

# EPM78Vx

## Non-isolated DC-DC converter



### Product features

- Switching regulator, Non-isolated DC-DC converter
- Convenient 3-Pin SIP Package compatible with LM78xx linear regulator
- Input voltages: 4.75 V to 32 Vdc
- 6 SKU's representing 6 output voltages (1.8 V – 15 V) @ 1A output current
- Efficiency up to 96%
- Operating ambient temperature -40 °C to +90 °C
- Continuous short circuit protection
- EN62368 safety approval

### Engineering tools

- EPM78 Evaluation kit
- PN: EPM78-EVK  
Includes evaluation board and 7 EPM78 part numbers
- [EPM78 Evaluation kit user guide](#)

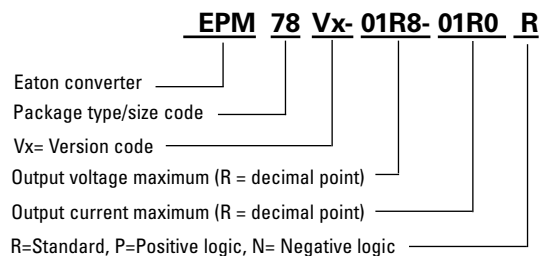
### Applications

- Industrial
  - Automation & testing equipment
  - Displays
  - Lighting
  - IoT
  - Power Supply
- Energy
  - Solar and wind inverters
  - Battery management
- Medical
  - Hospital & home care equipment
  - Inventory tracking
  - Diagnostics
- Telecom
  - Networking and telecommunications
  - Infrastructure

### Environmental compliance



### Ordering part number



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## Specifications

	Parameter	Conditions	Minimum	Typical	Maximum	Unit	
<b>Input</b>	Input voltage range			24		Vdc	
	<b>Output</b>	Efficiency	Vo = 1.8 Vdc @ min. Vin		86		%
Vo = 3.3 Vdc @ min. Vin				90		%	
Vo = 5.0 Vdc @ min. Vin				93		%	
Vo = 6.5 Vdc @ min. Vin				94		%	
Vo = 12 Vdc @ min. Vin				95		%	
Vo = 15 Vdc @ min. Vin				96		%	
<b>Output</b>	Minimum load			1		%	
	Line voltage regulation	LL-HL		0.2	0.4	%	
	Load voltage regulation	10-100% Load		0.4	0.6	%	
	Voltage accuracy			±3		%	
	Operating frequency	100% Load at nominal Vin			500		kHz
	Ripple & noise		Vo = 1.8 Vdc			50 <sup>(1)</sup>	mVp-p
			Vo = 3.3 Vdc			50	mVp-p
			Vo = 5.0 Vdc			50	mVp-p
			Vo = 6.5 Vdc			75 <sup>(2)</sup>	mVp-p
			Vo = 12 Vdc			100	mVp-p
			Vo = 15 Vdc			100	mVp-p
<b>Environment</b>	Operating temperature	With derating	-40		+90	°C	
	Storage temperature		-55		+125	°C	
	Relative humidity				95	%RH	
	Temperature coefficient			0.015		%/°C	
	Maximum case temperature				105	°C	
	Vibration				MIL-STD-202G		
	<b>Function</b>	Short circuit protection			Continuous, automatic recovery		
Safety				EN 62368-1			
MTBF		MIL-HDBK217F	13300			hours	
<b>Physical</b>	Dimension			0.457 (L) x 0.402 (W) x 0.300 (H)		inches	
	Weight			1.9		g	
	Cooling method			Free air convection			
	Case material			Non conductive black plastic			
<b>EMC</b>	EMI	EN 55032		Class A/B			
	ESD	EN61000-4-2 Air ± 8 kV Contact ± 6 kV		Criteria A			
				Criteria A			
	Surge <sup>3</sup>	EN 61000-4-5, ±2 kV		Criteria A			

1. If you use 26 V input and the loading is less 5%, the R&N will be 100 mVp-p maximum

2. With a 4.7 µF/ 50 V X7R MLCC, the R&N will be 50 mVp-p maximum

3. External input capacitor required 1500 µF/ 50 V.

4. The product information and specifications are subject to change without prior notice.

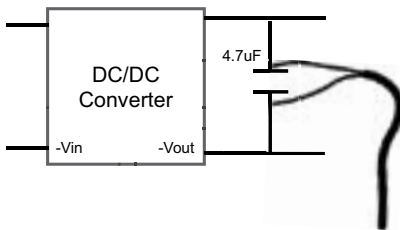
5. All specifications valid at 24 V input, full load and +25 °C after warm-up time unless otherwise stated.

### Selection guide

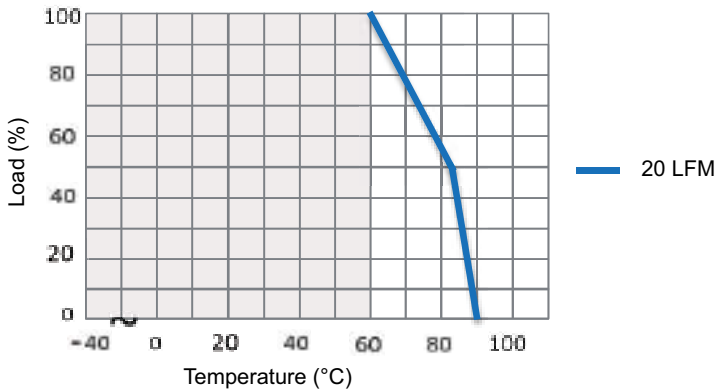
Part number	Input voltage	Output voltage	Output current @ full load	Input current @ no load	Efficiency (typical) <sup>1</sup> Vin minimum/ Vin maximum	Capacitive load <sup>2</sup> maximum
EPM78V1-01R8-01R0R	4.75 - 26 Vdc	1.8 Vdc	1000 mA	10 mA	86.0/77.5%	470 µF
EPM78V2-03R3-01R0R	4.75 - 32 Vdc	3.3 Vdc	1000 mA	12 mA	90.0/82.5%	470 µF
EPM78V2-05R0-01R0R	6.5 - 32 Vdc	5.0 Vdc	1000 mA	16 mA	93.0/86.0%	470 µF
EPM78V2-06R5-01R0R	8 - 32 Vdc	6.5 Vdc	1000 mA	20 mA	94.0/88.0%	470 µF
EPM78V2-12R0-01R0R	15 - 32 Vdc	12 Vdc	1000 mA	23 mA	95.0/92.0%	470 µF
EPM78V2-15R0-01R0R	18 - 32 Vdc	15 Vdc	1000 mA	25 mA	96.0/93.0%	330 µF

1. The efficiency is test by max./ min. input voltage and full load @ +25 °C, and ±2% tolerance
2. The capacitive load is test by minimum input and constant resistive load
3. All specifications valid at 24 V input voltage, full load and +25 °C after warm-up time unless otherwise stated

### Measuring circuit

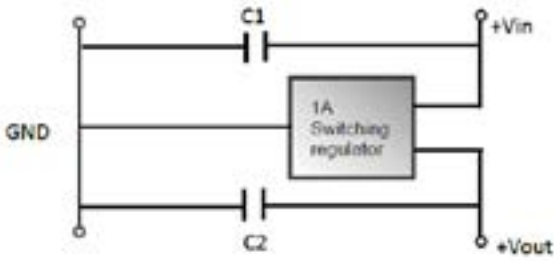


### Derating curve

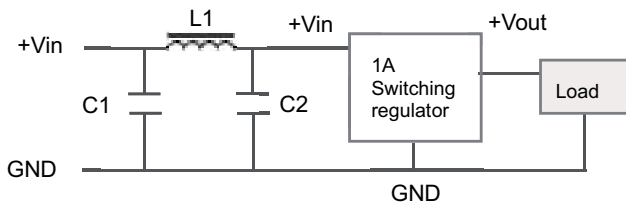


The derating curve was measured at 24 V input

**Standard application circuit**

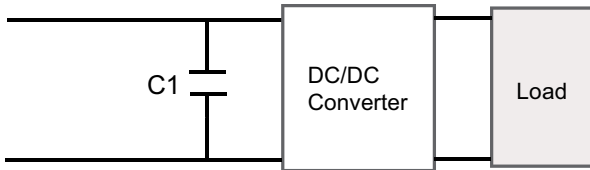


**EMC filtering circuit**



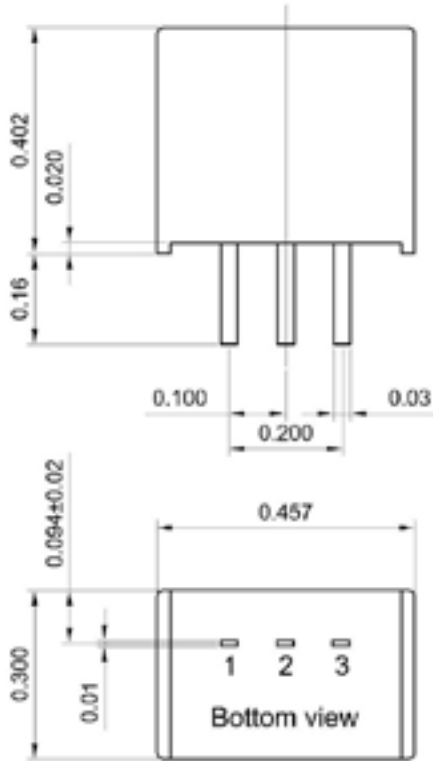
Class	C1	L1	C2
Class A	1206 4.7 $\mu$ F 50 V MLCC	3.3 $\mu$ H	x
Class B	1210 10 $\mu$ F 50 V MLCC	10 $\mu$ H	1206 4.7 $\mu$ F 50 V MLCC

**EFT and surge circuit**



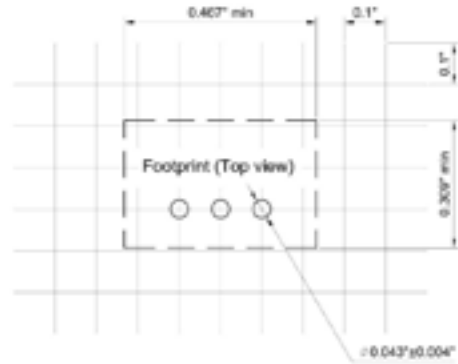
C1
1500 $\mu$ F / 50 V

**Mechanical dimension and pinning - inches**



Pin	Function
1	+Vin
2	GND
3	+Vout

Recommended pad layout



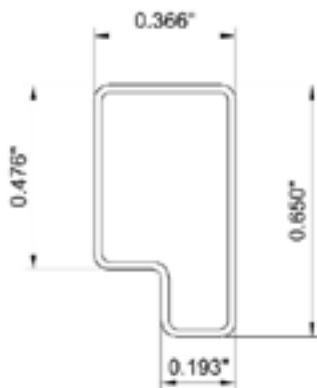
**Marking**



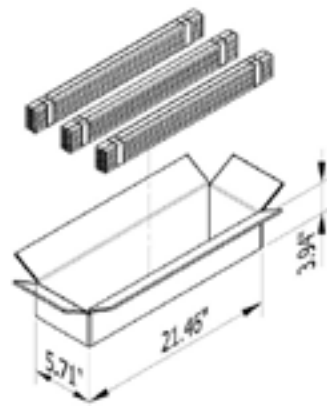
xxx= lot code

Projection: Third angle projection  
Tolerance: X.XX ± 0.02 X.XXX ± 0.01  
PIN tolerance: ± 0.004

**Packaging- Inches**



Tolerance : ±0.02"  
1 Tube = 42 pcs  
Length : 20.47"±0.08"



Carton=21.46\*5.71\*3.94 inch  
MOQ=42(pcs/tube)\*12(tube/bundle)\*3(bundle)=1512pcs~4Kg

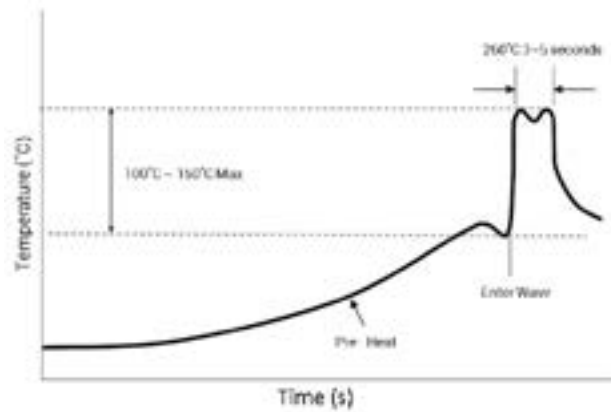
## General information

### Storage and handling

The shelf life will be a minimum of 12 months, when stored at the following conditions: < 40 °C, < 90% relative humidity.

### Wave solder profile

The wave solder profile is measured based on lead temperature. The internal temperature of the solder parts should not exceed +210 °C. The duration of solder dwell time should be between 3 to 5 seconds, and not to exceed 10 seconds.



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