MU30G Series

30W, Wide 4:1 Input, 1.5KV Isolation, DIP1"X1" DC/DC Converters

Features

- Rated power: 30W Max
- Input voltage range 4:1
- Regulated output
- High efficiency up to 90%
- Isolation voltage 1.5KVDC
- Remote On/Off control
- Output trimming ±10%
- Operating temperature range: -40 ~ +85°C ambient
- RoHS compliant
- Compact 1"x1" package
- Under voltage, over voltage, over current, and short circuit protection
- Designed to meet UL/EN/IEC 62368-1
- 3 year warranty

RoHS CE

Overview

The MU30G series are 1.5KV isolated 30Watt DC/DC converters with standard DIP1"x1" 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, output trimming, under voltage, over 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.
	Nom.	Range	*Max.		Max.	Min.		
MU30G-2403	24	9-36	40	3.3	6000	0	84	8000
MU30G-2405	24	9-36	40	5	6000	0	88	6000
MU30G-2412	24	9-36	40	12	2500	0	89	5000
MU30G-2415	24	9-36	40	15	2000	0	89	3000
MU30G-2424	24	9-36	40	24	1250	0	90	1000
MU30G-4803	48	18-75	80	3.3	6000	0	83	8000
MU30G-4805	48	18-75	80	5	6000	0	87	6000
MU30G-4812	48	18-75	80	12	2500	0	88	5000
MU30G-4815	48	18-75	80	15	2000	0	88	3000
MU30G-4824	48	18-75	80	24	1250	0	89	1000
MU30G-4812D	48	18-75	80	±12	±1250	0	88	2000
MU30G-4815D	48	18-75	80	±15	±1000	0	88	1500
MU30G-4824D	48	18-75	80	±24	±625	0	88	470

* 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°C, nominal input voltage, full load after warm up.

Parameters	Conditions	Min.	Typ.	Max.	Unit	Note
Input current Full load	$V_{IN, Nom}$ = 24V $V_{IN, Nom}$ = 48V	-	1388 710	-	mA	
Input current No load	$V_{IN, Nom}$ = 24V $V_{IN, Nom}$ = 48V	-	6 8	-	mA	
Reflected ripple current		-	60	-	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 12	7.5 15.5	-	VDC	
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 1.2 8	VDC VDC mA	Positive Logic
Output voltage accuracy	I_{OUT}=0 to 100%	-	±1	±3	%	
Line regulation Full load, V_{IN}=$V_{IN, Min}$ to $V_{IN, Max}$	Main output Other output	-	±0.2 ±0.2	±0.5 ±1.0	%	
Load regulation I_{OUT}=5% to 100% of $I_{OUT, rated}$		-	±0.5	±1.0	%	
Output ripple and noise 20MHz bandwidth, peak to peak		-	100	200	mVp-p	
Temperature coefficiency	Full load	-	-	±0.02	%/°C	
Dynamic load response I_{OUT}=25%~50%~75% of $I_{OUT, rated}$	Peak deviation Recovery time	-	±3 250	±8 500	% V_{OUT} uS	
Output voltage trim	Trim range	-	-	±10	% V_{OUT}	
Output over voltage protection		110	140	-	% V_{OUT}	
Output over current protection		110	150	-	% I_{OUT}	
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.

General Specifications

Parameters	Conditions	Min.	Typ.	Max.	Unit	Note
Isolation voltage 1 minute, leakage current 1mA max.	I/P to O/P I/P & O/P to Case	1500 1000	-	-	VDC	
Isolation resistance Tested at 500VDC	I/P to O/P	1000	-	-	M ohm	
Isolation capacitance 100KHz, 0.1V	Single Out Dual Out	-	2000 1000	-	pF	
Switching frequency	Full load	-	330	-	KHz	PWM mode
Operating temperature	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	
Vibration		IEC/EN61373 – Category 1, Grade B				
Cooling method		Free air convection				
Case material		Aluminum alloy				
MTBF	MIL-HDBK-217F	>1,000,000 Hours, T_A=25°C				
Design based on standards		UL/EN/IEC 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		25.4 x 25.4 x 12mm, 21g				

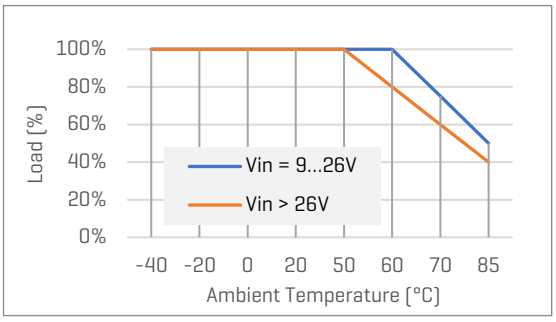
* Switching frequency is measured at full load. The converter reduces the switching frequency at low load (less than 50% load) for better efficiency.

Characteristic Curves

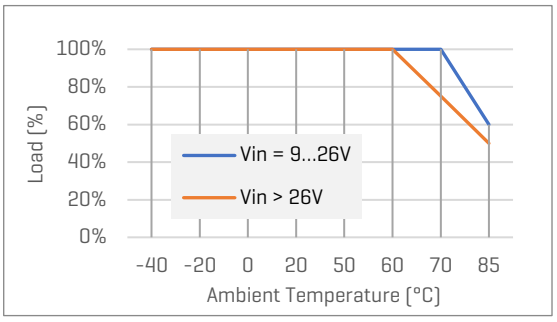
Derating Curve

Load vs Ambient Temperature

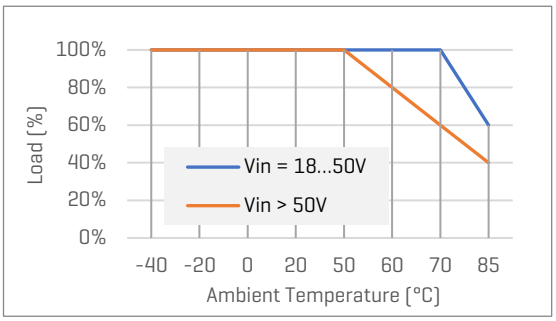
MU30G-24xx, and V_{OUT}=3.3V, 5V



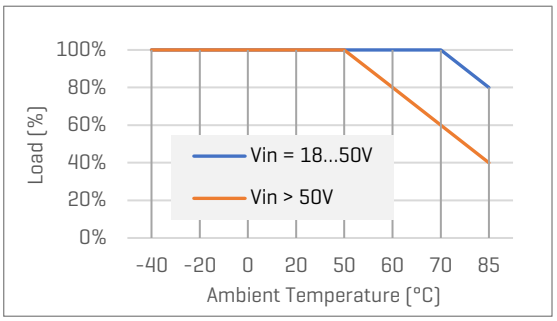
MU30G-24xx, and V_{OUT}=12 ... 24V



MU30G-48xx, and V_{OUT}=3.3V, 5V, or Dual Out

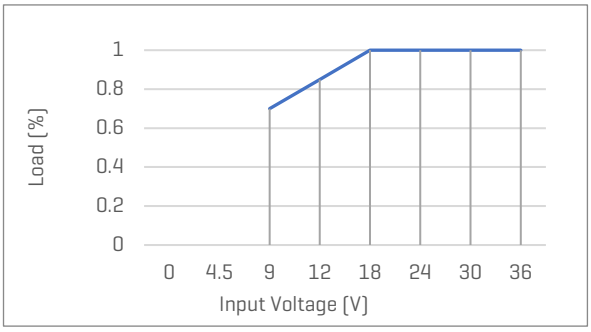


MU30G-48xx, and V_{OUT}=12 ... 24V

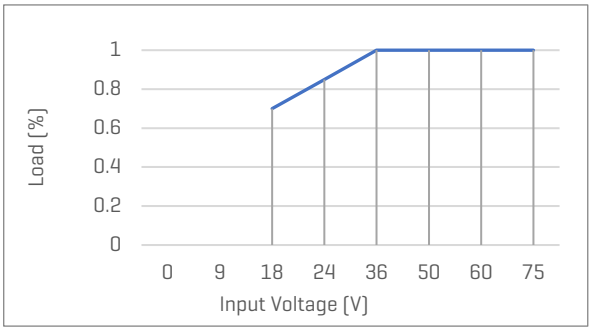


Load vs Input Voltage

MU30G-24xx



MU30G-48xx



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.

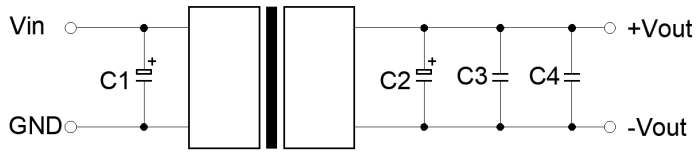


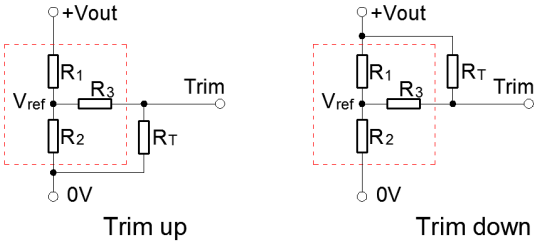
Figure 1. Typical external circuit

[Table 1] Recommended component spec

Items	C1	C2	C3	C4
V_{IN}=24V	100uF	470uF	10uF	0.1uF
V_{IN}=48V	100uF	470uF	22uF	10uF

Circuits for Output Trim

* Items in the red blocks are internal components of the converter.



* The formulas to calculate the desired resistance of Trim resistor "R_T".

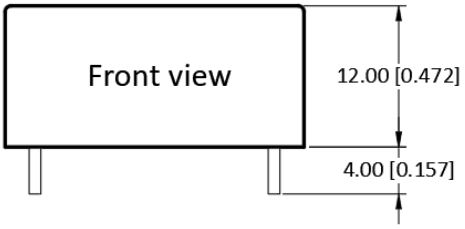
Trim up: $R_T = \frac{a\,R_2}{R_2 - a} - R_3$ $\quad a = \frac{V_{ref}}{V_{OUT} - V_{ref}} R_1$

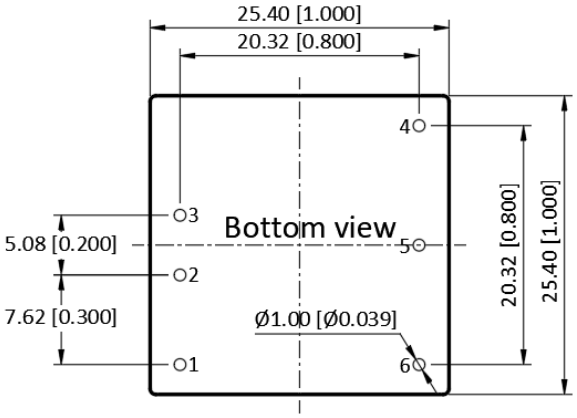
Trim down: $R_T = \frac{a\,R_1}{R_1 - a} - R_3$ $\quad a = \frac{V_{OUT} - V_{ref}}{V_{ref}} R_2$

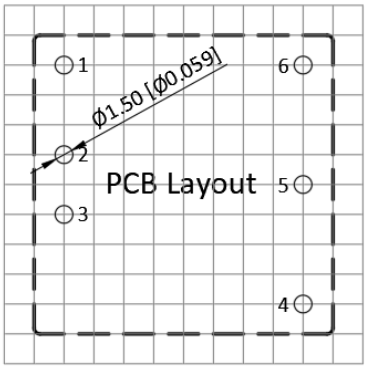
[Table 3] Internal component spec

V_{OUT} [V]	R1 [K Ohm]	R2 [K Ohm]	R3 [K Ohm]	V_{ref} [V]
3.3	10	6.064	13.622	1.24
5	2.4	2.344	17.346	2.5
12	8.2	2.153	21.016	2.5
15	12	2.388	21.016	2.5
24	10	1.158	10.714	2.5

Mechanical Specifications







Pin Definition

Pin #	Single Out	Dual Out
1	Ctrl	Ctrl
2	GND	GND
3	V_{IN}	V_{IN}
4	$+V_{OUT}$	$+V_{OUT}$
5	Trim	0V
6	0V	$-V_{OUT}$

* 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