

# Make-Ps®

## DC/DC CONVERTER

## Single Output DC/DC Converter

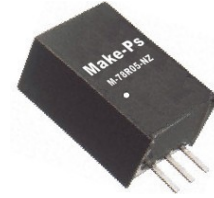
### M-78R-NZ

Up to 13 Watt | DC-DC Converter



#### FEATURES:

- 3 Pin SIP Package
- Pin-out compatible with LM78XX Linear Regulators
- Continuous Short Circuit Protection
- Non-Isolated Regulated Outputs
- Operating temperature -40°C to +85°C
- Wide input range
- Very High Efficiency Up To 92%
- Low ripple and noise



#### Models

##### Single output

Model	Input Voltage (V)	Output Voltage (V)	Output Current max (A)	Efficiency Vin Min (%)	Efficiency Vin Max (%)
M-78R2.5-NZ	4.75-18	2.5	2	85	83
M-78R3.3-NZ	4.75-18	3.3	2	87	86
M-78R5.0-NZ	7-18	5	2	91	88
M-78R6.5-NZ	8.5-18	6.5	2	92	91

NOTE: All specifications in this datasheet are measured at an ambient temperature of 25°C, humidity<75%, nominal input voltage and at rated output load unless otherwise specified.

#### Input Specifications

Input Specifications	Nominal	Typical	Maximum	Units
Voltage range		See the table above		VDC
Filter		Capacitor		
Quiescent Current	Vin=(LL-HL) at full load	5	10	mA

#### Output Specifications

Output Specifications	Conditions	Typical	Maximum	Units
Voltage accuracy	100% load	±3		%
Short Circuit protection		Continuous.		
Short circuit restart		Auto recovery		
Output current limit			5	A
Thermal shutdown	Internal IC junction	150		°C
Dynamic load stability	10-100% load		±100	mV
Line voltage regulation	Vin=(LL-HL) at full load	±0.75		%
Load voltage regulation	10-100% load	±1		%
Temperature coefficient	-40°C to +85°C ambient	±0.03		%/°C
Ripple & Noise	20MHz Bandwidth	45		mV p-p
Maximum Capacitive Load			1000	µF

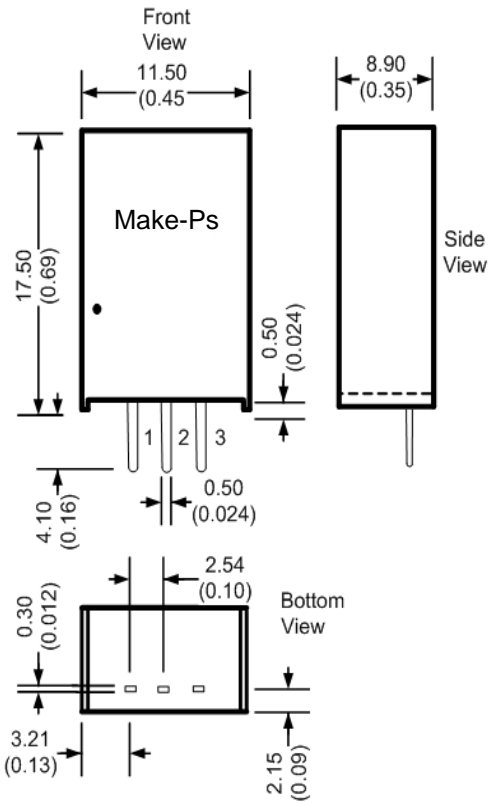
#### General Specifications

Input Specifications	Conditions	Typical	Maximum	Units
Switching frequency	100% load	340		KHz
Operating temperature	With derating above 71°C	-40 to +85		°C
Storage temperature		-55 to +125		°C
Max Case temperature			100	°C
Cooling		Free air convection		
Humidity			95	%
Case material		Non-conductive black plastic (UL94-V0 rated)		
Weight		4		g
Dimensions (L x W x H)		0.45 X 0.35 X 0.69 inch	11.50 X 8.90 X 17.50 mm	
MTBF		> 2 000 000 hrs (MIL-HDBK-217F, Ground Benign, t=+25°C)		
Soldering Temperature	1.5 mm from case for 10 sec		300	°C

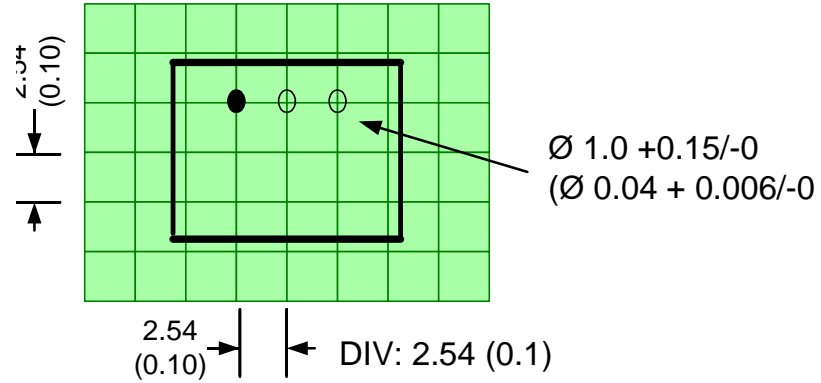
**Pin Out Specifications**

Pin	Single
1	+Vin
2	GND
3	+Vout

**Dimensions**



**Footprint**

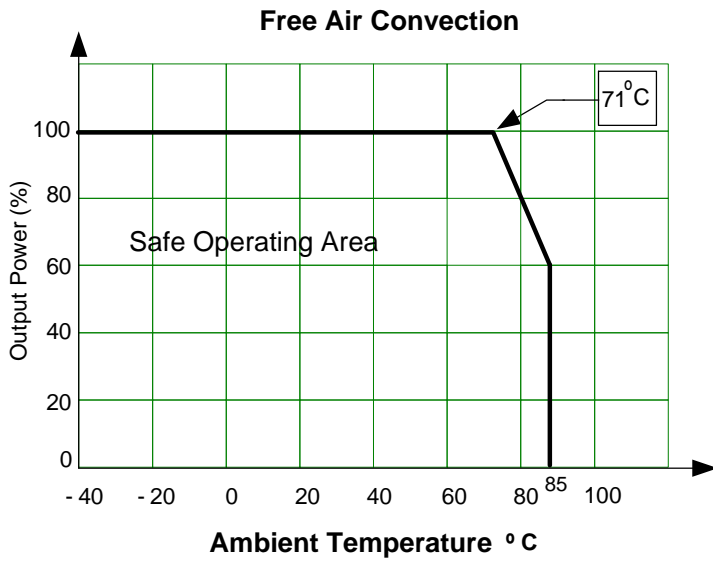


Dimensions are typical values: mm (inch)

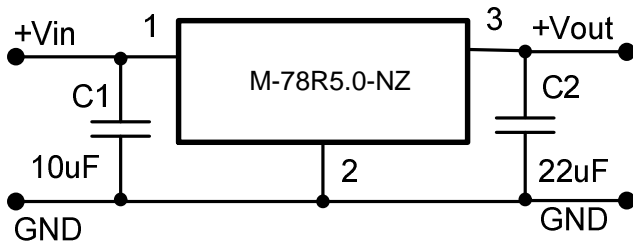
General Tolerance:  $\pm 0.25$  ( $\pm 0.01$ )

Pin Tolerance:  $\pm 0.1$  ( $\pm 0.004$ )

## Derating



## Typical Application Circuit

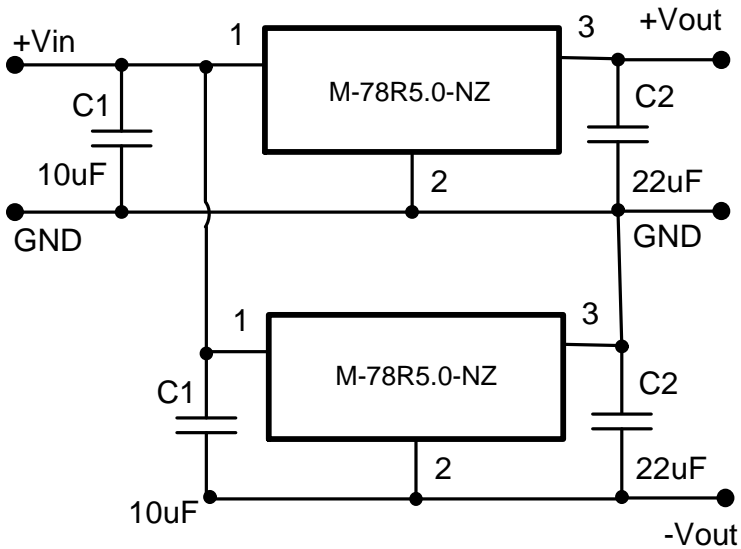


C1: A low ESR capacitor is required to keep the noise of the converter to a minimum. Ceramic capacitors are recommended with typical value is 10µF / 25V.

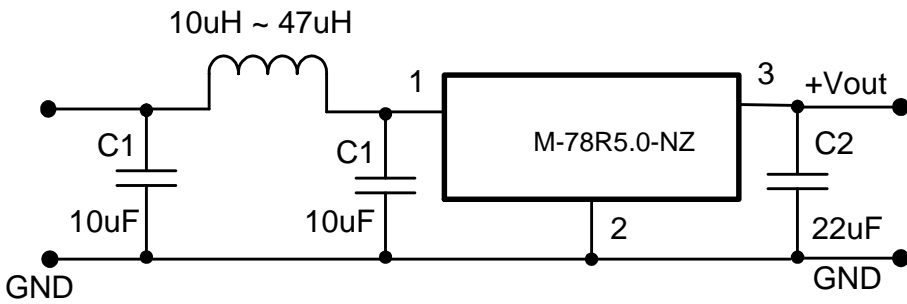
C2: Installation of C2 is recommended with typical value of 22µF / 16V ceramic for 5V and 6.5V output signal and 22µF / 6.3V ceramic for 2.5V and 3.3V output signal.

**NOTE: This part is not designed for parallel operation.**

Dual Output Connection



Input Filter



Output Filter

