# MEK3S Series

3W, Unregulated, 3KV Isolation, SIP7 Package DC/DC Converters

## Features

- Rated power: 3W Max
- Input voltage range ±10%
- Unregulated single output
- High efficiency, up to 85%
- Small no load input current
- Isolation voltage 3KVDC
- Operating temperature range: -40 ~ +85°C ambient
- RoHS compliant
- Compact SIP7 package
- Continuous short circuit protection
- Designed to meet EN/IEC 62368-1
- 3 year warranty

## Overview

The MEK3S series are unregulated SIP7 package DC/DC converters with single outputs, and 3KVDC isolation. These converters feature high efficiency, low ripple and noise, continuous short circuit protection, and wide operating temperature range. They are widely used in distributed power system in industrial applications where isolation and voltage converting is needed.

## Model Numbers

| Model Number | Input Voltage [VDC] ±10% | Output Voltage [VDC] | Output Current [mA] | | Efficiency [%] Typ. | Capacitive Load [uF] Max. |
|---|---|---|---|---|---|---|
| | | | Max. | Min. | | |
| **MEK3S-0503** | 5 | 3.3 | 600 | 60 | 80 | 220 |
| **MEK3S-0505** | 5 | 5 | 600 | 60 | 83 | 220 |
| **MEK3S-0509** | 5 | 9 | 333 | 33 | 83 | 220 |
| **MEK3S-1205** | 12 | 5 | 600 | 60 | 83 | 220 |
| **MEK3S-1212** | 12 | 12 | 250 | 25 | 83 | 220 |
| **MEK3S-1515** | 15 | 15 | 200 | 20 | 85 | 220 |

* Only typical models are listed. Other models may be available upon request.

## Electrical Specifications

Unless otherwise indicated, specifications are measured at $T_A$=25°C, nominal input voltage, full load after warm up.

| Parameters | Conditions | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| **Input current**<br>Full load | $V_{IN}$=5V<br>$V_{IN}$=12V<br>$V_{IN}$=15V | - | 714<br>284<br>230 | - | mA | |
| **Input current**<br>No load | $V_{IN}$=5V<br>$V_{IN}$=12V<br>$V_{IN}$=15V | - | 10<br>15<br>20 | - | mA | |
| **Reflected Ripple Current** | | - | 15 | - | mA | |
| **Surge voltage**<br>1 second max | $V_{IN}$=5V<br>$V_{IN}$=12V<br>$V_{IN}$=15V | -0.7<br>-0.7<br>-0.7 | - | 9<br>18<br>21 | VDC | |
| **Output voltage accuracy** | All models | Refer to graphic in "Characteristic Curves" section | | | | |
| **Line regulation**<br>For $V_{IN}$ change of ±1% | $V_{OUT}$=3.3V<br>Others | - | - | ±1.5<br>±1.2 | % | |
| **Load regulation**<br>$I_{OUT}$=10% to 100% of $I_{OUT, rated}$ | $V_{OUT}$=3.3V<br>Others | - | 14<br>10 | 20<br>15 | % | |
| **Temperature coefficiency** | Full load | - | | ±0.03 | %/°C | |
| **Output ripple and noise** | 20MHz bandwidth | - | 60 | 150 | mVp-p | |
| **Output short circuit protection** | | Continuous, automatic recovery | | | | |
| **Input filter** | | Capacitor | | | | |
| **Hot plug** | | None | | | | |

* Operating with less than 10% of rated load will not cause permanent damage to the converters, but the performances data may not fall into the specifications, and reliable operating is not assured.

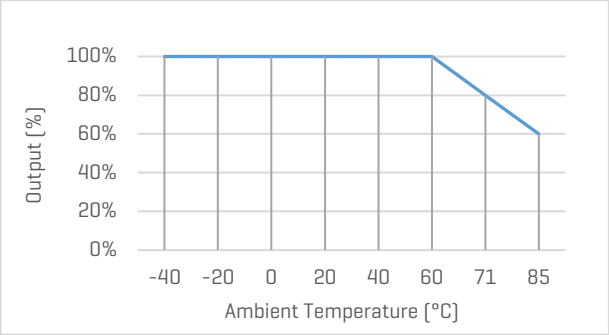
## General Specifications

| Parameters | Conditions | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| **Isolation voltage**<br>1 minute, leakage current <1mA | Input to Output | 3000 | - | - | VDC | |
| **Isolation resistance**<br>Tested at 500VDC | Input to Output | 1000 | - | - | M ohm | |
| **Isolation capacitance**<br>100KHz, 0.1V | Input to Output | - | 20 | - | pF | |
| **Operating temperature** | See "Derating Curve" | -40 | - | +85 | °C | |
| **Storage temperature** | | -55 | - | +125 | °C | |
| **Temperature rise at case** | Full load | - | 25 | - | °C | |
| **Storage humidity** | Non-condensing | - | - | 95 | %RH | |
| **Switching frequency** | Full load | - | 220 | - | KHz | |
| **Pin soldering resistance**<br>1.5mm away from case for 10 sec | | - | - | 300 | °C | |
| **Cooling method** | | Free air convection | | | | |
| **Case material** | | Black plastic UL94-V0 | | | | |
| **Vibration** | | 10-150Hz, 5G, 0.75mm along X, Y and Z | | | | |
| **Design based on standards** | | UL/EN/IEC 62368-1 | | | | |
| **Safety certifications** | | EN/IEC 62368-1 | | | | |
| **EMC** | Emissions<br>Immunity | CISPR32, EN55032 Class B with External Circuit<br>IEC/EN61000-4-2, Air ±8KV, Contact ±6KV, Criteria B | | | | |
| **MTBF** | MIL-HDBK-217F | >3,500,000 Hours, $T_A$=25°C | | | | |
| **Size** | | 19.65 x 7.05 x 10.10 mm | | | | |
| **Weight** | | 2.4g Typ. | | | | |

## Characteristic Curves

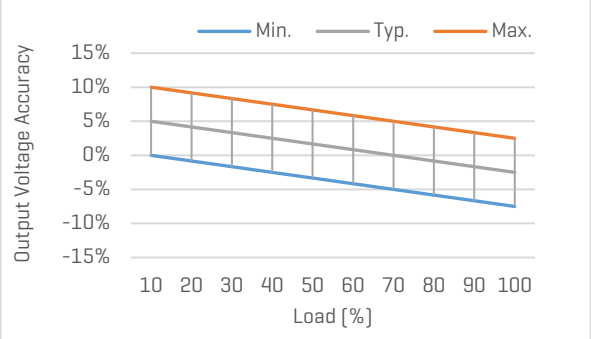
### Derating Curve

**Output vs Ambient Temperature**

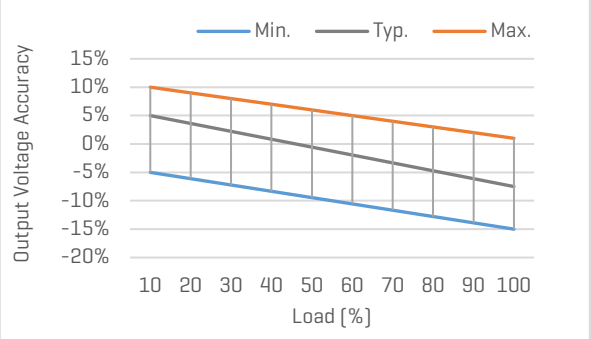



### Output Voltage Accuracy vs Load

None 3.3V output models

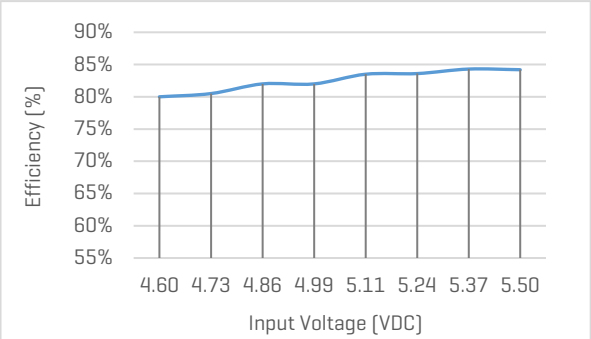



3.3V output models



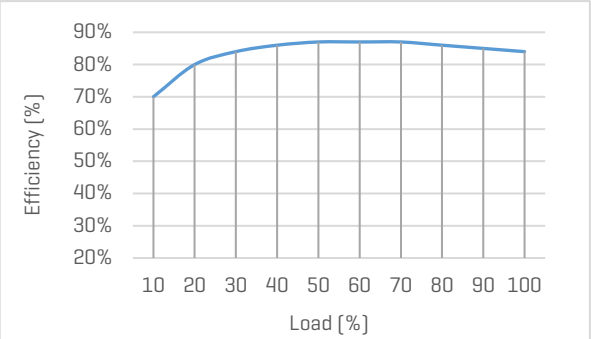

### Efficiency vs Input Voltage

MEK3S-0505, with full Load




### Efficiency vs Load

MEK3S-0505, with nominal input voltage



## Recommended External Circuit

### Typical Application Circuit

Typical application circuit is to further lower the input and output ripple. It is not required for general use.

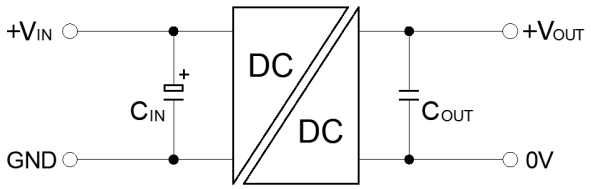



Figure 1. Typical external circuit

[Table 1] Recommended components

| Input voltage | $C_{IN}$ |
|---|---|
| **5V** | 4.7uF, 16V |
| **12, 15V** | 2.2uF, 25V |

| Output voltage | $C_{OUT}$ |
|---|---|
| **3.3, 5V** | 10uF, 16V |
| **9, 12V** | 2.2uF, 25V |
| **15V** | 1uF, 25V |

### EMC Enhancement for EN55032 Class B

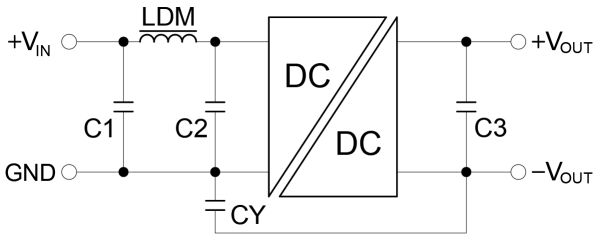
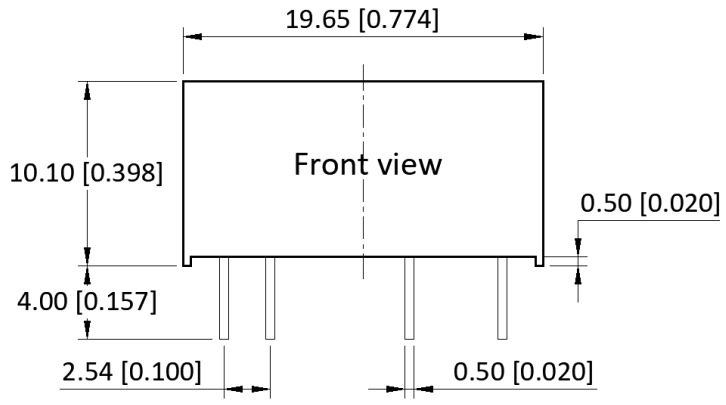


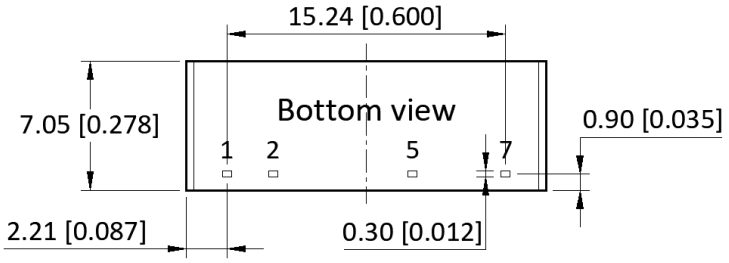

Figure 2. Circuit for EMC enhancement

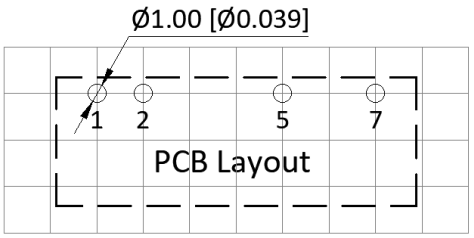
[Table 2] Recommended components

| Item | Spec |
|---|---|
| **LDM** | 6.8uH |
| **C1, C2** | 4.7uF, 50V |
| **CY** | 1nF, 4KV |
| **C3** | Refer to $C_{OUT}$ in [Table 1] |

## Mechanical Specifications




**Pin Definition**

| Pin # | Single Out |
|---|---|
| 1 | $V_{IN}$ |
| 2 | GND |
| 5 | 0V |
| 7 | $+V_{OUT}$ |

* Unless otherwise specified unit: mm [inch]
* General tolerance: ±0.50 [±0.020]
* Pin thickness: ±0.10 [±0.004]
* Footprint grid 2.54 x 2.54 mm