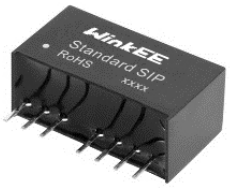
MUK10S Series

10W, 4:1 Input Range, 3KV Isolation, DC/DC Converters

Features

- Rated power: 10W Max
- Input voltage range: 4:1
- Regulated output
- High efficiency up to 86%
- Isolation voltage 3KVDC
- 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 MUK10S series are 3KV 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 4:1 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.		
MUK10S-2403 [1]	24	9~36	40	3.3	2400	0	80	2200
MUK10S-2405 [1]	24	9~36	40	5	2000	0	82	2200
MUK10S-2406 [1]	24	9~36	40	6	1667	0	82	680
MUK10S-2409 [1]	24	9~36	40	9	1111	0	83	680
MUK10S-2412 [1]	24	9~36	40	12	833	0	85	470
MUK10S-2415 [1]	24	9~36	40	15	667	0	85	330
MUK10S-2424 [1]	24	9~36	40	24	417	0	85	220
MUK10S-2403D	24	9~36	40	±3.3	±1200	0	82	±1000
MUK10S-2405D	24	9~36	40	±5	±1000	0	82	±1000
MUK10S-2409D	24	9~36	40	±9	±556	0	83	±330
MUK10S-2412D	24	9~36	40	±12	±417	0	85	±220
MUK10S-2415D	24	9~36	40	±15	±333	0	85	±100
MUK10S-2424D	24	9~36	40	±24	±208	0	85	±47
MUK10S-4803	48	18~75	80	3.3	2400	0	80	2200
MUK10S-4805	48	18~75	80	5	2000	0	82	2200
MUK10S-4806	48	18~75	80	6	1667	0	82	680
MUK10S-4809	48	18~75	80	9	1111	0	84	680

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	Nominal	Range	*Max.		Max.	Min.		
MUK10S-4812	48	18~75	80	12	833	0	86	470
MUK10S-4815	48	18~75	80	15	667	0	86	330
MUK10S-4824	48	18~75	80	24	417	0	86	220
MUK10S-4803D	48	18~75	80	±3.3	±1200	0	82	±1000
MUK10S-4805D	48	18~75	80	±5	±1000	0	82	±1000
MUK10S-4809D	48	18~75	80	±9	±556	0	83	±330
MUK10S-4812D	48	18~75	80	±12	±417	0	85	±220
MUK10S-4815D	48	18~75	80	±15	±333	0	85	±100
MUK10S-4824D	48	18~75	80	±24	±208	0	85	±47

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, $V_{IN, Nom}$ = 24V	V_{OUT}=3.3V V_{OUT}=5, 6, 9V Others	-	418 521 484	430 530 496	mA
Input current Full load, $V_{IN, Nom}$ = 48V	V_{OUT}=3.3V V_{OUT}=5, 6, 9V Others	-	206 254 245	211 265 250	mA
Input current No load		-	9 ... 25	45	mA
Reflected ripple current		-	50	-	mA
Input voltage surge 1 second max	$V_{IN, Nom}$ = 24V $V_{IN, Nom}$ = 48V	-0.7 -0.7	-	50 100	VDC
Startup input voltage	$V_{IN, Nom}$ = 24V $V_{IN, Nom}$ = 48V	-	-	9 18	VDC
Input under voltage shutdown	$V_{IN, Nom}$ = 24V $V_{IN, Nom}$ = 48V	5.5 13	6.5 16	-	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

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
Output voltage accuracy I_{OUT}=5% to 100%	Main output Other output	-	±1 ±3	±3 ±5	%
Line regulation Full load, V_{IN} = $V_{IN, Min}$ to $V_{IN, Max}$	Main output Other output	-	±0.2 ±0.5	±0.5 ±1.0	%
Load regulation I_{OUT}=5% to 100%	Main output Other output	-	±0.5 ±1.0	±1.0 ±1.5	%
Output ripple and noise [2] I_{OUT}=5% to 100% of $I_{OUT, rated}$	20MHz bandwidth	-	75	150	mVp-p
Cross regulation $I_{OUT, main}$=50% of $I_{OUT, rated}$, $I_{OUT, other}$=10% to 100% of $I_{OUT, rated}$	Dual output	-	-	±5	%
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	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	-	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

General Specifications

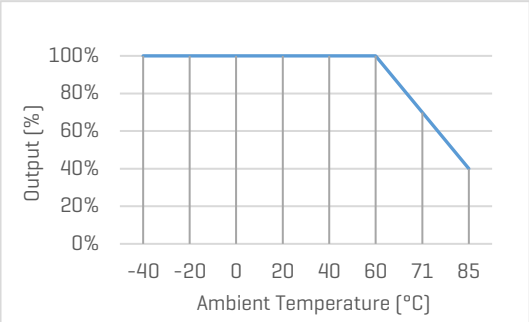
Parameters	Conditions	Min.	Typ.	Max.	Unit
Case material		Black plastic, UL94-V0			
Cooling method		Free air convection			
Vibration		10-150Hz, 5G, 0.75mm along X, Y and Z			
MTBF	MIL-HDBK-217F	>1,000,000 Hours, T_A=25°C			
Safety standards		UL/EN/IEC 62368-1			
EMC standards	CISPR32, EN55032	Class B *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.

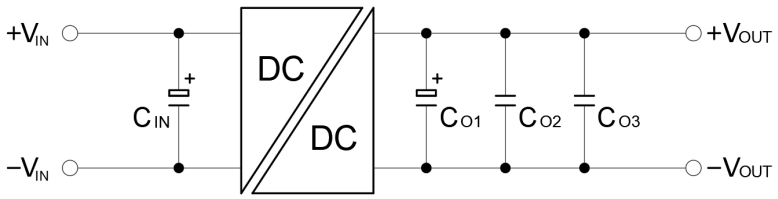


Figure 1. Typical Application Circuit

[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

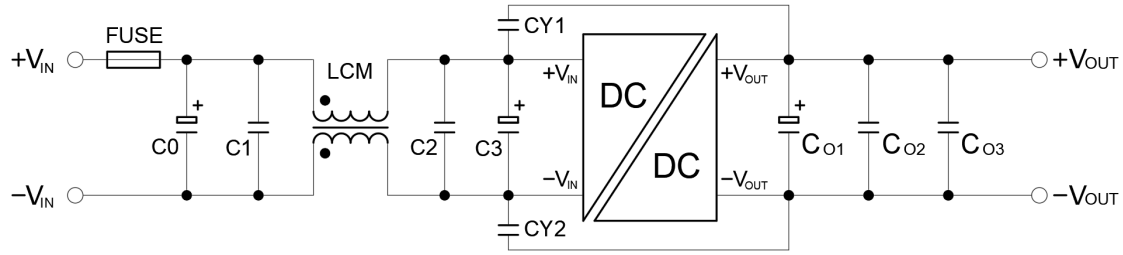


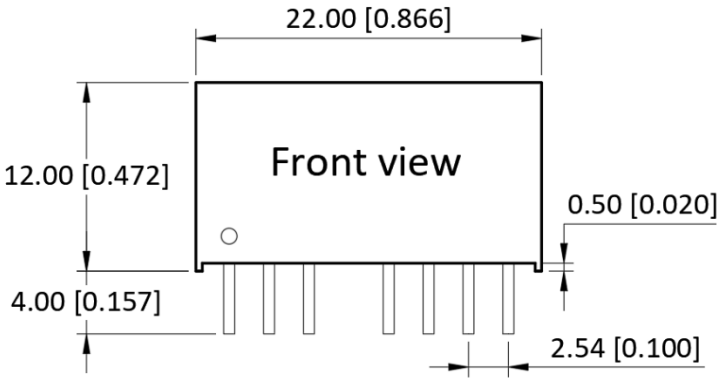
Figure 2. Circuit for EMC enhancement

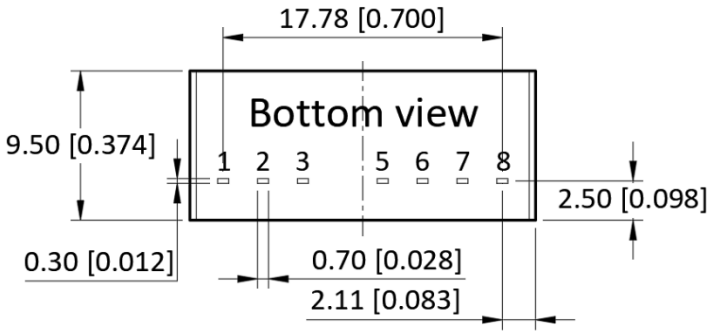
[Table 2] Recommended component spec

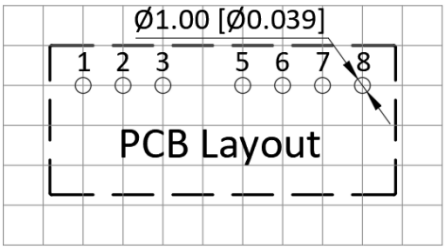
V_{IN}	C0, C3	C1, C2	LCM	CY1, CY2
24V	330uF, 100V	10uF, 100V	1.4~1.7mH	1nF, 4kV
48V	220uF, 100V	10uF, 100V	1.4~1.7mH	1nF, 4kV

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

Mechanical Specifications







Pin Definition

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

* 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