



## IA\_KS-1W & IA\_S-1W Series

### 1W FIXED INPUT ISOLATED & REGULATED DUAL OUTPUT DC-DC CONVERTER

multi-country patent protection **RoHS**

#### FEATURES

- SIP Package
- 1KVDC Isolation
- Temperature Range: -40°C to +85°C
- No Heatsink Required
- No External Component Required
- Industry Standard Pinout
- RoHS Compliance

#### APPLICATIONS

The IA\_KS-1W & IA\_S-1W Series are specially designed for applications where a group of polar power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.

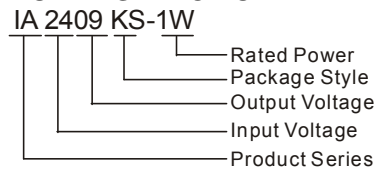
These products apply to:

- 1) Where the voltage of the input power supply is fixed (voltage variation  $\leq \pm 5\%$ );
- 2) Where isolation is necessary between input and output (isolation voltage  $\leq 1000\text{VDC}$ );
- 3) Where the regulation of the output voltage and the output ripple noise are demanded.

These products don't apply to:

- 1) Where the input supply voltage varied (variation  $\geq \pm 5\%$ ), otherwise our company's WRA series is recommended;
- 2) When the isolation voltage than 1000VDC, the IE\_KS-1W series are recommended.

#### MODEL SELECTION



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#### PRODUCT PROGRAM

Part Number	Input		Output			Efficiency (% Typ)
	Voltage (VDC)		Voltage (VDC)	Current (mA)		
	Nomin	Range		Max	Min	
IA0505S-1W	5	4.75-5.25	$\pm 5$	$\pm 100$	$\pm 10$	69
IA0505KS-1W			$\pm 5$	$\pm 100$	$\pm 10$	54
IA0509KS-1W			$\pm 9$	$\pm 56$	$\pm 6$	63
IA0512KS-1W			$\pm 12$	$\pm 42$	$\pm 5$	63
IA0515KS-1W*			$\pm 15$	$\pm 33$	$\pm 4$	65
IA1205S-1W	12	11.4-12.6	$\pm 5$	$\pm 100$	$\pm 10$	72
IA1205KS-1W			$\pm 5$	$\pm 100$	$\pm 10$	56
IA1209KS-1W			$\pm 9$	$\pm 56$	$\pm 6$	62
IA1212KS-1W			$\pm 12$	$\pm 42$	$\pm 5$	65
IA1215KS-1W			$\pm 15$	$\pm 33$	$\pm 4$	66
IA2405S-1W	24	22.8-25.2	$\pm 5$	$\pm 100$	$\pm 10$	72
IA2405KS-1W			$\pm 5$	$\pm 100$	$\pm 10$	54
IA2409KS-1W			$\pm 9$	$\pm 56$	$\pm 6$	62
IA2412KS-1W*			$\pm 12$	$\pm 42$	$\pm 5$	64
IA2415KS-1W			$\pm 15$	$\pm 33$	$\pm 4$	66

\* Designing.

#### OUTPUT SPECIFICATIONS

Item	Test condition	Min	Typ	Max	Units
Output power		0.1		1	W
Line regulation	For $V_{in}$ change of 5%			$\pm 0.25$	%
Load regulation	10% to 100% full load			$\pm 1$	%
Output voltage accuracy	100% full load			$\pm 3$	%
Temperature drift	100% full load			0.03	%/°C
Output ripple*	20MHz Bandwidth		10	20	mVp-p
Output Noise*	20MHz Bandwidth		50	100	mVp-p
Switching frequency	Full load, nominal input		100		KHz

\*test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

#### COMMON SPECIFICATION

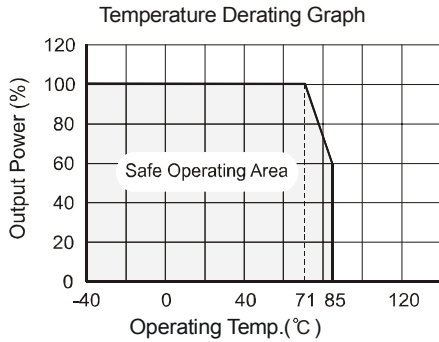
Item	Test Conditions	Min	Typ	Max	Units
Storage humidity range				95	%
Operating temperature		-40		85	°C
Storage temperature		-55		125	
Lead temperature	1.5mm from case for 10 seconds			300	
Temp. rise at full load			20	30	
Cooling	Free air convection				
Isolation voltage	Tested for 1 minute and 1mA max	1000			VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Short circuit protection*		1 second(Max)			
Case material		Plastic(UL94-V0)			
MTBF		3500			K Hours
Weigh			5.2		g

\* Supply voltage must be discontinued at the end of short circuit duration;  
 IAXX05S-1W series : Continuous Short Circuit Protection.

Note:

- 1.All specifications measured at  $T_A=25^\circ\text{C}$ , humidity<75%, nominal input voltage and rated output load unless otherwise specified.
- 2.See below recommended circuits for more details.

## TYPICAL CHARACTERISTICS



### Overload Protection

Under normal operating conditions, the output circuit of these products has no protection against over-current and short-circuits. The simplest method is to connect a self-recovery fuse in series at the input end or add a circuit breaker to the circuit.

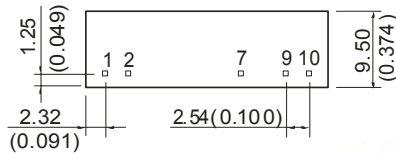
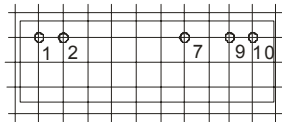
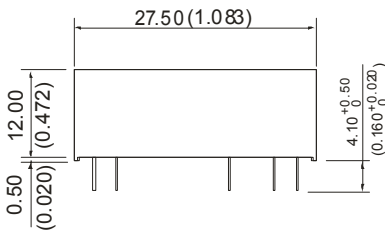
### Requirement on output load

To ensure this module can operate efficiently and reliably, a minimum load is specified for this kind of DC/DC converter in addition to a maximum load (namely full load). During operation, make sure the specified range of input voltage is not exceeded, the minimum output load is **not less than 10%** of the full load, that this product should never be operated under no load! If the actual output power is very small, please connect a resistor with proper resistance at the output end in parallel to increase the load.

## OUTLINE DIMENSIONS & PIN CONNECTIONS

### RECOMMENDED FOOTPRINT

Top view, grid: 2.54mm (0.1inch), diameter: 1.00mm (0.039inch)



### FOOTPRINT DETAILS

Pin	Function
1	Vin
2	GND
7	+Vo
9	-Vo
10	0V

Note:

Unit: mm (inch)

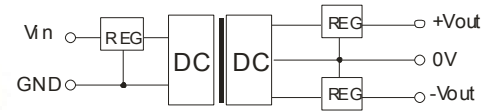
Pin section: 0.50\*0.3mm (0.020\*0.012inch)

Pin tolerances: ±0.10mm (±0.004inch)

General tolerances: ±0.25mm (±0.010inch)

### Output Voltage Regulation and Over-voltage Protection Circuit

The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage regulator with overheat protection that is connected to the input or output end in series (Figure 2).



(Figure 2)

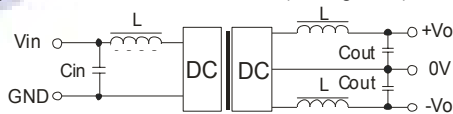
When the environment temperature is higher than 71°C, the product output power should be less than 60% of the rated power.

No parallel connection or plug and play.

## APPLICATION NOTE

### Recommended testing and application circuit

To get an extreme low ripple, an "LC" filtering network may be connected to the input and output ends of the DC/DC converter, which may produce a more significant filtering effect. It should also be noted that the inductance and the frequency of the "LC" filtering network should be staggered with the DC/DC frequency to avoid mutual interference (see figure 1).



(Figure 1)

In some circuits which are sensitive to noise and ripple, a filtering capacitor may be added to the DC/DC output end and input end to reduce the noise and ripple. However, the capacitance of the output filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the greatest capacitance of its filter capacitor sees the **EXTERNAL CAPACITOR TABLE** (see Table 1). **It's not recommend to connect any external capacitor in the application field with less than 0.5 watt output.**

EXTERNAL CAPACITOR TABLE (Table 1)

Vin (VDC)	Cin (uF)	Vout (VDC)	Cout (uF)
5	4.7	±5	4.7
12	2.2	±9	2.2
24	0.47	±12	1
-	-	±15	0.47