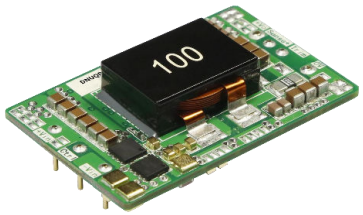
Descriptions

10W isolated，DC/DC Converter



RoHS

Report EN62368-1

BS EN62368-1

Features

- Adjustable input starting (under-voltage) voltage
- Operating ambient temperature range: -40℃ to +85℃
- Up to 97% efficiency
- Input under-voltage protection, output short-circuit, over-current protection
- Open frame package
- 1/4-Brick package industry standard pin-out

Applications

- Robotic field
- Battery powered systems

Selection Guide

Certification	Part No.	Input Voltage (VDC)*		Output		Full Load Efficiency (%) Vin Min. / Vin Max.	Capacitive Load (μF) Max.
		Nominal (Range)	MAX*	Voltage (VDC)	Current (A) Max.		
EN/BS EN	DNUQB10-B4824	48 (30-75)	80	24	10	94/97	3300
	DNUQB10-B4812	48 (16-75)		12	10	92/95	5500

Note: *Exceeding the maximum input voltage may cause permanent damage.

Specifications

Product Specifications	Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	Input Current (full load / no-load)	Nominal input voltage	24VDC Output	--	5208/35	5320/80	mA
			12VDC Output	--	2660/35	2718/80	
	Reflected Ripple Current	Nominal input voltage		--	200	--	
	Surge Voltage (1sec. max.)			-0.7	--	80	VDC
	Starting Voltage	DNUQB10-B4824		--	--	30	
		DNUQB10-B4812		--	--	16	
	Under-voltage protection	DNUQB10-B4824		25	27	--	
		DNUQB10-B4812		12.5	14	--	
	Adjustable input Starting(Under-voltage) Voltage	Refer to Design Reference for details	24VDC Output	30	--	75	
			12VDC Output	16	--	75	
	Input Filter			Capacitance filter			
	Ctrl①	Module on		Ctrl pin open or pulled high (1.5-12VDC)			
		Module off		Ctrl pin pulled low to GND (0-0.8VDC)			
		Input current when off		--	2	10	mA
	Hot Plug			Unavailable			
Output Specifications	Voltage Accuracy	0%-100% load		--	±1	±3	%
	Linear Regulation	Full load, the input voltage is from low to high		--	±0.1	±0.5	
	Load Regulation	5%-100% load		--	±0.3	±2	
	Transient Recovery Time	25% load step change		--	200	500	μs
	Transient Response Deviation	25% load step change		--	±4	±5	%
	Temperature Coefficient	Full load		--	--	±0.03	%/℃
	Ripple & Noise②	20MHz bandwidth		--	150	220	mVp-p
	Over-current protection	Input voltage range		110	130	190	%Io
	Short-circuit Protection			Hiccup, continuous, self-recovery			
General Specifications	Trim			90	--	110	%Vo
	Sense	Refer to Remote Sense Application for details		--	--	105	
	Operating Temperature			-40	--	+85	℃
	Storage Temperature			-55	--	+125	
	Pin Soldering Resistance Temperature	Wave-soldering, 10s		--	--	260	
	Storage Humidity	Non-condensing		5	--	95	%RH
	Vibration	0-150Hz, 5g, 0.75mm, 90 Min. along X, Y and Z					
	Switching Frequency	PWM mode	24VDC Output	--	250	--	kHz
			12VDC Output	--	200	--	
	MTBF	MIL-HDBK-217F@25℃		1000	--	--	k hours
Mechanical Specifications	Dimensions	59.20 × 37.60 × 13.00 mm					
	Weight	33.0g(Typ.)					
	Cooling Method	Nature convection or forced convection					
Note:							

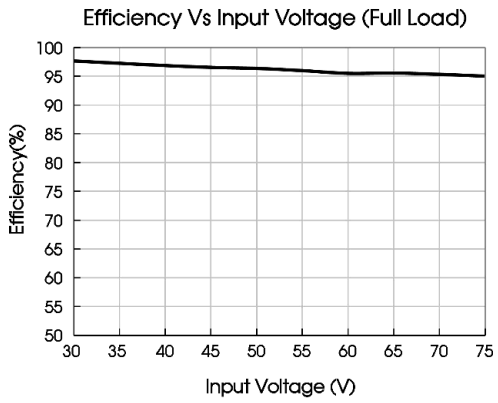
①The voltage of Ctrl pin is relative to input pin GND;
②The "parallel cable" method is used for Ripple and Noise test.

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS A (see Fig. 2 for recommended circuit)	
	RE	CISPR32/EN55032 CLASS A (see Fig. 2 for recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2 Contact ±6kV	perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4 ±2kV (see Fig. 2 for recommended circuit)	perf. Criteria A
	Surge	IEC/EN61000-4-5 ±2kV (see Fig. 2 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6 10 Vr.m.s	perf. Criteria A

Characteristic Curve

DNUQB10-B4824



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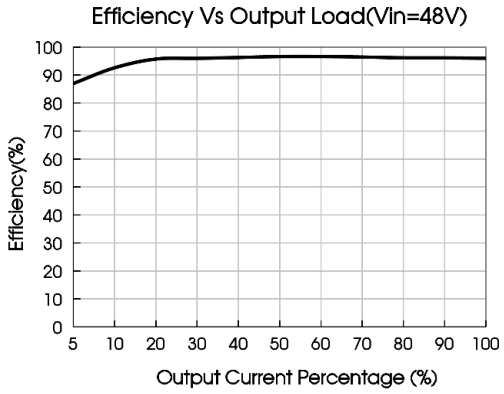
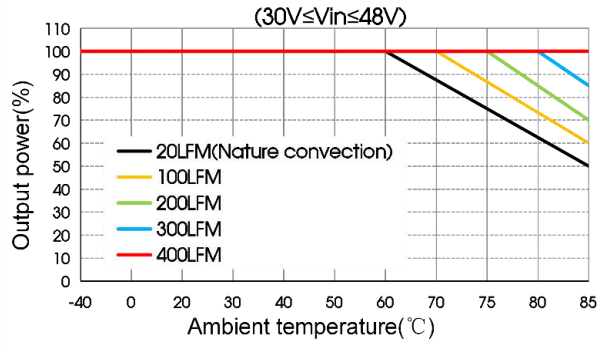


DNUQB10-B4824 Temperature Derating Curves



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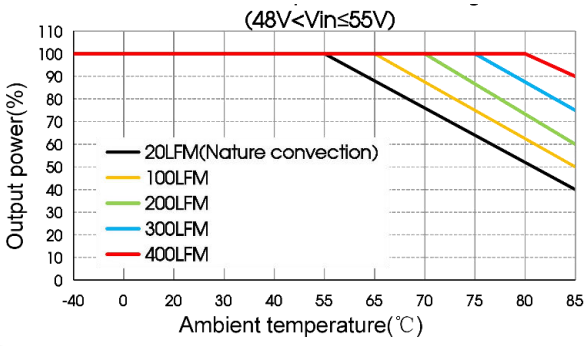

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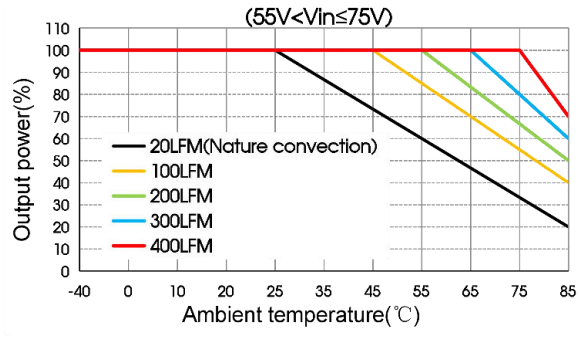
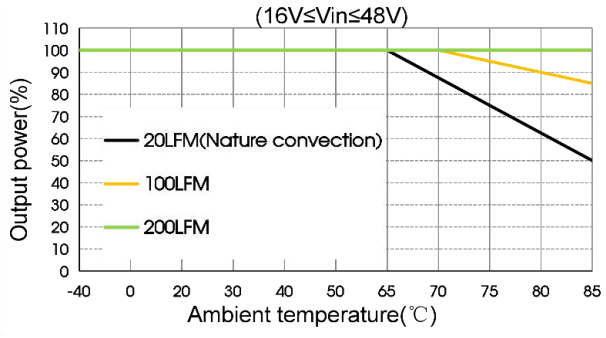
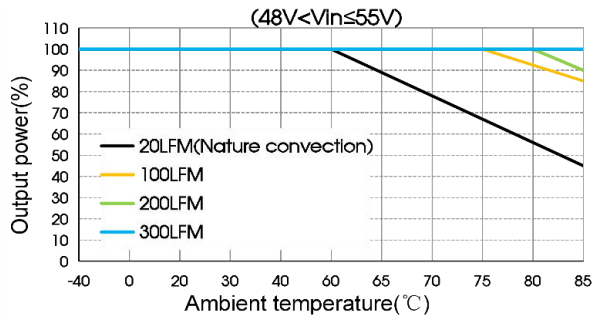


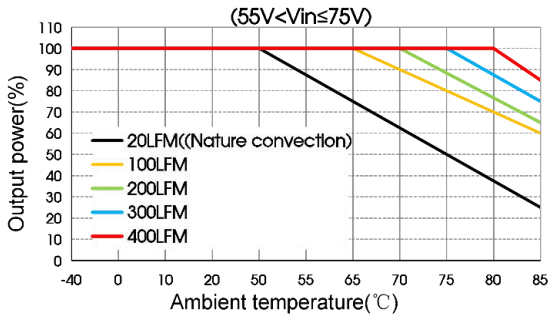
DNUQB10-B4812 Temperature Derating Curves



DNUQB10-B4812 Temperature Derating Curves

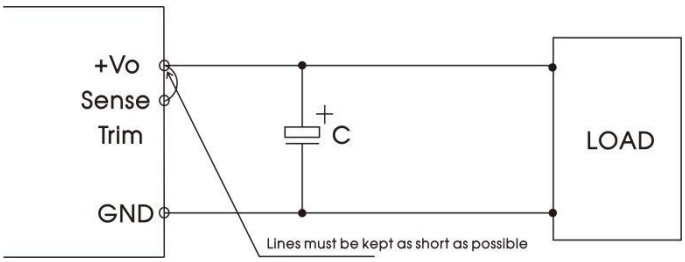


DNUQB10-B4812 Temperature Derating Curves



Remote Sense Application

1.Remote sense connection if not used

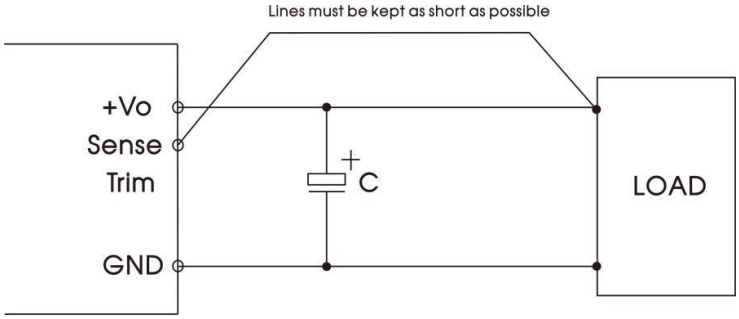


Notes:

①If the sense function is not used for remote regulation the user must connect the Sense to + Vo at the DC-DC converter pins and will compensate for voltage drop across pins only;

②The connections between Sense and +Vo must be kept as short as possible, otherwise they may be picking up noise, interference and/or causing unstable operation of the power module.

2.Remote sense connection used for compensation



Notes:

①Using remote sense with long wires may cause unstable output.

②We recommend using adequate cross section for PCB-track layout and/or cables to connect the power supply module to the load in order to keep the voltage drop below 0.3V and to make sure the power supply's output voltage remains within the specified range.

③Note that large wire impedance may cause oscillation of the output voltage and/or increased ripple. Consult technical support or factory for further advice of sense operation.

Design Reference

1. Typical application

① We recommenced using the recommended circuit shown in Fig.1 during product testing and application, otherwise please ensure that at least a100μF electrolytic capacitors is connected at the input in order to ensure adequate voltage surge suppression and protection.

②We recommenced increasing the value of Cin and pay attention to the unstable input voltage if the product input side is paralleled with motor drive circuit and/or larger energy transient circuits, to ensure the stability of input terminal and avoid repeatedly start-up problems due to input voltage lower than under-voltage protection point.

③We recommended increasing the output capacitance with limited to the capactive load specification and/or increasing the voltage clamping circuit(such as TVS) if the output terminal is inductive device such as relay or a motor, to ensure adequate voltage surge suppression and protection.

④ Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values Cin and Cout and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the specified max. capacitive load value of the product.

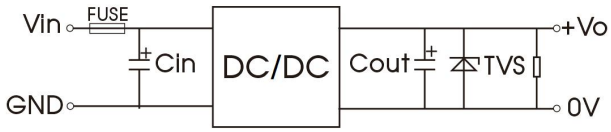


Fig. 1

Vout(VDC)	Fuse	Cin*	Cout	TVS
12 VDC	20A, slow blow	100μF	100μF	SMDJ14A
24 VDC				SMDJ28A

Note:

*Please pay attention to the ambient temperature of the product when using an external capacitor, increase the electrolytic capacitor values to at least 1.5 times the original parameter if the ambient temperature is low.

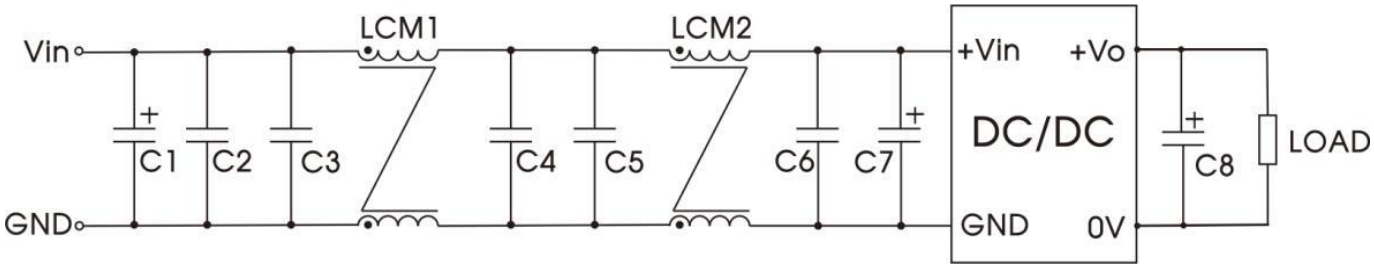
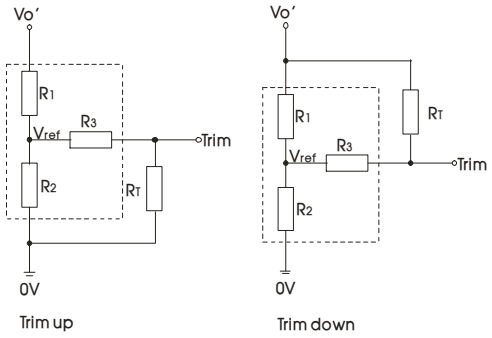


Fig. 2

Components	Recommended Component value	Components function
C1	1000μF electrolytic capacitor	Meet EFT and Surge
C7	330μF electrolytic capacitor	
C1	1000μF electrolytic capacitor	Meet CE and RE
C7	330μF electrolytic capacitor	
C8	100μF electrolytic capacitor	
C2, C3, C4, C5, C6	4.7 μF electrolytic capacitor	
LCM1, LCM2	47 μH common mode inductor	

2.Trim Function for Output Voltage Adjustment (open if unused)



TRIM resistor connection (dashed line shows internal resistor network)

Calculation formula of Trim resistance:

$$up:\ R_T=\frac{aR_2}{R_2-a}-R_3 \qquad a=\frac{Vref}{Vo'-Vref}\cdot R_1$$

$$down:\ R_T=\frac{aR_1}{R_1-a}-R_3 \qquad a=\frac{Vo'-Vref}{Vref}\cdot R_2$$

RT = Trim Resistor value;

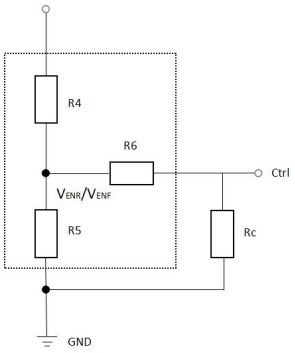
a = self-defined parameter

Vo'= desired output voltage (±10% max.)

Vout(VDC)	R1(kΩ)	R2(kΩ)	R3(kΩ)	Vref(V)
12	330	23.48	120	0.8
24	330	11.38	91	0.8

Note: When using the Trim down function make sure that the RT resistor value is calculated correctly. If the Trim pin is shorted with +Vo, or its value is too low, then the output voltage Vo would be lower, which may cause the product to fail.

3.Adjustable input Starting (Under-voltage) Voltage and Resistor calculation



Adjustable input Starting (Under-voltage) Voltage resistor connection (dashed line shows internal resistor network)

Calculation resistor of Adjustable input Starting (Under-voltage) Voltage:

$$R_C=\frac{bR_5}{R_5-b}-R_6 \qquad b=\frac{V_{EN}}{Vin-V_{EN}}\bullet R_4$$

RC: resistor of Adjustable input Starting (Under-voltage) Voltage:

b: self-defined parameter

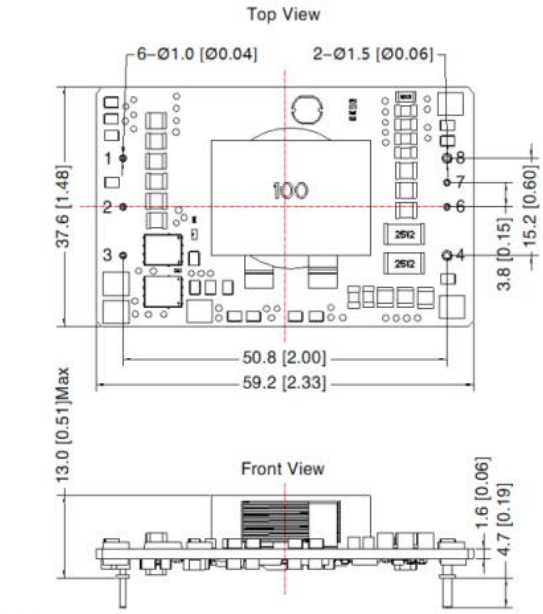
When VEN=VENR, Vin is actual starting voltage required for input;

When VEN=VENF, Vin is actual under-voltage required for input;

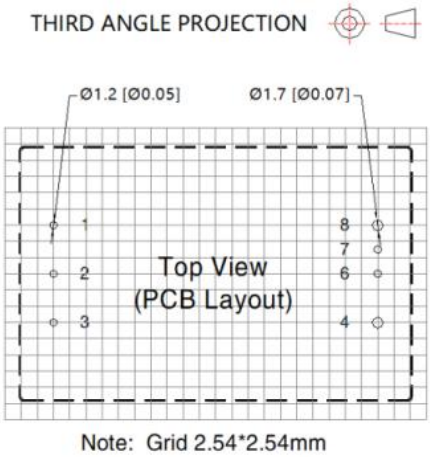
Vout(VDC)	R4(kΩ)	R5(kΩ)	R6(kΩ)	VENR(V)	VENF(V)
12	100	8.93	0.1	1.22	1.09
24	100	4.32	0.1	1.22	1.09

4.The products do not support parallel connection of their output.

Dimensions and Recommended Layout



Note:
Unit: mm[inch]
Pin1,2,3,6,7's diameter: 1.0[0.04]
Pin4,8's diameter: 1.5[0.06]
Pin diameter tolerances: ±0.1[±0.004]
General tolerances: ±0.5[±0.02]
Device layout is for reference only, the specific object shall prevail



Note: Grid 2.54*2.54mm

Pin–Out			
Pin	Mark	Pin	Mark
1	+Vin	4	0V
2	Ctrl	6	Trim
3	–Vin	7	Sense+
		8	+Vo

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. 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;
3. All index testing methods in this datasheet are based on our company corporate standards;
4. Products are related to laws and regulations: see "Features" and "EMC";
5. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.