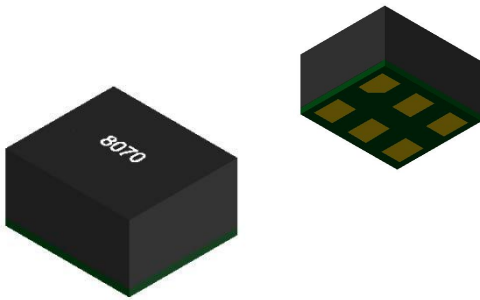


## 2A , 18V DC/DC Integrated Plastic-Encapsulated Adjustable Buck Converter Module



### 1 Features

- **2A Output Current**
- **Wide input voltage range : 4.5V-18V (20V maximum)**
- **Output voltage : 0.6V-15V**  
(adjustable or fixed output versions)
- **Switching frequency : 750kHz**
- **Efficiency of up to 93%**
- **Ripple of 20mV or less**
- **Soft start**
- **Good heat dissipation performance**
- **Small size, thin thickness, surface mount packaging method:**

LGA (8.00mm×7.00mm × 4.32(2.50mm))

(The standard height of the product is 4.32mm, and it can reach a minimum of 2.50mm)

### 2 Applications

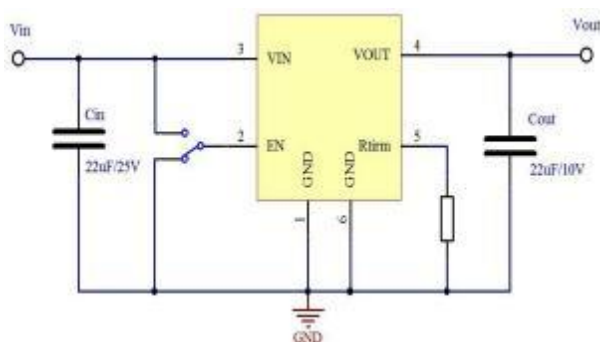
- **Solid state drive**
- **Distributed power converter**
- **Industrial equipment power supply**
- **Transformer power supply**

### 3 Description

The MPPM8070 is an integrated 2A, DC/DC buck converter module. The MPPM8070 features an extremely wide input and output voltage range, with an input voltage range of 4.5V to 18V and an output voltage range of 0.6V to 15V. It boasts an efficiency of up to 93%, ripple control within 20mV, and a switching frequency of 750kHz. The MPPM8070 integrates IC chips, inductors, resistors, capacitors, and other components, allowing for plug-and-play functionality. The peripheral setup merely requires a small amount of input and output filter capacitors, as well as voltage regulation resistors (note that the fixed output version does not require external voltage regulation resistors). This ensures high reliability and significantly reduces the new product development cycle for our customers. The MPPM8070 is enclosed in a heat-dissipating, compact molded package with a small footprint. The module adopts an LGA package, measuring 8.00mm × 7.00mm × 4.32mm (2.50mm in height), making it ideal for SMT automatic assembly.

## Typical Applications

**2A DC/DC Buck Converter Module**

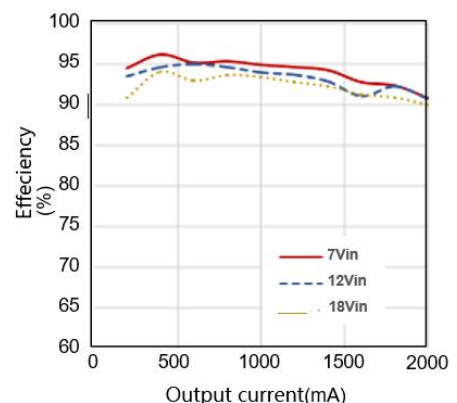


Note:

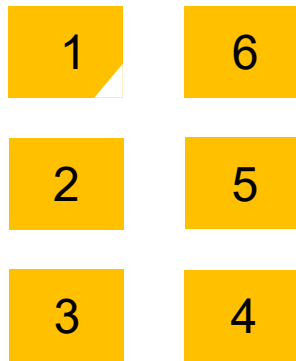
- ① For the adjustable output voltage version, connect the Rtrim pin to a voltage-regulating resistor with an accuracy of 1% or better, grounding (GND) the other end.
- ② For the fixed output voltage version, this pin should be left unconnected (floating).

**Efficiency@Vout=5V**

**Vout=5V Efficiency vs Output current**



## Pin Configuration



Top View

Pin number	Pin Name	Function Description
1、 6	GND	Grounds
2	EN	Enable
3	Vin	Input Voltage Pin
4	Vout	Output voltage pin
5	TRIM	<p>① For the adjustable output voltage model, the voltage adjustment pin should be connected to a voltage-regulating resistor with an accuracy of 1% or better, with the other end grounded (GND).</p> <p>② For the fixed output voltage model, this pin remains unconnected (floating).</p>

## Ordering information

PRODUCT MODEL	Input		Output	Encapsulation	Packag e
	Input range	Nominal input			
MPPM80700V6	4.5V~18V	5	0.6V	8mm×7mm×4.32mm	Tray
MPPM80700V8	4.5V~18V	5	0.8V	8mm×7mm×4.32mm	Tray
MPPM80701V0	4.5V~18V	5	1.0V	8mm×7mm×4.32mm	Tray
MPPM80701V2	4.5V~18V	5	1.2V	8mm×7mm×4.32mm	Tray
MPPM80701V6	4.5V~18V	5	1.6V	8mm×7mm×4.32mm	Tray
MPPM80701V8	4.5V~18V	5	1.8V	8mm×7mm×4.32mm	Tray
MPPM80702V5	4.5V~18V	5	2.5V	8mm×7mm×4.32mm	Tray
MPPM80703V3	5V~18V	5	3.3V	8mm×7mm×4.32mm	Tray
MPPM80705V0	7V~18V	12	5.0V	8mm×7mm×4.32mm	Tray
MPPM80706V0	9V~18V	12	6.0V	8mm×7mm×4.32mm	Tray
MPPM8070A	ADJ#	ADJ#	ADJ#(0.6V~Vin-3V)	8mm×7mm×4.32mm	Tray

## Electrical Characteristics

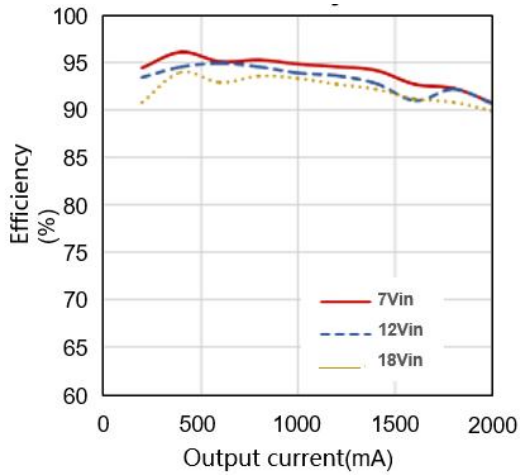
Absolute Maximum Ratings	Condition	Minimum	Nominal value	Maximum	Unit
Input voltage pin		-0.3	12	20	V
Output voltage pin		0.6		17	V
Output current	Vout=5V	10		2000	mA
FB,RT		-0.3		6	V
Storage temperature		-40		125	°C
Reflow soldering temperature				245	°C
Input characteristic	Condition	Minimum	Nominal value	Maximum	Unit
Input Voltage		4.5	12	18	V
Startup voltage threshold	Vin rising		1.6		V
Shutdown voltage threshold			0.6		V
General requirements	Condition	Minimum	Nominal value	Maximum	Unit
Switching frequency			750		kHz
Efficiency				95	%
Output characteristic	Condition	Minimum	Nominal value	Maximum	Unit
Line regulation	Vout=5V		1		%
Ripple & Noise	Iout=2000mA		20		mV
Dynamic load response	50-100% ILOAD , di/dt=2.5A/μS		60		mV
Output overcurrent protection			2.7		A
Over temperature protection			135		°C
Structural characteristics	Condition	Minimum	Nominal value	Maximum	Unit
Size	8.00*7.00*4.32 8.00*7.00*2.50				mm
Weight		0.355	0.365	0.375	g
Environmental adaptability	Condition	Minimum	Nominal value	Maximum	Unit
Working temperature (ambient temperature)		-40		125	°C
High temperature storage (ambient temperature)	+125°C , 48h			125	°C
High temperature work (ambient temperature)	+85°C , 24h; Input low-voltage, standard-voltage, and high-voltage for 8 hours each.; VIN =60V , VOUT =12V , IOUT=2.4A			85	°C

## Electrical Characteristics

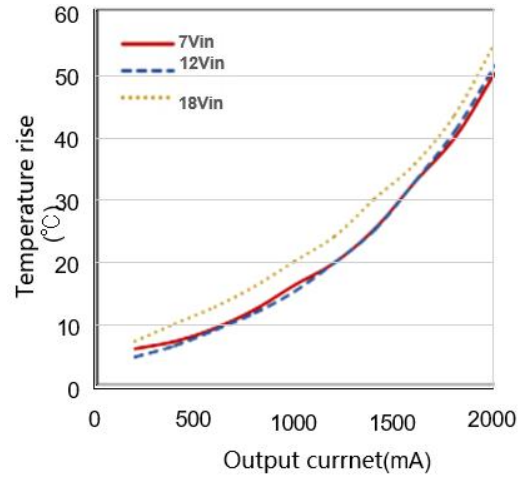
Environmental adaptability	Condition	Minimum	Nominal value	Maximum	Unit
Low temperature storage (ambient temperature)	-55°C , 24h	-55			°C
Low temperature operation (ambient temperature)	-40°C , 24h; Input low-voltage, standard-voltage, and high-voltage for 8 hours each. ;	-40			°C
Damp heat	High temperature and high humidity stage: 60 °C, 95%; Low temperature and high humidity stage: 30 °C, 95%; Cycle 10 times, each cycle lasting 24 hours	30		60	°C
Thermal shock	At a high temperature of 125°C and a low temperature of -55°C, one hour at each temperature constitutes one cycle, with a total of 32 cycles being tested.	-55		125	°C

## Performance Curve

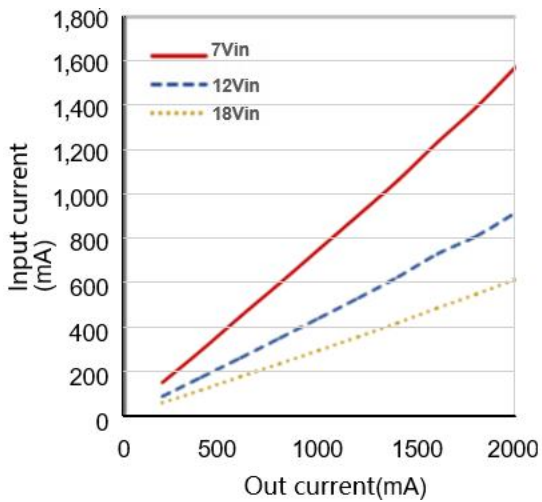
Vout=5V Efficiency vs Output current



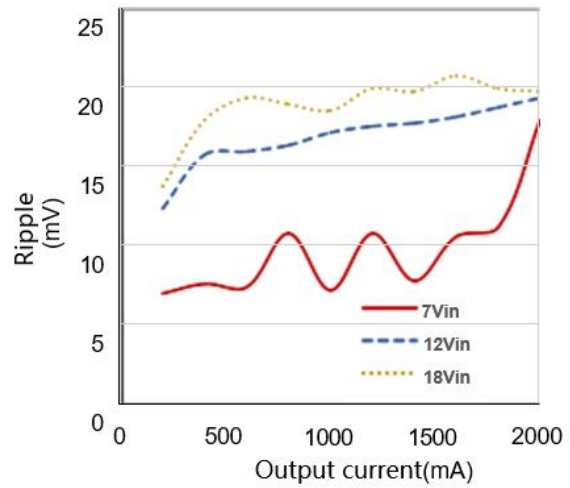
Vout=5V Temperature rise vs Output current



Vout=5V Input current vs Output current



Vout=5V Ripple vs Output current



## Operation

The MPPM8070 is a standalone, non-isolated buck switching DC/DC power supply with an input range of 4.5V to 18V, capable of delivering an output current of up to 2A. This power module offers ultra-high conversion efficiency and allows for precise adjustment of the output voltage from 0.6V to 15V. Given that the MPPM8070 is a buck converter, please ensure that the input voltage is sufficiently high to support the desired output voltage and load current.

## Selection of input capacitor

The recommended input capacitor is a ceramic capacitor with specifications of 22μF, 25V, 0805 footprint, and X5R grade or better. Ceramic capacitors are known for their small size, high reliability, and extremely low ESR. X5R and X7R types of ceramic capacitors maintain stable performance across a wide range of temperatures and voltages, effectively minimizing the ripple in the input voltage.

## Selection of output capacitor

The choice of the output capacitor should be based on the output voltage:

1. When the output voltage is less than 5V, a ceramic capacitor with specifications of 47μF, 6.3V, 0805 footprint, and X5R grade or higher is recommended.
2. For an output voltage ranging from 5V to 10V, a ceramic capacitor featuring 22μF, 25V, 0805 footprint, and X5R grade or higher is advisable.
3. When the output voltage exceeds 10V, it is suggested to opt for a ceramic capacitor with specifications of 10μF, 25V, 0805 footprint, and X5R grade or higher.

## Selection of output capacitor and adjustment of output voltage (only applicable to adjustable versions)

The output voltage is determined by the voltage divider resistor of the FB pin, and the calculation formula is as follows:

$$R_{FB} = \frac{0.6V * 100 \text{【kohm】}}{V_{out} - 0.6V}$$

The resistance of R<sub>FB</sub> is adjusted based on customer requirements, where R<sub>FB</sub> is measured in kΩ. The table below lists the recommended values for the voltage-dividing resistors at various output voltages.:

Vout (V)	RFB(kΩ)
0.6	NC
0.8	300
1.0	150
1.2	100
1.6	60
1.8	50
2.5	31.58
3.3	22.22
5.0	13.64
6.0	11.11
...	For the selection of resistors for other voltages, please consult our company

## PFM mode

Under light load conditions, the MPPM8070 operates in PFM mode. To improve efficiency during these conditions, the switching frequency decreases as the load current diminishes, thereby minimizing switching losses. When the load intensifies, the switching frequency increases, leading to a reduction in ripple.

## Overcurrent Protection

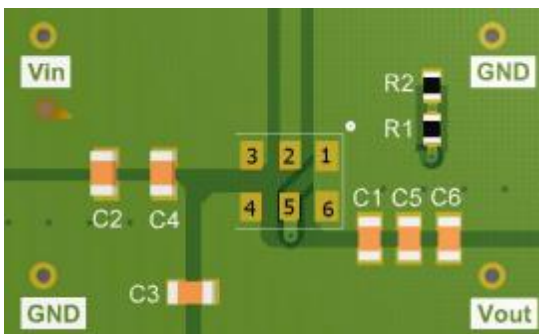
When the output current exceeds 2.7A, the module triggers hiccup overcurrent protection.

## Input undervoltage protection

When the input voltage falls below a preset value, the EN voltage triggers the input undervoltage lockout (UVLO) at 1.6V.

## PCB Layout

Due to the high integration of the components required for power conversion in the MPPM8070, it alleviates and eliminates most of the challenging issues associated with PCB layout. However, minimizing electromagnetic interference remains crucial to ensure its proper operation. Despite the module's high integration, during use, it is still imperative to ensure adequate grounding and thermal dissipation, and to avoid overly casual layout arrangements. The recommended layout diagram is provided below.



Layout (Top View)

1. Position the  $R_{FB}$  resistor as close as possible to its respective pin.
2. Place the  $C_{in}$  capacitor as close as practical to the  $V_{in}$  and GND connections on the MPPM8070.
3. Position the  $C_{out}$  capacitor as close as possible to the  $V_{out}$  and GND connections on the MPPM8070.
4. When placing the  $C_{in}$  and  $C_{out}$  capacitors, ensure that their grounding currents flow directly adjacent to or underneath the MPPM8070.

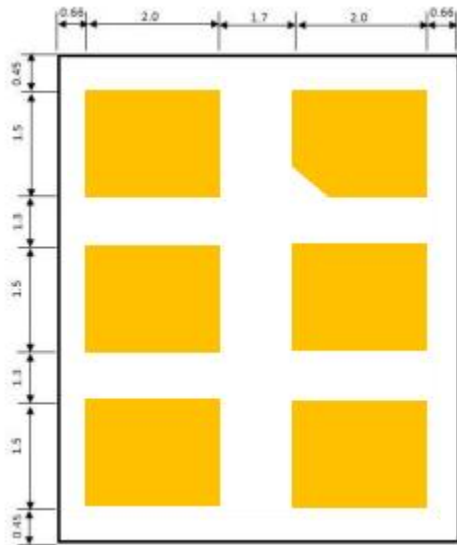
5. Connect all GND points to the largest possible copper pour area on the top layer, avoiding any disruption in the grounding path between external components and the MPPM8070.

6. To achieve effective thermal dissipation, use vias to connect the GND copper pour area to the internal grounding plane of the circuit board, providing both a robust grounding connection and a thermal dissipation pathway to the internal plane. Since the vias are located close to the internal power handling components, the MPPM8070 can efficiently dissipate heat through these vias connected to the internal GND plane of the PCB.

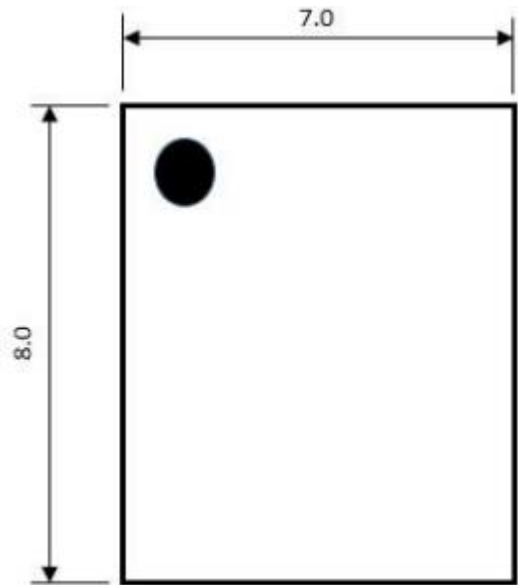
The optimal number of thermal vias will depend on the PCB design specifics. For example, if the board incorporates very small vias, a greater number of thermal vias may be necessary to ensure adequate heat dissipation.

### Package Description

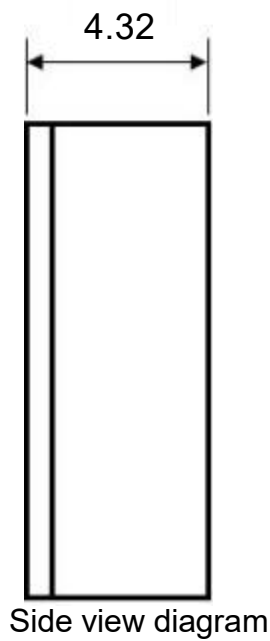
LGA packaging  
6 feet  
(8.00mm × 7.00mm × 2.50mm)



Bottom view diagram



Top view diagram



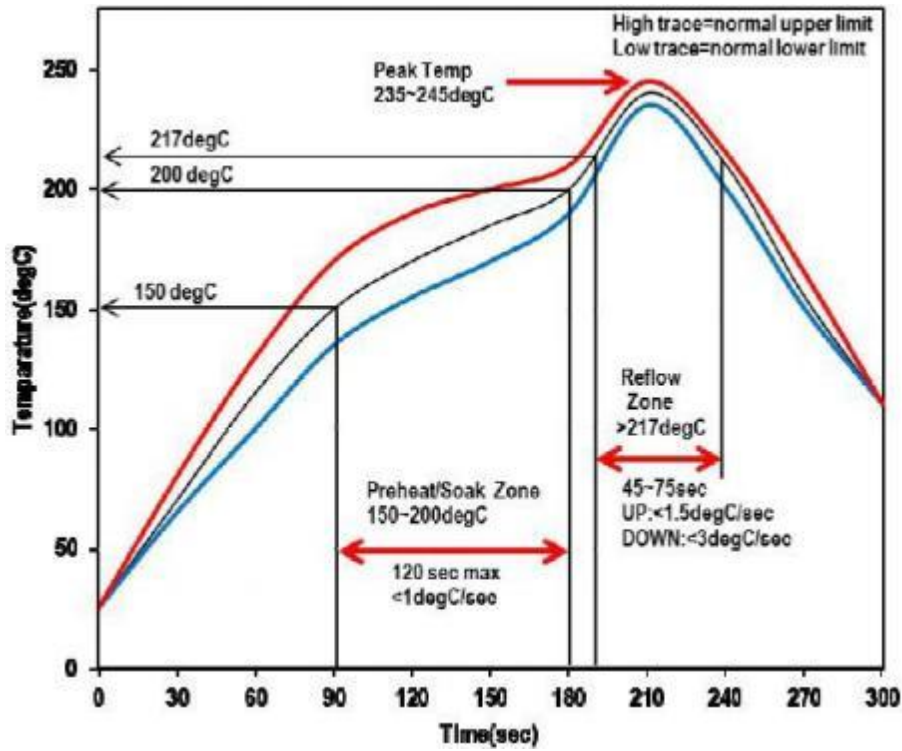
Side view diagram

Unit: mm  
Accuracy: ±0.15mm



### Soldering and Storage Precautions

Recommended reflow soldering curve



Note: Due to the module being larger than other SMT components, please do not place the module on the bottom side of the board during reflow soldering to prevent it from falling off.

