

MUK1S Series

1W, Wide 4:1 Input Range, 3KV Isolation, SIP8 Package DC/DC Converters

Features

- ▶ Rated power: 1W Max
- ▶ Input voltage range: 4:1
- ▶ Regulated output
- ▶ High efficiency up to 81%
- ▶ Isolation voltage 3KVDC
- ▶ Low ripple and noise
- ▶ Operating temperature range: -40 ~ +85°C
- ▶ 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 MUK1S series are 3KV isolated 1Watt DC/DC converters with a compact SIP8 package. 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.		
MUK1S-1203	12	4.5~18	20	3.3	303	0	74	2700
MUK1S-1205	12	4.5~18	20	5	200	0	78	2200
MUK1S-1212	12	4.5~18	20	12	83	0	80	680
MUK1S-1215	12	4.5~18	20	15	67	0	80	470
MUK1S-1205D	12	4.5~18	20	±5	±100	0	80	±1000
MUK1S-1212D	12	4.5~18	20	±12	±42	0	80	±470
MUK1S-1215D	12	4.5~18	20	±15	±33	0	80	±330
MUK1S-2403	24	9~36	40	3.3	303	0	75	2700
MUK1S-2405	24	9~36	40	5	200	0	80	2200
MUK1S-2412	24	9~36	40	12	83	0	81	680
MUK1S-2415	24	9~36	40	15	67	0	81	470
MUK1S-2405D	24	9~36	40	±5	±100	0	79	±1000
MUK1S-2412D	24	9~36	40	±12	±42	0	80	±470
MUK1S-2415D	24	9~36	40	±15	±33	0	81	±330

MUK1S Series



1W, Wide 4:1 Input Range, 3KV Isolation, SIP8 Package DC/DC Converters

Model Numbers [continued]

Model Number	Input Voltage [VDC]			V _{OUT} [VDC]	Output Current [mA]		Efficiency [%] Typ.	Capacitive Load [uF] *Max.
	Nominal	Range	*Max.		Max.	Min.		
MUK1S-4803	48	18~75	80	3.3	303	0	74	2700
MUK1S-4805	48	18~75	80	5	200	0	79	2200
MUK1S-4812	48	18~75	80	12	83	0	79	680
MUK1S-4815	48	18~75	80	15	67	0	79	470
MUK1S-4805D	48	18~75	80	±5	±100	0	79	±1000
MUK1S-4812D	48	18~75	80	±12	±42	0	79	±470
MUK1S-4815D	48	18~75	80	±15	±33	0	80	±330

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

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

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	$V_{IN, Nom} = 12\text{V}$ $V_{IN, Nom} = 24\text{V}$ $V_{IN, Nom} = 48\text{V}$	-	281 111 55	290 114 57	mA	
Input current No load	$V_{IN, Nom} = 12\text{V}$ $V_{IN, Nom} = 24\text{V}$ $V_{IN, Nom} = 48\text{V}$	-	40 15 6	60 30 10	mA	
Input reflected ripple current		-	15	-	mA	
Input voltage surge 1 second max	$V_{IN, Nom} = 12\text{V}$ $V_{IN, Nom} = 24\text{V}$ $V_{IN, Nom} = 48\text{V}$	-0.7 -0.7 -0.7	-	25 50 100	Vdc	
Startup input voltage	$V_{IN, Nom} = 12\text{V}$ $V_{IN, Nom} = 24\text{V}$ $V_{IN, Nom} = 48\text{V}$	-	-	4.5 9 18	Vdc	
Input under voltage protection	$V_{IN, Nom} = 12\text{V}$ $V_{IN, Nom} = 24\text{V}$ $V_{IN, Nom} = 48\text{V}$	-	-	4 8 16	Vdc	
Output voltage accuracy	$V_{OUT}=3.3\text{V}, 5\text{V}$ All others	-	± 2 ± 1	± 5 ± 3	%	
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% of $I_{OUT, rated}$		-	± 0.5	± 1.0	%	
Temperature coefficient	Full load	-	0.02	0.03	%/ $^{\circ}\text{C}$	
Dynamic load response $I_{OUT}=25\%\sim 50\%\sim 75\%$ of $I_{OUT, rated}$	Peak deviation Recovery time	-	± 2.5 0.5	± 5 3	% V_{OUT} mS	
Output ripple and noise	20MHz bandwidth	-	50	150	mVp-p	
Remote On/Off control "Ctrl" pin open or logic high [ON] "Ctrl" pin grounded or logic low [OFF]	Logic high Logic low Ctrl pin current	3.5 0 -	- - 5	12 0.7 10	VDC VDC mA	Positive Logic
Output over current protection		110	140	-	% I_{OUT}	
Output short circuit protection		Continuous, automatic recovery				

* 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	Note
Isolation voltage Tested for 1 minute	Input to Output	3000	-	-	VDC	
Isolation resistance Tested at 500VDC	Input to Output	1000	-	-	M ohm	
Isolation capacitance 100KHz, 0.1V	Input to Output	-	25	-	pF	
Switching frequency	Full load	-	250	-	KHz	
Operating temperature	No derating	-40	-	+85	°C	
Storage temperature		-55	-	+125	°C	
Storage humidity	None condensing	5	-	95	%RH	
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				
MTBF	MIL-HDBK-217F	>1,000,000 Hours, T _A =25°C				
Design based on standards		IEC/EN/UL 62368-1				
Safety certifications		IEC/EN 62368-1				
EMC [Fig x] means connected with external circuit as shown in the Recommended External Circuit section	CE & RE ESD RS EFT Surge CS	CISPR32, EN55032 Class B with [Fig 2] IEC/EN61000-4-2, Contact ±6kV, Criteria B IEC/EN61000-4-3, 10V/m, Criteria A IEC/EN61000-4-4, ±2kV, Criteria B [Fig 1] IEC/EN61000-4-5, Line to Line ±2kV, Criteria B [Fig 1] IEC/EN61000-4-6, 3Vrms, Criteria A				
Size & Weight		22x9.5x12mm, 4.5g				

MUK1S Series

1W, Wide 4:1 Input Range, 3KV Isolation, SIP8 Package DC/DC Converters

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.

*Recommended component specifications are typical values. Excessive external capacitive load may cause startup problem.

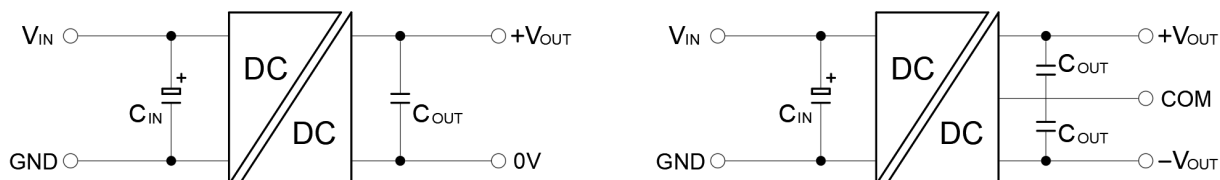


Figure 1. Typical Application Circuit

[Table 1] Recommended component spec

Item	C_{IN}	C_{OUT}
Spec	100uF, 100V	22uF, 50V

EMC Enhancement for EN55032 Class B

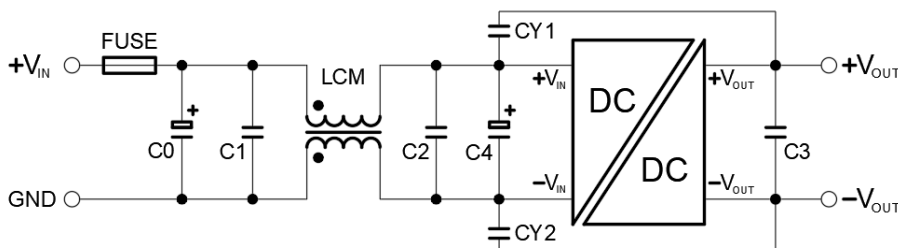


Figure 2. Circuit for EMC enhancement

[Table 2] Recommended component spec

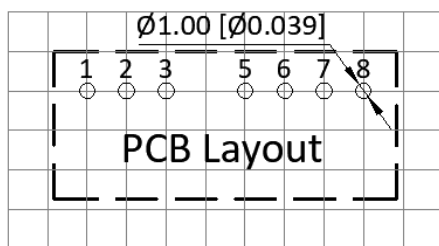
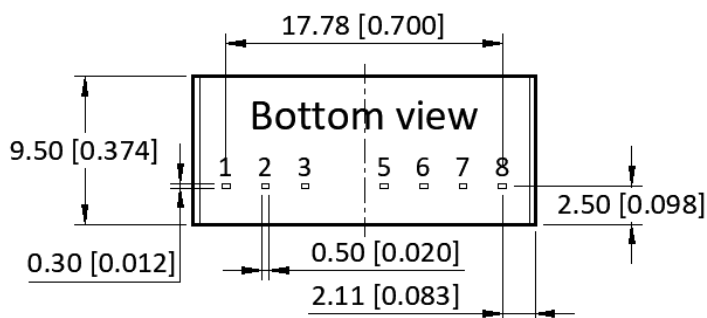
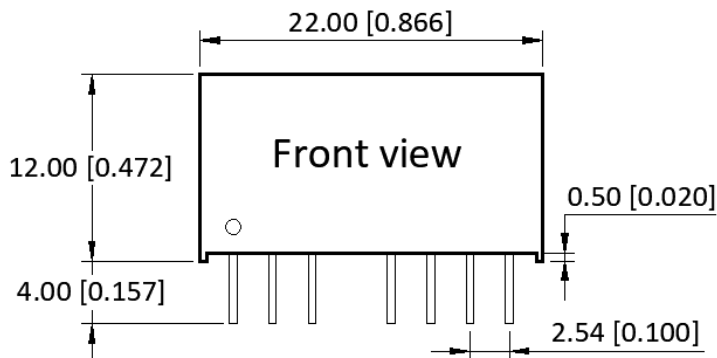
Items	LCM	C0, C4	C1, C2	CY1, CY2	C3
Spec	1.4...1.7mH	330uF, 100V	10uF, 100V	1nF, 400VAC	22uF, 50V

* Fuse to be selected according to application needs.

MUK1S Series

1W, Wide 4:1 Input Range, 3KV Isolation, SIP8 Package DC/DC Converters

Mechanical Specifications



Pin Definition

Pin #	Single Out	Dual Out
1	GND	GND
2	V _{IN}	V _{IN}
3	Ctrl	Ctrl
5	No connection	No connection
6	+V _{OUT}	+V _{OUT}
7	-V _{OUT} [0V]	COM
8	NC	-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