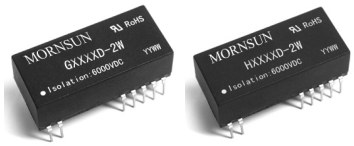
MORNSUN®

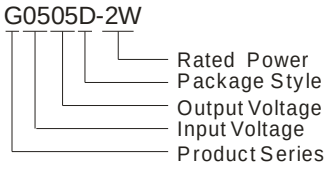
G_D-2W & H_D-2W Series

2W, FIXED INPUT, 6000V ISOLATED & UNREGULATED DUAL/SINGLE OUTPUT DC-DC CONVERTER



RoHS

PART NUMBER SYSTEM



PRODUCT FEATURES

- Efficiency up to 81%
- Up to 6KVDC Isolation
- DIP Package
- Low Isolation Capacitance
- Operating Temperature Range: -40°C to +85°C
- Low Temperature rise
- Internal SMD Construction
- No External Component Required
- Continuous short circuit protection
- Industry Standard Pinout
- Meets UL Approval

APPLICATIONS

The G_D-2W & H_D-2W Series are designed for application where isolated output is required from a distributed power system.

These products apply to where:

1) Input voltage variation ≤ ±10%;
2) 6KVDC input and output isolation;
3) Regulated and low ripple noise is not required.

Such as: digital circuits, low frequency analog circuits, and IGBT power device driving circuits.

SELECTION GUIDE

Model Number	Input Voltage(VDC) Nominal (Range)	Output Voltage (VDC)	Output Current (mA) Max.	Output Current (mA) Min.	Input Current (mA)(typ.) @Max. Load	Input Current (mA)(typ.) @No Load	Reflected Ripple Current (mA,typ.)	Max. Capacitive Load(μF)	Efficiency (%, typ.) @Max. Load	Approval
H0505D-2W	5 (4.5-5.5)	5	400	40	547	60.3	60.6	220	75	UL
H0509D-2W		9	222	23	492	52.1	72.5		76	UL
H0512D-2W		12	167	17	504	58.1	71.2		78	UL
H0515D-2W		15	133	13	505	54.9	70.3		77	UL
G0505D-2W		±5	±200	±20	533	57.7	68.7	100	75	UL
G0509D-2W		±9	±111	±12	498	52.6	88.1		77	UL
G0512D-2W		±12	±84	±9	512	59.9	78.1		79	UL
G0515D-2W		±15	±67	±7	502	53.3	68.7		78	UL
H1205D-2W	12 (10.8-13.2)	5	400	40	217	20.5	54	220	75	UL
H1209D-2W		9	222	23	215	26.9	79		78	UL
H1212D-2W		12	167	17	204	25.4	69		80	UL
H1215D-2W		15	133	14	214	24.3	89.5		78	UL
G1205D-2W		±5	±200	±20	215	23.2	79	100	76	UL
G1209D-2W		±9	±111	±12	207	22.8	94		78	UL
G1212D-2W		±12	±84	±9	206	22.9	37.5		80	UL
G1215D-2W		±15	±67	±7	212	26.9	90		78	UL
H1505D-2W	15 (13.5-16.5)	5	400	40	170	20.6	64.4	220	75	
H1515D-2W		15	133	14	165	15.4	62.5		81	
G1515D-2W		±15	±67	±7	166	15.5	76.8	100	77	
H2405D-2W	24 (21.6-26.4)	5	400	40	109	10.8	158.9	220	77	
H2409D-2W		9	222	23	101	10.1	62.5		78	
H2412D-2W		12	167	17	100	9.3	155.6		81	
H2415D-2W*		15	133	14	100	9.1	137.5		80	
G2405D-2W*		±5	±200	±20	104	16.6	86.7	100	77	
G2409D-2W		±9	±111	±12	99	9.6	98.5		78	
G2412D-2W	24 (21.6-26.4)	±12	±84	±9	99	9.3	102.7		81	
G2415D-2W		±15	±67	±7	100	9.2	113.6		80	

Note: *Designing. The G_D-1W/H_D-1W series also are available in our company.

INTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (1sec. max.)	5VDC Input Models	-0.7	--	9	VDC
	12VDC Input Models	-0.7	--	18	
	15VDC Input Models	-0.7	--	21	
	24VDC Input Models	-0.7	--	30	
Input Filter		C Filter			

OUTPUT SPECIFICATIONS

Item	Test Conditions		Min.	Typ.	Max.	Unit
Output Power			0.2	--	2	W
Output Voltage Accuracy			See tolerance envelope graph			
Output Voltage Balance	Dual Output, Balanced Loads		--	±0.5	±1	%
Line Regulation	For Vin change of ±1%		--	--	±1.2	
Load Regulation	10% to 100% load	5V output		10	15	
		9V output		8.3	15	
		12V output		6.8	15	
		15V output		6.3	15	
Temperature Drift	100% full load		--	--	±0.03	%/°C
Ripple & Noise*	20MHz Bandwidth		--	150	250	mVp-p
Short Circuit Protection			Continuous			

Note: Dual output models unbalanced load: ±5%.
*Ripple and noise tested by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Tested for 1 minute and 1mA max	6000	--	--	VDC
Isolation Resistance	Test at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input/Output,100KHz/1V	--	3.5	--	pF
Switching Frequency	Full load, nominal input(5V Input)	--	35	--	KHz
	Full load, nominal input(12V,15V,24VInput)	--	50	--	
MTBF	MIL-HDBK-217F@25℃	3500	--	--	K hours
Case Material		Plastic(UL94-V0)			
Weight		--	8.2	--	g

ENVIRONMENTAL SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Storage Humidity	Non condensing	--	--	95	%
Operating Temperature	Power derating (above 85℃)	-40	--	85	°C
Storage Temperature		-55	--	125	
Temp. rise at full load		--	25	--	
Soldering Temperature	1.5mm from case for 10 seconds	--	--	300	
Cooling		Free air convection			

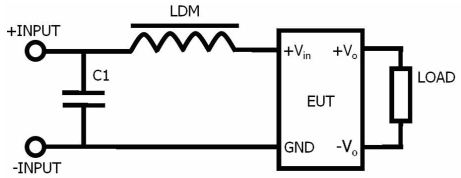
EMC SPECIFICATIONS

EMI	CE	CISPR22/EN55022 CLASS A（External Circuit Refer to Figure1,2）
EMS	ESD	IEC/EN61000-4-2 Contact ±8KV perf. Criteria B

EMC RECOMMENDED CIRCUIT

G15XXD-2W, G24XXD-2W and H15XXD-2W already meet CLASS A, for other models following Figure 1,2.

EMI Recommended External Circuit：



(Figure 1)

G_D-2W Series

Recommended external circuit parameters:

Vin：5V

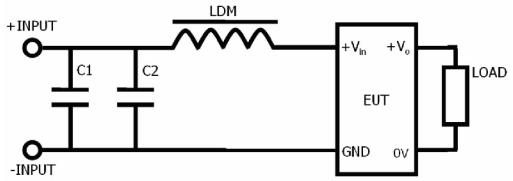
① C1：4.7μF/50V 1210

② LDM：6.8μH

Vin：12V

① C1：1μF/50V 1210

② LDM：4.7μH



(Figure 2)

H_D-2W Series

Recommended external circuit parameters:

Vin：5V

① C1：4.7μF/50V 1210

② LDM：6.8μH

Vin： 12V

C1：4.7μF/50V 1210

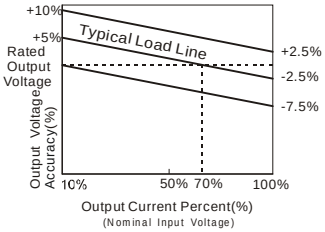
Vin： 24V

① C1、C2：4.7μF/50V 1210

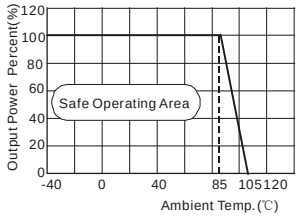
② LDM：6.8μH

PRODUCT TYPICAL CURVE

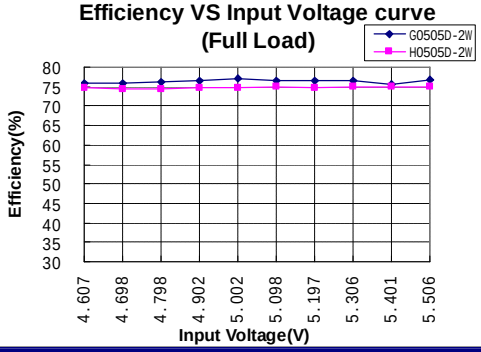
Tolerance Envelope Graph



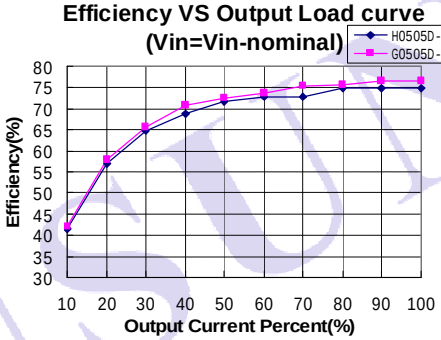
Temperature Derating Graph



Efficiency VS Input Voltage curve (Full Load)

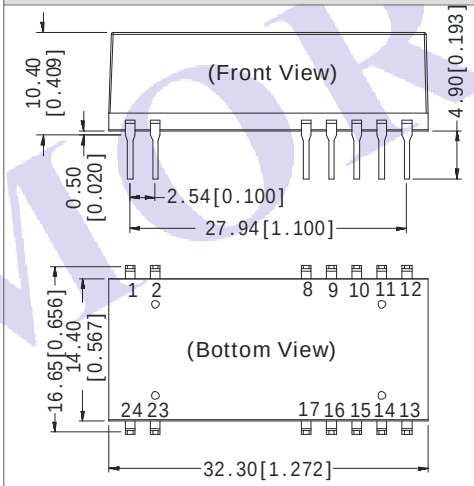


Efficiency VS Output Load curve (Vin=Vin-nominal)



OUTLINE DIMENSIONS、RECOMMENDED FOOTPRINT & PACKAGING

MECHANICAL DIMENSIONS



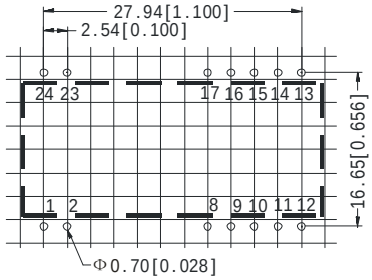
Note:
Unit:mm(inch)
Pin section:0.50*0.30mm(0.020*0.012inch)
Pin section tolerances:±0.10mm(±0.004inch)
General tolerances:±0.25mm(±0.010inch)

FOOTPRINT DETAILS		
Pin	Single	Dual
1	Vin	Vin
2	GND	GND
8,17	NC	-Vo
10,15	0V	0V
12,13	+Vo	+Vo
Others	NC	NC

NC:No Connection

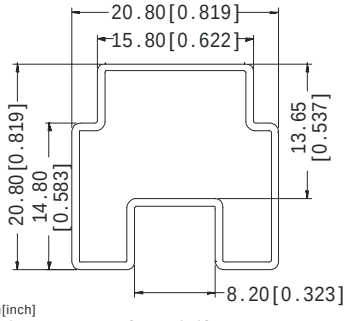
RECOMMENDED FOOTPRINT

Single/Dual



Note：Grid 2.54*2.54mm.

TUBE OUTLINE DIMENSIONS

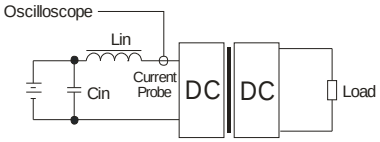


Note:
Unit :mm[inch]
General tolerances: ±0.50mm[±0.020inch]
L=530mm[20.866inch] Tube Quantity: 15pcs
L=220mm[8.661inch] Tube Quantity: 8pcs
Short tube inner packaging dimensions: L*W*H=255*170*80mm;
Short tube outer packaging dimensions(with six inner packaging boxes): L*W*H=375*280*270mm;
Long tube inner packaging dimensions: L*W*H=580*200*100mm;
Long tube outer packaging dimensions(with two inner packaging boxes): L*W*H=600*215*220mm;
Long tube outer packaging dimensions(with three inner packaging boxes): L*W*H=600*215*325mm.

TEST CONFIGURATIONS

Input Reflected-Ripple Current Test Setup

Input reflected-ripple current is measured with an inductor Lin and Capacitor Cin to simulate source impedance.



Lin(4.7μH) Cin(220μF, ESR < 1.0Ω at 100 KHz)

DESIGN CONSIDERATIONS

1) Requirement on output load

To ensure this module can operate efficiently and reliably, During operation, the minimum output load ***could not be less than 10% of the full load.*** If the actual output power is very small, please connect a resistor with proper resistance at the output end in parallel to increase the load, or use our company's products with a lower rated output power (G/H_D-1Wseries).

2) Overload Protection

Under normal operating conditions, the output circuit of these products has no protection against overload. The simplest method is to connect a self-recovery fuse in series at the input end or add a circuit breaker to the circuit.

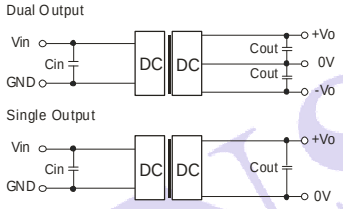
Input Fuse Selection Guide

5VDC Input Models	1000mA slow-Blow Type	15VDC Input Models	250mA slow-Blow Type
12VDC Input Models	500mA slow-Blow Type	24VDC Input Models	250mA slow-Blow Type

3) Recommended circuit

If you want to further decrease the input/output ripple, an capacitor filtering network may be connected to the input and output ends of the DC/DC converter, see (Figure 3).

It should also be noted that the capacitance of filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the recommended capacitance of its filter capacitor sees (Table 1).



(Figure 3)

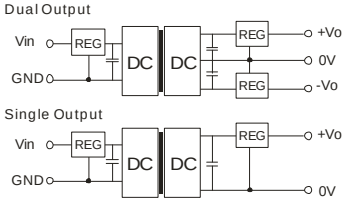
EXTERNAL CAPACITOR TABLE (TABLE 1)

Vin (VDC)	Cin (μF)	Single Vout (VDC)	Cout (μF)	Dual Vout (VDC)	Cout (μF)
5	4.7	5	10	±5	4.7
12	2.2	9	4.7	±9	2.2
15	2.2	12	2.2	±12	1
24	1	15	1	±15	1

It's not recommended to connect any external capacitor in the application field with less than 0.5 watt output.

4) Output Voltage Regulation and Over-voltage Protection Circuit

The simplest device for output voltage regulation, over-voltage and over-current protection is a linear regulator and an capacitor filtering network with overheat protection that is connected to the input or output end in series (Figure 4), the recommended capacitance of its filter capacitor sees (Table 1), linear regulator based on the actual voltage and current required.



(Figure 4)

5) Cannot use in parallel and hot swap

Note:

1. Operation under minimum load will not damage the converter; However, they may not meet all specification listed.
2. Max. Capacitive Load tested at input voltage range and full load.
3. All specifications measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
4. In this datasheet, all the test methods of indications are based on our corporate standards.
5. All characteristics are for listed model only, non-standard models may perform differently, please contact our technical person for more detail.
6. Contact us for your specific requirement.
7. Specifications subject to change without prior notice.

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