

Features

- ▶ Rated power: 1W max
- ▶ Input voltage range $\pm 10\%$
- ▶ Unregulated single output
- ▶ High efficiency up to 88%
- ▶ Isolation voltage 3KVDC
- ▶ Small no load input current, only about 3mA
- ▶ Operating temperature range: $-40 \sim +105^{\circ}\text{C}$ ambient
- ▶ RoHS compliant
- ▶ Compact SMD package
- ▶ Continuous short circuit protection
- ▶ Designed to meet UL/EN/IEC 62368-1
- ▶ 3 year warranty



Overview

The MEK1T 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 $-40 \sim +105^{\circ}\text{C}$. 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] $\pm 10\%$	Output Voltage [VDC]	Output Current [mA]		Efficiency [%] Typ.	Capacitive Load [μF] Max.
			Max.	Min.		
MEK1T-0303	3.3	3.3	303	30	80	3000
MEK1T-0305	3.3	5	200	20	82	3000
MEK1T-0309	3.3	9	111	11	83	1200
MEK1T-0312	3.3	12	83	8	84	820
MEK1T-0503	5	3.3	303	30	82	3000
MEK1T-0505	5	5	200	20	85	3000
MEK1T-0509	5	9	111	12	86	1200
MEK1T-0512	5	12	84	9	86	820
MEK1T-0515	5	15	67	7	86	680
MEK1T-0524	5	24	42	4	87	330
MEK1T-1203	12	3.3	303	30	82	3000
MEK1T-1205	12	5	200	20	85	3000
MEK1T-1209	12	9	111	12	86	1200
MEK1T-1212	12	12	84	9	86	820
MEK1T-1215	12	15	67	7	86	680
MEK1T-1224	12	24	42	4	88	330

Model Numbers [continued]

Model Number	Input Voltage [VDC] ±10%	Output Voltage [VDC]	Output Current [mA]		Efficiency [%] Typ.	Capacitive Load [uF] Max.
			Max.	Min.		
MEK1T-1505	15	5	200	20	86	3000
MEK1T-1512	15	12	84	9	87	820
MEK1T-1515	15	15	67	7	88	680
MEK1T-2403	24	3.3	303	30	82	3000
MEK1T-2405	24	5	200	20	85	3000
MEK1T-2409	24	9	111	12	86	1200
MEK1T-2412	24	12	84	9	87	820
MEK1T-2415	24	15	67	7	87	680
MEK1T-2424	24	24	42	4	88	330

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

* 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.

* Standard models in this series are 3KVDC isolation single output models. See MEK1T-D for dual output, and ME1T series for 1.5KVDC 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	$V_{IN}=3.3\text{V}$		370		mA	
	$V_{IN}=5\text{V}$	-	230	-		
	$V_{IN}=12, 15\text{V}$		99			
	$V_{IN}=24\text{V}$		51			
Input current No load		-	3	-	mA	
Reflected Ripple Current		-	15	-	mA	
Surge voltage 1 second max	$V_{IN}=3.3\text{V}$	-0.7		5	VDC	
	$V_{IN}=5\text{V}$	-0.7		9		
	$V_{IN}=12$	-0.7	-	18		
	$V_{IN}=15\text{V}$	-0.7		21		
	$V_{IN}=24\text{V}$	-0.7		30		
Output voltage accuracy	All models	Refer to graphic in "Characteristic Curves" section				
Line regulation For V_{IN} change of $\pm 1\%$	$V_{OUT}=3.3\text{V}$	-	-	± 1.5	%	
	All others			± 1.2		
Load regulation $I_{OUT}=10\%$ to 100% of $I_{OUT,rated}$	$V_{OUT}=3.3\text{V}$		14		%	
	$V_{OUT}=5\text{V}$		10			
	$V_{OUT}=9\text{V}$	-	9	-		
	$V_{OUT}=12\text{V}$		8			
	$V_{OUT}=15\text{V}$		7			
$V_{OUT}=24\text{V}$		6				
Temperature coefficient	Full load	-	± 0.02	-	$\%/^{\circ}\text{C}$	
Output ripple and noise	20MHz bandwidth		60	150	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

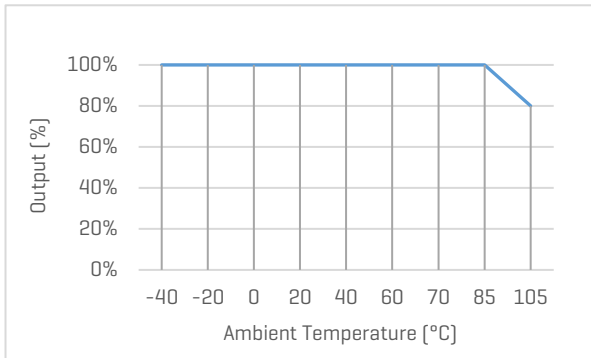
Parameters	Conditions	Min.	Typ.	Max.	Unit	Note
Isolation voltage 1 minute, leakage current <1mA	Input to Output	3000	-	-	VDC	
Isolation resistance Tested at 500VDC	Input to Output	1000	-	-	M ohm	
Isolation capacitance 100KHz, 0.1V	Input to Output	-	20	-	pF	
Operating temperature	See "Derating Curve"	-40	-	+105	°C	
Storage temperature		-55	-	+125	°C	
Temperature rise at case	Full load	-	25	-	°C	
Storage humidity	Non-condensing	5	-	95	%RH	
Switching frequency	Full load	-	220	-	KHz	
Reflow soldering temperature		Peak temp. 217 - 245°C, maximum duration 60s				
Vibration		10-150Hz, 5G, 0.75mm along X, Y and Z				
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				
Moisture sensitivity level [MSL]		IPC/JEDEC J-STD-020D.1 Level 1				
Size		13.5 x 11 x 6.05 mm				
Weight		1.5g Typ.				

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

Characteristic Curves

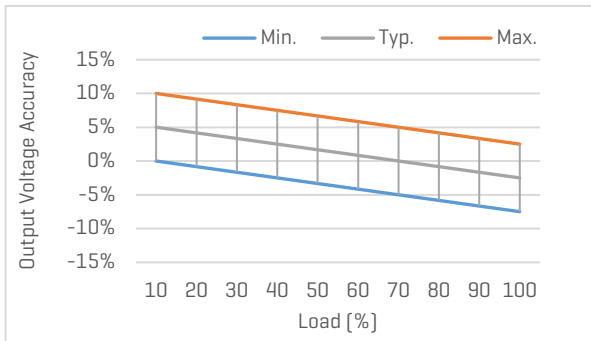
Derating Curve

Output vs Ambient Temperature

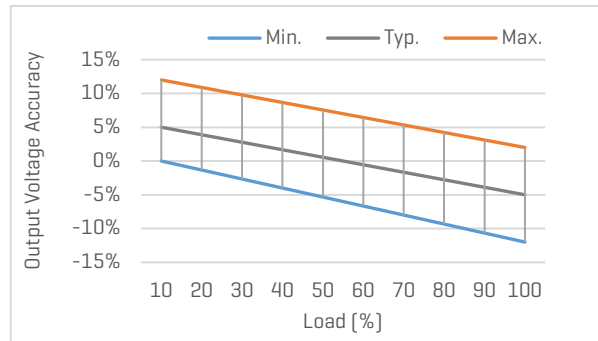


Output Voltage Accuracy vs Load

None 3.3V output models



3.3V output models

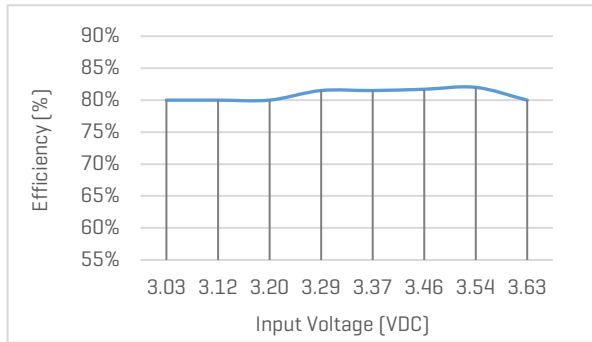


Characteristic Curves [continued]

Efficiency Curves

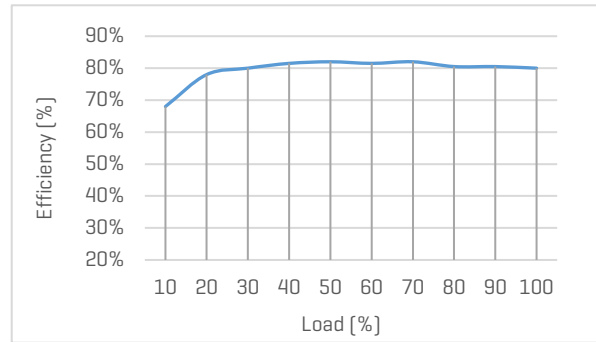
Efficiency vs Input Voltage

MEK1T-0305, with full Load



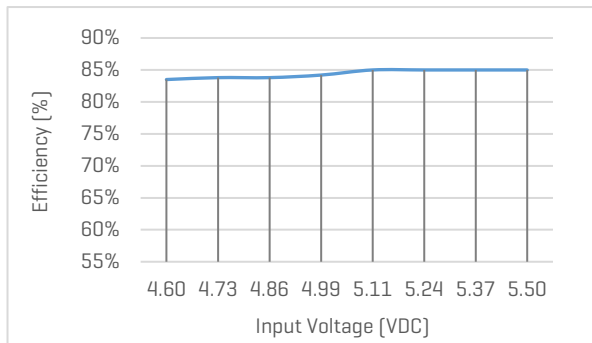
Efficiency vs Load

MEK1T-0305, with nominal input voltage



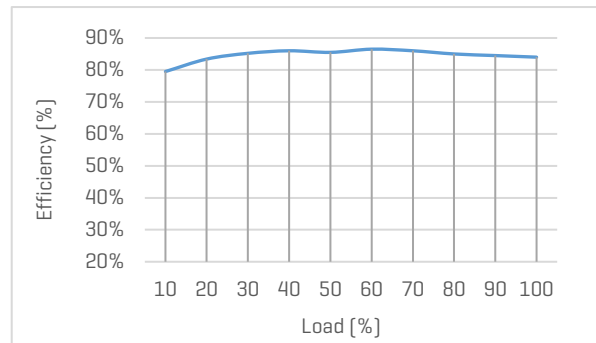
Efficiency vs Input Voltage

MEK1T-0505, with full Load



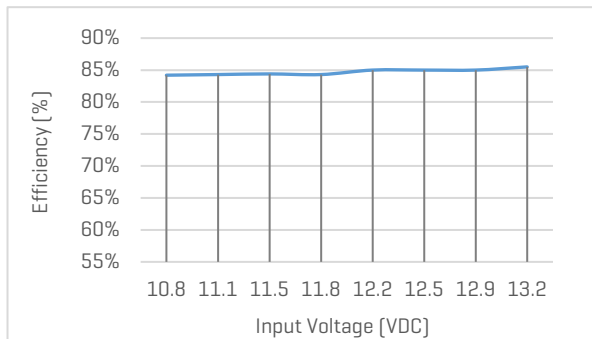
Efficiency vs Load

MEK1T-0505, with nominal input voltage



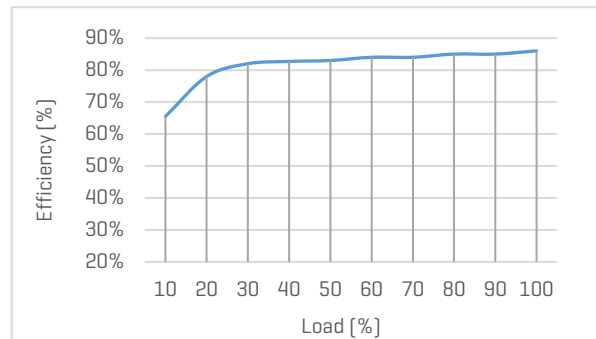
Efficiency vs Input Voltage

MEK1T-1205, with full Load



Efficiency vs Load

MEK1T-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}	4.7 μ F, 16V	2.2 μ F, 25V	2.2 μ F, 25V	1 μ F, 50V

[Table 2] Recommended component spec

Output voltage	3.3, 5V	9V	12V	15V	24V
C_{OUT}	10 μ F, 16V	4.7 μ F, 16V	2.2 μ F, 25V	1 μ F, 25V	0.47 μ F, 50V

Circuit for EMC Enhancement

*Use this application circuit to meet Class B EMC performance.

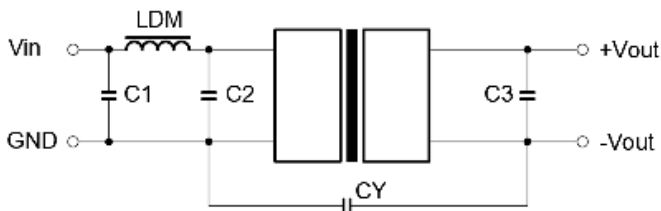
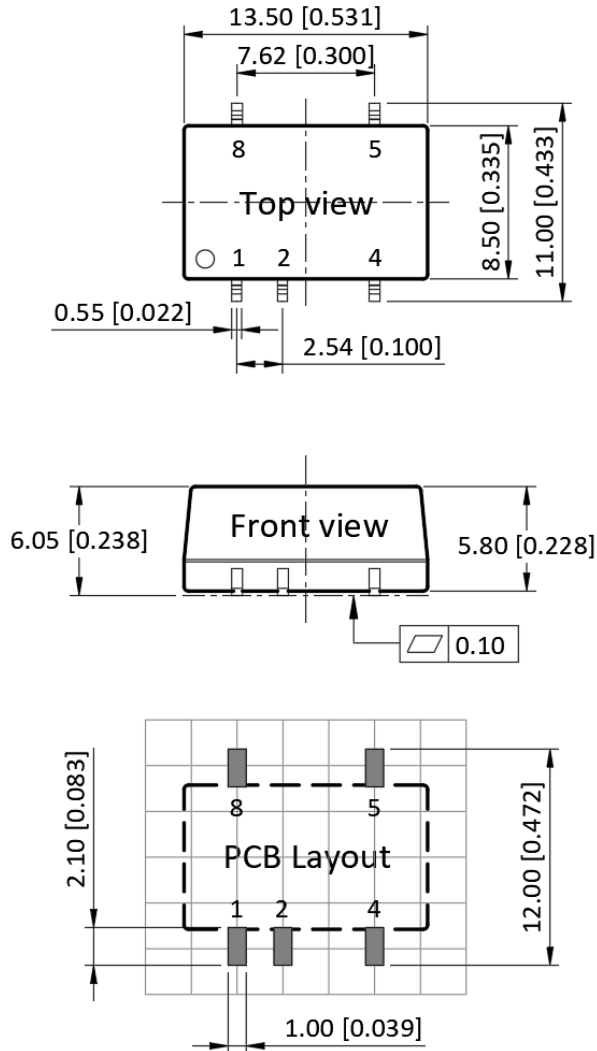


Figure 2. Circuit for EMC enhancement

[Table 3] Recommended component spec

Component	LDM	C1, C2	CY	C3
C_{OUT}	6.8 μ H	4.7 μ F, 50V	270pF, 2KV	Refer to C_{OUT} in [Table 2]

Mechanical Specifications



Pin Definition

Pin #	Single Out
1	GND
2	V _{IN}
4	0V
5	+V _{OUT}
8	No connection

* 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

FAVOTEK LIMITED

#17 Canton Road, Tsim Sha Tsui, Kowloon, Hong Kong
 Tel: +852 8191 6662
 Eml: info@favotek.com

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hello@conexotech.com | +44 118 402 3430

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