MORNSUN®

E_XT-1WAR2 Series

1W，*FIXED INPUT, ISOLATED & UNREGULATED DUAL OUTPUT*

Continuous Short Circuit Protection

Patent Protected RoHS

FEATURES

- ●Ultra-Miniature SMD package
- ●3000VDC isolation
- ●Operating temperature range: -40℃~+105℃
- ●Efficiency up to 82%
- ●Internal SMD construction
- ● No external component required
- ● Industry standard pinout

PART NUMBER SYSTEM

E0505XT-1WAR2

- Rated Power
- Package
- Output Voltage
- Input Voltage
- Product Series

APPLICATIONS

The E_XT-1WAR2 Series are designed for application where isolated output is required from a distributed power system.

These products apply to where:

1) Input voltage rang :±10%Vin;
2) 3000VDC input and output isolation;
3) Regulated and low ripple noise is not required,

Such as: digital circuit, low frequency analog circuit, and relay drive circuit.

SELECTION GUIDE

Model	Input Voltage(VDC)	Output Voltage (VDC)	Output Current (mA)		Input Current (mA,Typ.)		Reflected Ripple Current (mA,Typ.)	Max. Capacitive Load (μF)	Efficiency (%) @Max. Load	
	Nominal (Range)		Max.	Min.	@Max. Load	@No Load			Min.	Typ.
E0505XT-1WAR2	5 (4.5-5.5)	±5	±100	±10	250	20	15	100	76	80
E0509XT-1WAR2		±9	±56	±6	250				76	80
E0512XT-1WAR2		±12	±42	±5	247				77	81
E0515XT-1WAR2		±15	±33	±3	247				77	81
E0524XT-1WAR2		±24	±21	±2	247				77	81
E1205XT-1WAR2	12 (10.8-13.2)	±5	±100	±10	104	15	5		76	80
E1209XT-1WAR2		±9	±56	±6	104				76	80
E1212XT-1WAR2		±12	±42	±5	103				77	81
E1215XT-1WAR2		±15	±33	±3	103				77	81
E1224XT-1WAR2		±24	±21	±2	103				77	81
E2405XT-1WAR2	24 (21.6-26.4)	±5	±100	±10	51	7	5		78	82
E2409XT-1WAR2		±9	±56	±6	51				78	82
E2412XT-1WAR2		±12	±42	±5	51				78	82
E2415XT-1WAR2		±15	±33	±3	51				78	82
E2424XT-1WAR2		±24	±21	±2	51				78	82

INPUT SPECIFICATIONS

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

OUTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		See tolerance envelope curve			
Line Regulation	For Vin change of ±1%	--	--	±1.2	%

Load Regulation	10% to 100% load	5VDC output	--	12	--	%
		9VDC output	--	8	--	
		12VDC output	--	7	--	
		15VDC output	--	6	--	
		24VDC output	--	5	--	
Temperature coefficient	100% load		--	--	±0.03	%/°C
Ripple & Noise*	20MHz Bandwidth		--	60	--	mVp-p
Short Circuit Protection			Continuous, automatic recovery			
Note:* Ripple and noise tested with "parallel cable" method. See detailed operation instructions at *DC-DC Application Notes.*						

COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-Output, tested for 1 minute and leakage current less than 1 mA	3000	--	--	VDC
Isolation Resistance	Input-Output, test at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-Output,,100KHz/0.1V	--	20	--	pF
Switching Frequency	Full load, nominal input	--	100	300	KHz
MTBF	MIL-HDFK-217F@25℃	3500	--	--	K hours
Case Material		Epoxy Resin (UL94-V0)			
Weight		--	1.8	--	g

ENVIRONMENTAL SPECIFICATIONS

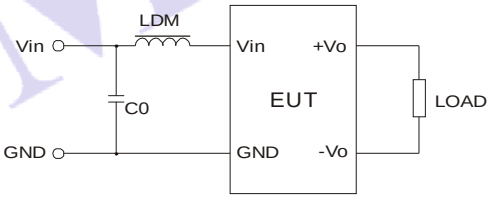
Item	Test Conditions	Min.	Typ.	Max.	Unit
Storage Humidity	Non condensing	--	--	95	%
Operating Temperature	Power derating (≥100℃, see Figure 2)	-40	--	105	°C
Storage Temperature		-55	--	125	
Case Temperature rise	Ta=25°C	--	25	--	
Lead Temperature	1.5mm from case for 10 seconds	--	--	300	
Cooling		Free air convection			

EMC SPECIFICATIONS

EMI	CE	CISPR22/EN55022 CLASS B(Recommended Circuit Refer to Figure1)	
	RE	CISPR22/EN55022 CLASS B(Recommended Circuit Refer to Figure1)	
EMS	ESD	IEC/EN61000-4-2 Contact ±6KV	perf. Criteria B

EMC RECOMMENDED CIRCUIT

EMI Typical Recommended Circuit（CLASS B）:

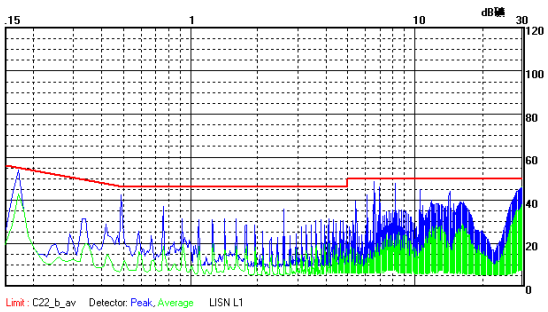


(Figure1)

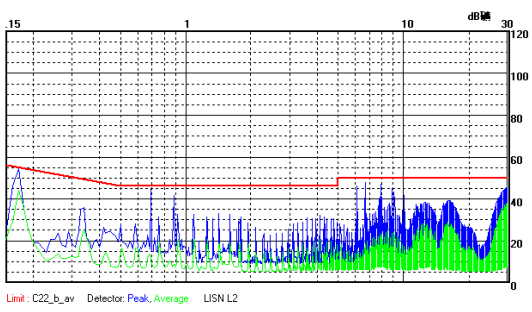
Recommended typical circuit parameters:

Vin(V)		5/12/24
EMI	C0	4.7μF /50V
	LDM	6.8μH

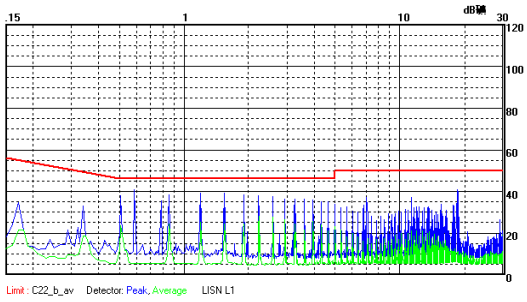
EMI TEST WAVEFORM (RECOMMENDED CIRCUIT FINGURE 1)



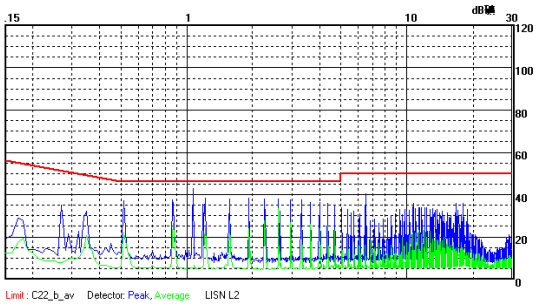
E0505XT-1WAR2 CE(Class B, Positive line)



E0505XT-1WAR2 CE(Class B , Negative line)



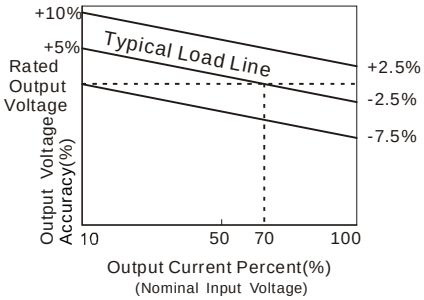
E1205XT-1WAR2 CE(Class B, Positive line)



E1205XT-1WAR2 CE(Class B , Negative line)

PRODUCT TYPICAL CURVE

Tolerance Envelope Curve



Temperature Derating Graph

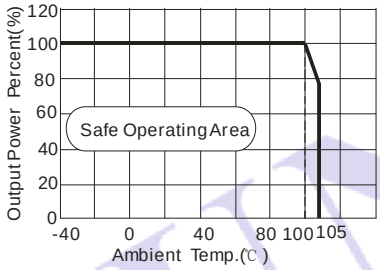
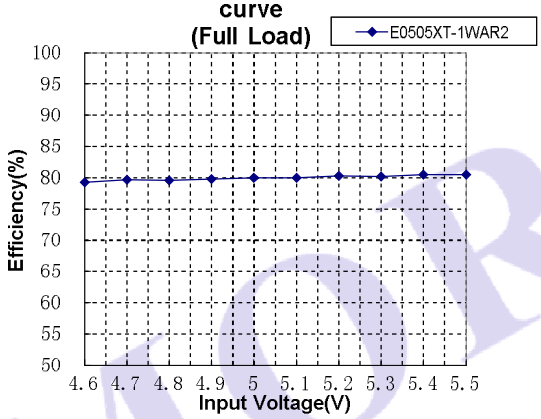
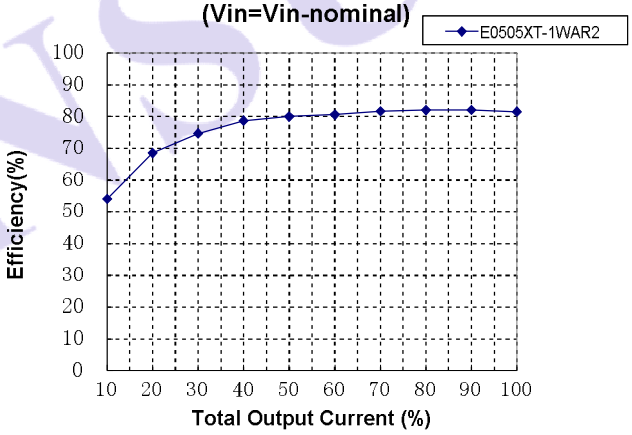


图 2

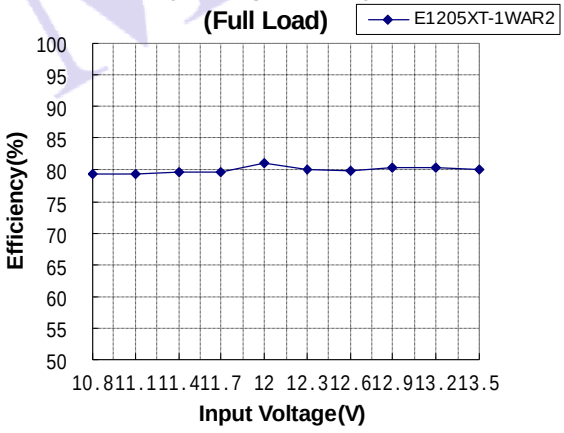
Efficiency VS Input Voltage curve (Full Load)



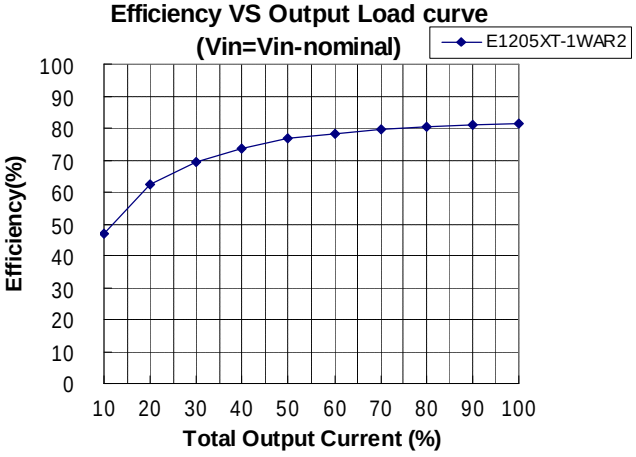
Efficiency VS Output Load curve (Vin=Vin-nominal)



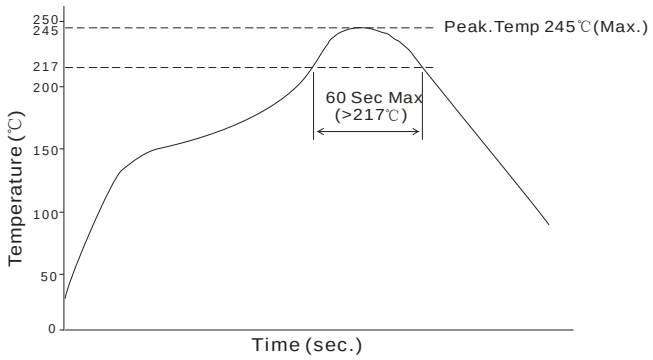
Efficiency VS Input Voltage curve (Full Load)



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



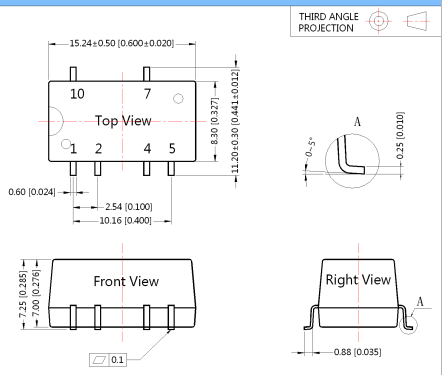
Recommended reflow soldering profile refer to IPC/JEDEC J-STD-020D standard, our products recommended reflow soldering profile as follow:



Note: The curve only applies to the hot air reflow soldering

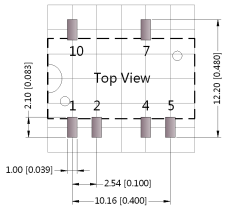
DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGIN

MECHANICAL DIMENSIONS



Note:
Unit: mm[inch]
Pin section tolerances: ±0.10[±0.004]
General tolerances: ±0.25[±0.010]

RECOMMENDED FOOTPRINT DETAILS

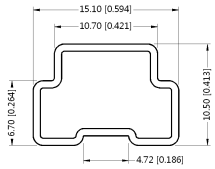


Note: Grid 2.54*2.54mm

PIN CONNECTION	
Pin	Function
1	GND
2	Vin
4	0V
5	-Vo
7	+Vo
10	NC

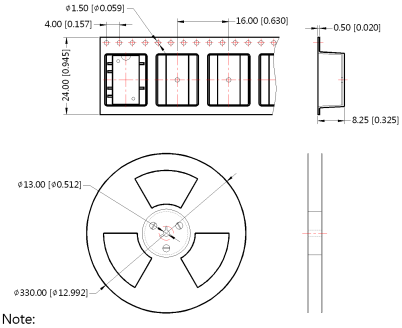
NC: No Connection

TUBE PACKAGING DIMENSIONS



Note:
Unit: mm[inch]
General tolerances: ±0.50[±0.020]
L=530[20.866] Quantity: 33pcs
L=220[8.661] Quantity: 13pcs
Inner carton(S): L*W*H=255*170*80
Outer carton(S): L*W*H=375*280*270
Inner carton(L): L*W*H=580*200*100
Outer carton(L): L*W*H=600*215*220, 2 inner cartons(L)
Outer carton(L): L*W*H=600*215*325, 3 inner cartons(L)

REEL PACKAGING DIMENSIONS

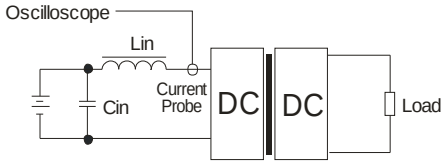


Note:
Unit: mm[inch]
General tolerances: ±0.50[±0.020]
Per reel of packing quantity: 500pcs
Inner carton: L*W*H=365*350*105
Quantity: 2000pcs
Outer carton: L*W*H=390*360*245
Quantity: 4000pcs

TEST CONFIGURATIONS

Input Reflected-Ripple Current Test Setup

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



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

DESIGN CONSIDERATIONS

1) Requirement for output load

To ensure this module operate efficiently and reliably, 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 to the output in parallel to increase the load, or use our company's products with a lower rated output power.

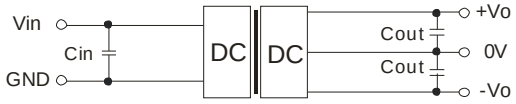
2) Overload Protection

Under normal operating conditions, the output circuit of these products have not overload protection. The simplest method is to add a breaker circuit in the circuit.

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, refer to Figure 3.

It should also be noted that the capacitance of the capacitor must be proper. If the capacitance is too large, a startup problem might arise.For ensuring every channel of output can provide a safe and reliable operation , the recommended capacitance of the capacitor refer to Table 1.



(Figure 3)

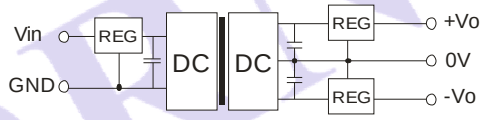
EXTERNAL CAPACITOR TABLE (Table 1)

Vin (VDC)	Cin (μF)	Dual Vout (VDC)	Cout (μF)
5	4.7	±5	4.7
12	2.2	±9	2.2
24	1	±12	1
--	--	±15	1
--	--	±24	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 with overheat protection which is connected to the input or output in series (Figure 4)and an capacitor filtering network.the recommended capacitance of the capacitor refer to Table 1, linear regulator based on the actual voltage and current to make a reasonable selection.



(Figure 4)

5) It is not recommended to increase the output power capability by connecting two or more converters in parallel. The product is not hot-swappable

Note:

1. Operation under minimum load will not damage the converter; However, they may not meet all specifications.
2. Max. Capacitive Load is tested at nominal input voltage and full load.
3. Unless otherwise noted, All specifications are measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load.
4. In this datasheet, all test methods are based on our corporate standards.
5. All characteristics are for listed models, and non-standard models may perform differently. Please contact our technical support for more detail.
6. Please contact our technical support for any specific requirement.
7. Specifications of this product are subject to changes without prior notice.

MORNSUN Science & Technology Co.,Ltd.

Address: No. 5, Kehui St. 1, Kehui development center, Science Ave., Guangzhou Science City, Luogang district, Guangzhou,P.R.China.

Tel: 86-20-38601850

Fax:86-20-38601272

E-mail: info@mornsun.cn

Http://www.mornsun-power.com