ME1T Series

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

Features

- Rated power: 1W max
- Input voltage range ±10%
- Unregulated output
- High efficiency up to 88%
- Isolation voltage 1.5KVDC
- Small no load input current
- Operating temp. range: -40 ~ +105°C ambient
- RoHS compliant
- Compact SMD package
- Continuous short circuit protection
- Meet UL/EN/IEC 62368-1 EN 55032 Class B
- 5 year warranty

Overview

The ME1T series are unregulated DC/DC converters offered in compact SMD package with 1.5KVDC isolation. These converters feature high efficiency, low ripple and noise, continuous short circuit protection, and wide operating temperature range -40 ~ +105°C. 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.
ME1T-0303	3.3 [2.97~3.63]	3.3	303	80	2400
ME1T-0305		5	200	82	2400
ME1T-0309		9	111	83	1200
ME1T-0312		12	84	84	820
ME1T-0315		15	67	84	680
ME1T-0324		24	42	84	330
ME1T-0503	5 [4.5~5.5]	3.3	303	82	3000
ME1T-0505 [1]		5	200	85	3000
ME1T-0509		9	111	86	1200
ME1T-0512 [1]		12	84	86	820
ME1T-0515		15	67	86	680
ME1T-0524		24	42	87	330
ME1T-1203	12 [10.8~13.2]	3.3	303	82	3000
ME1T-1205		5	200	85	3000
ME1T-1209		9	111	86	1200
ME1T-1212		12	84	86	820
ME1T-1215		15	67	86	680
ME1T-1224		24	42	88	330

Model Numbers

Model Number	Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA] Max.	Efficiency [%] Typ.	Capacitive Load [uF] Max.
ME1T-1505	15 [13.5~16.5]	5	200	86	3000
ME1T-1512		12	84	87	820
ME1T-1515		15	67	88	680
ME1T-2403	24 [21.6~26.4]	3.3	303	82	3000
ME1T-2405		5	200	85	3000
ME1T-2409		9	111	86	1200
ME1T-2412		12	84	87	820
ME1T-2415		15	67	87	680
ME1T-2424		24	42	88	330

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 / No load	V_{IN}=3.3V V_{IN}=5V V_{IN}=12V V_{IN}=15V V_{IN}=24V	-	370 230 99 80 51	-	mA
Input current No load		-	6	17	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 [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 9 8 7 6	20 15 10 10 10 10	%

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
Temperature coefficiency	Full load	-	±0.02	-	%/°C
Output ripple and noise	20MHz bandwidth	-	60	120	mVp-p
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.

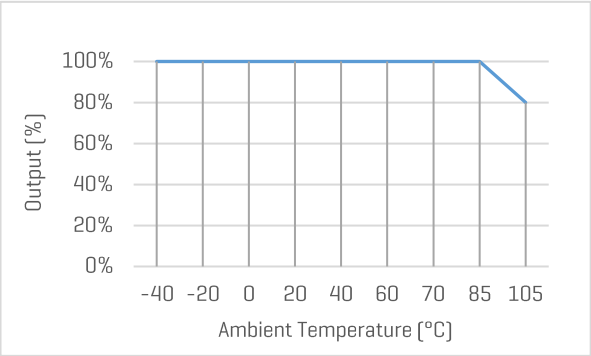
General Specifications

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
Reflow soldering temperature		Peak temp. 217 - 245°C, maximum duration 60s			
Case material		Black plastic UL94-V0			
Cooling method		Free air convection			
Vibration		10-150Hz, 5G, 0.75mm along X, Y and Z			
Moisture sensitivity level (MSL)		IPC/JEDEC J-STD-020D.1 Level 1			
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		13.5x11x7.25mm, 1.2g Typ.			

Characteristic Curves

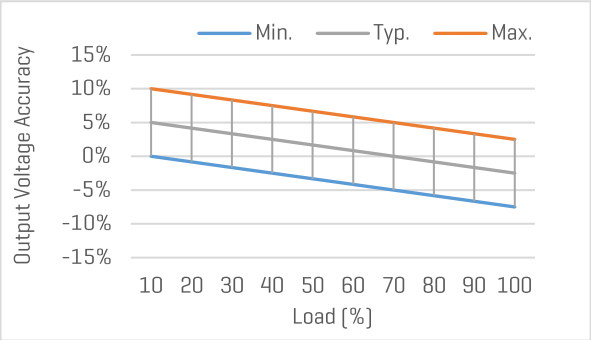
Output vs Ambient Temperature

All models



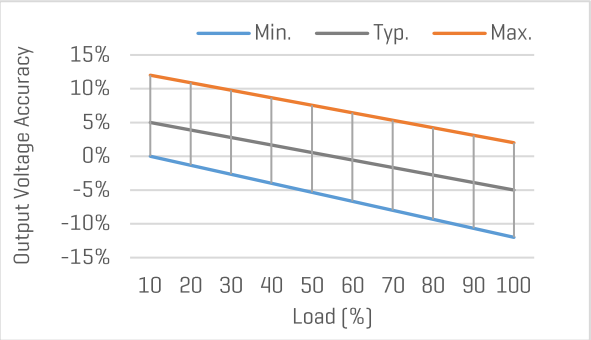
Output Voltage Accuracy vs Load

None 3.3V output models



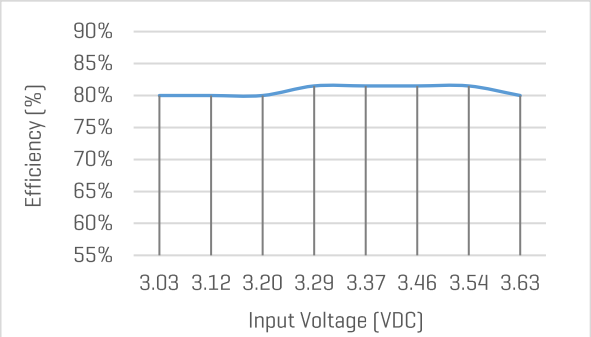
Output Voltage Accuracy vs Load

3.3V output models



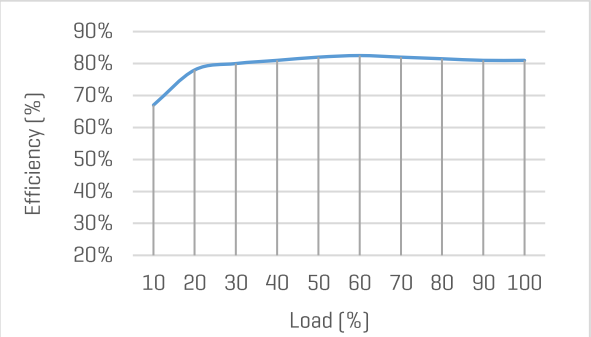
Efficiency vs Input Voltage

ME1T-0305, with full Load



Efficiency vs Load

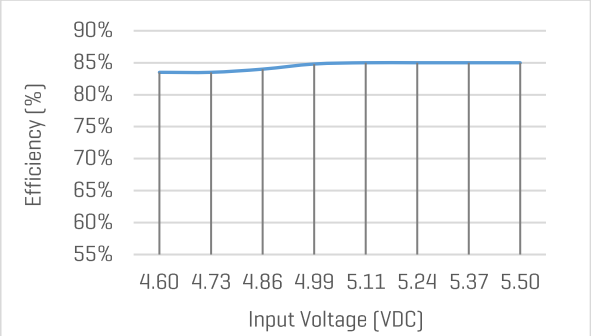
ME1T-0305, with nominal input voltage



Characteristic Curves

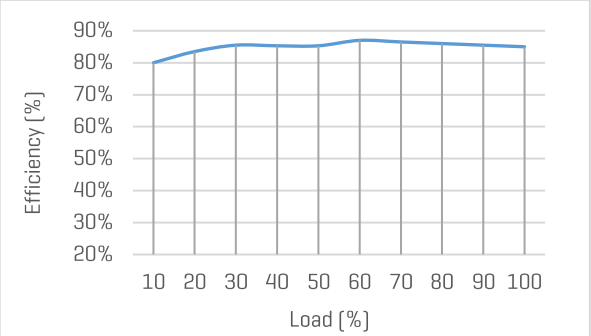
Efficiency vs Input Voltage

ME1T-0505, with full Load



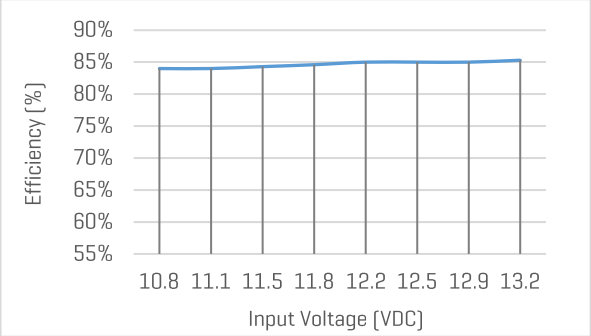
Efficiency vs Load

ME1T-0505, with nominal input voltage



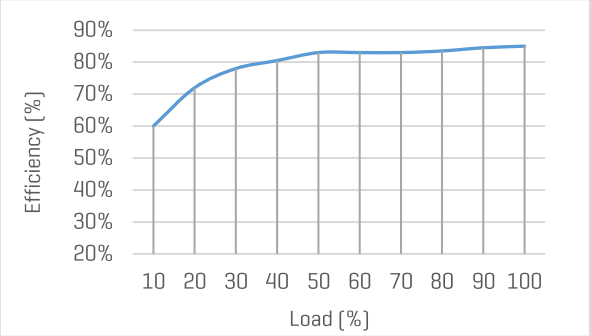
Efficiency vs Input Voltage

ME1T-1205, with full Load



Efficiency vs Load

ME1T-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 mandatory.

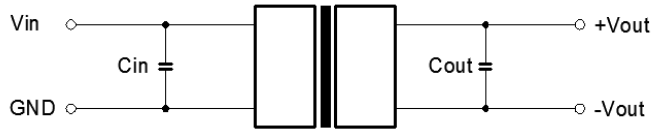


Figure 1. Typical external circuit

[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

EMC Enhancement for EN55032 Class B

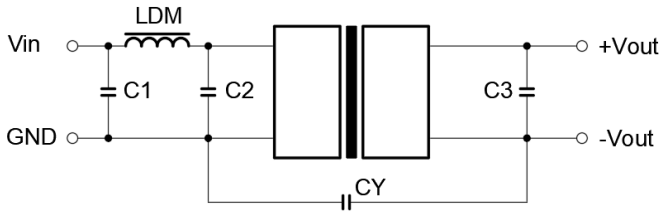


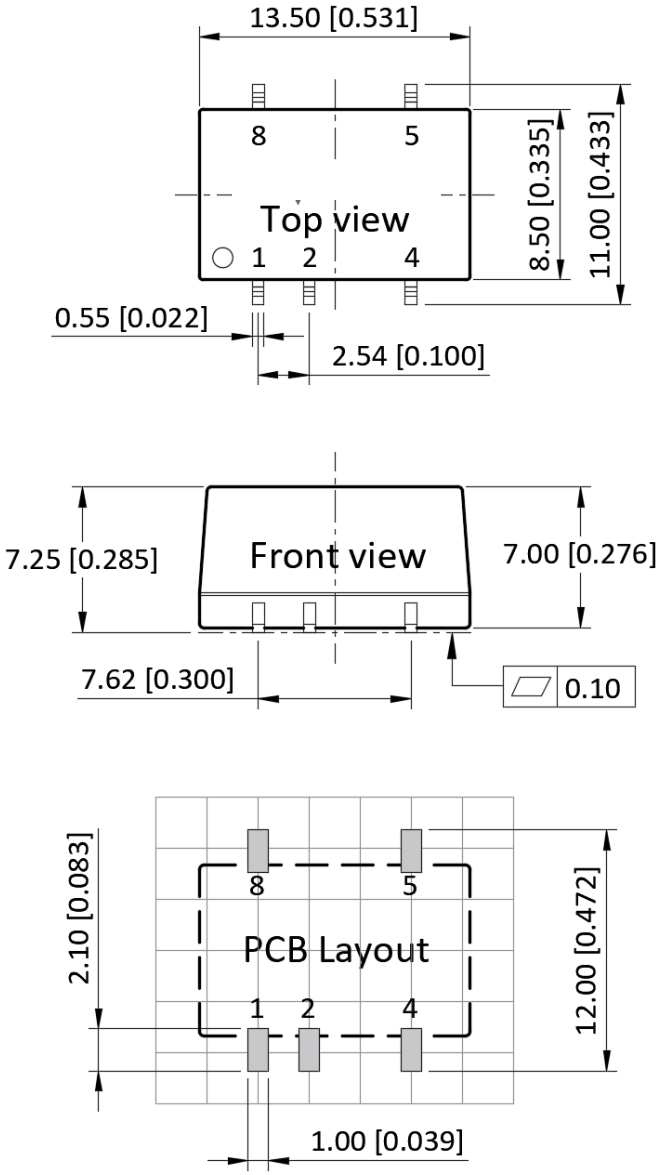
Figure 2. Circuit for EMC enhancement

[Table 3] Recommended component spec

Component	LDM	C1, C2	CY
C_{OUT}	6.8uH	4.7uF, 50V	270pF, 2KV

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

Mechanical Specifications



Pin Definition

Pin #	Single Out
1	$-V_{IN}$
2	$+V_{IN}$
4	$-V_{OUT}$
5	$+V_{OUT}$
8	N/C

* Unless otherwise specified unit: mm [inch]
* General tolerance: ±0.25 [±0.010]
* Pin thickness: ±0.10 [±0.004]
* Footprint grid 2.54 x 2.54 mm