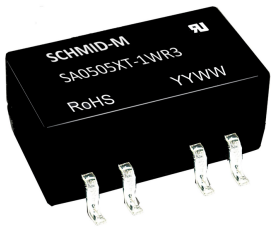
DC/DC Converter

SA05_XT-1WR3 Series

1W isolated DC-DC converter

Fixed input voltage and unregulated dual output



Continuous Short Circuit Protection

cULus CE CB Patent Protection RoHS

FEATURES

- Continuous short-circuit protection
- No-load input current as low as 5mA
- Operating ambient temperature range: -40℃ ~ +105℃
- High efficiency up to 85%
- Compact SMD package
- I/O isolation test voltage 1.5k VDC
- Industry standard pin-out
- IEC62368, UL62368, EN62368 approved

SA05_XT-1WR3 series are specially designed for applications where 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(%)	Capacitive Load(μF)*
		Nominal (Range)	Voltage (VDC)	Current(mA) Max./Min.	Min./Typ.	Max.
UL/CE/CB	SA0505XT-1WR3	5 (4.5-5.5)	±5	±100/±10	78/82	1200
	SA0509XT-1WR3		±9	±56/±6	79/83	470
	SA0512XT-1WR3		±12	±42/±5	79/83	220
	SA0515XT-1WR3		±15	±34/±4	79/83	220
	SA0524XT-1WR3		±24	±21/±3	81/85	100

Note: * The specified maximum capacitive load for positive and negative output is identical.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	5VDC input	5VDC output	--	244/5	257/10	mA
		9VDC/12VDC output	--	241/12	254/20	
		15VDC/24VDC output	--	241/18	254/30	
Reflected Ripple Current*			--	15	--	mA
Surge Voltage (1sec. max.)	5VDC input		-0.7	--	9	VDC
Input Filter			Capacitance filter			
Hot Plug			Unavailable			

Note: * Refer to DC-DC Converter Application Notes for detailed description of reflected ripple current test method.

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	--	10	15	%
		9VDC output	--	8	10	
		12VDC output	--	7	10	
		15VDC output	--	6	10	
		24VDC output	--	5	10	
Ripple & Noise*	20MHz bandwidth	Other output	--	30	75	mVp-p
		24VDC output	--	50	100	
Temperature Coefficient	Full load		--	±0.02	--	%/℃

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.	1500	--	--	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≥100℃, (see Fig. 2)	-40	--	105	℃
Storage Temperature		-55	--	125	
Case Temperature Rise	Ta=25℃	--	15	--	
Storage Humidity	Non-condensing	--	--	95	%RH
Reflow Soldering Temperature*		Peak temp.≤245℃, maximum duration time≤60s over 217℃.			
Switching Frequency	Full load, nominal input voltage	--	270	--	KHz
MTBF	MIL-HDBK-217F@25℃	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 V-0)
Dimensions	15.24 x 11.40 x 7.25 mm
Weight	1.4g(Typ.)
Cooling methods	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B (see Fig. 5 for recommended circuit)
	RE	CISPR32/EN55032 CLASS B (see Fig. 5 for recommended circuit)
Immunity	ESD	IEC/EN61000-4-2 Air ±8kV , Contact ±4kV perf. Criteria B

Typical Characteristic Curves

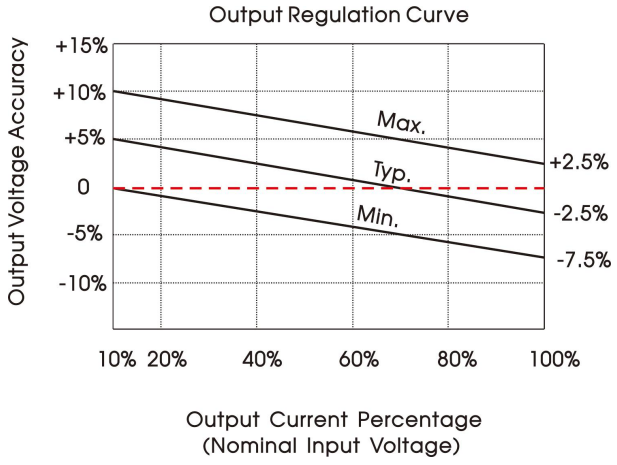


Fig. 1

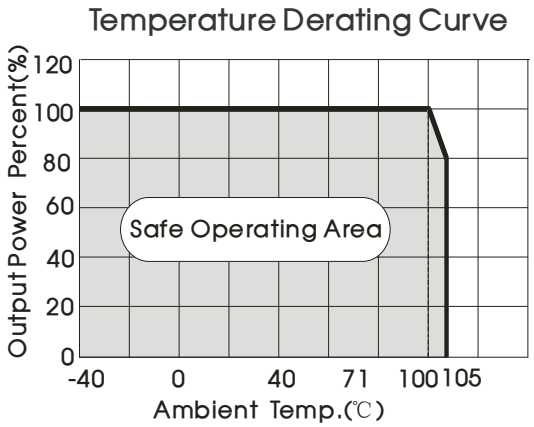
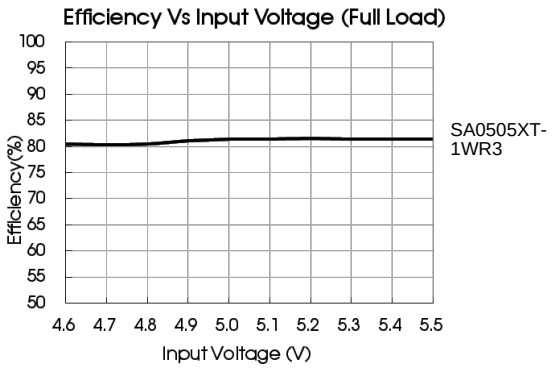
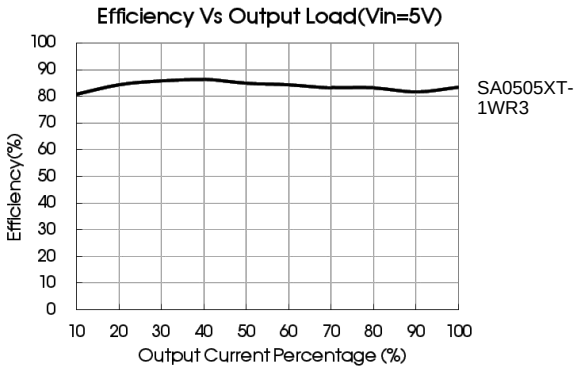


Fig. 2





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.

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 (see Fig. 4).

Fig.3

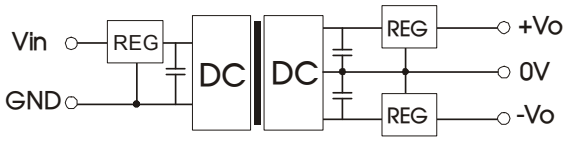


Fig.4

Recommended capacitive load value table (Table 1)

Vin(VDC)	Cin(μF)	Vo (VDC)	Cout(μF)
5	4.7	±5	4.7
		±9	2.2
		±12	1
		±15/±24	1

2. EMC (CLASS B) compliance circuit

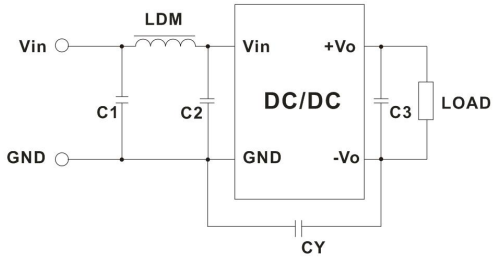


Fig. 5

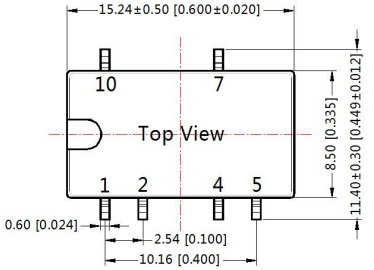
EMC recommended circuit value table (Table 2)

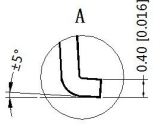
Input voltage 5VDC	Output voltage(VDC)		5/9	12/15/24
	EMI	C1/C2	4.7μF /25V	4.7μF /25V
		CY	--	1nF/2KVDC HEC C1206X102K202T JOHANSON 202R18W102KV4E
		C3	Refer to the Cout in table 1	
		LDM	6.8μH	6.8μH

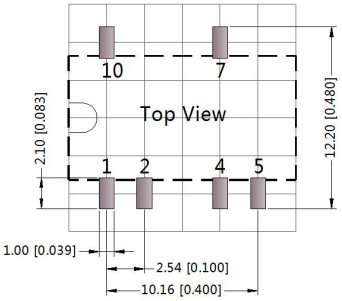
Note: In the case of actual use, the requirements for EMI are high, it is subject to CY.

Dimensions and Recommended Layout

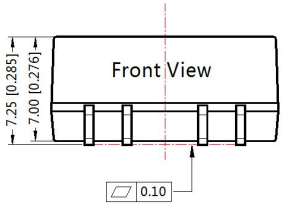
THIRD ANGLE PROJECTION

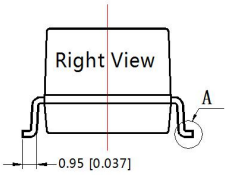






Note: Grid 2.54*2.54mm

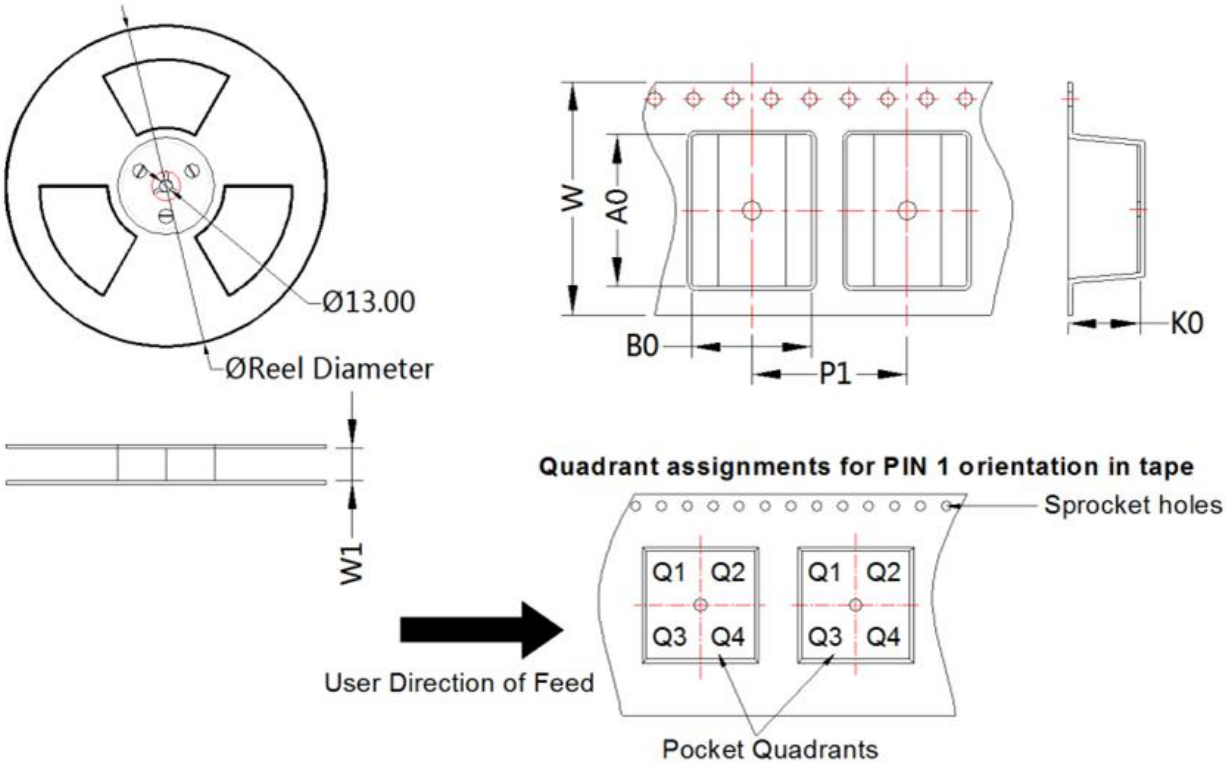




Note:
Unit: mm[inch]
Pin section tolerances: ±0.10[±0.004]
General tolerances: ±0.25[±0.010]

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

NC: Pin to be isolated from circuitry



Device	Package Type	Pin	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SA05_XT-1WR3	SMD	6	500	330.0	24.5	15.64	12.4	7.45	16.0	24.0	Q1

Notes:

1. 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;
2. The maximum capacitive load offered were tested at input voltage range and full load;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. 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.