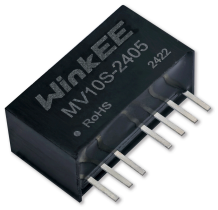
MV10S Series

10W, 2:1 Input Range, 1.5KV Isolation, DC/DC Converters

Features

- Rated power: 10W Max
- Input voltage range: 2:1
- Regulated output
- High efficiency up to 85%
- Isolation voltage 1.5KVDC
- Standby power only 0.12W
- Operating temperature range: -40 ~ +85°C ambient
- RoHS compliant
- Compact SIP8 package
- Remote On/Off
- Under voltage, over current and short circuit protection
- Meet UL/EN/IEC 62368-1 CISPR32, EN55032
- 5 year warranty



Overview

The MV10S series are 1.5KV isolated 6Watt DC/DC converters with compact SIP8 footprint. Designed with high efficiency, they operate in a wide temperature range from -40°C to +85°C. Other features include wide 2:1 input voltage range, remote On/Off control, under voltage, over current, and short circuit protections. These converters are ideally suitable for battery operated equipment, measurement equipment, telecom, wireless network, industrial control system.

Model Numbers

Model Number	Input Voltage [VDC]			V_{OUT} [VDC]	Output Current [mA]		Efficiency [%] Typ.	Capacitive Load [uF] Max.
	Nominal	Range	*Max.		Max.	Min.		
MV10S-1203 [1]	12	9~18	20	3.3	2400	0	80	2200
MV10S-1205 [1]	12	9~18	20	5	2000	0	82	2200
MV10S-1205 [1]	12	9~18	20	6	1667	0	82	680
MV10S-1209 [1]	12	9~18	20	9	1111	0	83	680
MV10S-1212 [1]	12	9~18	20	12	833	0	85	470
MV10S-1215 [1]	12	9~18	20	15	667	0	85	330
MV10S-1224 [1]	12	9~18	20	24	417	0	85	220
MV10S-2403 [1]	24	18~36	40	3.3	2400	0	80	2200
MV10S-2405 [1]	24	18~36	40	5	2000	0	82	2200
MV10S-2406 [1]	24	18~36	40	6	1667	0	82	680
MV10S-2409 [1]	24	18~36	40	9	1111	0	83	680
MV10S-2412 [1]	24	18~36	40	12	833	0	85	470
MV10S-2415 [1]	24	18~36	40	15	667	0	85	330
MV10S-2424 [1]	24	18~36	40	24	417	0	85	220

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, $V_{IN, Nom}$ = 12V	V_{OUT}=3.3V Others	-	777 969	-	mA
Input current Full load, $V_{IN, Nom}$ = 24V	V_{OUT}=3.3V Others	-	389 474	-	mA
Input current No load	V_{OUT}=3.3V Others	-	30 10	-	mA
Reflected ripple current		-	50	-	mA
Input voltage surge 1 second max	$V_{IN, Nom}$ = 12V $V_{IN, Nom}$ = 24V	-0.7 -0.7	-	25 50	VDC
Startup input voltage	$V_{IN, Nom}$ = 12V $V_{IN, Nom}$ = 24V	-	-	9 18	VDC
Input under voltage shutdown	$V_{IN, Nom}$ = 12V $V_{IN, Nom}$ = 24V	5.5 13	6.5 15.5	-	VDC
Remote On/Off control Ctrl pin logic high or open [ON] Ctrl pin logic low or grounded [OFF]	Logic high Logic low Ctrl pin current	3.5 0 -	- - 6	12 1.2 10	VDC VDC mA
Output voltage accuracy I_{OUT}=5% to 100%		-	±1	±3	%
Line regulation Full load, V_{IN} = $V_{IN, Min}$ to $V_{IN, Max}$		-	±0.2	±0.5	%
Load regulation I_{OUT}=5% to 100%		-	±0.5	±1.0	%
Output ripple and noise [2] I_{OUT}=5% to 100% of $I_{OUT, rated}$	20MHz bandwidth	-	75	150	mVp-p
Temperature coefficiency	Full load	-	-	±0.03	%/°C
Dynamic load response I_{OUT}=25%~50%~75% of $I_{OUT, rated}$	Peak deviation *V_{OUT}=3.3V, 5V Peak deviation *Others Recovery time	-	±5 ±3 300	±8 ±5 500	% V_{OUT} % V_{OUT} uS
Output over current protection		110	160	230	% I_{OUT}
Output short circuit protection		Continuous, automatic recovery			
Input filter		Capacitor			
Hot plug		None			

Note [2]: Ripple and noise measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uF & 47uF parallel capacitor. 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.

General Specifications

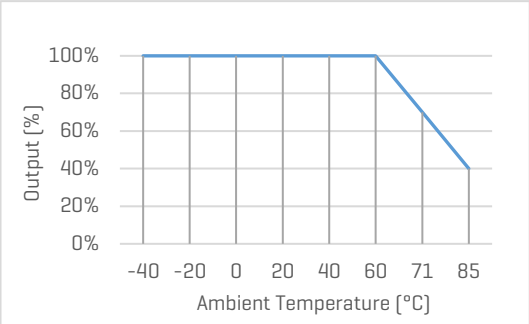
Parameters	Conditions	Min.	Typ.	Max.	Unit
Isolation voltage 1 minute, leakage current 1mA max.	I/P to O/P	1500	-	-	VDC
Isolation resistance Tested at 500VDC	I/P to O/P	1000	-	-	M ohm
Isolation capacitance 100KHz, 0.1V	I/P to O/P	-	1000	-	pF
Switching frequency	Full load	-	300	-	KHz
Operating temperature	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		Black plastic, UL94-V0			
Cooling method		Free air convection			
Vibration		10-150Hz, 5G, 0.75mm along X, Y and Z			
MTBF	MIL-HDBK-217F	>1,000,000 Hours, T_A=25°C			
Safety standards		UL/EN/IEC 62368-1			
EMC standards	CISPR32, EN55032	Class B *with External Circuit [3]			
ESD	IEC/EN61000-4-2	Contact ±4kV, perf. Criteria B			
Radiated	IEC/EN61000-4-3	10V/m, perf. Criteria A			
EFT, Burst	IEC/EN61000-4-4	±2kV, perf. Criteria B [3]			
Surge	IEC/EN61000-4-5	Line to Line ±2kV, perf. Criteria B [3]			
Conducted	IEC/EN61000-4-6	3Vrms, perf. Criteria A			
Size, and Weight		22x9.5x12mm, 4.5g			

Note [3]: with External Circuit Figure 2 for EMC Enhancement

Characteristic Curves

Derating Curve

Output vs Ambient Temperature



Recommended Application Circuit

Typical Application Circuit

*Typical application circuit is to further lower the input and output ripple. It is not required for general use.

*For dual output models, output capacitors are connected to each output.

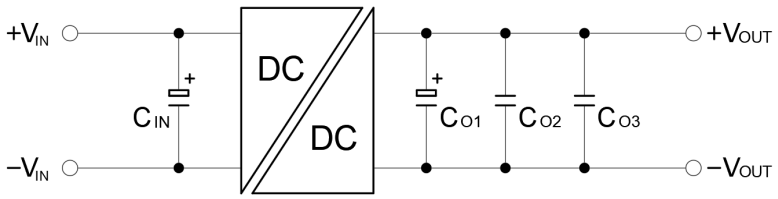


Figure 1. Typical Application Circuit

[Table 1] Recommended component spec

V_{OUT}	C_{IN}	C_{O1}	C_{O2}	C_{O3}
3.3, 5, 6V	100uF, 100V	100uF, 50V	10uF, 50V	0.1uF, 50V
9, 12, 15V	100uF, 100V	47uF, 50V	10uF, 50V	0.1uF, 50V
24V	100uF, 100V	47uF, 50V	10uF, 50V	0.1uF, 50V

EMC Enhancement for EN55032 Class B

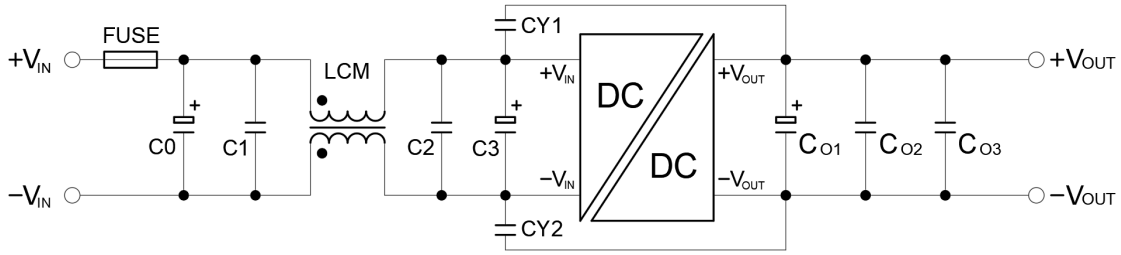


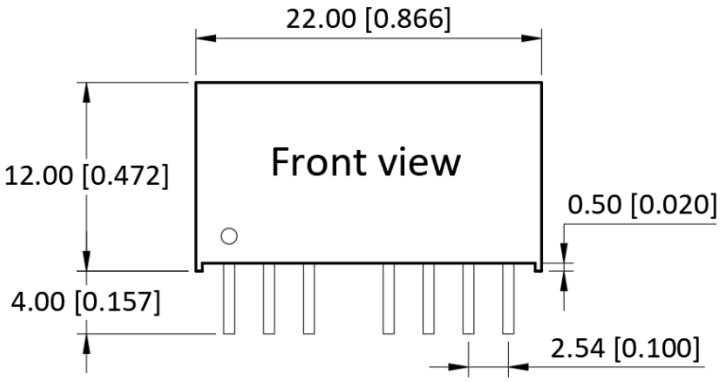
Figure 2. Circuit for EMC enhancement

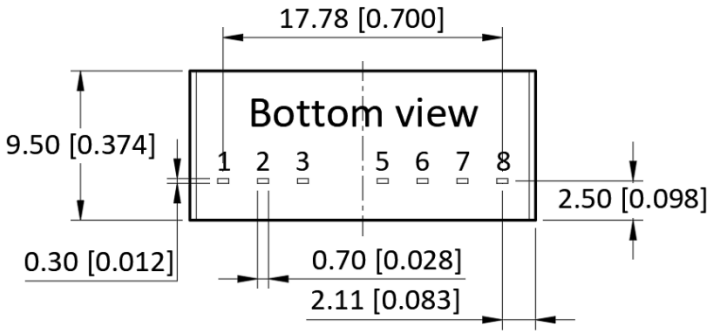
[Table 2] Recommended component spec

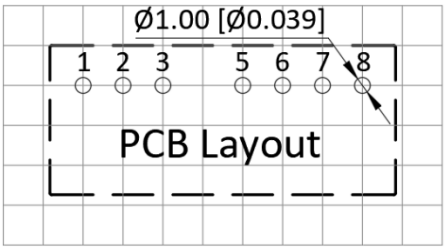
V_{IN}	C0, C3	C1, C2	LCM	CY1, CY2
12V	330uF, 100V	10uF, 100V	1.4~1.7mH	1nF, 2kV
24V	220uF, 100V	10uF, 100V	1.4~1.7mH	1nF, 2kV

* Fuse to be selected according to application needs. Output components refer to Table 1

Mechanical Specifications







Pin Definition

Pin #	Single Out
1	$-V_{IN}$
2	$+V_{IN}$
3	Ctrl
5	N/C
6	$+V_{OUT}$
7	$-V_{OUT}$
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