Product Manual

E_UHBGD-30W

Data Sheet

Wide voltage input,isolated,voltage regulator,single output



Product Series

Product Series	Temperature Range	Isolated Voltage	Package
E_UHBGD-30W	-40℃～+80℃	1500VDC	DIP

RoHS

Features

- Efficiency up to 89%
- Isolated voltage 1500VDC
- Sustainable short circuit, self-recovery
- Output over-current protection
- No additional radiator

Applications

- Industrial control systems
- Data communication systems
- Distributed power control systems
- Digital, analog hybrid systems
- BMS systems, instrumentation
- Distribution terminal,etc.
- .....

Product Model

Part Number	Input Voltage (VDC)		Output		Full Load Efficiency (%,Min/Typ)	Maximum Capacitive Load (μF)
	Nominal (Range)	Max.(1)	Nominal Voltage (VDC)	Current (mA) (Min./ Max.)		
E2405UHBGD-30W	24 (9-36)	40	5	0/6000	84/86	10000
E2412UHBGD-30W			12	0/2500	87/89	4700
E2415UHBGD-30W			15	0/2000	87/89	2200
E2424UHBGD-30W			24	0/1250	87/89	1680
E4805UHBGD-30W	48 (18-75)	80	5	0/6000	84/86	10000
E4812UHBGD-30W			12	0/2500	87/89	4700
E4815UHBGD-30W			15	0/2000	87/89	2200
E4824UHBGD-30W			24	0/1250	87/89	1680

Note:(1)The input voltage must not exceed the specified range value, otherwise it may cause permanent irreparable damage.

Limit Characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Input Surge Voltage (1s，max)	24VDC input	-0.7	--	50	VDC
	48VDC input	-0.7	--	100	
Lead Soldering Temperature	1.5mm from case,10s	--	--	300	℃
Hot Plug		Unavailable			

Input Characteristics

Parameter	Conditions		Min	Typ	Max	Unit
Input Voltage Range	24VDC input		9	24	36	VDC
	48VDC input		18	48	75	
No Load/Full Load Input Current	24VDC input	5V	--	50/1420	90/1450	mA
		Other	--	10/1400	16/1435	
	48VDC input	5V	--	30/710	50/730	
		Others	--	5/700	10/720	
CTRL Remote ON/OFF Control	Input current when turned off		--	3	5	mA
	Module on		Ctrl is floating or connected to TTL high level (3.5-12VDC)			
	Module off		Ctrl connected to GND or low level (0-1.5VDC)			
Starting Voltage	24VDC input		--	--	9	VDC
	48VDC input		--	--	18	
Input Under Voltage Protection	24VDC input		--	7	--	VDC
	48VDC input		--	15	--	
Input Filter			π type filter			

Output Characteristics

Parameter	Conditions		Min	Typ	Max	Unit
Line Regulation	Full load,input voltage from low to high		--	±0.2	±0.5	%
Load Regulation	Nominal input voltage, load varies from 5% to 100%		--	±0.5	±1	
Output Voltage Accuracy	Load varies from 5% to 100%		--	±1	±3	
Temperature Drift Coefficient	Nominal input Voltage, full load		--	--	±0.03	%/℃
Output Ripple(1)	20MHz bandwidth		--	25	75	mVp-p
Output Noise(1)			--	100	150	mVp-p
Transient Recovery Time	Load step change 75%-50%-75%	--	--	300	500	μs
Transient Response Deviation		5V	--	±5	±8	%
		Others	--	±3	±5	%
Output Voltage Adjustable Via Trim	Input voltage range		--	±10	--	%Vo
Over-Voltage Protection			110	--	160	
Over-Current Protection(2)			110	--	190	%Io
Output Short-Circuit Protection			Sustainable short circuit, self-recovery			

Note:(1)0% -5% load ripple & noise is less than or equal to 5%Vo; The test method of ripple and noise adopts the parallel line test method.
(2)Over-current protection operates in hiccup mode.

General Characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Isolation Voltage	Input-output, time 1 minute, leakage current less than 1mA	1500	--	--	VDC
Isolation Resistance	Input-output,isolation voltage 500VDC	1	--	--	GΩ
Isolation Capacitance	Input-output,100kHz,0.1V	--	2000	--	pF
Switching Frequency	Nominal input voltage, 100% load	--	300	--	kHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	k hours
Package Size	--	50.80×25.40×12.70			mm
Package Material	--	Metal shell			

Note:This product adopts light load frequency reduction technology, and the switching frequency is the test value when the output is full load. When the load is lower than 40%, the switching frequency decreases with the load decrease.

Environmental Characteristics

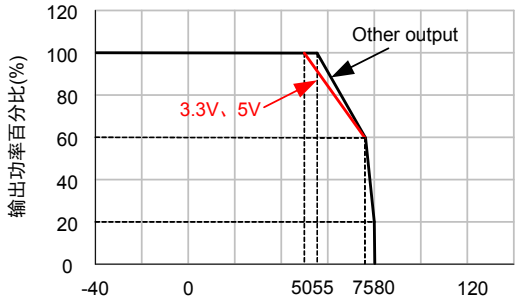
Parameter	Conditions	Min	Typ	Max	Unit
Operating Temperature	See the ambient temperature derating curve for details	-40	--	+80	℃
Storage Temperature	--	-55	--	+125	
Casing Temperature Rise	Ta=25℃	--	30	50	
Storage Humidity	No condensation	--	--	95	%
Cooling Method		Natural air cooling			
Vibration		5-200Hz, 5G, 0.75mm. along X, Y and Z			

EMC Characteristics

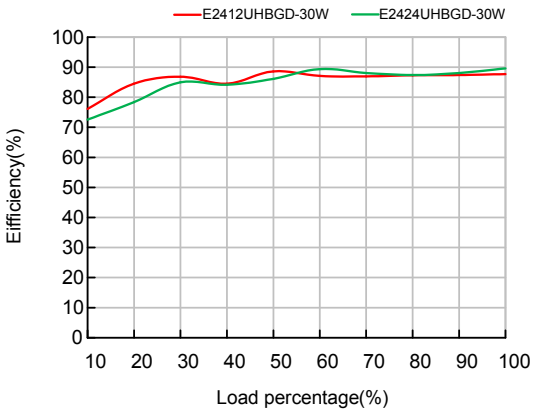
EMI	CE	EN 55032,CLASS B(Figure 2-②)	
	RE	EN 55032,CLASS B(Figure 2-②)	
EMS	ESD	IEC/EN 61000-4-2 Contact±4kV	Perf.Criteria B
	RS	IEC/EN 61000-4-3 10V/m	Perf.Criteria A
	EFT	IEC/EN 61000-4-4 ±2kV(Figure 2-①)	Perf.Criteria B
	Surge	IEC/EN 61000-4-5 ±2kV(Figure 2-①)	Perf.Criteria B
	CS	IEC/EN 61000-4-6 3Vr.m.s	Perf.Criteria A

Note:Unless otherwise specified, the parameters in this manual are measured at 25℃, humidity 40%~75%, input nominal voltage and output electronic load mode.

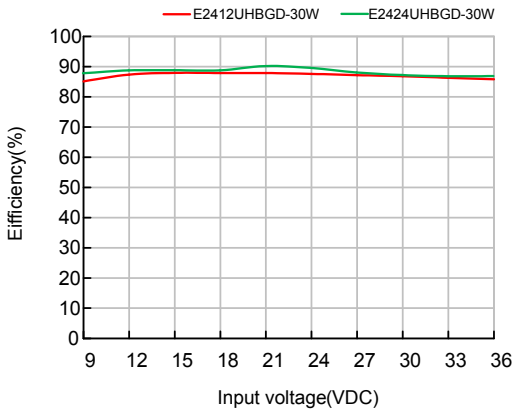
Product Characteristic Graph



Temperature Derating Graph



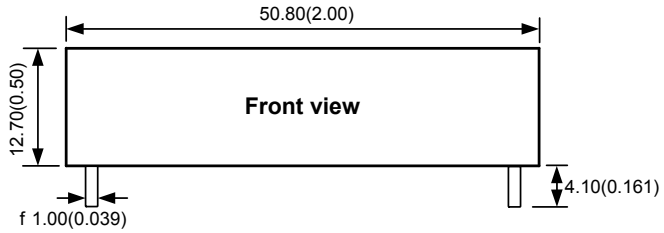
Efficiency VS load(Nominal input voltage)

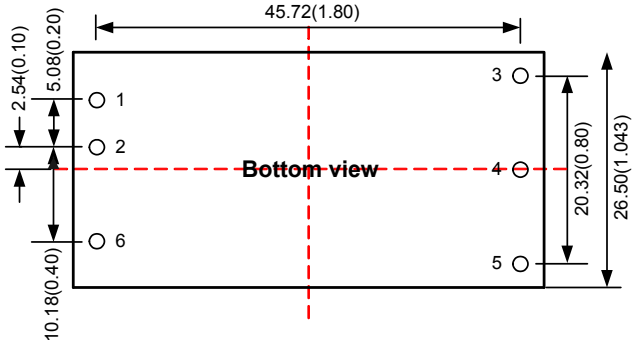


Eifficiency VS input voltage(Full load)

Appearance And Package Size

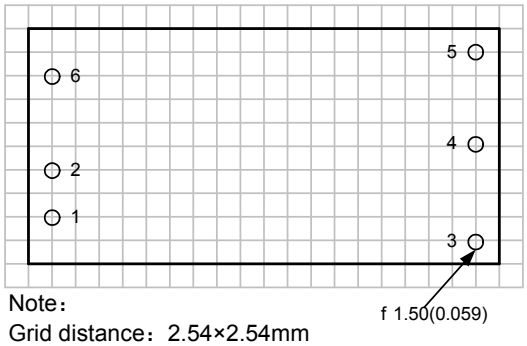
Mechanic Size





Notes：
Unit：mm(inch)
Unlabeled tolerance：±0.5(±0.020)

PCB Silkscreen Diagram



Note：
Grid distance：2.54×2.54mm

Pin Function Description

Pin	Funtion
1	Vin
2	GND
3	+Vo
4	0V
5	Trim
6	Ctrl

Pack Instruction

Carton Size：L×W×H=269×254×127mm
72pieces/carton

Circuit Design And Application

1. Recommended circuit

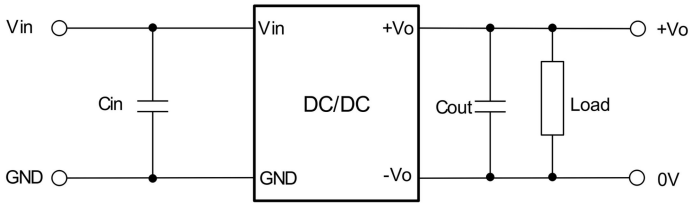


Figure1 Recommended circuit

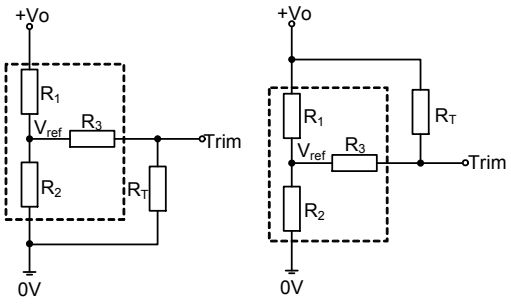
2. Filter capacitor

In order to further stabilize the input power supply, a capacitor Cin, is added at the input end; In order to reduce the output ripple and noise, it is necessary to add a capacitor Cout at the output end. Note that the output capacitance cannot exceed the maximum capacitive load. Excessive output capacitance may easily lead to poor startup of the power module. Recommended external capacitance values are shown in Table 1.

Table 1 The reference value of the external capacitor

Vin(VDC)	Cin(μF)	Vo(VDC)	Cout(μF)
24/48	100	5	300
--	--	12	100
--	--	15	100
--	--	24	47

3. The use of pins(Trim)



Trim up　　Trim down

Use circuit of Trim function (dotted line box is internal circuit of product)

Resistance calculation formula：

up：$R_T=\frac{aR_2}{R_2-a}-R_3$　　$a=\frac{V_{ref}}{Vo'-V_{ref}}\cdot R_1$

down：$R_T=\frac{aR_1}{R_1-a}-R_3$　　$a=\frac{Vo'-V_{ref}}{V_{ref}}\cdot R_2$

R_T indicates the Trim resistor
a is a user-defined parameter and has no actual meaning

Figure 2　Use circuit of Trim function (Dotted line box is internal circuit of product)

Table 2　Internal circuit parameters

Vout(V)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
5	15	4.87	10	1.24
12	15	3.92	10	2.5
15	15	3	10	2.5
24	20	2.32	10	2.5

4. EMC Solutions

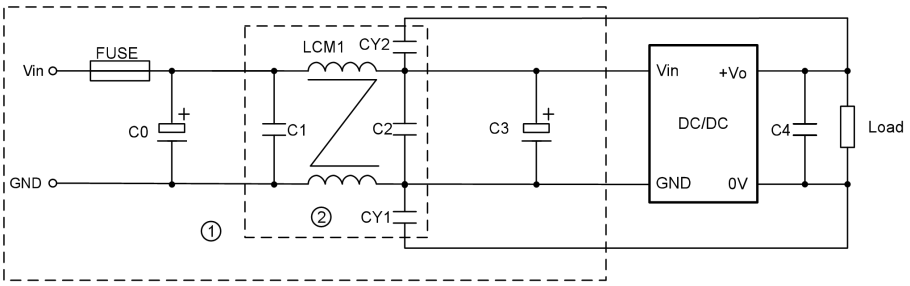


Figure 3　EMC Solutions

Typical recommended circuit for EMC

Table 3　Recommended EMC external circuit parameters

Model	Vin：24V	Vin：48V
FUSE	Select according to the actual input current of the customer	
MOV	14D470K	14D101K
C0	680μF/50V	330μF/100V
C3	330μF/50V	330μF/100V
C1/C2	4.7μF/50V	2.2μF/100V
C4	Refer to Table 3	
LCM1	1mH	
CY1、CY2	1nF/2kV	

5. Load requirements

In order to ensure efficient and reliable operation of the module, it is recommended that the output load should be between 5% and 100% of the rated power.

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