

# Non Isolated Board Mount DC / DC Converters

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**RoHS  
Compliant**



## Features

- High efficiency up to 96%
- No-load input current as low as 0.1mA
- Operating ambient temperature range: -40°C to +85°C
- Support the negative output
- Output short-circuit protection

## Selection Guide

Part Number	Certification	Input Voltage (V DC)*	Output		Full Load Efficiency(%) Vin Min. / Vin Max.	Capacitive Load (µF) Max.
		Nominal (Range)	Voltage (V DC)	Current (mA) Max.		
MP-K7805-1000R3L	UL/EN/BS EN/IEC	24 (8-36)	5	1000	93/86	680
		12 (8-27)	-5	-500	86/82	330
MP-K7809-1000R3L		24 (13-36)	9	1000	95/90	680
MP-K7812-1000R3L		24 (16-36)	12	1000	96/93	680
		12 (8-20)	-12	-300	89/88	330
MP-K7815-1000R3L		24 (20-36)	15	1000	96/94	680
		12 (8-18)	-15	-300	89/89	330

Note: For input voltages exceeding 30V DC, an input capacitor of 22µF/50V is required.

L-suffix: Add L-suffix for horizontal mount with 90 degree angled pins

## Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
No-load Input Current	Positive output	-	0.3	1	mA
Reverse Polarity at Input		Forbidden			
Input Filter		Capacitance filter			

## Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Voltage Accuracy	Full load, Input Voltage Range	-	±2	±3	%
Linear Regulation	Full load, input voltage range	-	±0.2	±0.4	
Load Regulation	Nominal input voltage, 10% -100% load	-	±0.4	±0.6	
Ripple & Noise*	20MHz bandwidth, nominal input, 20% -100% load	-	20	75	mVp-p

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Item	Operating Conditions	Min.	Typ.	Max.	Unit
Temperature Coefficient	Operating ambient temperature -40°C to +85°C	-	-	±0.03	%/°C
Transient Response Deviation	Nominal input voltage, 25% load step change	-	50	300	mV
Transient Recovery Time		-	0.1	1	ms
Short-circuit Protection	Nominal input voltage	Continuous, self-recovery			

Notes:

- \*1. The “parallel cable” method is used for ripple and noise test, please refer to DC-DC Converter Application Notes for specific information;
2. With light loads at or below 20%, the maximum Ripple and Noise for 3.3/5V output parts increase to 100mVp-p and for 9/12/15V output parts increase to 2%Vo Max.

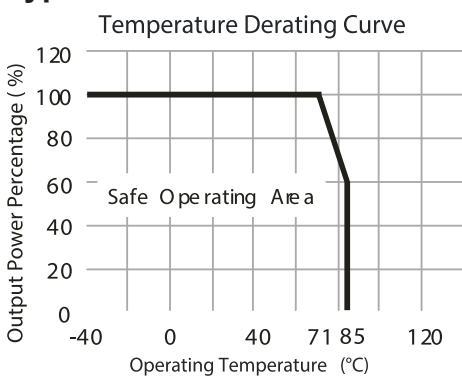
## General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Operating Temperature*	Derating if the temperature $\geq 71^\circ\text{C}$	-40	-	85	°C	
Storage Temperature	-	-55	-	125		
Pin Soldering Resistance Temperature	Soldering time: 10 seconds	-	-	260		
Storage Humidity	Non-condensing	5	-	95	%RH	
Switching Frequency	100% load, input voltage range	MP-K7805-1000R3L	420	520	620	kHz
		Other output	580	680	780	
MTBF	MIL-HDBK-217F @ 25°C	2000	-	-	k hours	

## Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)
Dimensions	19mm × 11.5mm × 9mm
Weight	3.8g (Typ.)
Cooling Method	Free Air Convection

## Typical Characteristic Curves



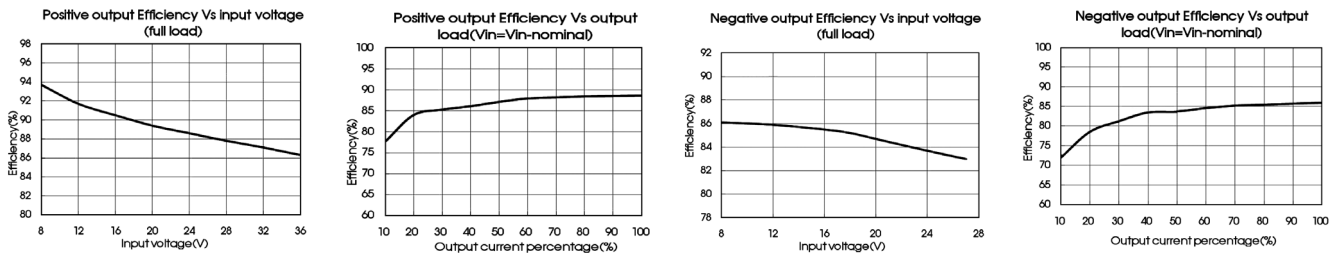
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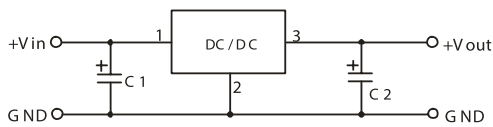
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## Typical Characteristic Curves

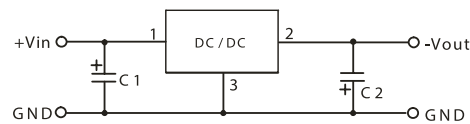


## Design Reference

### Typical application

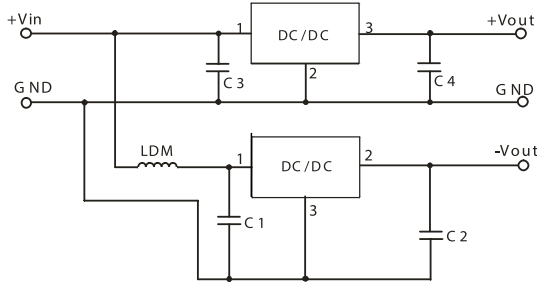


Positive output application circuit



Negative output application circuit

### Typical application circuit



Positive and Negative output application circuit

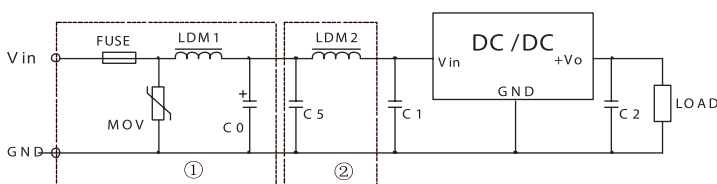
Table 1

Part Number	C1/C3 (Ceramic Capacitor)	C2/C4 (Ceramic Capacitor)
MP-K7805-1000R3L	10μF/50V	22μF/10V
MP-K7809-1000R3L		22μF/16V
MP-K7812-1000R3L		22μF/25V
MP-K7815-1000R3L		22μF/25V

### Notes:

1. The required capacitors C1 and C2 (C3 and C4) must be connected close as possible to the terminals of the module.
2. Refer to Table 1 for C1 and C2 (C3 and C4) capacitor values.
3. For certain applications, increased values for C2 and C4 and/or tantalum or low ESR electrolytic capacitors may also be used instead.
4. When using configurations as shown, we recommended to add an inductor (LDM) with a value of up to 10μH which helps reducing mutual interference.
5. Converter cannot be used for hot swap and with output in parallel.

## EMC compliance circuit



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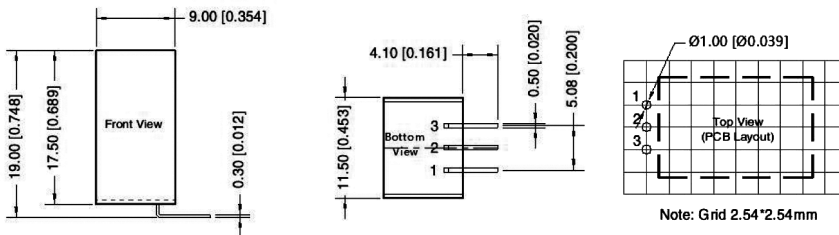
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FUSE	MOV	LDM1	C0	C1/C2	C5	LDM2
Select fuse value according to actual input current	S20K30	82 $\mu$ H	680 $\mu$ F/50V	Refer to table 1	4.7 $\mu$ F / 50V	12 $\mu$ H

## Diagram



Pin-Out		
Pin	Positive Output	Negative Output
1	V <sub>in</sub>	V <sub>in</sub>
2	GND	-V <sub>o</sub>
3	+V <sub>o</sub>	GND

Dimensions : Millimetres (Inches)  
 Pin Diameter Tolerances:  $\pm 0.1$ mm ( $\pm 0.004$ "")  
 General Tolerances:  $\pm 0.5$ mm ( $\pm 0.02$ "")

## Part Number Table

Description	Part Number
Non Isolated Board Mount, DC / DC Converters, 5V, 1A	MP-K7805-1000R3L
Non Isolated Board Mount, DC / DC Converters, 9V, 1A	MP-K7809-1000R3L
Non Isolated Board Mount, DC / DC Converters, 12V, 1A	MP-K7812-1000R3L
Non Isolated Board Mount, DC / DC Converters, 15V, 1A	MP-K7815-1000R3L

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