ME1N Series

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

Features

- Rated power: 1W Max
- Input voltage range ±10%
- Unregulated output
- High efficiency up to 89%
- Isolation voltage 1.5KVDC
- Small no load input current
- Operating temp. range: -40 ~ +105°C ambient
- RoHS compliant
- Compact DIP8 package
- Continuous short circuit protection
- Meet UL/EN/IEC 62368-1 EN 55032 Class B
- 5 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]	Output Voltage [VDC]	Output Current [mA] Max.	Efficiency [%] Typ.	Capacitive Load [uF] Max.
ME1N-0503	5 [4.5~5.5]	3.3	303	79	2400
ME1N-0505 [1]		5	200	86	2400
ME1N-0509		9	111	86	1000
ME1N-0512 [1]		12	84	88	560
ME1N-0515		15	67	86	560
ME1N-0524		24	42	86	220
ME1N-1203	12 [10.8~13.2]	3.3	303	79	2400
ME1N-1205		5	200	86	2400
ME1N-1209		9	111	86	1000
ME1N-1212		12	84	88	560
ME1N-1215		15	67	86	560
ME1N-1224		24	42	86	220
ME1N-1503	15 [13.5~16.5]	3.3	303	80	2400
ME1N-1505		5	200	86	2400
ME1N-1509		9	111	86	1000
ME1N-1512		12	84	88	560
ME1N-1515		15	67	86	560
ME1N-1524		24	42	86	220

Model Numbers

Model Number	Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA] Max.	Efficiency [%] Typ.	Capacitive Load [uF] Max.
ME1N-2403	24 [21.6~26.4]	3.3	303	80	2400
ME1N-2405		5	200	86	2400
ME1N-2409		9	111	86	1000
ME1N-2412		12	84	87	560
ME1N-2415		15	67	88	560
ME1N-2424		24	42	89	220

Note [1]: Models that are certified to UL62368-1.

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
Input current Full load	V_{IN}=5V V_{IN}=12V V_{IN}=15V V_{IN}=24V	-	227 95 76 47	253 105 83 52	mA
Input current No load		-	10	-	mA
Reflected Ripple Current		-	15	-	mA
Surge voltage 1 second max	V_{IN}=5V V_{IN}=12V V_{IN}=15V V_{IN}=24V	-0.7 -0.7 -0.7 -0.7	-	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 [2] I_{OUT}=10% to 100% of $I_{OUT, rated}$	V_{OUT}=3.3V V_{OUT}=5V V_{OUT}=9V V_{OUT}=12V V_{OUT}=15V V_{OUT}=24V	-	15 10 8 7 6 6	20 15 10 10 10 10	%
Temperature coefficiency	Full load	-	±0.02	-	%/°C
Output ripple and noise	20MHz bandwidth	-	45	100	mVp-p

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
Output short circuit protection		Continuous, automatic recovery			
Input filter		Capacitor			
Hot plug		None			

Note [2]: 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.

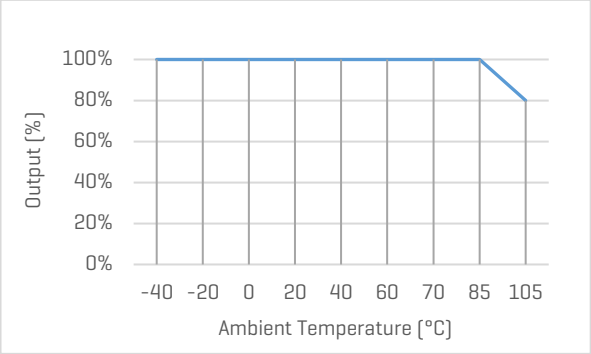
General Specifications

Parameters	Conditions	Min.	Typ.	Max.	Unit
Isolation voltage 1 minute, leakage current <1mA	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
Switching frequency	Full load	-	220	-	KHz
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	5	-	95	%RH
Pin soldering resistance	1.5mm away from case for 10 sec	-	-	300	°C
Case material		Black plastic UL94-V0			
Cooling method		Free air convection			
Design based on standards		UL/EN/IEC 62368-1			
Vibration		10-150Hz, 5G, 0.75mm along X, Y and Z			
MTBF	MIL-HDBK-217F	>3,500,000 Hours, T_A=25°C			
Safety standards		UL/EN/IEC 62368-1			
EMC standards	CISPR32, EN55032	Class B with "External Circuit"			
ESD	IEC/EN61000-4-2	Contact ±4kV, Air ±8kV, perf. Criteria B			
Size & Weight		12.7x10.1x7 mm, 1.8g Typ.			

Characteristic Curves

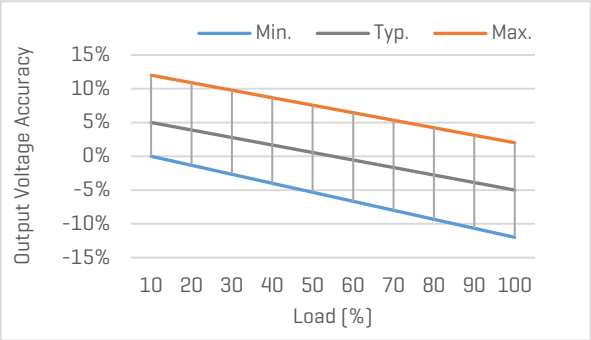
Output vs Ambient Temperature

All models

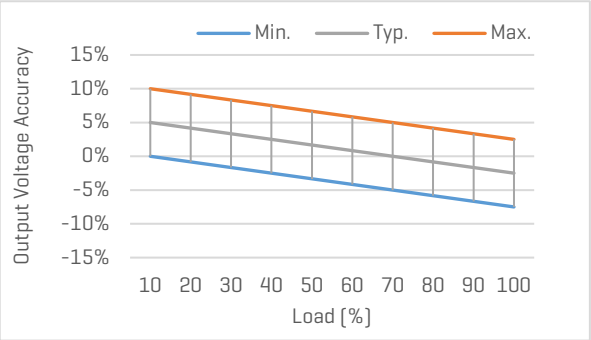


Output Voltage Accuracy vs Load

V_{OUT}=3.3V

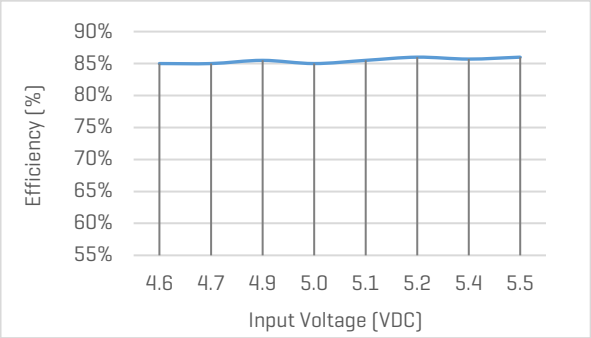


None 3.3V output models



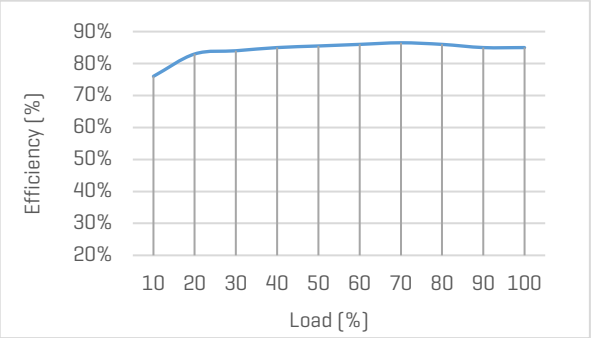
Efficiency vs Input Voltage

ME1N-0505, with full Load



Efficiency vs Load

MEK1N-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 mandatory.

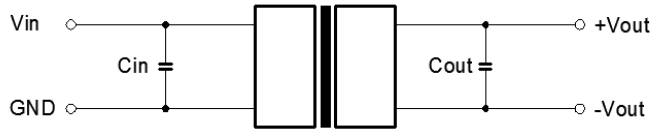


Figure 1. Typical external circuit

[Table 1] Recommended component spec

Input voltage	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	1uF, 50V

EMC Enhancement for EN55032 Class B

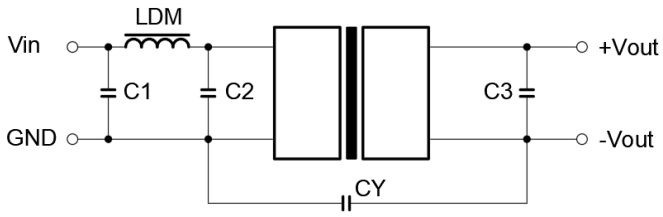


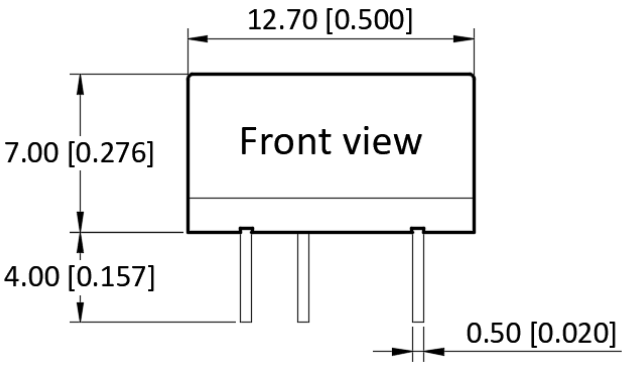
Figure 2. Circuit for EMC enhancement

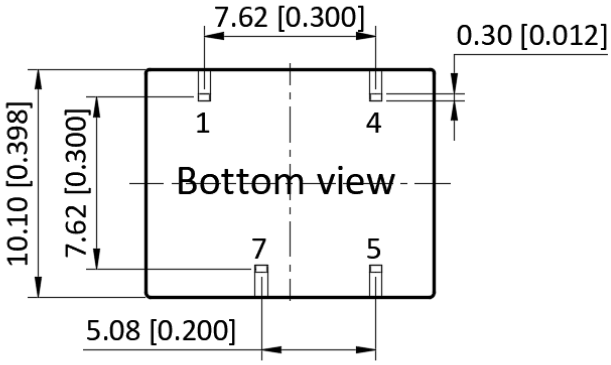
[Table 3] Recommended component spec

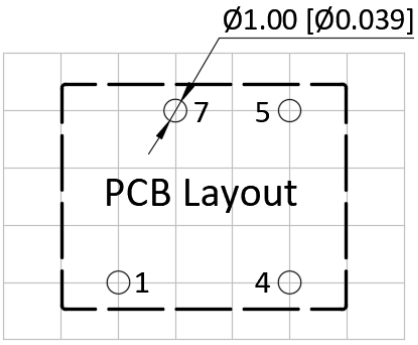
Component	LDM	C1, C2	CY
Spec	6.8uH	4.7uF, 50V	1nF, 2KV

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

Mechanical Specifications







Pin Definition

Pin #	Single Out
1	$-V_{IN}$
4	$+V_{IN}$
5	$+V_{OUT}$
7	$-V_{OUT}$

* 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