

# ME1A Series

1W, Unregulated Single Output, 1.5KV Isolation, SIP4 Package DC/DC Converters

## Features

- ▶ Rated power: 1W Max
- ▶ Input voltage range  $\pm 10\%$
- ▶ Unregulated single output
- ▶ High efficiency, up to 92%
- ▶ Small no load input current
- ▶ Isolation voltage 1.5KVDC
- ▶ Operating temperature range:  $-40 \sim +105^{\circ}\text{C}$  ambient
- ▶ RoHS compliant
- ▶ Compact SIP4 package
- ▶ Continuous short circuit protection
- ▶ Designed to meet UL/EN/IEC 62368-1
- ▶ 3 year warranty



## Overview

The ME1A series are SIP4 package DC/DC converters with unregulated single output, 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.		
ME1A-0303	3.3	3.3	303	30	82	4000
ME1A-0305	3.3	5	200	20	83	4000
ME1A-0309	3.3	9	111	11	84	2000
ME1A-0312	3.3	12	84	8	85	1000
ME1A-0503	5	3.3	303	30	82	4000
ME1A-0505	5	5	200	20	87	4000
ME1A-0509	5	9	111	12	86	2000
ME1A-0512	5	12	84	9	88	1000
ME1A-0515	5	15	67	7	88	680
ME1A-0524	5	24	42	4	89	560
ME1A-1203	12	3.3	303	30	84	4000
ME1A-1205	12	5	200	20	88	4000
ME1A-1209	12	9	111	12	87	2000
ME1A-1212	12	12	84	9	90	1000
ME1A-1215	12	15	67	7	88	680
ME1A-1224	12	24	42	5	89	560

1W, Unregulated Single Output, 1.5KV Isolation, SIP4 Package DC/DC Converters

## Model Numbers [continued]

Model Number	Input Voltage [VDC] ±10%	Output Voltage [VDC]	Output Current [mA]		Efficiency [%] Typ.	Capacitive Load [uF] Max.
			Max.	Min.		
ME1A-1503	15	3.3	200	20	85	4000
ME1A-1505	15	5	200	20	85	4000
ME1A-1509	15	9	111	12	91	2000
ME1A-1512	15	12	84	9	89	1000
ME1A-1515	15	15	67	7	89	680
ME1A-2403	24	3.3	303	30	84	4000
ME1A-2405	24	5	200	20	87	4000
ME1A-2409	24	9	111	12	92	2000
ME1A-2412	24	12	84	9	88	1000
ME1A-2415	24	15	67	7	88	680
ME1A-2424	24	24	42	5	89	560

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

\* See MEK1A series for 3KVDC 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	$V_{IN}=3.3\text{V}$		370	390	mA	
	$V_{IN}=5\text{V}$		230	260		
	$V_{IN}=12\text{V}$	-	99	105		
	$V_{IN}=15\text{V}$		78	85		
	$V_{IN}=24\text{V}$		50	55		
Input current No load		-	3	15	mA	
Reflected ripple current		-	15	-	mA	
Surge voltage 1 second max	$V_{IN}=3.3\text{V}$	-0.7		5	VDC	
	$V_{IN}=5\text{V}$	-0.7		9		
	$V_{IN}=12\text{V}$	-0.7	-	18		
	$V_{IN}=15\text{V}$	-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 $I_{OUT, rated}$	$V_{OUT}=3.3\text{V}$		10		%	
	$V_{OUT}=5\text{V}$		8			
	$V_{OUT}=9\text{V}$		8			
	$V_{OUT}=12\text{V}$	-	7	-		
	$V_{OUT}=15\text{V}$		6			
	$V_{OUT}=24\text{V}$		6			
Temperature coefficient	Full load	-	$\pm 0.03$	-	$\%/^{\circ}\text{C}$	
Output ripple and noise 20MHz bandwidth, peak to peak		-	45	70	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

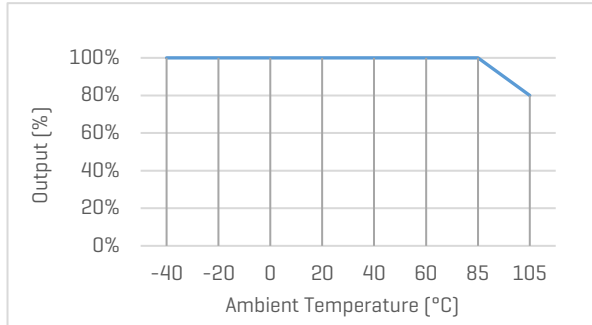
Parameters	Conditions	Min.	Typ.	Max.	Unit	Note
<b>Isolation voltage</b> 1 minute, leakage current 1mA max	Input to Output	1500	-	-	VDC	
<b>Isolation resistance</b> Tested at 500VDC	Input to Output	1000	-	-	M ohm	
<b>Isolation capacitance</b> 100KHz, 0.1V	Input to Output	-	20	-	pF	
<b>Operating temperature</b>	See "Derating Curve"	-40	-	+105	°C	
<b>Storage temperature</b>		-55	-	+125	°C	
<b>Temperature rise at case</b>	Full load	-	15	-	°C	
<b>Storage humidity</b>	Non-condensing	5	-	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>		11.6 x 6.0 x 10.2mm				
<b>Weight</b>		1.6 Typ.				

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

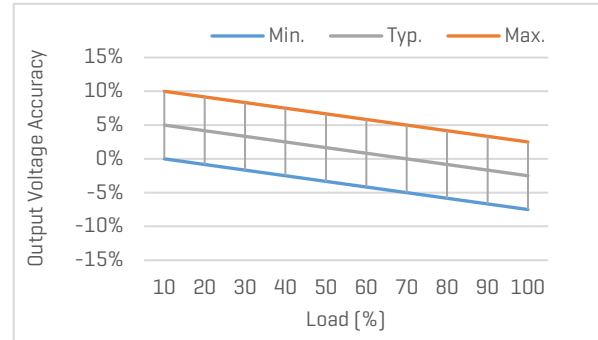
## Characteristic Curves

### Derating Curve

#### Output vs Ambient Temperature



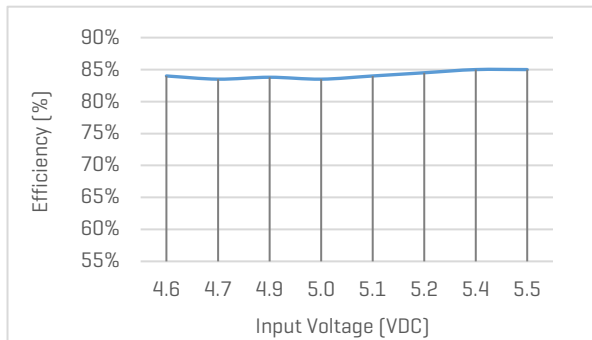
### Output Voltage Accuracy vs Load



### Efficiency Curves

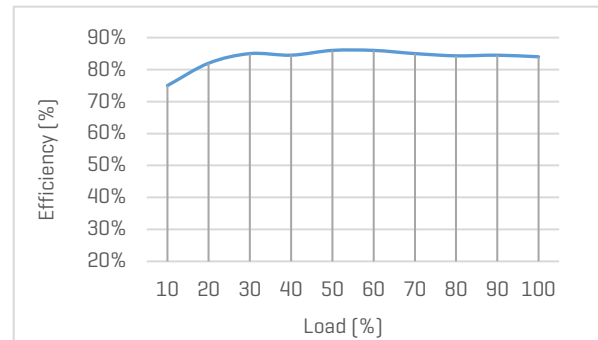
#### Efficiency vs Input Voltage

ME1A-0505, with full Load



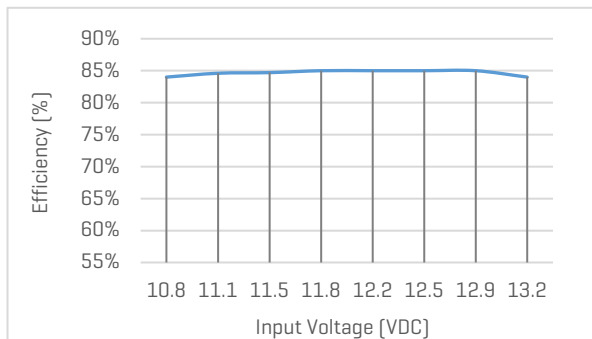
#### Efficiency vs Load

ME1A-0505, with nominal input voltage



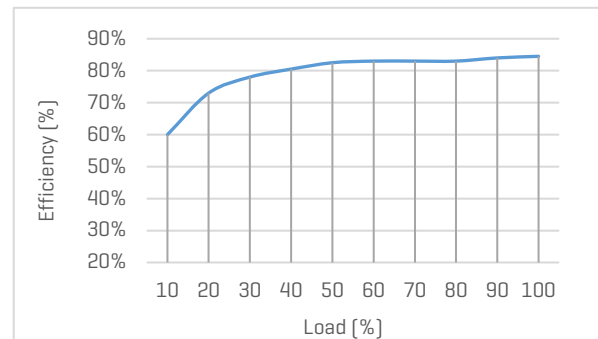
#### Efficiency vs Input Voltage

ME1A-1205, with full Load



#### Efficiency vs Load

ME1A-1205, 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	3.3, 5V	12V	15V	24V
$C_{IN}$	4.7uF, 16V	2.2uF, 25V	2.2uF, 25V	1uF, 50V

[Table 2] Recommended component spec

Output voltage	3.3, 5V	9V	12V	15V	24V
$C_{OUT}$	10uF, 16V	4.7uF, 16V	2.2uF, 25V	1uF, 25V	0.47uF, 50V

### Circuit for EMC Enhancement

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

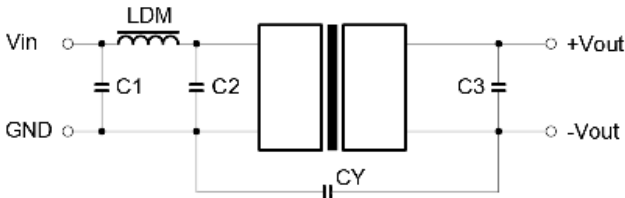


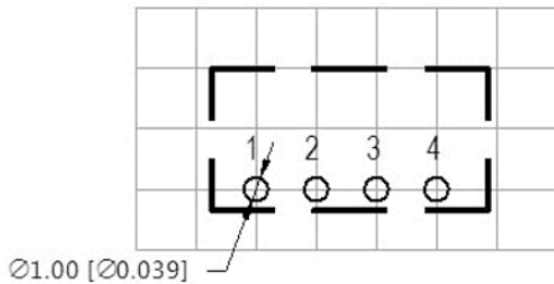
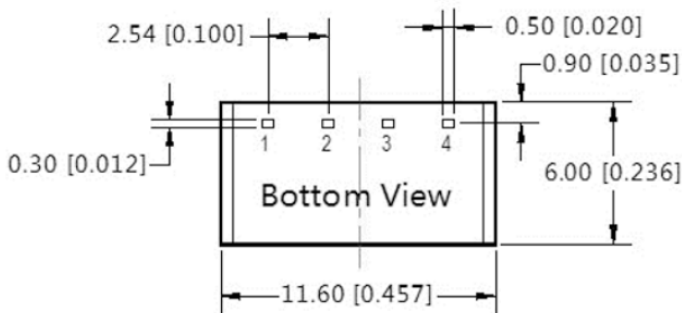
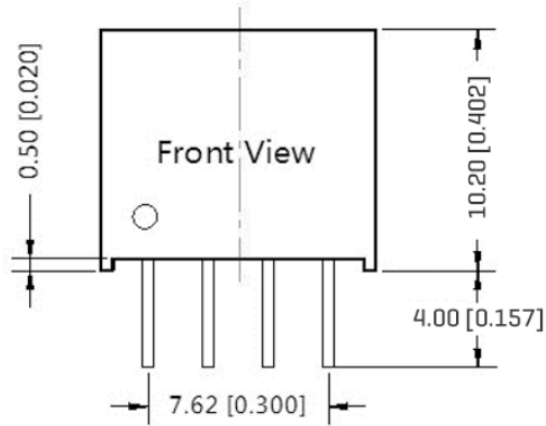
Figure 2. Circuit for EMC enhancement

[Table 3] Recommended component spec

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

\*C3 refer to  $C_{OUT}$  in [Table 2]

## Mechanical Specifications



**Recommended Footprint**

### Pin Definition

Pin #	Single Out
1	GND
2	V <sub>IN</sub>
3	0V
4	+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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