

# MEK3S Series

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

## Features

- ▶ Rated power: 3W Max
- ▶ Input voltage range  $\pm 10\%$
- ▶ Unregulated single output
- ▶ High efficiency, up to 83%
- ▶ Small no load input current
- ▶ Isolation voltage 3KVDC
- ▶ Operating temperature range:  $-40 \sim +105^{\circ}\text{C}$  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] $\pm 10\%$	Output Voltage [VDC]	Output Current [mA]		Efficiency [%] Typ.	Capacitive Load [ $\mu\text{F}$ ] 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.

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## Electrical Specifications

Unless otherwise indicated, specifications are measured at  $T_A=25^{\circ}\text{C}$ , nominal input voltage, full load after warm up.

Parameters	Conditions	Min.	Typ.	Max.	Unit	Note
<b>Input current</b> Full load	$V_{IN}=5\text{V}$ $V_{IN}=12\text{V}$ $V_{IN}=15\text{V}$	-	714 284 230	-	mA	
<b>Input current</b> No load	$V_{IN}=5\text{V}$ $V_{IN}=12\text{V}$ $V_{IN}=15\text{V}$	-	40 20 20	80 40 40	mA	
<b>Reflected Ripple Current</b>		-	15	-	mA	
<b>Surge voltage</b> 1 second max	$V_{IN}=5\text{V}$ $V_{IN}=12\text{V}$ $V_{IN}=15\text{V}$	-0.7 -0.7 -0.7	-	9 18 21	VDC	
<b>Output voltage accuracy</b>	All models	Refer to graphic in "Characteristic Curves" section				
<b>Line regulation</b> For $V_{IN}$ change of $\pm 1\%$	$V_{OUT}=3.3\text{V}$ Others	-	$\pm 1.5$ $\pm 1.2$	-	%	
<b>Load regulation</b> $I_{OUT}=10\%$ to $100\%$ of $I_{OUT, rated}$	$V_{OUT}=3.3\text{V}$ Others	-	14 10		%	
<b>Temperature coefficient</b>	Full load	-		$\pm 0.03$	$\%/^{\circ}\text{C}$	
<b>Output ripple and noise</b>	20MHz bandwidth	-	60	200	mVp-p	
<b>Output short circuit protection</b>		Continuous, automatic recovery				
<b>Input filter</b>		Capacitor				
<b>Hot plug</b>		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.

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## General Specifications

Parameters	Conditions	Min.	Typ.	Max.	Unit	Note
<b>Isolation voltage</b> Tested for 1 minute, leakage current less than 1mA	Input to Output	3000	-	-	VDC	
<b>Isolation resistance</b> Tested at 500VDC		1000	-	-	M ohm	
<b>Isolation capacitance</b> Tested between input and output, test condition 100KHz, 0.1V		-	20	-	pF	
<b>Operating temperature</b>	See "Derating Curve"	-40	-	+105	°C	
<b>Storage temperature</b>		-55	-	+125	°C	
<b>Temperature rise at case</b>	Full load	-	25	-	°C	
<b>Storage humidity</b>	Non-condensing	-	-	95	%RH	
<b>Switching frequency</b>	Full load	-	220	-	KHz	
<b>Pin soldering resistance</b> 1.5mm away from case for 10 sec		-	-	300	°C	
<b>Vibration</b>		10-150Hz, 5G, 0.75mm along X, Y and Z				
<b>Case material</b>		Black plastic UL94-V0				
<b>Cooling method</b>		Free air convection				
<b>Design based on standards</b>		UL/EN/IEC 62368-1				
<b>Safety certifications</b>		EN/IEC 62368-1				
<b>EMC</b>	Emissions Immunity	CISPR32, EN55032 Class B* IEC/EN61000-4-2				
<b>MTBF</b>	MIL-HDBK-217F	>3,500,000 Hours, T <sub>A</sub> =25°C				
<b>Size</b>		19.65 x 7.05 x 10.16 mm				
<b>Weight</b>		1.8g Typ.				

\*External circuit is required in order to meet Class B, refer to Figure 2 in Recommended External Circuit

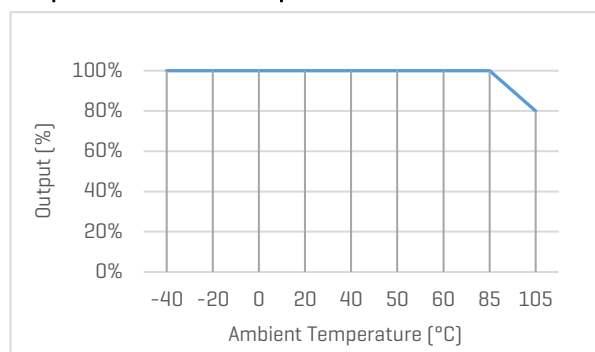
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## Characteristic Curves

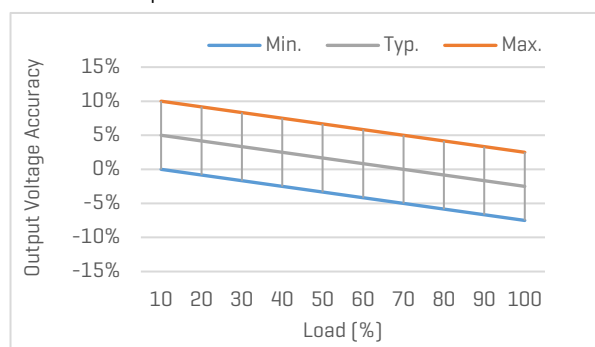
### Derating Curve

Output vs Ambient Temperature

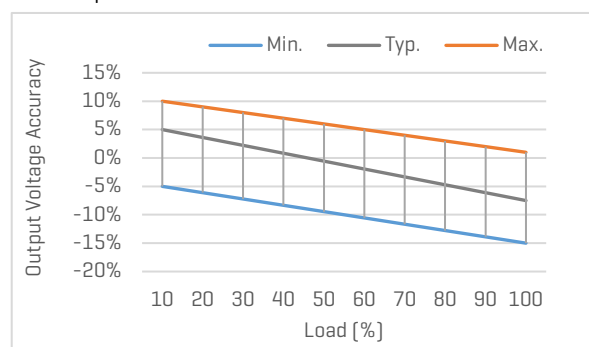


### Output Voltage Accuracy vs Load

None 3.3V output models

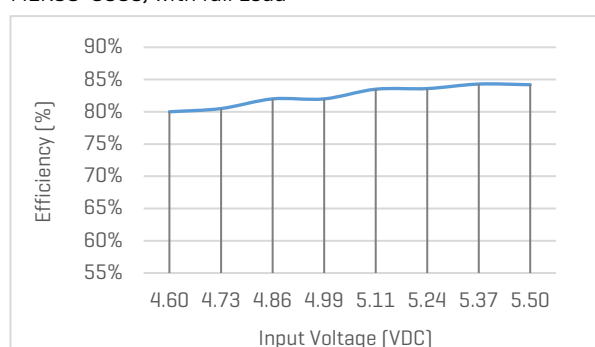


3.3V output models



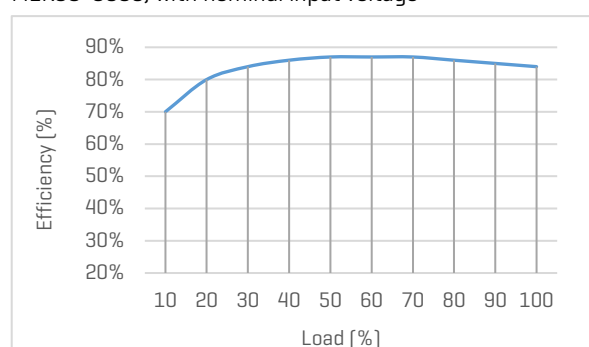
### Efficiency vs Input Voltage

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.

\*Recommended component specifications are typical values. Excessive external capacitive load may cause startup problem.

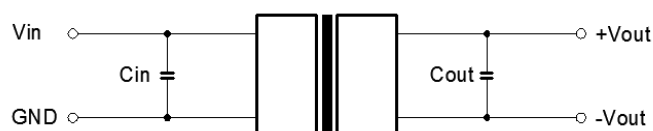


Figure 1. Typical external circuit

[Table 1] Recommended component spec

Input voltage	5V	9, 12, 15V	24V
C <sub>IN</sub>	4.7uF, 16V	2.2uF, 25V	1.0uF, 50V

[Table 2] Recommended component spec

Output voltage	3.3, 5V	9, 12V	15, 24V
C <sub>OUT</sub>	10uF, 16V	2.2uF, 25V	1.0uF, 50V

### Circuit for EMC Enhancement

\*Use this application circuit to meet Class B EMC performance.

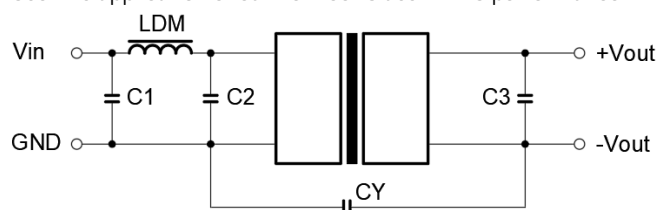


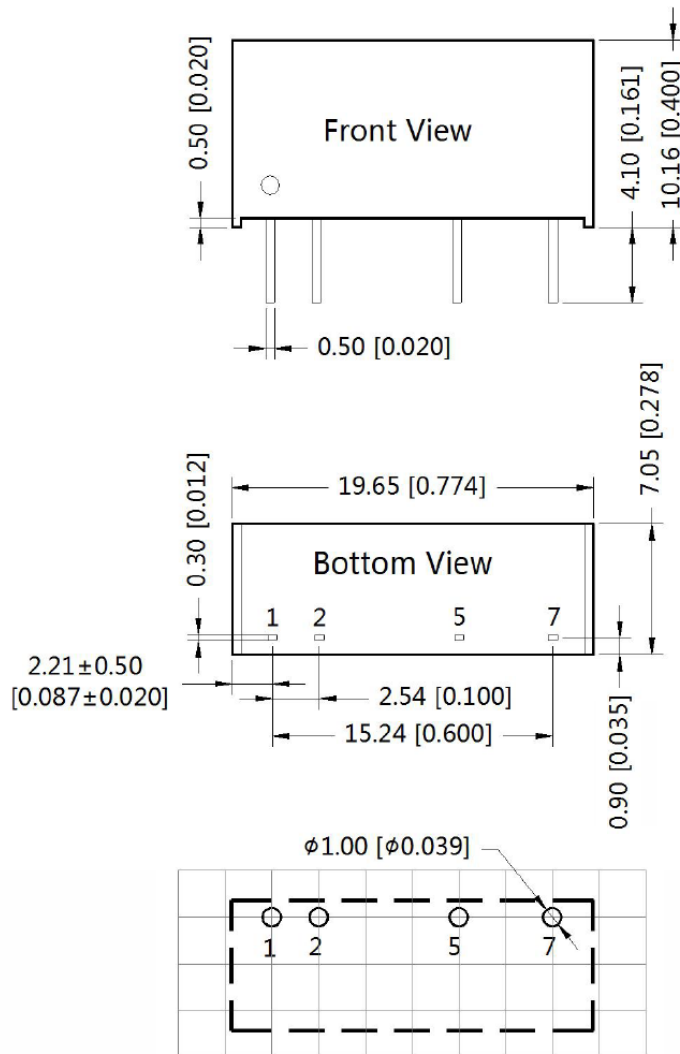
Figure 2. Circuit for EMC enhancement

[Table 3] Recommended component spec

Component	LDM	C1, C2	CY
Spec	6.8uH	4.7uF, 50V	1nF, 2KV

\*C3 refer to C<sub>OUT</sub> in [Table 2]

## Mechanical Specifications



### Pin Definition

Pin #	Single Out
1	V <sub>IN</sub>
2	GND
5	0V
7	+V <sub>OUT</sub>

\* Unless otherwise specified unit: mm [inch]

\* General tolerance:  $\pm 0.50$  [ $\pm 0.020$ ]

\* Pin thickness:  $\pm 0.10$  [ $\pm 0.004$ ]

\* Footprint grid 2.54 x 2.54 mm

### Recommended Footprint

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