

ME1N Series

1W, Unregulated, 1.5KV Isolation, DIP8 Package DC/DC Converters



Features

- Rated power: 1W Max
- Input voltage range $\pm 10\%$
- Unregulated single output
- High efficiency, up to 89%
- Small no load input current
- Isolation voltage 1.5KVDC
- Operating temperature range: $-40 \sim +105^{\circ}\text{C}$ ambient
- RoHS compliant
- Compact DIP8 package
- Continuous short circuit protection
- Designed to meet UL/EN/IEC 62368-1
- 3 year warranty



Overview

The ME1N series are DIP8 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 [uF] Max.
			Max.	Min.		
ME1N-0503	5	3.3	303	30	83	4000
ME1N-0505	5	5	200	20	86	4000
ME1N-0509	5	9	111	12	86	2000
ME1N-0512	5	12	84	9	88	1000
ME1N-0515	5	15	67	7	88	680
ME1N-0524	5	24	42	4	89	560
ME1N-1203	12	3.3	303	30	84	4000
ME1N-1205	12	5	200	20	86	4000
ME1N-1209	12	9	111	12	87	2000
ME1N-1212	12	12	83	9	87	1000
ME1N-1215	12	15	67	7	88	680
ME1N-1224	12	24	42	5	89	560

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

* See MEK1N 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	$V_{IN}=5\text{V}$ $V_{IN}=12\text{V}$	-	230 99	-	mA	
Input current	No load	-	3	15	mA	
Reflected ripple current		-	15	-	mA	
Surge voltage 1 second max	$V_{IN}=5\text{V}$ $V_{IN}=12\text{V}$	-0.7 -0.7	-	9 18	VDC	
Output voltage accuracy	All models	Refer to graphic in "Characteristic Curves" section				
Line regulation For V_{IN} change of $\pm 1\%$	$V_{OUT}=3.3\text{V}$ All others	-	-	± 1.5 ± 1.2	%	
Load regulation $I_{OUT}=10\%$ to 100% of $I_{OUT, rated}$,	$V_{OUT}=3.3\text{V}$ $V_{OUT}=5\text{V}$ $V_{OUT}=9\text{V}$ $V_{OUT}=12\text{V}$ $V_{OUT}=15\text{V}$ $V_{OUT}=24\text{V}$	-	10 8 8 7 6 6	-	%	
Output ripple and noise	20MHz bandwidth	-	45	100	mVp-p	
Temperature coefficient	Full load	-	± 0.03	-	%/ $^{\circ}\text{C}$	
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.

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General Specifications

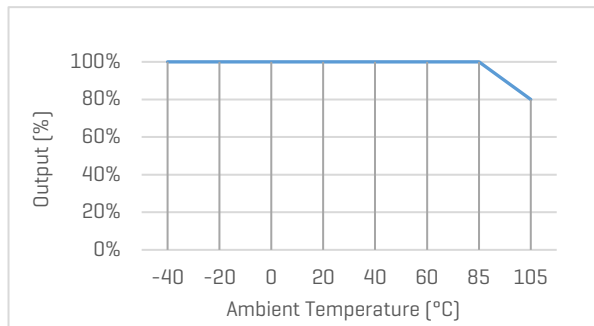
Parameters	Conditions	Min.	Typ.	Max.	Unit	Note
Isolation voltage Tested for 1 minute	I/P to O/P	1500	-	-	VDC	
Isolation resistance Tested at 500VDC	I/P to O/P	1000	-	-	M ohm	
Isolation capacitance Tested at 100KHz, 0.1V	I/P to O/P	-	20	-	pF	
Operating temperature	See "Derating Curve"	-40	-	+105	°C	
Storage 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 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* IEC/EN61000-4-2				
MTBF	MIL-HDBK-217F	>3,500,000 Hours, T _A =25°C				
Size & Weight		11.5 x 9.8 x 6 mm, 1.6g Typ.				

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

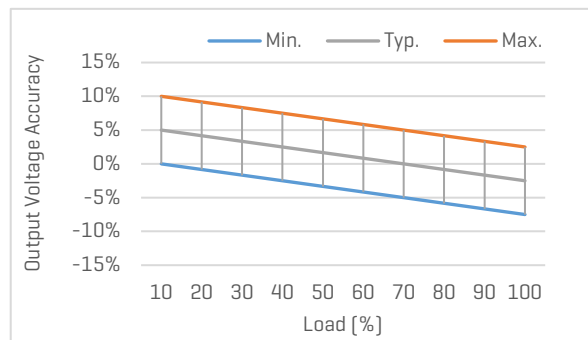
Characteristic Curves

Derating Curve

Output vs Ambient Temperature



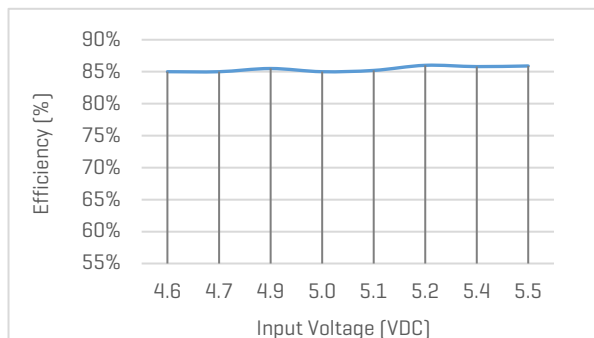
Output Voltage Accuracy vs Load



Efficiency Curves

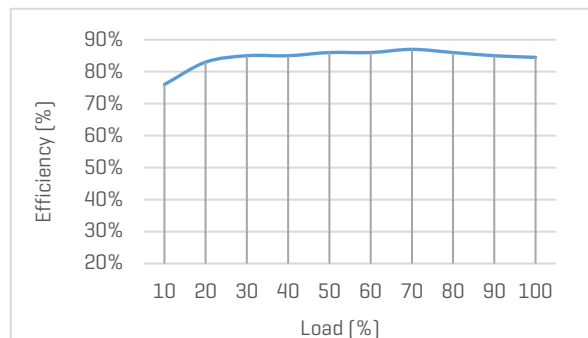
Efficiency vs Input Voltage

ME1N-0505, with full Load



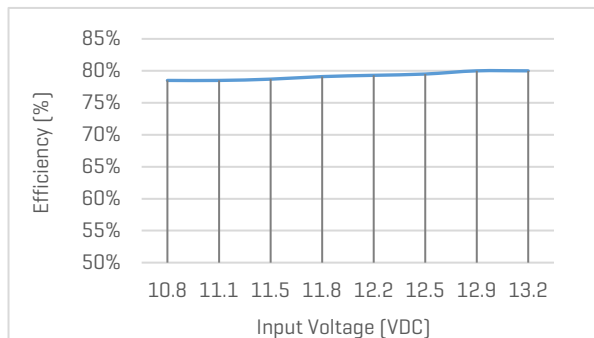
Efficiency vs Load

ME1N-0505, with nominal input voltage



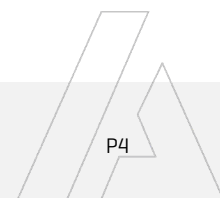
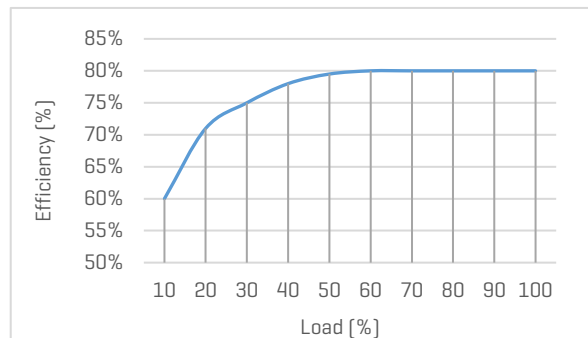
Efficiency vs Input Voltage

ME1N-1205, with full Load



Efficiency vs Load

ME1N-1205, with nominal input voltage



Recommended External Circuit

Typical Application Circuit

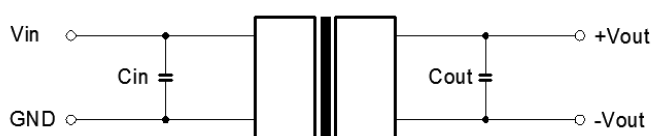


Figure 1. Typical external circuit

*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

Input voltage	3.3, 5V	12V	15V	24V
C_{IN}	4.7uF, 16V	2.2uF, 25V	2.2uF, 25V	1.0uF, 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.

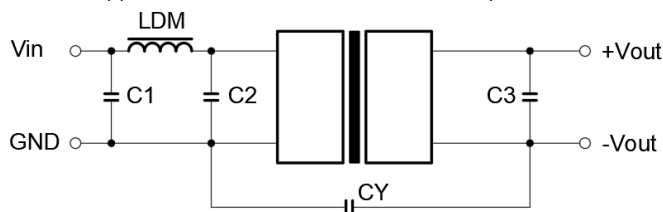


Figure 2. Circuit for EMC enhancement

[Table 3] Recommended component spec

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

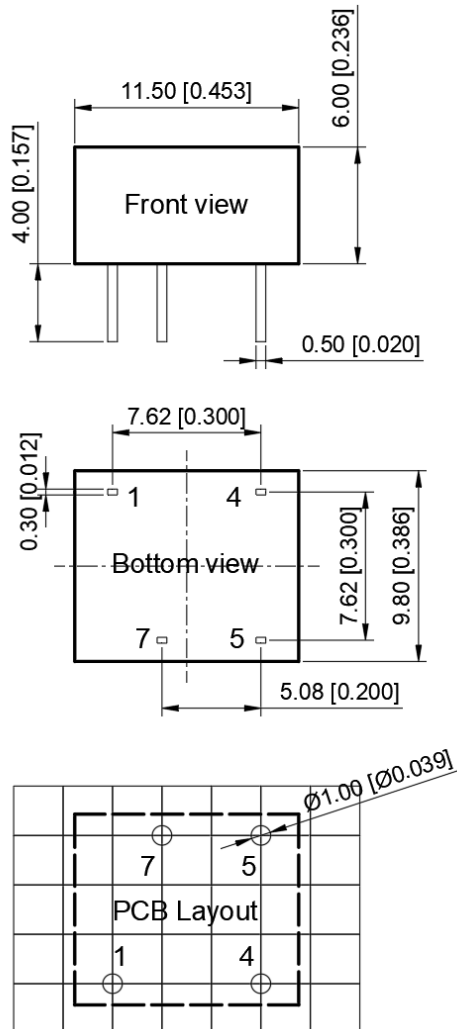
*C3 refer to C_{OUT} in [Table 2]

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Mechanical Specifications



Pin Definition

Pin #	Single Out
1	GND
4	V _{IN}
5	+V _{OUT}
7	0V

* 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