Typical Features

- ◆Ultra Wide Input Voltage Range (4:1), Output Power 1W
- ◆High Efficiency up to 82%
- ◆With remote control Switch-off function
- ◆Continuous Short Circuit protection, Self-recovery
- ◆Input under voltage, output over current protection
- ◆Isolation Voltage 1500VDC
- ◆Operating Temperature: -40℃～+85℃
- ◆Plastic Case, meet UL94 V-0 standard

Test Condition: Unless otherwise specified, data in the datasheet should be tested under the conditions of inputting nominal voltage, pure resistance rated load and Ta=25℃

Application Field

It could be widely used for instrument, communication, pure digital circuit, general low frequency analog circuit, relay drive circuit, data exchange circuit, etc.

Typical Product List

Part No.	Input Voltage Range (VDC)		Output Voltage/Current (Vo/Io)		Input Current(mA) Nominal Voltage		Max. Capacitive Load	Ripple & Noise (Max.)	Efficiency (%)@output full load, input nominal voltage	
	Nominal	Range	Voltage (VDC)	Current(mA) MAX.	Full load Typ.	No Load Typ.	uF	mVp-p	Min.	Typ.
KW1-24S3V3ER3	24	9 - 36	3.3	303	56	3	2200	100	73	75
KW1-24S05ER3			5	200	53	3	2200	100	77	79
KW1-24S09ER3			9	111	50	4	1000	100	78	80
KW1-24S12ER3			12	83	50	4	680	100	80	82
KW1-24S15ER3			15	67	51	5	470	100	78	80
KW1-24S24ER3			24	42	49	5	100	100	80	82
KW1-24D05ER3	24	9 - 36	±5	±100	53	3	1000	100	77	79
KW1-24D09ER3			±9	±56	50	3	680	100	78	80
KW1-24D12ER3			±12	±42	50	4	470	100	80	82
KW1-24D15ER3			±15	±33	51	5	330	100	78	80

Note 1. The ripple & noise test method uses the twisted pair method.
Note 2. The capacitive load of the positive and negative outputs is the same.

Input Specifications

Item	Test Condition	Min.	Typ.	Max.	Unit
Max Input Overshoot Voltage	9-36V Input	-0.7	-	50	VDC
Turn-on Voltage	9-36V Input	7	8.3	9	VDC
Control Pin (Ctrl)	High level or floating enable, with output	3.5	-	50	VDC
	Low level or connected to input ground, no output	0	-	1.2	

Stand-by Power Consumption	As low as 0.12W
Input Filter	Capacitor Filter
Hot Plug	Unavailable
Note: Voltage of control pin(Ctrl) is related to input GND.	

Output Specifications

Positive Output Voltage Accuracy	Full voltage full load	+Vo	≤±2.0%
Negative Output Voltage Accuracy		-Vo	≤±3.0%
No Load Output Voltage Accuracy		Vo	Primary Output:≤±3.0%, Secondary Output:≤±5.0%
Line Regulation	Nominal load, full voltage range	Vo	Primary Output:≤±0.2%, Secondary Output:≤±0.5%
Load Regulation	10% ~ 100% rated load	Vo	Primary Output:≤±0.5%, Secondary Output:≤±3%
Cross Regulation	Dual output, Primary output 50% load, secondary output 25%-100% load		≤±5.0%
Ripple & Noise	Nominal load, nominal voltage		≤100mVp-p （20MHz bandwidth）
Temperature Drift Coefficient	100％ full load		±0.03%/℃
Dynamic Response	25% nominal load step change	△Vo/△t	≤±5.0%/0.5ms(Typ.)
Output Short Circuit Protection	Continuous, Self-recovery		
Note: * Ripple & noise test adopts twisted pair method, see the design and application circuit reference for details.			

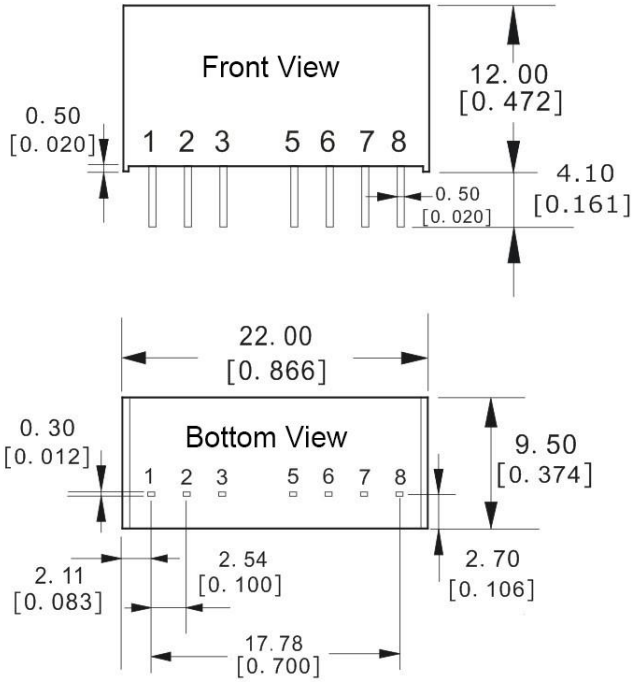
General Specifications

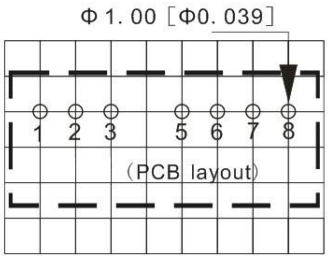
Item	Test Condition	Min.	Typ.	Max.	Unit
Switching Frequency	Nominal input voltage full load		330		KHz
Operating Temperature	Refer to Temperature Derating Curve	-40	--	+85	℃
Storage Temperature		-55	--	+125	
Case temperature rise during	Ta=25℃	--	25	--	
Pin withstand welding temp	Distance to case 1.5mm, 10s	--	--	300	
Relative Humidity	No condensing	5	--	95	%RH
Isolation Voltage	Input-output, test time 1 minute, leakage current less than 1mA	1500			VDC
Insulation resistance	Input-output, insulation voltage 500VDC	1000			MΩ
Isolation capacitor	Input/output, 100KHz/0.1V		20		pF
Vibration		10-150Hz, 5G, 30 Min. along X, Y and Z			
MTBF	MIL-HDBK-217F@25℃	1000			K hours
Case Material	Black flame-retardant heat-resistant plastic(UL94 V-0)				
Weight	4.5g (Typ.)				
Cooling Method	Natural air cooling				
Packing Method	Tube(225*20.5*12.5mm)	9PCS			
	Inner Box(245*155*85mm)	432PCS (Total 48 tubes)			
Package Dimension	L x W x H	22*9.5*12 mm		0.866*0.374*0.472 inch	

EMC Characteristics

EMI	CE	CISPR32/EN55032 CLASS B (EMC Recommended Circuit)
	RE	CISPR32/EN55032 CLASS B (EMC Recommended Circuit)
EMS	ESD	IEC/EN61000-4-2 Air±8kV,Contact±6kV perf.Criteria B
	RS	IEC/EN61000-4-3 10V/m perf. CriteriaA
	EFT	IEC/EN61000-4-4 ±2kV perf. CriteriaB
	Surge	IEC/EN61000-4-5 line to line ±2kV perf. CriteriaB
	CS	IEC/EN61000-4-6 3 Vr.m.s perf. CriteriaA

Packing Dimension





TOP View (PCB layout)

Unit: mm [inch]
Lattic spacing: 2.54*2.54mm
Unmarked section tolerance ±0.10 [±0.004]
Unmarked tolerance ±0.50 [±0.020]

Pin Function

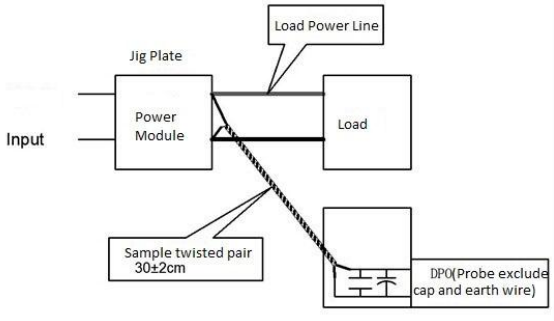
Pin-Out	1	2	3	4	5	6	7	8
Single(S)	GND	+Vin	Ctrl	NP	NC	+Vo	0V	CS
Dual(D)	GND	+Vin	Ctrl	NP	NC	+Vo	0V	-Vo

Note: if the definition of pin is not in accordance with the model selection manual, please refer to the label on actual item.

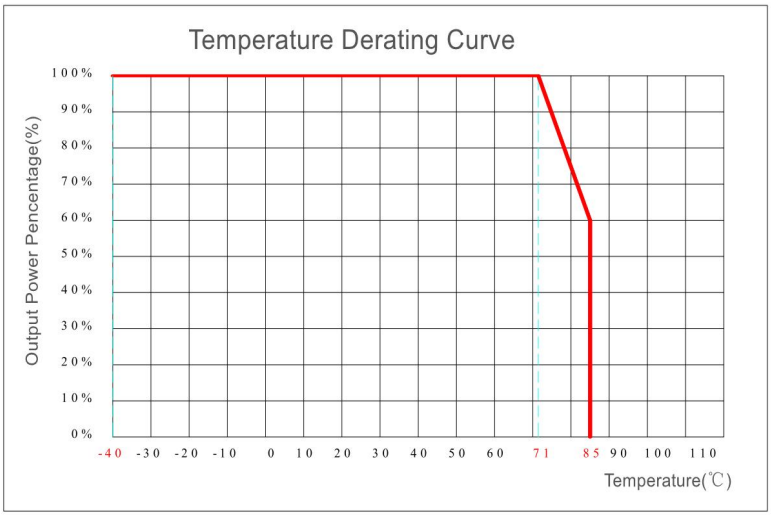
Ripple& Noise Test: (Twisted Pair Method 20MHZ bandwidth)

a.12# twisted pair to connect, Oscilloscope bandwidth set as 20MHz, 100M bandwidth probe, terminated with 0.1uF polypropylene capacitor and 10uF high frequency low resistance electrolytic capacitor in parallel, oscilloscope set as Sample pattern.

b. Input terminal connect to power supply, output terminal connect to electronic load through jig plate, Use 30cm±2 cm sampling line, Power line selected from corresponding diameter wire with insulation according to the flow of output current.



Product Temperature Curve



Design and Application Circuit Recommended

1.CS terminal

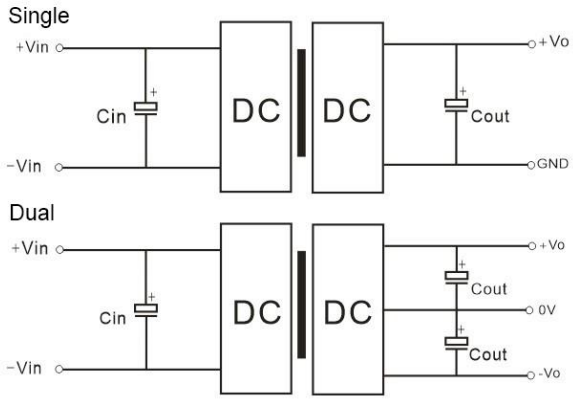
This terminal provides a connection point for connecting the internal main filter capacitor at the output of the DC/DC converter (connected to the positive electrode of the capacitor). By connecting a low ESR capacitor between this terminal and the 7th pin terminal (connected to the negative electrode of the capacitor), the output ripple and noise can be further improved (generally CS ≤47uF).

2. Output Load Request

The maximum capacitive load of the product is obtained from the nominal full load test. It should not be used in excess of the maximum capacitive load at the output end. Otherwise, it may cause startup difficulties and damage the product.

3.Recommended Circuit

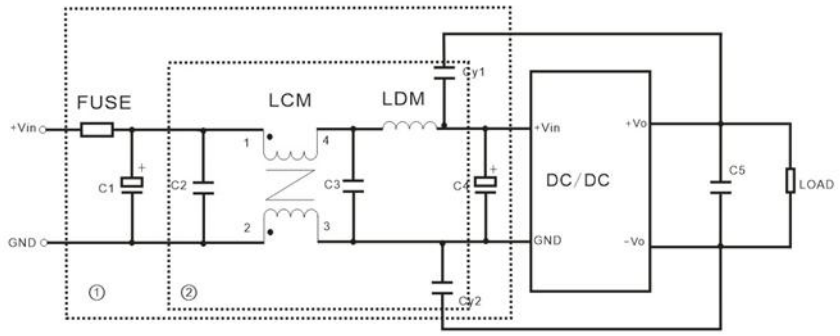
To ensure effective reduction of input and output ripple and noise, a capacitor filter network can be connected to the input and output ends. The application circuit is shown in the figure below; however, a suitable filter capacitor should be selected. If the capacitance is too large, it may affect the startup of the product. To ensure that each output works under safe and reliable conditions, the recommended capacitive load value is detailed in Table 1 below.



Recommended Capacitive Load Value Table (Photo 1)

SingleVout (Vdc)	Cin (μF)	Cout (μF)	Dual Vout (Vdc)	Cin (μF)	Cout (μF)
5/9/12/15	10μF/16V	22μF/25V	±5/9/12/15	10μF/16V	22μF/25V

4.EMC Typical Recommended Circuit

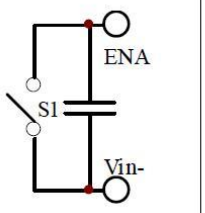
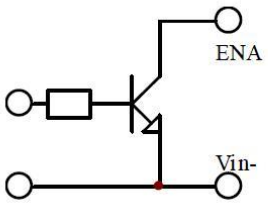
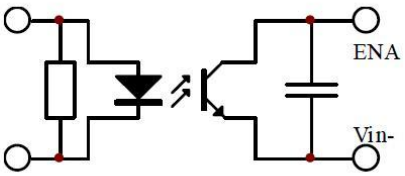
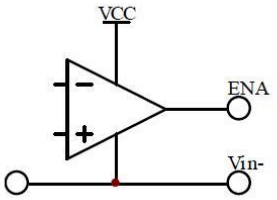


FUSE	Select according to actual input current
C1	1000μF/50V
C2/C3	4.7μF/50V
C4	100μF/50V
C5	22μF/50V
LCM	2.2mH
LDM	6.8μH
CY1/CY2	1nF/3KV

Note: The ① part in the figure is used for EMC testing,
and the ② part is used for EMI filtering, which can be selected according to needs.

5.CTRL Terminal

Positive logic is enabled, the module works normally when the control pin is connected to a high level or suspended, and is turned off when it is grounded or low.

			
on-off mode	Triode control mode	Optical coupler isolation control mode	Logic gate control mode

Note:

1. This product cannot be used in parallel, and do not support hot-plugging;
2. If the product operates below the minimum required load, it cannot be guaranteed that the product performance meets all the performance indicators in this manual;
2. All index testing methods in this datasheet are based on our Company's corporate standards
3. The product specification may be changed at any time without prior notice.

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