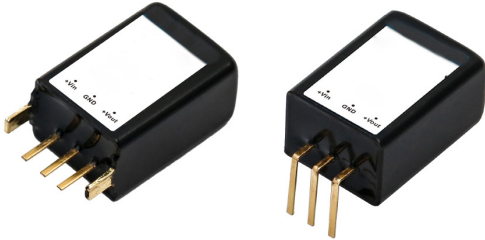


# Non Isolated Board Mount DC / DC Converters

**multicomp** PRO

**RoHS  
Compliant**



## Features

- Input voltage range up to 8:1
- High efficiency up to 92%
- No-load input current as low as 0.5mA
- Operating ambient temperature range: -40°C to +85°C
- Output short-circuit protection
- Meet MIL-STD-810F vibration test

## Selection Guide

Part Number	Input Voltage (V DC)*	Output		Full Load Efficiency (%) MIN./Typ.		Capacitive Load (µF) Max.
	Nominal (Range)	Voltage (V DC)	Current (mA) Max.	Vin=24V	Vin=48V	
MP-K78U03-1000R3	48 (9-75)	3.3	1000	76/80	72/76	2400
MP-K78U03-1000R3L						
MP-K78U05-1000R3	48 (9-75)	5		80/84	78.5/82.5	1580
MP-K78U05-1000R3L						
MP-K78U09-1000R3	48 (14-75)	9		84/88	83.5/87.5	880
MP-K78U09-1000R3L						
MP-K78U12-1000R3	48 (17-75)	12		86.5/90.5	86.5/90.5	660
MP-K78U12-1000R3L						
MP-K78U15-1000R3	48 (21-75)	15	87/91	86/90	530	
MP-K78U15-1000R3L						

Note: \*For input voltage exceeding 60 VDC, an input capacitor of 100µF/100V is required.

## Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
No-load Input Current	Nominal input voltage	-	0.5	1.5	mA
Reverse Polarity at Input	-	Avoid / Not protected			
Input Filter	-	Capacitance filter			

## Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Voltage Accuracy	10%-100%, input voltage range	-	±1.5	±2.5	%
Linear Regulation	Full load, input voltage range	3.3V DC & 5V DC	±0.6	±1.5	
		9V DC, 12V DC & 15V DC	±0.6	±2	
Load Regulation	Nominal input voltage, 10% -100% load	-	±0.6	±1	
Ripple & Noise*	20MHz bandwidth, nominal input voltage, 10% -100% load	-	75	-	mVp-p
Temperature Coefficient	Operating temperature -40°C to +105°C	-	-	±0.02	%/°C

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Item	Operating Conditions	Min.	Typ.	Max.	Unit
Transient Response Deviation	Nominal input voltage, 25% load step change	-	±100	±180	mV
Transient Recovery Time		-	150	250	µs
Short-circuit Protection	Input voltage range	Ambient temperature ≤ 85°C		Continuous, self-recovery	
		Ambient temperature > 85°C		Short ≤ 3s	

Notes:

\*The “parallel cable” method is used for ripple and noise test, refer to DC-DC Converter Application Notes for specific information.

## General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Operating Temperature	-	-40	-	+105	°C	
Storage Temperature	Product	-55	-	+125		
	Tag	-40		+300		
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	-	-	+300		
Storage Humidity	Non-condensing	5	-	95	%RH	
Vibration*	Bottom-filled silicone rubber	MIL-STD-810F				
Switching Frequency	Full load, nominal input voltage	3.3V DC & 5V DC	-	200	-	kHz
		9V DC	-	250	-	
		12V DC	-	350	-	
		15V DC	-	400	-	
MTBF	MIL-HDBK-217F@25°C	8215	-	-	k hours	

Note: \* Meeting the vibration standard requires filling the bottom void of the product with silicone rubber.

## Mechanical Specifications

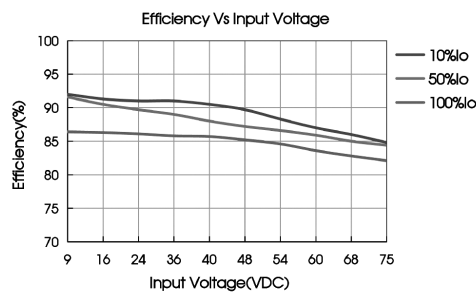
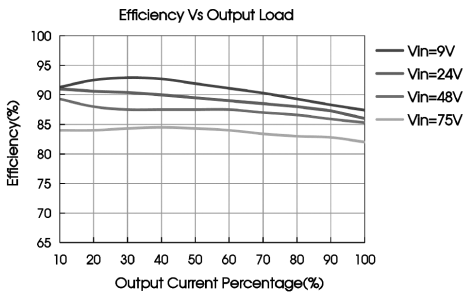
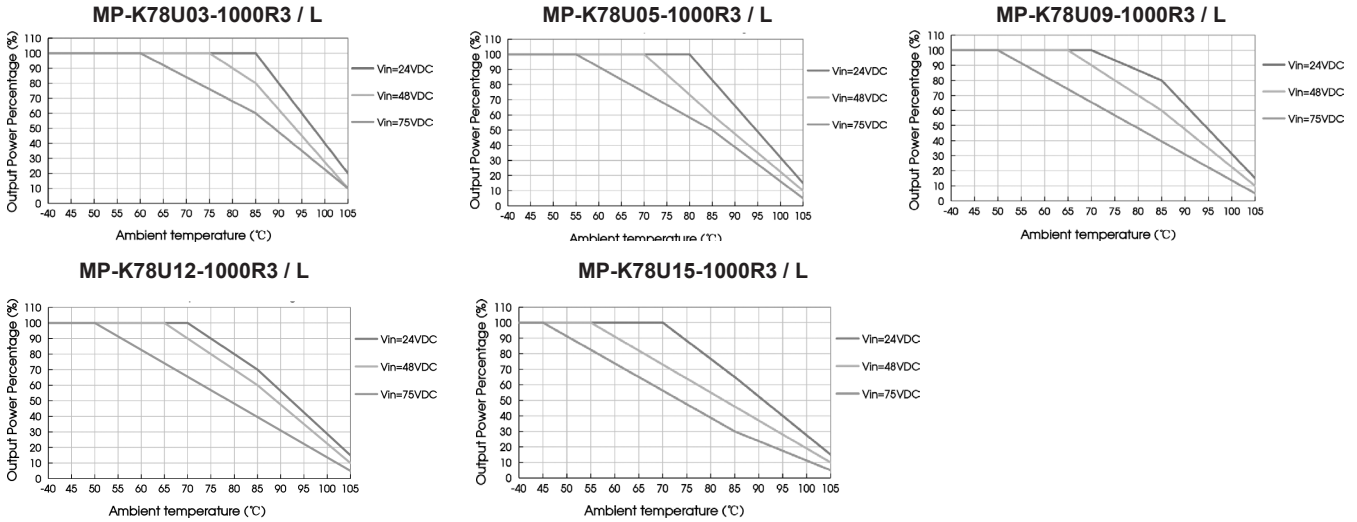
Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)	
Dimensions	MP-K78UXX-1000R3	12.1mm × 8.6mm × 17.5mm
	MP-K78UXX-1000R3L	20.35mm × 12.1mm × 8.6mm
Weight	MP-K78UXX-1000R3	6.2g (Typ.)
	MP-K78UXX-1000R3L	6.6g (Typ.)
Cooling Method	Free Air Convection	

# Non Isolated Board Mount DC / DC Converters

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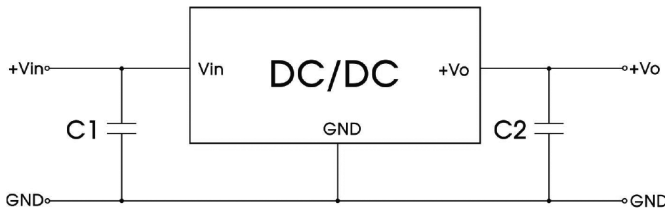
## Typical Characteristic Curves

### Temperature Derating Curves



## Design Reference

### Typical application



Part Number	C1 (Ceramic Capacitor)	C2 (Ceramic Capacitor)
MP-K78U03-1000R3	10µF/100V	22µF/10V
MP-K78U03-1000R3L		
MP-K78U05-1000R3		
MP-K78U05-1000R3L		
MP-K78U09-1000R3	10µF/100V	22µF/25V
MP-K78U09-1000R3L		
MP-K78U12-1000R3		
MP-K78U12-1000R3L		
MP-K78U15-1000R3	10µF/100V	22µF/25V
MP-K78U15-1000R3L		

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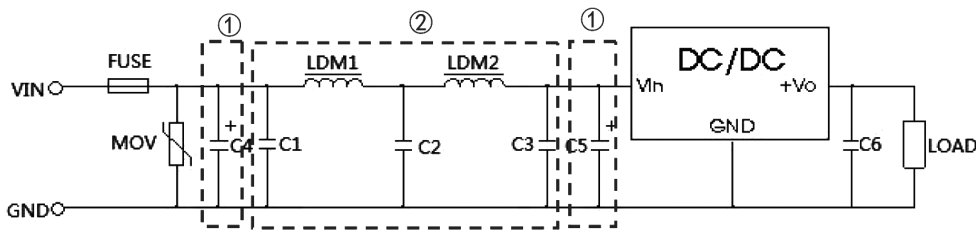
# Non Isolated Board Mount DC / DC Converters

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**Notes:**

1. The required C1 and C2 capacitors must be connected as close as possible to the terminals of the module;
2. Refer to Table 1 for C1 and C2 capacitor values. For certain applications, increased values and/or tantalum or low ESR electrolytic capacitors may also be used instead;
3. Converter cannot be used for hot swap and with output in parallel.

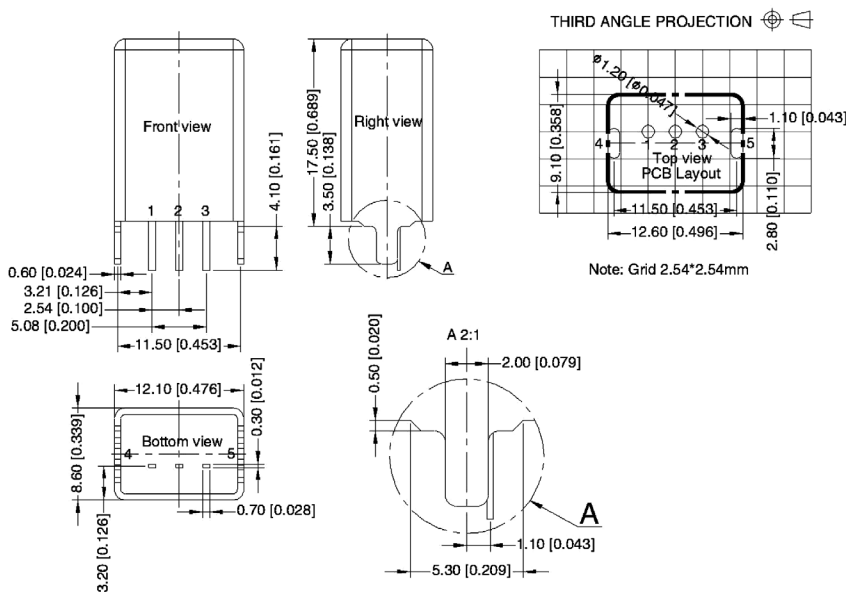
**EMC compliance circuit**



Series	C4/C5	C1/C2/C3	C6	LDM1	LDM2
MP-K78UXX-1000R3 (L)	680µF/100V	4.7µF/100V	10µF/50V	10µH	22µH

**Diagram**

MP-K78UXX-1000R3



Pin-Out	
Pin	Mark
1	+Vin
2	GND
3	+Vout
4	Case Pin
5	Case Pin

**Note:**

PIN4 and PIN5 are shell terminals for heat dissipation. When using the product, connect the terminals to the rear PCB board, and the PCB must be suspended.

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

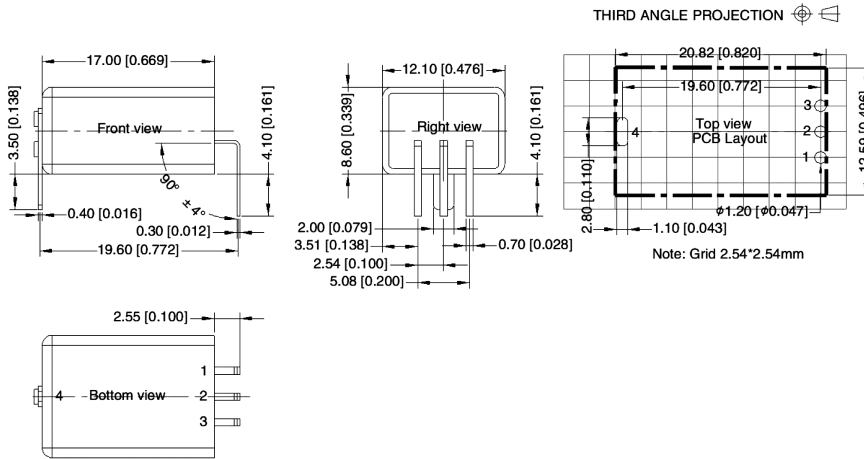
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# Non Isolated Board Mount DC / DC Converters



## MP-K78UXX-1000R3L



Pin-Out	
Pin	Mark
1	+Vin
2	GND
3	+Vout
4	Case Pin

Note: PIN4 is the shell terminal, which dissipates heat. When using the product, connect the terminal to the rear PCB board. The PCB must be suspended in the air.

### PCB Heat Dissipation Copper Foil Recommended

Series	Heat dissipation copper foil layer	Heat dissipation copper foil area
MP-K78UXX-1000R3	double	15mm×15mm
MP-K78UXX-1000R3L	single	20mm×20mm

### Part Number Table

Description	Part Number
Non Isolated Board Mount, DC / DC Converters, 3.3V, 1A	MP-K78U03-1000R3
Non Isolated Board Mount, DC / DC Converters, 3.3V, 1A	MP-K78U03-1000R3L
Non Isolated Board Mount, DC / DC Converters, 5V, 1A	MP-K78U05-1000R3
Non Isolated Board Mount, DC / DC Converters, 5V, 1A	MP-K78U05-1000R3L
Non Isolated Board Mount, DC / DC Converters, 9V, 1A	MP-K78U09-1000R3
Non Isolated Board Mount, DC / DC Converters, 9V, 1A	MP-K78U09-1000R3L
Non Isolated Board Mount, DC / DC Converters, 12V, 1A	MP-K78U12-1000R3
Non Isolated Board Mount, DC / DC Converters, 12V, 1A	MP-K78U12-1000R3L
Non Isolated Board Mount, DC / DC Converters, 15V, 1A	MP-K78U15-1000R3
Non Isolated Board Mount, DC / DC Converters, 15V, 1A	MP-K78U15-1000R3L

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