

MORNSUN®

D_T-2W Series

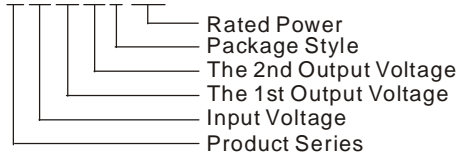
**2W, FIXED INPUT, ISOLATED & UNREGULATED
TWIN OUTPUT ULTRAMINIATURE SMD PACKAGE
DC-DC CONVERTER**



Patent Protection RoHS

PART NUMBER SYSTEM

D050505T-2W



FEATURES

- Efficiency up to 85%
- Small Footprint
- SMD Package Styles
- Twin Independent Output
- Low Temperature Rise
- 1KVDC Isolation
- Operating Temperature Range: -40°C ~ +85°C
- No External Component Required

APPLICATIONS

The D_T-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 $\leq \pm 10\%$;
- 2) 1KVDC 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)		Input Current (mA)(typ.)		Reflected Ripple Current (mA,typ.)	Max. Capacitive Load(μ F)	Efficiency (%, typ.) @Max. Load	Approval
			Max.	Min.	@Max. Load	@No Load				
D050505T-2W	5 (4.5-5.5)	5/5	200/200	20/20	478	32	50	100	82	
D050909T-2W		9/9	112/112	12/12	482	48	42		83	
D051212T-2W		12/12	84/84	9/9	483	55	32		84	
D051515T-2W		15/15	67/67	7/7	470	29	27		85	
D120505T-2W	12 (10.8-13.2)	5/5	200/200	20/20	199	19	25		82	
D120909T-2W		9/9	112/112	12/12	200	20	27		83	
D121212T-2W		12/12	84/84	9/9	198	18	24		84	
D121515T-2W		15/15	67/67	7/7	196	18	25		85	

Note: 1. Models listed with strike-through text have been officially discontinued.
2. The D_T-1W series also are available in our company.

INPUT 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	
Input Filter		Capacitance Filter			

OUTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit	
Output Power		0.2	--	2	W	
Output Voltage Accuracy		See tolerance envelope curve				
Line Regulation	For V_{in} change of $\pm 1\%$	--	--	± 1.2	%	
Load Regulation	10% to 100% load	5VDC output	--	12.8		15
		9VDC output	--	8.3		10
		12VDC output	--	6.8		10
		15VDC output	--	6.0	10	
Temperature Drift	100% load	--	--	± 0.03	%/°C	

Ripple & Noise*	20MHz Bandwidth	--	75	150	mVp-p
Short Circuit Protection**		--	--	1	s

Note: 1. *Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.
2.**Supply voltage must be discontinued at the end of short circuit duration.

COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage(Vin/Vout)	Tested for 1 minute and leakage current less than 1 mA	1000	--	--	VDC
Isolation Voltage(Vo1/Vo2)		1000	--	--	
Isolation Resistance(Vin/Vout)	Test at 500VDC	1000	--	--	MΩ
Isolation Resistance(Vo1/Vo2)		1000	--	--	
Isolation Capacitance(Vin/Vout)	100KHz/1V	--	60	--	pF
Isolation Capacitance(Vo1/Vo2)		--	60	--	
Switching Frequency	Full load, nominal input	--	100	--	KHz
MTBF	MIL-HDBK-217F@25°C	3500	--	--	K hours
Case Material		Epoxy Resin (UL94-V0)			
Weight		--	2.1	--	g

ENVIRONMENTAL SPECIFICATIONS

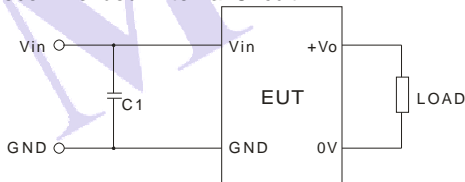
Item	Test Conditions	Min.	Typ.	Max.	Unit
Storage Humidity	Non condensing	--	--	95	%
Operating Temperature	Power derating (above 85°C)	-40	--	85	°C
Storage Temperature		-55	--	125	
Temp. rise at full load		--	25	--	
Lead Temperature	1.5mm from case for 10 seconds	--	--	300	
Cooling		Free air convection			

EMC SPECIFICATIONS

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

EMC RECOMMENDED CIRCUIT

EMI Recommended External Circuit:

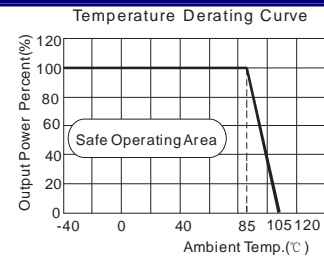
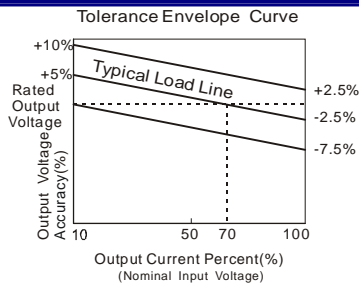


(Figure 1)

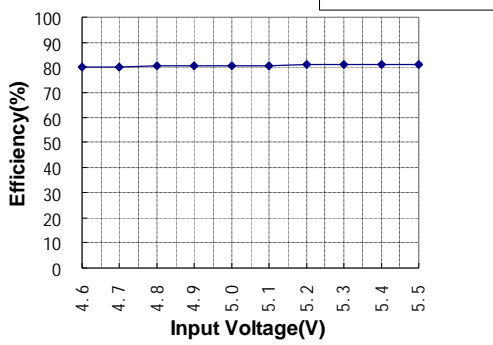
Recommended external circuit parameters:

- Vin: 5V
- C1: 4.7μF/50V
- Vin: 12V
- C1: 1μF/50V

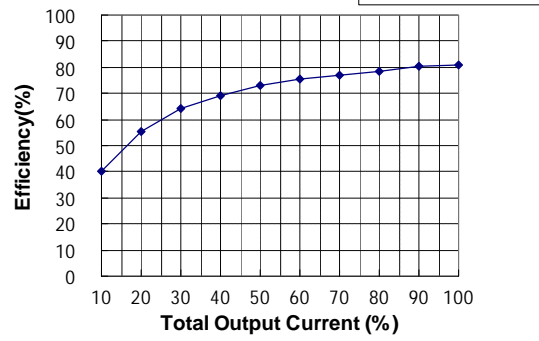
PRODUCT TYPICAL CURVE



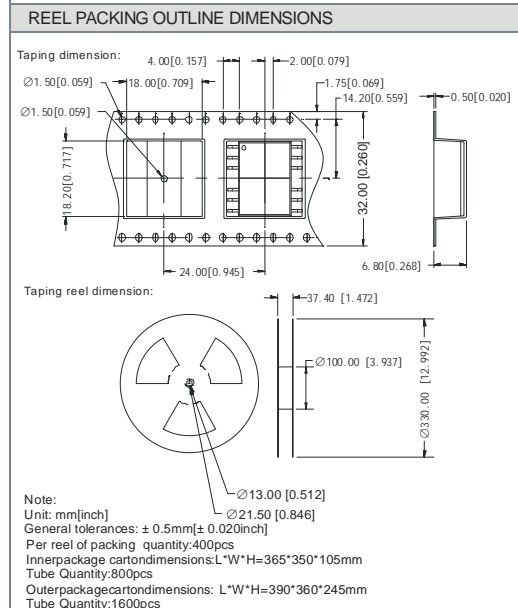
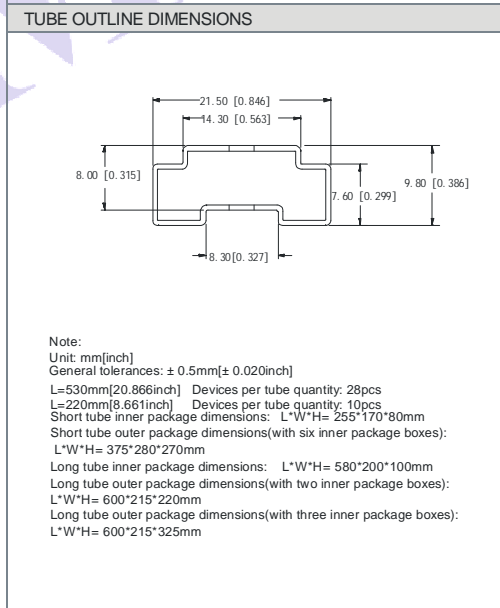
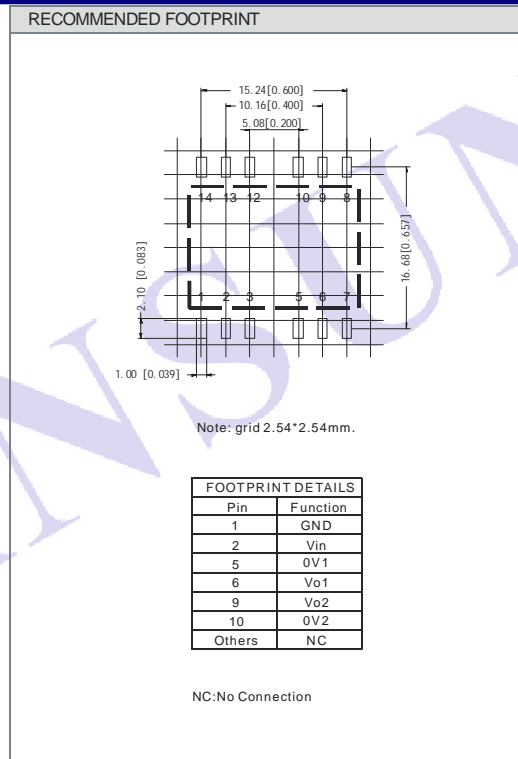
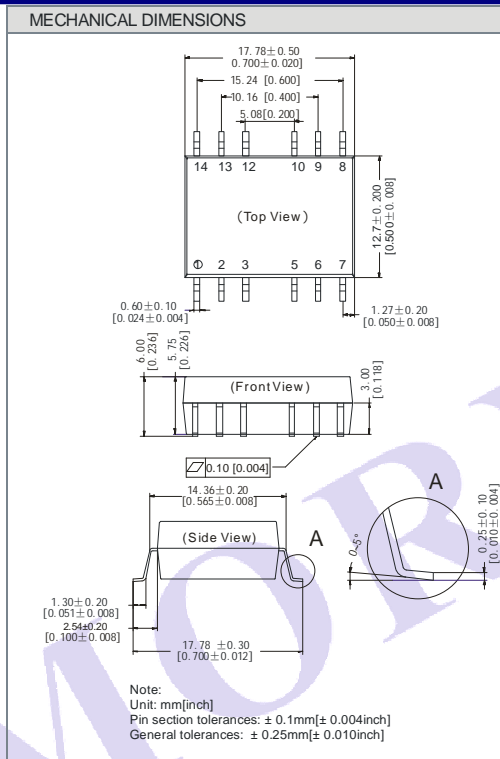
Efficiency VS Input Voltage curve (Full Load)



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



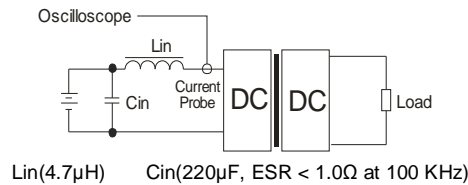
OUTLINE DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGING



TEST CONFIGURATIONS

Input Reflected-Ripple Current Test Setup

Input reflected-ripple current is measured with an inductor L_{in} and Capacitor C_{in} to simulate source impedance.



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 (D_T-1W).

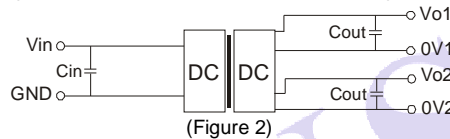
2) Overload Protection

Under normal operating conditions, the output circuit of these products has no protection against overload. The simplest method is add a circuit breaker to the circuit.

3) Recommended circuit

If you want to further decrease the input/output ripple, a capacitor filtering network may be connected to the input and output ends of the DC/DC converter, see (Figure 2).

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).



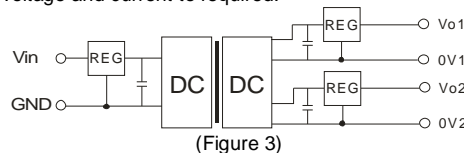
EXTERNAL CAPACITOR TABLE (TABLE 1)

Vin (VDC)	Cin (μF)	Vout (VDC)	Cout (μF)
5	4.7	5	4.7
12	2.2	9	2.2
-	-	12	1
-	-	15	0.47

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 3), the recommended capacitance of its filter capacitor sees (Table 1), linear regulator based on the actual voltage and current to required.



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 date in the datasheet are measured according to nominal input voltage, rated output load, TA=25°C, humidity<75%, unless otherwise specified.
4. In this datasheet, all the test methods of indications are based on our corporate standards.
5. The performance in the datasheet is just fit for the part number in the selection guide, and may be different from the customer-designed product, you can get more details from MORNSUN FAE.
6. Contact us for your specific requirement.
7. Specifications subject to change without prior notice.

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