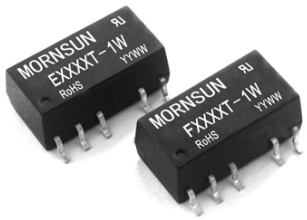
MORNSUN®



E_T-1W & F_T-1W Series

1W, FIXED INPUT, ISOLATED & UNREGULATED DUAL/SINGLE OUTPUT DC-DC CONVERTER

RoHS

FEATURES

- Small Footprint
- SMD Package Style
- 3kVDC Isolation
- Temperature Range: -40°C ~ +85°C
- No Heatsink Required
- Industry Standard Pinout
- Internal SMD construction
- No External Component Required
- RoHS Compliance

APPLICATIONS

The E_T-1W & F_T-1W series are specially designed for applications where a group of polar power supplies are isolated from the input power supply in a distributed power supply system on a circuit board. These products apply to:

1) Where the voltage of the input power supply is fixed (voltage variation ≤ ±10%);
2) Where isolation is necessary between input and output (isolation voltage ≤3000VDC);
3) Where the regulation of the output voltage and the output ripple noise are not demanding.

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

MODEL SELECTION

F0505T-1W

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

PRODUCT PROGRAM

Part Number	Input		Output			Efficiency (%, Typ.)	Certificate
	Voltage (VDC)		Voltage (VDC)	Current (mA)			
	Nominal	Range		Max.	Min.		
F0303T-1W	3.3	3.0-3.6	3.3	304	30	73	
F0305T-1W			5	200	20	75	
E0305T-1W			±5	±100	±10	68	
E0312T-1W			±12	±42	±5	77	
F0505T-1W	5	4.5-5.5	5	200	20	70	UL
F0509T-1W			9	110	11	76	UL
F0512T-1W			12	84	9	78	UL
F0515T-1W			15	66	7	79	UL
E0505T-1W			±5	±100	±10	71	UL
E0509T-1W			±9	±55	±6	77	UL
E0512T-1W			±12	±42	±5	78	UL
E0515T-1W			±15	±33	±4	79	UL
F1203T-1W	12	10.8-13.2	3.3	303	30	70	
F1205T-1W			5	200	20	69	UL
F1209T-1W			9	110	11	73	UL
F1212T-1W			12	84	9	73	UL
F1215T-1W			15	66	7	74	UL
E1205T-1W			±5	±100	±10	71	UL
E1209T-1W			±9	±55	±6	73	UL
E1212T-1W			±12	±42	±5	74	UL
E1215T-1W			±15	±33	±4	75	UL
F2405T-1W	24	21.6-26.4	5	200	20	69	
F2412T-1W			12	84	9	77	
F2415T-1W			15	66	7	74	
F2424T-1W			24	42	5	76	
E2405T-1W			±5	±100	±10	70	
E2412T-1W			±12	±42	±5	77	
E2424T-1W			±24	±21	±3	79	

COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Units
Storage humidity				95	%
Operating temperature		-40		85	°C
Storage temperature		-55		125	
Temp. rise at full load			15	25	
Lead temperature	1.5mm from case for 10 seconds			260	
Cooling		Free air convection			
Package material		Epoxy Resin(UL94-V0)			
Short circuit protection*				1	s
MTBF		3500			k hours
Weight			1.71		g

*Supply voltage must be discontinued at the end of short circuit duration.

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ISOLATION SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Units
Isolation voltage	Tested for 1 minute and 1mA max	3000			VDC
Isolation resistance	Test at 500VDC	1000			MΩ

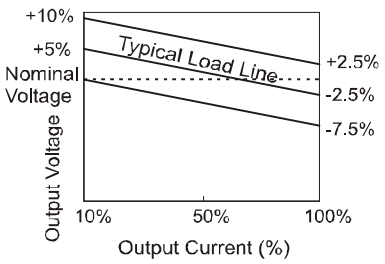
OUTPUT SPECIFICATIONS

Item	Test Conditions		Min.	Typ.	Max.	Units
Output power			0.1		1	W
Line regulation	For Vin change of ±1%(3.3V output)				±1.5	%
	For Vin change of ±1%(Others output)				±1.2	
Load regulation	10% to 100% load (3.3V output)			15	20	
	10% to 100% load (5V output)			12.8	15	
	10% to 100% load (9V output)			8.3	10	
	10% to 100% load (12V output)			6.8	10	
	10% to 100% load (15V output)			6.3	10	
	10% to 100% load (24V output)			6.0	10	
Output voltage accuracy	See tolerance envelope					
Temperature drift	100% full load				±0.03	%/°C
Output ripple &Noise*	20MHz Bandwidth	E_T-1W series		50	75	mVp-p
		F_T-1W series		75	100	
Switching frequency	Full load, nominal input	24V input		500		kHz
		Others		100		

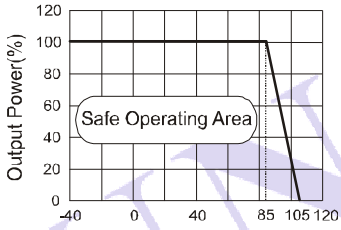
*Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

TYPICAL CHARACTERISTICS

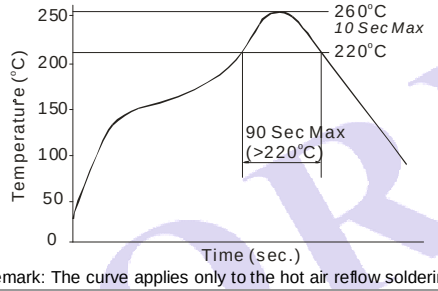
Tolerance Envelope Graph



Temperature Derating Graph

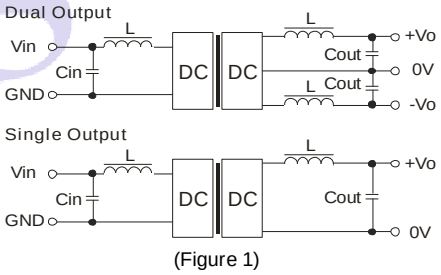


RECOMMENDED REFLOW SOLDERING PROFILE

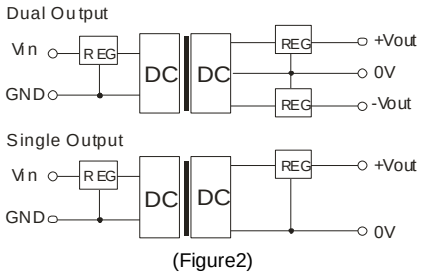


Remark: The curve applies only to the hot air reflow soldering

RECOMMENDED CIRCUIT



(Figure 1)



(Figure2)

APPLICATION NOTE

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 (E _T-W2/F_T-W2 Series).

2) Recommended testing circuit

If you want to further decrease the input/output ripple, an "LC" filtering network may be connected to the input and output ends of the DC/DC converter, see (Figure 1).

It should also be noted that the inductance and the frequency of the "LC" filtering network should be staggered with the DC/DC frequency to avoid mutual interference. However, the capacitance of the output 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 greatest capacitance of its filter capacitor sees (Table 1).

3) Output Voltage Regulation and Over-voltage Protection Circuit

The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage regulator with overheat protection that is connected to the input or output end in series (Figure2).

4) 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.

5) No parallel connection or plug and play

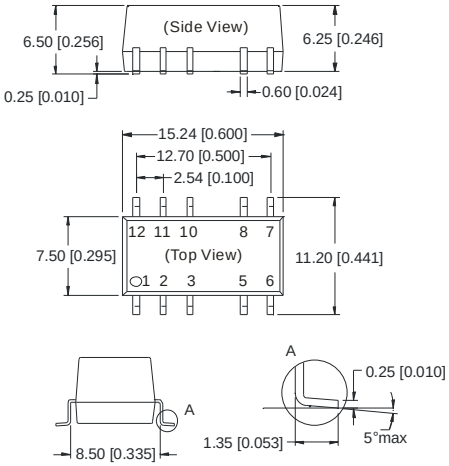
EXTERNAL CAPACITOR TABLE (Table 1)

Vin (VDC)	Cin (μF)	Single Vout (VDC)	Cout (μF)	Dual Vout (VDC)	Cout (μF)
3.3/5	4.7	5	10	±3.3/5	4.7
12	2.2	9	4.7	±9	2.2
24	1	12	2.2	±12	1
-	-	15	1	±15	1
		24	0.47	±24	0.47

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

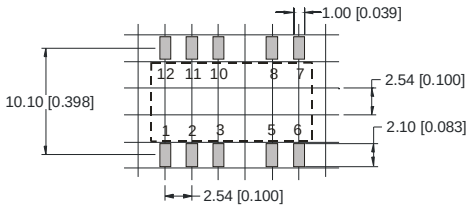
OUTLINE DIMENSIONS & FOOTPRINT DETAILS

MECHANICAL DIMENSIONS



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

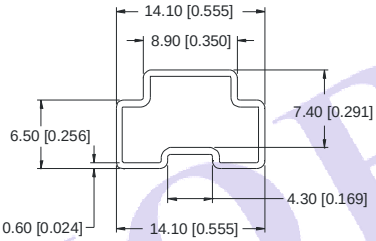
RECOMMENDED FOOTPRINT



FOOTPRINT DETAILS		
Pin	Single	Dual
1	GND	GND
2	Vin	Vin
5	0V	0V
6	NC	-Vo
8	+Vo	+Vo
Others	NC	NC

NC:No Connection

TUBE OUTLINE DIMENSIONS

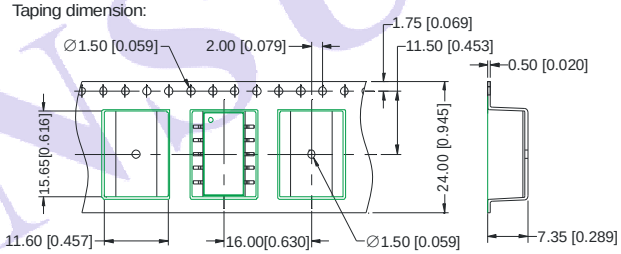


Note:
Unit: mm[inch]
General tolerances: ± 0.5mm[± 0.020inch]

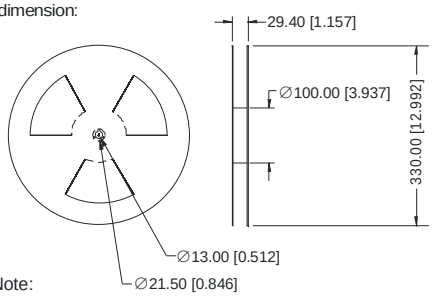
L=540mm[21.260inch] Devices per tube quantity: 33pcs
L=220mm[8.661inch] Devices per tube quantity: 12pcs

REEL PACKING OUTLINE DIMENSIONS

Taping dimension:



Taping reel dimension:



Note:
Unit: mm[inch]
General tolerances: ±0.5mm[±0.020inch]
Devices per reel quantity: 500pcs

Note:

1. Operation under minimum load will not damage the converter; However, they may not meet all specification listed, and that will reduce the life of product.
2. All specifications measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
1. Only typical models listed, other models may be different, please contact our technical person for more details.
2. In this datasheet, all the test methods of indications are based on corporate standards.