

# ME2S Series

2W, Unregulated Single or Dual Output, 1.5KV Isolation, SIP7 Package DC/DC Converters

## Features

- ▶ Rated power: 2W Max
- ▶ Input voltage range  $\pm 10\%$
- ▶ Unregulated single or dual output
- ▶ High efficiency, up to 90%
- ▶ Small no load input current
- ▶ Isolation voltage 1.5KVDC
- ▶ Operating temperature range:  $-40 \sim +105^{\circ}\text{C}$  ambient
- ▶ RoHS compliant
- ▶ Compact SIP7 package
- ▶ Continuous short circuit protection
- ▶ Designed to meet UL/EN/IEC 62368-1
- ▶ 3 year warranty



## Overview

The ME2S series are unregulated SIP7 package DC/DC converters with single or dual outputs, and 1.5KVDC 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.		
ME2S-0303	3.3	3.3	400	40	77	2400
ME2S-0305	3.3	5	400	40	79	2400
ME2S-0309	3.3	9	222	22	80	1000
ME2S-0312	3.3	12	167	17	81	820
ME2S-0503	5	3.3	400	40	83	2400
ME2S-0505	5	5	400	40	85	2400
ME2S-0509	5	9	222	22	85	1000
ME2S-0512	5	12	167	17	86	820
ME2S-0515	5	15	133	13	87	680
ME2S-0524	5	24	83	8	88	560
ME2S-1203	12	3.3	400	40	84	2400
ME2S-1205	12	5	400	40	85	2400
ME2S-1209	12	9	222	22	86	1000
ME2S-1212	12	12	167	17	87	820
ME2S-1215	12	15	133	13	88	680
ME2S-1224	12	24	83	8	89	560
ME2S-1503	15	3.3	400	40	84	2400
ME2S-1505	15	5	400	40	85	2400

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## Model Numbers (continued)

Model Number	Input Voltage [VDC] ±10%	Output Voltage [VDC]	Output Current [mA]		Efficiency [%] Typ.	Capacitive Load [uF] Max.
			Max.	Min.		
ME2S-1509	15	9	222	22	86	1000
ME2S-1512	15	12	167	17	87	820
ME2S-1515	15	15	133	13	88	680
ME2S-1524	15	24	83	8	89	560
ME2S-2403	24	3.3	400	40	84	2400
ME2S-2405	24	5	400	40	86	2400
ME2S-2409	24	9	222	22	87	1000
ME2S-2412	24	12	167	17	88	820
ME2S-2415	24	15	133	13	89	680
ME2S-2424	24	24	83	8	90	560
ME2S-0503D	5	±3.3	±303	±30	83	1000
ME2S-0505D	5	±5	±200	±20	85	1000
ME2S-0509D	5	±9	±111	±11	85	560
ME2S-0512D	5	±12	±83	±8	86	560
ME2S-0515D	5	±15	±67	±7	87	220
ME2S-1203D	12	±3.3	±303	±30	84	1000
ME2S-1205D	12	±5	±200	±20	85	1000
ME2S-1209D	12	±9	±111	±11	86	560
ME2S-1212D	12	±12	±83	±8	87	560
ME2S-1215D	12	±15	±67	±7	88	220
ME2S-1503D	15	±3.3	±303	±30	84	1000
ME2S-1505D	15	±5	±200	±20	85	1000
ME2S-1509D	15	±9	±111	±11	86	560
ME2S-1512D	15	±12	±83	±8	87	560
ME2S-1515D	15	±15	±67	±7	88	220
ME2S-2403D	24	±3.3	±303	±30	84	1000
ME2S-2405D	24	±5	±200	±20	86	1000
ME2S-2409D	24	±9	±111	±11	87	560
ME2S-2412D	24	±12	±83	±8	88	560
ME2S-2415D	24	±15	±67	±7	89	220

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

\* For dual output models, max capacitive load stipulated in the above list is for each output.

\* See MEK2S series for 3KVDC isolation models, and MEG2S series for 6KVDC isolation models.

## 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
Input current Full load	$V_{IN}=5\text{V}$		506			
	$V_{IN}=9\text{V}$		268			
	$V_{IN}=12\text{V}$	-	208	-	mA	
	$V_{IN}=15\text{V}$		167			
	$V_{IN}=24\text{V}$		104			
Input current No load		-	4	15	mA	
Reflected Ripple Current		-	15	-	mA	
Surge voltage 1 second max	$V_{IN}=5\text{V}$	-0.7		9		
	$V_{IN}=9\text{V}$	-0.7		12		
	$V_{IN}=12\text{V}$	-0.7	-	18	VDC	
	$V_{IN}=15\text{V}$	-0.7		21		
	$V_{IN}=24\text{V}$	-0.7		30		
Output voltage accuracy	All models	Refer to graphic in "Characteristic Curves" section				
Line regulation For $V_{IN}$ change of $\pm 1\%$	$V_{OUT}=3.3\text{V}$	-	$\pm 1.5$	-	%	
	All others		$\pm 1.2$			
Load regulation $I_{OUT}=10\%$ to $100\%$ of $I_{OUT, \text{rated}}$ ,	$V_{OUT}=3.3\text{V}$		14			
	$V_{OUT}=5\text{V}$		10			
	$V_{OUT}=9\text{V}$	-	9	-	%	
	$V_{OUT}=12\text{V}$		8			
	$V_{OUT}=15\text{V}$		7			
	$V_{OUT}=24\text{V}$		6			
Temperature coefficient	Full load	-	-	$\pm 0.03$	$\%/^{\circ}\text{C}$	
Output ripple and noise	20MHz bandwidth	-	60	120	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.

\* Dual output models need to operate with balanced load. The load difference between two outputs over 10% may cause unstable operating of the converter.

## 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	1500	-	-	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/EN 61000-4-2				
<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>		2.0g Typ.				

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

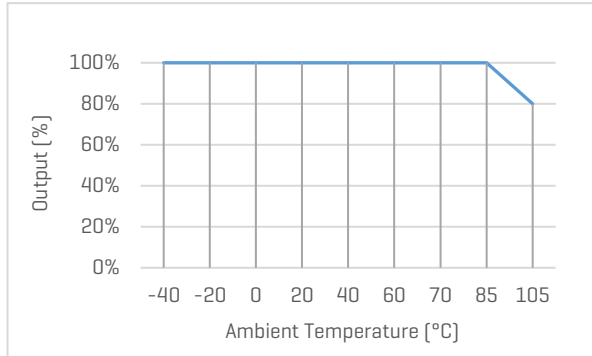
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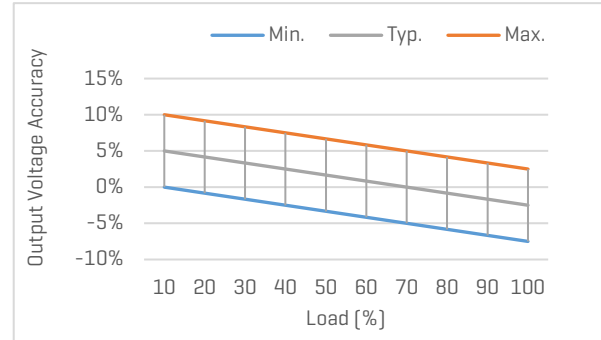
## Characteristic Curves

### Derating Curve

Output vs Ambient Temperature



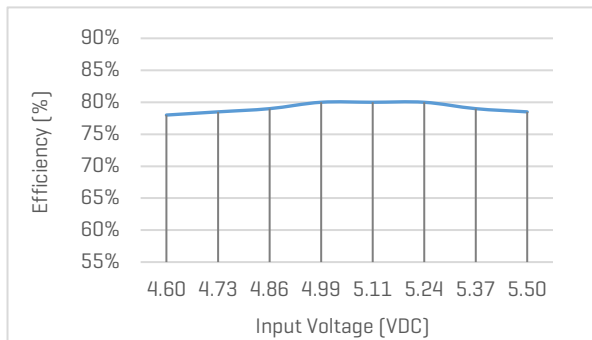
Output Voltage Accuracy vs Load



### Efficiency Curves

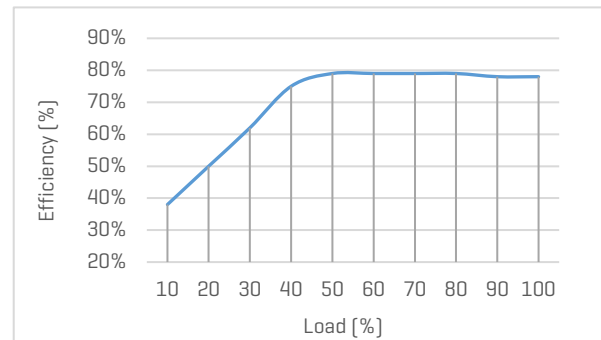
Efficiency vs Input Voltage

ME2S-0505, with full Load



Efficiency vs Load

ME2S-0505, with nominal input voltage

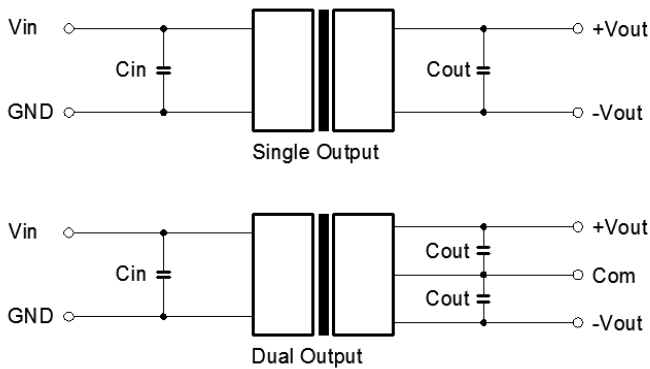


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## Recommended External Circuit

### 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.

[Table 1] Recommended component spec

V <sub>IN</sub>	5V	9, 12, 15V	24V
C <sub>IN</sub>	4.7uF, 16V	2.2uF, 25V	1uF, 50V

Figure 1. Typical external circuit

[Table 2] Recommended component spec

Single Out	3.3, 5V	9, 12V	15, 24V
C <sub>OUT</sub>	10uF, 16V	2.2uF, 25V	1uF, 50V
Dual Out	±3.3, ±5V	±9, ±12V	±15, ±24V
C <sub>OUT</sub>	4.7uF, 16V	1uF, 25V	0.47uF, 50V

### Circuit for EMC Enhancement

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

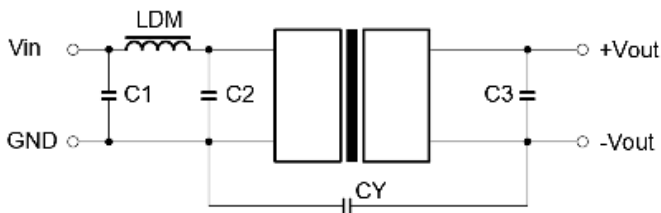


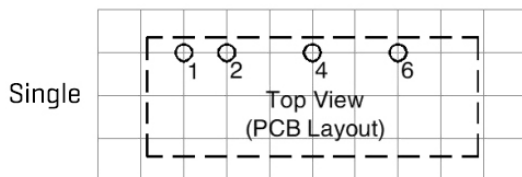
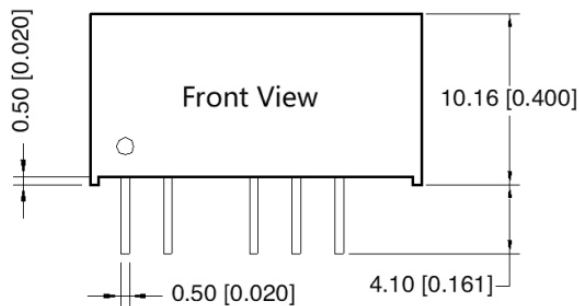
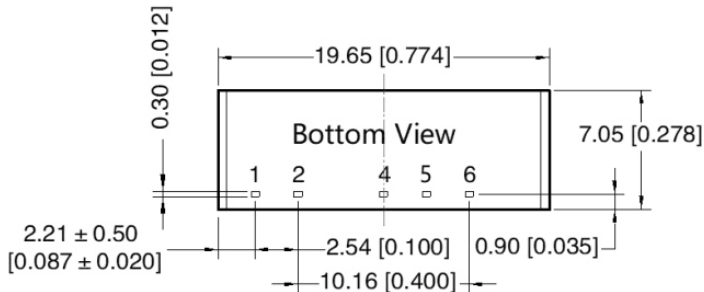
Figure 2. Circuit for EMC enhancement

[Table 3] Recommended component spec

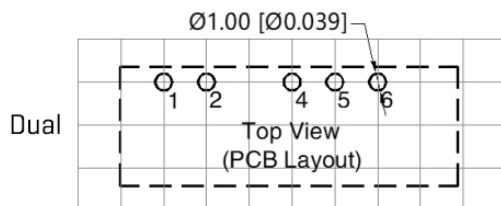
Component	LDM	C1, C2	CY
Spec	6.8uH	4.7uF, 50V	1nF, 2KV

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

## Mechanical Specifications



Note: Grid 2.54\*2.54mm



### Recommended Footprint

### Pin Definition

Pin #	Single Out	Dual Out
1	V <sub>IN</sub>	V <sub>IN</sub>
2	GND	GND
4	0V	-V <sub>OUT</sub>
5	No Pin	0V
6	+V <sub>OUT</sub>	+V <sub>OUT</sub>

\* 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

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