high temperatures. The device is exceptionally suited for 24V, 28V, and 48V power rails as a point of load solution in a distributed power architecture. Trimmable output, remote sense, and remote control features as well as undervoltage lockout, overload, over-temperature, and short circuit protections are standard.

## 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 Load [ $\mu$ F]
RPMGE5.0-10	18-75	5	3.3-8	10	91	11000
RPMGE12-10	18-75	12	8-15	10	95	11000

Note1: Measured Values are with  $C_{IN}$ = 470 $\mu$ F +  $C_{OUT}$ = 2000 $\mu$ F

# RPMGE-10 Series $\diamond$ Power Module

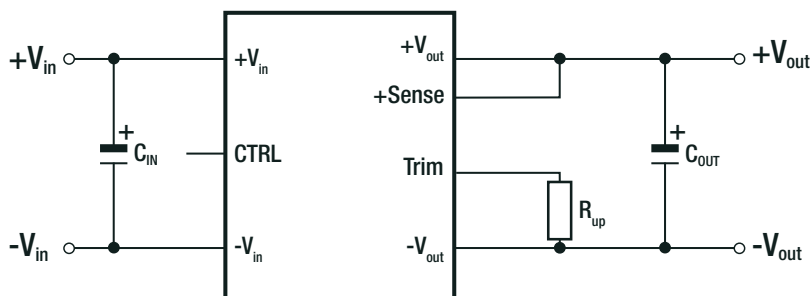
10A  $\diamond$  Input: 18-75VDC  $\diamond$  Eighth Brick

**BASIC CHARACTERISTICS** (measured @  $T_{AMB} = 25^{\circ}C$ , nom.  $V_{IN}$ , full load and after warm-up unless otherwise stated)

Parameter	Condition		Min.	Typ.	Max.
Input Voltage Range	nom $V_{IN} = 48VDC$		18VDC		75VDC
Absolute Maximum Input Voltage					80VDC
Maximum Input Voltage Transient	maximum transient duration 5 seconds				90VDC
Under Voltage Lockout (UVLO)	DC/DC ON			17.3VDC	
	DC/DC OFF			14.5VDC	
Input Current (Range)	RPMGE5.0-10	$V_{IN} = 48VDC$		1.15A	
	RPMGE12-10			2.65A	
Quiescent current	RPMGE5.0-10	$V_{IN} = 24VDC$		20mA	
		$V_{IN} = 48VDC$		24mA	
		$V_{IN} = 60VDC$		15mA	
	RPMGE12-10	$V_{IN} = 24VDC$		15mA	
		$V_{IN} = 48VDC$		23mA	
		$V_{IN} = 60VDC$		9mA	
No Load Power Consumption	RPMGE5.0-10	$V_{IN} = 24VDC$		0.48W	
		$V_{IN} = 48VDC$		1.14W	
		$V_{IN} = 60VDC$		0.87W	
	RPMGE12-10	$V_{IN} = 24VDC$		0.36W	
		$V_{IN} = 48VDC$		1.11W	
		$V_{IN} = 60VDC$		0.54W	
Standby Current	RPMGE5.0-10 DC/DC OFF / CTRL to GND	$V_{IN} = 24VDC$		120 $\mu$ A	
		$V_{IN} = 48VDC$		220 $\mu$ A	
	RPMGE12-10 DC/DC OFF / CTRL to GND	$V_{IN} = 24VDC$		120 $\mu$ A	
		$V_{IN} = 48VDC$		220 $\mu$ A	
Output Voltage Trimming	RPMGE5.0-10	refer to „Output Voltage Trimming“	3.3VDC		8VDC
	RPMGE12-10		8VDC		15VDC
Minimum Load			0%		
Startup-Time				29ms	
Rise Time				25ms	
Internal Operating Frequency			235kHz	250kHz	265kHz

## Typical Application

RPMGE12-10



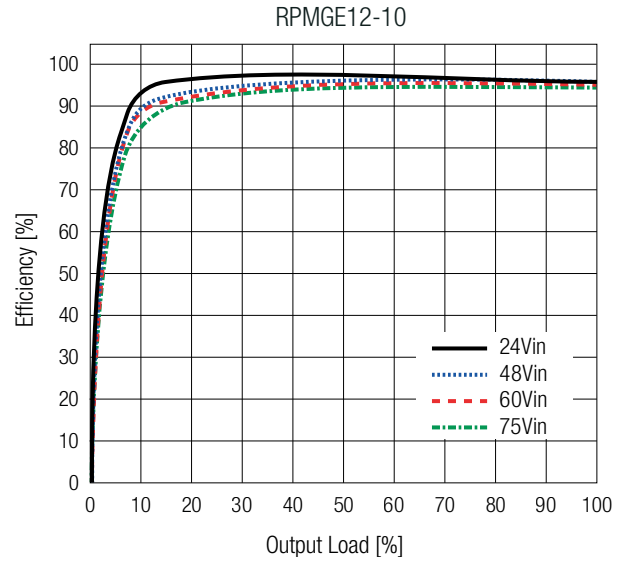
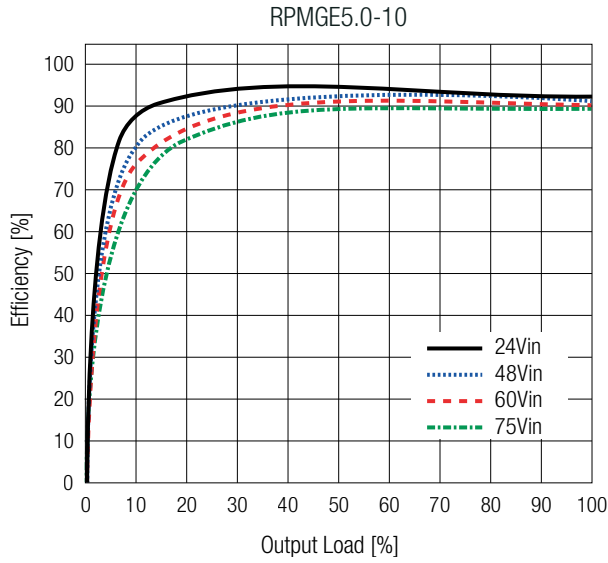
VOUTset	CIN	Rup	COUT
15VDC	>220 $\mu$ F	3k $\Omega$	>470 $\mu$ F ESR<30m $\Omega$

For nom.  $V_{OUT}$  leave Trim pin open

Note2: +Sense must be connected to +V<sub>OUT</sub> for proper operation, otherwise the unit could be damaged.

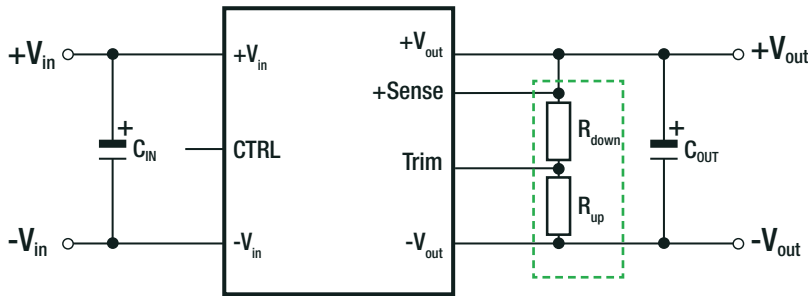
**BASIC CHARACTERISTICS** (measured @  $T_{AMB}= 25^{\circ}\text{C}$ , nom.  $V_{IN}$ , full load and after warm-up unless otherwise stated)

### Efficiency vs. Output Current



### OUTPUT VOLTAGE TRIMMING

The RPMGE series offers the feature of trimming the output voltage over a range between 3.3V and 15V by using external trim resistors. The values for trim resistors shown in trim tables below are according to standard E96 values; therefore, the specified voltage may slightly vary.



- $V_{out_{nom}}$  = nominal output voltage [VDC]
- $V_{out_{set}}$  = trimmed output voltage [VDC]
- $R_{up}$  = trim up resistor [ $\Omega$ ]
- $R_{down}$  = trim down resistor [ $\Omega$ ]
- $R_3, R_4, R_5$  = internal resistors [ $\Omega$ ]

Model	$R_3$ [ $\Omega$ ]	$R_4$ [ $\Omega$ ]	$R_5$ [ $\Omega$ ]	$V_{REF}$ [VDC]
RPMGE5.0-10	21k	4k02	4k02	0.8
RPMGE12-10	21k	1k5	2k49	0.8

### Calculation

$$R_{DOWN} = \frac{V_{OUTset} \times (R_3 \times R_4 + R_4 \times R_5) - V_{REF} \times (R_3 \times R_4 + R_4 \times R_5 + R_3 \times R_5)}{V_{REF} \times (R_3 + R_4) - R_4 \times V_{OUTset}} = \Omega$$

$$R_{UP} = \frac{V_{REF} \times R_3 \times (R_4 + R_5) - R_4 \times R_5 \times (V_{OUTset} - V_{REF})}{(V_{OUTset} - V_{REF}) \times R_4 - V_{REF} \times R_3} = \Omega$$

#### RPMGE5.0-10

##### Trim up

$V_{out_{set}}$	5.5	6	7	8	[VDC]
$R_{up}$ (E96)	28k	12k4	4k32	1k5	[ $\Omega$ ]

##### Trim down

$V_{out_{set}}$	3.3	3.6	4	4.5	[VDC]
$R_{down}$ (E96)	28k7	39k2	64k9	162k	[ $\Omega$ ]

#### RPMGE12-10

##### Trim up

$V_{out_{set}}$	15	[VDC]
$R_{up}$ (E96)	3k01	[ $\Omega$ ]

##### Trim down

$V_{out_{set}}$	8	9	10	11	[VDC]
$R_{down}$ (E96)	35k7	54k9	95k3	215k	[ $\Omega$ ]

### REGULATIONS

Parameter	Condition		Value	
Output Accuracy			$\pm 0.5\%$ typ.	
Line Regulation	low line to high line, full load		$\pm 0.5\%$ typ.	
Load Regulation	0% to 100% load		$\pm 0.5\%$ typ.	
Transient Response	$C_{IN} 470\mu F, C_{OUT} 2x1000\mu F$ low ESR (10% to 100% load)	RPMGE5.0-10	$V_{IN} = 24VDC$	27mV typ.
			$V_{IN} = 48VDC$	28mV typ.
		RPMGE12-10	$V_{IN} = 24VDC$	30mV typ.
			$V_{IN} = 48VDC$	35mV typ.

### PROTECTIONS

Parameter	Condition		Value
Short Circuit Protection (SCP)	hiccup mode	RPMGE5.0-10	14.6A typ.
		RPMGE12-10	15.4A typ.
Over Current Protection (OCP)	hiccup mode	RPMGE5.0-10	14.6A typ.
		RPMGE12-10	15.4A typ.
Over Temperature Protection (OTP)	measured on Tj of controller		175°C

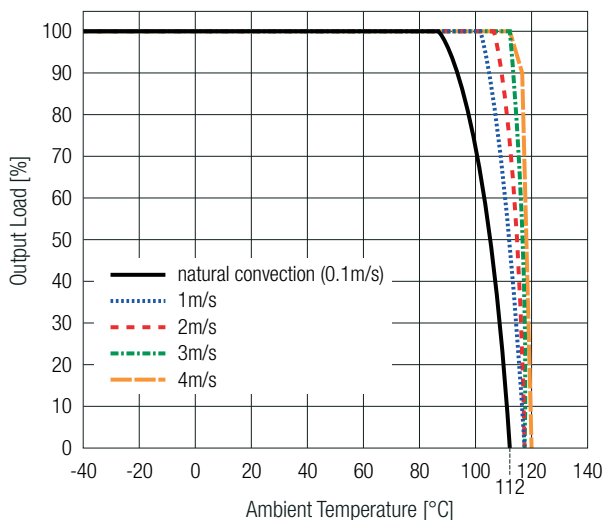
### ENVIRONMENTAL

Parameter	Condition		Value	
Operating Temperature Range	with forced airflow, refer to „Derating Graph“		-40°C to +120°C	
Operating Humidity	non-condensing		5%-95% RH max.	
Operating Altitude			5000m	
Vibration	IEC60068-2-65, IEC60068-2-68, IEC60068-2-27			
MTBF	according to MIL-HDBK-217F, G.B.	$T_{AMB} = +25^\circ C$	RPMGE5.0-10	1369 x 10 <sup>3</sup> hours
			RPMGE12-10	1369 x 10 <sup>3</sup> hours

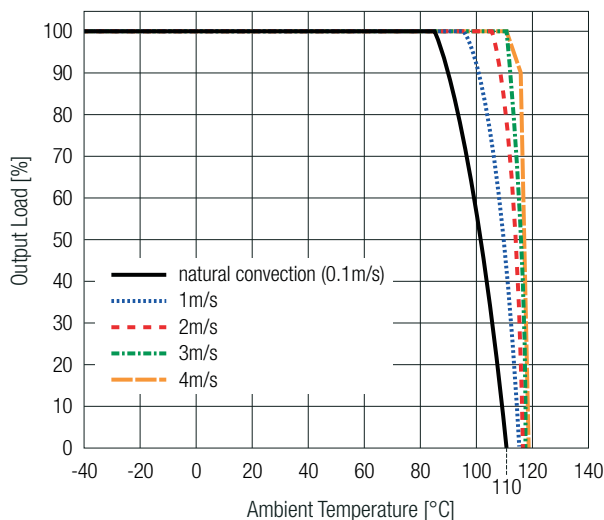
### Derating Graph

(at chamber and  $V_{IN} = 24VDC$ )

RPMGE5.0-10



RPMGE12-10



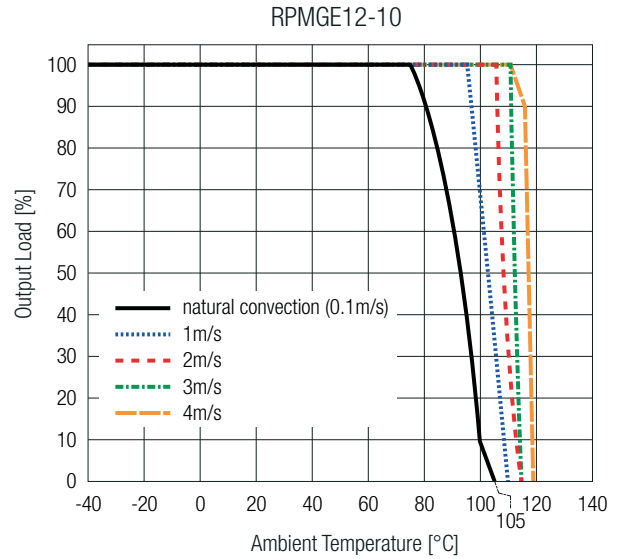
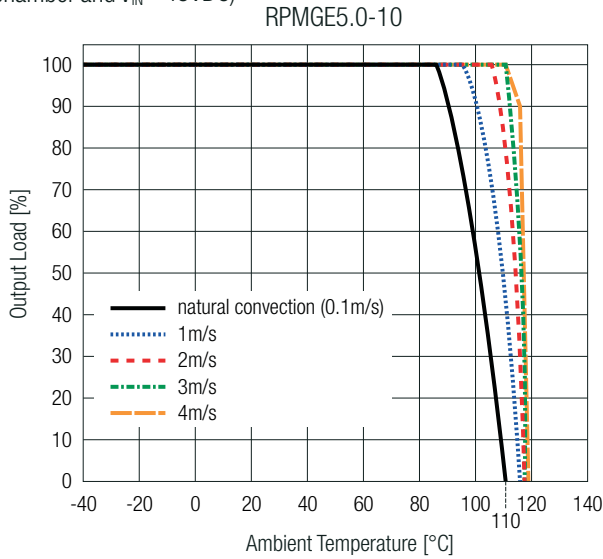
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## ENVIRONMENTAL

### Derating Graph

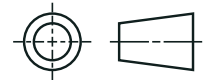
(at chamber and  $V_{IN} = 48VDC$ )



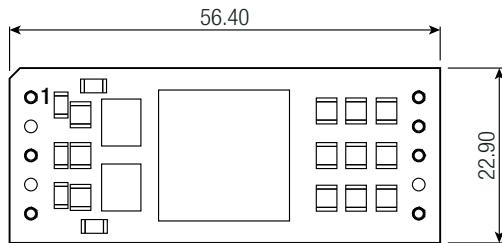
## DIMENSION & PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	PCB	FR4, (UL94 V-0)
Dimension (LxWxH)		56.4 x 22.9 x 12.0mm 2.22 x 0.9 x 0.47 inch
Weight		20.5g typ. 0.045 lbs.

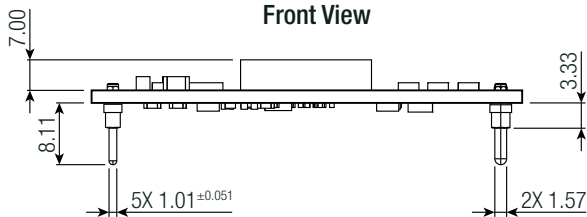
### Dimension Drawing (mm)



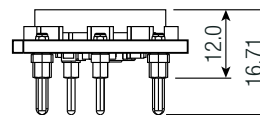
Top View



Front View



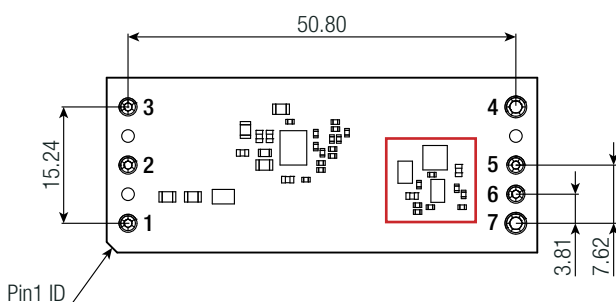
Side View



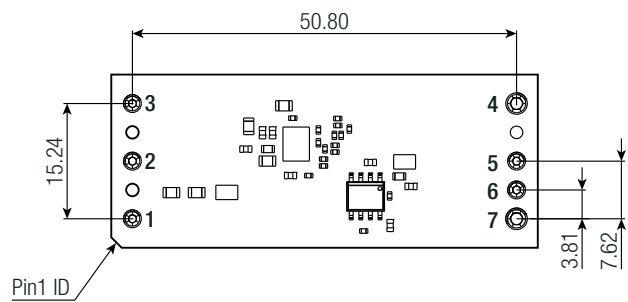
### Pinning Information

Pin #	Function
1	+Vin
2	CTRL/UVLO
3	-Vin
4	-Vout
5	TRIM
6	+Sense
7	+Vout

Bottom View RPMGE5.0-10



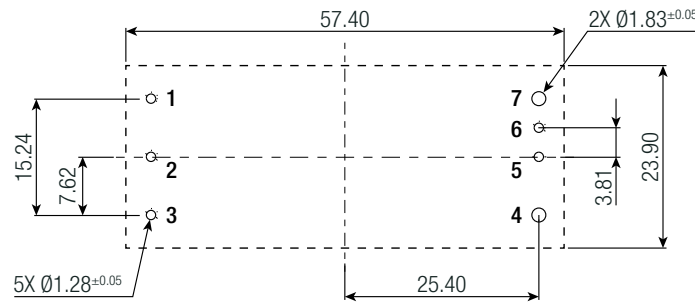
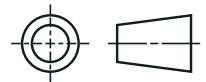
Bottom View RPMGE12-10



Note3: The components in the selected area may differ based on the production lot. Product performance is not affected.

### DIMENSION & PHYSICAL CHARACTERISTICS

Recommended Footprint Details



Tolerances:  
 x.x= ±0.5mm  
 x.xx= ±0.25mm

### PACKAGING INFORMATION

Parameter	Type	Value
Packaging Dimension (LxWxH)	tray	305.0 x 165.0 x 45.0mm
Packaging Quantity		14pcs
Storage Temperature Range		-40°C to +125°C
Storage Humidity	non-condensing	95% RH max.

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