FEATURES

- High Reliability, Small Size
- -55 ~ +105°C Operation
- 16V_{DC} ~ 40V_{DC} Permit Input
- 15W Output Power
- Fixed Frequency, 430kHz Typical
- Inhibit Function
- Over Current/Short Circuit Protection
- Optocoupler Feedback
- Hermetic DIP

MODELS OUTPUT VOLTAGE (V_{DC})
TRIPLE 5&±12 5&±15 15&±5

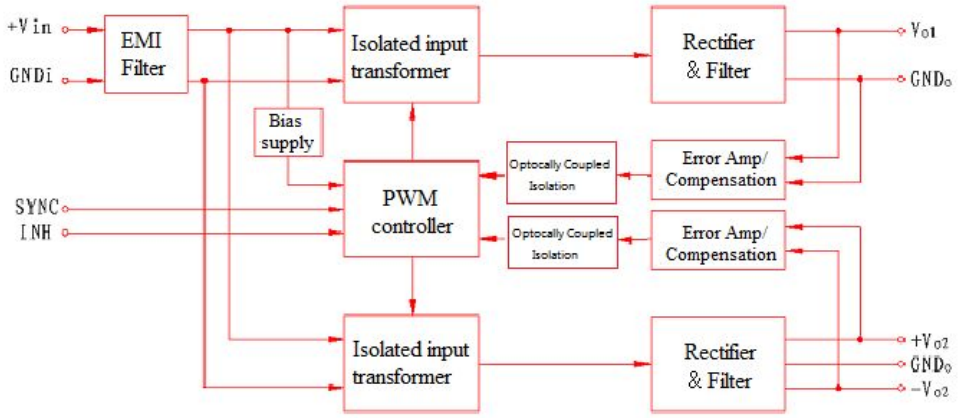
DESCRIPTION

The WK3028***T-15 Series of high-frequency DC/DC converters offers ruggedness, reliability and features required to meet the design challenges of high reliability market. WK3028***T-15 Series utilizes hybrid integration technology and DIP shallow-cavity all-metal hermetic enclosure. This Series provides up to 15 watts output power over the full temperature range of -55 to +105°C with up to 79% efficiency. The WK302851*T-15 Series' small size, low height, and hermetically sealed metal enclosures make them ideal for use in military, aerospace/aviation and other high reliability applications. Units are available with standard screening, and fully compliant with class E/M screening.

The WK302851*T-15 Series converters use a flyback converter design with a constant switching frequency of 430 kHz. They are regulated, isolated units using a pulse width modulated topology and built as high reliability thick-film hybrids. Isolation between input and output circuits is provided with a transformer in the forward power path and an optical link in the feedback control loop. Negative output regulation is maintained by tightly coupled magnetics.

The WK302851*T-15 Series is compatible with Interpoint MHF+ Series.

FUNCTIONAL BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Output Power: 15W

Operating Temp(Tc): -55°C ~ +105°C (M)/-40°C ~ +85°C (E/I)

Storage Temp: -55°C ~ +125°C (M/E/I)

Pin-Solder Temp (10s): 300°C

ELECTRICAL CHARACTERISTICS

PARAMETERS	CONDITIONS[1]		WK3028512T-15			WK3028515T-15			WK3028155T-15			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
OUTPUT VOLTAGE	V_{IN}=28V_{DC}	+V_1	4.90	5.00	5.10	4.90	5.00	5.10	14.85	15.00	15.15	V
		±V_2	11.82	12.00	12.18	14.78	15.00	15.22	4.95	5.00	5.05	
	MIN TO MAX T_C	+V_1	4.84	5.00	5.16	4.84	5.00	5.16	14.60	15.00	15.40	
		±V_2	11.67	12.00	12.33	14.60	15.00	15.40	4.84	5.00	5.16	
OUTPUT CURRENT	V_{IN}=16V_{DC}~40V_{DC}	+V_1	-	-	1.5	-	-	1.5	0	-	0.33	A
		±V_2	-	-	0.32	-	-	0.25	0	-	0.5	
OUTPUT POWER	V_{IN}=28V_{DC}	+V_1	-	-	7.5	-	-	7.5	-	-	5	W
		±V_2	-	-	7.5	-	-	7.5	-	-	5	
OUTPUT RIPPLE VOLTAGE[2]	V_{IN}=28V_{DC}, FULL LOAD 20MHz	+V_1	-	30	50	-	30	50	-	30	50	mV_{P-P}
		±V_2	-	30	80	-	30	80	-	30	50	
	MIN TO MAX T_C	+V_1	-	50	100	-	50	100	-	50	100	
		±V_2	-	50	100	-	50	100	-	50	100	
LINE REGULATION	V_{IN}=16V_{DC}~40V_{DC}	+V_1	-	20	30	-	20	30	-	10	20	mV
		±V_2	-	20	30	-	20	30	-	10	25	
	MIN TO MAX T_C	+V_1	-	20	50	-	20	50	-	30	50	
		±V_2	-	20	50	-	20	50	-	30	50	
LOAD REGULATION	V_{IN}=28V_{DC} NO LOAD TO FULL LOAD	+V_1	-	20	30	-	20	30	-	10	20	
		±V_2	-	20	30	-	20	30	-	10	25	
	MIN TO MAX T_C	+V_1	-	20	50	-	20	50	-	30	50	
		±V_2	-	20	50	-	20	50	-	30	50	
CROSS REGULATION	20%~80%	±V_2	-	2	3	-	2	3	-	2	5	%
	10%~50%		-	2	3	-	2	3	-	1	2	
INPUT VOLTAGE	CONTINUOUS		16	28	40	16	28	40	16	28	40	V
	50V/50ms		-	-	50	-	-	50	-	-	50	
INPUT CURRENT	NO LOAD		-	50	100	-	50	100	-	10	30	mA
	FULL LOAD		-	678	-	-	678	-	-	232	-	
	INHIBITED		-	10	20	-	10	20	-	3	6	
EFFICIENCY	V_{IN}=28V_{DC}, FULL LOAD		75	79	-	75	79	-	73	77	-	%
SHORT CIRCUIT PROTECTION	POWER DISSIPATION		-	3	6	-	3	6	-	0.2	1	W
STEP LOAD RESPONSE	V_{IN}=28V_{DC} 50% ~ 100% ~ 50%	+V_1	-	±200	±400	-	±200	±400	-	±150	±300	mV
		±V_2	-	±200	±350	-	±200	±350	-	±150	±300	
STEP LOAD RESPONSE RECOVERY[3]		+V_1	-	200	300	-	200	300	-	200	300	μs
		±V_2	-	200	300	-	200	300	-	200	300	
START-UP DELAY	V_{IN}=28V_{DC}, FULL LOAD	-	-	10	20	-	10	20	-	5	10	ms
START-UP OVER-SHOOT		+V_1	-	50	100	-	50	100	-	-	50	mV_{pk}
		±V_2	-	50	100	-	50	100	-	-	50	
CAPACITIVE LOAD	V_{IN}=28V_{DC}, FULL LOAD	+V_1	-	-	1000	-	-	1000	-	-	100	μF
		±V_2	-	-	220	-	-	220	-	-	100	
MTBF	GROUND FIXED, Tc=25°C		-	497	-	-	497	-	-	936	-	KHrs
INSULATION RESISTANCE	≥100MΩ@500V_{DC} (INPUT-OUTPUT; INPUT-CASE; OUTPUT-CASE)											
ISOLATION CAPACITANCE	2200pF(INPUT-OUTPUT)											

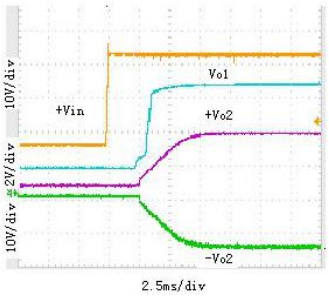
NOTES:

1) Unless otherwise specified, T_C=25°C, Vin=28 V_{DC} , 100% load.
2) Using tip and barrel measurement.
3) Recovery time is measured from application of the transient to point at which V_{OUT} is within 1% of V_{OUT} at final value, transition time > 25μs.

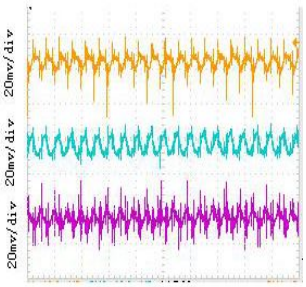
TYPICAL PERFORMANCE CURVES

E.g. WK3028512T-15

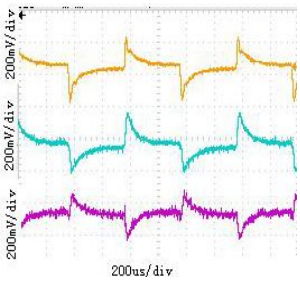
1：Start - Up



2：Output Ripple Voltage (20MHz)

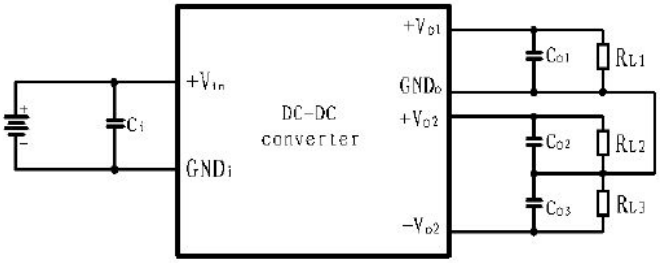


3：Step Load Response (50%~100%)



APPLICATION NOTES

DC/DC Converter Typical Connection Shown as Below



Inhibit Function

The INH pin can be used as an external shut down for applications requiring on/off operation.

·A logic pulled low (0 to 0.3V) on INH pin disables the converter.

·No connection on INH pin enables the converter.

Over Current/Short Circuit Protection

The WK3028***T-15 series of DC/DC converters has over current/short circuit protection. When it is working under load fault condition, the converter will automatically activate the over current/short circuit protection and restore when the fault is removed.

Ripple Voltage Suppress

Use tip and barrel measurement test the output ripple voltage on the condition of 20MHz bandwidth constraints.

If the output voltage ripple can't be satisfied in your application, it can be improved by adding capacitors between the output Vo+ and Vo- pins. The recommended capacitors are film capacitors or ceramic capacitors. Large capacitance can be accomplished by connecting several capacitors in parallel.

Synchronization (Sync)

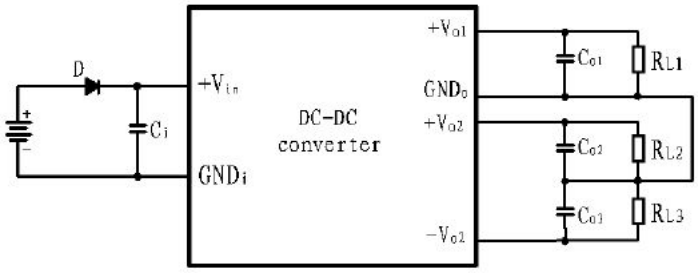
A synchronization feature is include with the WK3028***T-15 series that allows the user to match the switching frequency of the converter to the frequency of the system clock.

The external synchronization feature allows the user to adjust the nominal frequency within the range of

900 KHz to 1 MHz, at a level from 4.5 V to 5.5V. The synchronization pulse width should be between 15ns and 150ns. The sync pin should be unconnected when not in use.

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)



NOTES:

1) Please properly connect pins of power module to PCB following instructions of part's specification.
2) To prevent pins of power module from being stressed to cause glass insulators cracked and power module leaked, please install power module with fixed flanges or screws prior to soldering pins of power module.
3) The bottom of power module should be tightly fitted to heat sink. If necessary, thermal washers and shockproof gaskets can be employed.
4) In any case, bending of pins should be avoided to keep glass insulators from cracking and loss of hermeticity.

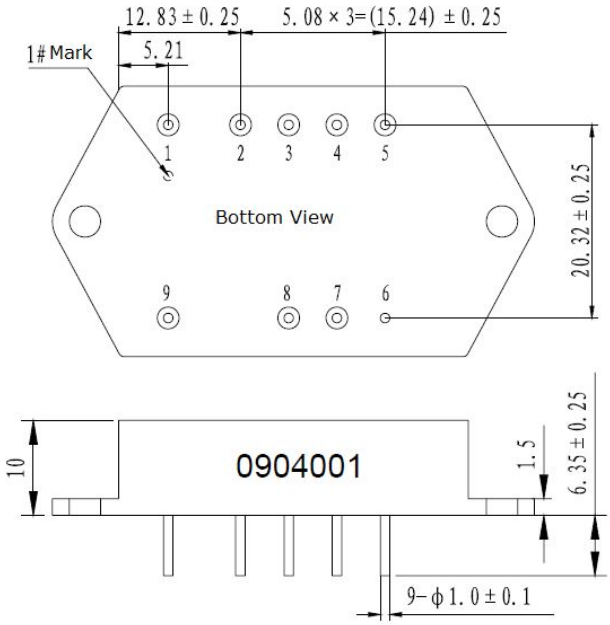
ENVIRONMENTAL SCREENING

NO.	TEST/INSPECTION ITEMS	METHODS	CONDITIONS	REQUIREMENTS		
				CLASS M	CLASS E	CLASS I
1	INTERNAL INSPECTION	MIL-STD-883 METHOD 2017	-	100%	100%	100%
2	HIGH TEMPERATURE STORAGE	MIL-STD-810.3	125°C,48h	100%	-	-
3	TEMP-CYCLE	MIL-STD-883 METHOD 1010	CONDITION B	100%	100%	-
4	CONSTANT ACCELERATION	MIL-STD-202 METHOD 212	Y1, 3000g, 1min	100%	100%	-
5	INTERMEDIATE ELECTRICAL TEST	DETAILED PRODUCT SPECIFICATION	AMBIENT TEMPERATURE	100%	100%	-
6	BURN-IN	DETAILED PRODUCT SPECIFICATION	MAX OPERATING TEMP, 160h	100%	-	-
			MAX OPERATING TEMP, 96h	-	100%	-
			MAX OPERATING TEMP, 48h	-	-	100%
7	FINAL ELECTRICAL TEST	DETAILED PRODUCT SPECIFICATION	AMBIENT TEMPERATURE	100%	100%	100%
			MIN OPERATING TEMP	100%	100%	100%
			MAX OPERATING TEMP	100%	100%	100%
8	SEAL	MIL-STD-883 METHOD 1014	CONDITION A1	100%	100%	-
		MIL-STD-883 METHOD 1014	CONDITION C1	100%	100%	100%
9	EXTERNAL INSPECTION	MIL-STD-883 METHOD 2009	-	100%	100%	100%

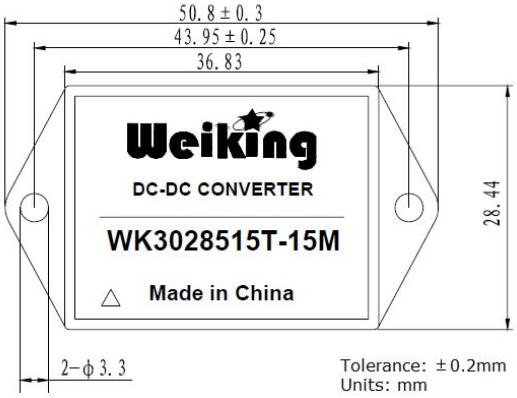
MECHANICAL SPECIFICATIONS

Weight: ≤40g Case Style：H (without flange) and K (with flange) Case Material: 10# Steel

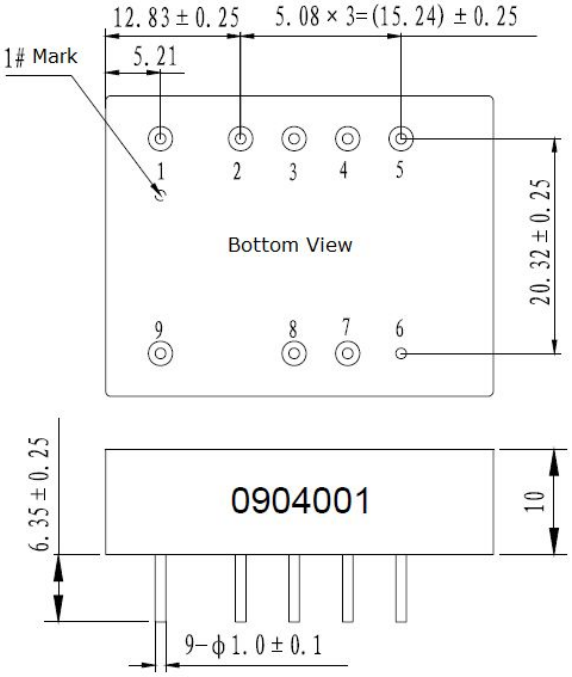
K Style (e.g. WK3028515T-15M)



PIN	PIN FUNCTIONS	
1	INH	INHBIT
2	+Vo1	OUTPUT 1+
3	GNDo	OUTPUT COMMON
4	+Vo2	OUTPUT 2+
5	-Vo2	OUTPUT 2-
6	CASE	CASE GROUND
7	SYNC	SYNC
8	GNDi	INPUT COMMON
9	+Vin	INPUT +



H Style (e.g. WK3028515T-15HM)



ORDERING GUIDE

WK 30 28 5 15 T - 15 H M

- M: Grade: M=Military; E=High reliability; I=Standard
- H: Style: H=H-Style; Blank= K-Style
- 15: Output power: 15=15W
- T: Number of output: T=Triple
- 15: Auxiliary output voltage: 5=±5V;12=±12V; 15=±15V
- 5: Main output voltage: 5=5V; 15=15V
- 28: Nominal input voltage: 28=28V
- 30: Serials number
- WK: Company ID

MARKING SPECIFICATION

Production Number: 0904 001, for example, indicates this product has been manufactured in the 4th week of 2009, and the serial number is 001.