

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](#)

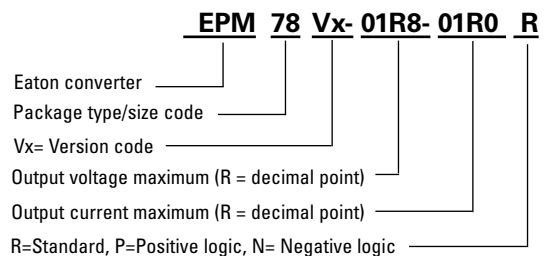
Applications

- 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



Specifications

| | Parameter | Conditions | Minimum | Typical | Maximum | Unit | |
|-------------------------|-----------------------------|---|-------------------------|-----------------------------------|--------------------------------|-------------------|-------|
| Input | Input voltage range | | | 24 | | Vdc | |
| | Output | 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 | | % | |
| Output | 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 ⁽¹⁾ | mVp-p |
| | | Vo = 3.3 Vdc | | | | 50 | mVp-p |
| | | Vo = 5.0 Vdc | | | | 50 | mVp-p |
| | | Vo = 6.5 Vdc | | | | 75 ⁽²⁾ | mVp-p |
| | | Vo = 12 Vdc | | | | 100 | mVp-p |
| | | Vo = 15 Vdc | | | | 100 | mVp-p |
| Environment | 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 | | |
| | Function | Short circuit protection | | | Continuous, automatic recovery | | |
| Safety | | | | EN 62368-1 | | | |
| MTBF | | MIL-HDBK217F | 13300 | | | hours | |
| Physical | 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 | | | |
| EMC | EMI | EN 55032 | | Class A/B | | | |
| | ESD | EN61000-4-2 Air ± 8 kV Contact ± 6 kV | | Criteria A | | | |
| | Fast transient ³ | EN 61000-4-4, ±2 kV | | Criteria A | | | |
| | Surge ³ | 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.

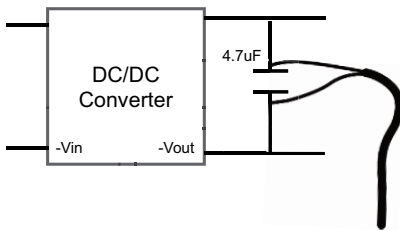
5. All specifications valid at 24 V input, full load and +25 °C after warm-up time unless otherwise stated.

Selection guide

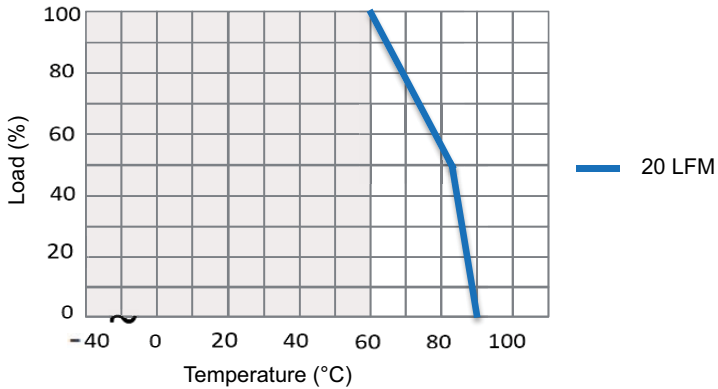
| Part number | Input voltage | Output voltage | Output current @ full load | Input current @ no load | Efficiency (typical) ¹ Vin minimum/ Vin maximum | Capacitive load ² maximum |
|--------------------|---------------|----------------|----------------------------|-------------------------|---|---|
| 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

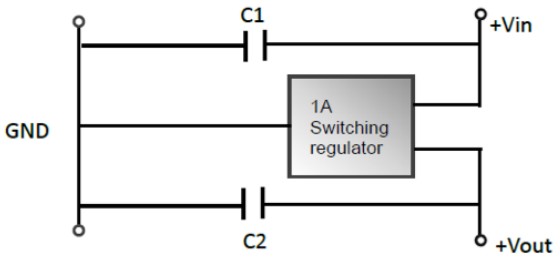


Derating curve

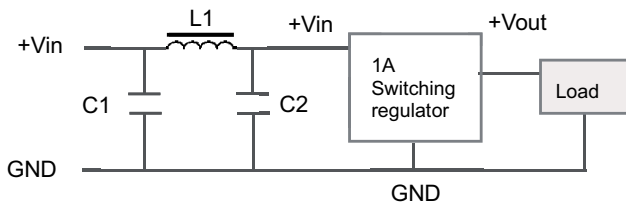


The derating curve was measured at 24 V input

Standard application circuit

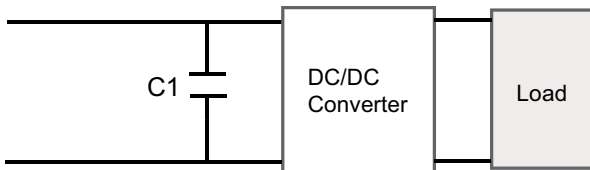


EMC filtering circuit



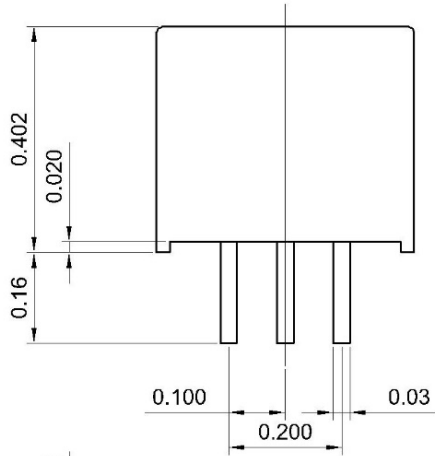
| Class | C1 | L1 | C2 |
|---------|----------------------------|-------------|----------------------------|
| Class A | 1206 4.7 μ F 50 V MLCC | 3.3 μ H | x |
| Class B | 1210 10 μ F 50 V MLCC | 10 μ H | 1206 4.7 μ F 50 V MLCC |

EFT and surge circuit



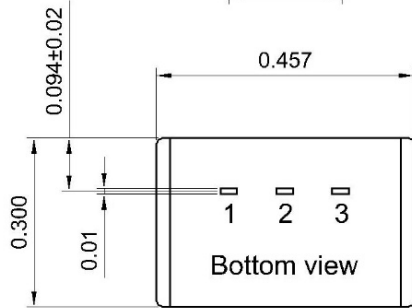
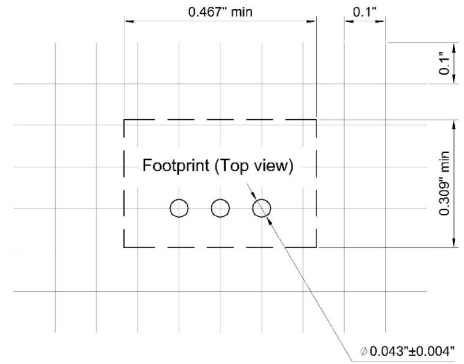
| C1 |
|---------------------|
| 1500 μ F / 50 V |

Mechanical dimension and pinning - inches



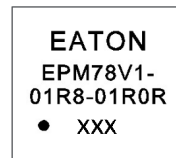
| Pin | Function |
|-----|----------|
| 1 | +Vin |
| 2 | GND |
| 3 | +Vout |

Recommended pad layout



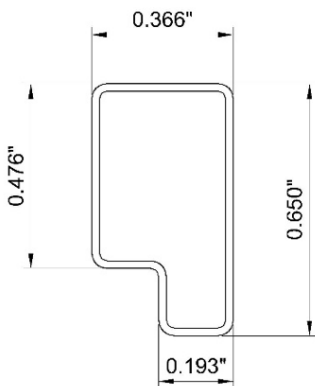
Projection: Third angle projection
Tolerance: X.XX ± 0.02 X.XXX ± 0.01
PIN tolerance: ± 0.004

Marking

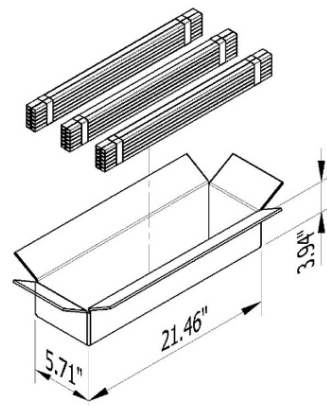


xxx= lot code

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

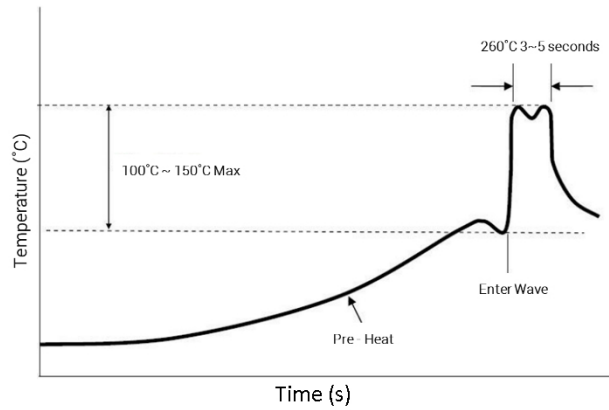
General information

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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