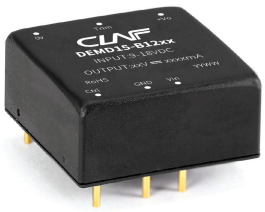
Descriptions

15W, DC-DC Converter



RoHS

CE Report EN 62368-1

UKCA Report BS EN 62368-1

Features

- Wide 2:1 input voltage range
- High efficiency up to 91%
- I/O isolation test voltage 1.5k VDC
- Input under-voltage protection, output short-circuit, over-current, over-voltage protection
- Operating ambient temperature range: -40℃ to +105℃
- Meets CISPR32/EN55032 CLASS A, without extra components
- Industry standard pin-out

Applications

- Industrial Control
- Electric Power
- Instrumentation
- Communication

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency② (%) Min./Typ.	Capacitive Load (μF)Max.
		Nominal (Range)	Max.①	Voltage (VDC)	Current(mA) Max./Min.		
EN/BS EN	DEMD15-B1203	12 (9-18)	20	3.3	4000/0	86/88	4700
	DEMD15-B1205			5	3000/0	88/90	4700
	DEMD15-B1212			12	1250/0	88/90	1000
	DEMD15-B1215			15	1000/0	89/91	820
	DEMD15-B1224			24	625/0	89/91	270
--	DEMD15-B2403	24 (18-36)	40	3.3	4000/0	86/88	4700
	DEMD15-B2405			5	3000/0	88/90	4700
	DEMD15-B2412			12	1250/0	88/90	1000
	DEMD15-B2415			15	1000/0	89/91	820
	DEMD15-B2424			24	625/0	88/90	270
--	DEMD15-B4805	48 (36-75)	80	5	3000/0	88/90	4700

Notes:
①Exceeding the maximum input voltage may cause permanent damage;
②Efficiency is measured at nominal input voltage and rated output load;
③Product images are for reference only; the actual product shall prevail.

Specifications

Product Specifications	Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	Input Current (full load / no-load)	12VDC nominal input series, nominal input voltage	3.3V output	--	1250/40	1280/65	mA
			5V output	--	1389/40	1421/65	
			12V output	--	1389/7	1421/22	
			15V output	--	1374/7	1405/22	
			24V output	--	1374/12	1405/22	
		24VDC nominal input series, nominal input voltage	3.3V output	--	625/30	647/50	
			5V output	--	695/30	711/50	
			12V output	--	695/6	711/15	
			15V output	--	687/6	703/15	
			24V output	--	687/10	703/20	
		48VDC nominal input series, nominal input voltage	5V output	--	348/15	356/30	
	Reflected Ripple Current	Nominal input voltage		--	30	--	
	Surge Voltage (1sec. max.)	12VDC nominal input series		-0.7	--	25	VDC
		24VDC nominal input series		-0.7	--	50	
		48VDC nominal input series		-0.7	--	100	
	Start-up Voltage	12VDC nominal input series		--	--	9	
		24VDC nominal input series		--	--	18	
		48VDC nominal input series		--	--	36	
	Under-voltage Protection	12VDC nominal input series		5.5	6.5	--	
		24VDC nominal input series		12	15.5	--	
		48VDC nominal input series		26	30	--	
	Start-up Time	Nominal input voltage & constant resistance load		--	10	--	ms
	Input Filter			Pi filter			
	Hot Plug			Unavailable			
	Ctrl ①	Module on		Ctrl pin open or pulled high (TTL 3.5-12VDC)			
		Module off		Ctrl pin pulled low to GND (0-1.2VDC)			
		Input current when off		--	2	7	mA
Output Specifications	Voltage Accuracy	0%-100% load		--	±1	±3	%
	Linear Regulation	Input voltage variation from low to high at full load		--	±0.2	±0.5	
	Load Regulation	5%-100% load		--	±0.5	±1	
	Transient Recovery Time	25% load step change, nominal input voltage		--	300	500	μs
	Transient Response Deviation		3.3V, 5V output	--	±3	±7	%
			Others	--	±3	±5	
	Temperature Coefficient	Full load		--	--	±0.03	%/℃
	Ripple & Noise②	20MHz bandwidth, 5%-100% load		--	50	100	mV p-p
	Trim	Input voltage range		90	--	110	%Vo
	Over-voltage Protection			110	--	160	

	Over-current Protection			110	150	190	%Io
	Short-circuit protection			Hiccup, continuous, self-recovery			
General Specifications	Isolation	Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max.		1500	--	--	VDC
		Input/output-case Electric Strength Test for 1 minute with a leakage current of 1mA max.		1000	--	--	
	Insulation Resistance	Input-output resistance at 500VDC		1000	--	--	MΩ
	Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		--	2000	--	pF
	Operating Temperature	See Fig. 1	3.3V, 5V output	-40	--	+95	℃
			Others	-40	--	+105	
	Storage Temperature			-55	--	+125	
	Storage Humidity	Non-condensing		5	--	95	%RH
	Pin Soldering Resistance Temperature③	Soldering spot is 1.5mm away from the case, 10 seconds max.		--	--	+300	℃
		Wave soldering, maximum 10 seconds		255	260	265	
	Vibration			10-150Hz, 5G, 0.75mm. along X, Y and Z			
	Switching Frequency④	PWM mode	3.3V, 5V output	--	300	--	kHz
			Others	--	270	--	
	MTBF	MIL-HDBK-217F@25℃		1000	--	--	k hours
Mechanical Specifications	Case Material	Aluminum alloy					
	Dimensions	25.40 × 25.40 × 11.70 mm					
	Weight	15.0g (Typ.)					
	Cooling method	Free air convection					

Notes:

①The Ctrl pin voltage is referenced to input GND;

②Under 0% -5% load conditions, ripple & noise does not exceed 5%Vo. The ” parallel cable” method is used for Ripple and Noise test,;

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;

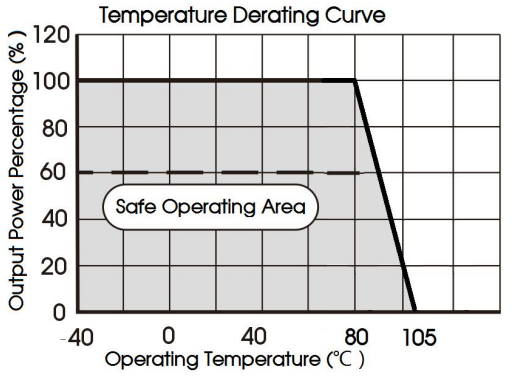
④Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/E N55032	CLASS A (without external components)/ CLASS B (see Fig.3-② for recommended circuit)	
	RE	CISPR32/E N55032	CLASS A (without external components)/ CLASS B (see Fig.3-② for recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2	Contact ±6kV, Air ±8kV	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±2kV (see Fig.3-① for recommended circuit)	perf. Criteria A
	Surge	IEC/EN61000-4-5	line to line ±2kV (see Fig.3-①for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A

Characteristic Curve

Nominal input voltage, 12V, 15V, 24V output



Nominal input voltage, 3.3V, 5V output

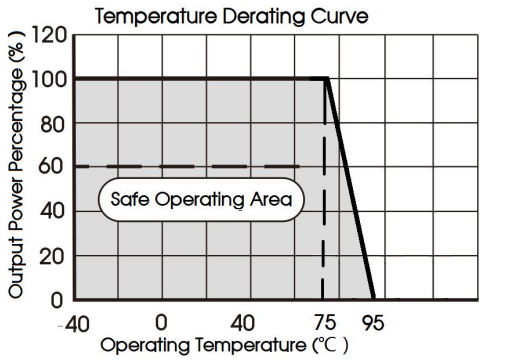
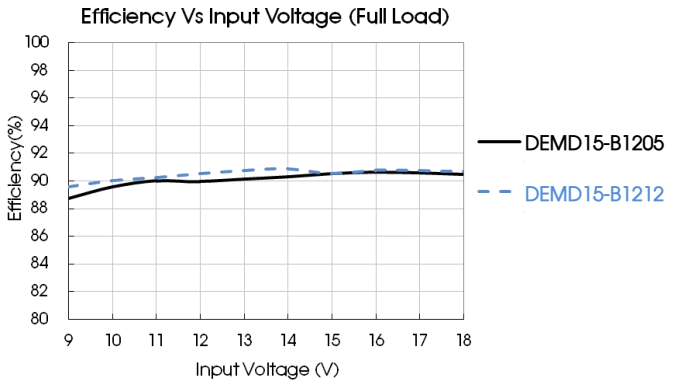
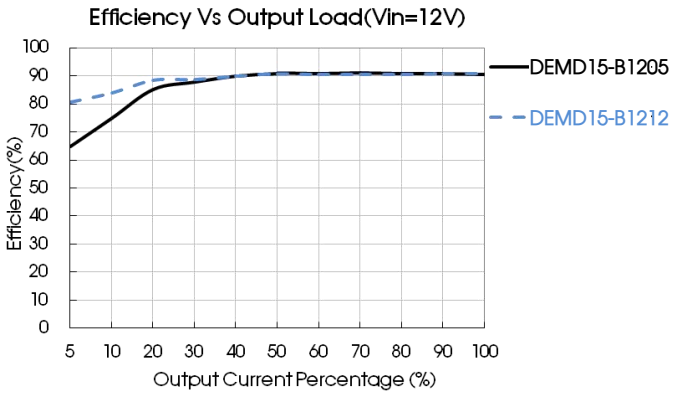
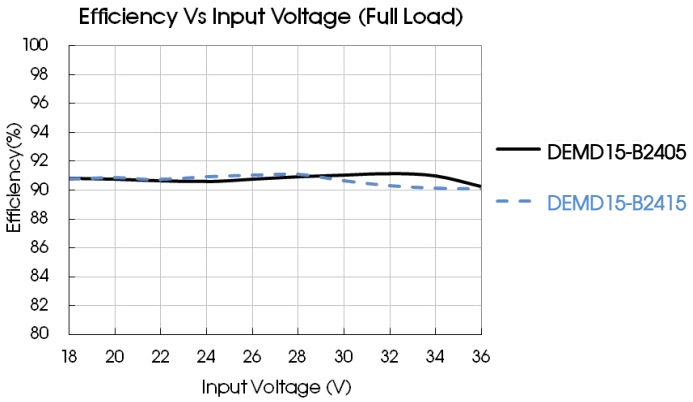
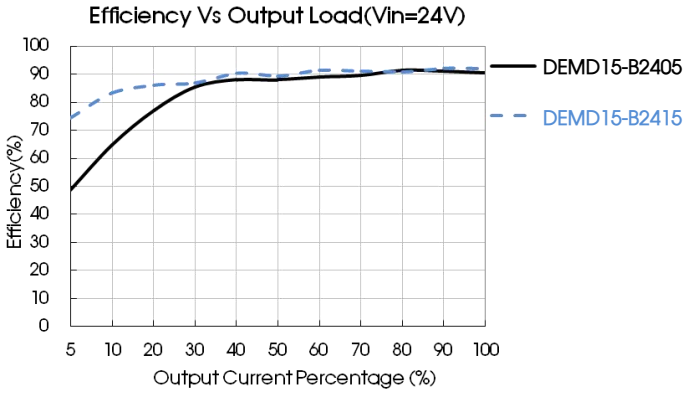


Fig. 1









Design Reference

1. Typical application

①All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2.

②Input 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. 2

Vin (VDC)	Vout (VDC)	Cin	Cout
12	3.3/5	100μF/50V	100μF/16V
	12/15		100μF/25V
	24		47μF/50V
24	3.3/5	100μF/50V	100μF/16V
	12/15		100μF/25V
	24		47μF/50V
48	05	100μF/100V	100μF/16V

2. EMC compliance circuit

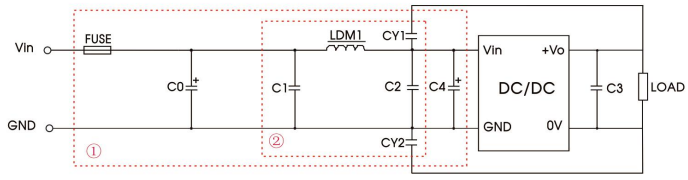


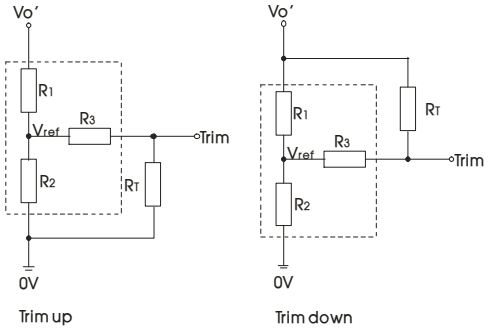
Fig. 3

Notes: For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs.

Parameter description:

Model	Vin: 12/24VDC	Vin:48VDC
FUSE	Select fuse value according to actual input current	
C0, C4	330μF/50V	330μF/100V
C1, C2	4.7μF/50V	4.7μF/100V
C3	Refer to the Cout in Fig.2	
LDM1	2.2μH/4A	2.2μH/2A
CY1/CY2	1nF/2kV	

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



TRIM resistor connection (dashed line shows internal resistor network)

Calculating Trim resistor values:

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

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

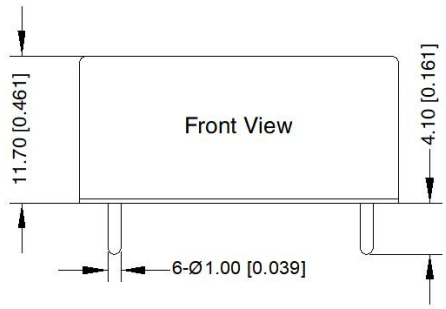
R_T = Trim Resistor value;

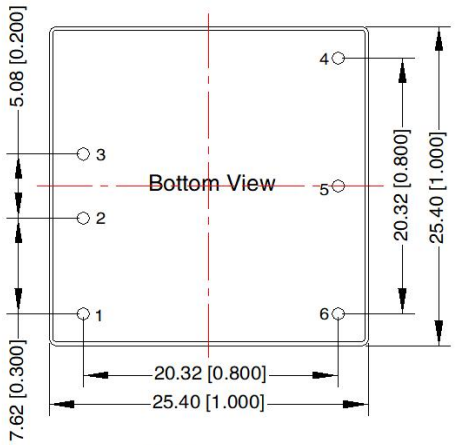
a = self-defined parameter;

Vout(V)	R1(kΩ)	R2(kΩ)	R3(kΩ)	Vref(V)
3.3	4.772	2.87	15	1.25
5	2.894	2.87	10	2.5
12	11.000	2.87	17.4	2.5
15	14.494	2.87	17.4	2.5
24	24.872	2.87	20	2.5

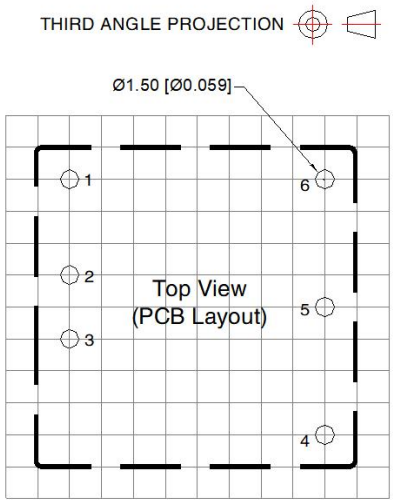
4. The products do not support parallel connection of their output

Dimensions and Recommended Layout





Note:
Unit: mm[inch]
PIN1,2,3,4,5,6: Ø1.0mm
Pin diameter tolerances: ± 0.10[± 0.004]
General tolerances: ± 0.50[± 0.020]



Note: Grid 2.54*2.54mm

Pin–Out	
Pin	Mark
1	Ctrl
2	GND
3	Vin
4	+Vo
5	Trim
6	0V

Notes:

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%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on 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.