BETT POWER
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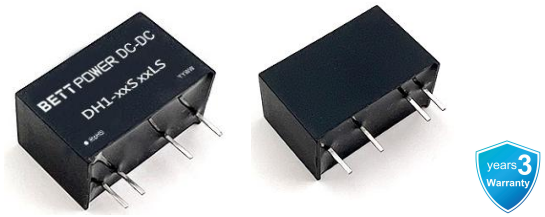
2025/08/18 (A/2)

DH1-xxSxxLS Series

DC-DC Converter | 1W | SIP7 | Fixed voltage input, unregulated output | 6000VDC



Features

- SIP7 package
- Operating Temperature Range: -40℃ ~ +105℃
- Isolation Voltage: 5000VAC/6000VDC
- Full Load Efficiency: up to 90% (typ.)
- Continuous Short Circuit Protection
- CMTI >200kV/μS
- Designed to meet IEC/EN/BS EN/UL 62368

Product Description

Medical Industrial Automate Power Security

The DH1-xxSxxLS series is 1W unregulated DC/DC converters which features high isolation voltage of 5000VAC and 6000VDC and continuous short circuit protection. They are specially designed for applications where require compact size,high isolation, low isolation capacitor and low leakage current power. Typical applications are electricity, IGBT driver applications, etc.

Selection Guide

Certification	Part No.	Input Voltage	Output			Full Load Efficiency (%)	Capacitive Load (μF)
		Nominal (Range) (VDC)	Voltage (VDC)	Current (mA) Min.	Current (mA) Max.	Typ.	Max.
EN/UL pending	DH1-05S03LS	5(4.5~5.5)	3.3	30	303	79	2200
	DH1-05S05LS	5(4.5~5.5)	5	20	200	84	2200
	DH1-05S09LS	5(4.5~5.5)	9	11	111	84	1000
	DH1-05S12LS	5(4.5~5.5)	12	9	84	85	470
	DH1-05S15LS	5(4.5~5.5)	15	7	67	85	470
	DH1-05S24LS	5(4.5~5.5)	24	4	42	86	220
	DH1-12S03LS	12(10.8~13.2)	3.3	30	303	79	2200
	DH1-12S05LS	12(10.8~13.2)	5	20	200	84	2200
	DH1-12S09LS	12(10.8~13.2)	9	11	111	84	680
	DH1-12S12LS	12(10.8~13.2)	12	9	84	85	470
	DH1-12S15LS	12(10.8~13.2)	15	7	67	86	470
	DH1-12S24LS	12(10.8~13.2)	24	4	42	87	220
	DH1-15S03LS	15 (13.5~16.5)	3.3	30	303	80	2200

Selection Guide

Certification	Part No.	Input Voltage	Output			Full Load Efficiency (%)	Capacitive Load(μF)
		Nominal(Range) (VDC)	Voltage (VDC)	Current (mA) Min.	Current (mA) Max.	Typ.	Max.
EN/UL pending	DH1-15S05LS	15 (13.5~16.5)	5	20	200	85	2200
	DH1-15S09LS	15 (13.5~16.5)	9	11	111	85	680
	DH1-15S12LS	15 (13.5~16.5)	12	9	84	85	470
	DH1-15S15LS	15 (13.5~16.5)	15	7	67	87	470
	DH1-15S24LS	15 (13.5~16.5)	24	4	42	88	220
	DH1-24S03LS	24 (21.6~26.4)	3.3	30	303	81	2200
	DH1-24S05LS	24 (21.6~26.4)	5	20	200	86	2200
	DH1-24S09LS	24 (21.6~26.4)	9	11	111	86	680
	DH1-24S12LS	24 (21.6~26.4)	12	9	84	85	470
	DH1-24S15LS	24 (21.6~26.4)	15	7	67	87	470
	DH1-24S24LS	24 (21.6~26.4)	24	4	42	90	220

Note: The above efficiency is measured at nominal input voltage and rated output load.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (Full Load/No-load)	5VDC Input	3.3VDC Output	--	253/40	264/60	mA
		Others	--	238/45	244/60	mA
	12VDC Input	3.3VDC Output	--	105/3	111/15	mA
		5/9VDC Output	--	99/3	103/15	mA
		Others	--	98/3	102/15	mA
	15VDC Input	3.3VDC Output	--	83/3	87/15	mA
		5/9/12VDC Output	--	78/3	82/15	mA
		Others	--	76/3	80/15	mA
	24VDC Input	3.3VDC Output	--	51/2	54/15	mA
		5/9/12/15VDC Output	--	49/2	51/15	mA
		24VDC Output	--	46/2	48/15	mA
Reflected Ripple Current			--	200	--	mA
Surge Voltage	5VDC Input		-0.7	--	9	VDC
	12VDC Input		-0.7	--	18	VDC
	15VDC Input		-0.7	--	21	VDC
	24VDC Input		-0.7	--	30	VDC
Input Filter Type			Capacitance Filter			
Hot Plug			Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy			See Output Regulation Curve			
Line Regulation	Input Voltage Variation ± 1%		--	± 1.2	±1.5	%
Load regulation	10%~100% Load	3.3, 5VDC Output	--	--	20	%
		Others	--	--	15	%
Ripple & noise	20MHz bandwidth (peak-to-peak)		--	--	150	mV
Temperature coefficient	Full Load		--	±0.01	±0.02	%/℃
Short circuit protection			Continuous, self-recovery			

Note: Ripple & noise are measured at 20MHz of bandwidth with a 10uF electrolytic capacitor and a 1uF ceramic capacitor connected inparallel at the output.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, test time 1 minute, leakage current less than 1mA	5000	--	--	VAC
		6000	--	--	VDC
Insulation Resistance	Input-output, insulated voltage 500VDC	1000	--	--	MΩ

Isolation Capacitance	Input-Output,100KHz/0.1V	--	6	10	pF
Operating Temperature	Derating when operating temperature≥85℃ (See Temperature derating curve chart)	-40	--	105	℃
Storage Temperature		-55	--	125	℃
Case temperature rise during operation	Ta=25℃, nominal input, full load output	--	25	--	℃
Storage Humidity	No condensation	5	--	95	%RH
Soldering Profile	Wave soldering	260±5℃; Time: 5 - 10s			
	Manual soldering	360±10℃; Time: 3 - 5s			
Switching Frequency	Full load, nominal input voltage	--	250	--	kHz
MTBF	MIL-HDBK-217F@25℃	>3500Kh			

Mechanical Specifications

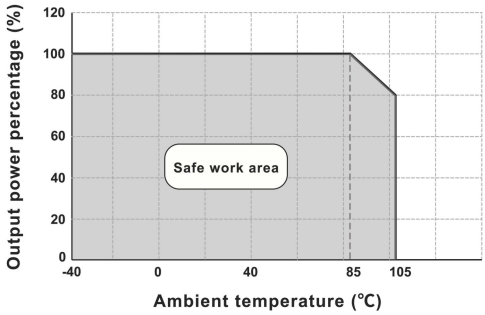
Case Material	Black flame-retardant heat-resistant plastic (UL94V-0)
Mechanical Dimensions	19.50 * 9.80 * 12.50mm
Weight	4.1g (typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

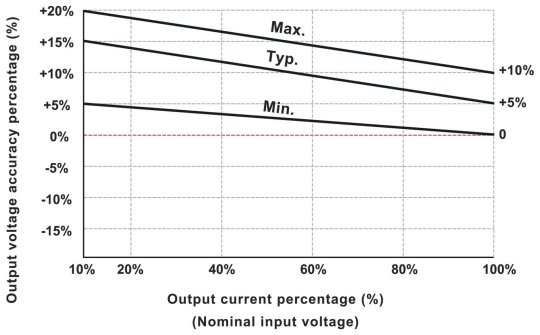
EMI	CE	CISPR32/EN55032 CLASS B (EMC recommended circuit see Fig. 2)	
	RE	CISPR32/EN55032 CLASS B (EMC recommended circuit see Fig. 2)	
EMS	ESD	IEC/EN61000-4-2 Contact ±8KV	perf. Criteria B

Product Characteristic Curve

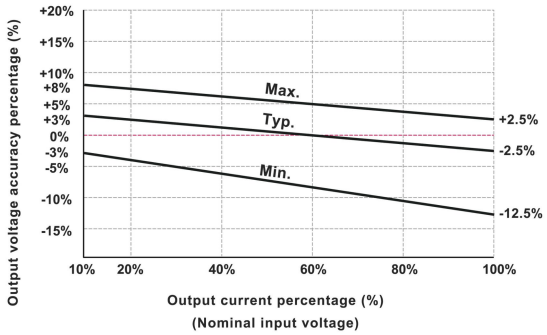
Temperature Derating Curve



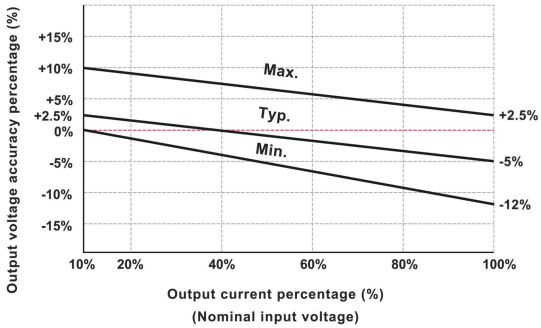
Output Regulation Curve (DH1-05S05LS/DH1-05S03LS)



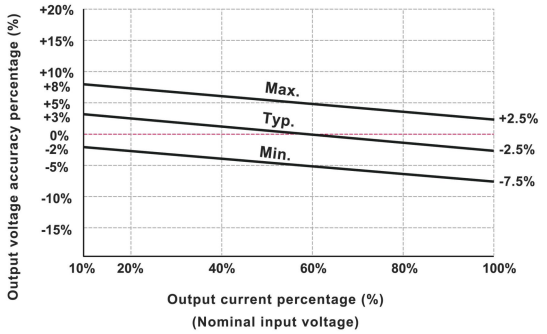
Output Regulation Curve (DH1-15S03LS/DH1-24S15LS)



Output Regulation Curve (Other input 3.3/5V output)

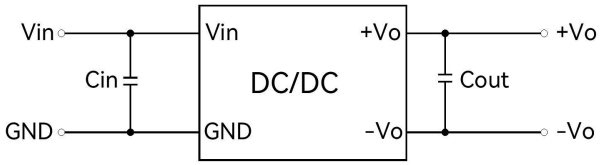


Output Regulation Curve (DH1-245S05LS and other input 9/12/15/24V output)



Design Reference - Application circuit

Application circuit



(Figure 1)

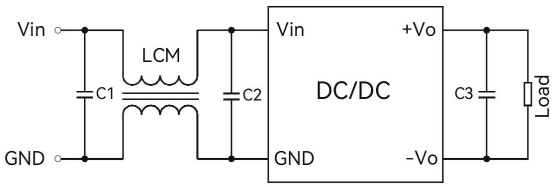
Recommended Capacitive Load Value Table

Vin	Cin	Vo	Cout
5VDC	10uF/10V	3.3/5VDC	10μF/16V
12VDC	10uF/25V	9/12VDC	4.7μF/25V
15VDC	2.2uF/25V	15VDC	1.0μF/25V
24VDC	2.2uF/50V	24VDC	1.0uF/50V

All DC/DC converters in this series are tested according to the recommended application circuit (Figure 1) before the shipment. To further reduce input and output ripple, the external capacitors Cin and Cout at the input and output can be increased or capacitors with low equivalent series impedance can be selected. For each output, under safe and reliable operating conditions, the maximum capacitance of the filter capacitor must not exceed the maximum capacitive load of the product.

Design Reference - EMC Solutions - Recommended Circuits

EMC Recommended Circuit Design and Application



(Figure 2)

Recommended Parameter Table

C1	4.7μF /50V
C2	4.7μF /50V
C3	Refer to Cout parameter in Figure 1
LCM	22μH (Nickel-Zinc Inductor)

Note:

1. Typical Application

To further reduce input and output ripple, a Capacitance Filter network can be connected at the input and output terminals, as shown in the application circuit in Figure 1. However, appropriate filter capacitors should be selected. If the capacitor is too large, it may cause startup issues. For each output, under conditions ensuring safe and reliable operation, the recommended capacitive load values are detailed in the table.

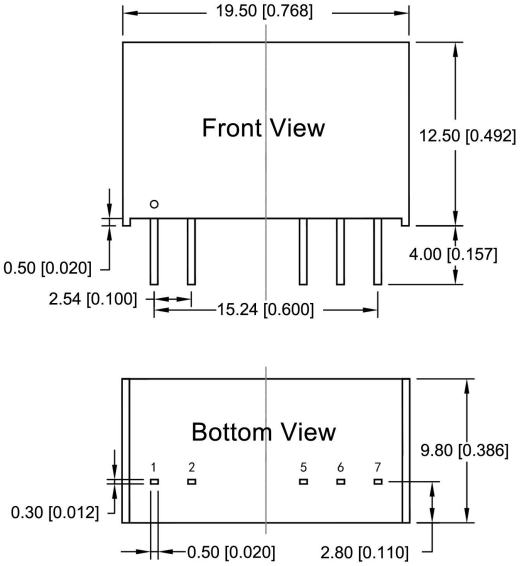
2. EMC Recommended Circuit: See Figure 2

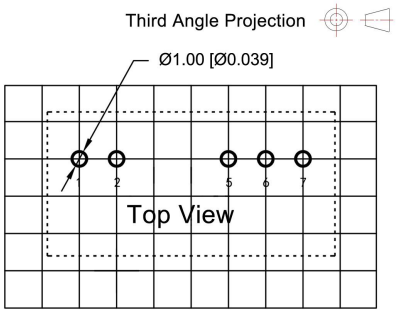
3. Output Load Requirements

To ensure efficient and reliable operation of the module, the minimum output load during use should not be less than 10% of the rated load. If the required power is indeed small, please connect a resistor in parallel at the output (the power dissipated by the resistor plus the actual usage power should be greater than or equal to 10% of the rated power).

Dimensions and Recommended Layout

DH1-xxSxxLS Dimensions and Recommended Layout





The grid distance size is 2.54mm*2.54mm

Pin	Function (Single Output)
1	Vin
2	GND
5	-Vo
6	No Pin
7	+Vo

Note:

Size unit: mm [inch]

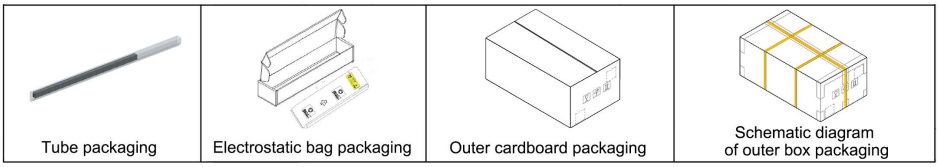
Pin diameter tolerance: ±0.10 [±0.004]

Unmarked dimensional tolerance: ±0.50 [±0.020]

Packaging Information

Model series (Tube packaging)	Quantity per tube (pcs/ tube)	Quantity of electrostatic bag (pcs/ bag)	Quantity of inner box (pcs/ box)	Full box Quantity (pcs)
DH1-xxSxxLS	26	260	780	3120

The schematic diagram of tube packaging is shown below:



Product precautions

1. The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage;
2. It is recommended to use at a load of over 5%. If the load is below 5%, the ripple index of the product may exceed the specifications, but it does not affect the reliability of the product;
3. The maximum capacitive load is tested within the input voltage range and under full load conditions;
4. Unless otherwise specified, all indicators in this manual are measured at Ta=25 ℃, humidity<75% RH, nominal input voltage, and output rated load;
5. All indicator testing methods in this manual are based on our company's corporate standards;
6. Our company can provide product customization, and specific requirements can be directly contacted by our technical personnel;
7. Product specifications are subject to change without prior notice.

Manufacturer contact information

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