FEATURES

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

RS PRO 1W isolated DC-DC converters

- **2233660, 2233663, 2233665**

RS Professionally Approved Products bring to you professional quality parts across all product categories. Our product range has been tested by engineers and provides a comparable quality to the leading brands without paying a premium price.

Product Description

PCB Mount DC-DC converters are specially designed for applications where an 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. Featuring continuous short circuit protection and no-load input current as low as 5mA

General Specifications

Model	DC-DC 1W Isolated DC-DC converter
Mounting Type	PCB SMD
MTBF	MIL-HDBK-217F@25°C > 3,500,000 hrs
Applications	Industrial control systems, instrumentation, analog, relay-driven and data switching circuits.

RS Stock#	Input Voltage (Vdc)		Output Voltage	Output Current Max/Min	Wattage	Max. Capacitive Load(µF)	Efficiency (Typ)
	Nominal	Max					
2233660	5V (4.5-5.5)		5V	200/20mA	1W	2400	82%
2233663			12V	83/9mA	1W	560	83%
2233665			24V	42/5mA	1W	220	85%

Input Specifications

Input Specification						
Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	5VDC input	5VDC output	-	270/5	286/10	mA
		12VDC output		241/12	254/20	
		24V output	-	241/18	254/30	
Reflected Ripple Current			-	15	-	
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

Output Specification						
Item	Operating Conditions		Min	Typ.	Max	Unit
Voltage Accuracy			See output regulation curves (Fig. 1)			
Linear Regulation	Input voltage change: ±1%		-	-	1.2	%
Load Regulation	10% -100% load	5VDC output	-	10	15	
		12VDC output	-	7	10	
		24VDC output	-	5	10	
Temperature Coefficient	100% load		-	±0.02	-	%/°C
Ripple & Noise *	20MHz bandwidth	5VDC and 12VDC output	-	30	75	mV p-p
		24VDC output	-	50	100	
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.						

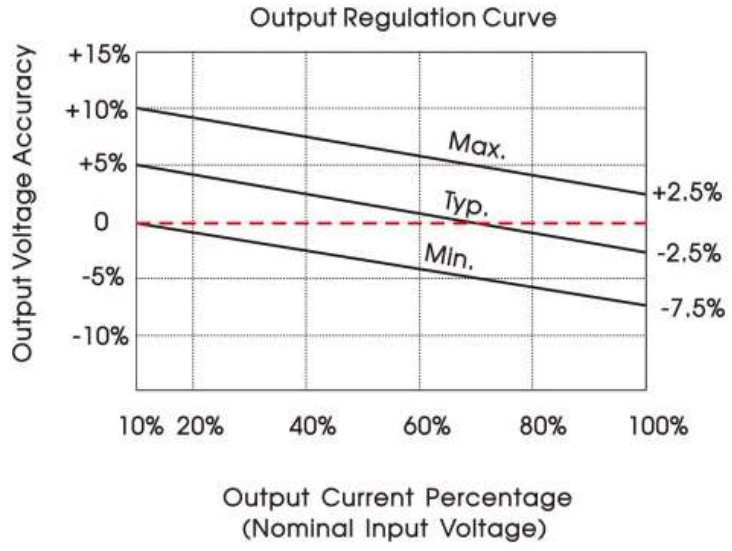
General Specifications

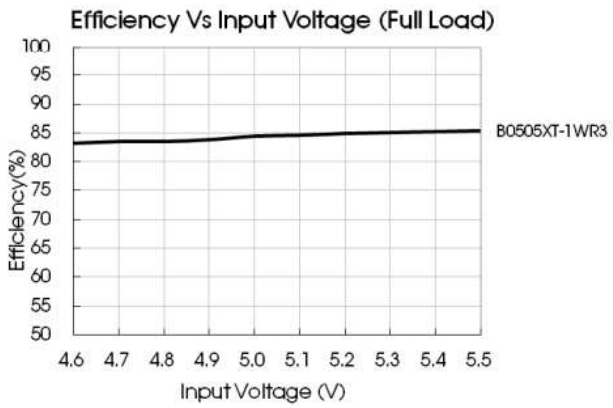
Item	Operating Conditions	Min	Typ	Max.	Unit
Isolation	Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max.	1500	-	-	VDC
Insulation Resistance	Input-output resistance at 500VDC	1000	-	-	MΩ
Isolation Capacitance	Input-output capacitance at 100KHz/0.1V	-	20	-	pF
Operating 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℃			
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1	Level 1			
Switching Frequency	Full load, nominal input voltage	-	270	-	KHz
MTBF	MIL-HDBK-217F@25℃	3500			K hours
Note:*For actual application, please refer to IPC/JEDEC J-STD-020D.1.					

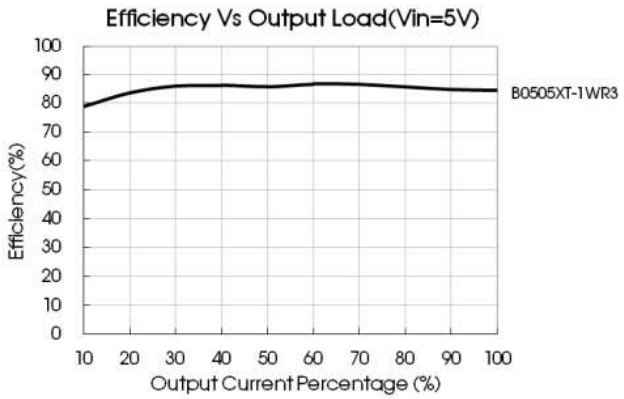
EMC Specifications

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

Typical Performance Curves







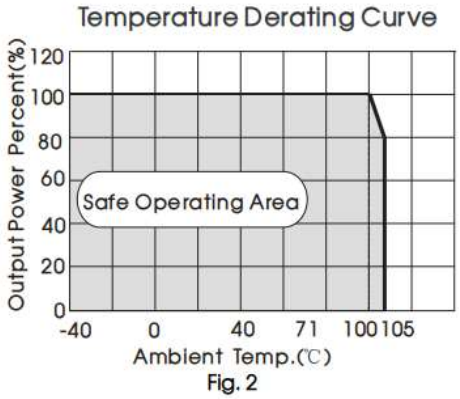


Fig. 2

Design Reference

Typical application

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.

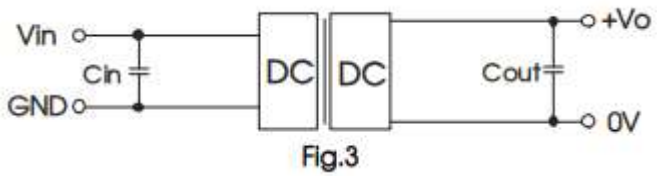


Fig.3

Table 1 : Recommended input and output capacitor values

Vin	Cin	Vout	Cout
5VDC	4.7µF	5VDC	10µF
		12VDC	2.2µF
		24VDC	0.47µF

EMC (ClassB) compliance circuit

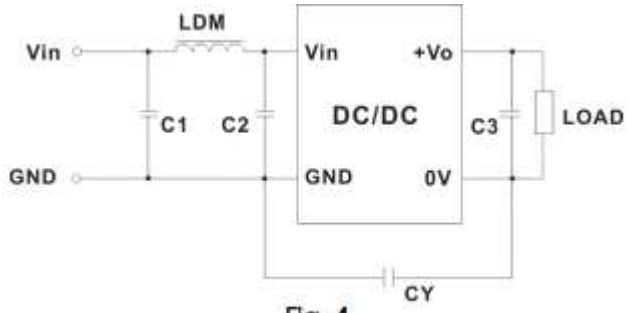


Fig. 4

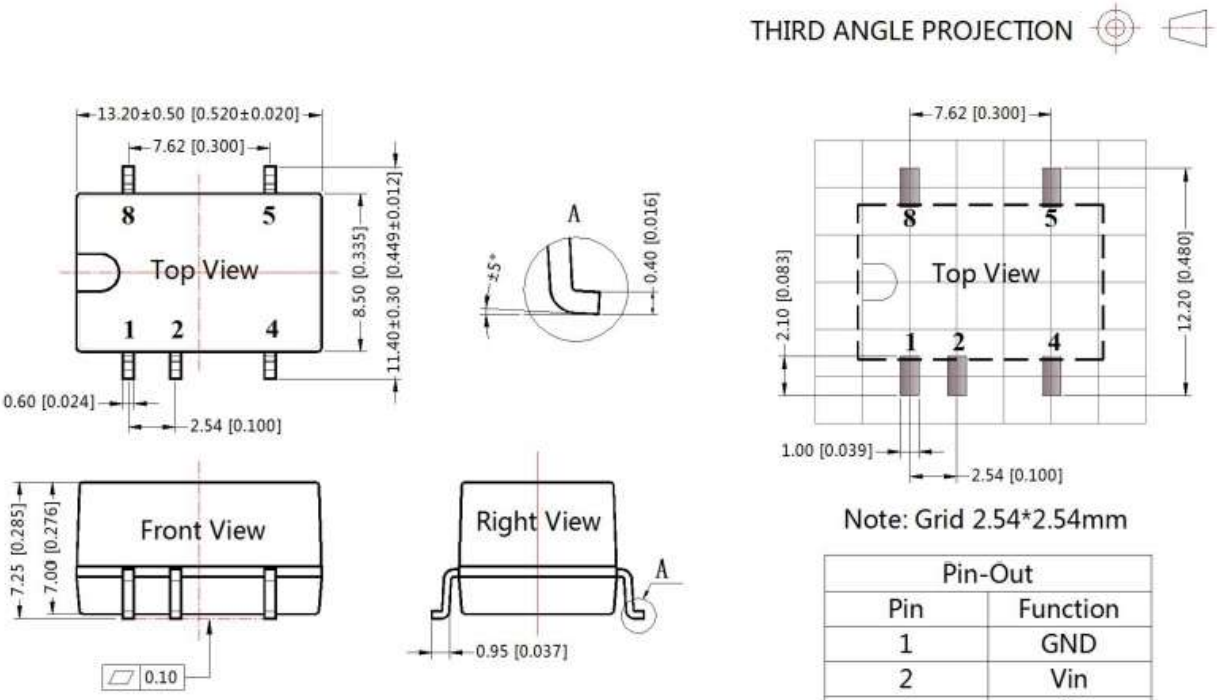
EMC recommended circuit value table (Table 2)

Input voltage 5VDC	Output voltage(VDC)		5V	12V / 24V
	EMI	C1	4.7μF /25V	4.7μF /25V
		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

Mechanical Specifications

Case material	Black plastic; flame-retardant and heat-resistant (UL94 V-0)
Dimensions	13.20 x 11.40 x 7.25 mm
Weight	1.4g (Typ.)
Cooling Method	Free air convection

Dimensions and recommended layout



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

Note: Grid 2.54*2.54mm

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

NC: Pin to be isolated from circuitry

Approvals

Safety Certification	IEC62368, UL62368, EN62368 approved

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
4. Our products shall be classified according to ISO14001 and related environmental laws and regulations.