Technical Data Sheet

RPMGE-10 Series ◊ Power Module

10A ◊ Input:18-75VDC ◊ Eighth Brick

RECOM DC/DC Converter

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

RoHS² compliant 10 from 10

Reach compliant

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(1) [VDC]	Output Voltage [VDC]	Vout Adjust Range [VDC]	Output Current max. [A]	Efficiency typ. [%]	Max. Capacitive Load [µF]
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}= 470µF + C_{OUT}= 2000µF

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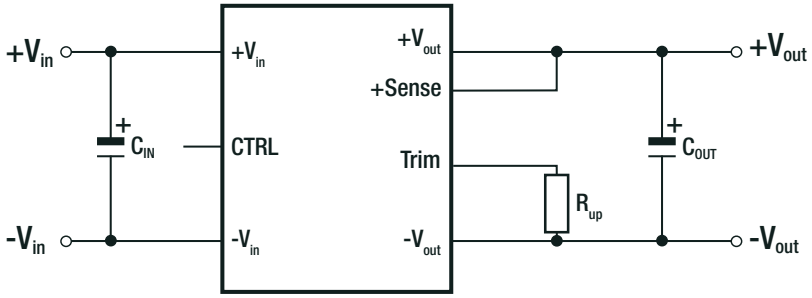
BASIC CHARACTERISTICS (measured @ T_{AMB}= 25°C, nom. V_{IN}, full load and after warm-up unless otherwise stated)

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		120µA	
		V_{IN}= 48VDC		220µA	
	RPMGE12-10 DC/DC OFF / CTRL to GND	V_{IN}= 24VDC		120µA	
		V_{IN}= 48VDC		220µA	
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	C_{IN}	R_{up}	C_{OUT}
15VDC	>220µF	3kΩ	>470µF ESR<30mΩ
For nom. V_{OUT} leave Trim pin open			

Note2: +Sense must be connected to $+V_{OUT}$ for proper operation, otherwise the unit could be damaged.

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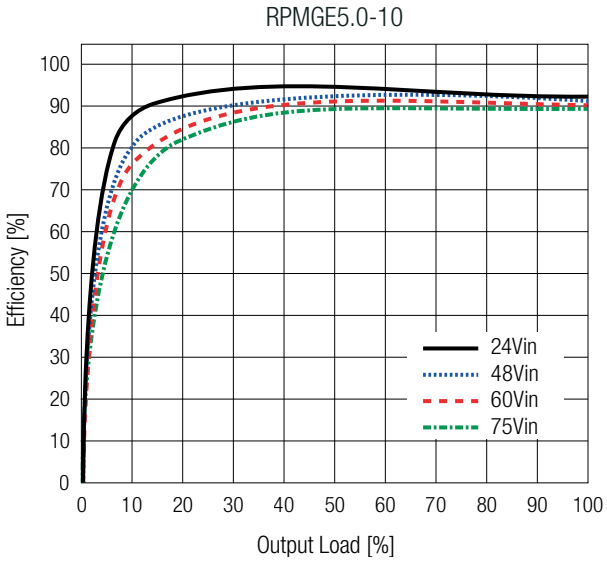
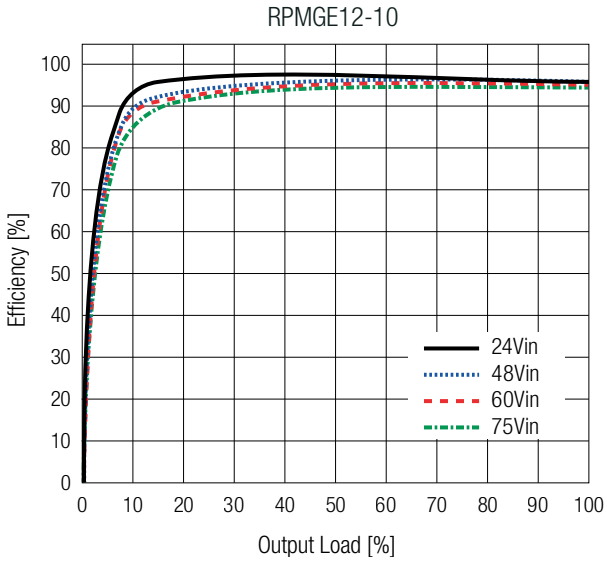
10A ◊ Input: 18-75VDC ◊ Eighth Brick

RECOM DC/DC Converter

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

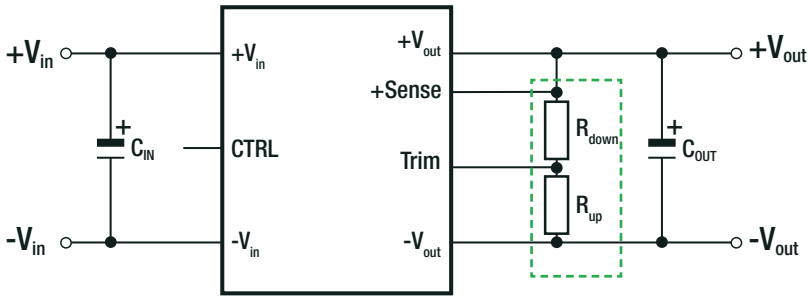
Efficiency vs. Output Current





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.



$Vout_{nom}$	= nominal output voltage	[VDC]	
$Vout_{set}$	= trimmed output voltage	[VDC]	
R_{up}	= trim up resistor	[Ω]	
R_{down}	= trim down resistor	[Ω]	
R_3, R_4, R_5	= internal resistors	[Ω]	

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

Calculation

$$R_{DOWN} = \frac{V_{OUTset} \times (R3 \times R4 + R4 \times R5) - V_{REF} \times (R3 \times R4 + R4 \times R5 + R3 \times R5)}{V_{REF} \times (R3 + R4) - R4 \times V_{OUTset}} = \Omega$$

$$R_{UP} = \frac{V_{REF} \times R3 \times (R4 + R5) - R4 \times R5 \times (V_{OUTset} - V_{REF})}{(V_{OUTset} - V_{REF}) \times R4 - V_{REF} \times R3} = \Omega$$

RPMGE5.0-10

Trim up

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

Trim down

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

RPMGE12-10

Trim up

$Vout_{set}$	15	[VDC]
R_{up} (E96)	3k01	[Ω]

Trim down

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

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REGULATIONS

Parameter	Condition			Value
Output Accuracy				±0.5% typ.
Line Regulation	low line to high line, full load			±0.5% typ.
Load Regulation	0% to 100% load			±0.5% typ.
Transient Response	C_{IN} 470µF, C_{OUT} 2x1000µF 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

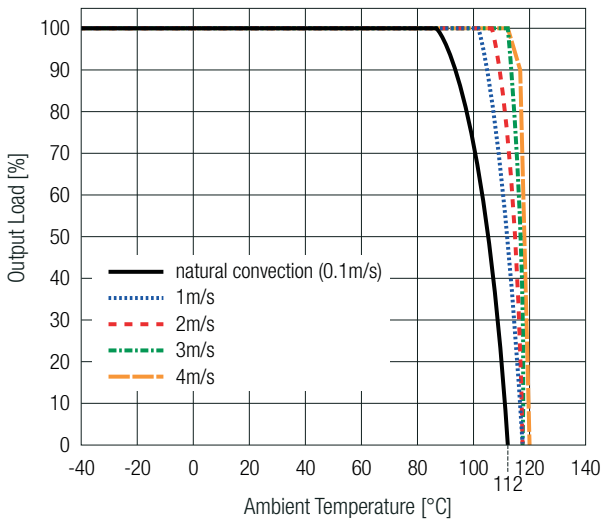
ENVIRONMENTAL

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°C	RPMGE5.0-10	1369 x 10³ hours
			RPMGE12-10	1369 x 10³ hours

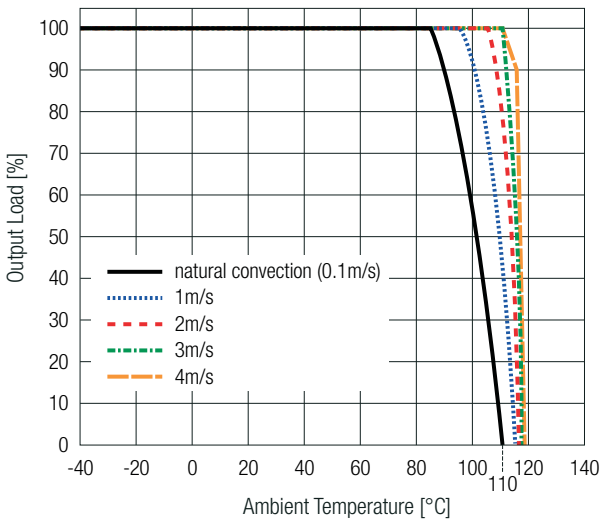
Derating Graph

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

RPMGE5.0-10



RPMGE12-10



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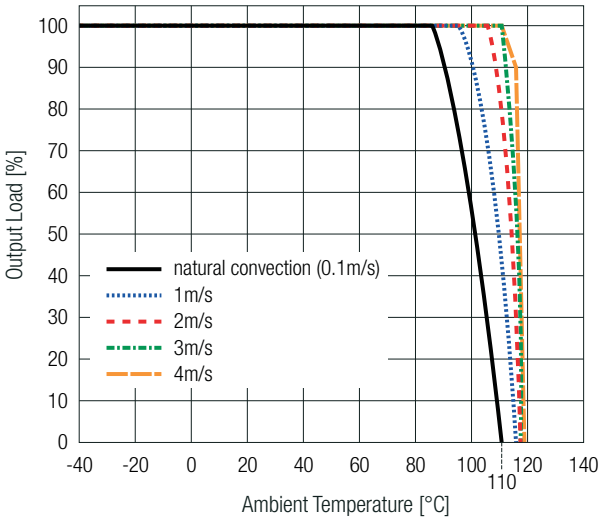
ENVIRONMENTAL

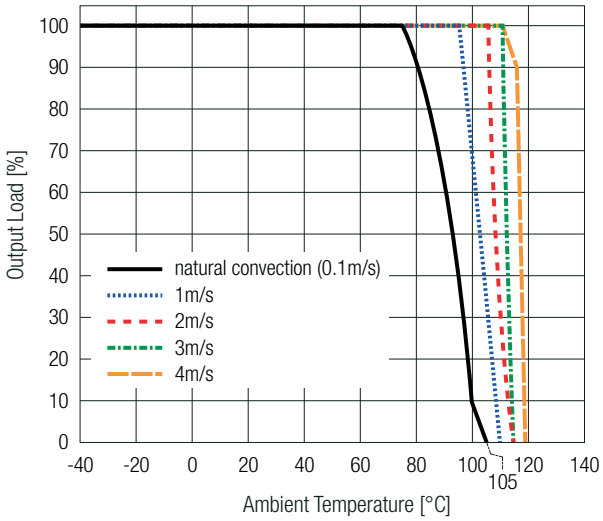
Derating Graph

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

RPMGE5.0-10



RPMGE12-10

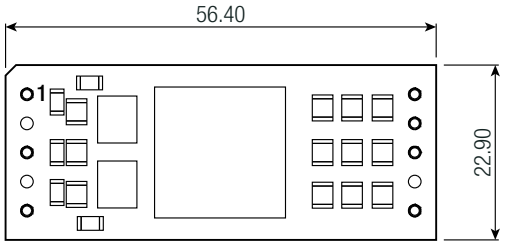


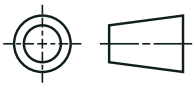
DIMENSION & PHYSICAL CHARACTERISTICS

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.

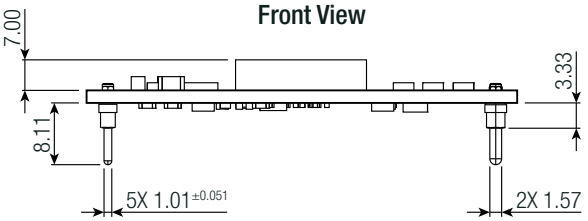
Dimension Drawing (mm)

Top View

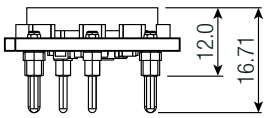




Front View



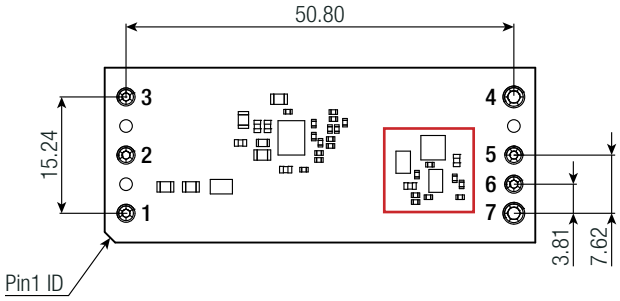
Side View



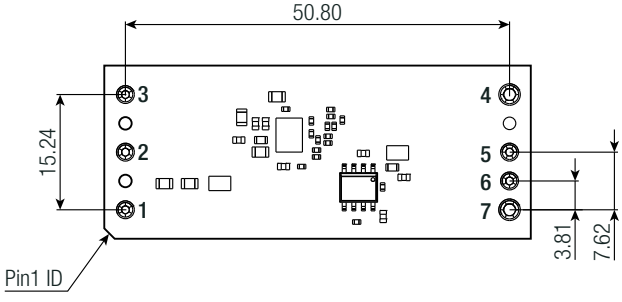
Pinning Information

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.

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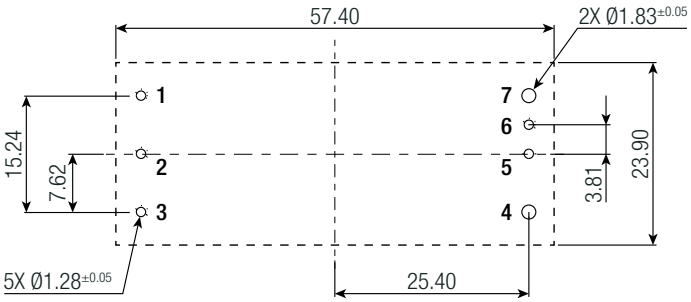
DIMENSION & PHYSICAL CHARACTERISTICS

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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