1S7BE_3RP series

1 Watt, Fixed input voltage, isolated & regulated single output

DC-DC Converter 1 Watt

- Continuous short-circuit protection
- No-load input current as low as 5mA
- Operating temperature range: -40°C to +85°C
- High efficiency up to 75%
- Isolation voltage: 3kVDC
- I/O isolation test voltage 3kVDC
- Industry standard pin-out
- SIP package

The 1S7BE_3RP series is especially designed for distributed power supply systems where an isolated voltage is required. They are suitable for occasions of: pre-interference isolation, ground interference elimination, pure digital circuit, voltage isolation conversion, general low frequency analog circuit, relay drive circuit, etc.

Common specifications

Item	Operating condition
Short circuit protection:	Continuous, self-recovery
Operating Temperature	-40 ~ +85°C (Derating when operating temperature up to 71°C, see Fig.)
Case Temperature (Ta=25°C)	• 3.3VDC output 30°C Typ. • others 25°C Typ.
Storage Temperature	-55 ~ +125°C
Storage Humidity	5 ~ 95 %RH
Pin Welding Resistance Temperature	300°C Max., Welding spot is 1.5mm away from the casing, 10 seconds
Vibration (5vin)	10-150Hz, 5G, 30 Min. along X, Y and Z
Vibration (others)	10-150Hz, 5G, 0.75mm. along X, Y and Z
MTBF(MIL-HDBK-217F@25°C)	> 3500 Khrs
Cooling:	Free air convection
Case Material	Black plastic; flame-retardant and heat-resistant (UL94 V-0)
Weight	2.1g Typ.
Dimensions	19.65 x 6.00 x 10.16mm

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (no-load/full load)	**3.3/5V Input**		286/5	303/-	mA
	12V input		115/8	121/-	mA
	• 5/9/12VDC output		112/8	118/-	mA
	• 15VDC output				
	15V input		92/8	97/-	mA
	• 5VDC output		89/8	94/-	mA
	• 15VDC output				
	24V input		59/8	65/-	mA
	• 3.3VDC output		58/8	63/-	mA
	• 5/9/12/15VDC output				
Reflected ripple current*			15		mA
Input filter	Capacitance filter				
Hot plug	Unavailable				

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

EMC specifications

Emissions	CE	CISPR32/EN55032	CLASS B
Emissions	RE	CISPR32/EN55032	CLASS B
Immunity	ESD	IEC/EN61000-4-2 Air ±8kV, Contact ±6kV perf. Criteria B	

*Refer to Fig.3 for recommended circuit test.

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output Voltage Accuracy				±3	%
Line Regulation	Input voltage change: ±1			±0.25	%
Load regulation	10%-100% load				
	• 3.3VDC output			±3	%
	• 5/9/12/15VDC output			±2	%
Temperature coefficient	100% load		±0.02		%/°C
Ripple & Noise*	20MHz Bandwidth(5vin)		30	70	mVp-p
Ripple & Noise*	20MHz Bandwidth				
	• 3.3/5/9/12VDC output		30	100	mVp-p
	• 15VDC output		80	150	mVp-p
Switching frequency	100% load, nominal input voltage				
	• 5VDC input		300		KHz
	• others		260		KHz

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

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Insulation Voltage	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

Example:
1S7BE_0505S3RP
1 = 1Watt; S7 = SIP7; BE = Pinning; 05 = 5Vin; 05 = 5Vout; S = Single Output; 3 = 3kVDC; R = Regulated output; P = Short circuit protection

Note:

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°C, humidity <75%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our Company's 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";
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

GAPTEC-Electronic GmbH & Co. KG
sales@gaptec-electronic.com – www.gaptec-electronic.com

Product Selection Guide

Part Number	Input Voltage [V]	Output Voltage [VDC]	Output current [mA, max./min]	Efficiency [%, min./typ.]	Capacitive load [µF, max]	Certification
1S7BE_0503S3RP	5 (4.75-5.25)	3.3	250/25	63/67	2400	
1S7BE_0505S3RP	5 (4.75-5.25)	5	200/20	66/70	2400	
1S7BE_1205S3RP	12 (11.4-12.6)	5	200/20	69/73	2400	
1S7BE_1209S3RP	12 (11.4-12.6)	9	111/12	69/73	1000	
1S7BE_1212S3RP	12 (11.4-12.6)	12	83/9	69/73	560	
1S7BE_1215S3RP	12 (11.4-12.6)	15	67/7	71/75	560	
1S7BE_1505S3RP	15 (14.25-15.75)	5	200/20	69/73	2400	
1S7BE_1515S3RP	15 (14.25-15.75)	15	67/7	71/75	560	
1S7BE_2403S3RP	24 (22.8-25.2)	3.3	250/25	65/71	2400	
1S7BE_2405S3RP	24 (22.8-25.2)	5	200/20	67/73	2400	
1S7BE_2409S3RP	24 (22.8-25.2)	9	111/12	67/73	1000	
1S7BE_2412S3RP	24 (22.8-25.2)	12	83/9	67/73	560	
1S7BE_2415S3RP	24 (22.8-25.2)	15	67/7	67/73	560	

Typical characteristics

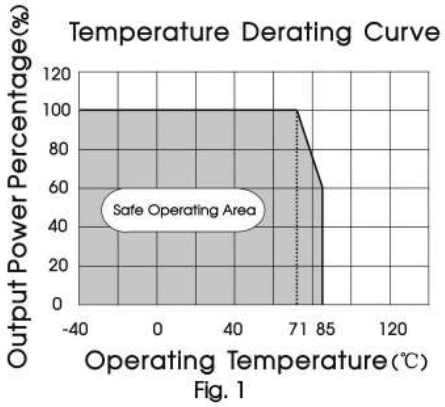
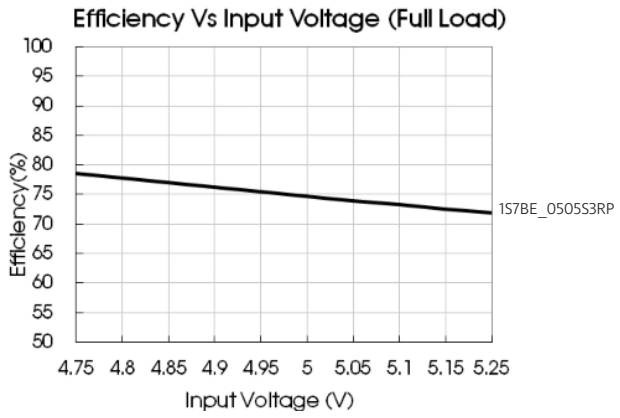
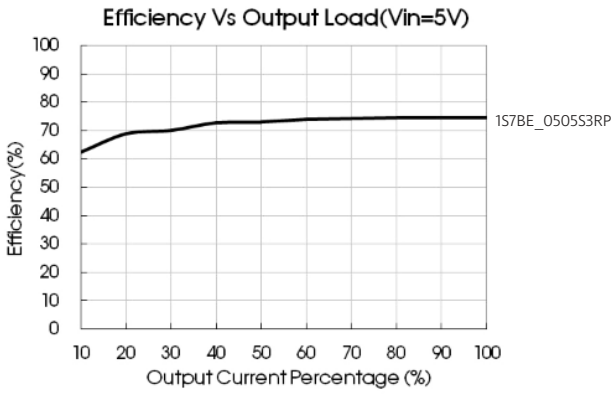


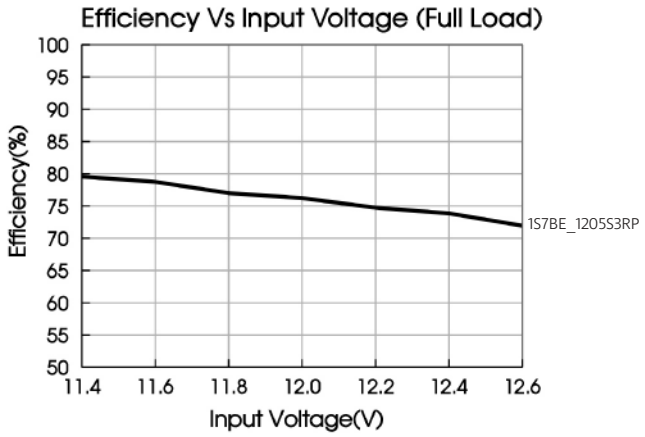
Fig. 1

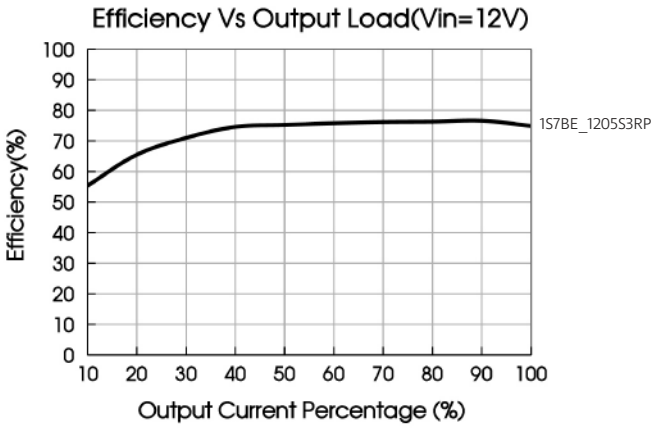
Efficiency

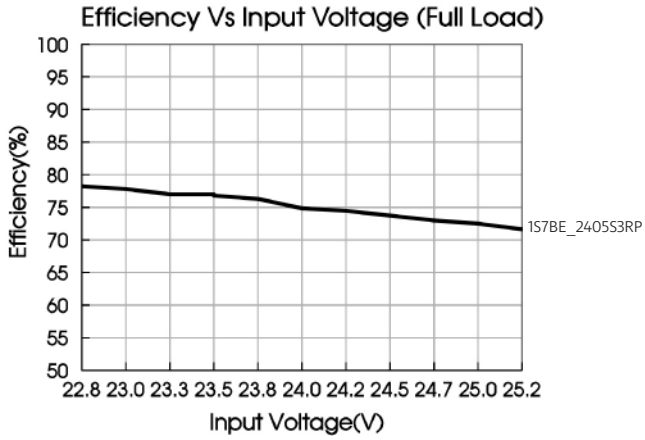


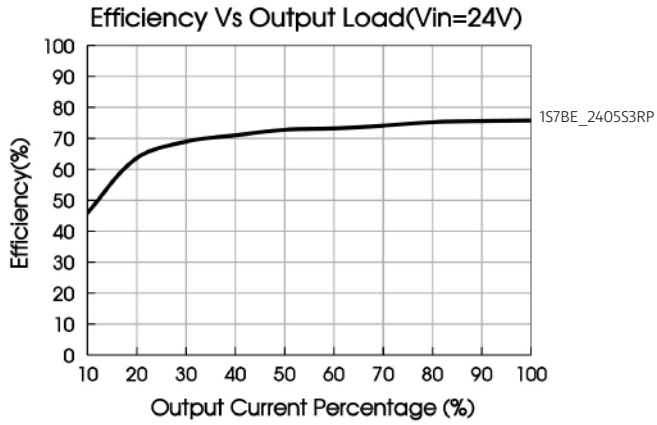


Efficiency









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.2. 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.2

Table 1.1: Recommended input and output capacitor values

Vin	Cin	Vo	Cout
5VDC	4.7µF/16V	3.3/5VDC	10µF/16V

Table1.2: Recommended input and output capacitor values

Vin	Cin	Vo	Cout
12VDC	2.2µF/25V	3.3VDC	10µF/16V
15VDC	2.2µF/25V	5VDC	10µF/16V
24VDC	1µF/50V	9VDC	2.2µF/16V
--	--	12VDC	2.2µF/25V
--	--	15VDC	1µF/25V

EMC solution-recommended circuit

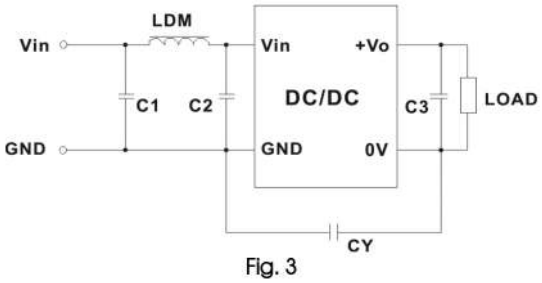


Fig. 3

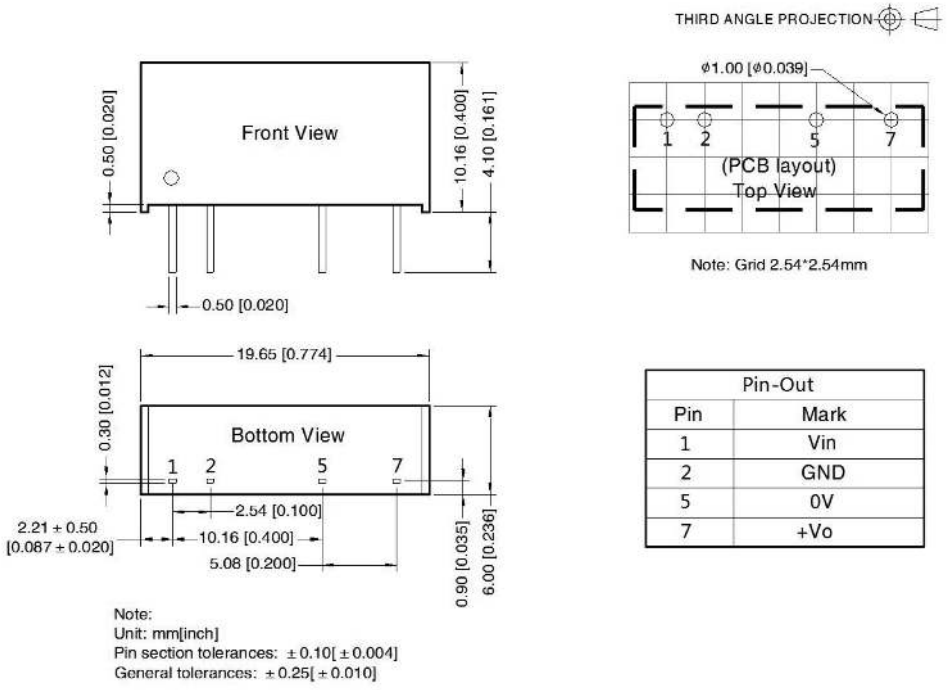
Table 2.1: EMC recommended circuit value table

5Vin	Vout		3.3/5VDC
	Emissions	C1/C2	4.7μF /50V
		CY	100pF/4kV
		C3	Refer to the Cout in table 1.1
		LDM	6.8μH

Table 2.2: EMC recommended circuit value table (others Vin)

Emissions	C1	4.7μF /50V
	C2	4.7μF /50V
	CY	270pF/3kV
	C3	Refer to the Cout in table 1.2
	LDM	6.8μH

Mechanical dimensions



Pin-Out	
Pin	Mark
1	Vin
2	GND
5	0V
7	+Vo