MEK1TL Series

1W, Unregulated, 3KV Isolation, DC/DC Converters

Features

- Rated power: 1W max
- Input voltage range ±10%
- Unregulated output
- High efficiency up to 85%
- Isolation voltage 3KVDC
- 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

RoHS CE

Overview

The MEK1TL series are unregulated DC/DC converters offered in compact SMD package with 3KVDC 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.
MEK1TL-0503	5 [4.5~5.5]	3.3	303	74	2400
MEK1TL-0505		5	200	82	2400
MEK1TL-0509		9	111	83	1000
MEK1TL-0512		12	84	83	560
MEK1TL-0515		15	67	83	560
MEK1TL-0524		24	42	85	220
MEK1TL-0503D	5 [4.5~5.5]	±3.3	±151	74	±1200
MEK1TL-0505D		±5	±100	82	±1200
MEK1TL-0509D		±9	±56	83	±470
MEK1TL-0512D		±12	±42	83	±220
MEK1TL-0515D		±15	±34	83	±220
MEK1TL-0524D		±24	±21	85	±100

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_{OUT}=3.3, 5V Others	-	270 241	-	mA
Input current No load	V_{OUT}=3.3, 5V V_{OUT}=9, 12V V_{OUT}=15, 24V	-	5 12 18	-	mA
Reflected Ripple Current		-	15	-	mA
Surge voltage 1 second max	V_{IN}=5V	-0.7	-	9	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 [1] I_{OUT}=10% to 100% of $I_{OUT, rated}$	V_{OUT}=3.3V, ±3.3V V_{OUT}=5V, ±5V All others	-	15 10 8	20 15 10	%
Temperature coefficiency	Full load	-	±0.03	-	%/°C
Output ripple and noise 20MHz bandwidth	V_{OUT}=24V, ±24V Others	-	50 30	100 75	mVp-p
Output short circuit protection		Continuous, automatic recovery			
Input filter		Capacitor			
Hot plug		None			

Note [1]: 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.

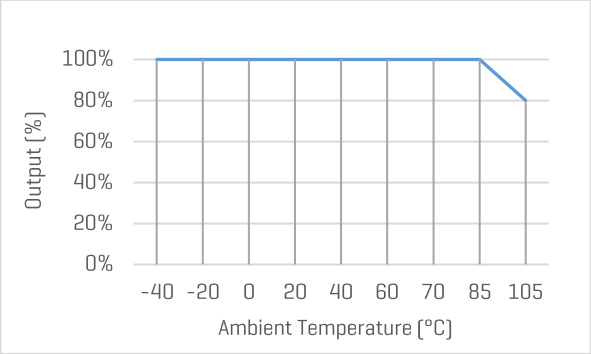
General Specifications

Parameters	Conditions	Min.	Typ.	Max.	Unit
Isolation voltage 1 minute, leakage current <1mA	Input to Output	3000	-	-	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	-	270	-	KHz
Operating temperature	See "Derating Curve"	-40	-	+105	°C
Storage temperature		-55	-	+125	°C
Temperature rise at case Full load	V_{OUT}=3.3V Others	-	25 15	-	°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		15.24x11.4x7.25mm, 1.3g Typ.			

Characteristic Curves

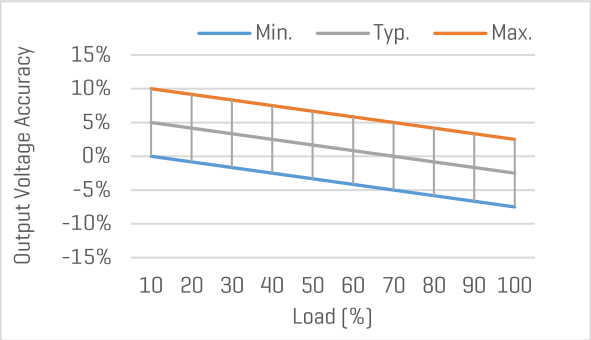
Output vs Ambient Temperature

All models

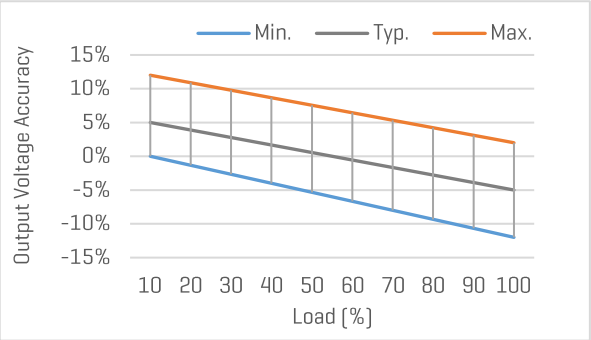


Output Voltage Accuracy vs Load

None 3.3V output models



3.3V output models



Recommended External Circuit

Typical Application Circuit

*Typical application circuit is to further lower the input and output ripple. It is not mandatory.

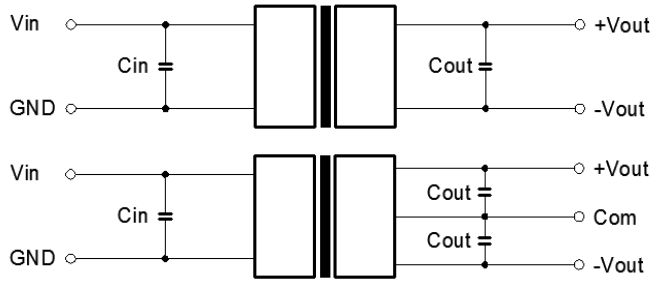


Figure 1. Typical external circuit

[Table 1] Recommended component spec

Input voltage	5V
C_{IN}	4.7uF, 16V

[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

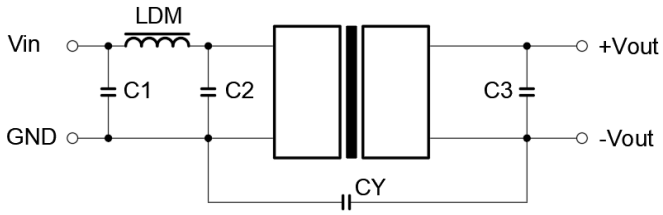


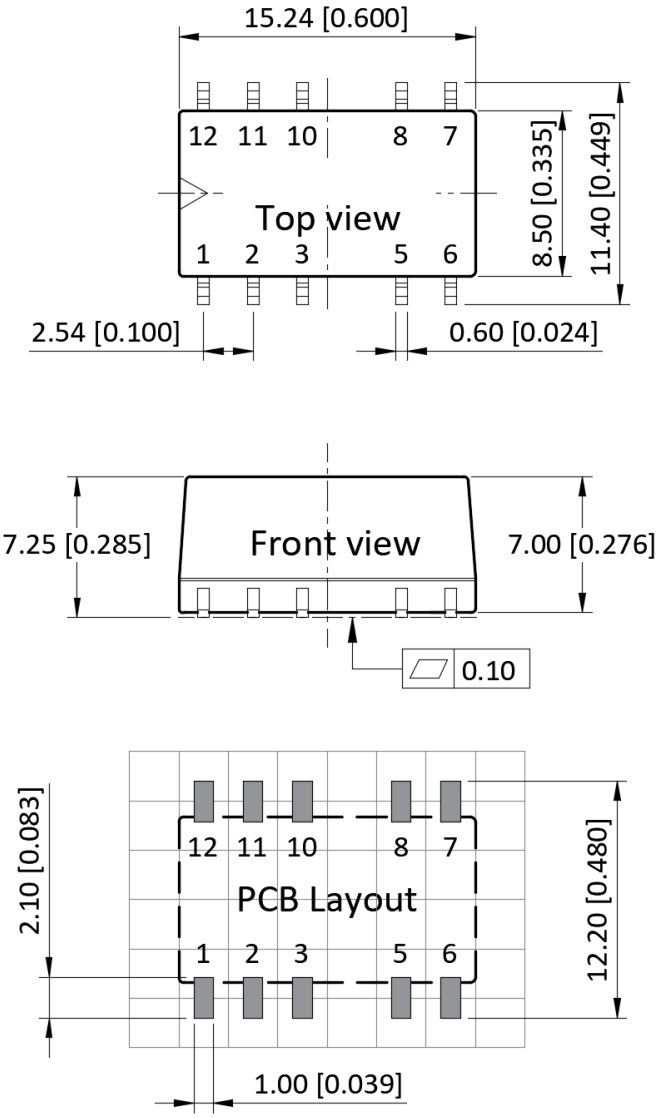
Figure 2. Circuit for EMC enhancement

[Table 3] Recommended component spec

Component	LDM	C1, C2	CY [V_{OUT}=3.3, 5, 9]	CY [V_{OUT}=12, 15, 24]
C_{OUT}	6.8uH	4.7uF, 50V	N/C	1nF, 4KV

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

Mechanical Specifications



Pin Definition

Pin #	Single Out	Dual Out
1	$-V_{IN}$	$-V_{IN}$
2	$+V_{IN}$	$+V_{IN}$
5	$-V_{OUT}$	COM
6	N/C	$-V_{OUT}$
8	$+V_{OUT}$	$+V_{OUT}$
Others	N/C	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