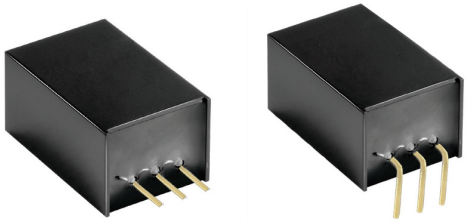
Non Isolated Board Mount
DC / DC Converters

multicomp PRO

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
- 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-K78X6-2000R3 MP-K78X6-2000R3L	EN/BS EN	24 (10-36)	6.5	2000	92/89	1000
		12 (8-29)	-6.5	1000	85/83	680

Note: For input voltage exceeding 30V DC, an input electrolytic capacitor of 22µF/50V is required to prevent the module from being damaged by voltage spikes.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
No-load Input Current	Positive output, nominal input voltage	-	0.1	1	mA
	Negative output, nominal input voltage	-	-	1	
Reverse Polarity at Input		Avoid / Not protected			
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		-	±0.4	±0.8	
Load Regulation	10% -100% load step; nominal input voltage		-	±0.5	±1.5	
Ripple & Noise*	Positive output, 20MHz bandwidth, nominal input voltage, 100% load		-	30	75	mVp-p
	Negative output, 20MHz bandwidth, nominal input voltage, 100% load		-	-	150	
Temperature Coefficient	Operating ambient temperature -40°C to +85°C		-	-	±0.03	%/°C
Transient Response Deviation	Nominal input, 25% load step (25%-50%-25%, 50%-75%-50% step)	Positive output	-	±50	±150	mV
		Negative output		±100	±150	
Transient Recovery Time	Nominal input, 25% load step (25%-50%-25%, 50%-75%-50% step)		-	0.2	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 Non-isolated DC-DC Converter Application Notes for specific information;

*2. Positive output: Input voltage range, 20%-100% load ripple & noise is less than 100mVp-p, 0%-20% load ripple & noise is less than 180mVp-p.

*3. Negative output: Input voltage range, 20%-100% load ripple & noise is less than 150mVp-p, 0%-20% load ripple & noise is less than 180mVp-p.

General Specifications

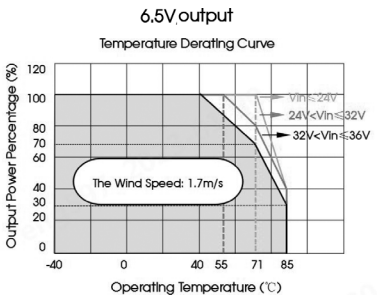
Item	Operating Conditions	Min.	Typ.	Max.	Unit
Operating Temperature	-	-40	-	85	°C
Storage Temperature	-	-55	-	125	
Pin Soldering Resistance Temperature	Soldering time: 10 seconds (Max.)	-	-	260	
Storage Humidity	Non-condensing	5	-	95	%RH
Switching Frequency	Full load, nominal input	-	400	-	kHz
MTBF	MIL-HDBK-217F @ 25°C	2000	-	-	k hours

Mechanical Specifications

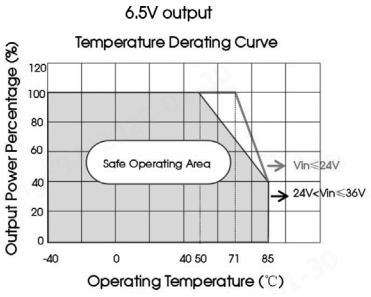
Case Material		Black plastic; flame-retardant and heat-resistant (UL94V-0)
Dimensions	MP-K78X6-2000R3	11.5mm × 9mm × 17.5mm
	MP-K78X6-2000R3L	19mm × 11.5mm × 9mm
Weight		3.8g (Typ.)
Cooling Method		Free Air Convection

Typical Characteristic Curves

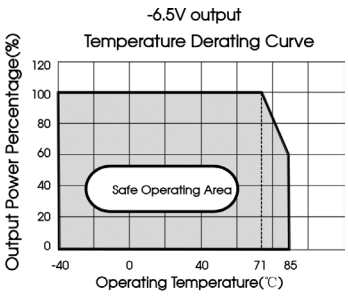
Forced convection curve (Positive output)

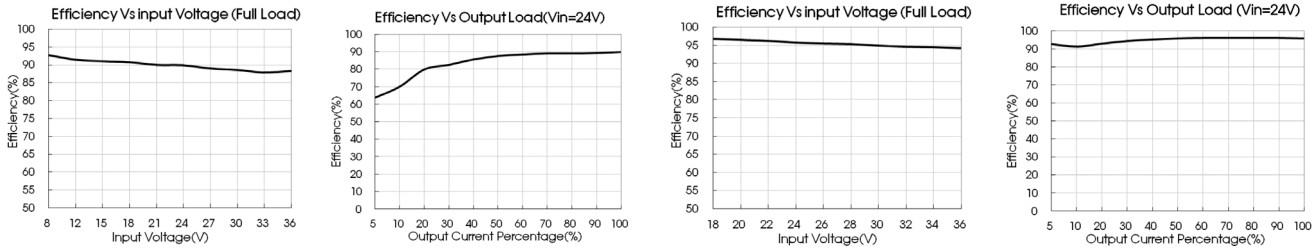


Free air convection curve (Positive output)



Free air convection curve (Negative output)





Design Reference

Typical application

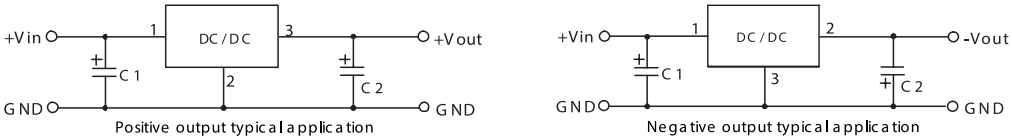


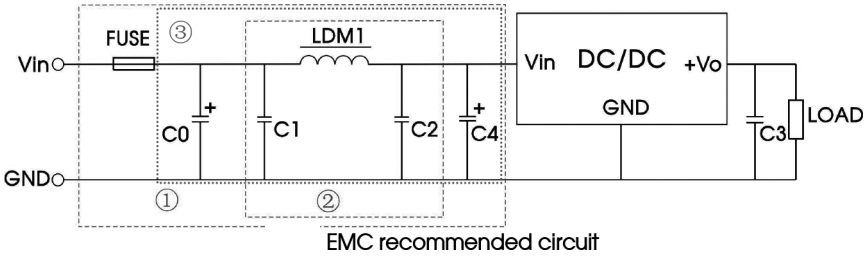
Table 1

Part Number	C1/C3 (Ceramic Capacitor)	C2/C4 (Ceramic Capacitor)
MP-K78X6-2000R3	22μF/50V	22μF/10V
MP-K78X6-2000R3L		

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.

EMC compliance circuit

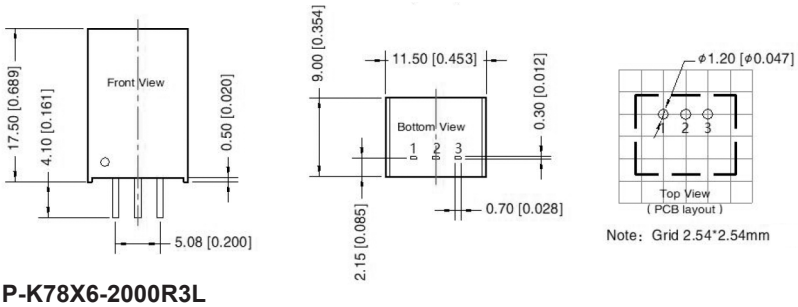


EMC recommended circuit

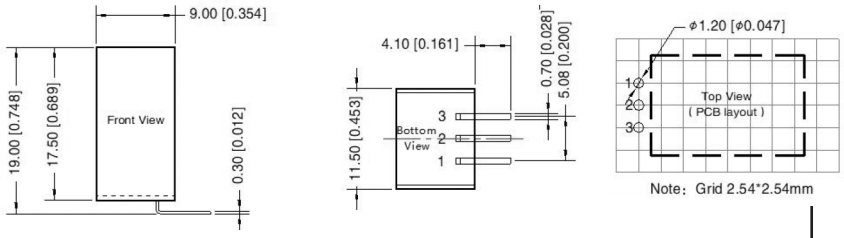
FUSE	C0	LDM1	C4	C1/C2	C3
Selected based on the actual input current in application	100μF /100V	22μH	680μF /50V	10μF /50V	22μF /25V

Diagram

MP-K78X6-2000R3



MP-K78X6-2000R3L



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

Pin-Out		
Pin	**Positive Output**	**Negative Output**
1	Vin	Vin
2	GND	-Vo
3	+Vo	GND

Part Number Table

Description	Part Number
Non Isolated Board Mount, DC / DC Converters, 6.5V, 2A	MP-K78X6-2000R3
Non Isolated Board Mount, DC / DC Converters, 6.5V, 2A	MP-K78X6-2000R3L