Technical Data Sheet

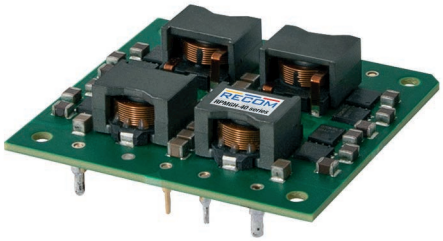
RPMGH-40 Series ◊ Power Module

40A ◊ Input: 18-75VDC ◊ Half Brick

RECOM DC/DC Converter

FEATURES

- 40A non isolated half brick
- 18 to 75VDC wide input range
- 3.3 to 24VDC adjustable output
- Standard half brick format
- High efficiency up to 95%
- Operating temperature derates to 120°C
- 3 years Warranty



Dimensions (LxWxH): 57.9 x 61.0 x 15.0mm (2.27 x 2.4x 0.59 inch)
49g (0.108 lbs)

APPLICATIONS



SAFETY & EMC

RoHS² compliant 10 from 10

Reach compliant

DESCRIPTION

The RPMGH-40 series is a non-isolated 40A DC/DC converter in a half-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]
RPMGH5.0-40	18-75	5	3.3 - 8	40	91	14000
RPMGH12-40	18-75	12	8 - 24	40	95	3400

Note1: Measured Values are with C_{IN}= 470µF + C_{OUT}= 2000µF

copyright © RECOM Power GmbH, all rights reserved

RPMGH-40 Series ◊ Power Module

40A ◊ Input: 18-75VDC ◊ Half Brick

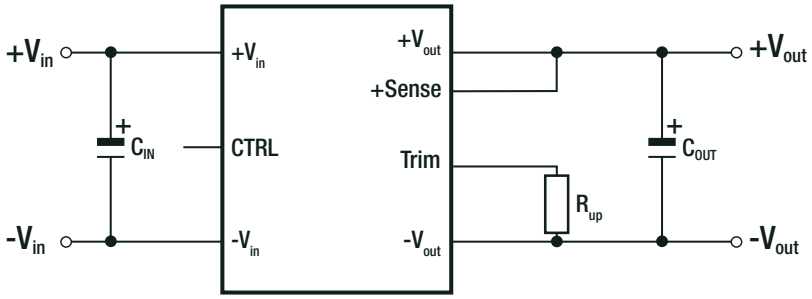
RECOM DC/DC Converter

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
Under Voltage Lockout (UVLO)	DC/DC ON			16.9VDC	
	DC/DC OFF			14.5VDC	
Input Current (Range)	RPMGH5.0-40	V_{IN}= 48VDC		4.5A	
	RPMGH12-40			10.45A	
Quiescent current	RPMGH5.0-40	V_{IN}= 24VDC		57mA	
		V_{IN}= 48VDC		53mA	
	RPMGH12-40	V_{IN}= 24VDC		65mA	
		V_{IN}= 48VDC		54mA	
No Load Power Consumption	RPMGH5.0-40	V_{IN}= 24VDC		1.36W	
		V_{IN}= 48VDC		2.55W	
	RPMGH12-40	V_{IN}= 24VDC		1.55W	
		V_{IN}= 48VDC		2.6W	
Standby Current	RPMGH5.0-40 DC/DC OFF / CTRL to GND	V_{IN}= 24VDC		73µA	
		V_{IN}= 48VDC		143µA	
	RPMGH12-40 DC/DC OFF / CTRL to GND	V_{IN}= 24VDC		73µA	
		V_{IN}= 48VDC		150µA	
Output Voltage Trimming	RPMGH5.0-40		3.3VDC		8VDC
	RPMGH12-40		8VDC		24VDC
Minimum Load			0%		
Startup-Time	RPMGH5.0-40			14ms	
	RPMGH12-40			14ms	
Rise Time	RPMGH5.0-40			10ms	
	RPMGH12-40			10ms	
Internal Operating Frequency			400kHz	420kHz	440kHz

Typical Application

RPMGH12-40



VOUTset	C_{IN}	R_{up}	C_{OUT}
15VDC	>400µF	5kΩ	>2000µF ESR<20mΩ
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.

copyright © RECOM Power GmbH, all rights reserved

RPMGH-40 Series ◊ Power Module

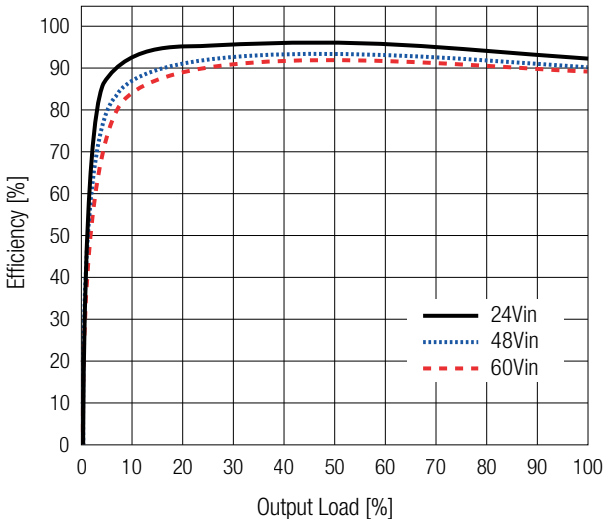
40A ◊ Input: 18-75VDC ◊ Half Brick

RECOM DC/DC Converter

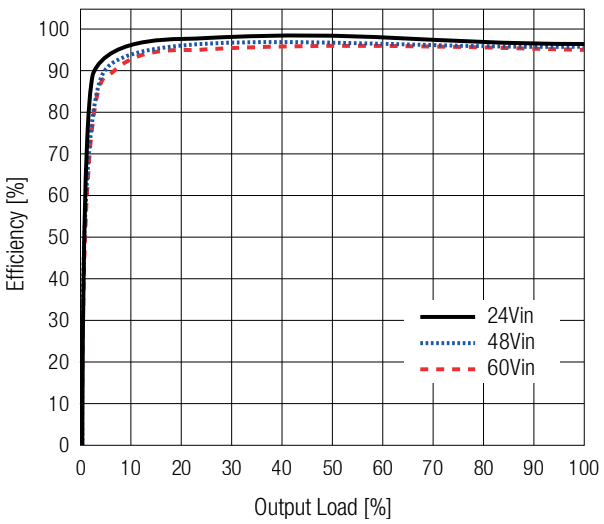
BASIC CHARACTERISTICS (measured @ T_{AMB}= 25°C, nom. V_{IN}, full load and after warm-up unless otherwise stated)

Efficiency vs. Output current

RPMGH5.0-40

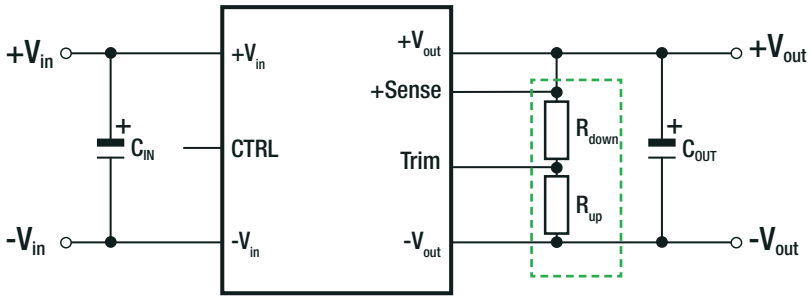


RPMGH12-40



OUTPUT VOLTAGE TRIMMING

The RPMGH series offers the feature of trimming the output voltage over a range between 3.3V and 24V 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]
RPMGH5.0-40	9k1	1k74	1k78	0.8
RPMGH12-40	24k35	1k74	1k5	0.8

Calculation

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

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

RPMGH5.0-40

Trim up

$Vout_{set}$	5.5	6	7	8	[VDC]
R_{up} (E96)	12k1	5k36	1k82	619	[Ω]

Trim down

$Vout_{set}$	3.3	3.6	4	4.5	[VDC]
R_{down} (E96)	12k1	16k2	27k4	66k5	[Ω]

RPMGH12-40

Trim up

$Vout_{set}$	15	18	20	24	[VDC]
R_{up} (E96)	5k	1k74	931	121	[Ω]

Trim down

$Vout_{set}$	8	9	10	11	[VDC]
R_{down} (E96)	42k5	65k	110k	250k	[Ω]

copyright © RECOM Power GmbH, all rights reserved

REGULATIONS

Parameter	Condition			Value
Output Accuracy				±1.0% 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)	RPMGH5.0-40	V_{IN}= 24VDC	90mV typ.
			V_{IN}= 48VDC	90mV typ.
		RPMGH12-40	V_{IN}= 24VDC	105mV typ.
			V_{IN}= 48VDC	110mV typ.

PROTECTIONS

Parameter	Condition		Value
Short Circuit Protection (SCP)	hiccup mode	RPMGH5.0-40	43.1A typ.
		RPMGH12-40	42.7A typ.
Over Current Protection (OCP)	hiccup mode	RPMGH5.0-40	43.1A typ.
		RPMGH12-40	42.7A typ.
Over Temperature Protection (OTP)	measured on T_J of controller		160°C

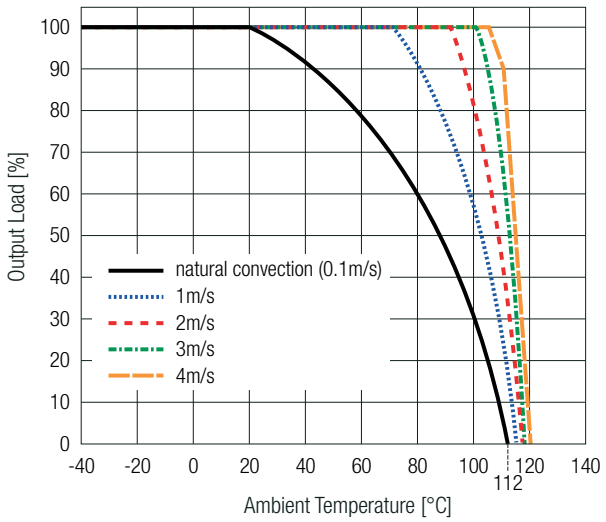
ENVIRONMENTAL

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	RPMGH5.0-40	1208 x 10³ hours
			RPMGH12-40	1239 x 10³ hours

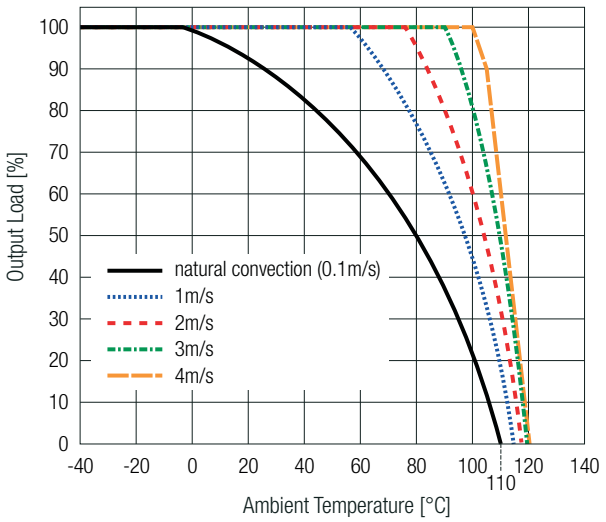
Derating Graph

V_{IN}= 24VDC

RPMGH5.0-40



RPMGH12-40



copyright © RECOM Power GmbH, all rights reserved
www.recom-power.com

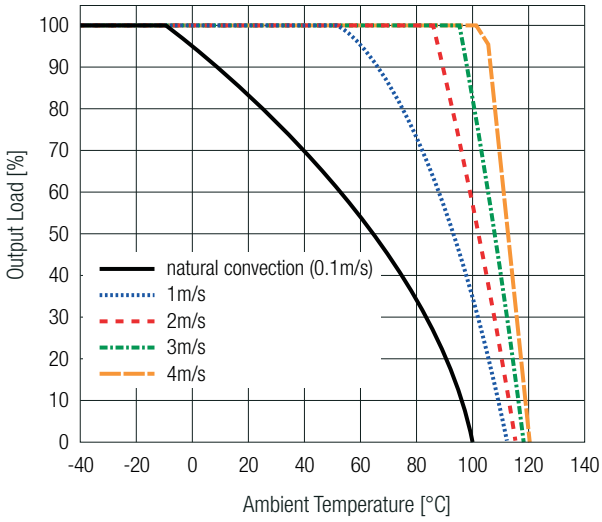
RPMGH-40 Series ◊ Power Module

40A ◊ Input: 18-75VDC ◊ Half Brick

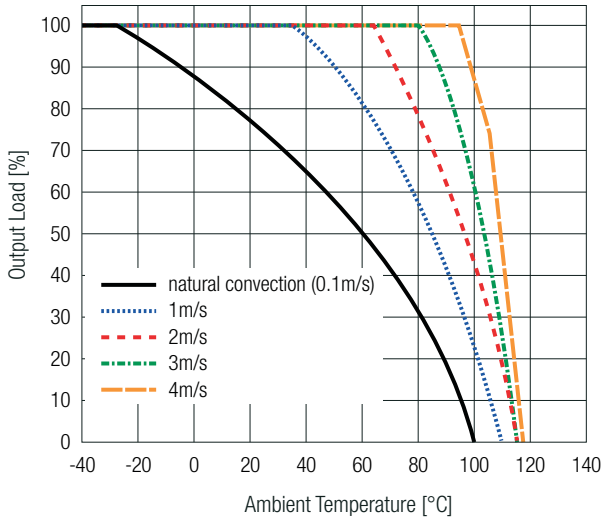
ENVIRONMENTAL

V_{IN}= 48VDC

RPMGH5.0-40



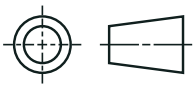
RPMGH12-40



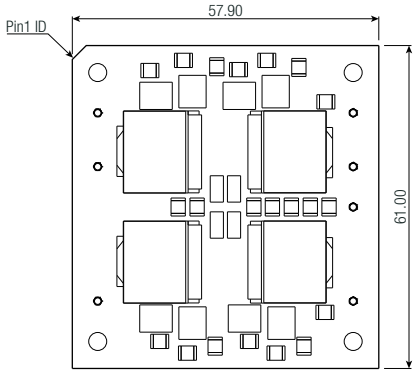
DIMENSION & PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	PCB	FR4, (UL94 V-0)
Dimension (LxWxH)		57.9 x 61.0 x 15.0mm 2.4 x 2.27 x 0.59 inch
Weight		49g typ. 0.108 lbs.

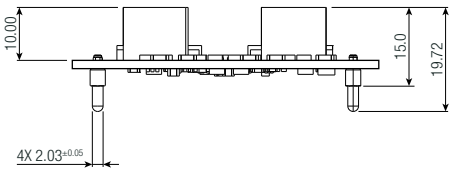
Dimension Drawing (mm)



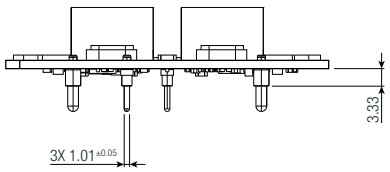
Top View



Front View



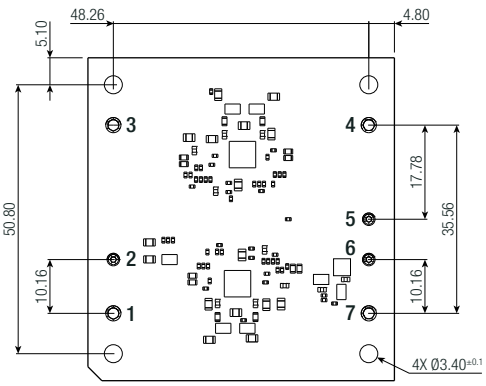
Side View



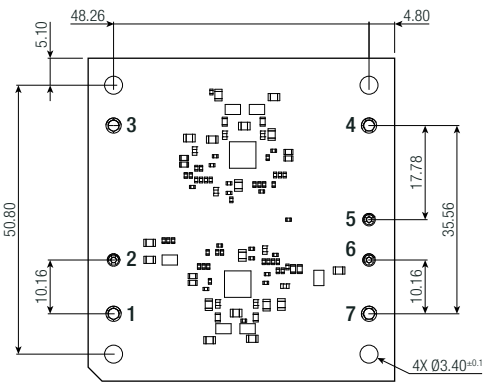
Pinning Information

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

Bottom View RPMGH5.0-40



Bottom View RPMGH12-40

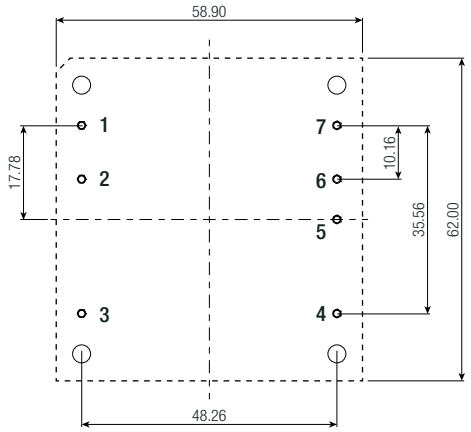


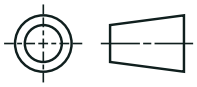
Tolerances:
x.x= ±0.5mm
x.xx= ±0.25mm

copyright © RECOM Power GmbH, all rights reserved

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		6 pcs.
Storage Temperature Range		-40°C to +125°C
Storage Humidity	non-condensing	95% RH max.

The product information and specifications may be subject to changes even without prior written notice.The product has been designed for various applications; its suitability lies in the responsibility of each customer. The products are not authorized for use in safety-critical applications without RECOM's explicit written consent. A safety-critical application is an application where a failure may reasonably be expected to endanger or cause loss of life, inflict bodily harm or damage property. The applicant shall indemnify and hold harmless RECOM, its affiliated companies and its representatives against any damage claims in connection with the unauthorized use of RECOM products in such safety-critical applications.

copyright © RECOM Power GmbH, all rights reserved