PMH

Non-insulation type DC-DC converter
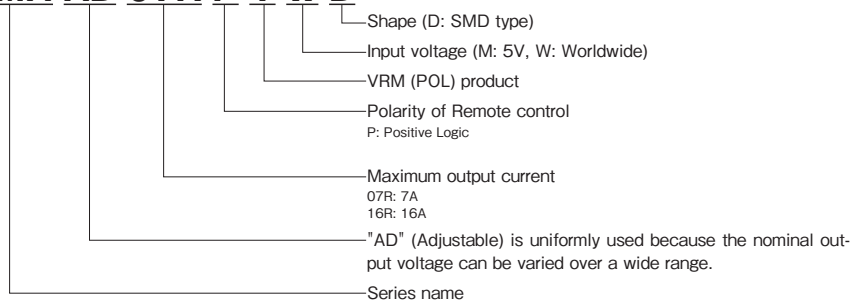

1 YEARS warranty
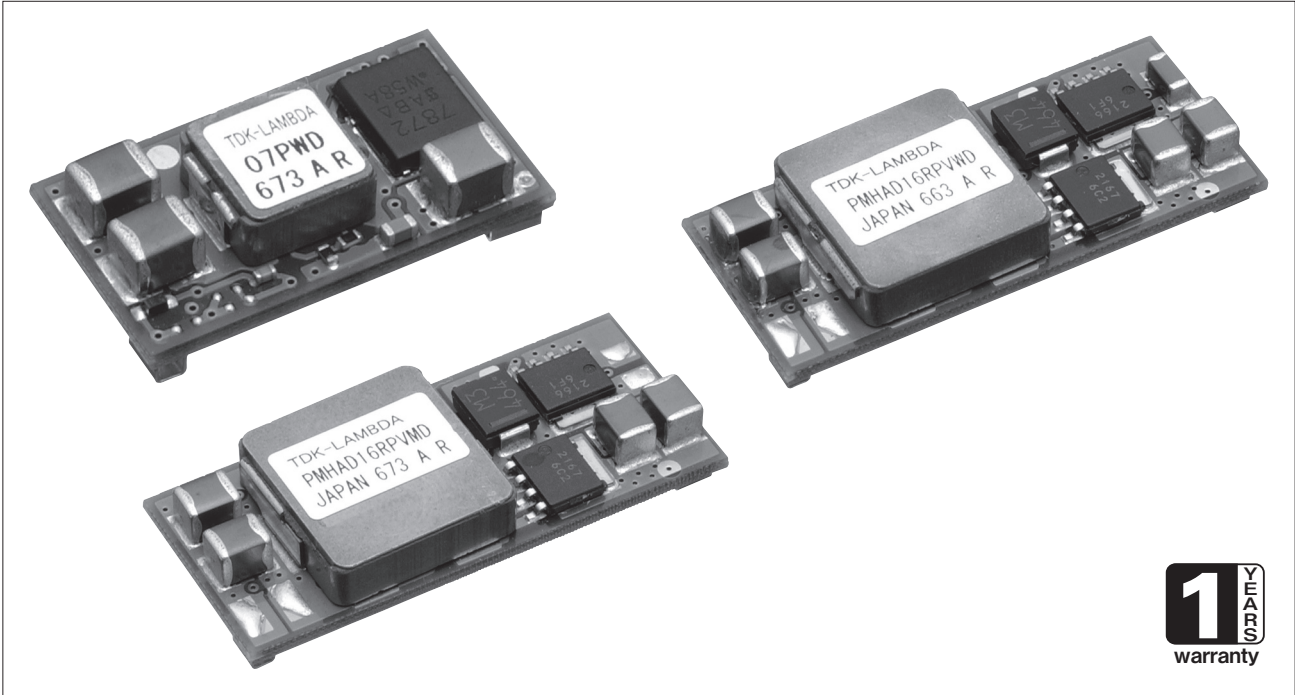
■ Features

- ●Industry standard footprint adopted
- ●High efficiency
- ●Equipped with a function to vary output over a wide range
- ●Equipped with Remote On/Off function
- ●Protection functions (output over current protection, over temperature protection (AD16R only))

■ Model-naming method

PMH AD 07R P V W D

- Shape (D: SMD type)
- Input voltage (M: 5V, W: Worldwide)
- VRM (POL) product
- Polarity of Remote control
  P: Positive Logic
- Maximum output current
  07R: 7A
  16R: 16A
- "AD" (Adjustable) is uniformly used because the nominal output voltage can be varied over a wide range.
- Series name

■ Applications

COMP **COM** **Others**

■ Conformity to RoHS Directive

This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

■ Product Line up

Model name	PMH-AD16RPVMD	PMH-AD16RPVWD	PMH-AD07RPVWD
Input voltage	4.5V ～ 5.5V	6V ～ 14V	6V ～ 14V
Output voltage	0.75V ～ 3.63V	0.75V ～ 5.5V	0.75V ～ 5.5V
Output current	16A	16A	7A
Output power	52.8W	80W	35W

· All specifications are subject to change without notice.

PMH

PMH Specifications

ITEMS/UNITS		MODEL	PMH-AD16RPVMD	PMH-AD16RPVWD	PMH-AD07RPVWD
Input	Nominal Voltage	V	DC5	DC12	
	Voltage Range 0.75 ≦ Vo ≦ 3.63V (*1)	V	DC4.5-5.5	DC6-14	
	Voltage Range 3.63 ≦ Vo ≦ 5.5V(*1)	V	-	DC7-14	
	Efficiency Vo=1.2V (typ) (*2)	%	86	83	77
	Efficiency Vo=1.8V (typ) (*2)	%	90	87.5	83
	Efficiency Vo=3.3V (typ) (*2)	%	94	92.5	89
	Efficiency Vo=5.0V (typ) (*2)	%	-	95	93
Output	Maximum Current (*3)	A	16		7
	Maximum Power (*4)	W	52.8	80	35
	Maximum Line Regulation 0.75 ≦ Vo ≦ 3.63V (typ)	mV	2	10	3
	Maximum Line Regulation 3.63 ≦ Vo ≦ 5.5V (typ)	mV	-	15	5
	Maximum Load Regulation 0.75 ≦ Vo ≦ 3.63V 0-100% (typ)	mV	5	10	3
	Maximum Load Regulation 3.63 ≦ Vo ≦ 5.5V 0-100% (typ)	mV	-	15	7
	Max Power Total Regulation (max)	%	± 5	± 2	
	Maximum Ripple & Noise (typ) (*5)	mVp-p	50	50/80	50
	Start Up Time (typ)	ms	2.5		
	Voltage Adjustable Range(*6)	VDC	0.75-3.63	0.75-5.5	
Function	Over Current Protection (typ) (*7)	A	24.0		10.5
	Over Voltage Protection		Not available		
	Over Temperature Protection (typ)	℃	120		Not available
	Remote Sensing		Available		Not available
	Remote ON/OFF Control		Available		
	Parallel Operation		Not available		
Environment	Operating Temperature	℃	-40 to +85		
	Storage Temperature	℃	-55 to +125		
	Operating Humidity	% RH	10-95 (the conditions of maximum 38℃ in wet bulb temperature and non-condensation should be ensured.)		
	Storage Humidity	% RH	10-95 (the conditions of maximum 38℃ in wet bulb temperature and non-condensation should be ensured.)		
	Vibration		10-500Hz, 1 minutes sweep and 98m/s² (10G) acceleration or 1.5mm total amplitude, 3 directions, 0.5h for each, in non-operation		
	Shock		980m/s² (100G), 6ms, 3 directions, 3 times for each, in non-operation		
Mechanical	Weight (typ)	g	6.5		2.5
	Size (W x H x D)	mm	33 x 6.7 x 14.2		20.3 x 6.0 x 11.43

(*1) Input voltage range differs depending on the Vo value.
(*2) With nominal input voltage, maximum output current, and Ta=25°C.
(*3) Check the output current because it varies depending on the usage conditions and the voltage setting.
(*4) Check the maximum output power because it varies depending on the output voltage.
(*5) In 20MHz, nominal input voltage, maximum output current, and Ta=25°C. This value is that in the condition where a 1µF ceramic capacitor + 10µF OS capacitor is attached to the output terminal.
    For PMH-AD16RPVWD only,
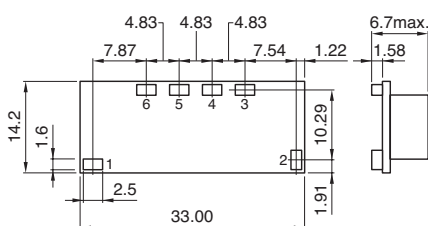   50mVp-p in 0.75 ≦ Vo ≦ 3.63V
    80mVp-p in 3.63 ≦ Vo ≦ 5.5V
(*6) Refer to *1 "Input voltage range".
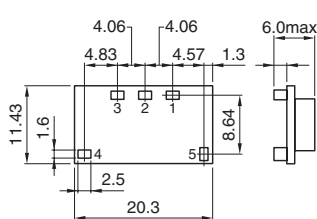(*7) Automatically resumes when the causes are removed.

With nominal input/output voltage, maximum output current, and Ta=25°C, if not specified separately.

Outline Drawing

PMH16 D (SMD) type

PMH07 D (SMD) type

Unit: mm
Allowable tolerance is ±0.25 if not specified separately.

■ Terminal assignments

Model name	PMH-AD16RPVMD PMH-AD16RPVWD	PMH-AD07RPVWD
No.1	Vin	Vin
No.2	RC	RC
No.3	Vo sense	Vo
No.4	Trim	Trim
No.5	Vo	GND
No.6	GND	—

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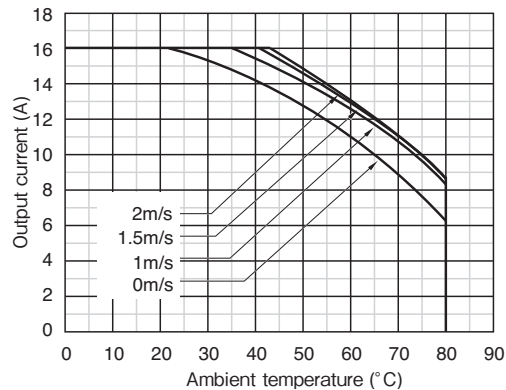
PMH-AD16RPVMD

Derating Curve

PMH- AD16RPVMD

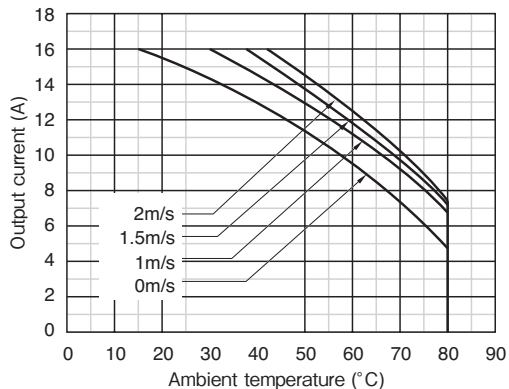Output current derating by ambient temperature (in Vin=5V, and mounted on 150x100x1.6mm PCB)
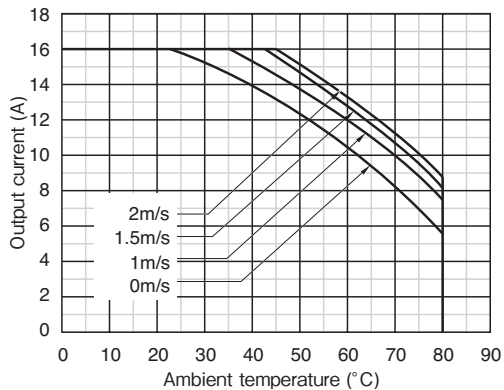
In 1.2V output

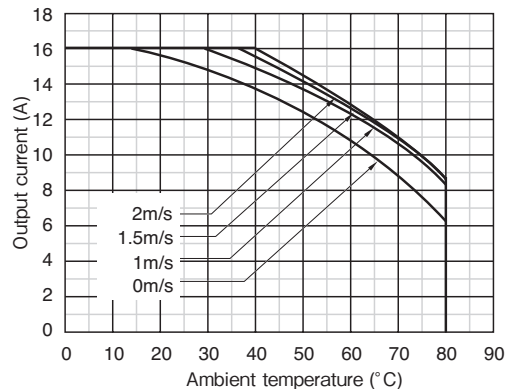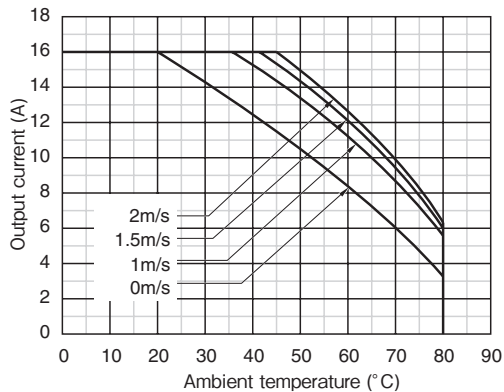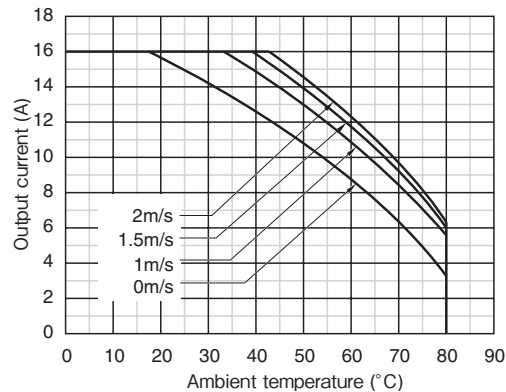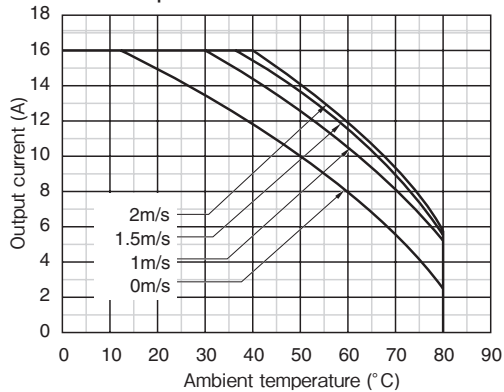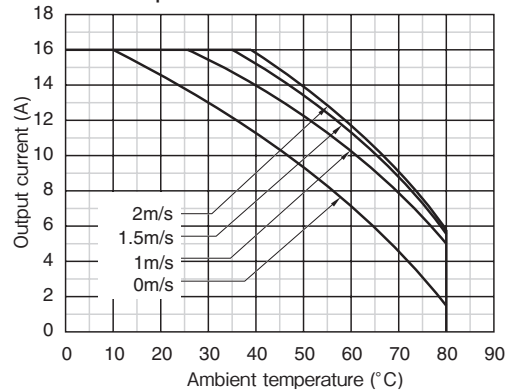In 1.8V output

In 2.5V output

In 3.3V output

PMH-AD16RPVWD

PMH- AD16RPVWD

Output current derating by ambient temperature (in Vin=12V, and mounted on 150x100x1.6mm PCB)

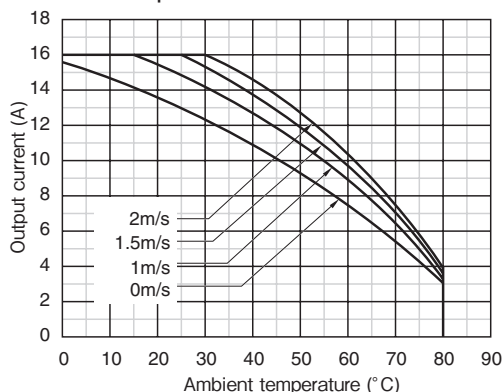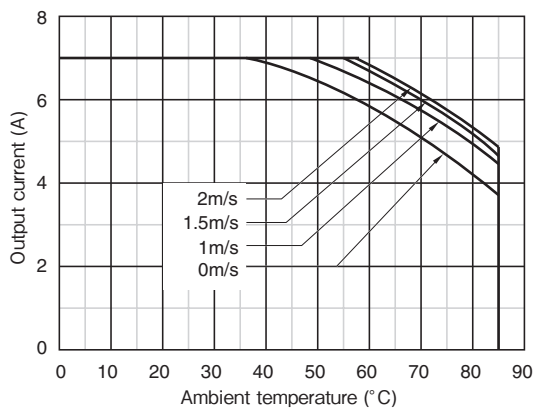### In 1.2V output

In 1.8V output

In 2.5V output

In 3.3V output

In 5.0V output

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PMH-AD07RPVWD
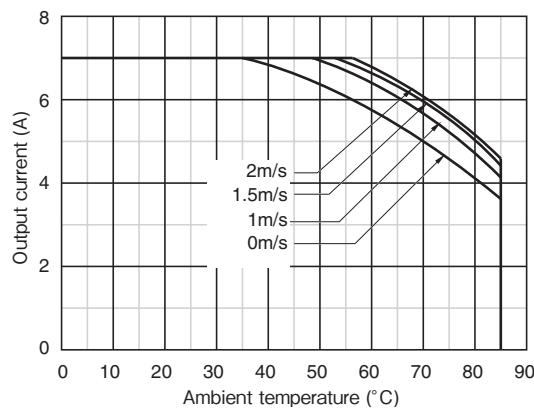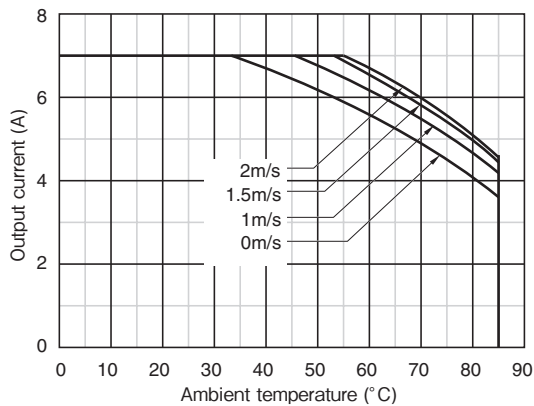
PMH- AD07RPVWD

Output current derating by ambient temperature (in Vin=12V, and mounted on 150x100x1.6mm PCB)

In 1.2V output

2m/s
1.5m/s
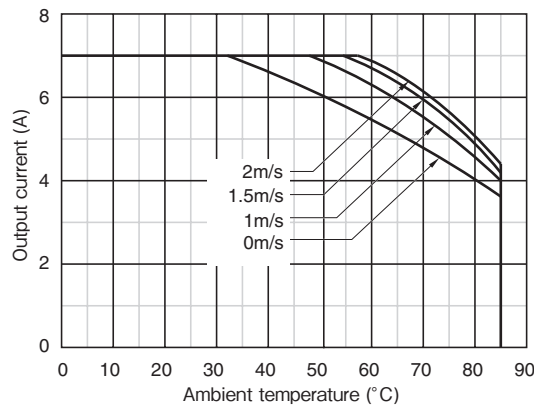1m/s
0m/s

In 1.8V output

2m/s
1.5m/s
1m/s
0m/s

In 2.5V output

2m/s
1.5m/s
1m/s
0m/s

In 3.3V output

2m/s
1.5m/s
1m/s
0m/s

In 5.0V output

2m/s
1.5m/s
1m/s
0m/s

· All specifications are subject to change without notice.
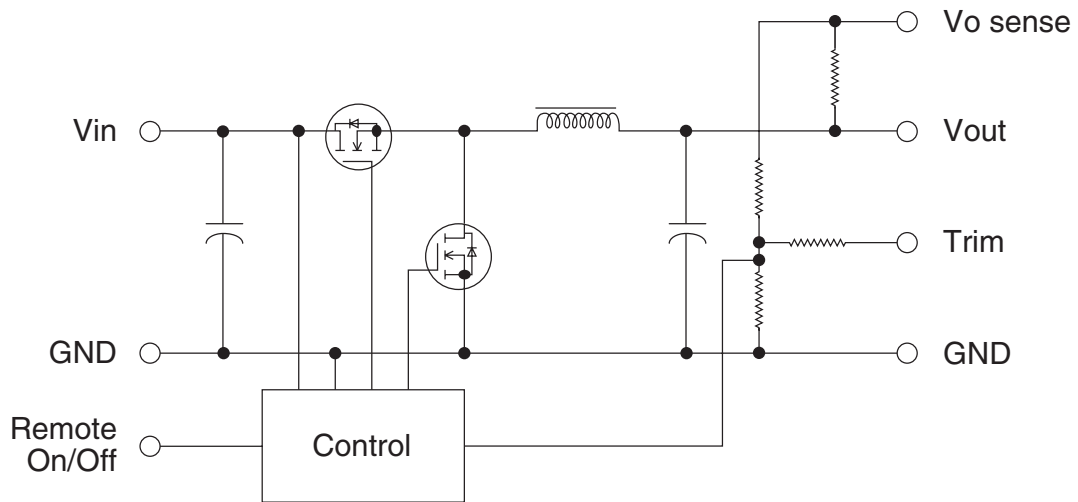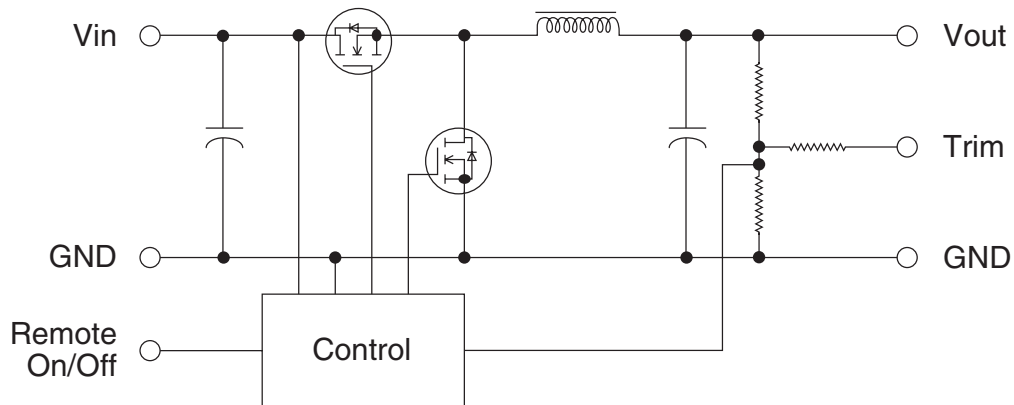
Block Diagram

PMH- AD16RPVMD、PMH- AD16RPVWD
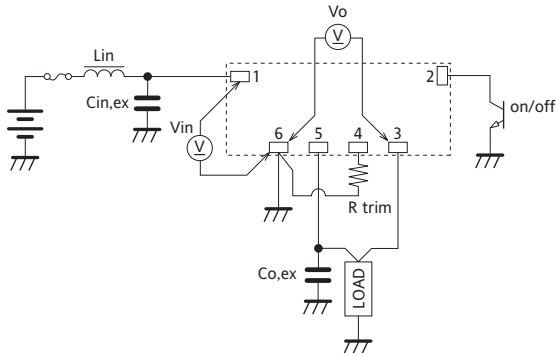

PMH- AD07RPVWD

PMH Instruction Manual

1. PMH-AD16RPVMD, PMH-AD16RPVWD

1-1. Connection diagram

Recommended circuit connection diagram
(conductive polymer type (OS capacitor) to be used)

Lin: 1.0 μH

Cin. ex: 1000 μF (aluminum electrolysis capacitor) +
2x100 μF (tantalum capacitor)

Co. ex: 10 μF (OS capacitor) + 1 μF (ceramic capacitpr)

1-2. Output voltage setting

Output voltage can be programmed within the output voltage adjustable range by connecting a resistance or applying voltage between Trim terminal and GND terminal. When nothing is connected externally, the output voltage is 0.75V.

Use the expressions below to calculate the value of resistance and the voltage to be applied.

PMH-AD16RPVMD

Setting by external resistance

Expression

$$R\,trim = \frac{21105}{Vout - 0.7513} - 5100\ (\Omega)$$

Setting by voltage application

Expression
$$V\,trim = 0.6993 - 0.1690 \times (Vout - 0.7513)\ (V)$$

PMH-AD16RPVWD

Setting by external resistance

Expression

$$R\,trim = \frac{10500}{Vout - 0.7525} - 1000\ (\Omega)$$

Setting by voltage application

Expression
$$V\,trim = 0.7 - 0.0667 \times (Vout - 0.7525)\ (V)$$

1-3. Remote sensing

By connecting Vo Sense terminal (3 pins) to the load terminal, the voltage drop in the system load line can be compensated for.

The output voltage compensation value should be within 5% of the output voltage. (Voltage drop in Rdistribution should be within 5% of the output.)

Also, the output voltage at the load terminal (Load) should be within the voltage adjustable range.

When not using the remote sensing function, connect Vo Sense terminal (3 pins) and Vo terminal (5 pins).
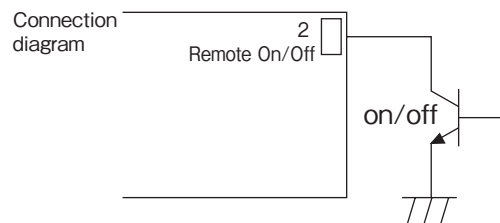
Current in the remote sensing line is small. In wiring, due attention should be paid to effect of noise.

Connection diagram
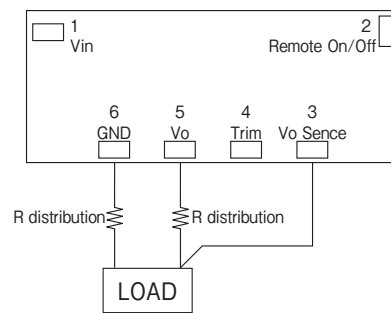
1-4. Remote On/Off

Output On/Off can be controlled by setting a switch (open collector system) between Remote On/Off terminal (2 pins) and GND.

On/Off terminal in low level: Output Off

On/Off terminal open: Output On

Low level

On/Off terminal voltage: Von/off < 0.5V

On/Off terminal source current: Ion/off-max. = 200 μA

Open

On/Off terminal maximum voltage: Von/off-max. = 5.5V (M type), 14V (W type)

Allowable leakage current: Ion/off-max. = 10 μA

1-5. Over voltage protection

This product is not equipped with a function for over voltage protection.

1-6. Over current protection

This product is equipped with an over current protection circuit, and if a current over the nominal current flows, the output voltage is lowered. By removing the over current of the load or shorted conditions, the output voltage automatically resumes.

Note that the load current value, in which the over current protection is activated, varies depending on the ambient temperature, input voltage, and set output voltage, etc.
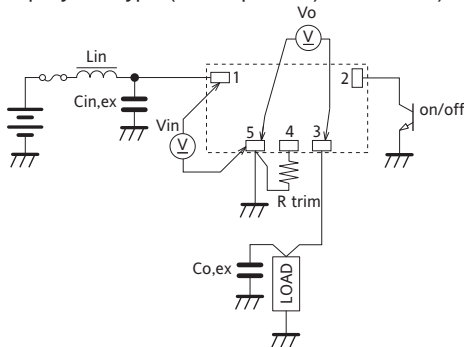
1-7. Over temperature protection

This product is equipped with an over temperature protection circuit.

2. PMH-AD07RPVWD

2-1. Connection diagram

Recommended circuit connection diagram
(conductive polymer type (OS capacitor) to be used)

Lin: $1.0 \mu H$
Cin. ex: $1000 \mu F$ (aluminum electrolysis capacitor) + $2 \times 100 \mu F$ (tantalum capacitor)
Co. ex: $10 \mu F$ (OS capacitor) + $1 \mu F$ (ceramic capacitor)

2-2. Output voltage setting

Output voltage can be programmed within the output voltage adjustable range by connecting a resistance or applying voltage between Trim terminal and GND terminal. When nothing is connected externally, the output voltage is 0.75V.
Use the expressions below to calculate the value of resistance and the voltage to be applied.

Setting by external resistance

Expression

$$R\ trim = \frac{10500}{Vout - 0.7525} - 1000\ (\Omega)$$

Setting by voltage application
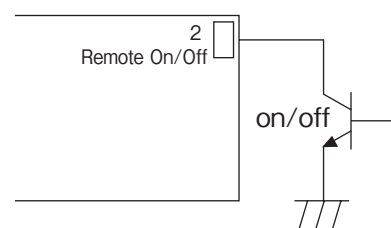
Expression
$V\ trim = 0.7 - 0.0667 \times (Vout - 0.7525)\ (V)$

2-3. Remote On/Off

Output On/Off can be controlled by setting a switch (open collector system) between Remote On/Off terminal (2 pins) and GND.

Connection diagram

On/Off terminal in low level: Output Off
On/Off terminal open: Output On
Low level
    On/Off terminal voltage: Von/off < 0.5V
    On/Off terminal source current: Ion/off-max. = $200 \mu A$
Open
    On/Off terminal maximum voltage: Von/off-max = 14V
    Allowable leakage current: Ion/off-max. = $10 \mu A$

2-4. Over voltage protection

This product is not equipped with a function for over voltage protection.

2-5. Over current protection

This product is equipped with an over current protection circuit, and if a current over the nominal current flows, the output voltage is lowered. By removing the over current of the load or shorted conditions, the output voltage automatically resumes.

Note that the load current value, in which the over current protection is activated, varies depending on the ambient temperature, input voltage, and set output voltage, etc.

2-6. Over temperature protection

This product is not equipped with a function for over temperature protection.

3. Notes on mounting and handling

● The connection diagrams in these handling instructions represent the standard connection methods for this product. Consult us for use with other connection methods.

● To reduce ripple & noise voltage, connect a capacitor with 100μ F or less.

● Series connection or parallel connection is not applicable for this product.

● Input fuse is not installed in this product.

● Do not use this product in an overload condition. Doing so can cause failure.

● Cleaning is not applicable for this product. Use low-residue or non-cleaning flux.

● Notes on storage

▶ Keep this product indoors with little temperature/humidity change and away from direct sunlight. Note that if this product is kept in a hot and humid condition or in a condition with drastic temperature changes, it can cause condensation, performance deterioration, or solderability deterioration.

▶ This product uses multilevel boards. Observe the handling instructions described below. Otherwise, problems including pattern disconnection in reflow may occur (JEDEC MSL level 3).

Baking process should be applied when 696 hours or over (in 30°C, 60% R.H.) has passed after unpacking and the indicator value is 30% or over.

Recommended baking conditions: 125 °C, for 24 hours, 1 time only

＊ Tray is not heat-resistant. Baking should be processed after taking out products from the tray.

Recommended reflow soldering conditions
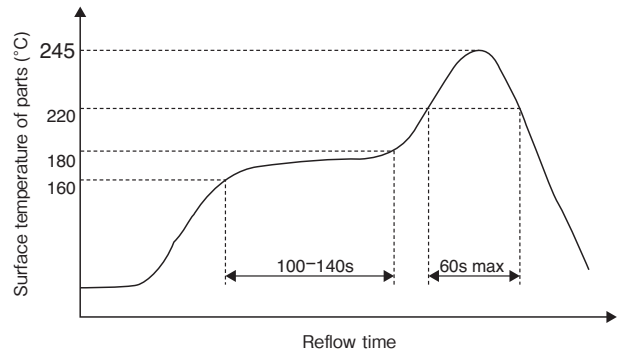
Preheating temperature: 160°C-180°C, for 120±20s
Soldering temperature: 245°C or lower
Solder melting temperature: 220°C or upper, within 60s/245°C, within 10s
Reflow frequency: 1 time only

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