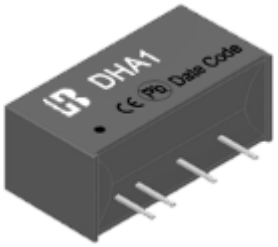
DHA1 Series

7 pin SIP Package, 1 Watt, Isolated, Regulated

BOTHHAND

Features

- 7pin SIP Package with Industry-Standard Footprint
- Input / Output Isolation Voltage: 1.5kVDC
- High Efficiency
- Lead Free Design, RoHS Compliant
- Operating temperature: -40°C to +85°C
- Meet Safety Standard / Approval: IEC / EN60950-1



Applications

These converters are well suitable for battery operated equipment, measurement equipment, telecom, wireless network, Industry control system, everywhere where isolated, tightly regulated voltages and compact size are required.

Technical Specification All specifications are typical at nominal input, full load and 25°C unless otherwise stated.

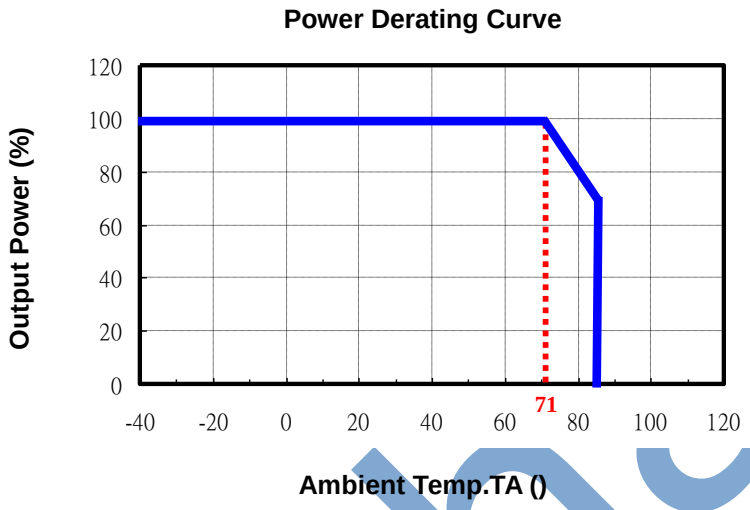
Model Number	Input Voltage Range(V)	Output Voltage (V)	Output Current (mA) (1)	Input Current (mA) Typ.		Eff .(%) (2) Typ.	Capacitive Load, max. (3) (uF)
			Full Load	No Load	Full Load		
DHA1-03S0	3.14-3.47 Nominal:3.3	3.3	300	35	455	66	68
DHA1-03S1		5	200		446	68	47
DHA1-05S0	4.75-5.25 Nominal:5	3.3	300	25	291	68	68
DHA1-05S1		5	200		286	70	47
DHA1-05SA		9	110		275	72	33
DHA1-05S2		12	83		269	74	22
DHA1-05S3		15	67		269	74	22
DHA1-05S5		24	42		296	68	10
DHA1-12S0	11.4-12.6 Nominal:12	3.3	300	15	121	68	68
DHA1-12S1		5	200		119	70	47
DHA1-12SA		9	110		115	72	33
DHA1-12S2		12	83		112	74	22
DHA1-12S3		15	67		112	74	22
DHA1-12S5		24	42		120	70	10
DHA1-15S0	14.3-15.8 Nominal:15	3.3	300	12	97	68	68
DHA1-15S1		5	200		95	70	47
DHA1-15SA		9	110		92	72	33
DHA1-15S2		12	83		90	74	22
DHA1-15S3		15	67		90	74	22
DHA1-15S5		24	42		96	70	10
DHA1-24S0	22.8-25.2 Nominal:24	3.3	300	7	59	70	68
DHA1-24S1		5	200		58	72	47
DHA1-24SA		9	110		56	74	33
DHA1-24S2		12	83		55	76	22
DHA1-24S3		15	67		55	76	22
DHA1-24S5		24	42		60	70	10

Input Specifications		
	3.3V nominal input	3.14-3.47V
	5V nominal input	4.75-5.25V
	12V nominal input	11.4-12.6V
	15V nominal input	14.3-15.8V
	24V nominal input	22.8-25.2V
Input filter		Capacitor
Environmental Specifications		
Operating ambient temperature		-40°Cto+85°C
Maximum case temperature		+105°C
Storage temperature range		-55°C to +125°C
Relative humidity		95%RH Max.
Output Specifications		
Output power		1 Watts Max.
Voltage accuracy	Nominal Vin and full load 3.3Vdc 5Vdc 9Vdc 12Vdc 15Vdc 24Vdc	 3.135-3.399V 4.75-5.15V 8.73-9.18V 11.64-12.24V 14.55-15.30V 23.52-24.36V
Voltage balance	Output	±1% max.
Minimum load		0A
Line regulation	For Vin charge of -5% +5%	±0.25% Max.
Load Regulation	10%~100% load	±1% Max.
Ripple and Noise (20MHz Bandwidth)		60mVp-p Max.
Maximum capacitive load		See table
Output short circuit protection	Automatic recovery	Continuous
Temperature coefficient		±0.03%/°C Typ.
General Specifications		
Efficiency	Nominal input and full load	See table
Isolation voltage	Input to output	1500VDC (60 second)
Isolation resistance	500VDC	1000MΩ Min.
Isolation capacitance		30pF Typ.
Switching frequency		300kHz Max.
Reliability, calculated MTBF		2×10^{6} Hrs
Physical Specifications		
Case material		Plastic (UL94 V-0)
Potting material		PU (UL94 V-0)
Dimensions		19.6×10.1×6.0 mm
Weight		2g Typ.

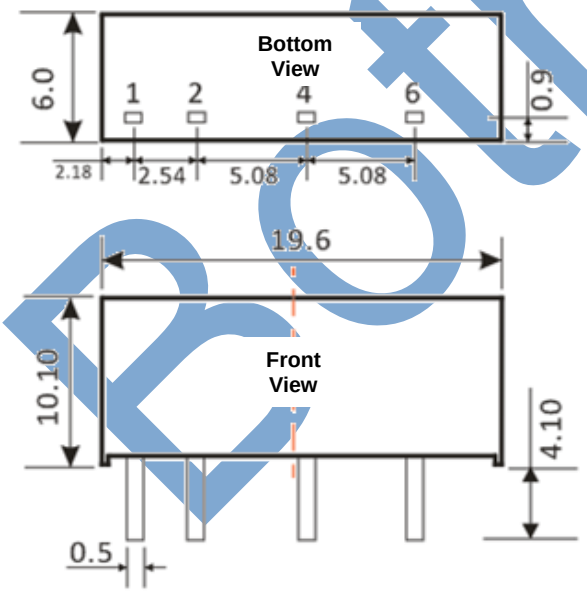
Note

1. Io below this value will not damage these converters, however, they may not meet all listed specifications.
2. Typical value, tested at nominal input and full load.
3. For each output.
4. Specifications subject to change without notice.
5. In case of long input lines or hot plug-in requirements, we recommended to use an external low ESR capacitor (22uF) near to the converter's input pins.

Power Derating Curve



Mechanical Dimensions

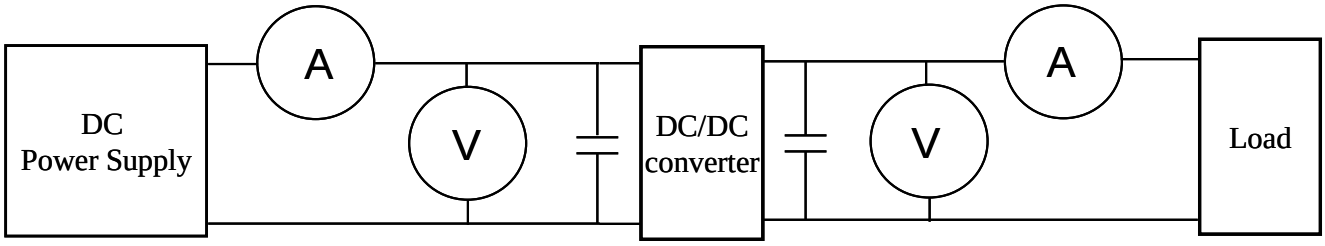


Pin Assignment	
Pin	Single
1	+Vin
2	-Vin
4	-Vout
6	+Vout

Unit: mm (inch)
Pin section tolerances:±0.1(±0.004)
General tolerances:±0.5(±0.02)

Test Configurations

All specifications are typical at nominal input, full load and 25°C unless otherwise stated.



◎DC Power Supply: It offers a wide voltage and current range precisely.

◎Current meter (A): Accuracy➔200μA ~ 200mA 4 ranges±(0.2% rdg + 2 digits)

2000mA ~ 20A 2ranges±(0.3% rdg + 2 digits).

◎Voltage meter (V): Accuracy➔±(0.03% rdg + 4 digits).

◎Load: At full load.

◎Wires:The resistance of the wires must be small.

1.Input voltage range:Narrow input voltage range（±10%）、wide input voltage range (2:1 and 4:1）。

EX: Narrow input voltage range（±10%）

5V nominal input ➔ 4.5~5.5V
12V nominal input ➔ 10.10~13.2V
24V nominal input ➔ 21.6~26.4V

Wide input voltage range 2:1

5V nominal input ➔ 4.5~9V
12V nominal input ➔ 9~18V
24V nominal input ➔ 18~36V
48V nominal input ➔ 36~75V

Wide input voltage range 4:1 (W)

24V nominal input ➔ 9~36V
48V nominal input ➔ 18~75V

2. Input power :

Pin = Vin x Iin

Vin：Input voltage
Iin：Input current

3. Output power :

Pout = Vout x Iout

Vout：Output voltage
Iout：Output current

4. Efficiency :

$$\text{Efficiency} = \frac{Pout}{Pin} \times 100\%$$

Pout: Output power
Pin: Input power

5.Voltage accuracy:

$$\frac{|\,Vout-Vout(nominal)\,|}{Vout} \times 100\%$$

Vout：Output voltage
Vout(nominal)：Nominal output voltage

6. Line regulation:

Narrow input voltage range（±10%）and unregulated output voltage series.

$$\text{Line regulation} = \frac{\Delta \text{Vout}}{\Delta \text{Vin}}$$

$$\Delta \text{Vout} = \frac{\text{Vout(+10\%)-Vout(-10\%)}}{\text{Vout}} \times 100\%$$

Vout(+10%)：Output voltage at Vin = 1.1xVin(nominal)&full load

Vout(-10%)：Output voltage at Vin = 0.9xVin(nominal)&full load

Vout：Output voltage at Vin = Vin(nominal)&full load

$$\Delta \text{Vin} = \frac{\text{Vin(+10\%)-Vin(-10\%)}}{\text{Vin(nominal)}} \times 100\%$$

Vin(+10%)：Input voltage = 1.1xVin(nominal)

Vin(-10%)：Input voltage = 0.9xVin(nominal)

Vin(nominal)：Nominal Input voltage

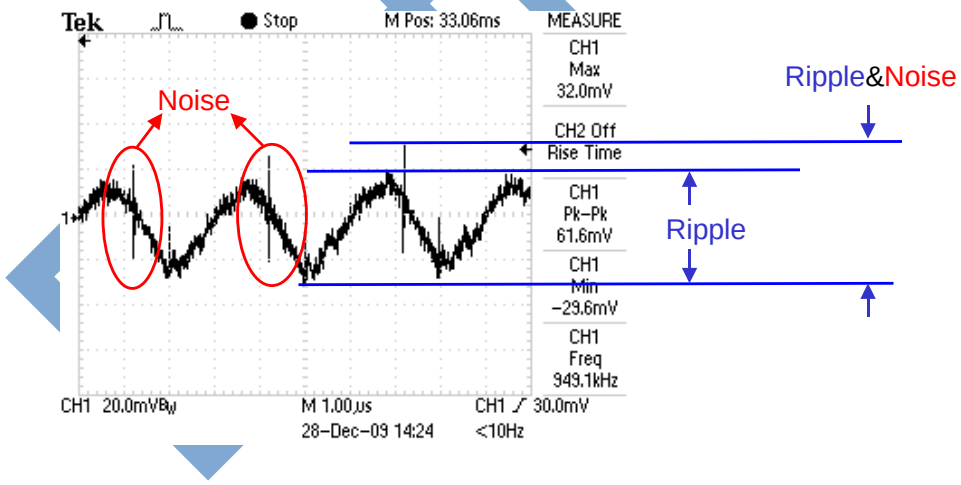
7. Load regulation :

$$\frac{|\text{Vout(FL)-Vout(NL)}|}{\text{Vout(FL)}} \times 100\%$$

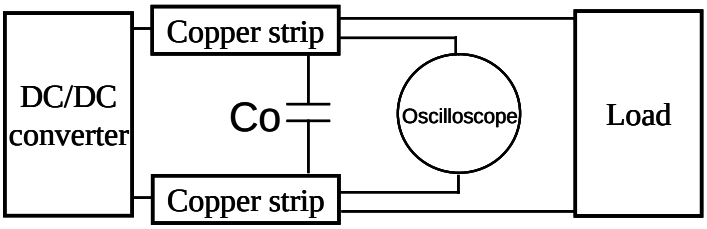
Vout(FL): Output voltage at full load

Vout(NL): Output voltage at 25% full load or 10% full load

8. Ripple and Noise: as shown below. The bandwidth is 0-20MHz.

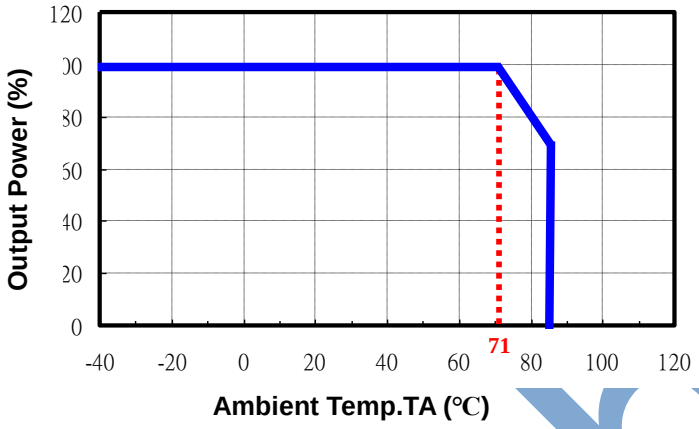


Output Ripple&Noise measurement test circuit: as shown below.



Co: usually 0.47uF.

9. Temperature derating curve: The DC-DC converter will operate over a wider temperature range if less power is drawn from the output and the device is already running. The temperature derating curve shows the operating power-temperature range. As shown below.



10. Switching frequency: The nominal operating frequency of the DC-DC converters.

11. Input to output isolation: The dielectric breakdown strength test between input and output circuits. This is the isolation voltage the device is capable of withstanding for a specified time, usually 1 second or 1 minute.

12. Input souce impedance: The power module should be connected to low ac-impedance input souce.

Highly inductive souce impedances can affect the stability of the power module. In applications where power is supplied over long lines and output loading is high , it maybe necessary to use a capacitor at the input to ensure startup. Capacitor mounted close to the power module helps ensure stability of the unit , it is commended to use a good quality low Equivalent Series Resistance (ESR < 0.1Ω at 100KHz) capacitor of a 22uF for the power module.