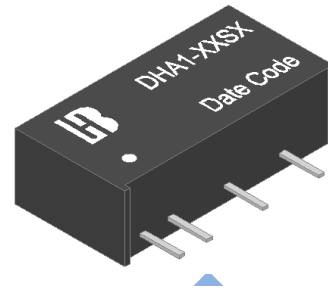


Features

- 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.

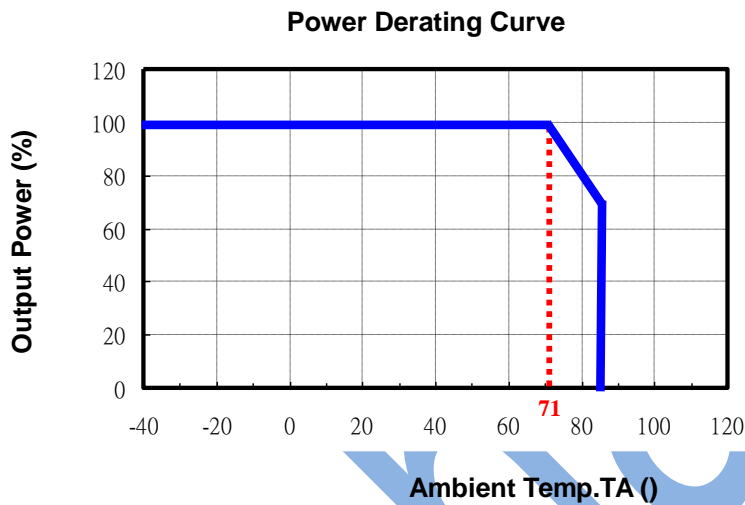
Model Number	Input Voltage Range(V) Nominal:3.3	Output Voltage (V)	Output Current (mA) ⁽¹⁾		Input Current (mA) Typ.		Eff .(%) ⁽²⁾ Typ.	Capacitive Load, max. ⁽³⁾ (uF)
			Full Load	No Load	No Load	Full Load		
DHA1-03S0	3.14-3.47 Nominal:3.3	3.3	300	35	455	66	68	
DHA1-03S1		5	200					446
DHA1-05S0	4.75-5.25 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
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	
DHA1-26S1	24.7-27.3 Nominal:26	26	200	7	55	70	47	

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
	26V nominal input	24.7-27.3V
Input filter		Capacitor
Environmental Specifications		
Operating ambient temperature		-40°C to +85°C
Maximum case temperature		+105°C
Storage temperature range		-55°C to +125°C
Relative humidity		95%RH Max.
Output Specifications		
Output power		1Watts Max.
Voltage accuracy	Nominal Vin and full load	
	3.3Vdc	3.135-3.399V
	5Vdc	4.75-5.15V
	9Vdc	8.73-9.18V
	12Vdc	11.64-12.24V
	15Vdc	14.55-15.30V
	24Vdc	23.52-24.36V
Voltage balance	Output	±1% max.
Minimum load		0A
Line regulation	For Vin change 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
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		Epoxy (UL94 V-0)
Dimensions		19.6×10.1×6.0 mm
Weight		2g Typ.

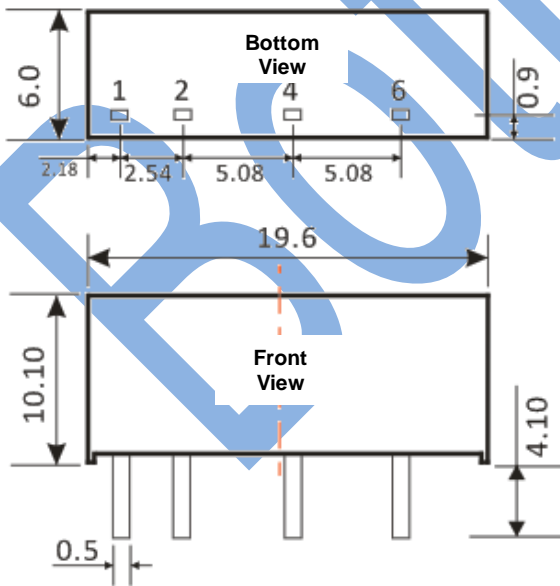
Note

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. This series of products do not support CC mode, CR mode is recommended.
6. 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

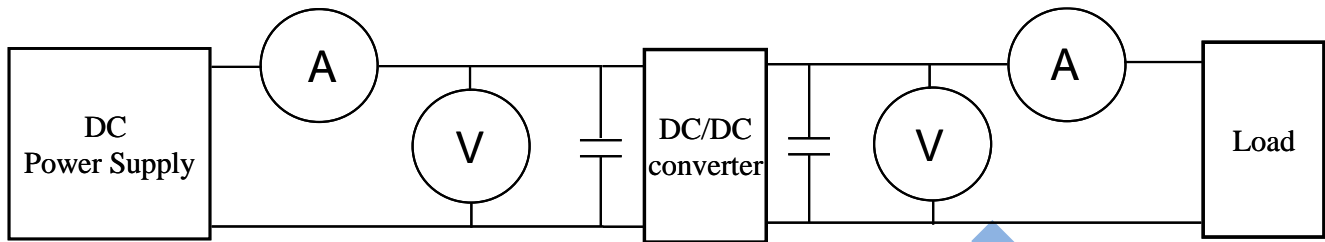


Pin Assignment	
Pin	Single
1	+Vin
2	-Vin
4	-Vout
6	+Vout

Unit: mm (inch)
 Pin section tolerances: $\pm 0.1 (\pm 0.004)$
 General tolerances: $\pm 0.5 (\pm 0.02)$

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 2 ranges ±(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
26V nominal input	→	23.4~28.4V

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 :

$$P_{in} = V_{in} \times I_{in}$$

V_{in} : Input voltage
 I_{in} : Input current

3. Output power :

$$P_{out} = V_{out} \times I_{out}$$

V_{out} : Output voltage
 I_{out} : Output current

4. Efficiency :

$$\text{Efficiency} = \frac{P_{out}}{P_{in}} \times 100\%$$

P_{out} : Output power
 P_{in} : Input power

5. Voltage accuracy:

$$\frac{|V_{out} - V_{out(nominal)}|}{V_{out}} \times 100\%$$

V_{out} : Output voltage
 $V_{out(nominal)}$: Nominal output voltage

6. Line regulation:

Narrow input voltage range ($\pm 10\%$) and unregulated output voltage series.

$$\text{Line regulation} = \frac{\Delta V_{out}}{\Delta V_{in}}$$

$$\Delta V_{out} = \frac{V_{out(+10\%)} - V_{out(-10\%)}}{V_{out}} \times 100\%$$

$V_{out(+10\%)}$: Output voltage at $V_{in} = 1.1 \times V_{in}(\text{nominal})$ & full load

$V_{out(-10\%)}$: Output voltage at $V_{in} = 0.9 \times V_{in}(\text{nominal})$ & full load

V_{out} : Output voltage at $V_{in} = V_{in}(\text{nominal})$ & full load

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

$V_{in(+10\%)}$: Input voltage = $1.1 \times V_{in}(\text{nominal})$

$V_{in(-10\%)}$: Input voltage = $0.9 \times V_{in}(\text{nominal})$

$V_{in}(\text{nominal})$: Nominal Input voltage

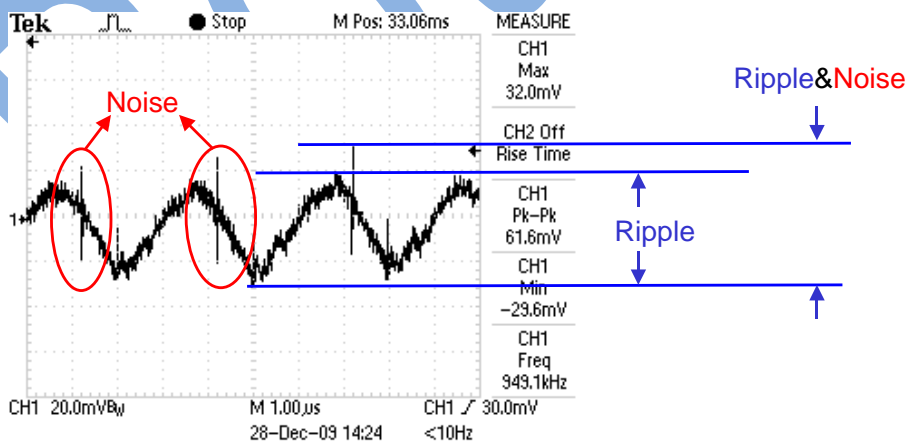
7. Load regulation :

$$\frac{|V_{out(FL)} - V_{out(NL)}|}{V_{out(FL)}} \times 100\%$$

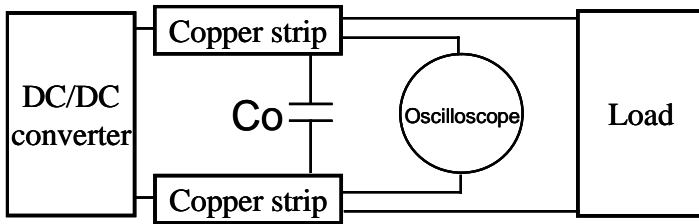
$V_{out(FL)}$: Output voltage at full load

$V_{out(NL)}$: Output voltage at 25% full load or 10% full load

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

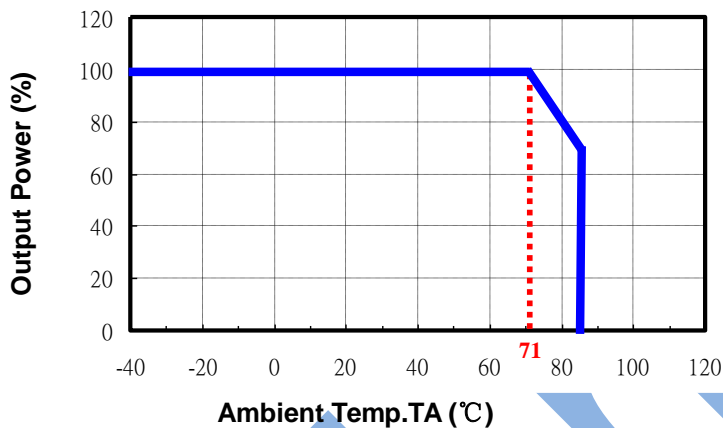


Output Ripple&Noise measurement test circuit: as shown below.



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 source impedance:** The power module should be connected to low ac-impedance input source.

Highly inductive source impedances can affect the stability of the power module. In applications where power is supplied over long lines and output loading is high, it may be 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 <math>< 0.1 \Omega</math> at 100KHz) capacitor of a 22uF for the power module.

