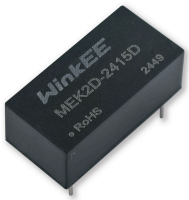
MEK2D Series

2W, Unregulated Output, 3KV Isolation, DIP14 Package DC/DC Converters

Features

- Rated power: 2W Max
- Input voltage range ±10%
- Unregulated output
- High efficiency, up to 90%
- Small no load input current
- Isolation voltage 3KVDC
- Operating temperature range: -40 ~ +105°C ambient
- RoHS compliant
- Standard DIP14 package
- Continuous short circuit protection
- Designed to meet UL/EN/IEC 62368-1
- 5 year warranty



Overview

The MEK2D series are DIP14 package DC/DC converters with unregulated single or dual output, and 3KVDC 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] ±10%	Output Voltage [VDC]	Output Current [mA]		Efficiency [%] Typ.	Capacitive Load [uF] Max.
			Max.	Min.		
MEK2D-0303	3.3	3.3	400	40	82	2400
MEK2D-0305	3.3	5	400	40	83	2400
MEK2D-0309	3.3	9	222	22	84	1000
MEK2D-0312	3.3	12	167	17	85	820
MEK2D-0503	5	3.3	400	40	83	2400
MEK2D-0505	5	5	400	40	85	2400
MEK2D-0509	5	9	222	22	85	1000
MEK2D-0512	5	12	167	17	86	820
MEK2D-0515	5	15	133	13	87	680
MEK2D-0524	5	24	83	8	88	560
MEK2D-0503D	5	±3.3	±303	±30	83	1000
MEK2D-0505D	5	±5	±200	±20	85	1000
MEK2D-0509D	5	±9	±111	±11	85	560
MEK2D-0512D	5	±12	±83	±8	86	560
MEK2D-0515D	5	±15	±67	±7	87	220
MEK2D-0524D	5	±24	±42	±4	87	100
MEK2D-1203	12	3.3	400	40	84	2400
MEK2D-1205	12	5	400	40	85	2400
MEK2D-1209	12	9	222	22	86	1000

Model Numbers (continued)

Model Number	Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA]		Efficiency [%] Typ.	Capacitive Load [uF] Max.
			Max.	Min.		
MEK2D-1212	12	12	167	17	87	820
MEK2D-1215	12	15	133	13	88	680
MEK2D-1224	12	24	83	8	89	560
MEK2D-1203D	12	±3.3	±303	±30	84	1000
MEK2D-1205D	12	±5	±200	±20	85	1000
MEK2D-1209D	12	±9	±111	±11	86	560
MEK2D-1212D	12	±12	±83	±8	87	560
MEK2D-1215D	12	±15	±67	±7	88	220
MEK2D-1224D	12	±24	±42	±4	86	100
MEK2D-1503	15	3.3	400	40	84	2400
MEK2D-1505	15	5	400	40	85	2400
MEK2D-1509	15	9	222	22	86	1000
MEK2D-1512	15	12	167	17	87	820
MEK2D-1515	15	15	133	13	88	680
MEK2D-1524	15	24	83	8	89	560
MEK2D-1505D	15	±5	±200	±20	85	1000
MEK2D-1509D	15	±9	±111	±11	86	560
MEK2D-1512D	15	±12	±83	±8	87	560
MEK2D-1515D	15	±15	±67	±7	88	220
MEK2D-2403	24	3.3	400	40	84	2400
MEK2D-2405	24	5	400	40	86	2400
MEK2D-2409	24	9	222	22	87	1000
MEK2D-2412	24	12	167	17	88	820
MEK2D-2415	24	15	133	13	89	680
MEK2D-2424	24	24	83	8	90	560
MEK2D-2403D	24	±3.3	±303	±30	84	1000
MEK2D-2405D	24	±5	±200	±20	86	1000
MEK2D-2409D	24	±9	±111	±11	87	560
MEK2D-2412D	24	±12	±83	±8	88	560
MEK2D-2415D	24	±15	±67	±7	89	220
MEK2D-2424D	24	±24	±42	±4	86	100

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

* For dual output models, max capacitive load stipulated in the above list is for each output.

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	Note
Input current Full load	V_{IN}=3.3V V_{IN}=5V V_{IN}=12V V_{IN}=15V V_{IN}=24V	-	768 506 208 167 104	-	mA	
Input current No load		-	4	15	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 I_{OUT}=10% to 100% of $I_{OUT, rated}$	V_{OUT}=3.3, 5V Others	-	14 10	20 15	%	
Temperature coefficiency	Full load	-	-	±0.03	%/°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.

* Dual output models need to operate with balanced load. The load difference between two outputs over 10% may cause unstable operating of the converter.

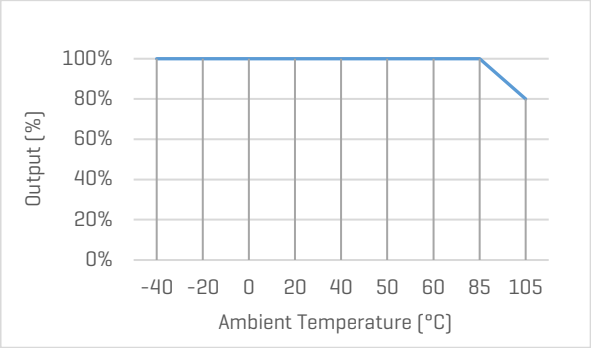
General Specifications

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	-	-	95	%RH	
Switching frequency	Full load	-	220	-	KHz	
Pin soldering resistance 1.5mm away from case for 10 sec		-	-	300	°C	
Case material		Black plastic UL94-V0				
Cooling method		Free air convection				
Vibration		10-150Hz, 5G, 0.75mm along X, Y and Z				
Design based on standards		UL/EN/IEC 62368-1				
Safety certifications		EN/IEC 62368-1				
EMC	Emissions Immunity	CISPR32, EN55032 Class B with External Circuit IEC/EN61000-4-2, Air ±8KV, Contact ±6KV, Criteria B				
MTBF	MIL-HDBK-217F	>3,500,000 Hours, T_A=25°C				
Size		19.5 x 9.8 x 8.0 mm				
Weight		2.4g Typ.				

Characteristic Curves

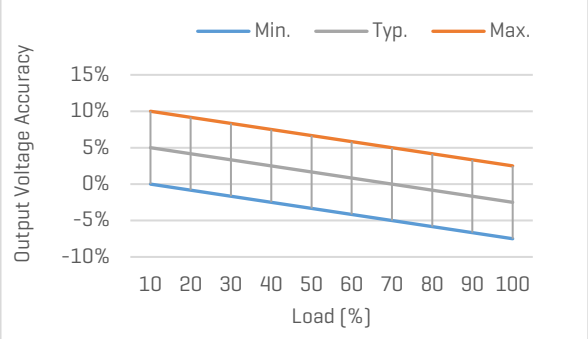
Derating Curve

Output vs Ambient Temperature

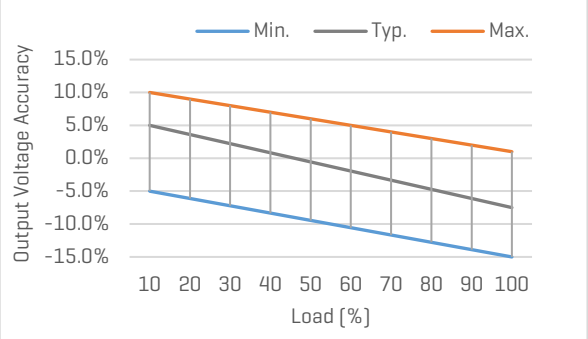


Output Voltage Accuracy vs Load

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 required for general use.

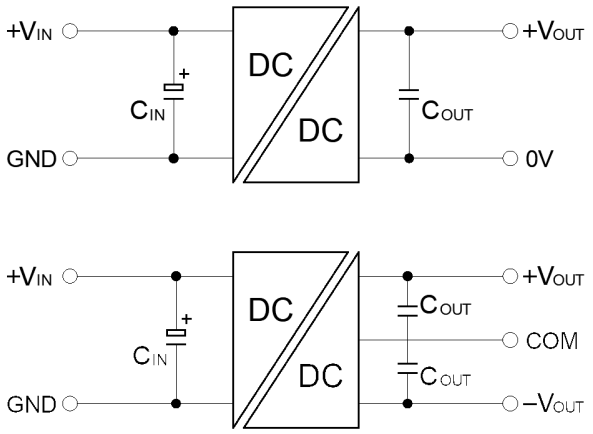


Figure 1. Typical external circuit

[Table 1] Recommended components

Input voltage	C_{IN}
3.3, 5V	4.7uF, 16V
12, 15V	2.2uF, 25V
24V	1uF, 50V

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

EMC Enhancement for EN55032 Class B

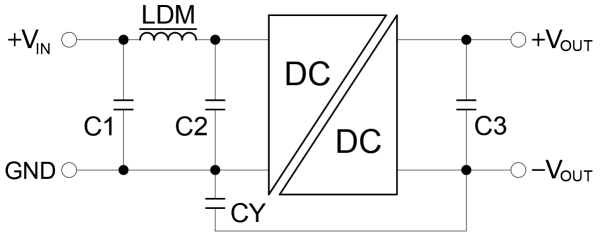
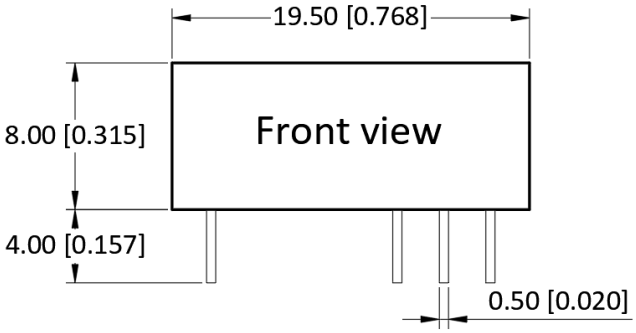


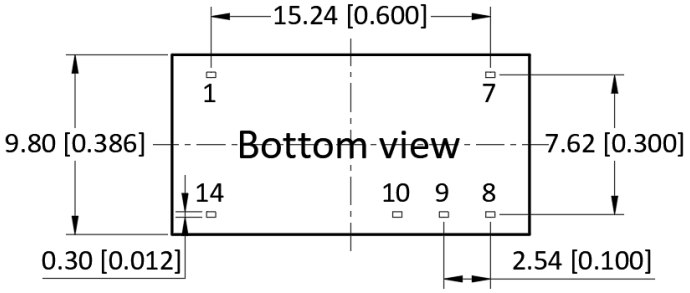
Figure 2. Circuit for EMC enhancement

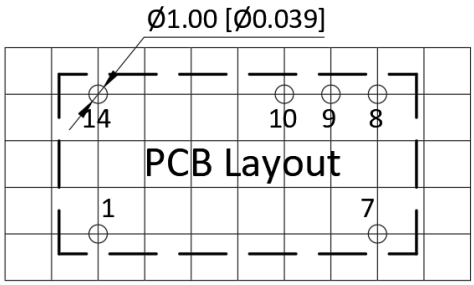
[Table 2] Recommended components

Item	Spec
LDM	6.8uH
C1, C2	4.7uF, 50V
CY	1nF, 4KV
C3	Refer to C_{OUT} in [Table 1]

Mechanical Specifications







Pin Definition

Pin #	Single Out	Dual Out
1	GND	GND
7	NC	NC
8	$+V_{OUT}$	$+V_{OUT}$
9	No Pin	COM
10	0V	-Vo
14	V_{IN}	V_{IN}

* 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