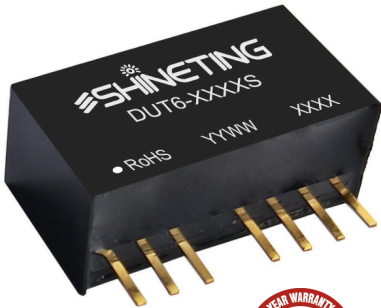


- Wide 4:1 input voltage range
- High efficiency up to 87%
- No-load power consumption bottom 0.12W
- I/O isolation test voltage 1.6k VDC
- Input under-voltage protection, output short-circuit, over-current protection
- Operating ambient temperature range: -40℃ to +105℃
- Small SIP packaging
- International Standard Pin out

DUT6-XXXXS



RoHS 3-Year Warranty

Description

DUT6-XXXXS series are isolated 6W DC-DC converter products with a 4:1 input voltage range. They feature efficiencies of up to 87%, 1600VDC input to output isolation, operating ambient temperature of -40℃ to +105℃, input under-voltage protection, output over-current, short-circuit protection, which is widely used in medical, industrial controls, electricity, instrumentation, communications and other fields.

Selection Guide

Certification	Part No.	Input Voltage (VDC) Nominal (Range)	Input Voltage (VDC) Max	Output Voltage (VDC)	Output Current (mA) Max./Min.	Full Load Efficiency② (%) Min./Typ.	Capacitive Load (μF)Max.
/	DUT6-2403S	24 (9-36)	40	3.3	1350/0	76/78	1800
	DUT6-2405S			5	1200/0	80/82	1000
	DUT6-2409S			9	667/0	82/84	470
	DUT6-2412S			12	500/0	83/85	470
	DUT6-2415S			15	400/0	83/85	220
	DUT6-2424S			24	250/0	83/85	100

Selection Guide

Certification	Part No. ①	Input Voltage (VDC) ② (Range)	Input Voltage (VDC) Max. ③	Output Voltage (VDC)	Output Current (mA) Max./Min.	Full Load Efficiency④ (%) Min./Typ.	Capacitive Load⑤ (μF)Max.
/	DUT6-4803S	48 (18-75)	80	3.3	1600/0	76/79	1200
	DUT6-4805S			5	1200/0	80/83	680
	DUT6-4809S			9	667/0	82/84	330
	DUT6-4812S			12	500/0	84/86	330
	DUT6-4815S			15	400/0	85/87	150
	DUT6-4824S			24	250/0	85/87	68

Notes:

- Exceeding the maximum input voltage may cause permanent damage;
- The above efficiency values are measured within 10 seconds of starting the product under the nominal input voltage and output rated load.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load /no load)	24VCD nominal input series nominal input voltage	3.3V Ouput	--	238/5	245/12	mA
		5V Ouput	--	305/5	313/12	
		Others	--	298/10	305/16	
	48VCD nominal input series nominal input voltage	3.3V, 5V Ouput	--	158/5	165/12	
		Others	--	143/10	156/16	
Reflected Ripple Current			--	50	--	

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Surge Voltage (1sec. max.)	24VCD nominal input series	-0.7	--	50	VDC
	48VCD nominal input series	-0.7	--	100	
Start-up Voltage	24VCD nominal input series	--	--	9	
	48VCD nominal input series	--	--	18	
Input Under-voltage Protection	24VCD nominal input series	5.5	6.5	--	
	48VCD nominal input series	13	14.5	--	
Input Filter		Capacitive filter			
Hot Plug		Unavailable			
Ctrl *	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	--	6	10	mA

Note: *The Ctrl pin voltage is referenced to input GND.

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	24VCD nominal input series	5%-100% load	--	±1	±2	%
	48VCD nominal input series		--	--	±3	
Linear Regulation	Input voltage variation from low to high at full load		--	±0.5	±1	
Load Regulation①	5%-100% load		--	±0.5	±1.5	
Transient Recovery Time	25% load step change, nominal input voltage		--	300	500	μs
Transient Response Deviation		3.3V/5V output	--	±5	±8	%
		Others	--	±3	±5	
Temperature Coefficient	Full load		--	--	±0.03	%/°C
Ripple & Noise②	20MHz bandwidth, 5%-100% load		--	50	100	mV p-p
Over-current Protection	Input voltage range		110	160	230	%Io
Short-circuit Protection			Continuous, self-recovery			

Note:

①Under 0%-5% load, the maximum output voltage accuracy is ±3%;

②Load regulation for 0%-100% load is ±3%;

③Under 0%-5% load conditions, ripple & noise does not exceed 150mV. The "parallel cable" method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation voltage	Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max.	1600	--	--	VDC
Insulation Resistance	Input-output resistance at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V	--	1000	--	pF
Operating Temperature	See Fig. 1	-40	--	+105	℃
Storage Humidity	Non-condensing	5	--	95	%RH
Storage Temperature		-55	--	+125	℃
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	+300	
Vibration		10-150Hz, 5G, 0.75mm. along X, Y and Z			
Switching Frequency *	PWM mode	--	500	--	kHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	k hours
Note: *Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.					

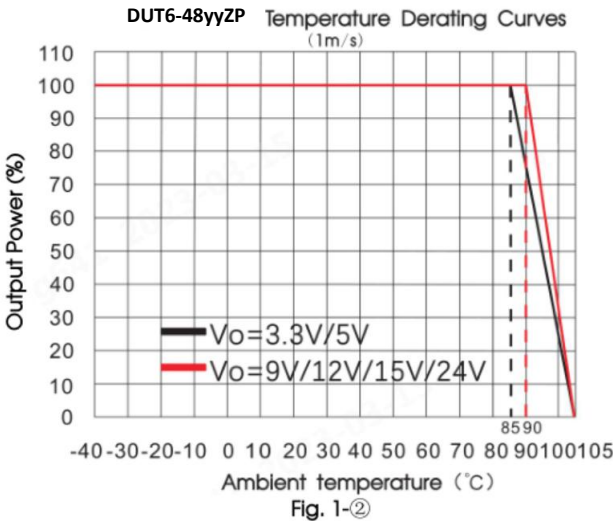
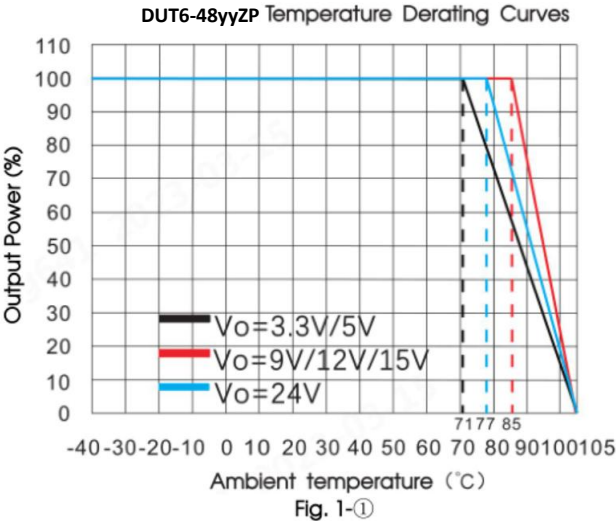
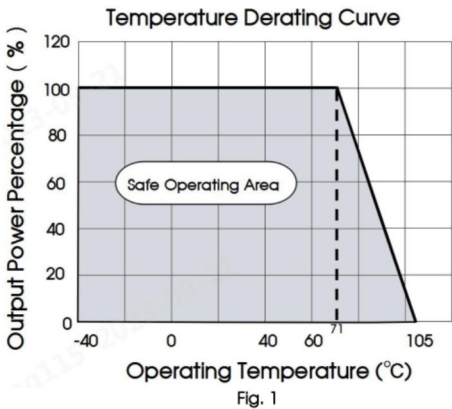
Mechanical Specifications

Case Material	Black flame-retardant and heat-resistant plastic branch (UL94 V-0)
Dimensions	22 × 9.50 × 12.00 mm
Weight	4.7g (Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B (24VDC nominal input series: See Figure 4-② for the recommended circuit; 48VDC nominal input series: See Figure 5-① for the recommended circuit;)
	RE	CISPR32/EN55032 CLASS B (24VDC nominal input series: See Figure 4-② for the recommended circuit; 48VDC nominal input series: See Figure 5-① for the recommended circuit;)
Immunity	ESD	IEC/EN61000-4-2 Contact $\pm 4\text{kV}$ perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m perf. Criteria A
	EFT	IEC/EN61000-4-4 $\pm 2\text{kV}$ (24VDC nominal input series: See Figure 4-① for the recommended circuit; perf. Criteria B 48VDC nominal input series: See Figure 5-① for the recommended circuit;)
	Surge	IEC/EN61000-4-5 line to line $\pm 2\text{kV}$ (24VDC nominal input series: See Figure 4-① for the recommended circuit; perf. Criteria B 48VDC nominal input series: See Figure 5-① for the recommended circuit;)
	CS	IEC/EN61000-4-6 3 Vr.m.s perf. Criteria A

Typical Characteristic Curves



Design Reference

1.Ripple & noise

The general performance of all DC/DC converters of this series is tested in accordance with the test circuit recommended in Figure 2 before leaving the factory. Figure 3 is used for ripple noise test.



Fig. 2

	Cin	Vo(VDC)	Cout	Cout0	Cout1
Vin:24VDC	100μF/100V	3.3/5/9	22μF/16V	1μF/50V	10μF/50V Tantalum Capacitors
		12/15	22μF/25V	1μF/50V	10μF/50V Tantalum Capacitors
		24	22μF/50V	1μF/50V	10μF/50V Tantalum Capacitors
Vin:48VDC	100μF/100V	3.3/5	22μF/16V	1μF/50V	10μF/50V Tantalum Capacitors
		9/12/15/24	10μF/50V	1μF/50V	10μF/50V Tantalum Capacitors

2. Typical application

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. 3

	Cin	Vo(VDC)	Cout
Vin:24VDC	100μF/100V	3.3/5/9	22μF/16V
		12/15	22μF/25V
		24	22μF/50V
Vin:48VDC	100μF/100V	3.3/5	22μF/16V
		9/12/15/24	10μF/50V

3. EMC compliance circuit

Parameter description:

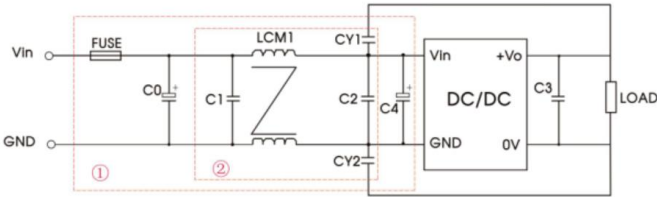


Fig. 4

Notes: We use Part ① in Fig. 4 for Immunity test and part ② for Emissions test. Selecting based on needs.

Model	Vin: 24VDC
FUSE	Choose according to actual input current
C0/C4	330μF/50V
C1/C2	10μF/50V
C3	22μF/50V
LCM1	470μH
CY1/CY2	1nF/400VAC

Design Reference

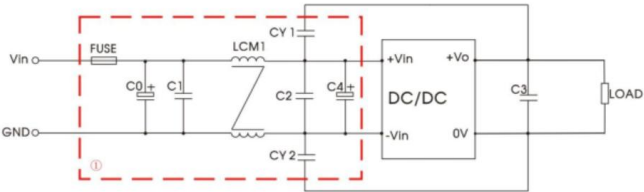
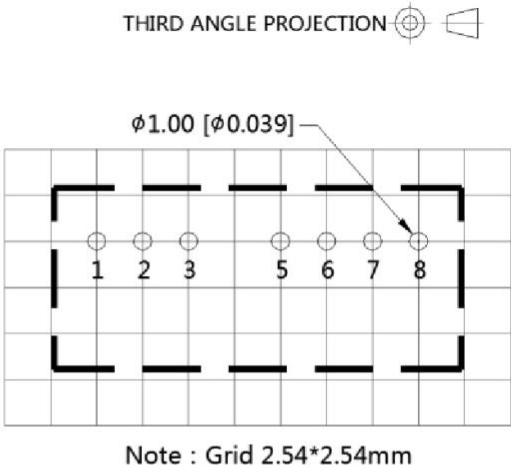
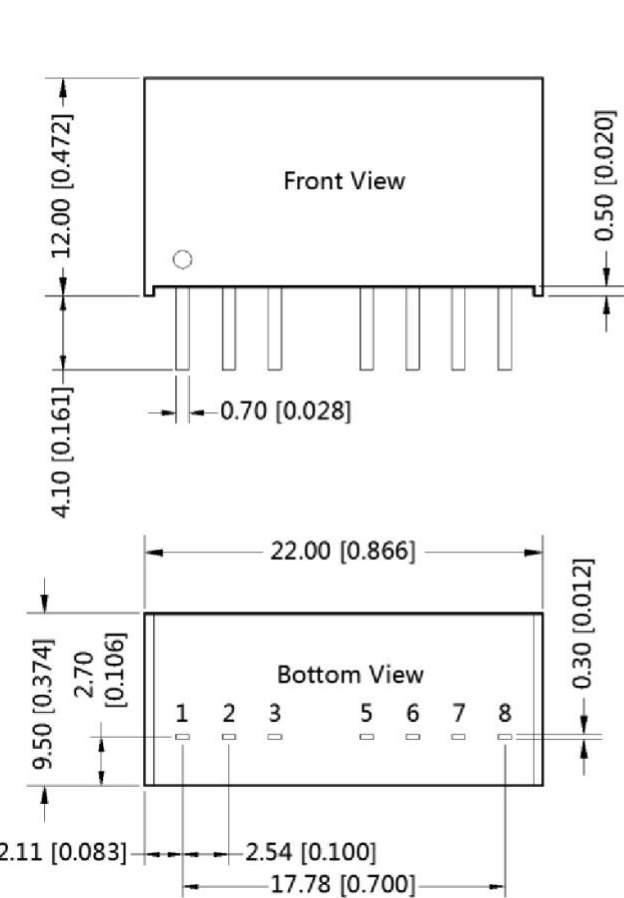


Fig. 5
Notes: For EMC and EMI tests we use Part ① in Fig. 5.

Model	Vin: 48VDC
FUSE	Choose according to actual input current
C0	200μF/100V
C1/C2	10μF/100V
C3	22μF/100V
LCM1	470μH
C4	330μF/100V
CY1/CY2	1nF/400VAC

Dimensions and Recommended Layout



units: mm [inch]
pin section tolerance: ±0.10[±0.004]
general tolerance: ±0.50[±0.020]

PIN Out		
PIN	Function Single output	Function Dual output
1	GND	GND
2	Vin	Vin
3	Ctrl	Ctrl
5	NC	NC
6	+Vout	+Vout
7	0V	0V
8	NC	-Vout

NC: Pin to be isolated from circuitry.

Note:

1. The maximum capacitive load offered were tested at input voltage range and full load;
2. 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;
3. All index testing methods in this datasheet are based on company corporate standards;
4. We can provide product customization service, please contact our technicians directly for specific information;
5. Products are related to laws and regulations: see "Features" and "EMC";