- **RATED 5W OUTPUT**
- **HIGH POWER DENSITY**
- **24PIN DIP PACKAGE**
- **SINGLE&DUAL OUTPUT**
- **INDUSTRIAL STANDARD PIN-OUT**
- **NO HEAT SINK REQUIRED**
- **1K VDC ISOLATION**
- **WIDE INPUT**
- **REGULATED OUTPUT**
- **PCB MOUNTING**
- **OVER CURRENT&SHORT CIRCUIT PROTECTION**

The DKW5 series DC-DC converter offers 5 watts regulated power from a 24 PIN international standard DIP package. The series are especially designed for the application of telecommunication, industry control, instrumentation and measurements. With its features, the product can be used where the wider input, regulated output and isolation needed.

ELECTRICAL SPECIFICATIONS

All specifications tested typically @ 25°C, humidity<75%, nominal input and rated output unless otherwise noted.

OUTPUT SPECIFICATIONS

Items:	Testing condition		Min	Typ	Max
Output accuracy:	At full load and nominal Vin				±2%
Output power:				5W	6W
Line regulation:	Input voltage from low to full load				0.5%
Load regulation:	From 10% to full load	Single Vout			0.5%
		Dual Vout			3%
Ripple and noise:	20MHz bandwidth				50mVp-p
Temperature drift:					0.03 %/°C
Minimum load					10%
Switching frequency				400K HZ	
Over load protection	% of FL at nominal input			120	
Short circuit protection	Continuous and automatic recovery				

INPUT SPECIFICATIONS

Items:	Testing condition	Min	Typ	Max
Input voltage range	12VDC nominal input	9-18VDC		
	24VDC nominal input	18-36VDC		
	48VDC nominal input	36-72VDC		
Input filter	Pi			
Start-up time	Nominal Vin and certain load		100mS	

COMMON SPECIFICATIONS

Items	Testing condition	Min	Typ.	Max
Operating temperature range		-40°C		+85°C
Storage temperature range		-55°C		+125°C
Humidity				<75%
Cooling	Free Air Convection			
Isolation voltage (VDC)	Input to Output		1,000	
Isolation resistance (ohms)			10^9	
Isolation capacitance (pF)				30
Efficiency (%)	See Product List	70		80
Case material	Non-conductive black copper			
Potting material	Epoxy Resin UL94-V0			
Packing material	Tube			
Dimension (mm / inch)	31.8*20.3*10.2 (1.25*0.80*0.40)			
Weight (g)	14			
MTBF (Hrs)		10^6		

PRODUCT LIST

Part Number	Input Voltage (VDC)			Output		Efficiency (%, Typ.)	Package	Capacitor Load Max (uF)
	Range	Nominal	Max.	Current (mA)	Voltage (VDC)			
DKW5-12S33	9-18	12	20	1100	3.3	70	DIP	2200
DKW5-12S05		12	20	1000	5	78	DIP	1200
DKW5-12S12		12	20	417	12	80	DIP	220
DKW5-12S15		12	20	333	15	80	DIP	150
DKW5-12D05		12	20	±500	±5	78	DIP	±680
DKW5-12D12		12	20	±208	±12	80	DIP	±100
DKW5-12D15		12	20	±167	±15	80	DIP	±68
DKW5-24S33	18-36	24	40	1100	3.3	70	DIP	2200
DKW5-24S05		24	40	1000	5	80	DIP	1200
DKW5-24S12		24	40	417	12	80	DIP	220
DKW5-24S15		24	40	333	15	80	DIP	150
DKW5-24D05		24	40	±500	±5	78	DIP	±680
DKW5-24D12		24	40	±208	±12	80	DIP	±100
DKW5-24D15		24	40	±167	±15	80	DIP	±68
DKW5-48S33	36-72	48	80	1100	3.3	70	DIP	2200
DKW5-48S05		48	80	1000	5	78	DIP	1200
DKW5-48S12		48	80	417	12	80	DIP	220
DKW5-48S15		48	80	333	15	80	DIP	150
DKW5-48D05		48	80	±500	±5	78	DIP	±680
DKW5-48D12		48	80	±208	±12	80	DIP	±100
DKW5-48D15		48	80	±167	±15	80	DIP	±68

Note:(1) A minimum 10% load is required on the output to meet the published specifications. Even though working at no load condition will not damage the device, it is not adoptable.

(2) If the output power needed is smaller than rated, please connect a proper value resistor at output end in parallel to increase the load or contact us for a lower power product.

(3) For lower noise and ripple, please use a “LC” filter network at the output. The capacitance must be at proper value in case of start-up problems.

CONNECTING DC-DC CONVERTERS IN SERIES

Galvanic isolation of the output allows multiple converters to be connected in series simply by connecting the positive output of one converter to the negative of another (see figure 1). In this way, non-standard voltage rails can be generated, however, the current output of the highest output voltage converter should not be exceeded. When converters are connected in series, additional filtering is strongly recommended as the converters switching circuits are not synchronized. As well as a summation of the ripple voltages, the output could also produce relatively large beat frequencies. A capacitor across the output will help, as will a series inductor.

CONNECTING DC-DC CONVERTERS IN PARALLEL

If the available power output from a single converter is inadequate for the application, then multiple converters can be paralleled to produce a higher output power. However, it is not recommended to parallel converters to generate a higher power output, please select our higher power output modules or contact us for a customized solution.

It should be noted that it is always preferable to parallel multiple converters of the same type. For instance, if a 2.5W converter is required, then either 2pcs AxxxxS-2W should be used or 3 AxxxxS-1W, not an AxxxxS-2W and an AxxxxS-1W. The reason for this is that the output voltages are not sufficiently well matched to guarantee that an AxxxxS-2W would supply twice as much as an AxxxxS-1W and the situation would occur where there was only 1W being drawn from the AxxxxS-2W and 1.5W from AxxxxS-1W. Even with paralleled converters of the same type, loading will be uneven, however, there is only likely to be around a 10% difference in output load when the output voltages are well matched.

When connecting converter outputs, it should be remembered that the switching will not be synchronous, hence some form of coupling should be employed. One possible solution is to use a diode feed, this is suitable mainly for 12V and 15V output types only where the diode voltage drop (typically 0.6V) will not significantly affect the circuit functionality (see figure 2). With 5V and 9V supplies the diode drop is generally too large to consider as a suitable means of connecting paralleled converters. This method also has a beat frequency that will superimpose itself over the ripple of the two converters, this can be reduced by using an external capacitor at the paralleled output. The preferred method of connecting converters in parallel is via series inductors on the output (see figure 3). This configuration not only has a lower loss of voltage than the diode method, but by suitable choice of inductor and an additional external capacitor, the beat frequency can be significantly reduced, as will the ripple from each converter. Suitable values are given in the table below (see table 1), these typically reduce the beat and ripple frequencies by a factor of 10.

ISOLATION

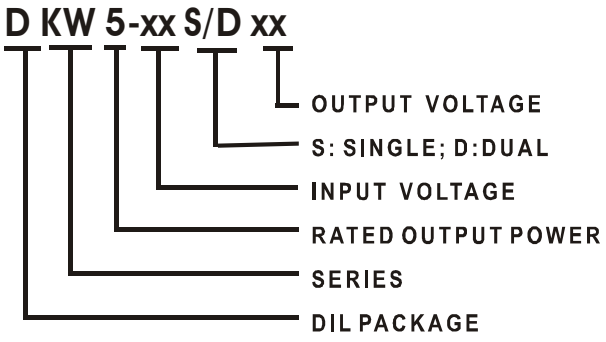
One of the main features of the majority of Sunyuan components DC-DC converters is the high galvanic isolation capability. This allows several variations on circuit topography by using a single DC-DC converter. The basic input to output isolation can be used to provide either a simple isolated output power source, or to generate different voltage rails and /or dual polarity rails. These configurations are most often found in data processing, instrumentation and other noise sensitive circuits where it is necessary to isolate the load and noise presented to the local power supply rails from that of an entire system. Usually local supply noise appears as common mode noise at the converter and does not pollute the main system power supply rails. The isolated positive output can be connected to the input ground rail to generate a negative supply rail if required. Since the output is isolated from the input the choice of reference for the output side can be relatively arbitrary, for example an additional single rail can be generated above the main supply rail or offset by some other DC value.

Regulated converters need more consideration than the unregulated type for mixing the reference level. Essentially the single supply rail has a regulator in its positive output rail only, hence referring the isolated ground will only work if all the current return is through the DC-DC and not via other external components, such as diode bias, resistor feed. Have an alternative return path can upset the regulation and the performance of the system may not equal that of the converter. In one word, the isolation features are to generate two completely independent power supply but also united perfectly through the modern technology. This has been widely used in the application of mixed circuits, A/D, D/A and other circuits that are sensitive to noise.

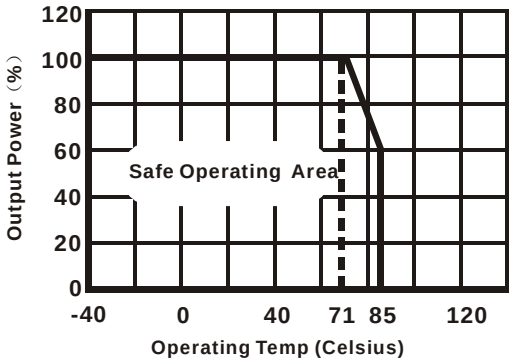
FILTERING

All Sunyuan isolated DC-DC Converters have a fixed characteristic frequency at which the device operates. This fixed frequency allows filtering that is relatively simple compared to pulse-skipping types. In a pulse-skipping converter a large range of frequencies are encountered as the device adjusts the pulse interval for loading conditions.

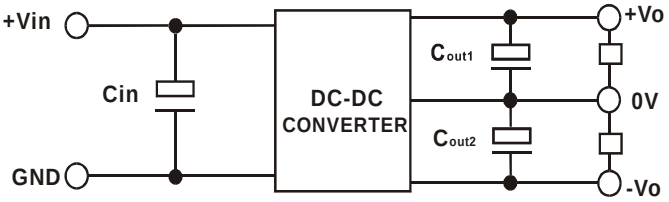
NOMENCLATURE



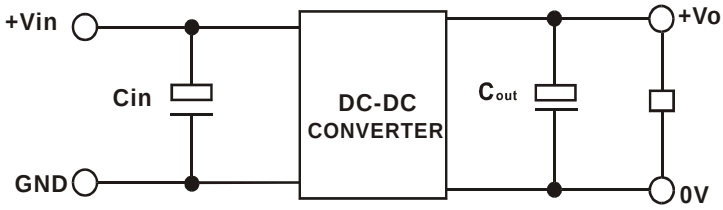
TEMPERATURE DERATING GRAPH



TYPICAL CONNECTION

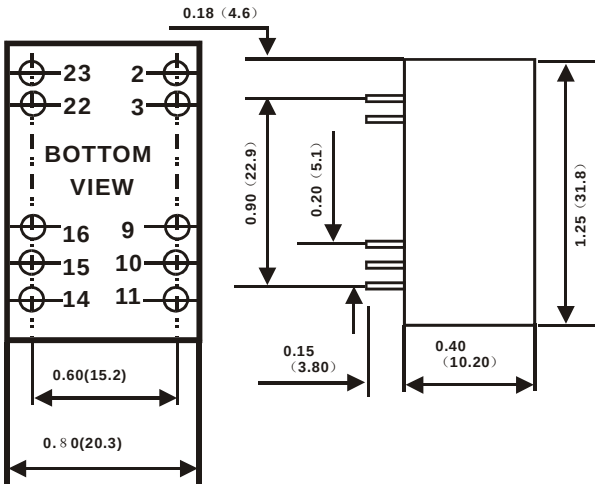


Dual Output



Single Output

OUTLINE DIMENSION



PINS DESCRIPTION

PIN	SINGLE	DUAL	PIN	SINGLE	DUAL
2	-Vin	-Vin	23	+Vin	+Vin
3	-Vin	-Vin	22	+Vin	+Vin
9	NC	COMMON	16	-Vout	COMMON
10	NC	NC	15	NC	NC
11	NC	-Vout	14	+Vout	+Vout

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