ME1A Series

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

Features

- Rated power: 1W Max
- Input voltage range ±10%
- Unregulated single output
- High efficiency, up to 92%
- Small no load input current
- Isolation voltage 1.5KVDC
- Operating temperature range: -40 ~ +105°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] ±10%	Output Voltage [VDC]	Output Current [mA]		Efficiency [%] Typ.	Capacitive Load [uF] 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

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.

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 Full load	V_{IN}=3.3V V_{IN}=5V V_{IN}=12V V_{IN}=15V V_{IN}=24V	-	370 230 99 78 50	390 260 105 85 55	mA	
Input current No load		-	3	15	mA	
Reflected ripple current		-	15	-	mA	
Surge voltage 1 second max	V_{IN}=3.3V V_{IN}=5V V_{IN}=12V V_{IN}=15V V_{IN}=24V	-0.7 -0.7 -0.7 -0.7 -0.7	-	5 9 18 21 30	VDC	
Output voltage accuracy	All models	Refer to graphic in "Characteristic Curves" section				
Line regulation For V_{IN} change of ±1%	V_{OUT}=3.3V All others	-	-	±1.5 ±1.2	%	
Load regulation I_{OUT}=10% to 100% of $I_{OUT, rated}$	V_{OUT}=3.3V Others	-	10 8	20 15	%	
Temperature coefficiency	Full load	-	±0.03	-	%/°C	
Output ripple and noise 20MHz bandwidth, peak to peak		-	45	100	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

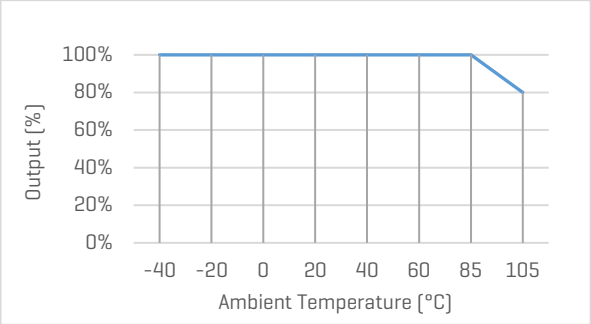
Parameters	Conditions	Min.	Typ.	Max.	Unit	Note
Isolation voltage 1 minute, leakage current 1mA max	Input to Output	1500	-	-	VDC	
Isolation resistance Tested at 500VDC	Input to Output	1000	-	-	M ohm	
Isolation capacitance 100KHz, 0.1V	Input to Output	-	20	-	pF	
Operating temperature	See "Derating Curve"	-40	-	+105	°C	
Storage temperature		-55	-	+125	°C	
Temperature rise at case	Full load	-	15	-	°C	
Storage humidity	Non-condensing	5	-	95	%RH	
Switching frequency Full load		-	220	-	KHz	
Pin soldering resistance 1.5mm away from case for 10 sec		-	-	300	°C	
Vibration		10-150Hz, 5G, 0.75mm along X, Y and Z				
Case material		Black plastic UL94-V0				
Cooling method		Free air convection				
Design based on standards		UL/EN/IEC 62368-1				
Safety certifications		EN/IEC 62368-1				
EMC	Emissions Immunity	CISPR32, EN55032 Class B with External Circuit IEC/EN61000-4-2, air ±8kV, contact ±6kV				
MTBF	MIL-HDBK-217F	>3,500,000 Hours, T_A=25°C				
Size		11.6 x 6.0 x 10.2mm				
Weight		1.6 Typ.				

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

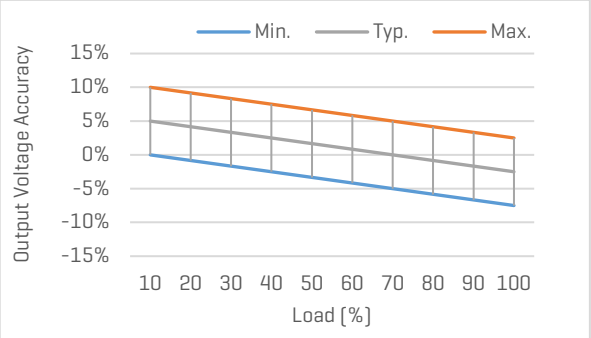
Characteristic Curves

Derating Curve

Output vs Ambient Temperature



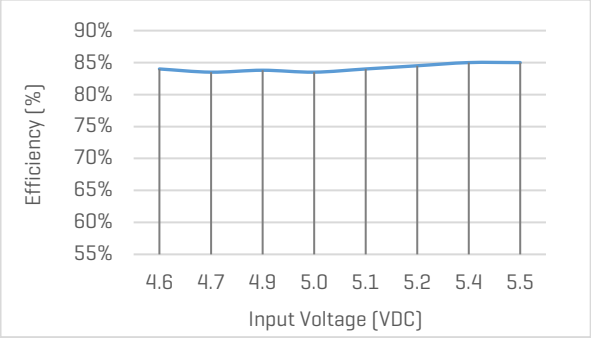
Output Voltage Accuracy vs Load



Efficiency Curves

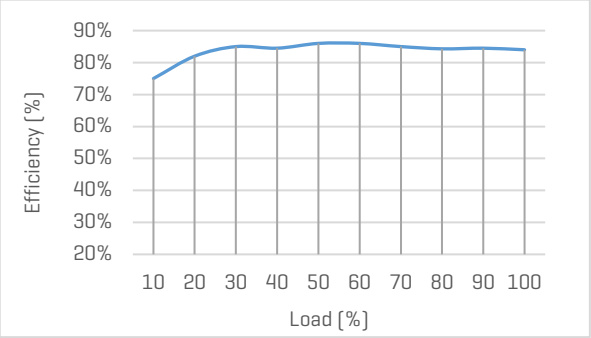
Efficiency vs Input Voltage

AME1A-0505, with full Load



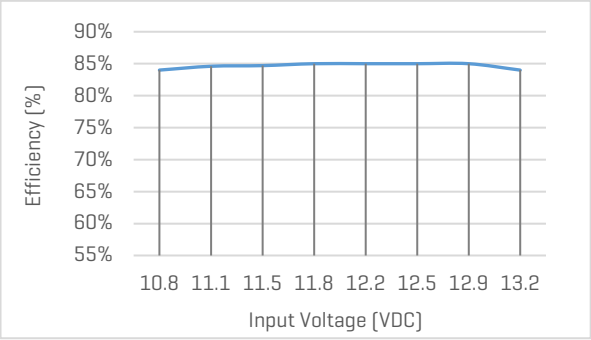
Efficiency vs Load

AME1A-0505, with nominal input voltage



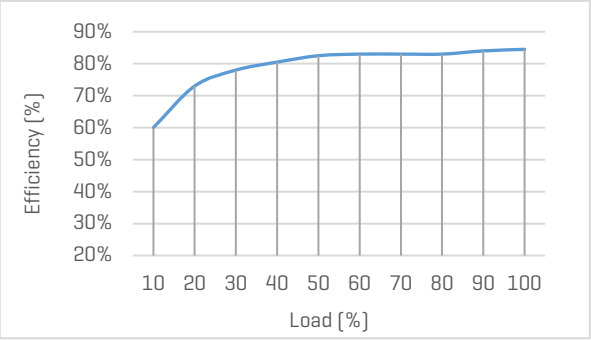
Efficiency vs Input Voltage

AME1A-1205, with full Load



Efficiency vs Load

AME1A-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.

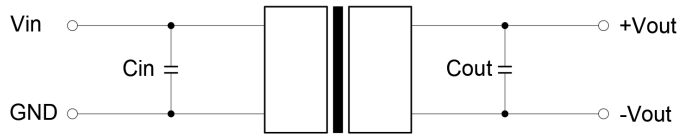


Figure 1. Typical external circuit

[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.

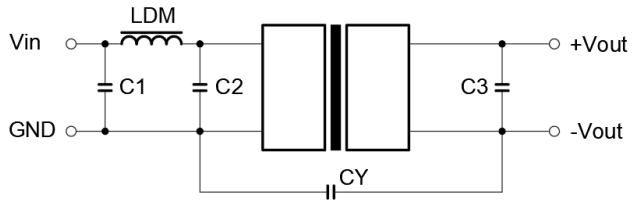


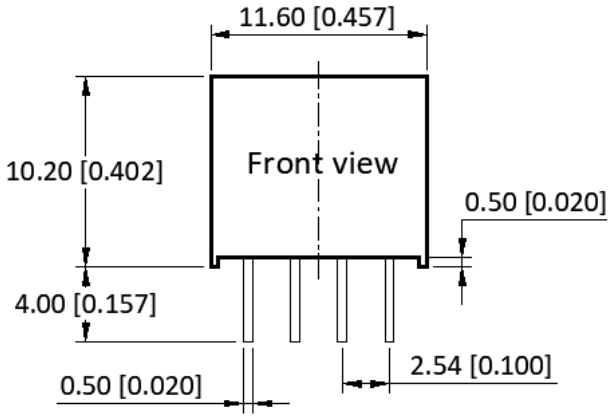
Figure 2. Circuit for EMC enhancement

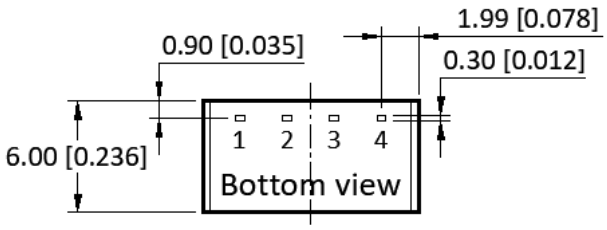
[Table 3] Recommended component spec

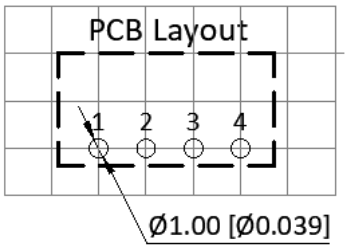
Item	**LDM**	**C1, C2**	**CY**
Spec	6.8uH	4.7uF, 50V	1nF, 2KV

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

Mechanical Specifications







Pin Definition

Pin #	Single Out
1	GND
2	V_{IN}
3	0V
4	$+V_{OUT}$

* 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