

CKW3-16XXE3R3 Series

DC-DC Converter



Typical Features

- ◆ Wide Input Voltage Range (8:1), Output Power 3W
- ◆ Continuous Short Circuit protection, Self-recovery
- ◆ Input under voltage, output short circuit & over current protections
- ◆ Standby power consumption 0.12W Max
- ◆ Isolation Voltage 3000VDC
- ◆ Operating Temperature from -40°C to +105°C
- ◆ Plastic Case, flame class UL94 V-0



Test Condition: Unless otherwise specified, all parameter values had been tested at rated input voltage, pure resistive rated load, and at room temperature 25°C.

Application Field

This series 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 (VDC)		Output Voltage/Current (Vo/Io)		Input Current(mA) Rated Voltage		Max. Capacitive Load	Ripple & Noise (20MHz) Max/Typ.	Efficiency (%) @full load/rated voltage	
		Rated	Range	Vo (VDC)	Io(mA) Max/Min	Full load	No Load	uF	mVp-p	Min	Typ.
-	CKW3-16S05E3R3	12	4.5 - 36	5	600	325	10	1000	100/50	75	77
-	CKW3-16S12E3R3			12	250	320	10	330	100/50	77	79
-	CKW3-16S15E3R3			15	200	320	10	220	100/50	77	79
-	CKW3-16D05E3R3			±5	±300	320	15	470	100/50	74	76
-	CKW3-16D12E3R3			±12	±125	320	15	220	100/50	77	79
-	CKW3-16D15E3R3			±15	±100	320	15	100	100/50	77	79

Note 1 – The input voltage should not be over 36V, or else the converter could be permanently broken.

Note 2 - The efficiency is tested under the condition of rated input voltage and rated full load.

Note 3 – The Ripple & noise is tested by the twisted pair method.

Input Specifications

Item	Operating conditions	Min.	Typ.	Max.	Unit
Input inrush voltage (1Sec. Max)		-0.7	--	50	VDC
Start-up voltage		--	--	4.5	
Under voltage protection		3.5	4	--	
Standby power consumption		--	--	0.12	W
Input Filter	Capacitor Filter				
Hot Plug	Unavailable				

Output Specifications

Output Voltage Accuracy	Full input voltage range, 5%-100% load	Vo	+Vo $\leq \pm 2.0\%$; -Vo $\leq \pm 3.0\%$
	Full input voltage range, No load	Vo	+Vo $\leq \pm 3.0\%$; -Vo $\leq \pm 5.0\%$
Voltage Regulation	Full load, input voltage from low to high	Vo	+Vo $\leq \pm 0.2\%$; -Vo $\leq \pm 0.5\%$
Load Regulation	10% - 100% load	Vo	+Vo $\leq \pm 0.5\%$; -Vo $\leq \pm 3.0\%$
Ripple & Noise	Nominal input voltage, rated load	$\leq 100\text{mVp-p}$ (20MHz bandwidth)	
Temperature Drift Coefficient	100% Load	$\pm 0.03\%/^{\circ}\text{C}$	
Dynamic Response	25% of rated load step	$\Delta \text{Vo}/\Delta \text{t}$	$\leq \pm 5.0\%/0.5 \text{ mS}$ (Typ.)
Over current protection	Full input voltage range	110-300 %Io	
Short Circuit Protection	Continuous, self-recovery		

Note – the Ripple & noise is tested by the twisted pair method, please refer to the following ripple and noise test instruction.

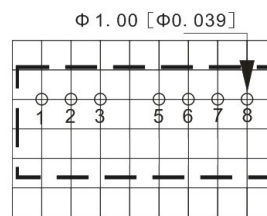
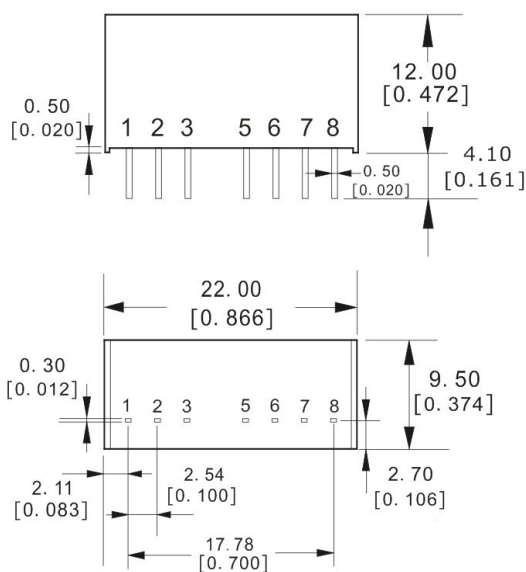
General Specifications

Item	Operating conditions	Min.	Typ.	Max.	Unit
Switching Frequency	Rated input voltage, full load	--	260	--	KHz
Operating Temperature	Please refer to the temperature derating curve	-40	--	105	$^{\circ}\text{C}$
Storage Temperature		-55	--	+125	
Case temperature rise	Operating at Ta =25 $^{\circ}\text{C}$	--	30 $^{\circ}$	--	
Pin Soldering Temperature	1.5mm from the case, 10S	--	--	300	
Relative humidity	No condensation	5	--	95	%RH
Isolation Voltage	Input-Output, test 1min, leakage current<1mA	3000	--	--	VDC
Insulation Resistance	Input-Output, @ 500Vdc	1000	--	--	M Ω
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 $^{\circ}\text{C}$	3500	--	--	K hours
Case Material	Plastic in Black, flame class UL94 V-0				
Unit Weight	4.5 g (Typ.)				
Cooling Method	Natural air				
Packing	Tube size (225x20.5x12.5mm)	9PCS/Tube			
	Carton size (245x155x85mm)	432PCS (Total 48 Tubes)			
Unit Size	L x W x H	22.0×9.5×12.0 mm		0.866×0.374×0.472 inch	

EMC Performance

EMI	CE	CISPR32/EN55032 CLASS B (With recommended EMC circuit)
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EMS	ESD	IEC/EN61000-4-2 Contact±4kV 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

Mechanical Dimensions



PCB layout vertical view
Grid 2.54x2.54[0.10x0.10]

Unit: mm[inch]
Pin section tolerance $\pm 0.10[\pm 0.004]$
General tolerance $\pm 0.50[\pm 0.020]$

Pin Function definition

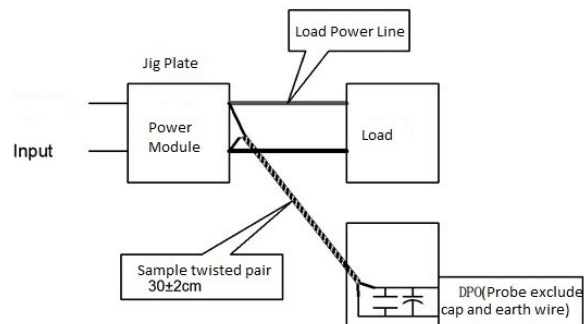
Pin No.	1	2	3	4	5	6	7	8
Single (S)	GND	+Vin	NC	NP	NC	+Vo	0V	NC
Dual (D)	GND	+Vin	NC	NP	NC	+Vo	0V	-Vo

Note - Please take the pin definition on the product label as the right one if it is different than the definition in this data sheet.

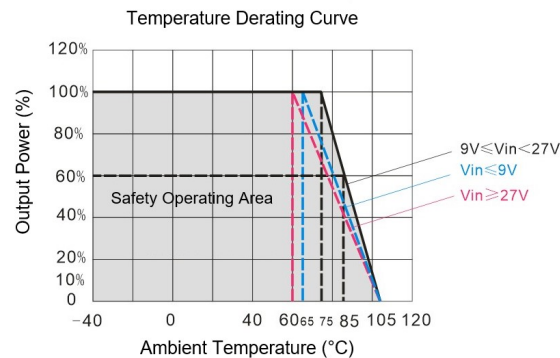
Ripple & Noise Test Instructions (Twisted Pair Method, 20MHz Bandwidth)

1, The Ripple & noise test need 12# twisted pair cables, an oscilloscope which bandwidth should be set to 20MHz, 0.1uF polypropylene capacitor and 10uF high-frequency low-resistance electrolytic capacitor are connected in parallel with the probes (100M bandwidth). The oscilloscope should be set at the Sample Mode.

2, The test diagram is shown on the right. 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 twisted pair (length $30\text{cm} \pm 2\text{ cm}$) should be connected in parallel with the load, the location is as close as possible to the output pins or terminals. The test can be started after input power on.



Product Performance Curve



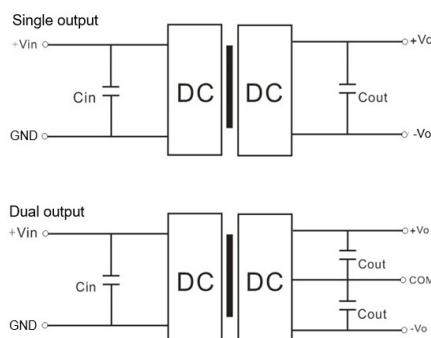
Recommended Circuits for Application

1. Requirement for Output load

The maximum capacitive load of the product was tested at the Rated full load. The converter may not start or be damaged if the capacitor exceeds this value.

2. Recommended application circuit

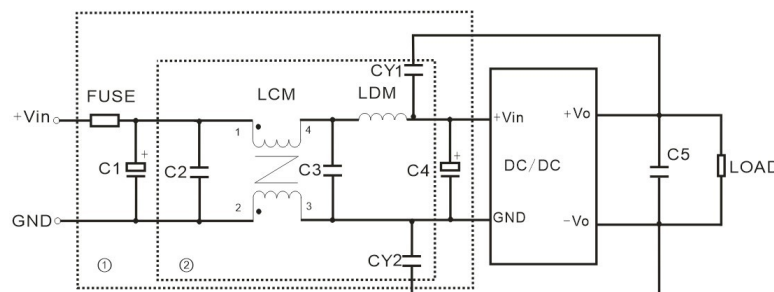
To effectively decrease the input and output ripple and noise, a capacitor filter can be connected at the input and output as the application circuit shown in the figure below. The suitable filter capacitors should be chosen as the recommended capacitive load values in Table 1. The converter could not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



Recommended Capacitive Load Value Table (Table 1)

Vin (Vdc)	Cin	Single Vout (Vdc)	Cout (μF)	Dual Vout (Vdc)	Cout (μF)
5	10 μF/16V	3.3	10 μF/16V	±3.3	4.7 μF/16V
12	2.2 μF/25V	5	10 μF/16V	±5	4.7 μF/16V
15	2.2 μF/25V	9	2.2 μF/25V	±9	2.2 μF/25V
24	1 μF/50V	12	2.2 μF/25V	±12	1 μF/25V
---	---	15	1 μF/25V	±15	1 μF/16V
---	---	24	1 μF/50V	±24	0.47 μF/50V

3. Recommended EMC Circuit



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

FUSE	TBD based on the actual current
C1	1000 μF/50V
C2/C3	4.7 μF/50V
C4	100 μF/50V
C5	22 μF/50V
LCM	2.2mH
LDM	6.8 μH
CY1/CY2	1nF/3KV

Note:

1. This product cannot be used in parallel, and it does not support hot-plugging.
2. The product performance in this manual cannot be guaranteed if it works at a lower load than the minimum load condition.
3. All values or indicators in this manual had been tested based on test specifications.