

### FEATURES:

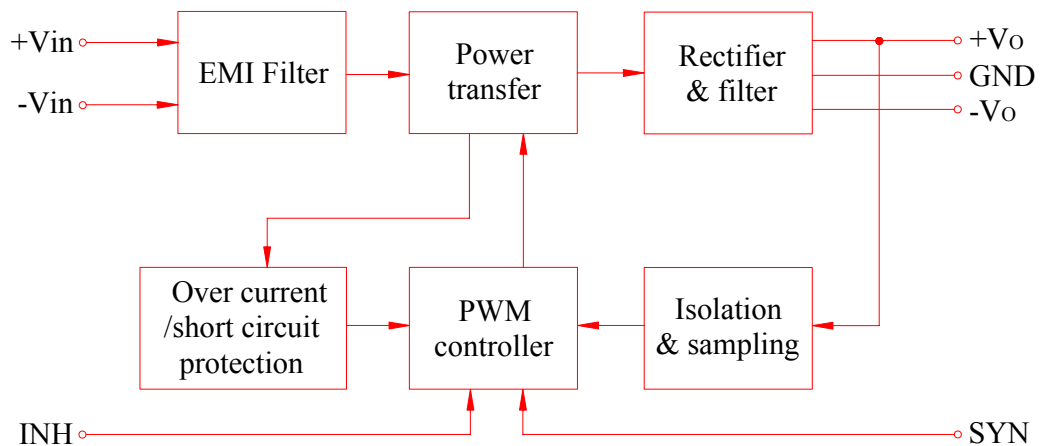
- High reliability, small size
- In photoelectric isolation
- Input voltage range: 16V<sub>DC</sub> to 40V<sub>DC</sub>
- Output power: 5W
- Inhibit function
- Short circuit protection
- DIP hermetical



### DESCRIPTION:

The WKI28XXS/D-5HM series module, which adopts Thick-Film Microcircuit Technology, parallel seam welding process, is a kind of perfect converter with high reliability necessary for some applications such as aviation, aerospace and military. The single output voltage is 5V, 12V, or 15V, the dual output voltage is  $\pm 12V$  or  $\pm 15V$ . The output power is 5W. The switching frequency is fixed at 430 KHz to minimize noise. The input filter circuit is designed to reduce the electro-magnetic interference. The typical input voltage is 28V, and the ranges from 16V to 40V. The WKI28XXS/D-5HM series also provides some control functions such as shut down, and short circuit protection.

### BLOCK DIAGRAM:



### ABSOLUTE MAXIMUM RATINGS:

Input Voltage:	16V <sub>DC</sub> ~40V <sub>DC</sub>
Output Power:	5W
Operating Temp(T <sub>C</sub> ):	-55°C~105°C (M) /-40°C~85°C (E/I)
Storage Temp:	-65°C~150°C (M) /-55°C~125°C (E/I)
Pin-Solder Temp (10s):	300°C

## THE ELECTRICAL CHARACTERISTICS:

### SINGLE OUTPUT:

		WKI2805S-5HM			WKI2812S-5HM			WKI2815S-5HM			UNITS
PARAMETER	CONDITIONS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
OUTPUT VOLTAGE	$V_{IN}=28V_{DC}$	4.95	5.00	5.05	11.88	12.00	12.12	14.85	15.00	15.15	$V_{DC}$
OUTPUT CURRENT	$V_{IN}=16\sim 40V_{DC}$	0	--	1000	0	--	417	0	--	333	mA
OUTPUT POWER	$V_{IN}=16\sim 40V_{DC}$	--	--	5	0	--	5	0	--	3	W
OUTPUT RIPPLE VOLTAGE 1	$V_{IN}=28V$ , FULL LOAD, 20MHZ	--	30	50	--	30	50	--	30	50	$mV_{p-p}$
	MIN~MAX $T_C$	--	50	100	--	50	100	--	50	100	
LINE REGULATION	$V_{IN}=16\sim 40V_{DC}$	--	10	20	--	10	20	--	10	20	mV
	MIN~MAX $T_C$	--	10	20	--	10	20	--	10	20	
LOAD REGULATION	$V_{IN}=28V_{DC}$	--	10	20	--	10	20	--	10	20	mV
	MIN~MAX $T_C$	--	10	20	--	10	20	--	10	20	
INPUT VOLTAGE	CONTINUOUS	16	28	40	16	28	40	16	28	40	V
	50V/50ms	0	--	50	0	--	50	0	--	50	
INPUT CURRENT	NO LOAD	--	10	20	--	10	20	--	10	20	mA
	FULL LOAD	--	238	--	--	230	--	--	235	--	
	INHIBITED	--	3	6	--	3	6	--	3	6	
INPUT RIPPLE CURRENT	$V_{IN}=28V$ , FULL LOAD, 20MHZ	--	25	50	--	25	50	--	25	50	$mA_{p-p}$
EFFICIENCY	$V_{IN}=28V$ , FULL LOAD	71	75	--	75	77	--	75	77	--	%
SHORT CIRCUIT POWER DISSIPATION	$V_{IN}=28V$ , FULL LOAD	--	0.2	1	--	0.2	1	--	0.2	1	W
STEP LOAD RESPONSE TRANSIENT	50%-100%-50%	--	$\pm 100$	$\pm 200$	--	$\pm 100$	$\pm 200$	--	$\pm 100$	$\pm 200$	mV
STEP LOAD RESPONSE TRANSIENT RECOVERY		--	200	300	--	200	300	--	200	300	us
STEP LINE RESPONSE TRANSIENT	16-40-16V <sub>DC</sub>	--	50	100	--	100	200	--	100	200	mV
STEP LINE RESPONSE TRANSIENT RECOVERY		--	200	300	--	200	300	--	200	300	us
START-UP	DELAY	--	2	5	--	2	5	--	2	5	ms
	FULL LOAD OVERSHOOT	--	0	50	--	0	50	--	0	50	$mV_{pk}$
INSULATION RESISTANCE	$\geq 100M\Omega @ 500VDC$ (INPUT - OUTPUT; ANY PINS TO CASE)										

#### NOTE:

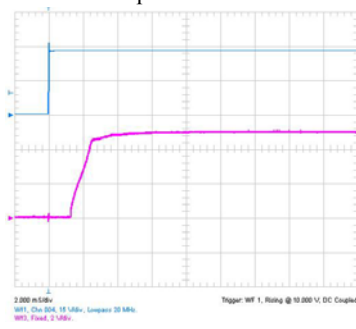
- Using tip and barrel measurement;
- Unless otherwise specified,  $T_c = 25^\circ C$   $V_{in} = 28V_{DC}$  100% load.

## TYPICAL PERFORMANCE CURVES:

1: Output Ripple Voltage



2: Start - Up



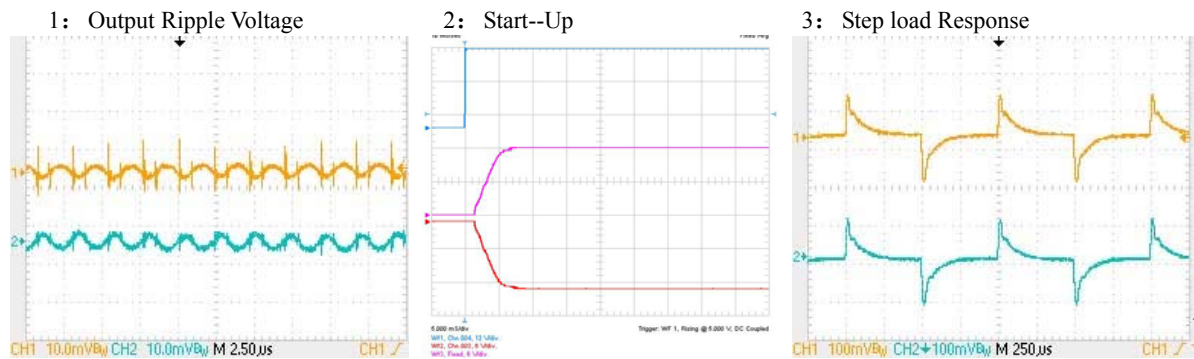
3: Step load Response



**DUAL OUTPUT:**

PARAMETER	CONDITIONS	WKI2812D-5HM			WKI2815D-5HM			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
OUTPUT VOLTAGE	$V_{IN}=28V_{DC}$ $\pm V_O$	11.88	12.00	12.12	14.85	15.00	15.15	V
OUTPUT CURRENT	$V_{IN}=16\sim 40V_{DC}$ $\pm V_O$	0	--	208	0	--	167	mA
OUTPUT POWER	$V_{IN}=16\sim 40V_{DC}$	--	--	5	--	--	5	W
OUTPUT RIPPLE VOLTAGE 1	$V_{IN}=28V$ FULL LOAD 20MHz	--	30	50	--	30	50	mV <sub>p-p</sub>
	MIN~MAX $T_c$	--	50	100	--	50	100	
LINE REGULATION	$V_{IN}=16\sim 40V_{DC}$ $+V_O$	--	10	30	--	10	30	mV
	$-V_O$	--	10	30	--	10	30	
LOAD REGULATION	$V_{IN}=28V_{DC}$ $+V_O$	--	10	30	--	10	30	mV
	$-V_O$	--	10	30	--	10	30	
CROSS REGULATION	20%~80%	--	2	5	--	2	5	%
	10%~50%	--	1	2	--	1	2	
INPUT VOLTAGE	CONTINUOUS	16	28	40	16	28	40	V
	50V/50ms	--	--	50	--	--	50	
INPUT CURRENT	NO LOAD	--	20	30	--	20	30	mA
	FULL LOAD	--	230	--	--	230	--	
	INHIBITED	--	3	5	--	3	5	
INPUT RIPPLE CURRENT	$V_{IN}=28V$ FULL LOAD 20MHz	--	20	50	--	20	50	mA <sub>p-p</sub>
EFFICIENCY	$V_{IN}=28V$ FULL LOAD	71	76	--	75	78	--	%
SHORT CIRCUIT POWER DISSIPATION	$V_{IN}=28V$ FULL LOAD	--	0.2	1	--	0.2	1	W
STEP LOAD RESPONSE. TRANSIENT $\pm V_O$	50%~100%~50%	--	$\pm 100$	$\pm 200$	--	$\pm 100$	$\pm 200$	mV
STEP LOAD RESPONSE. TRANSIENT RECOVERY		--	100	200	--	100	200	us
STEP LINE RESPONSE. TRANSIENT $\pm V_O$	16-40-16V <sub>DC</sub>	--	--	$\pm 100$	--	--	$\pm 100$	mV
STEP LINE RESPONSE. TRANSIENT RECOVERY		--	--	200	--	--	200	us
START-UP	DELAY	--	5	10	--	5	10	ms
	FULL LOAD OVERSHOOT	--	--	50	--	--	50	mV <sub>pk</sub>
INSULATION RESISTANCE	$\geq 100M\Omega$ @ 500VDC (INPUT - OUTPUT; ANY PINS TO CASE)							
NOTE:								
1. Using tip and barrel measurement;								
2. Unless otherwise specified, $T_c = 25^\circ C$ $V_{in} = 28V_{DC}$ 100% load.								

**TYPICAL PERFORMANCE CURVES:**



## APPLICATION NOTE:

### ● INHIBIT FUNCTION

The INH pin is used to achieve the function of external shut down. No connection to Pin 5 is necessary for normal operation of the converter. Shut down may be implemented by simply pulling the Pin 5 below 0.3V referenced to input common.

### ● SHORT CIRCUIT PROTECTION

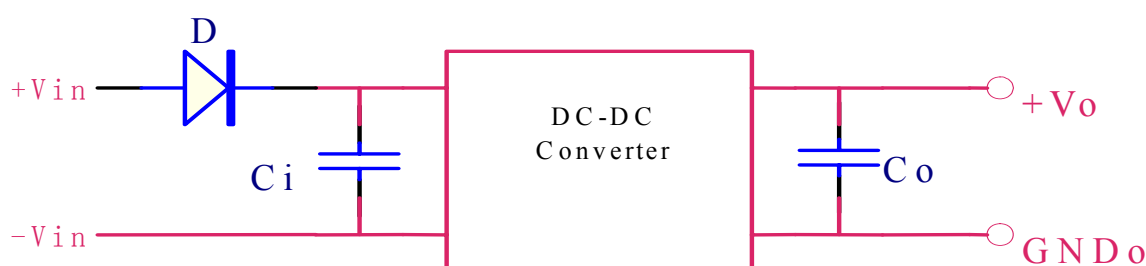
The WKI28XXS/D-5HM series of DC/DC converters has the function of short circuit protection. When it is working under load fault condition, the converter will automatically activate the short circuit protection and restore when the fault is removed.

### ● RIPPLE VOLTAGE

While the output ripple voltage can't satisfy your application, it can still be suppressed by adding a filter capacitor between outputs and GND<sub>o</sub>.

### ● REVERSE POLARITY PROTECTION

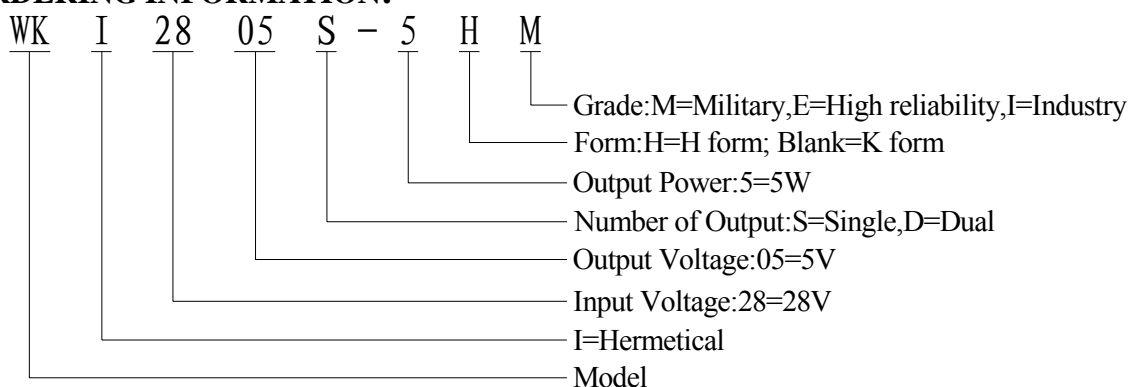
To avoid the input reverse connection, it's advised to connect a diode in series with the input pin of the converter. (Shown as below)



## ENVIRONMENTAL SCREENING:

M/E:				
NUM.	TEST ITEMS	METHODS	REQUEST	CONDITIONS
1	Internal Visual	MIL-STD-883 Method 2017	100%	---
2	Temp-Cycle	MIL-STD-883 Method 1010	100%	-65°C to+ 150°C(M), 10 times -55°C to +125°C(E), 10 times
3	Constant Acceleration	MIL-STD-883 Method 2001	100%	3000g, Y1, 1min
4	Burn-in	MIL-STD-883 Method 1015	100%	Tc +105°C(M)/ +85°C(E), 160h
5	Final Electrical Test	MIL-PRF-38534	100%	-55°C, +25°C, +105°C(M) -40°C, +25°C, +85°C(E)
6	Seal (Fine and Gross)	MIL-STD-883 Method 1014	100%	Fine Leak, Cond. A1 Gross Leak, Cond. C1
7	External Visual	MIL-STD-883 Method 2009	100%	---
I:				
NUM.	TEST ITEMS	METHODS	REQUEST	CONDITIONS
1	Internal Visual	MIL-STD-883 Method 2017	100%	---
2	Burn-in	MIL-STD-883 Method 1015	100%	Tc +85°C 48h
3	Final Electrical Test	MIL-PRF-38534	100%	+25°C
4	External Visual	MIL-STD-883 Method 2009	100%	---

## ORDERING INFORMATION:



**NOTE:** There are two kinds of form (H and K) for customers to choose, please mark it when purchasing.

## MARK SPECIFICATION:

Serials Number: DC 0621 001, which indicates this product has been manufactured in the 21st week of 2006, and the sequence number is 001.

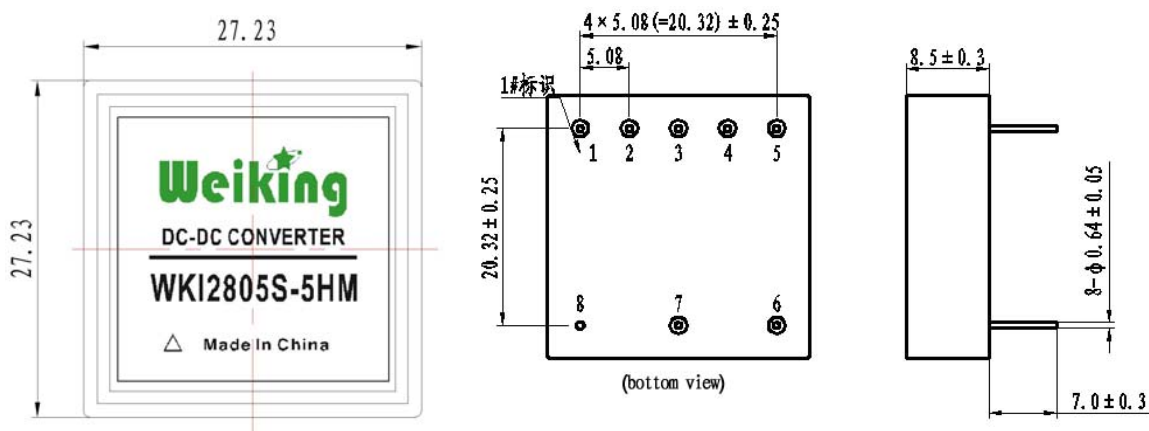
## MECHANICAL SPECIFICATIONS:

Encapsulation: Seam Seal

Shell Material: Cold Rolled Steel

Package style: Two kinds of form (H and K) for customers to choose

### H FORM:



PIN	PIN FUNCTIONS			
	SINGLE		DUAL	
1	POSITIVE OUTPUT	+V <sub>o</sub>	POSITIVE OUTPUT	+V <sub>o</sub>
2	OUTPUT COMMON	GND <sub>o</sub>	OUTPUT COMMON	GND <sub>o</sub>
3	NO CONNECTION	NC	NEGATIVE OUTPUT	-V <sub>o</sub>
4	NO CONNECTION	NC	NO CONNECTION	NC
5	INHIBIT	INH	INHIBIT	INH
6	POSITIVE INPUT	+V <sub>in</sub>	POSITIVE INPUT	+V <sub>in</sub>
7	INPUT COMMON	-V <sub>in</sub>	INPUT COMMON	-V <sub>in</sub>
8	CASE GROUND	CASE	CASE GROUND	CASE