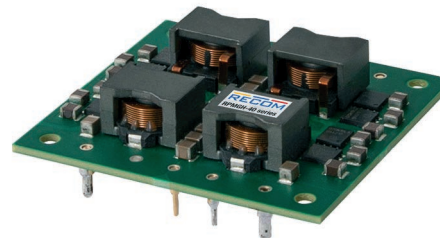


### FEATURES

- 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



### 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 <sup>(1)</sup> [VDC]	Output Voltage [VDC]	Vout Adjust Range [VDC]	Output Current max. [A]	Efficiency typ. [%]	Max. Capacitive Load [ $\mu$ F]
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  $C_{IN}= 470\mu$ F +  $C_{OUT}= 2000\mu$ F

# RPMGH-40 Series $\diamond$ Power Module

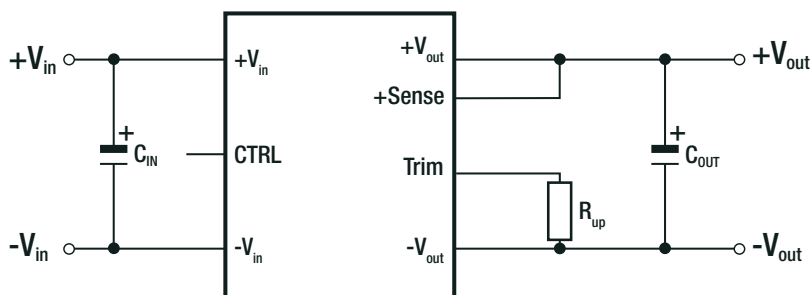
40A  $\diamond$  Input: 18-75VDC  $\diamond$  Half Brick

**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
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	$V_{IN}= 24VDC$	73 $\mu$ A	
		$V_{IN}= 48VDC$	143 $\mu$ A	
	RPMGH12-40 DC/DC OFF / CTRL to GND	$V_{IN}= 24VDC$	73 $\mu$ A	
		$V_{IN}= 48VDC$	150 $\mu$ A	
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

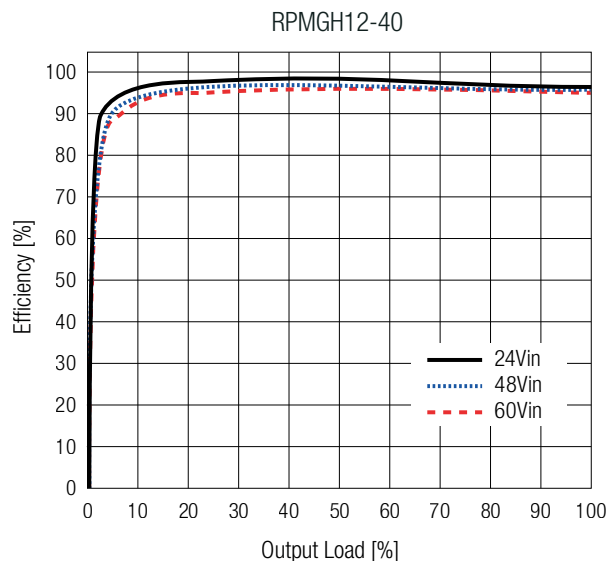
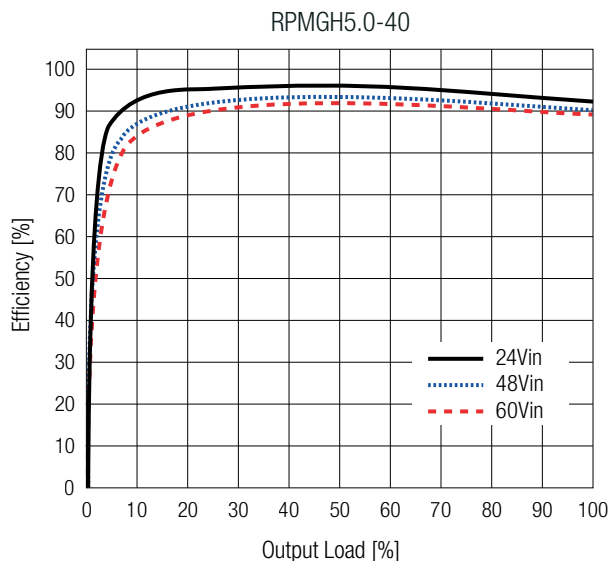


VOUTset	C <sub>IN</sub>	R <sub>up</sub>	C <sub>OUT</sub>
15VDC	>400 $\mu$ F	5k $\Omega$	>2000 $\mu$ F ESR<20m $\Omega$
For nom. V <sub>OUT</sub> leave Trim pin open			

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

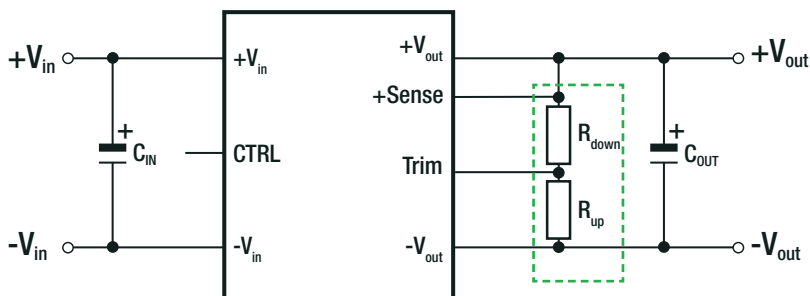
**BASIC CHARACTERISTICS** (measured @  $T_{AMB}= 25^{\circ}C$ , nom.  $V_{IN}$ , full load and after warm-up unless otherwise stated)

### Efficiency vs. Output current



### 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.



- $V_{out_{nom}}$  = 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]
RPMGH5.0-40	9k1	1k74	1k78	0.8
RPMGH12-40	24k35	1k74	1k5	0.8

### Calculation

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

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

#### RPMGH5.0-40

##### Trim up

$V_{out_{set}}$	5.5	6	7	8	[VDC]
$R_{up}$ (E96)	12k1	5k36	1k82	619	[ $\Omega$ ]

##### Trim down

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

#### RPMGH12-40

##### Trim up

$V_{out_{set}}$	15	18	20	24	[VDC]
$R_{up}$ (E96)	5k	1k74	931	121	[ $\Omega$ ]

##### Trim down

$V_{out_{set}}$	8	9	10	11	[VDC]
$R_{down}$ (E96)	42k5	65k	110k	250k	[ $\Omega$ ]

# RPMGH-40 Series $\diamond$ Power Module

40A  $\diamond$  Input: 18-75VDC  $\diamond$  Half Brick

## REGULATIONS

Parameter	Condition		Value	
Output Accuracy			$\pm 1.0\%$ 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	$C_{IN} 470\mu F, C_{OUT} 2 \times 1000\mu F$ 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

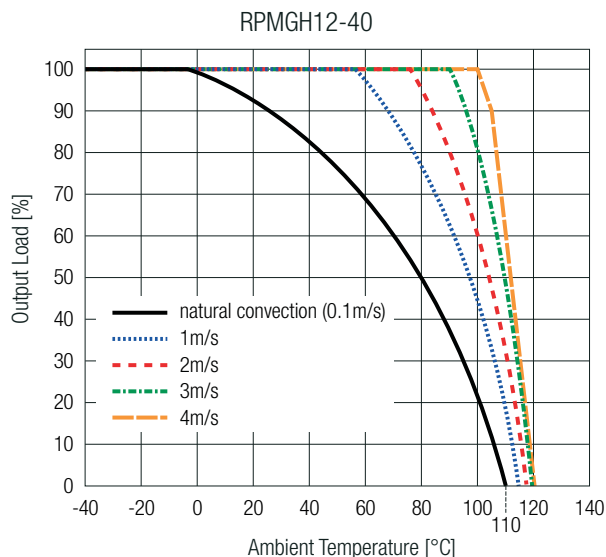
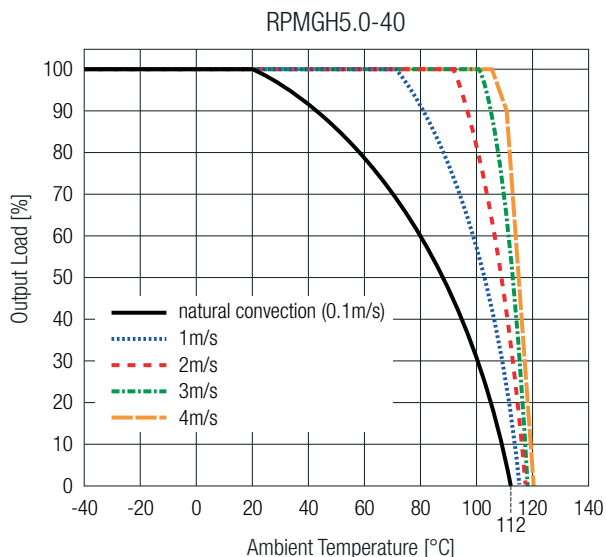
Parameter	Condition		Value
Short Circuit Protection (SCP)	hiccup mode	RPMGH5.0-40	43.1A typ.
		RPMGH12-40	42.7A typ.
Over Current Protection (OCP)	hiccup mode	RPMGH5.0-40	43.1A typ.
		RPMGH12-40	42.7A typ.
Over Temperature Protection (OTP)	measured on $T_J$ of controller		160°C

## 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.	$T_{AMB} = +25^\circ C$	RPMGH5.0-40	1208 x 10 <sup>3</sup> hours
			RPMGH12-40	1239 x 10 <sup>3</sup> hours

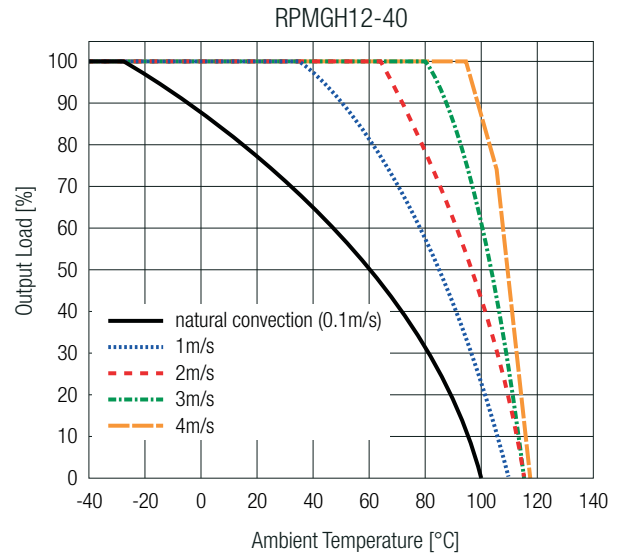
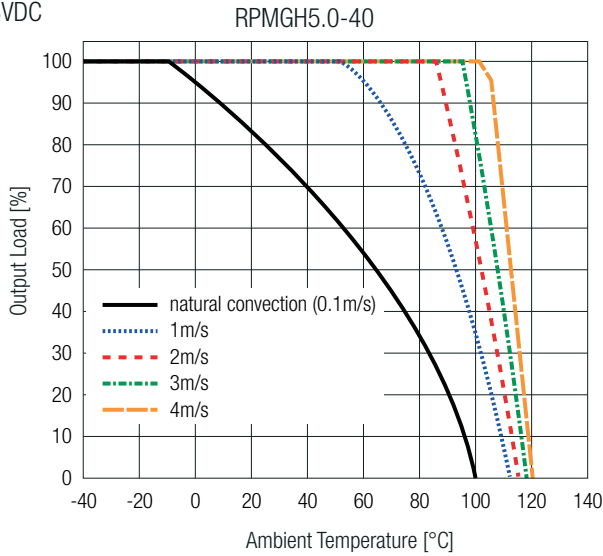
### Derating Graph

$V_{IN} = 24VDC$



### ENVIRONMENTAL

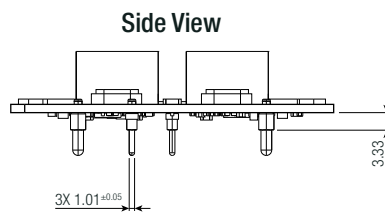
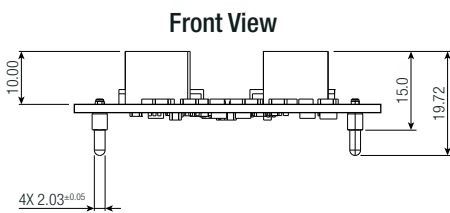
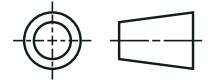
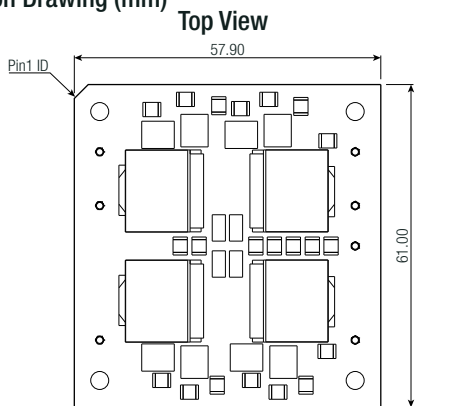
$V_{IN} = 48VDC$



### DIMENSION & PHYSICAL CHARACTERISTICS

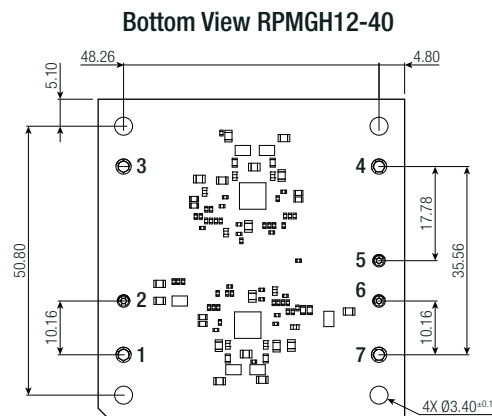
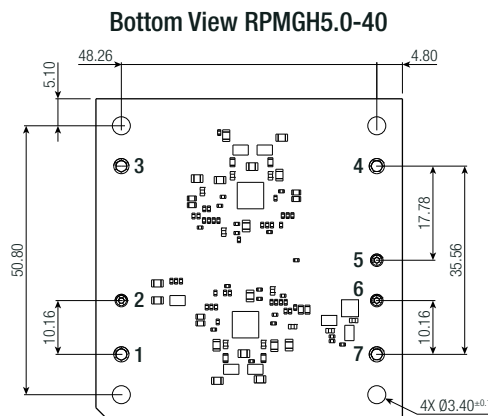
Parameter	Type	Value
Material	PCB	FR4, (UL94 V-0)
Dimension (LxWxH)		57.9 x 61.0 x 15.0mm 2.4 x 2.27 x 0.59 inch
Weight		49g typ. 0.108 lbs.

#### Dimension Drawing (mm)



#### Pinning Information

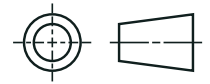
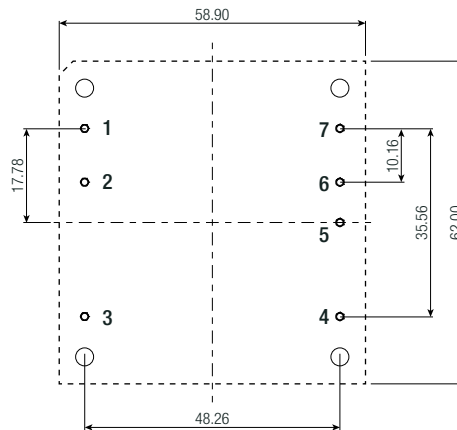
Pin #	Function
1	+Vin
2	CTRL/UVLO
3	-Vin
4	-Vout
5	TRIM
6	+Sense
7	+Vout



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

### 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.

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