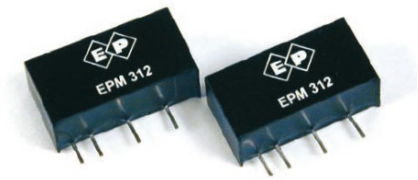
Electronic Products
Elektronisches Knowhow aus einer Hand

# EPM 300-400 Series – 2W unregulated

DC-DC Converter

## Features

SINGLE IN LINE PACKAGE
2W UNREGULATED OUTPUT POWER
100% BURN IN
HIGH EFFICIENCY
INTERNAL SMD TECHNOLOGY
LOW COST
NO HEATSINK REQUIRED
UL 94V-0 PACKAGE MATERIAL
CUSTOM SOLUTIONS AVAILABLE
RoHS COMPLIANT




## Specification

| | | |
|---|---|---|
| **Output Specification** | Voltage Set-point Accuracy | +/-2% max. |
| | Temperature Coefficient | +/-0.05%/°C |
| | Ripple & Noise(20MHz BW) [1] | 100mVp-p max. |
| | Line Regulation [2] | +/-1.2% max. |
| | Load Regulation [3] | +/-8% max. |
| | Minimum Load | 10% of Full Load |
| | Short Circuit Protection | Momentary |
| **Input Specification** | Input Voltage Range | +/-10% max. |
| | Input Filter | Capacitor Type |
| | Protection | Fuse Recommended |
| **Environmental Specifications** | Operating Temperature | -40 °C to +71 °C |
| | Storage Temperature | -55 °C to +125 °C |
| | Humidity | 95% max. |
| | Cooling | Free-Air Convection |
| **General Specifications** | Efficiency | 70%-85% |
| | Isolation Voltage[4] 1500 VDC min | Standard Models |
| | 3000 VDC min | Suffix "D" Models |
| | Isolation Resistance | 109 ohms min. |
| | Isolation Capacitance | 80pF max. |
| | Switching Frequency | 100KHz min. |
| | MTBF[5] | >1,800,000 Hours |
| | Weight | 2.3g typ. |
| | Case Material | Non-Conductive Plastic |
| | Case Size | 19.6mm*7.1mm*10.2mm |
| | Conducted Emissions | EN55022 Class A |
| | Radiated Emissions | EN55022 Class B |

ALL SPECIFICATIONS TYPICAL AT NOMINAL LINE, FULL LOAD, AND 25 °C UNLESS OTHERWISE NOTED

[1] Measured with 1uF ceramic capacitor connect to the output pins.
[2] Line Regulation is for a 1.0% change in input Voltage
[3] Load Regulation is for output load current change from 20% to 100%.
[4] 1500VDC for 10 seconds,3000VDC for 3 seconds.
[5] MIL-HDBK-217F @25 °C , Ground Benign

R. Nafe -Electronic Products Steinfeldstr. 3 83558 Maitenbeth Tel.: +049/(0) 80 76/88 933 52 Fax: +049/(0) 80 76/88 933 57 E-Mail: info@electronic-products.com Internet: www.electronic-products.com

# Selection Guide 2W Output

| MODEL NUMBER | INPUT VOLTAGE (VDC) | OUTPUT VOLTAGE (VDC) | OUTPUT CURRENT (mA) | INPUT[6] CURRENT(mA) FULL LOAD | INPUT[6] CURRENT(mA) NO LOAD | EFF (%)[7] | ISOLATION (VDC) | PACKAGE |
|---|---|---|---|---|---|---|---|---|
| EPM325 | 3.3 | 5 | 400 | 782 | 65 | 78 | 1500 | C |
| EPM326 | 3.3 | 24 | 84 | 782 | 65 | 78 | 1500 | C |
| EPM301 | 5 | 3.3 | 500 | 452 | 60 | 73 | 1500 | C |
| EPM302 | 5 | 5 | 400 | 520 | 60 | 77 | 1500 | C |
| EPM303 | 5 | 9 | 222 | 506 | 60 | 79 | 1500 | C |
| EPM304 | 5 | 12 | 167 | 500 | 60 | 80 | 1500 | C |
| EPM305 | 5 | 15 | 133 | 488 | 60 | 82 | 1500 | C |
| EPM327 | 3.3 | +/-15 | +/-67 | 740 | 65 | 82 | 1500 | C |
| EPM306 | 5 | +/-5 | +/-200 | 488 | 60 | 82 | 1500 | C |
| EPM307 | 5 | +/-12 | +/-84 | 500 | 60 | 80 | 1500 | C |
| EPM308 | 5 | +/-15 | +/-67 | 488 | 60 | 82 | 1500 | C |
| EPM328 | 5 | +/-24 | +/-42 | 504 | 60 | 79 | 1500 | C |
| EPM309 | 12 | 3.3 | 500 | 185 | 15 | 74 | 1500 | C |
| EPM310 | 12 | 5 | 400 | 214 | 15 | 78 | 1500 | C |
| EPM311 | 12 | 9 | 222 | 214 | 15 | 78 | 1500 | C |
| EPM312 | 12 | 12 | 167 | 200 | 15 | 83 | 1500 | C |
| EPM313 | 12 | 15 | 133 | 196 | 15 | 85 | 1500 | C |
| EPM314 | 12 | +/-5 | +/-200 | 214 | 15 | 78 | 1500 | C |
| EPM315 | 12 | +/-12 | +/-84 | 200 | 17 | 83 | 1500 | C |
| EPM316 | 12 | +/-15 | +/-67 | 196 | 15 | 85 | 1500 | C |
| EPM317 | 24 | 3.3 | 500 | 92 | 15 | 74 | 1500 | C |
| EPM318 | 24 | 5 | 400 | 107 | 15 | 78 | 1500 | C |
| EPM319 | 24 | 9 | 222 | 107 | 15 | 78 | 1500 | C |
| EPM320 | 24 | 12 | 167 | 104 | 15 | 80 | 1500 | C |
| EPM321 | 24 | 15 | 133 | 101 | 15 | 83 | 1500 | C |
| EPM322 | 24 | +/-5 | +/-200 | 107 | 15 | 78 | 1500 | C |
| EPM323 | 24 | +/-12 | +/-84 | 103 | 15 | 81 | 1500 | C |
| EPM324 | 24 | +/-15 | +/-67 | 103 | 15 | 81 | 1500 | C |

Note: Other input to output voltages may be available. Please contact factory.

[6] NOMINAL INPUT VOLTAGE.
[7] NOMINAL INPUT VOLTAGE, FULL LOAD.

# Selection Guide 2W Output D-Model

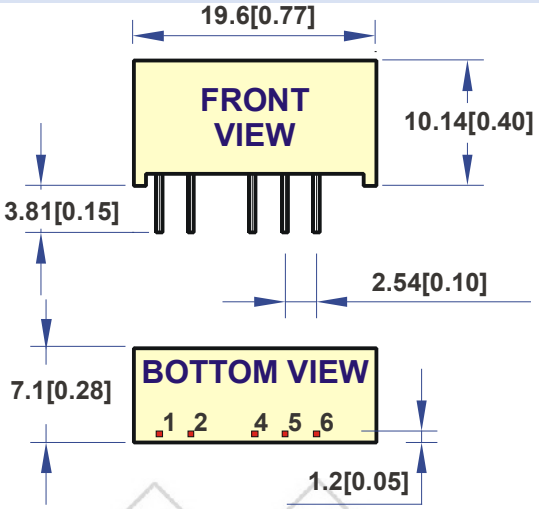
| MODEL NUMBER | INPUT VOLTAGE (VDC) | OUTPUT VOLTAGE (VDC) | OUTPUT CURRENT (mA) | INPUT[8] CURRENT(mA) FULL LOAD | INPUT[8] CURRENT(mA) NO LOAD | EFF (%)[9] | ISOLATION (VDC) | PACKAGE |
|---|---|---|---|---|---|---|---|---|
| EPM401 | 5 | 3.3 | 500 | 452 | 60 | 73 | 3000 | D |
| EPM402 | 5 | 5 | 400 | 520 | 60 | 77 | 3000 | D |
| EPM403 | 5 | 9 | 222 | 510 | 60 | 78 | 3000 | D |
| EPM404 | 5 | 12 | 167 | 500 | 60 | 80 | 3000 | D |
| EPM405 | 5 | 15 | 133 | 492 | 60 | 81 | 3000 | D |
| EPM406 | 5 | +/-5 | +/-200 | 520 | 60 | 77 | 3000 | D |
| EPM426 | 5 | +/-9 | +/-111 | 512 | 60 | 78 | 3000 | D |
| EPM407 | 5 | +/-12 | +/-84 | 500 | 60 | 80 | 3000 | D |
| EPM408 | 5 | +/-15 | +/-67 | 488 | 60 | 82 | 3000 | D |
| EPM409 | 12 | 3.3 | 500 | 185 | 15 | 74 | 3000 | D |
| EPM410 | 12 | 5 | 400 | 210 | 15 | 79 | 3000 | D |
| EPM411 | 12 | 9 | 222 | 210 | 15 | 79 | 3000 | D |
| EPM412 | 12 | 12 | 167 | 205 | 15 | 81 | 3000 | D |
| EPM413 | 12 | 15 | 133 | 200 | 15 | 83 | 3000 | D |
| EPM414 | 12 | +/-5 | +/-200 | 214 | 15 | 78 | 3000 | D |
| EPM415 | 12 | +/-12 | +/-84 | 203 | 15 | 82 | 3000 | D |
| EPM416 | 12 | +/-15 | +/-67 | 200 | 15 | 83 | 3000 | D |
| EPM425 | 12 | +/-18 | +/-55 | 199 | 20 | 83 | 3000 | D |
| EPM417 | 24 | 3.3 | 500 | 92 | 15 | 74 | 3000 | D |
| EPM418 | 24 | 5 | 400 | 108 | 15 | 77 | 3000 | D |
| EPM419 | 24 | 9 | 222 | 108 | 15 | 77 | 3000 | D |
| EPM420 | 24 | 12 | 167 | 104 | 15 | 80 | 3000 | D |
| EPM421 | 24 | 15 | 133 | 102 | 15 | 82 | 3000 | D |
| EPM422 | 24 | +/-5 | +/-200 | 107 | 15 | 78 | 3000 | D |
| EPM423 | 24 | +/-12 | +/-84 | 103 | 15 | 81 | 3000 | D |
| EPM424 | 24 | +/-15 | +/-67 | 102 | 15 | 81 | 3000 | D |

Note: Other input to output voltages may be available. Please contact factory.

[8] NOMINAL INPUT VOLTAGE.
[9] NOMINAL INPUT VOLTAGE, FULL LOAD.

# Mechanical Dimensions & Recommended Footprint Details

## PACKAGE "C"

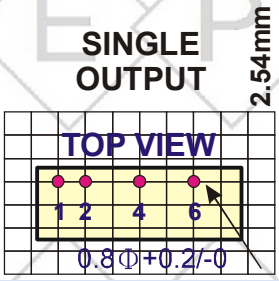


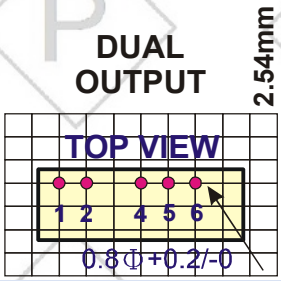

| PIN | SINGLE | DUAL |
|---|---|---|
| 1 | +Vin | +Vin |
| 2 | -Vin | -Vin |
| 4 | -Vout | -Vout |
| 5 | NP | COMMON |
| 6 | +Vout | +Vout |

NOTE : All dimensions are in mm(Inches)

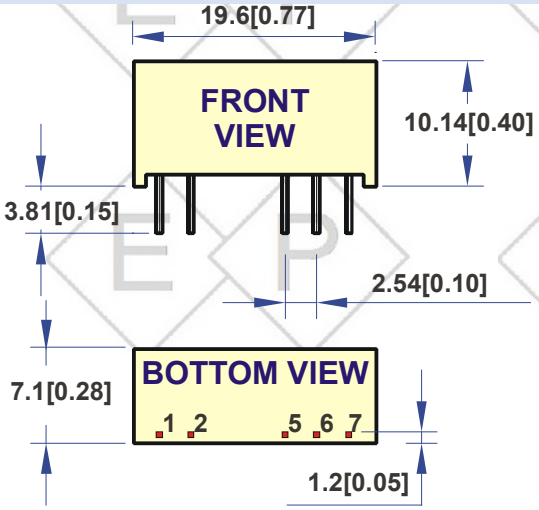
1. Pin Size is 0.50x0.30mm[0.02x0.01"]
2. Pin is Tolerance .XX= ±0.05mm
3. Tolerance .X or .XX= ±0.5mm

**All dimensions are in mm[inches]**




## PACKAGE "D"

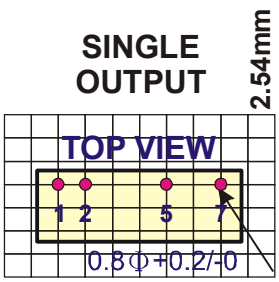


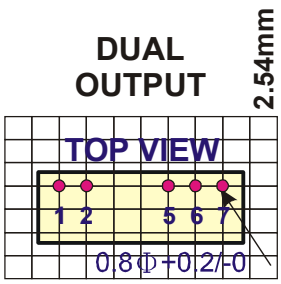

| PIN | SINGLE | DUAL |
|---|---|---|
| 1 | +Vin | +Vin |
| 2 | -Vin | -Vin |
| 5 | -Vout | -Vout |
| 6 | NP | COMMON |
| 7 | +Vout | +Vout |

NOTE : All dimensions are in mm(Inches)

1. Pin Size is 0.50x0.30mm[0.02x0.01"]
2. Pin is Tolerance .XX= ±0.05mm
3. Tolerance .X or .XX= ±0.5mm

**All dimensions are in mm[inches]**

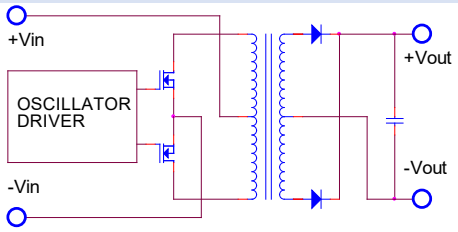


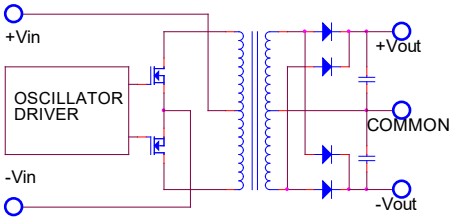

R. Nafe -Electronic Products Steinfeldstr. 3 83558 Maitenbeth Tel.: +049/(0) 80 76/88 933 52 Fax: +049/(0) 80 76/88 933 57 E-Mail: info@electronic-products.com Internet: www.electronic-products.com

## Simplified Schematic

SINGLE OUTPUT

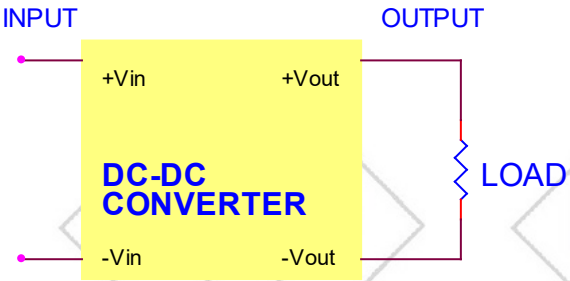



DUAL OUTPUT

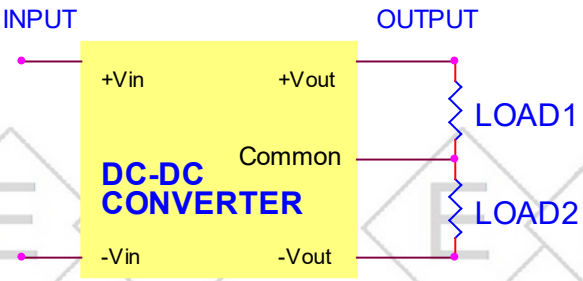



## Typical Applications

SINGLE OUTPUT



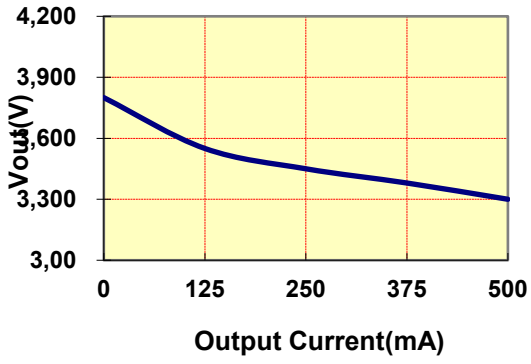

DUAL OUTPUT



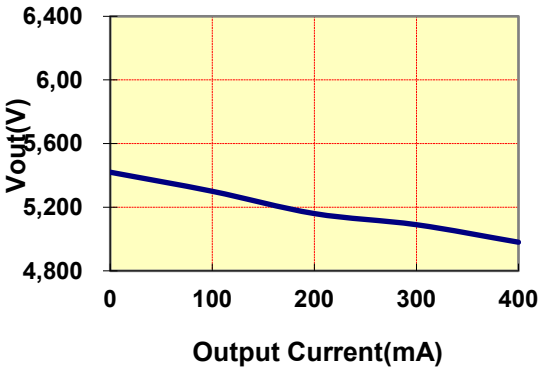

## Typical Performance Curves

Specifications typical at TA=25 °C,nominal input voltage , rated output current unless otherwise specified.

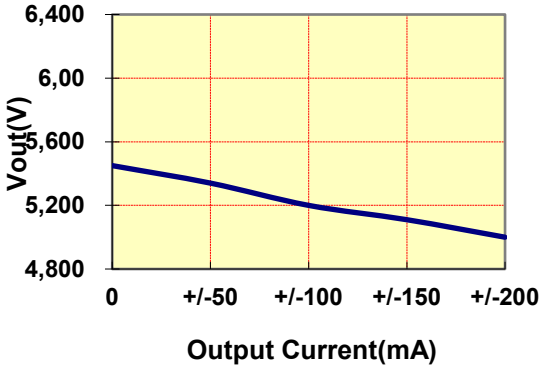
VOUT VS LOAD(3.3Vout Models)



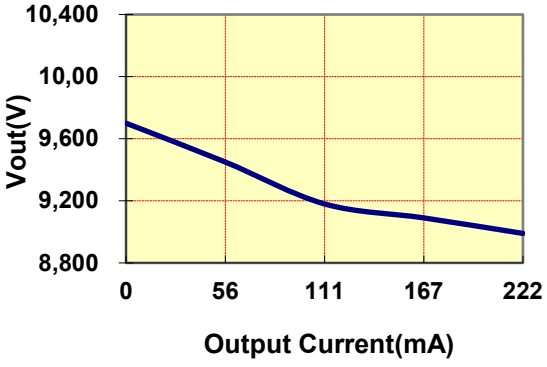

VOUT VS LOAD(5Vout Models)




VOUT VS LOAD(+/- 5Vout Models)

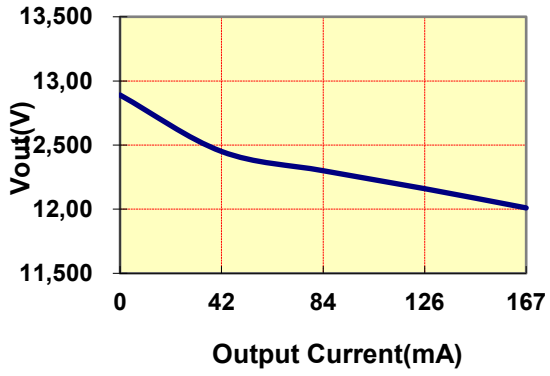



VOUT VS LOAD(9Vout Models)

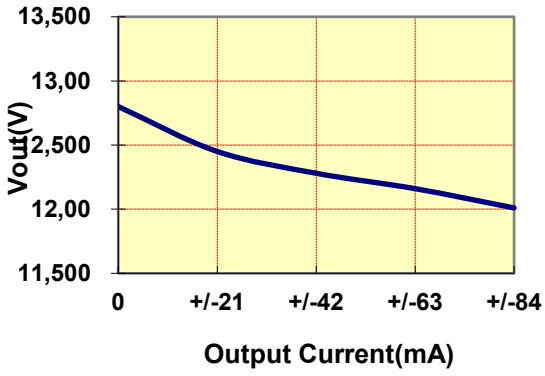



R. Nafe -Electronic Products Steinfeldstr. 3 83558 Maitenbeth Tel.: +049/(0) 80 76/88 933 52 Fax: +049/(0) 80 76/88 933 57 E-Mail: info@electronic-products.com Internet: www.electronic-products.com

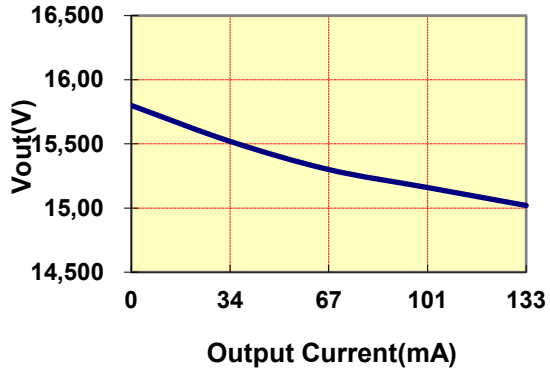
## VOUT VS LOAD(12Vout Models)



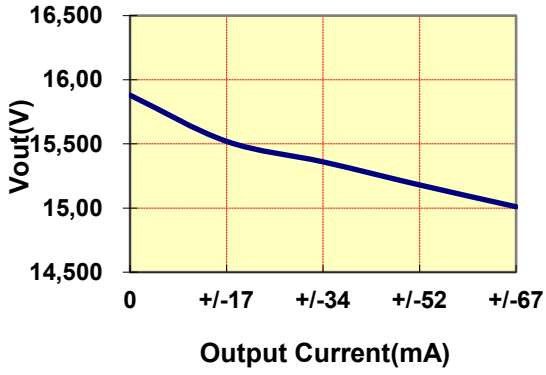

## VOUT VS LOAD(+/- 12Vout Models)



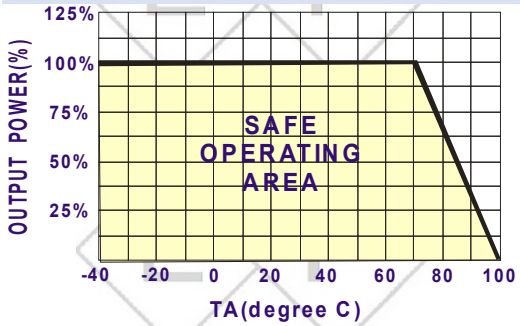

## VOUT VS LOAD(15Vout Models)



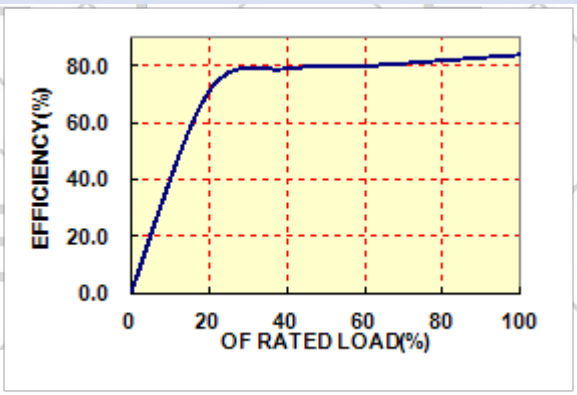

## VOUT VS LOAD(+/- 15Vout Models)




## DERATING CURVES



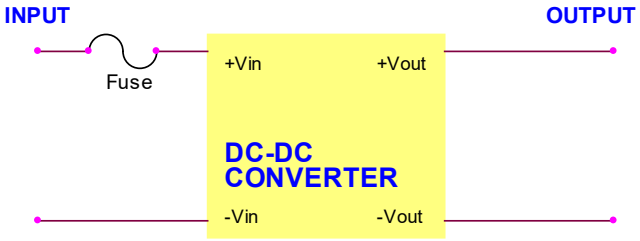

## EFFICIENCY VS LOAD




R. Nafe -Electronic Products Steinfeldstr. 3 83558 Maitenbeth Tel.: +049/(0) 80 76/88 933 52 Fax: +049/(0) 80 76/88 933 57 E-Mail: info@electronic-products.com Internet: www.electronic-products.com

## Input Fuse Selection Guide

| 2.97-3.63V | 4.5-5.5V | 10.8-13.2V | 21.6-26.4V |
|---|---|---|---|
| INPUT VOLTAGE (VDC) | INPUT VOLTAGE (VDC) | INPUT VOLTAGE (VDC) | INPUT VOLTAGE (VDC) |
| 1200mA Slow-Blow Type | 800mA Slow-Blow Type | 300mA Slow-Blow Type | 170mA Slow-Blow Type |




Note: Certain applications may require the installation of external fuse in front of the input.

## EPM300-400 Series Application Notes:

EXTERNAL CAPACITANCE REQUIREMENTS:
Output filtering is required for operation. A minimum of 10uF is needed. Output capacitance may be increased for additional filtering, not to exceed 220uF.
To meet the reflected ripple requirements of the converter, an input impedance of less than 0.5ohm from DC to 250KHz is required.
We Can Offer EMC-Filter According To EN55011/22 Class B.

Negative Outputs:
A negative output voltage may be obtained by connecting the +OUT to circuit ground and connecting –OUT as the negative output.



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