

# 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 (%) Typ. Vin Min./Vin Max.	Capacitive Load (µF) Max.
	Nominal (Range)	Voltage (V DC)	Current (mA) Max.		
MP-K78U03-500R3	48 (9-90)	3.3	500	82/69	100
MP-K78U03-500R3L					
MP-K78U05-500R3	48 (9-90)	5	500	87/75	
MP-K78U05-500R3L					
MP-K78U09-500R3	48 (14-90)	9	500	91/80	
MP-K78U09-500R3L					
MP-K78U12-500R3	48 (18-90)	12	500	91/83	
MP-K78U12-500R3L					
MP-K78U15-500R3	48 (20-90)	15	500	93/84	
MP-K78U15-500R3L					
MP-K78U24-300R3	48 (36-90)	24	300	93/85	
MP-K78U24-300R3L					

Note: \*For input voltage exceeding 80V DC, an input capacitor of 22µF/100V is required.

## Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
No-load Input Current	Nominal input voltage	-	-	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	3.3V output	-	±3.5	±4.5	%
		Others		±2	±3	
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	
		24V DC		±1.2	±2.5	

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Item	Operating Conditions	Min.	Typ.	Max.	Unit
Load Regulation	Nominal input voltage, 10% -100% load	-	±1	±2	%
Ripple & Noise*	20MHz bandwidth, nominal input voltage, 10% -100% load	-	40	80	mVp-p
Temperature Coefficient	Operating temperature -40°C to +85°C	-	-	±0.03	%/°C
Transient Response Deviation	Nominal input voltage, 25% load step change	-	±0.4	±1.5	%
Transient Recovery Time		-	0.2	1	ms
Short-circuit Protection	Nominal input voltage	Continuous, self-recovery			

Notes:

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

## General Specifications

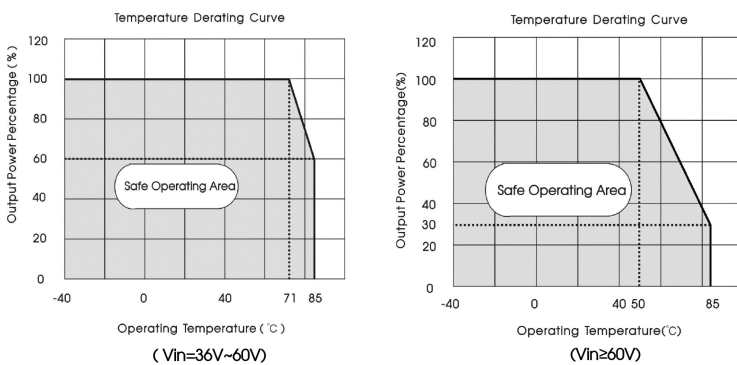
Item	Operating Conditions	Min.	Typ.	Max.	Unit
Operating Temperature	-	-40	-	+85	°C
Storage Temperature	-	-55	-	+125	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	-	-	+300	
Storage Humidity	Non-condensing	5	-	95	%RH
Switching Frequency*	Full load, nominal input voltage	-	300	-	kHz
MTBF	MIL-HDBK-217F@25°C	2000	-	-	k hours

Note: \* Different output voltage with different switching frequency.

## Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)	
Dimensions	MP-K78UXX-500R3	11.5mm × 9mm × 17.5mm
	MP-K78U03-500R3L	19mm × 11.5mm × 9mm
Weight	3.8g(typ.)	
Cooling Method	Free Air Convection	

## Typical Characteristic Curves

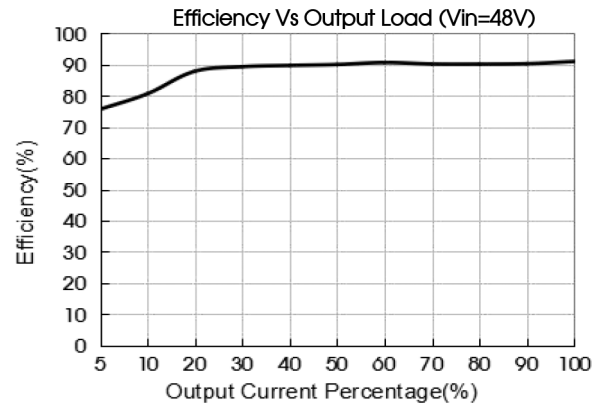
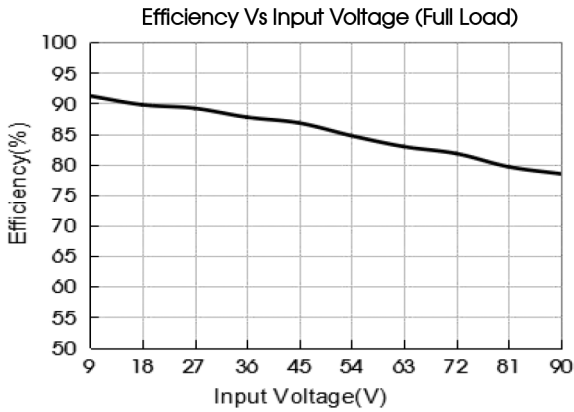


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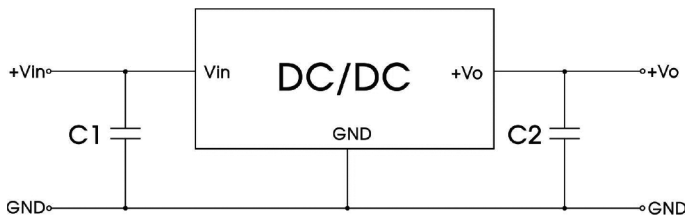
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## Design Reference

### Typical application



Part Number	C1 (Ceramic Capacitor)	C2 (Ceramic Capacitor)
MP-K78U03-500R3	10µF/100V	22µF/10V
MP-K78U03-500R3L		
MP-K78U05-500R3		
MP-K78U05-500R3L		22µF/16V
MP-K78U09-500R3		
MP-K78U09-500R3L		22µF/25V
MP-K78U12-500R3		
MP-K78U12-500R3L		
MP-K78U15-500R3		10µF/50V
MP-K78U15-500R3L		
MP-K78U24-300R3		
MP-K78U24-300R3L		

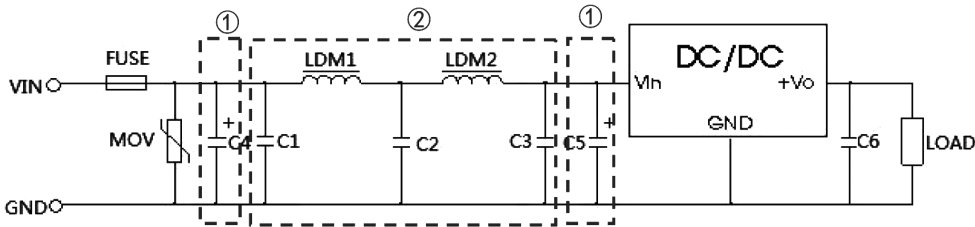
### Notes:

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.

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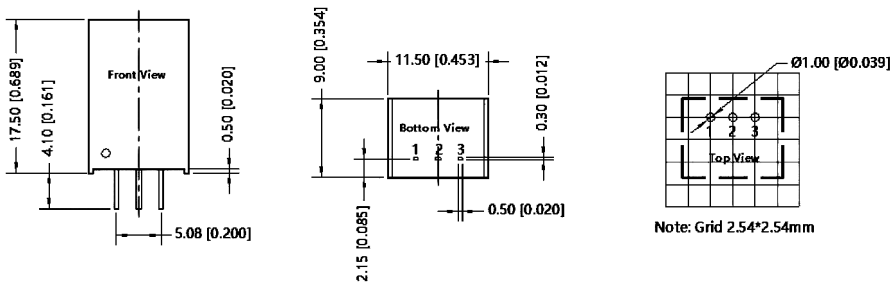
## EMC compliance circuit



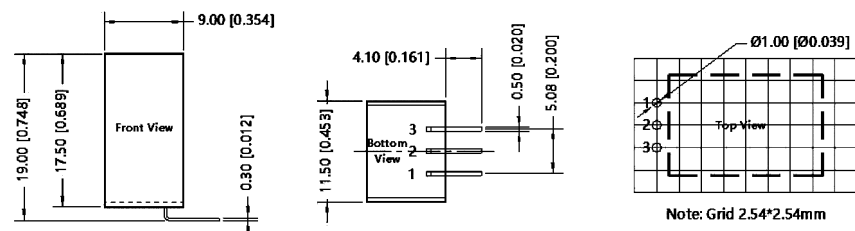
Series	MOV	C1	C2	LDM2	C3	C4
MP-K78UXX-500R3 (L)	S20K30	680µF /100V	4.7µF/100V	120µH	4.7µF/100V	10µF/50V

## Diagram

### MP-K78UXX-500R3



### MP-K78UXX-500R3L



Pin-Out	
Pin	Mark
1	Vin
2	GND
3	+Vo

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

# Non Isolated Board Mount DC / DC Converters



## Part Number Table

Description	Part Number
Non Isolated Board Mount, DC / DC Converter, 3.3V, 0.5A	MP-K78U03-500R3
Non Isolated Board Mount, DC / DC Converter, 3.3V, 0.5A	MP-K78U03-500R3L
Non Isolated Board Mount, DC / DC Converter, 5V, 0.5A	MP-K78U05-500R3
Non Isolated Board Mount, DC / DC Converter, 5V, 0.5A	MP-K78U05-500R3L
Non Isolated Board Mount, DC / DC Converter, 9V, 0.5A	MP-K78U09-500R3
Non Isolated Board Mount, DC / DC Converter, 9V, 0.5A	MP-K78U09-500R3L
Non Isolated Board Mount, DC / DC Converter, 12V, 0.5A	MP-K78U12-500R3
Non Isolated Board Mount, DC / DC Converter, 12V, 0.5A	MP-K78U12-500R3L
Non Isolated Board Mount, DC / DC Converter, 15V, 0.5A	MP-K78U15-500R3
Non Isolated Board Mount, DC / DC Converter, 15V, 0.5A	MP-K78U15-500R3L
Non Isolated Board Mount, DC / DC Converter, 24V, 0.5A	MP-K78U24-300R3
Non Isolated Board Mount, DC / DC Converter, 24V, 0.5A	MP-K78U24-300R3L

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