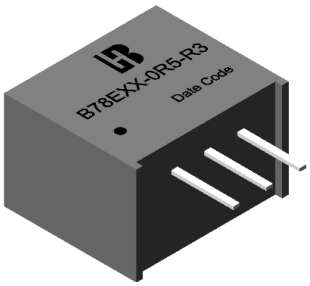
B78EXX-0R5-R3 Series

Non-isolated DC-DC Converters



Features

- 6 - 36VDC wide input range
- Pinout compatible with LM78xx linear regulators
- High Efficiency up to 97%
- Output Short Circuit Protection: Hiccup and Auto Recovery
- Over Temperature Protection
- Lead Free Design, RoHS Compliant
- Designed according to IEC/EN/UL 62368-1

Description

The B78EXX-0R5-R3 Series are non-isolated DC/DC converters suited to replace 0.5 Amp LM78xx linear regulators. Designed with highly efficiency, allow the operating temperature range of these units to be -40°C to +85°C in a 11.6×7.5×10.2mm non-conducted black plastic case. Further features include wide 6 - 36VDC input voltage range, short-circuits protection and over temperature protection.

Electrical Specification @ 25°C

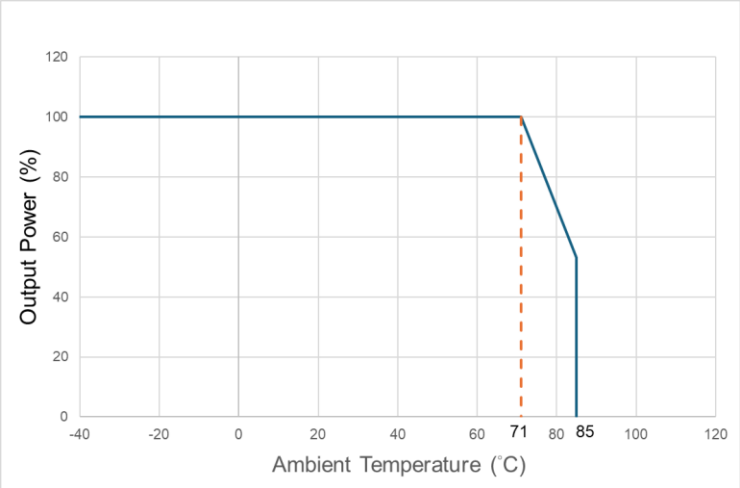
Model Number	Input Voltage Range	Output Voltage(V)	Output Current (mA)(1)		Efficiency (%)(2)		Capacitive Load(uF) Max.
			Min. Load	Full Load	Vin_Min.	Vin_Max.	
B78E03-0R5-R3	6-36V, nominal 24V	3.3	0	500	90	80	680
B78E05-0R5-R3	6.5-36V, nominal 24V	5	0	500	94	84	680
B78E6R5-0R5-R3	9-36V, nominal 24V	6.5	0	500	94	84	470
B78E09-0R5-R3	12-36V, nominal 24V	9	0	500	96	90	470
B78E12-0R5-R3	15-36V, nominal 24V	12	0	500	97	92	100
B78E15-0R5-R3	18-36V, nominal 24V	15	0	500	97	94	100

Input Specifications	
Input voltage	See table
Input filter	Capacitor type

Environmental Specifications		
Operating ambient temperature		-40°C to +85°C (with derating)
Maximum case temperature		+105°C
Storage temperature range		-50°C to +125°C
Relative humidity		95% RH max.
Temperature coefficient		±0.03% / °C max.
Output Specifications		
Output current		500mA max.
Voltage accuracy	0 -100% load and 24Vin	±1% typ. ±3% max.
Minimum load		Not required
Line regulation	Full load	±0.75% max.
Load Regulation	10 - 100% load and 24Vin	±1% max.
Ripple and Noise (20MHz Bandwidth)		150mVp-p max.
Capacitive load		See table
Short Circuit Protection		Hiccup, automatic recovery
Over Temperature Protection	The IC Thermal Shutdown Temperature	150°C typ.
General Specifications		
Efficiency		See table
Switching frequency (Fixed)	Pulse width modulation (PWM)	410kHz
Reliability, calculated MTBF		10×10^5 hrs
Physical Specifications		
Case material		Plastic (UL94 V-0)
Dimensions		0.46 × 0.295 × 0.4 Inch (11.6 × 7.5 × 10.2 mm)
Weight		1.6g (0.057oz) typ.

Note:
1. Io below this value will not damage these converters, however, they may not meet all listed specifications.
2. Typical value, tested at nominal input and full load.
3. Specifications subject to change without notice.
4. This power module is not internally fused. The input line fuse must always be used.
5. When the input voltage is higher than 30V or in case of long input lines or hot plug-in requirements, 33uF high frequency and low resistance electrolytic capacitor must be attached to the input during test or operation.
6. In the process of testing or using, it is necessary to ensure that the "GND" pin of the product is well connected to the GND of the power supply, otherwise the product will be damaged.
7. DO NOT use it in overload condition.

Power Derating Curve

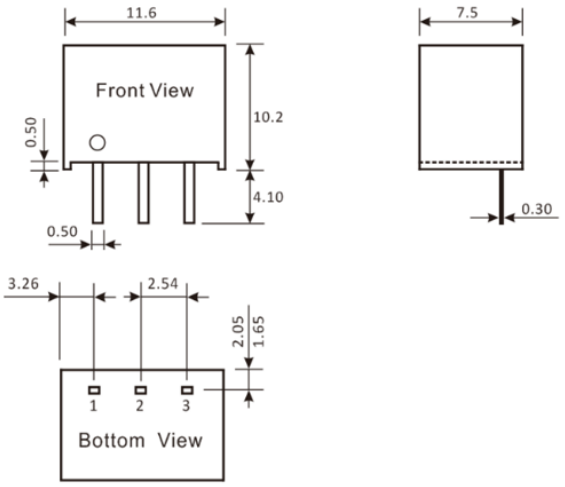


Process and Materials

1. Storage Temperature: Refer to the specification for details
2. Compliance to J-STD:
   A. J-STD-002: Solderability of Dipping at 255~260°C
   B. J-STD-020: Moisture Sensitive Level 1
3. All parts are packaged in tubes - see page 7 for details
4. For all electrical characteristics, curves and applications, please refer to the detailed spec.
5. Lead Frame: Cooper Alloy
   Underplated: Half Hard Ductile Nickel 40-118" (1.0 - 3.0um)
   Over plated: 100% Tin electro-deposited per 240~400u" (6~10um) min
   Finish: Matte finish 100% Tin solder

Mechanical

B78EXX-0R5-R3

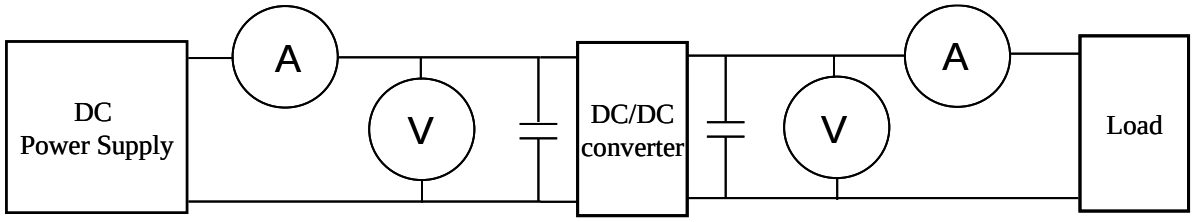


Pinout	
Pin	Function
1	Vin
2	GND
3	Vout

All dimensions in mm
Tolerances: ±0.5
Pin dimension tolerances: ±0.10

Test Configurations

All specifications are typical at nominal input, full load and 25°C unless otherwise stated.



◎DC Power Supply: It offers a wide voltage and current range precisely.

◎Current meter (A): Accuracy➔ 200μA ~ 200mA 4 ranges ± (0.2% rdg + 2 digits)

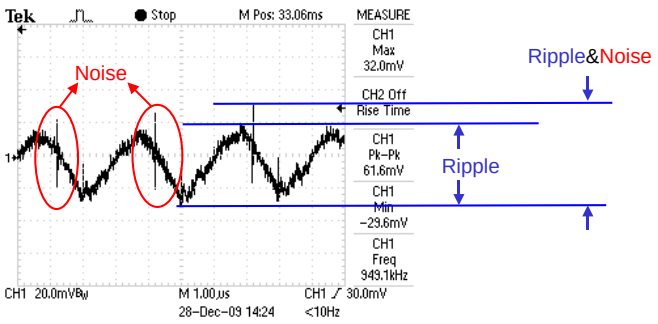
2000mA ~ 20A 2 ranges ± (0.3% rdg + 2 digits).

◎Voltage meter (V): Accuracy➔ ± (0.03% rdg + 4 digits).

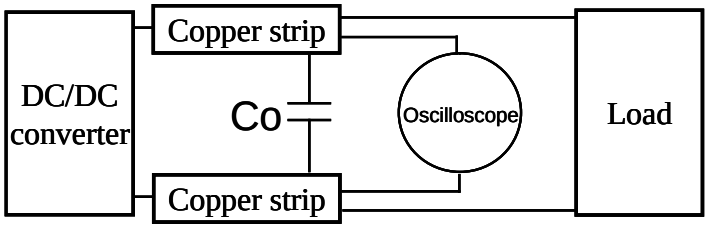
◎Load: At full load.

◎Wires: The resistance of the wires must be small.

1. Ripple and Noise: as shown below. The bandwidth is 0-20MHz.

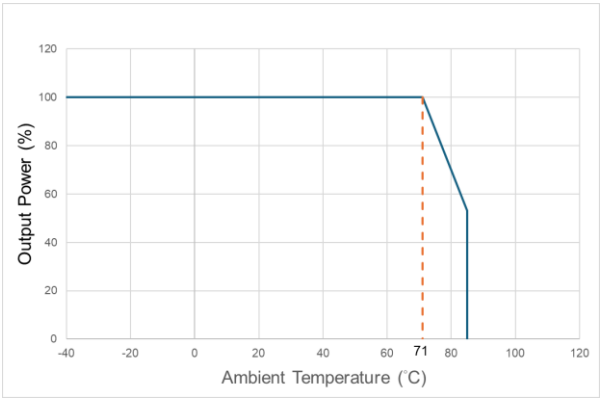


Output Ripple&Noise measurement test circuit: as shown below.

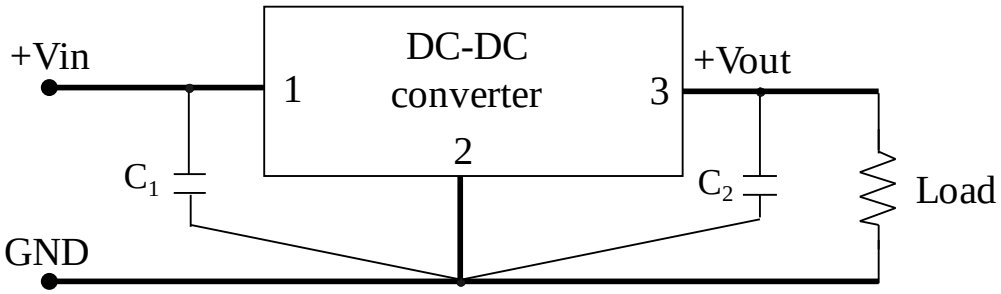


Co: usually 1uF MLCC and 10uF tantalum capacitor.

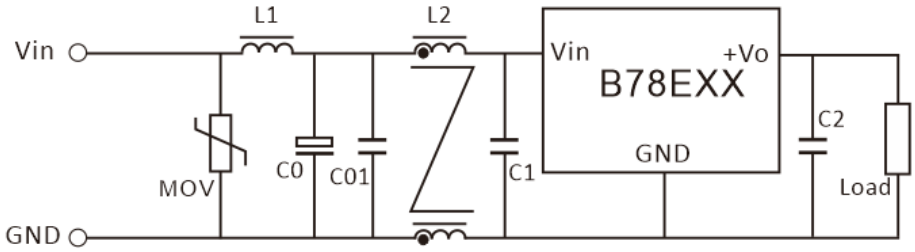
2. Temperature derating curve: The DC-DC converter will operate over a wider temperature range if less power is drawn from the output and the device is already running. The temperature derating curve shows the operating power-temperature range. As shown below.



3. Application circuit: as shown below. C1=10uF/50V MLCC, C2 =22uF/25V MLCC.

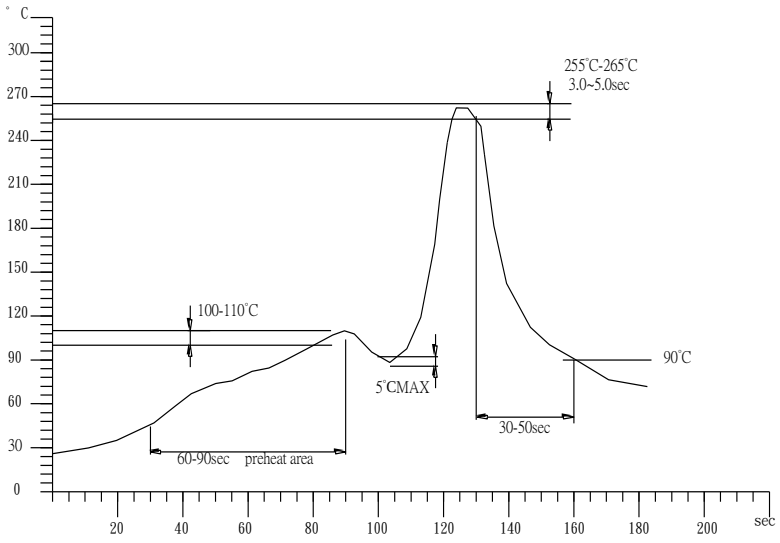


4. EMC Filter Suggestion according to EN55032 CLASS B:



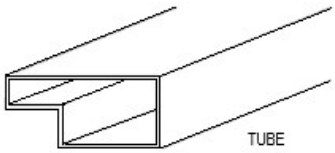
MOV	L1	C0	C01	L2	C1	C2
20D470K	300uH	470uF/50V	4.7uF/50V MLCC	5mH	10uF/50V MLCC	22uF/25V MLCC

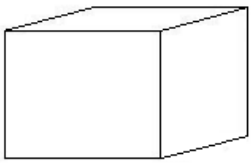
Wave Soldering Temperature Curve



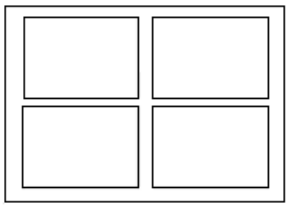
Carton Package

B78EXX-0R5-R3





INNER CARTON:240*200*110



EXPORT CARTON:420*256*238

TUBE=10PCS
INNER CARTON=100 TUBE=100*10=1000PCS
EXPORT CARTON=4 INNER CARTON=4*1000=4000PCS

For More Information:

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