

MVK3P Series

3W, Wide 2:1 Input, 3KV Isolation, DIP24 DC/DC Converters



Features

- Rated power: 3W Max
- Input voltage range 2:1
- Regulated single or dual out
- High efficiency up to 86%
- Isolation voltage 3KV
- Operating temperature range: -40 ~ +85°C ambient
- RoHS compliant
- Compact DIP24 package
- Continuous short circuit protection
- Meet IEC/EN/UL 62368
- 3 year warranty



Model Numbers

Model Number	Input Voltage [VDC]			V _{OUT} [VDC]	Output Current [mA]		Efficiency [%] Typ.	Capacitive Load [uF] Max.
	Nom.	*Range	*Max.		Max.	Min.		
MVK3P-0505	5	4.5~9	11	5	600	30	74	4700
MVK3P-0512	5	4.5~9	11	12	250	12	77	2700
MVK3P-0515	5	4.5~9	11	15	200	10	77	220
MVK3P-0505D	5	4.5~9	11	±5	±300	±15	76	2200
MVK3P-0509D	5	4.5~9	11	±9	±166	±8	76	1800
MVK3P-0512D	5	4.5~9	11	±12	±125	±6	78	1800
MVK3P-0515D	5	4.5~9	11	±15	±100	±5	78	1000
MVK3P-1203	12	9~18	20	3.3	909	46	74	4700
MVK3P-1205	12	9~18	20	5	600	30	81	4700
MVK3P-1212	12	9~18	20	12	250	12	83	2700
MVK3P-1215	12	9~18	20	15	200	10	82	2200
MVK3P-1224	12	9~18	20	24	125	6	83	1800
MVK3P-1205D	12	9~18	20	±5	±300	±15	81	2200
MVK3P-1209D	12	9~18	20	±9	±166	±8	84	2000
MVK3P-1212D	12	9~18	20	±12	±125	±6	84	1800
MVK3P-1215D	12	9~18	20	±15	±100	±5	85	1000
MVK3P-2403	24	18~36	40	3.3	909	46	78	4700
MVK3P-2405	24	18~36	40	5	600	30	81	4700
MVK3P-2409	24	18~36	40	9	333	16	81	2700
MVK3P-2412	24	18~36	40	12	250	12	86	2700
MVK3P-2415	24	18~36	40	15	200	10	86	2200
MVK3P-2424	24	18~36	40	24	125	6	85	1800

MVK3P Series

3W, Wide 2:1 Input, 3KV Isolation, DIP24 DC/DC Converters



Model Numbers [continued]

Model Number	Input Voltage [VDC]			V _{OUT} [VDC]	Output Current [mA]		Efficiency [%] Typ.	Capacitive Load [uF] Max.
	Nom.	*Range	*Max.		Max.	Min.		
MVK3P-2405D	24	18~36	40	±5	±300	±15	82	2200
MVK3P-2412D	24	18~36	40	±12	±125	±6	84	1800
MVK3P-2415D	24	18~36	40	±15	±100	±5	84	1000
MVK3P-4803	48	36~75	80	3.3	909	46	76	4700
MVK3P-4805	48	36~75	80	5	600	30	82	4700
MVK3P-4812	48	36~75	80	12	250	12	86	2700
MVK3P-4815	48	36~75	80	15	200	10	86	2200
MVK3P-4824	48	36~75	80	24	125	6	84	1000
MVK3P-4805D	48	36~75	80	±5	±300	±15	82	2200
MVK3P-4812D	48	36~75	80	±12	±125	±6	84	1800
MVK3P-4815D	48	36~75	80	±15	±100	±5	85	1000
MVK3P-4824D	48	36~75	80	±24	±63	±3	84	680

* Input voltage exceed the Max. value may cause permanent damage.

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

MVK3P Series

3W, Wide 2:1 Input, 3KV Isolation, DIP24 DC/DC Converters



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	$V_{IN, Nom}=5V$ $V_{IN, Nom}=12V$ $V_{IN, Nom}=24V$ $V_{IN, Nom}=48V$	-	789 316 152 77	-	mA	
Input current No load	$V_{IN, Nom}=5V$ $V_{IN, Nom}=12V$ $V_{IN, Nom}=24V$ $V_{IN, Nom}=48V$	-	40 30 15 5	-	mA	
Reflected ripple current	$V_{IN, Nom}=5V$ Others	-	20 30	-	mA	
Input voltage surge 1 second max	$V_{IN, Nom}=5V$ $V_{IN, Nom}=12V$ $V_{IN, Nom}=24V$ $V_{IN, Nom}=48V$	-0.7 -0.7 -0.7 -0.7	-	12 25 50 100	VDC	
Startup input voltage	$V_{IN, Nom}=5V$ $V_{IN, Nom}=12V$ $V_{IN, Nom}=24V$ $V_{IN, Nom}=48V$	-	-	4.5 9 18 36	VDC	
Output voltage accuracy	Load=5%~100% No load	-	± 1.0 ± 1.5	± 3 ± 5	%	
Output voltage balance Dual output with balanced load		-	± 0.5	± 1	%	
Line regulation Full load, $V_{IN}=V_{IN, Min}$ to $V_{IN, Max}$		-	± 0.2	± 0.5	%	
Load regulation $I_{OUT}=5\%$ to 100% of $I_{OUT, rated}$	-	-	± 0.2	± 0.5	%	
Cross regulation Dual output, $I_{OUT, main}=50\%$ of $I_{OUT, rated}$, $I_{OUT, other}=10\%$ to 100% of $I_{OUT, rated}$		-	-	± 5	%	
Output ripple and noise 20MHz bandwidth	$V_{OUT}=24V$ Others	-	100 50	120 80	mVp-p	
Temperature coefficient	Full load	-	± 0.03	± 0.03	%/ $^{\circ}\text{C}$	
Dynamic load response $I_{OUT}=25\%$ ~ 50% ~ 75% of $I_{OUT, rated}$	Peak deviation Recovery time	-	± 2 0.5	± 5 2	% V_{OUT} mS	
Output short circuit protection		Continuous, automatic recovery				
Input filter		PI filter				
Hot plug		None				

* Operating with less than 5% of rated load will not cause damage to the converters, but the performances data may not fall into the specifications, and stable operating is not assured.

MVK3P Series

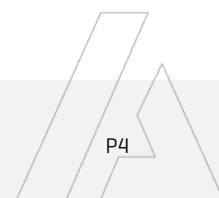
3W, Wide 2:1 Input, 3KV Isolation, DIP24 DC/DC Converters



General Specifications

Parameters	Conditions	Min.	Typ.	Max.	Unit	Note
Isolation voltage 1 minute, leakage current 1mA max.	I/P to O/P	3000	-	-	VDC	
Isolation resistance Tested at 500VDC	I/P to O/P	1000	-	-	M ohm	
Isolation capacitance 100KHz, 0.1V	I/P to O/P	-	1000	-	pF	
Switching frequency*	Full load	-	200	-	KHz	PWM mode
Operating temperature	See "Derating Curve"	-40	-	+85	°C	
Storage temperature		-55	-	+125	°C	
Storage humidity	None condensing	5	-	95	%RH	
Pin soldering temperature		-	-	300	°C	
Case material		Plastic 94-V0				
Cooling method		Free air convection				
Vibration		IEC/EN61373 – Category 1, Grade B				
MTBF	MIL-HDBK-217F	>1,000,000 Hours, T _A =25°C				
Design based on standards		IEC/EN/UL 62368-1				
Safety certifications		EN/IEC 62368-1				
EMC		CISPR32, EN55032 Class B with external circuit IEC/EN61000-4-2, 3, 4, 5, 6				
Size, and Weight		32 x 20 x 12 mm, 13g				

* Switching frequency is measured at full load. The converter reduces the switching frequency at low load [less than 50% load] for better efficiency.



MVK3P Series

3W, Wide 2:1 Input, 3KV Isolation, DIP24 DC/DC Converters

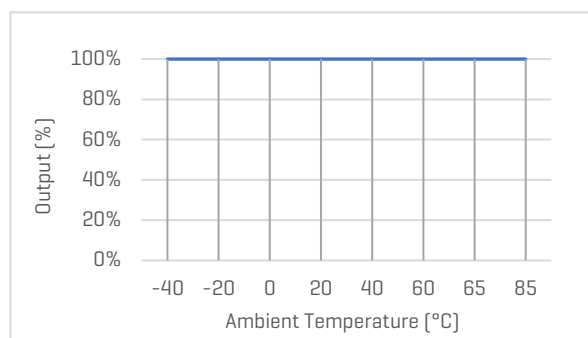


Characteristic Curves

Derating Curve

Output vs Ambient Temperature

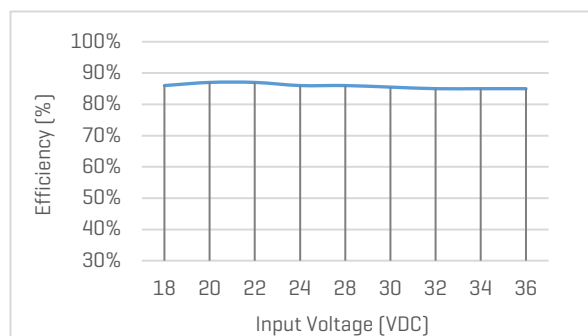
No heatsink



Efficiency Curve

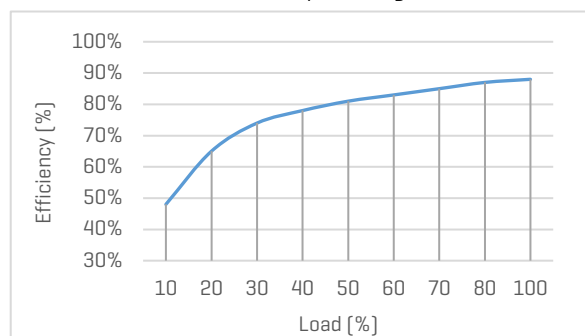
Efficiency vs Input Voltage

MVK3P-2405, with full Load

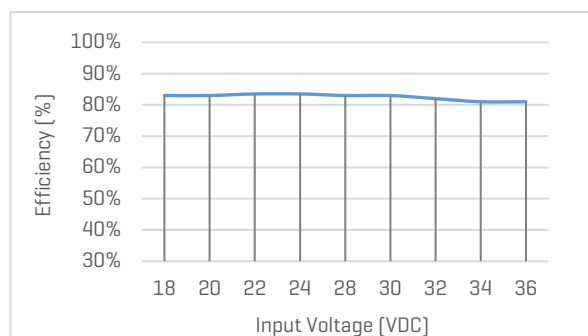


Efficiency vs Load

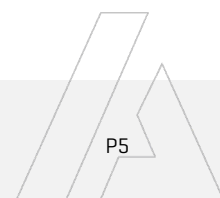
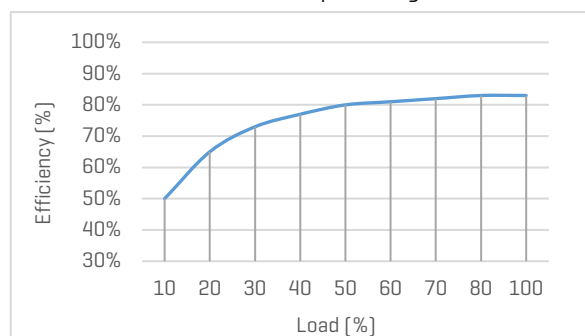
MVK3P-2405, with nominal input voltage



MVK3P-2415D, with full Load



MVK3P-2415D, with nominal input voltage



MVK3P Series

3W, Wide 2:1 Input, 3KV Isolation, DIP24 DC/DC Converters



Recommended Application Circuit

Typical Application Circuit

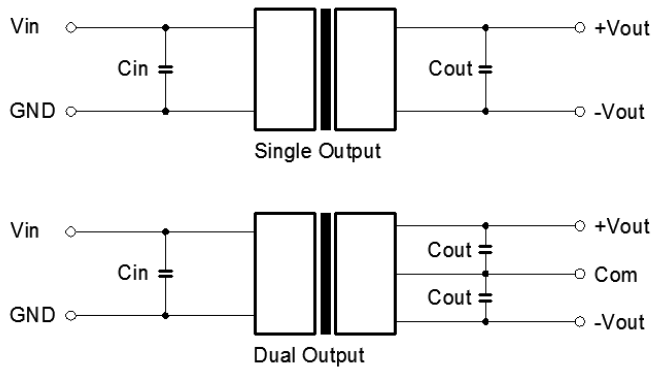


Figure 1. Typical external circuit

Note

*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.

[Table 1] Recommended component spec

Input voltage	5, 12V	24, 48V
C_{IN}	100uF, 25V	10...47uF, 100V
C_{OUT}	10uF, 50V	

EMC Enhancement to Meet EN55032 Class B

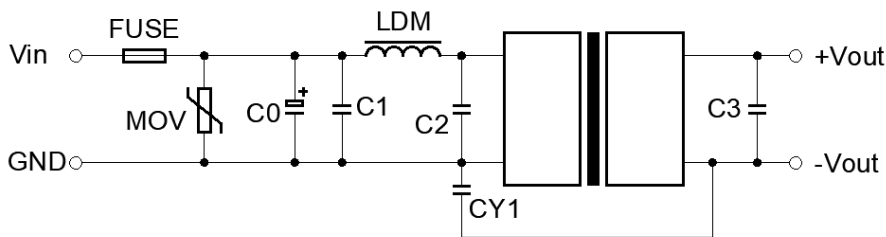


Figure 2. Circuit for EMC enhancement

[Table 2] Recommended component spec

Items	MOV	LDM	C0	C1, C2	CY1
$V_{IN}=5V$	-	12uH	1000uF, 16V	4.7uF, 50V	1nF, 3KV
$V_{IN}=12V$	14D330K	12uH	1000uF, 25V	4.7uF, 50V	1nF, 3KV
$V_{IN}=24V$	20D470K	12uH	330uF, 50V	4.7uF, 50V	1nF, 3KV
$V_{IN}=48V$	14D101K	12uH	330uF, 100V	4.7uF, 100V	1nF, 3KV

* Fuse to be selected according to application needs.

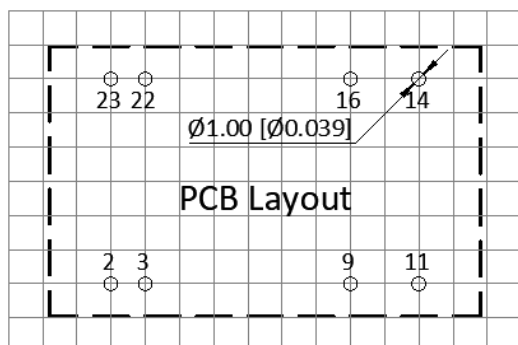
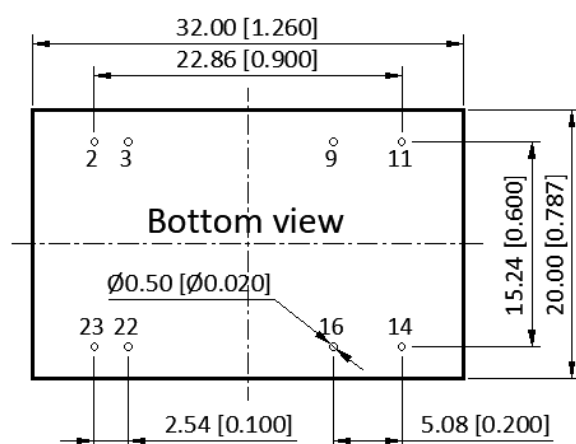
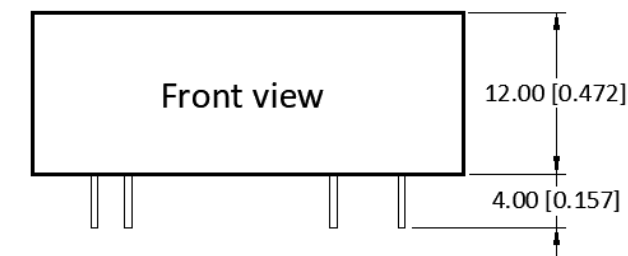
* C3 refer to C_{OUT} in Table 1

MVK3P Series

3W, Wide 2:1 Input, 3KV Isolation, DIP24 DC/DC Converters



Mechanical Specifications



Pin Definition

Pin #	Single Out	Dual Out
2, 3	GND	GND
9	No pin	COM
11	No connection	-V _{OUT}
14	+V _{OUT}	+V _{OUT}
16	OV	COM
22, 23	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