Descriptions

1W isolated, DC-DC Converter



RoHS

CE Report EN62368-1

UKCA Report BS EN62368-1

Features

- High efficiency up to 81%
- The leakage current < 2μA
- Isolation Capacitance as low as 4pF
- Creepage & Clearance Distance > 8mm
- Reinforced insulation, Isolation voltage: 5000VAC or 6000VDC
- Operating ambient temperature range: -40℃ to +105℃
- Continuous short-circuit protection

Applications

- Photo voltaic
- Energy storage

Selection Guide

Certification	Part No.	Input Voltage (VDC)	Output		Full Load Efficiency (%) Min./Typ.	Capacitive Load (μF)Max.
		Nominal (Range)	Voltage(VDC)	Current(mA) Max./Min.		
--	DFWS1-H0503	5 (4.5-5.5)	3.3	303/31	71/75	2200
EN/BS EN	DFWS1-H0505		5	200/20	76/80	2200
--	DFWS1-H0509		9	111/11	76/80	1000
	DFWS1-H0512		12	84/9	77/81	470
	DFWS1-H0515		15	67/7	77/81	470
	DFWS1-H0524		24	42/4	77/81	220

Notes: *Product images are for reference only; the actual product shall prevail.

Selection Guide

Product Specifications	Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	Input Current (full load / no-load)	3.3VDC/5VDC output		--	270/5	286/10	mA
		9VDC/12VDC output		--	241/12	254/20	
		15VDC output		--	241/18	254/30	
	Reflected Ripple Current			--	15	--	
	Surge Voltage (1sec. max.)			-0.7	--	9	VDC
	Input Filter			Capacitance Filter			
	Hot Plug			Unavailable			
Output Specifications	Voltage Accuracy			See output regulation curves(Fig. 1)			
	Linear Regulation	Input voltage change: ±1%	3.3V output	--	--	1.5	--
			Other output	--	--	1.2	
	Load Regulation	10%-100% load	3.3V/5V output	--	--	20	%
			Other output	--	--	15	
	Ripple & Noise①	20MHz bandwidth	3.3V output	--	100	150	mVp-p
			Other output	--	80	120	
	Temperature Coefficient	Full load		--	±0.02	--	%/℃
	Short-circuit Protection			Continuous, self-recovery			
General Specifications	Isolation	Input-output electric strength test for 1 minute with a leakage current of 1mA max.		5000	--	--	VAC
				6000	--	--	VDC
	Patient Leakage Current②	250VAC, 50/60Hz		--	--	2	μA
	Insulation Resistance	Input-output resistance at 500VDC		1000	--	--	MΩ
	Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		--	4	--	pF
	Operating Temperature	Derating when operating temperature up to 71℃, (see Fig. 2)		-40	--	105	℃
	Storage Temperature			-55	--	125	
	Case Temperature Rise	Ta=25℃		--	25	--	
	Storage Humidity	Non-condensing		5	--	95	%RH
	Pin Welding Resistance Temperature③	Soldering spot is 1.5mm away from the case, 10 seconds max.		--	--	+300	℃
		Wave soldering, maximum 10 seconds		255	260	265	
	Switching Frequency	Full load, nominal input voltage		--	300	--	kHz
	MTBF	MIL-HDBK-217F@25℃		19360	--	--	k hours
	Creepage & Clearance Distance			8	--	--	mm
Mechanical Specifications	Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)					
	Dimensions	19.50 x 9.80 x 12.50 mm					
	Weight	4.0 g(Typ.)					
	Cooling Method	Free air convection					

Note:
①The "parallel cable" method is used for Ripple and Noise test;
②Leakage current and reinforced insulation is based on 250 VAC, 50/60 Hz system input voltage;
③The pin soldering temperature tolerance is not the actual temperature set by the soldering iron but the temperature required for proper solder joints. The actual temperature set by the customer should be determined comprehensively based on factors such as PCB thickness, copper coverage, soldering iron power, and soldering iron tip selection.

Electromagnetic Compatibility (EMC)

Emissions	CE	DFWS1-H0515 DFWS1-H0524	CISPR32/EN55032 CLASS A (see Fig. 4 for recommended circuit) EN60601-1-2/CISPR 11 GROUP1 CLASS A (see Fig. 4 for recommended circuit)
		Other Part No.	CISPR32/EN55032 CLASS B (see Fig. 4 for recommended circuit) EN60601-1-2/CISPR 11 GROUP1 CLASS B (see Fig. 4 for recommended circuit)
	RE	DFWS1-H0515 DFWS1-H0524	CISPR32/EN55032 CLASS A (see Fig. 4 for recommended circuit) EN60601-1-2/CISPR 11 GROUP1 CLASS A (see Fig. 4 for recommended circuit)
		Other Part No.	CISPR32/EN55032 CLASS B (see Fig. 4 for recommended circuit) EN60601-1-2/CISPR 11 GROUP1 CLASS B (see Fig. 4 for recommended circuit)
Immunity	ESD		EN60601-1-2 (IEC/EN61000-4-2) Air ±15kV, Contact ±8kV perf. Criteria B

Characteristic Curve

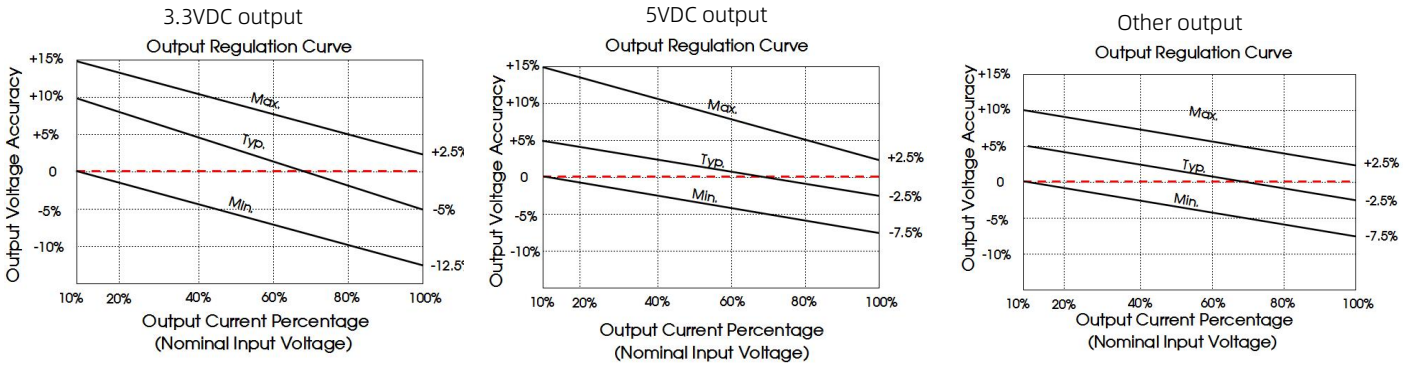


Fig. 1

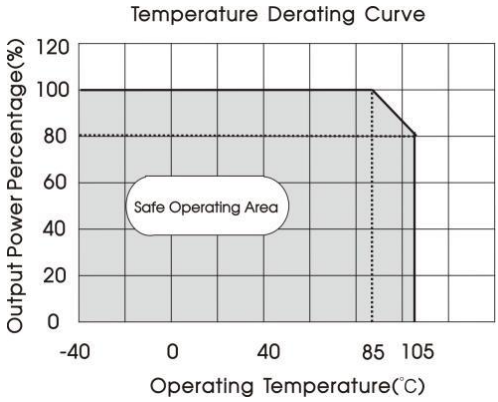


Fig.2

Design Reference

1. Typical application

①Input and/or output ripple can be further reduced, by connecting a filter capacitor from the input and/or output terminals to ground as shown in Fig. 3.

②Choosing suitable filter capacitor values is very important for a smooth operation of the modules, particularly to avoid start-up problems caused by capacitor values that are too high. For recommended input and output capacitor values refer to Table 1.

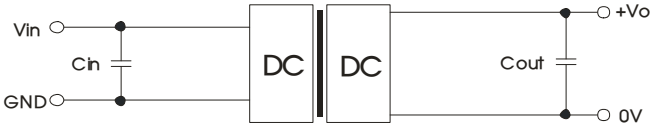


Fig. 3

Table 1: Recommended input and output capacitor values

Vin	Cin	Vo	Cout
5VDC	10μF/10V	3.3/5VDC	10μF/16V
		9VDC	10μF/16V
		12VDC	2.2μF/25V
		15VDC	1μF/25V
		24VDC	0.47μF/50V

2. EMC compliance circuit

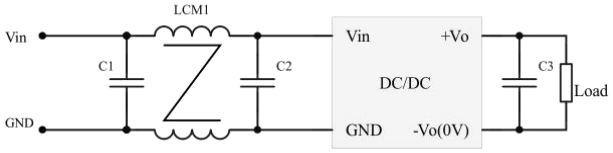


Fig. 4

Table 2: Recommended EMC filter values

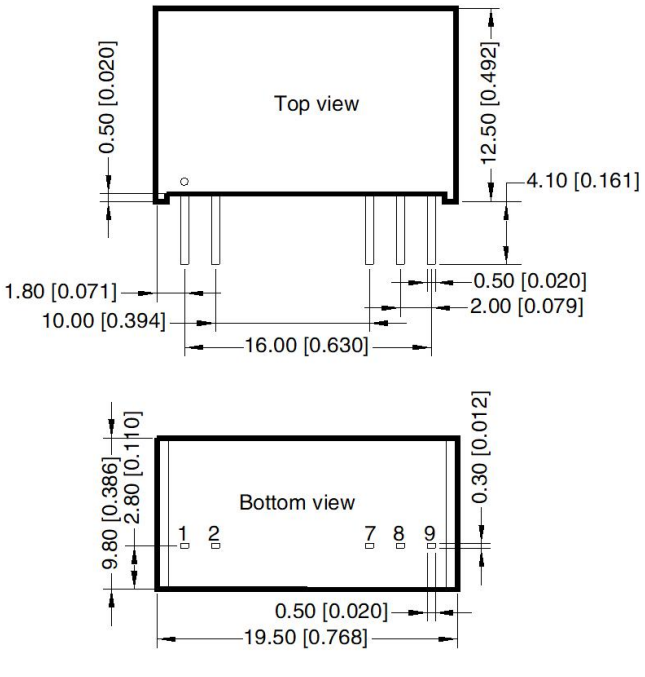
Emissions	C1/C2	4.7μF /16V
	C3	Refer to the Cout in table 1
	LCM1	22μH（Nickel zinc inductance）

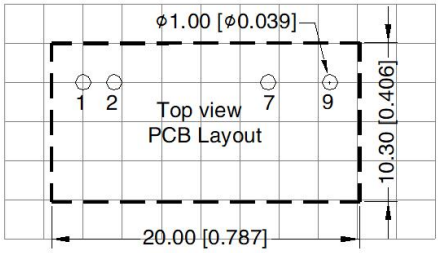
3. Minimum Output Load Requirement

For a reliable and efficient operation of the converter, the minimum load should never be less than 10% of the rated output load. If the total required output power is below 10%, a parallel bleeding resistor is required on the output, ensuring that the sum of the power consumption is always mantained at 10% minimum.

Dimensions and Recommended

THIRD ANGLE PROJECTION





Note: Grid 2.54*2.54mm

Pin-Out	
Pin	Mark
1	Vin
2	GND
7	0V
8	No Pin
9	+Vo

Note:
Unit: mm[inch]
Pin section tolerances: ±0.10[±0.004]
General tolerances: ±0.50[±0.020]

Note:

1. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
2. The maximum capacitive load offered were tested at input voltage range and full load;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75% with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. Products are related to laws and regulations: see "Features" and "EMC";
6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units;
7. The image certification marks are for reference only; please refer to the selection table for actual specifications. Certification is based on the physical mark or packaging label.