



7.2DBTW4_D4.2 series

7.2W - Dual Output - Wide Input - Isolated & Regulated regulated IGBT dedicated DC-DC converter

DC-DC Converter

7.2 Watt

- ⊕ Ultra-wide input voltage range (4:1)
- ⊕ High efficiency up to 85%
- ⊕ Input-Output isolation test voltage: 4.2kVAC
- ⊕ Output-Output isolation test voltage: 3.0kVAC
- ⊕ Operating ambient temp. range: -40°C to +105°C
- ⊕ Input under-voltage protection, output short-circuit protection, over-voltage protection
- ⊕ No-load operation allowed
- ⊕ Reinforced Insulation design
- ⊕ IGBT dedicated regulated DC-DC converter

The 7.2DBTW4_D4.2 is DC-DC converter for IGBT drivers. It offers output power up to 7.2w, features with output over-voltage protection, short-circuit protection and self-recovery capability. General application includes:

- Universal converter
- AC servo drive system
- Electric welding machine
- Un-interruptible power supply (UPS)



Common specifications

Short circuit protection	Continuous, self-recovery
Operation temperature	-40°C to +105°C (Derating when operating temperature up to ≥75°C, see Fig. 1)
Storage temperature	-55°C to +125°C
Casing Temperature Rise	30°C to 40°C; Ta=25°C
Storage Humidity	5 to 95 %RH (Non-condensing)
Lead temperature	300°C MAX, Soldering spot is 1.5mm away from case for 10 seconds
MTBF(MIL-HDBK-217F@25°C)	>1,000,000 hours
Case material	Black plastic; flame-retardant and heat-resistant (UL94-V0)
Cooling	Free air convection
Weight	13g Typ.
Dimension	31.70 × 20.30 × 12.65 mm

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input Current (full load / no-load)	Nominal input voltage		353/10		mA
Reflected Ripple Current	Nominal input voltage		55		mA
Surge Voltage	1sec. max.	-0.7		50	VDC
Starting voltage				9	VDC
Input Under-voltage Protection		5.5	6.5		VDC
Input filter	Input Filter Capacitor filter				
Hot Plug	Unavailable				

Example:

7.2DBTW4_2424D4.2
 7.2 = 7.2 Watt; D = DIP24; BT = IGBT; W = Wide input 4:1 (9-36);
 24 = 24Vin; 24 = +24Vout; D = Dual Output; 4.2 = 4.2kVDC isolation;

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output Power				7.2	W
Output voltage accuracy	5%-100% load • Vo1 • Vo2		±1	±2.5	%
Line regulation	Input voltage variation, low to high at full load • Vo1 • Vo2		±0.2 ±0.8	±0.5 ±1.2	%
Load regulation	5%-100% load • Vo1 • Vo2		±0.5 ±1	±1 ±1.5	%
Temperature Recovery Time	25% load step change, nominal input voltage		300	500	µs
Transient Response Deviation	25% load step change, nominal input voltage		±3	±5	%
Temperature Coefficient	100% load			±0.03	%/°C
Ripple & Noise*	20MHz bandwidth		75	150	mVp-p
Switching frequency	PWM mod		300		KHz
Over-voltage Protection		110		160	%Vo

* The "parallel cable" method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information.

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	• Input-output Electric Strength Test for 1min. with a leakage current of 1mA max • output-output Electric Strength Test for 1min. with a leakage current of 1mA max	4200			VAC
Isolation resistance	Input-output resistance at 500VDC	1000			MΩ
Isolation capacitance	Input-output capacitance at 100kHz/0.1V		15		pF

EMC specifications

Emissions	CE	CISPR32/EN55032 CLASS B (see Fig.4-② for recommended circuit)
Emissions	RE	CISPR32/EN55032 CLASS B (see Fig.4-② for recommended circuit)
Immunity	ESD	IEC/EN61000-4-2 Contact ±4kV perf. Criteria B
Immunity	EFT	IEC/EN61000-4-4 ±2kV (see Fig.4-③for recommended circuit) perf. Criteria B
Immunity	Surge	IEC/EN61000-4-5 ±2kV (see Fig.4-③for recommended circuit) perf. Criteria B
Immunity	Immunities of voltage dip, voltage drop and short interruption	IEC/EN61000-4-29 0, 70% perf. Criteria B

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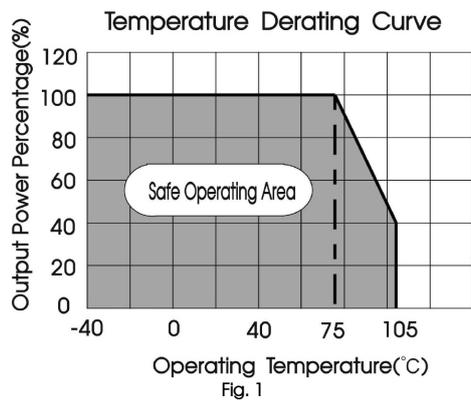
7.2W - Dual Output - Wide Input - Isolated & Regulated regulated
IGBT dedicated DC-DC converter

Product Selection Guide

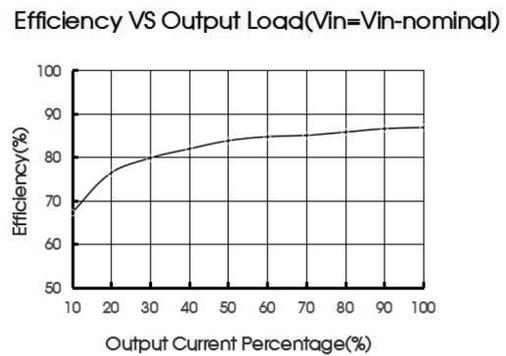
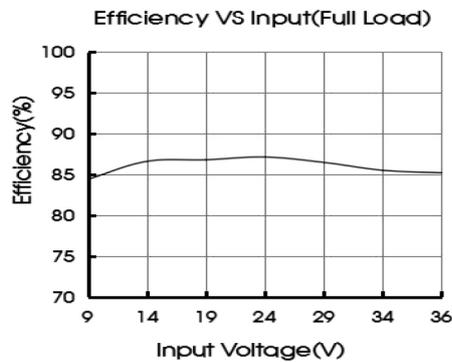
Part Number	Input Voltage [VDC]	Input Current Full Load/No Load [mA,Typ]	Output Voltage [VDC, Vo1/Vo2]	Output current [mA, max./min.]	Efficiency @ Full Load [%,typ]	Max. capacitive Load* [μ F]
7.2DBTW4_2424D4.2	24 (9-36)	353/10	24/24	150/0	85	470

Notes: The specified maximum capacitive load value for positive and negative output is identical.

Typical characteristics

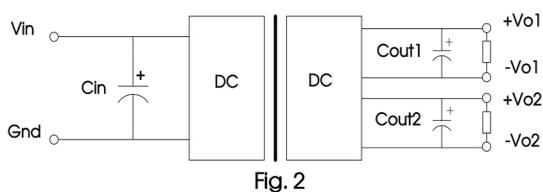


Efficiency



Recommended circuit

All the DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2. The load of positive and negative output is identical. Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values C_{in} and C_{out} and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the max. capacitive load value of the product.



Vin	24V
Cin	100 μ F
Cout1	100 μ F
Cout2	100 μ F

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Typical application

Application Notes

1. The wire between the converter and IGBT driver must as short as possible.
2. External filter capacitors should be connected as close as possible to the IGBT driver.
3. To ensure the high peak gate current, the filter capacitors should be electrolytic capacitor and ceramic capacitor collocation.
4. The output average power of the IGBT driver should be less than the output power of DC-DC module.
5. When driving the bridge circuit, the Main output Vo1 drives the lower tube, and the Supplement output Vo2 drives the upper tube. If it is reversed, the output voltage will be unstable.

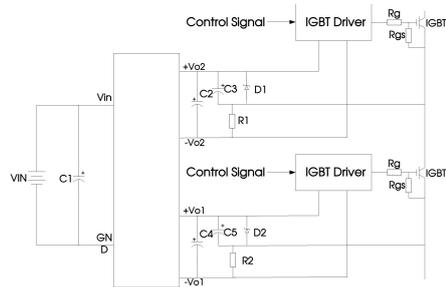


Fig. 3

C1	100uF/63V
C2, C3, C4, C5 R1, R2	100uF/35V
R1, R2	15KΩ
D1, D2	15V

EMC compliance circuit

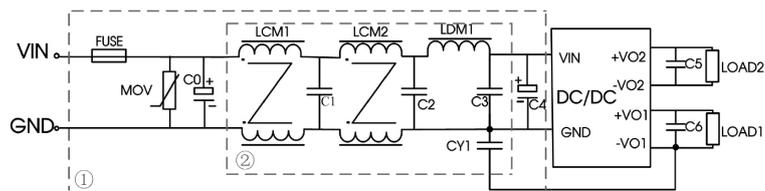
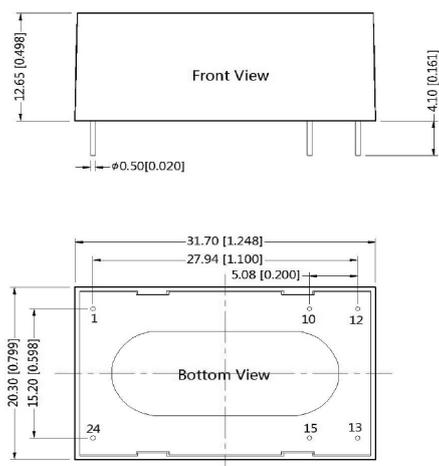


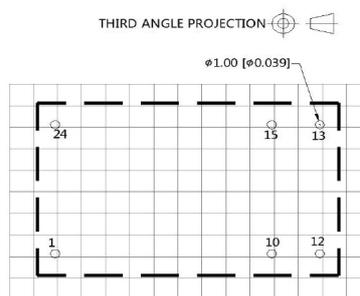
Fig. 4

Model	7.2DBTW4_2424D4.2
FUSE	Choose according to actual input current
MOV	20D560K
C0, C4	330uF/63V
C1	225K/50V
C2, C3	475K/50V
C5, C6	100uF/50V
CY1	102M/8kV
LCM1	4.8mH/2A
LCM2	2.2mH/2A
LDM1	15uH/2A

Mechanical dimensions



Note:
Unit: mm [inch]
Pin diameter tolerances: $\pm 0.10\text{mm}$ [$\pm 0.004\text{inch}$]
General tolerances: $\pm 0.5\text{mm}$ [$\pm 0.020\text{inch}$]



Note: Grid 2.54*2.54mm

Pin-Out	
Pin	Function
1	GND
10	-Vo1
12	+Vo1
13	+Vo2
15	-Vo2
24	Vin

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Note:

1. The lead connecting the power supply module and IGBT driver should be as short as possible during use;
2. The output filtering capacitor should be as close as possible to the power supply module and IGBT driver;
3. The peak of the IGBT driver dedicated power supply gate drive current is high, so low internal resistance electrolytic capacitor is recommended to be used for the power supply module output filter capacitor;
4. The average output power of the driver must be lower than that of the power supply module;
5. Consider fixing with glue near the module if being used in vibration occasion;
6. The maximum capacitive load offered were tested at nominal input voltage and full load;
7. Unless otherwise specified, parameters in this datasheet were measured under the conditions of $T_a=25^{\circ}\text{C}$, humidity<75%RH with nominal input voltage and rated output load;
8. All index testing methods in this datasheet are based on company corporate standards;
9. The performance indexes of the product models listed in this manual are as above, please directly contact our technicians for specific information;
10. We can provide product customization service, please contact our technicians directly for specific information;
11. Products are related to laws and regulations: see „Features“ and „EMC“.
12. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.
13. Electrolytic capacitors are recommended for external capacitors at the input or output of the product. Tantalum capacitors are not, otherwise there is a risk of failure.
14. The products do not support parallel connection of their output or hot-plug use.