

### FEATURES:

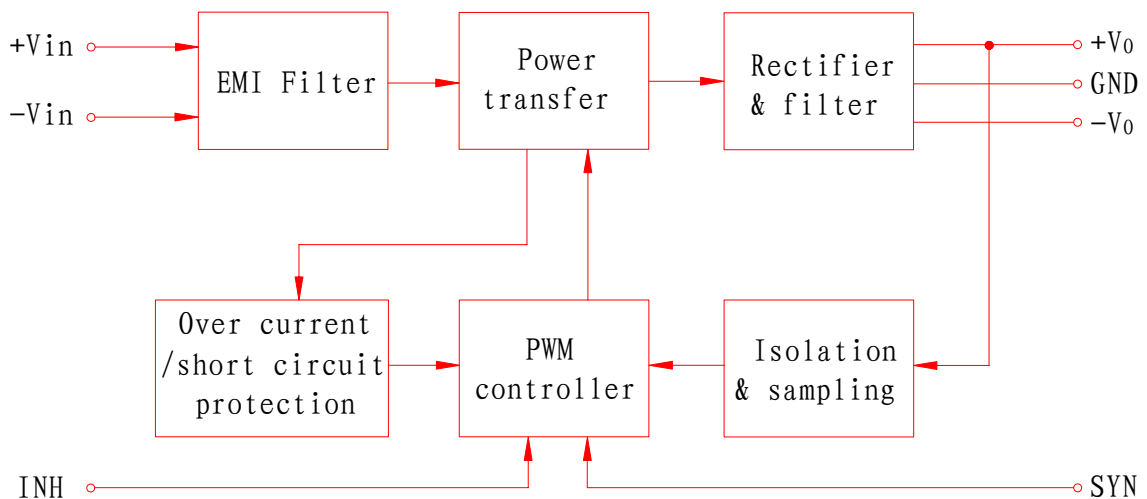
- High reliability, small size
- High power density: 31W/in<sup>3</sup>
- Input Voltage range: 16VDC to 40VDC
- Output Power: 30W
- Inhibit and synchronization functions
- Fully isolated
- In Photoelectric Isolation
- Over current /short circuit protection
- DIP full hermetic-sealed



### DESCRIPTION:

The WKI28XXD-30 dual output series module, which adopts Thick-Film microcircuit technology, is a kind of perfect converter with high reliability necessary for some applications such as aviation, aerospace and military. The output voltages are  $\pm 12V$  or  $\pm 15V$ . The output power is 30W. The switching frequency is fixed at 265 KHz to minimize noise. The input filter circuit is designed to reduce electro-magnetic interference. The typical input voltage is 28V<sub>DC</sub>, and the range from 16 V<sub>DC</sub> to 40V<sub>DC</sub>. The WKI28XXD-30 series also provides some control functions such as synchronization, shut down, and over current protection and short circuit protection.

### BLOCK DIAGRAM:



## ABSOLUTE MAXIMUM RATINGS(M):

Input Voltage: 16V<sub>DC</sub> to 40V<sub>DC</sub>

Output Power: 30W

Storage Temperature range(Tc): -55°C to +125°C

Operating Temperature ( Tc ): -55°C to +105°C(M) -40°C to +85°C(E)

Pin-Solder Temperature (10S): 300°C

## THE ELECTRICAL CHARACTERISTICS:

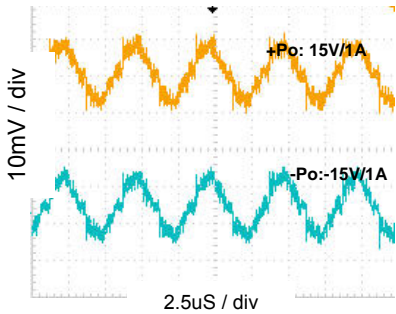
parameter	Conditions <sup>5</sup>	WKI2812D-30			WKI2815D-30			Unit	
		MIN	TYP	MAX	MIN	TYP	MAX		
OUTPUT VOLTAGE	+Vo	11.88	12.00	12.12	14.85	15.00	15.15	V	
	-Vo	11.82	12.00	12.18	14.77	15.00	15.23		
OUTPUT CURRENT	V <sub>IN</sub> =28V <sub>DC</sub> ±Io	0	-	1.25	0	-	1.0	A	
OUTPUT POWER	V <sub>IN</sub> =28V <sub>DC</sub>	0	-	30	0	-	30	W	
Ripple voltage <sup>1</sup>	±Vo 20MHz Tcmin to Tcmax	-	30	80	-	25	80	mV <sub>p-p</sub>	
		-	40	120	-	40	120		
Line Regulation	V <sub>IN</sub> =16V <sub>DC</sub> to 40V <sub>DC</sub>	+Vo	-	10	30	-	10	mV	
		-Vo	-	50	120	-	50		150
	Tcmin to Tcmax	+Vo	-	10	50	-	10		50
		-Vo	-	50	150	-	50		180
Load Regulation	No load to Full	+Vo	-	15	30	-	15	mV	
		-Vo	-	30	120	-	30		150
	Tcmin to Tcmax	+Vo	-	15	50	-	15		50
		-Vo	-	30	180	-	30		180
Cross Regulation	20% to 80% <sup>2</sup>	-	4	8.3	-	3	8	%	
	10% to 50% <sup>3</sup>	-	4	6	-	4	6		
Input voltage	continues	16	28	40	16	28	40	V	
	50V/50ms	0	-	50	0	-	50		
Input current	No load	-	50	75	-	50	75	mA	
	Full load	-	1.34	-	-	1.29	-	A	
	Inhibit	-	3	8	-	3	8	mA	
Ripple current <sup>1</sup>	20MHZ	-	20	50	-	20	50	mA <sub>p-p</sub>	
Efficiency		78	81	-	80	83	-	%	
Short Circuit	Dissipation	-	15	-	-	15	-	W	
	Recovery time	-	1.4	5.0	-	1.4	5.0	ms	
Step Load Response <sup>±Vo</sup>	50% to 100% to 50%	-	±150	±400	-	±200	±400	mV	
Step Load Recovery <sup>4</sup>		-	100	200	-	100	200	us	
Step Line Response <sup>±Vo</sup>	Overshoot	-	±200	±400	-	±400	±500	mV	
	Recovery time <sup>4</sup>	-	-	300	-	-	300	µs	
Start up	delay	-	1.4	5	-	1.4	5	ms	
	Overshoot (full)	-	0	120	-	0	150	mVpk	
	Overshoot (no)	-	120	600	-	150	750		
Insulation Resistance	≥100MΩ@500VDC (input to output, any pins to case)								

### NOTE:

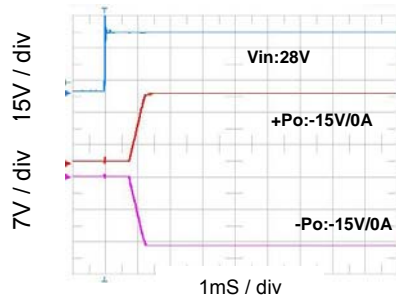
- Using tip and barrel measurement.
- Pout 20%,+Pout 20% to 80%.
- Pout 10%,+Pout 10% to 50%.
- Recovery time is measured from application of the transient to point at which Vout is within 1% of final value.
- Unless otherwise specified, Ta=25°C, 28VDC Vin, 100% load.

## Typical Performance Curves:

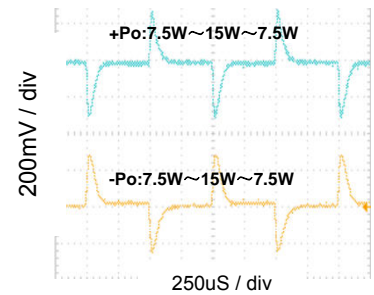
1: (WKI2815D-30) Output ripple voltage



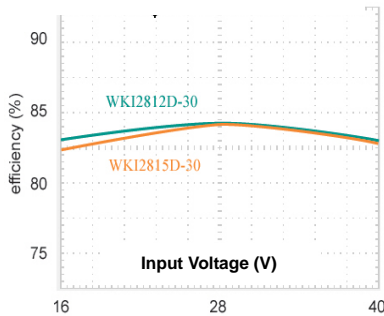
2: WKI2815D-30 Start-Up



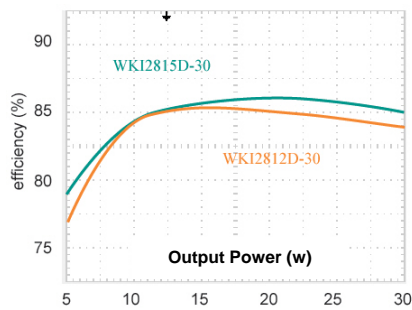
3: WKI2815D-30 Load Step  
50% to 100% to 50%



4: Efficiency vs input voltage



5: Efficiency vs output power



## APPLICATION NOTE:

### Inhibit Function

The INH pin is used to control the on/off inhibit function. No connection to Pin 2 is necessary for normal operation of the converter. Shut down may be implemented by simply pulling the Pin 2 below 0.3V referenced to input common.

### Over Current/Short Circuit Protection

The WKI28XXD-30 series of DC-DC converters feature internal over current/short circuit protection. When it is operating under a load fault condition, the converter will automatically activate the over current/short circuit protection feature and restore the converter to normal operating conditions when the load fault is removed. It is suggested that the duration of the current/short must be less than 10s, and the case temperature lower than 85°C. Otherwise, the module will be disabled.

### Ripple Voltage Suppress

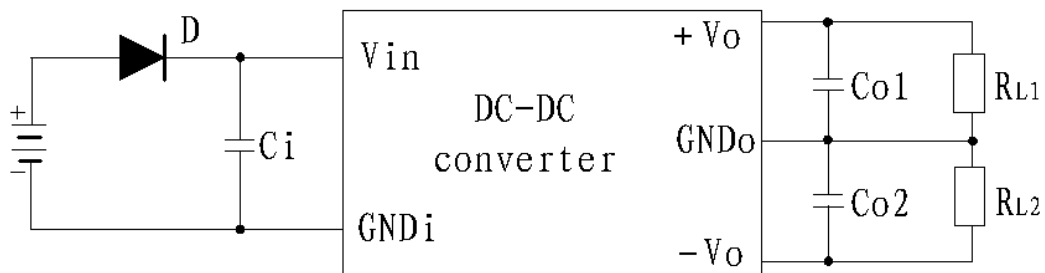
While the output V-ripple can't satisfy your application, it can still be suppressed by adding a filter capacitor between Vo+ and Vo- outputs. The optimal value for this capacitor is recommended at around 50V/ 10 μ F with film or ceramic capacitor as preferable options.

## Synchronization

The WKI28XXD-30 series of DC-DC converters allow the designers to match the switching frequency of the converter to the frequency of an external system clock or synchronize several modules by synchronization pin. Frequency ranges from 200KHz to 350 KHz, the level from -0.3v to 10V, and duty cycle from 40% to 60%. Under master and slave configuration, the master module will deliver  $\pm 3\text{mA}$  current and the slave will deliver  $\pm 0.5\text{mA}$  in maximum.

## Reverse Polarity Protection

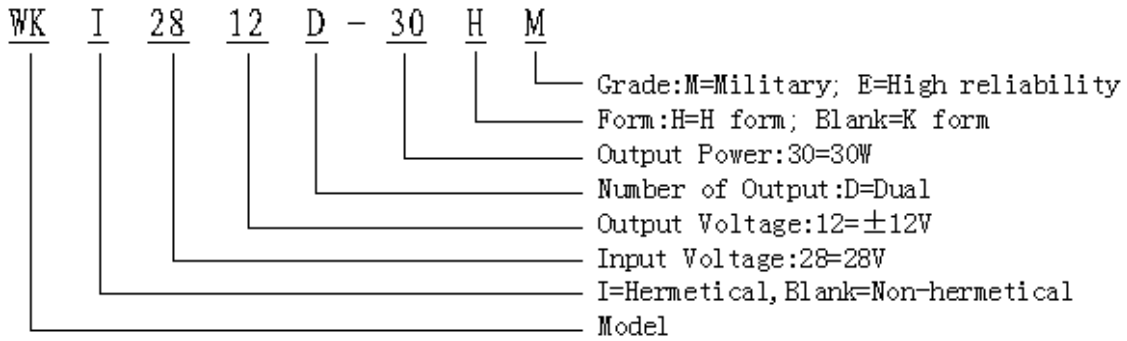
To avoid damage to the converter caused by reverse input connections, it's advised to connect a diode in series with the input pin of the converter. (Shown as below)



## Environmental Screening:

Environmental Screening(M/E)			
Test items	Methods	Request	Condition
PRE-CAP Inspection	MIL-STD-883 Method 2017	100%	---
Temp-Cycle	MIL-STD-883 Method 1010	100%	-55°C to+125°C
Constant Acceleration	MIL-STD-883 Method 2001	100%	3000 g, Y1, 1min
Burn-in	MIL-STD-883 Method 1015	100%	Tc +105°C(M)/ +85°C(E), 160h
Final Electrical Test	MIL-PRF-38534	100%	-55°C, +25°C, +105°C(M) -40°C, +25°C, +85°C(E)
Hermeticity Testing	MIL-STD-883 Method 1014	100%	Fine Leak, Cond. A1 Gross Leak, Cond. C1
Final Visual Inspection	MIL-STD-883 Method 2009	100%	---

**ORDERING INFORMATION:**



Military (M) and high reliability (E) products are hermetically sealed with a Parallel Seam Welding process, there are two Package styles (H and K) for customers to choose, please mark it when purchasing.

**Mark specification:**

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

**Mechanical:**

Volume: 17.9cm<sup>3</sup>

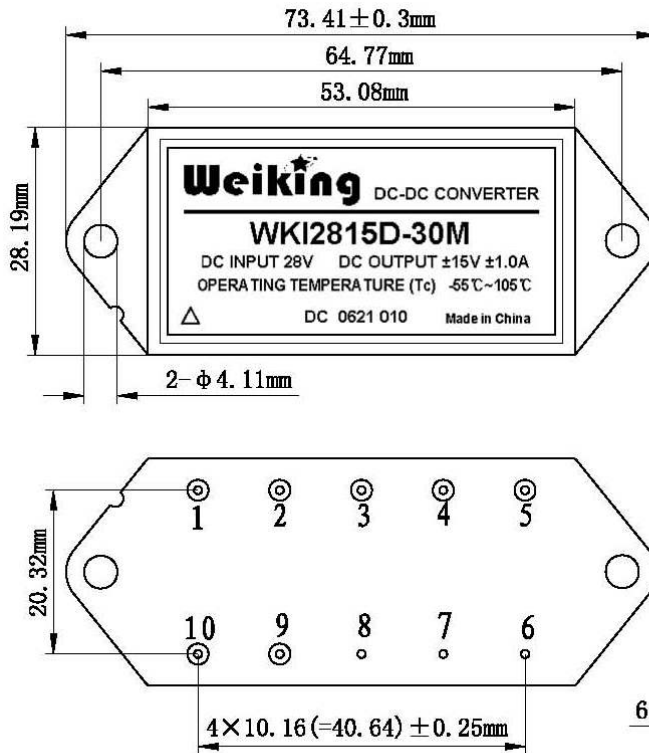
Weight: ≤63g

Encapsulation: Hermetically Sealed Welded Seam

Shell Material: Cold Rolled Steel

Package style: H and K for customers to choose

K Package style (M/E):



PIN FUNCTIONS (M/E)		PIN
POSITIVE INPUT	+Vin	1
INHIBIT	INH	2
POSITIVE OUTPUT	+Vo	3
OUTPUT COMMON	GND <sub>o</sub>	4
NEGATIVE OUTPUT	-Vo	5
CASE GROUND	CASE	6
CASE GROUND	CASE	7
CASE GROUND	CASE	8
SYNC	SYN	9
INPUT COMMON	-Vin	10

TOLERANCE: ±0.2mm

H Package style (M/E):

