Non Isolated Board Mount
DC / DC Converters

RoHS Compliant

Features

- Input voltage range up to 10:1
- High efficiency up to 93%
- No-load input current as low as 1.5mA
- Operating ambient temperature range: -40°C to +85°C
- Output short-circuit protection

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-K78Ux6-500R3	48 (9-90)	6.5	500	91/78	100
MP-K78UX6-500R3L					

Note: *For input voltage exceeding 60V DC, an input capacitor of 100uF/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		-	±2	±3	%
Linear Regulation	Full load, input voltage range		-	±0.6	±1.5	
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 +105°C		-	-	±0.03	%/°C
Transient Response Deviation	Nominal input voltage, 25% load step change		-	±0.4	±1.5	mV
Transient Recovery Time			-	0.2	1	ms
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	-	+85	°C
Storage Temperature	Product	-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	8215	-	-	k hours

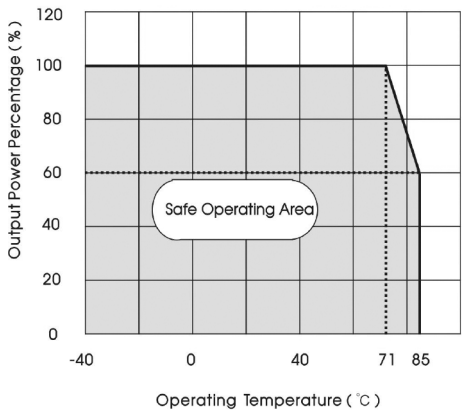
Note: * Meeting the vibration standard requires filling the bottom void of the product with silicone rubber.

Mechanical Specifications

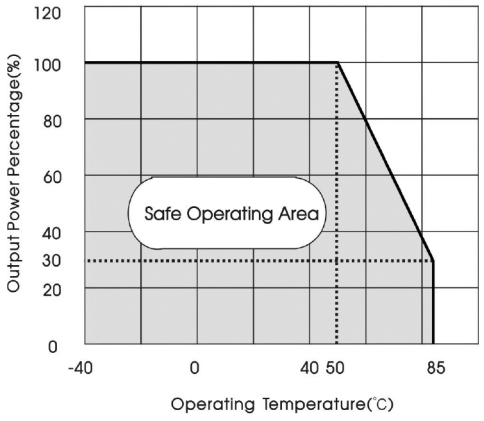
Case Material		Black plastic; flame-retardant and heat-resistant (UL94V-0)
Dimensions	MP-K78Ux6-500R3	11.5mm × 9mm × 17.5mm
	MP-K78UX6-500R3L	19mm × 11.5mm × 9mm
Weight		3.8g (Typ.)
Cooling Method		Free Air Convection

Typical Characteristic Curves

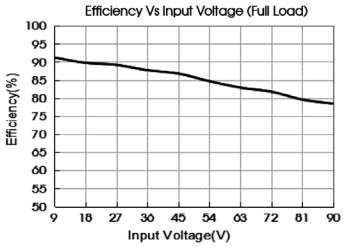
Temperature Derating Curves

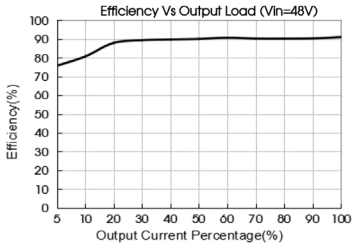


(Vin=36V~60V)



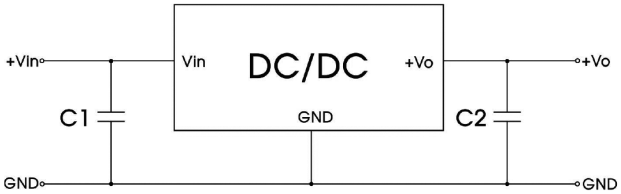
(Vin≥60V)





Design Reference

Typical application

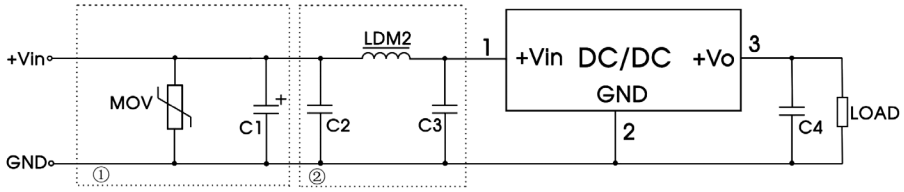


Part Number	C1 (Ceramic Capacitor)	C2 (Ceramic Capacitor)
MP-K78Ux6-500R3	10μF/100V	22μF/10V
MP-K78UX6-500R3L		

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.

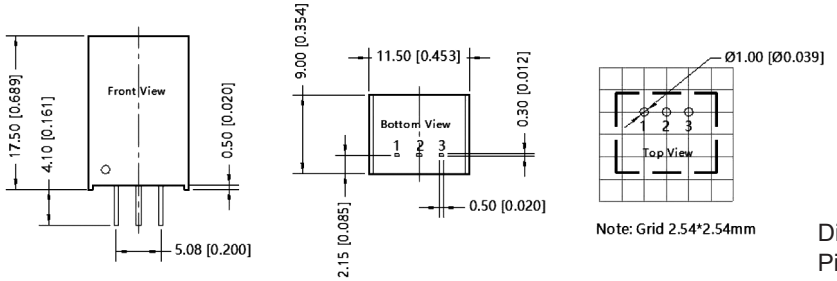
EMC compliance circuit



MOV	C1	C2	LDM2	C3	C4
S20K30	680μF /100V	4.7μF/100V	120μH	4.7μF/100V	10μF/50V

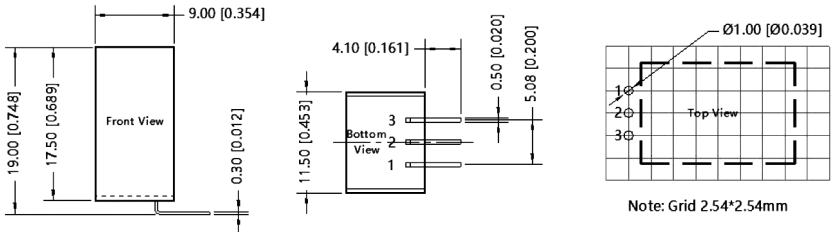
Diagram

MP-K78Ux6-500R3



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

MP-K78UX6-500R3L



Pin-Out	
Pin	**Function**
1	Vin
2	GND
3	+Vo

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

Part Number Table

Description	Part Number
Non Isolated Board Mount, DC / DC Converter, 6.5V, 0.5A	MP-K78Ux6-500R3
Non Isolated Board Mount, DC / DC Converter, 6.5V, 0.5A	MP-K78UX6-500R3L