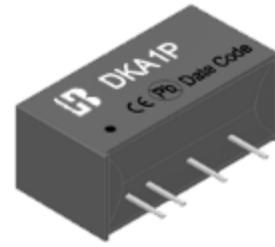


## Features

- 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 +105°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) <sup>(1)</sup>		Input Current (mA) Typ.		Eff. (%) <sup>(2)</sup> Typ.	Capacitive Load, max. <sup>(3)</sup> (uF)				
			Full Load	No Load	No Load	Full Load						
DKA1-03S0P	2.97-3.63 Nominal:3.3	3.3	300	35	405	74	68					
DKA1-03S1P		5	200					404	75	47		
DKA1-03D0P		±3.3	±150					405	74	33/33		
DKA1-03D1P		±5	±100					404	75	22/22		
DKA1-05S0P	4.5-5.5 Nominal:5	3.3	300	28	264	75						
DKA1-05S1P		5	200					260	77	47		
DKA1-05SAP		9	110					248	80	33		
DKA1-05S2P		12	83					247	81	22		
DKA1-05S3P		15	67					247	81	22		
DKA1-05S5P		24	42					247	81	10		
DKA1-05D0P		±3.3	±150					264	75	33/33		
DKA1-05D1P		±5	±100					260	77	22/22		
DKA1-05DAP		±9	±55					248	80	10/10		
DKA1-05D2P		±12	±42					247	81	10/10		
DKA1-05D3P		±15	±33					247	81	10/10		
DKA1-05D5P		±24	±21					247	81	4.7/4.7		
DKA1-12S0P		10.8-13.2 Nominal:12	3.3					300	17	109	76	68
DKA1-12S1P			5					200				
DKA1-12SAP	9		110	107	78	33						
DKA1-12S2P	12		83	104	80	22						
DKA1-12S3P	15		67	104	80	22						
DKA1-12S5P	24		42	104	80	10						
DKA1-12D0P	±3.3		±150	109	76	33/33						
DKA1-12D1P	±5		±100	107	78	22/22						
DKA1-12DAP	±9		±55	107	78	10/10						
DKA1-12D2P	±12		±42	104	80	10/10						
DKA1-12D3P	±15		±33	104	80	10/10						

Model Number	Input Voltage Range(V)	Output Voltage (V)	Output Current (mA) <sup>(1)</sup>	Input Current (mA) Typ.		Eff. (%) <sup>(2)</sup> Typ.	Capacitive Load, max. <sup>(3)</sup> (uF)
				No Load	Full Load		
DKA1-15S0P	13.5-16.5 Nominal:15	3.3	300	15	87	76	68
DKA1-15S1P		5	200		85	78	47
DKA1-15SAP		9	110		85	78	33
DKA1-15S2P		12	83		83	80	22
DKA1-15S3P		15	67		83	80	22
DKA1-15S5P		24	42		83	80	10
DKA1-15D0P		±3.3	±150		87	76	33/33
DKA1-15D1P		±5	±100		85	78	22/22
DKA1-15DAP		±9	±55		85	78	10/10
DKA1-15D2P		±12	±42		83	80	10/10
DKA1-15D3P		±15	±33		83	80	10/10
DKA1-24S0P		21.6-26.4 Nominal:24	3.3		300	8	54
DKA1-24S1P	5		200	53	79		47
DKA1-24SAP	9		110	52	80		33
DKA1-24S2P	12		83	51	81		22
DKA1-24S3P	15		67	51	81		22
DKA1-24S5P	24		42	51	81		10
DKA1-24D0P	±3.3		±150	54	77		33/33
DKA1-24D1P	±5		±100	53	79		22/22
DKA1-24DAP	±9		±55	52	80		10/10
DKA1-24D2P	±12		±42	51	81		10/10
DKA1-24D3P	±15		±33	51	81		10/10

### Input Specifications

3.3V nominal input	2.97-3.63V
5V nominal input	4.5-5.5V
12V nominal input	10.8-13.2V
15V nominal input	13.5-16.5V
24V nominal input	21.6-26.4V

Input filter Capacitor

### Environmental Specifications

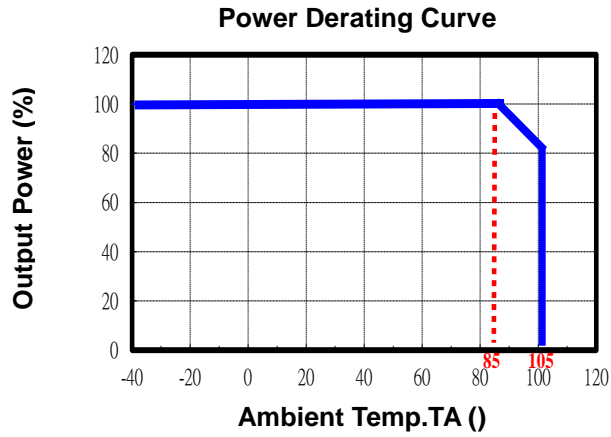
Operating ambient temperature	-40°C to +105°C
Maximum case temperature	+125°C
Storage temperature range	-55°C to +125°C
Relative humidity	95% RH max.

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	Dual output	±1% max.
Minimum load		10% load of full load
Line regulation	For Vin change of 1%	±1.2% Typ.
Load regulation	Nominal Vin and 10%-100% load	
	3.3Vdc	15% Typ.
	5Vdc	13% Typ.
	9Vdc	9% Typ.
	12Vdc	8% Typ.
	15Vdc	7% Typ.
	24Vdc	6% Typ.
Ripple and Noise (20MHz Bandwidth)		50mVp-p Typ. 100mVp-p Max.
Maximum capacitive load		See table
Output short circuit protection	DKA1-03SXP/03DXP/24SXP/ 24DXP	3S Max.
	Other models	Continuous, Automatic recovery
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		150kHz typ.
		300kHz max.
Reliability, calculated MTBF		2x10 <sup>6</sup> Hrs
Physical Specifications		
Case material		Plastic (UL94 V-0)
Potting material		PU (UL94 V-0)
Dimensions		19.6x 10.1x 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.

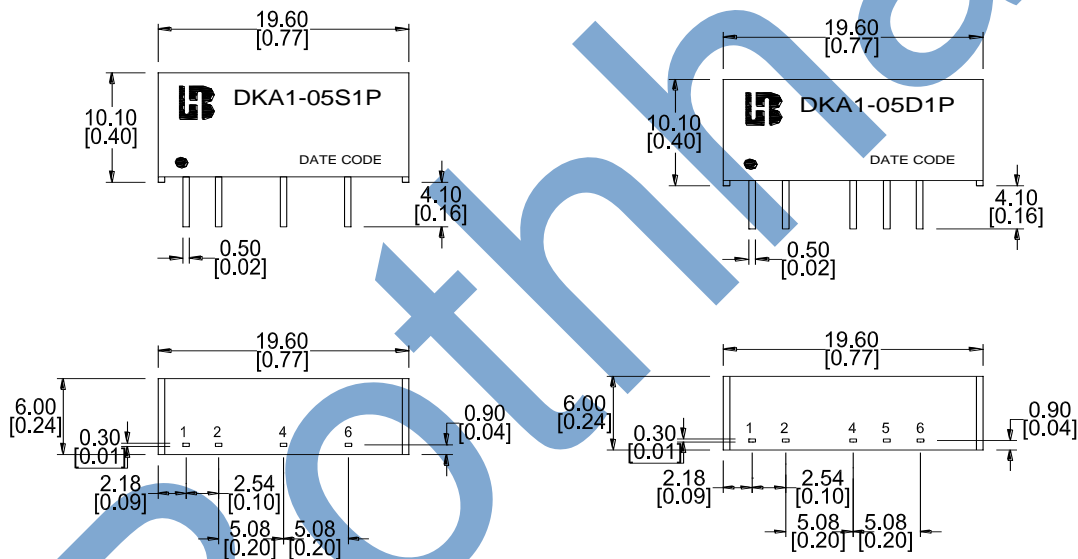
## Power Derating Curve



## Mechanical Dimensions

### Single output

### Dual output

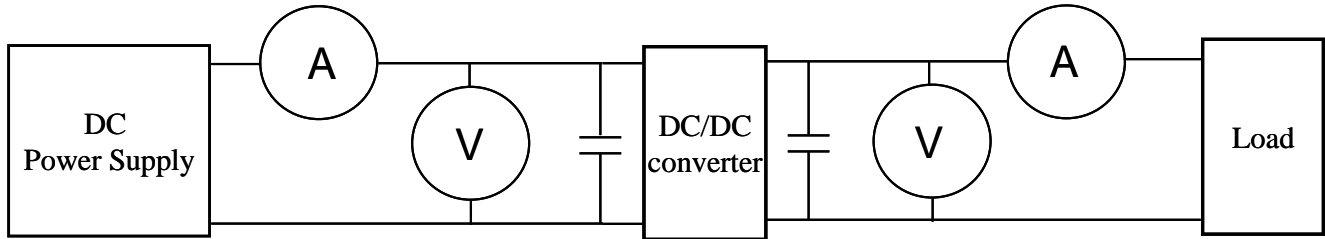


Pin Assignment		
Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
4	-Vout	-Vout
5	No pin	Common
6	+Vout	+Vout

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  $\pm(0.2\% \text{ rdg} + 2 \text{ digits})$   
 2000mA ~ 20A 2 ranges  $\pm(0.3\% \text{ rdg} + 2 \text{ digits})$ .

⊙Voltage meter (V): Accuracy →  $\pm(0.03\% \text{ rdg} + 4 \text{ digits})$ .

⊙Load: At full load.

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

1. Input voltage range: Narrow input voltage range ( $\pm 10\%$ ) · wide input voltage range (2:1 and 4:1) ·

EX: Narrow input voltage range ( $\pm 10\%$ )

5V nominal input → 4.5~5.5V  
 12V nominal input → 10.8~13.2V  
 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 :

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

$V_{in}$  : 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:

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

$V_{out}$  : Output voltage  
 $V_{out}(\text{nominal})$  : 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

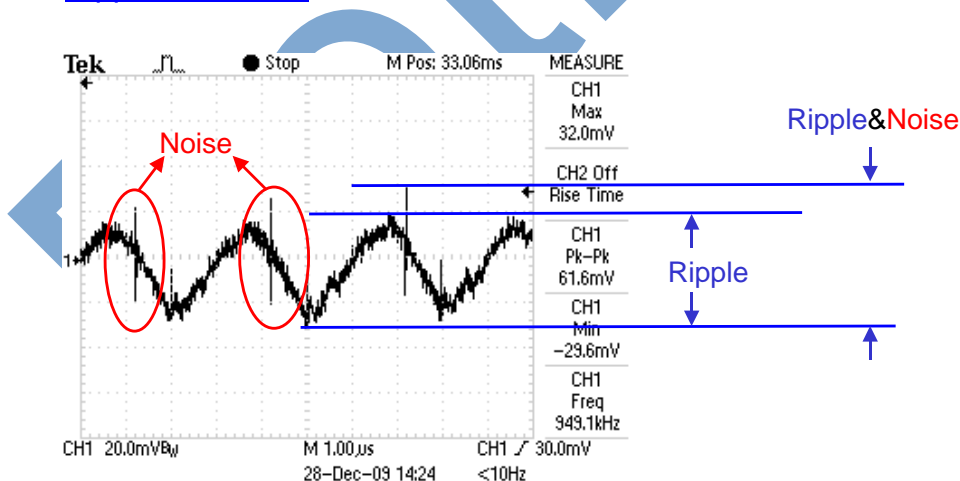
## 7. Load regulation :

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

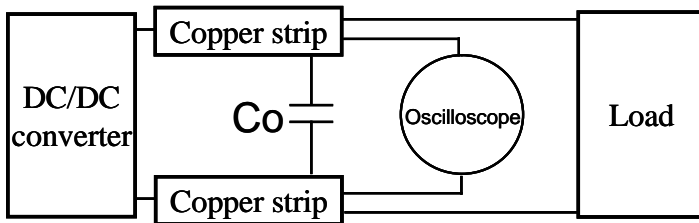
$V_{out(FL)}$ : Output voltage at full load

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

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

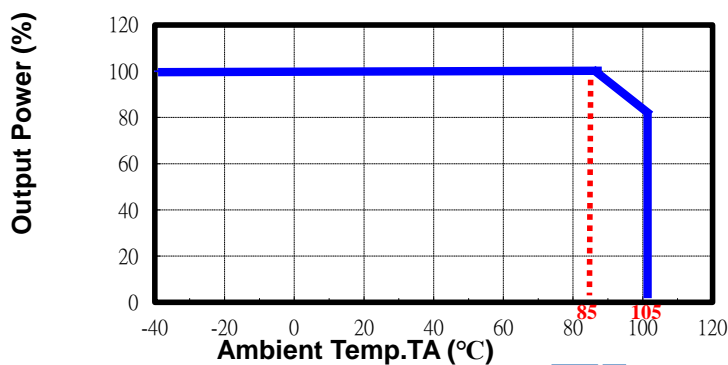


Output Ripple&Noise measurement test circuit: as shown below.



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 recommended 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.

