

1W isolated DC-DC converter  
Fixed input voltage, unregulated dual/single output



Patent Protection RoHS



FEATURES

- Continuous short-circuit protection
- No-load input current as low as 8mA
- Operating ambient temperature range: -40°C to +105°C
- High efficiency up to 83%
- Compact SMD package
- I/O isolation test voltage 3k VDC
- Industry standard pin-out

E\_LT-1WR3 & F\_LT-1WR3 series are specially designed for applications where an isolated (two isolated) voltage is required in a distributed power supply system. They are suitable for: pure digital circuits, low frequency analog circuits, relay-driven circuits and data switching circuits.

Selection Guide

Certification	Part No.	Input Voltage (VDC)	Output		Full Load Efficiency (%) Min./Typ.	Capacitive Load(μF) Max.
		Nominal (Range)	Voltage (VDC)	Current(mA) Max./Min.		
--	E1215LT-1WR3	12 (10.8-13.2)	±15	±33/±3	79/83	220
	F1205LT-1WR3		5	200/20	78/82	2400
	F1212LT-1WR3		12	84/9	79/83	560
	F1215LT-1WR3		15	67/7	79/83	560
	F2405LT-1WR3	24 (21.6-26.4)	5	200/20	74/80	2400
	F2415LT-1WR3		15	67/7	74/80	560

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	12VDC input	--	102/8	107/--	mA
	24VDC input	--	53/8	57/--	
Reflected Ripple Current*		--	15	--	
Surge Voltage (1sec. max.)	12VDC input	-0.7	--	18	VDC
	24VDC input	-0.7	--	30	
Input Filter		Capacitance filter			
Hot Plug		Unavailable			

Note: \* Reflected ripple current testing method please see DC-DC Converter Application Notes for specific operation.

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Voltage Accuracy		See output regulation curve(Fig. 1)				
Linear Regulation	Input voltage change: ±1%	--	--	±1.2	--	
Load Regulation	10%-100% load	5VDC output	--	5	15	%
		12VDC/15VDC output	--	2	10	
Ripple & Noise*	20MHz bandwidth	--	50	100	mVp-p	
Temperature Coefficient	Full load	--	±0.02	--	%/°C	
Short-circuit Protection		Continuous, self-recovery				

Note: \* The "parallel cable" method is used for ripple and noise test, please refer to DC-DC Converter Application Notes for specific information.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input-output electric strength test for 1 minute with a leakage current of 1mA max.	3000	--	--	VDC
Insulation Resistance	Input-output resistance at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V	--	20	--	pF
Operating Temperature	Derating when operating temperature $\geq 100^{\circ}\text{C}$ , (see Fig. 2)	-40	--	105	$^{\circ}\text{C}$
Storage Temperature		-55	--	125	
Case Temperature Rise	$T_a=25^{\circ}\text{C}$	--	25	--	
Storage Humidity	Non-condensing	5	--	95	%RH
Reflow Soldering Temperature*		Peak temp. $\leq 245^{\circ}\text{C}$ , maximum duration time $\leq 60\text{s}$ over $217^{\circ}\text{C}$			
Vibration		10-150Hz, 5G, 0.75mm. along X, Y and Z			
Switching Frequency	Full load, nominal input voltage	--	260	--	kHz
MTBF	MIL-HDBK-217F@ $25^{\circ}\text{C}$	3500	--	--	k hours
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1	Level 1			

Note: \* For actual application, please refer to IPC/JEDEC J-STD-020D.1.

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94-V0)
Dimensions	15.24 x 11.40 x 7.25 mm
Weight	1.3g(Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B
	RE	CISPR32/EN55032 CLASS B
Immunity	ESD	IEC/EN61000-4-2 Air $\pm 8\text{kV}$ , Contact $\pm 6\text{kV}$ perf. Criteria B

Note: Refer to Fig.4 for recommended circuit test.

Typical Characteristic Curves

Output Regulation Curve

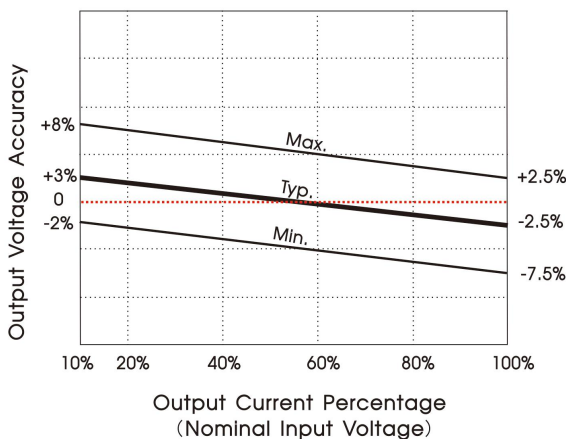


Fig. 1

Temperature Derating Curve

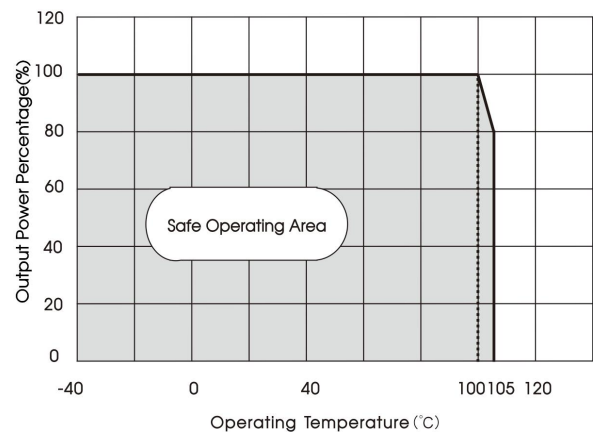
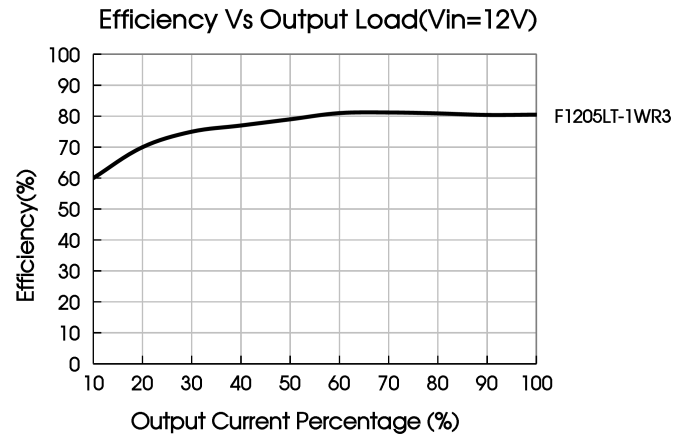
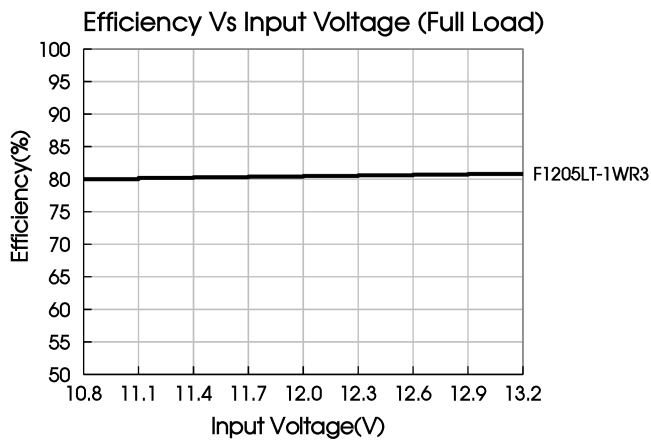


Fig. 2



## Design Reference

### 1. Typical application circuit

Input and/or output ripple can be further reduced, by connecting a filter capacitor from the input and/or output terminals to ground as shown in Fig.3.

Choosing suitable filter capacitor values is very important for a smooth operation of the modules, particularly to avoid start-up problems caused by capacitor values that are too high. For recommended input and output capacitor values refer to Table 1.

Dual



Single



Fig.3

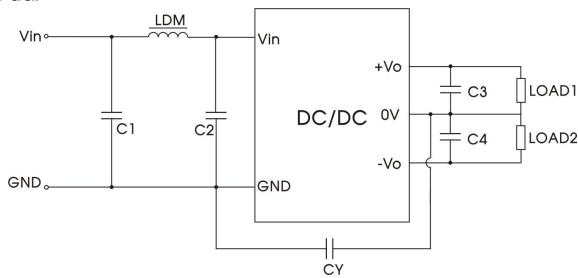
Table 1: Recommended input and output capacitor values

Vin	Cin	Single Vout	Cout	Dual Vout	Cout*
12VDC	2.2μF/25V	5VDC	10μF16V	±15VDC	0.47μF/25V
24VDC	1μF/50V	12VDC	2.2μF/25V	--	--
--	--	15VDC	1μF/25V	--	--

Note: \*The capacitor value of the positive and the negative output is identical.

### 2. EMC compliance circuit

Dual



Single

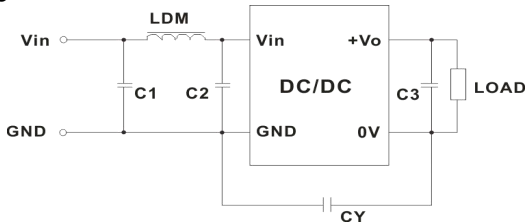


Fig. 4

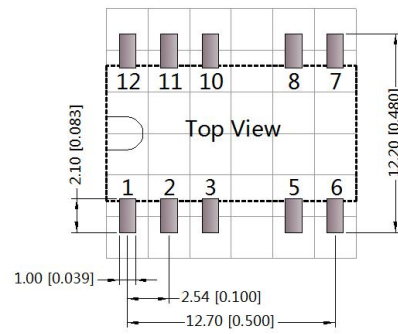
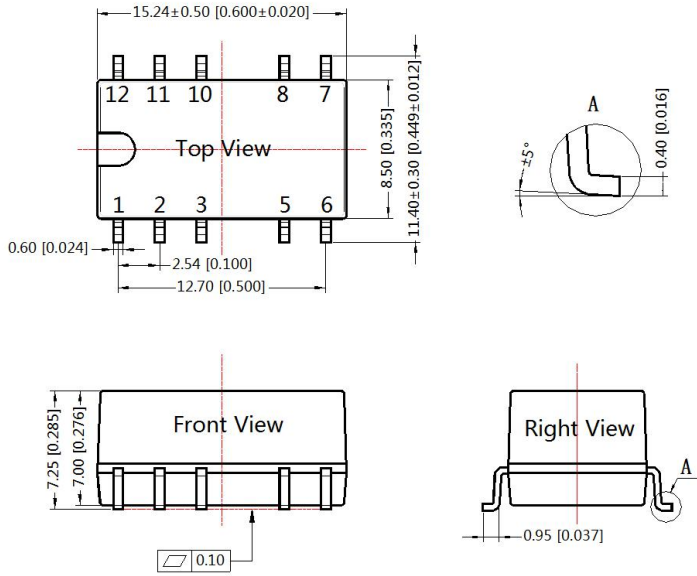
Emissions	C1/C2	4.7μF /50V
	CY	270pF/3kV
	C3/C4	Refer to the Cout in Fig.3
	LDM	6.8μH

3. For additional information, please refer to DC-DC converter application notes on

[www.mornsun-power.com](http://www.mornsun-power.com)

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



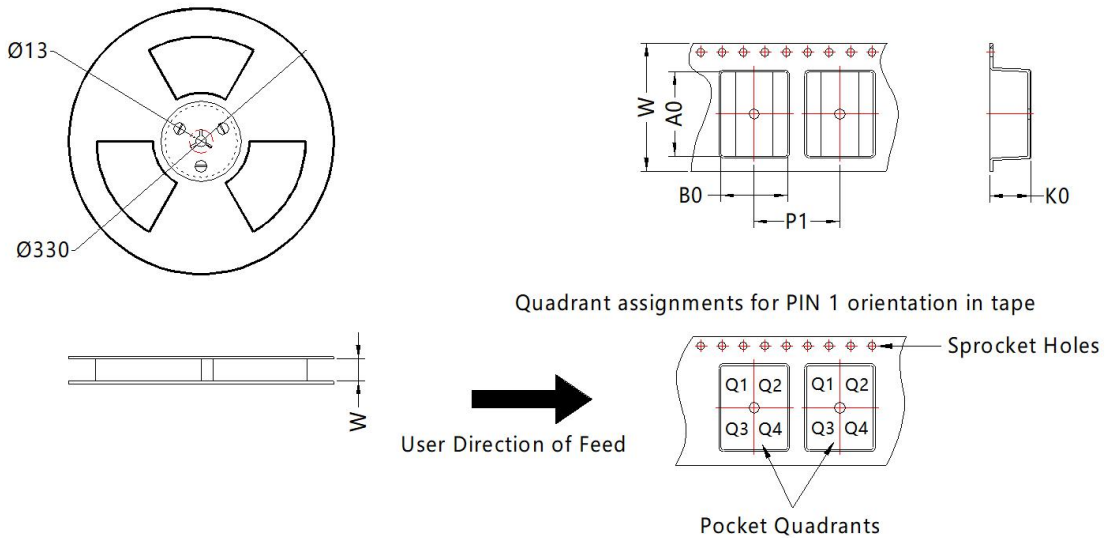
Note: Grid 2.54\*2.54mm

Pin-Out		
Pin	F_LT-1WR3	E_LT-1WR3
1	GND	GND
2	Vin	Vin
5	0V	0V
6	NC	-Vo
8	+Vo	+Vo
Other	NC	NC

NC: Pin to be isolated from circuitry

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

Tape and Reel Info



Device	Package Type	Pin	SPQ	Reel Diameter (mm)	Reel Width (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
E/F_LT-1WR3	SMD	10	500	330.0	24.5	15.6	12.4	7.45	16.0	24.0	Q1

Notes:

1. For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Tube Packaging bag number: 58210023, Roll Packaging bag number: 58210034;
2. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
3. The maximum capacitive load offered were tested at input voltage range and full load;
4. Unless otherwise specified, parameters in this datasheet were measured under the conditions of  $T_a=25^{\circ}\text{C}$ , humidity<75%RH with nominal input voltage and rated output load;
5. All index testing methods in this datasheet are based on our company corporate standards;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Products are related to laws and regulations: see "Features" and "EMC";
8. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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