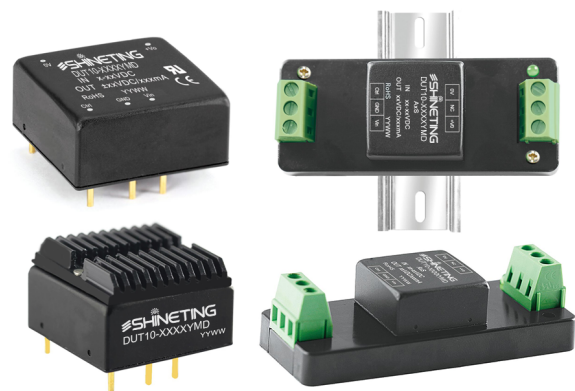


- Ultra-wide 4:1 input voltage range
- High efficiency up to 88%
- No-load power consumption as low as 0.12W
- I/O isolation test voltage 1.5k VDC
- Input under-voltage protection, output short-circuit, over-current, over-voltage protection
- Operating ambient temperature range: -40°C to +85°C
- Input reverse polarity protection available with Chassis (A2S) or 35mm DIN-Rail mounting (A4S) version

DUT10-XXXXYMD



RoHS



3-Year Warranty

Description

DUT10-XXXXYMD series are isolated 10W DC-DC converter products feature an ultra-wide with 4:1 input voltage with efficiencies of up to 88%, 1500VDC input to output isolation, operating ambient temperature range of -40°C to +85°C, input under-voltage protection, output short-circuit, over-current, over-voltage protection.

Selection Guide

Certificati on	Part No.	Input Voltage (VDC) Nomina l (Range)	Input Voltage (VDC) Max.	Output Voltage (Vdc)	Output Current (mA) Max./Min.	Full Load Efficiency (%) Min./Typ.	Capacitive Load(μF) Max.
/	DUT10-2403YMD	24 (9-36)	40	3.3	2400/0	75/77	2200
	DUT10-2405YMD			5	2000/0	80/82	2200
	DUT10-2409YMD			9	1111/0	83/85	680
	DUT10-2412YMD			12	833/0	84/86	470
	DUT10-2415YMD			15	667/0	84/86	330
	DUT10-2424YMD			24	416/0	86/88	100

Selection Guide

Certificati on	Part No.	Input Voltage (Vdc) Nomina l (Range)	Input Voltage (VDC) Max.	Output Voltage (Vdc)	Output Current (mA) Max./Min.	Full Load Efficiency (%) Min./Typ.	Capacitive Load(μF) Max.
/	*DUT10-4803YMDH	48 (18-75)	80	3.3	2400/0	77/79	2200
	*DUT10-4805YMDH			5	2000/0	81/83	2200
	*DUT10-4812YMDH			12	833/0	85/87	470
	*DUT10-4815YMDH			15	667/0	85/87	330
	*DUT10-4824YMDH			24	416/0	86/88	100

Notes:
1. Use “H” suffix for heat sink mounting,

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	24VDC nominal input series, nominal input voltage	3.3VDC output	--	429/5	440/12	mA
		Others	--	502/5	521/12	
	48VDC nominal input series, nominal input voltage	3.3VDC output	--	190/4	215/8	
		Others	--	251/4	258/8	
Reflected Ripple Current	24VDC nominal input series, nominal input voltage		--	40	--	
	48VDC nominal input series, nominal input voltage		--	30	--	
Surge Voltage (1sec. max.)	24VDC nominal input series		-0.7	--	50	VDC
	48VDC nominal input series		-0.7	--	100	

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Start-up Voltage	24VDC nominal input series	--	--	9	VDC
	48VDC nominal input series	--	--	18	
Input Under-voltage Protection	24VDC nominal input series	5.5	6.5	--	
	48VDC nominal input series	12	15.5	--	
Start-up Time	Nominal input voltage & constant resistance load	--	10	--	ms
Input Filter		Pi filter			
Hot Plug		Unavailable			
Ctrl *	Module on	Ctrl pin open or pulled high (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
Voltage Accuracy①	0%-100% load		--	±1	±3	%
Linear Regulation	Input voltage variation from low to high at full load	Vo1	--	±0.2	±0.5	
		Vo2	--	±0.5	±1	
Load Regulation②	5%-100% load	Vo1	--	±0.5	±1	
		Vo2	--	±0.5	±1.5	
Cross Regulation	Dual output, Vo1 load at 50%, Vo2 load at range of 10%-100%		--	--	±5	
Transient Recovery Time	25% load step change, nominal input voltage		--	300	500	μs
Transient Response Deviation			--	±3	±5	%

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Temperature Coefficient	Full load	--	--	±0.03	%/℃
Ripple & Noise③	20MHz bandwidth, 5%-100% load	--	40	80	mVp-p
Over-voltage Protection	Input voltage range	110	--	160	%Vo
Over-current Protection		110	140	190	%Io
Short-circuit Protection		Continuous, self-recovery			

Note:
①Output voltage accuracy of ±5VDC/±9VDC output converter for 0%-5% load is ±5% max;
②Load regulation for 0%-100% load is ±5%;
③Under 0% -5% load conditions, ripple & noise does not exceed 5%Vo. 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	Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max.	1500	--	--	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	--	+85	℃
Storage Temperature		-55	--	+125	
Storage Humidity	Non-condensing	5	--	95	%RH
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	+300	℃
Vibration		IEC/EN61373 - Category 1, Grade B			
Switching Frequency *	PWM mode	--	350	--	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	Aluminum alloy		
Dimensions	Horizontal package (without heat sink)		25.40 × 25.40 × 11.70 mm
	Horizontal package (with heat sink)		25.40 × 25.40 × 16.20 mm
Weight	without heat sink	Horizontal package/	12.5g/36.0g/56.0g (Typ.)
	with heat sink	Horizontal package	17g
Cooling method	Free air convection		

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS A (without extra components)/ CLASS B (see Fig.3-② for recommended circuit)
	RE	CISPR32/EN55032	CLASS A (without extra components)/ CLASS B (see Fig.3-② for recommended circuit)
Immunity	ESD	IEC/EN61000-4-2	Contact ±4kV 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 B
	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
	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-29	0%, 70% perf. Criteria B

Electromagnetic Compatibility (EMC) (EN50155)

Emissions	CE	EN50121-3-2 150kHz-500kHz 99dBuV(see Fig.3-2 for recommended circuit) EN55016-2-1 500kHz-30MHz 93dBuV(see Fig.3-2 for recommended circuit)
	RE	EN50121-3-230MHz-230MHz 40dBuV/m at 10m(see Fig.3-2 for recommended circuit) EN55016-2-1230MHz-1GHz 47dBuV/m at 10m(see Fig.3-2 for recommended circuit)
Immunity	ESD	EN50121-3-2 Contact ±6kV/Air ±8kV perf. Criteria A
	RS	EN50121-3-2 20V/m perf. Criteria A
	EFT	EN50121-3-2 ±2kV 5/50ns 5kHz (see Fig.3-① for recommended circuit) perf. Criteria A
	Surge	EN50121-3-2 line to line ±1kV (42Ω, 0.5μF) (see Fig.3-① for recommended circuit) perf. Criteria A
	CS	EN50121-3-2 0.15MHz-80MHz 10V r.m.s perf. Criteria A

Typical Characteristic Curves

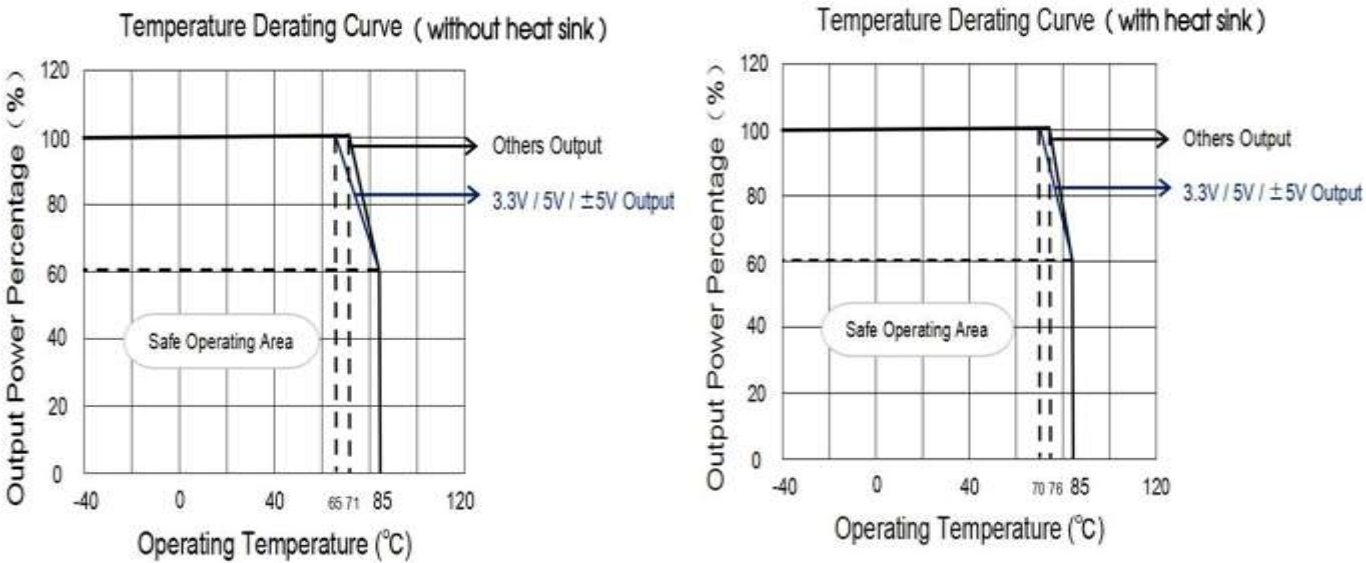
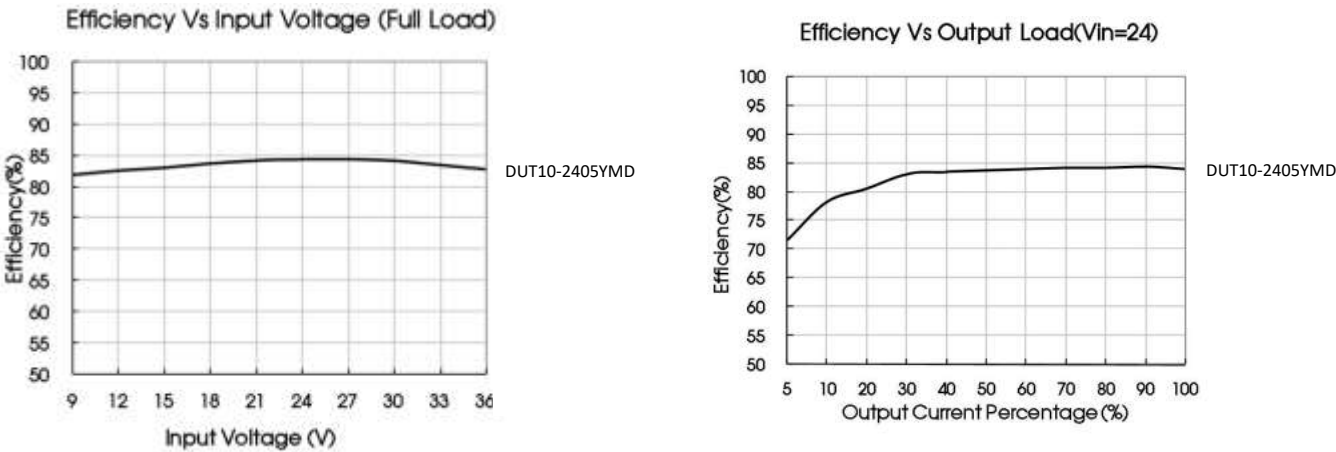


Fig. 1

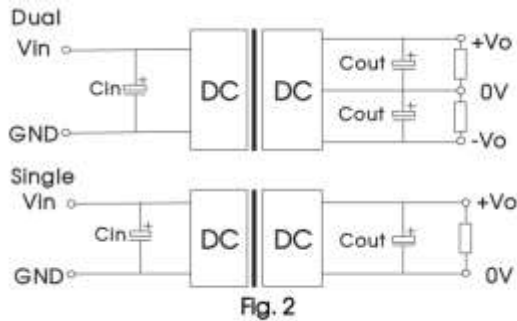
Typical Characteristic Curves



Design Reference

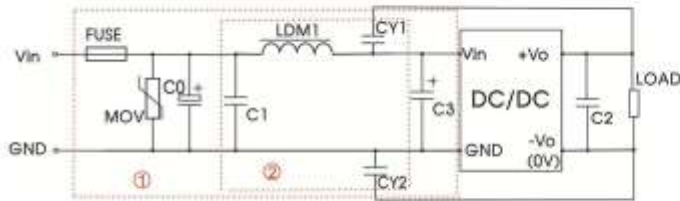
1. Typical application

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



Vin(VDC)	Vout(VDC)	Cin	Cout
24	3.3/5/±5	100μF/50V	10μF/16V
	9/12/15/±9/±12/±15		10μF/25V
	24/±24		10μF/50V
48	3.3/5/±5	10μF - 47μF/100V	10μF/16V
	9/12/15/±9/±12/±15		10μF/25V
	24/±24		10μF/50V

2. EMC compliance circuit



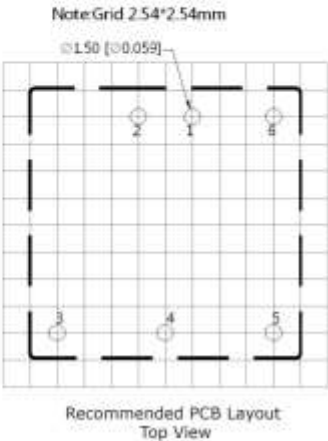
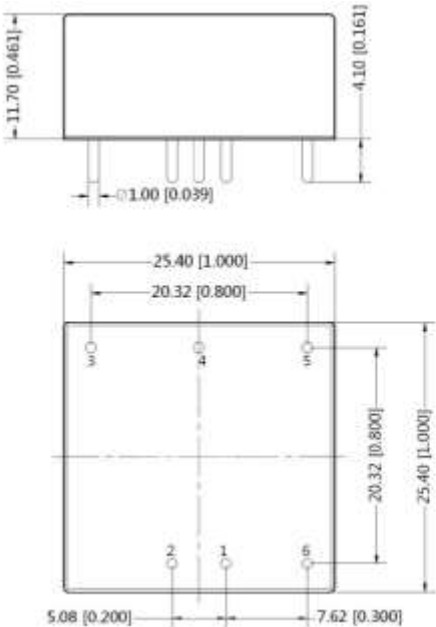
Notes: For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs.

Parameter description:		
Model	Vin: 24VDC	Vin: 48VDC
FUSE	Choose according to actual input current	
MOV	S20K30	S14K60
C0, C3	330μF/50V	330μF/100V
C1	1μF/50V	1μF/100V
C2	Refer to the Cout in Fig.2	
LDM1	4.7μH	
CY1, CY2	1nF/2kV	

Horizontal Package (without heat sink) Dimensions and Recommended Layout

units: mm [inch]
tolerance: $\pm 0.50[\pm 0.020]$
pin diameter tolerance: $\pm 0.10[\pm 0.004]$

PIN CONNECTIONS		
PIN	Function	
	Single	Dual
1	GND	GND
2	Vin	Vin
3	+Vout	+Vout
4	No Pin	0V
5	0V	-Vout
6	CTRL	CTRL



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 $T_a=25^{\circ}\text{C}$, humidity $<75\%\text{RH}$ with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on company corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";