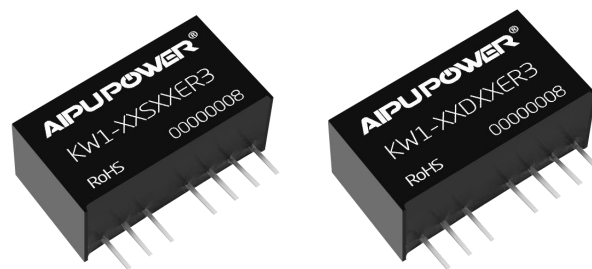


Typical Features

- ◆ Wide input voltage range, output power 1W
- ◆ Efficiency up to 82% (Typ.)
- ◆ With ON/OFF Control function
- ◆ Continuous short circuit protection, self-recovery
- ◆ Input under voltage & output over current protections
- ◆ Isolation voltage 1500VDC
- ◆ Operating temperature from -40℃ to +105℃
- ◆ Plastic case, flame class UL94-V0



Application Field

This series of products can be widely used in the fields of instrument, communication, pure digital circuit, general low frequency analog circuit, relay drive circuit, data exchange circuit, etc.

Typical Product List

Certificate	Part No.	Input Voltage Range		Output Voltage/Current (Vo/Io)		Input Current (mA) Typ. @nominal volt.		Max Capacitive Load	Efficiency (%) @full load nominal volt.	
		Nominal (VDC)	Range (VDC)	Vo (VDC)	Io (mA)	Full Load	No Load	(uF)	Min	Typ.
-	KW1-05S3V3ER3	5	4.5 - 9.0	3.3	303	281	10	1800	69	71
-	KW1-05S05ER3			5	200	264	6	1000	70	74
-	KW1-05S09ER3			9	111	264	6	680	73	77
-	KW1-05S12ER3			12	83	264	6	330	73	77
-	KW1-05S15ER3			15	67	264	8	220	73	77
-	KW1-05S24ER3			24	42	264	8	100	74	77
-	*KW1-05D3V3ER3			±3.3	±151	281	10	1800	69	71
-	KW1-05D05ER3			±5	±100	270	6	470	70	74
-	KW1-05D09ER3			±9	±55	270	6	330	73	77
-	KW1-05D12ER3			±12	±42	270	6	100	73	77
-	KW1-05D15ER3			±15	±34	270	8	100	74	77
-	*KW1-05D24ER3			±24	±21	263	8	100	72	76
-	KW1-24S3V3ER3	24	9 - 36	3.3	303	56	4	2200	73	75
-	KW1-24S05ER3			5	200	53	4	2200	77	79
-	KW1-24S06ER3			6	167	53	4	2200	77	79
-	KW1-24S09ER3			9	111	52	4	1000	78	80
-	KW1-24S12ER3			12	84	51	4	680	80	82
-	KW1-24S15ER3			15	67	52	5	470	78	80
-	KW1-24S18ER3			18	56	53	5	470	78	80
-	KW1-24S24ER3			24	42	53	5	100	78	80

-	KW1-24D3V3ER3	24	9 - 36	±3.3	±151	56	4	1000	73	75
-	KW1-24D05ER3			±5	±100	53	4	1000	77	79
-	KW1-24D09ER3			±9	±57	52	4	680	78	80
-	KW1-24D12ER3			±12	±42	51	4	470	80	82
-	KW1-24D15ER3			±15	±33	52	5	330	78	80
-	KW1-24D24ER3			±24	±21	53	5	100	78	80
-	KW1-48S3V3ER3	48	18 - 75	3.3	303	27	5	2200	74	76
-	KW1-48S05ER3			5	200	26	5	2200	78	80
-	KW1-48S09ER3			9	111	26	5	1000	78	80
-	KW1-48S12ER3			12	84	26	5	680	79	81
-	KW1-48S15ER3			15	67	26	5	470	79	81
-	KW1-48S24ER3			24	42	26	5	100	78	80
-	KW1-48D3V3ER3			±3.3	±151	27	5	1000	74	76
-	KW1-48D05ER3			±5	±100	26	5	1000	78	80
-	KW1-48D09ER3			±9	±57	26	5	680	78	80
-	KW1-48D12ER3			±12	±42	26	5	470	79	81
-	KW1-48D15ER3			±15	±33	26	5	330	79	81
-	KW1-48D24ER3			±24	±21	26	5	100	78	80

Note 1: The maximum capacitive load is the capacitance allowed to be used when the power supply starts up at full load. The converter may not start if the capacitor exceeds this value.

Note 2: The efficiency is tested at the nominal input voltage and the rated load.

Note 3: The * marked parts have been developed in process.

Note 4: Please contact Aipu sales for other output voltages requirements of this series but not listed in this table.

Input Specifications

Item	Test Condition	Min.	Typ.	Max.	Unit
Input inrush voltage (1Sec max.)	4.5 - 9V input	-0.7	-	12	VDC
	9 - 36V input	-0.7	-	50	
	18 - 75V input	-0.7	-	100	
Start-up voltage	4.5 - 9V input	-	3.6	4.5	VDC
	9 - 36V input	-	8	9	
	18 - 75V input	-	16	18	
ON/OFF Control (Ctrl)	Ctrl terminal No connection or connected to high level to turn ON the converter	3.5	-	50	VDC
	Ctrl terminal connected to low level or the input GND to turn OFF the converter	0	-	1.2	
No load power consumption	0.3W Max.				
Input filter	Capacitor Filter				
Hot plug	Unavailable				

Output Specifications

Item	Test Condition		Min.	Typ.	Max.	Unit
Output voltage accuracy	Full input voltage range, 10%-100% load	Positive output	-	-	±2	%
		Negative output	-	-	±3	
	Full input voltage range, with NO load	Positive output	-	-	±3	%
		Negative output	-	-	±5	
Line voltage regulation	100% load, full input voltage range	Positive output	-	-	±0.5	%
		Negative output	-	-	±1	
Load regulation	10% - 100% load	Positive output	-	-	±1	%
		Negative output	-	-	±1.5	
Cross regulation	Dual output, +Vo with 50% load, -Vo with 25%-100% load		-	-	±5	%
Transient response deviation	25% load change step, nominal input voltage	3.3 & 5V output	-	±5	±8	%
		Others	-	±3	±5	
Transient recovery time	25% load change step, nominal input voltage		-	300	500	μS
Temperature drift coefficient	100% load		-	-	±0.03	%/°C
Ripple & Noise	5%-100% load, 20MHz bandwidth		-	50	100	mVp-p
Over current protection	Full input voltage range		350	-	600	%Io
Short circuit protection	Continuous protection, self-recovery					

Note: The Ripple & Noise is tested by the Twisted Pair Method, please refer to the following test instruction.

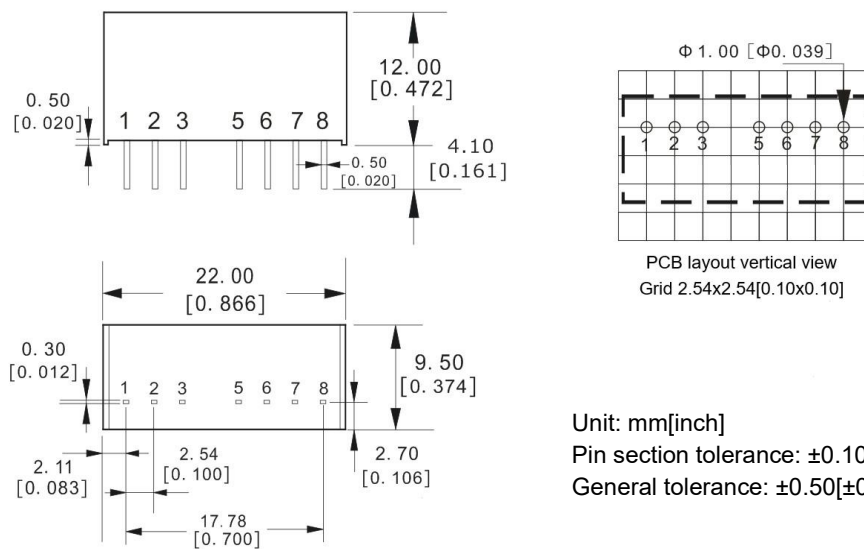
General Specifications

Item	Test Condition		Min.	Typ.	Max.	Unit
Switching frequency	Nominal input voltage, full load		-	260	-	KHz
Operating temperature	Refer to the Temperature Derating Graph		-40	-	+105	°C
Storage temperature			-55	-	+125	°C
Case temperature rise	Within the operation derating range		-	30°	-	°C
Pin soldering temperature	1.5mm from the case, soldering time 10S		-	-	300	°C
Relative humidity	No condensing		5	-	95	%RH
Isolation voltage	I/P-O/P, test 1 minute, leakage current <1mA		1500	-	-	VDC
Insulation resistance	I/P-O/P, @ 500VDC		1000	-	-	MΩ
Isolation capacitance	I/P-O/P, 100KHz/0.1V		-	50	-	pF
MTBF	MIL-HDBK-217F@25°C		1000	-	-	K hours
Vibration	10-150Hz, 5G, 30 Min. along X, Y and Z					
Case material	Plastic in Black, flame class UL94-V0					
Unit weight	4.5g (Typ.)					
Cooling method	Natural air					
Packing	Tube size (525x12.5x20mm)		22PCS/Tube			
	Carton size (542x110x155mm)		1232PCS/Carton (Total 56 Tubes)			
Unit dimensions	L x W x H	22.00× 9.50 × 12.00 mm		0.866 × 0.374 × 0.472 inch		

EMC Performance

Item		Test Standard	Performance/Class
EMI	CE	CISPR32/EN55032	Class B (with the Recommended EMC circuit part ②)
	RE	CISPR32/EN55032	Class B (with the Recommended EMC circuit part ②)
EMS	ESD	IEC/EN61000-4-2	Contact ±4kV perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m perf. Criteria A
	EFT	IEC/EN61000-4-4	±2kV perf. Criteria B (with the Recommended EMC circuit part ①)
	Surge	IEC/EN61000-4-5	±2kV perf. Criteria B (with the Recommended EMC circuit part ①)
	CS	IEC/EN61000-4-6	3 Vr.m.s perf. Criteria A

Mechanical Dimensions



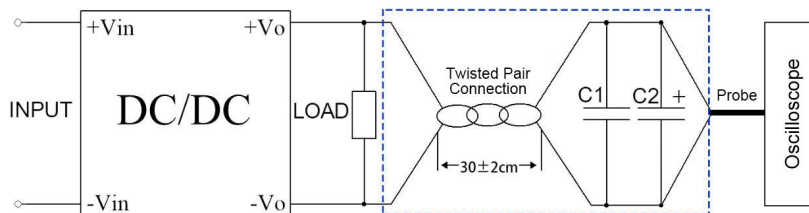
Pin-out Function Description

Pin No.	1	2	3	4	5	6	7	8
Single (S)	GND	+Vin	Ctrl	NP	NC	+Vo	-Vo	CS
Dual (D)	GND	+Vin	Ctrl	NP	NC	+Vo	0V	-Vo

Note 1: NC means No Connection, NP means No Pin, CS refers to the following application instruction.

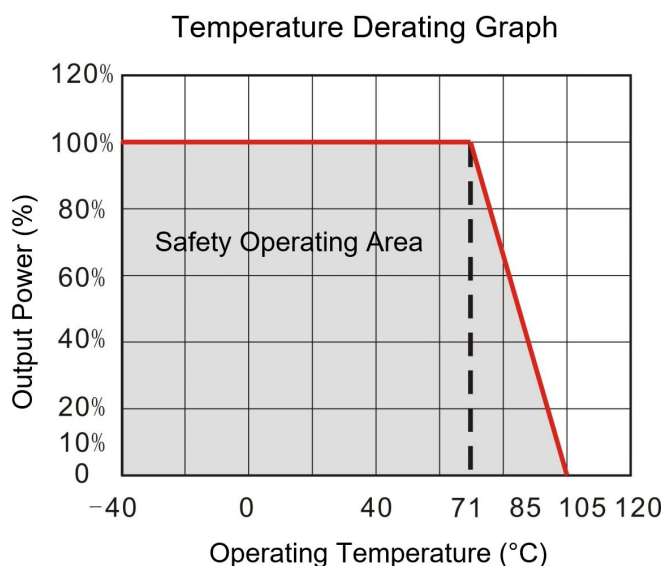
Note 2: Please take the pin definition on the product label as the right one if it is different than the data sheet description.

Ripple & Noise Test Instruction (Twisted Pair Method, 20MHz bandwidth)



1. The Ripple & noise test needs 12# twisted pair cables, an oscilloscope which should be set at the Sample Mode, bandwidth 20MHz. 100M bandwidth probe with cap and ground removed. C1(0.1uF) polypropylene capacitor and C2(10uF) high-frequency low-resistance electrolytic capacitor are connected in parallel with the probes and one side of the twisted pair.
2. Refer to the test diagram, the converter output connects to the electronic load by the jig with cables which size should be defined according to the output current value. The other side of the twisted pair (length 30cm±2 cm) should be connected in parallel with the load. The test can start after the input power on.
3. It is recommended to connect a ≥5% load or a high-frequency low resistance electrolytic capacitor (≥100uF) load to the output to avoid the output ripple increasing.

Product Characteristics Graph



Recommended Circuits for Application

1. CS Terminal

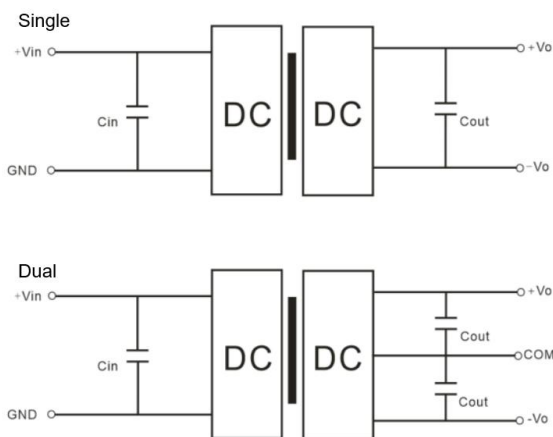
This terminal has connected with the converter internal main filter capacitor (positive). It is recommended to use a low ESR capacitor ($\leq 47\mu\text{F}$) between CS and Pin 7 (negative) to improve the output Ripple and Noise performance.

2. Requirement for the output load

The maximum capacitive load is tested at rated full load. The converter may not start or be damaged at the capacitive over-load.

3. Typical application circuits

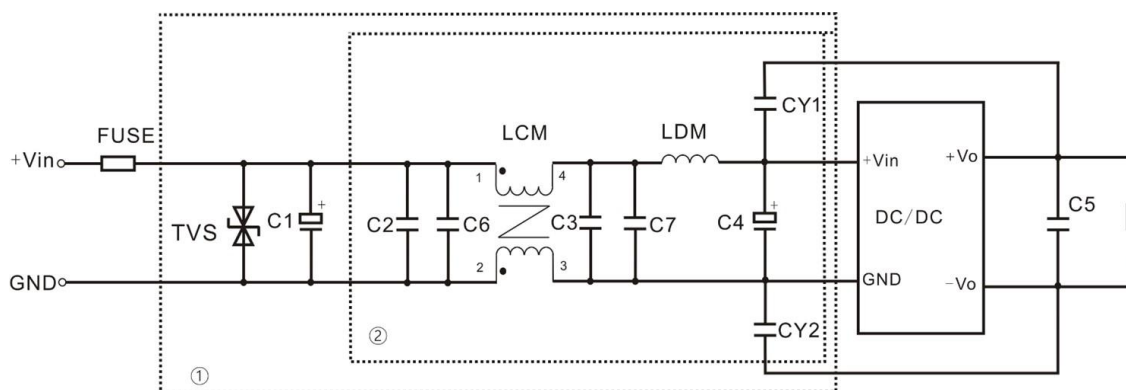
To ensure effectively decrease the input and output ripple and noise, a capacitor filter can be connected at the input and output, the application circuits are shown below. The suitable filtering capacitors should be chosen as the recommended capacitive load values in Table 1. The converter could not start if the capacitance is too big.



Recommended Capacitive Load Values (Table 1)

Vin (Vdc)	Cin	Single Vout (Vdc)	Cout	Dual Vout (Vdc)	Cout
5	10uF/16V	3.3	10uF/16V	±3.3	4.7uF/16V
24	4.7uF/50V	5 & 6	10uF/16V	±5	4.7uF/16V
48	1uF/100V	9	2.2uF/25V	±9	1uF/25V
-	-	12	2.2uF/25V	±12	1uF/25V
-	-	15	2.2uF/25V	±15	1uF/25V
-	-	18 & 24	1uF/50V	±24	0.47uF/50V

4. Recommended EMC circuit diagram

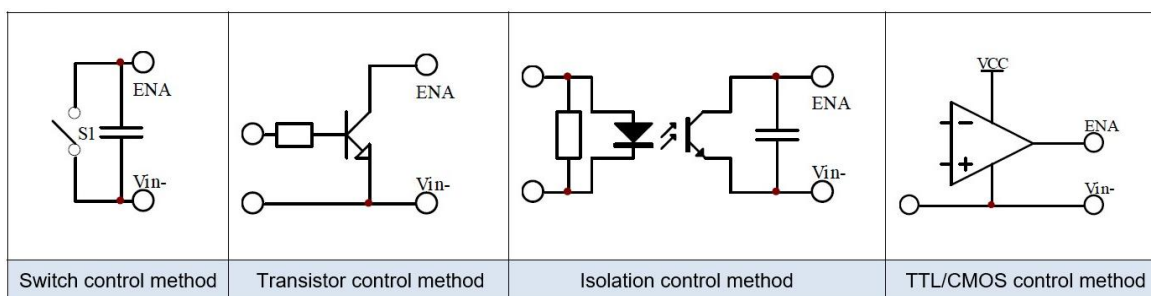


Note: The part ① circuit is for EMS test, part ② for EMI filtering, both can be adjusted according to the actual situation.

	5V input	24V input	48V input
FUSE	TBD by the actual input current		
TVS	SMCJ12CA	SMCJ40CA	SMCJ80CA
C1	1000uF/50V	1000uF/50V	680uF/100V
C2/C3	10uF/50V	4.7uF/50V	4.7uF/100V
C6/C7	470nF/50V	470nF/50V	470nF/100V
C4	330uF/25V	100uF/50V	100uF/100V
C5	22uF/50V	22uF/50V	22uF/50V
LCM	1.5mH	2.2mH	2.2mH
LDM	2.2uH	4.7uH	6.8uH
CY1/CY2	1nF/2KV	1nF/2KV	1nF/2KV

5. ON/OFF Control (Ctrl Terminal)

It is Positive logic control, the converter is turned ON when the Ctrl terminal is connected to high voltage level or no connection, it will be turned OFF when the Ctrl terminal is connected to GND or low voltage level.



Application Notice

1. This series of products cannot parallelly operate to increase the output power, and do not support hot-plug.
2. The product should be used according to the specifications, otherwise it could be permanently damaged.
3. The product performance cannot be guaranteed if it works at a lower load than the minimum load defined.
4. The product performance cannot be guaranteed if it works under the over-load condition.
5. Unless otherwise specified, all values or indicators on this datasheet are tested at $T_a=25^{\circ}\text{C}$, humidity<75%RH, nominal input voltage and rated load (pure resistance load).
6. All values or indicators on this datasheet have been tested based on Aipupower test specifications.
7. The specifications are specially for the parts listed on this datasheet, any other non-standard model performances could be out of the specifications. Please contact our technician for specific requirements.
8. Aipupower can provide customization service.

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