

- Ultra-wide 4:1 input voltage range
- High efficiency up to 84%
- No-load power consumption as low as 0.10W
- I/O Isolation test voltage 1.5k VDC
- Input under-voltage protection, output
- short-circuit protection, over-current protection
- Operating ambient temperature range:
-40°C to +85°C
- Industry standard pin-out

DUT3-XXXXMT



RoHS

3-Year Warranty

Description

DUT3-XXXXMT series of isolated 3W DC-DC converter products with an ultra-wide range of voltage input of 9-36VDC, 18-75VDC, input to output isolation is tested with 1500VDC, input under-voltage protection, output short-circuit, over-current protection, they are widely used in fields such as industrial control, electric power, instruments and communication.

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 Load⑤ (μF)Max.
/	DUT3-2403MT	24 (9-36)	40	3.3	728/0	73/75	2200
	DUT3-2405MT			5	600/0	78/80	2200
	DUT3-2409MT			9	333/0	78/80	1000
	DUT3-2412MT			12	250/0	80/82	680
	DUT3-2415MT			15	200/0	81/83	470
	DUT3-2424MT			24	125/0	80/82	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.
/	DUT3-4803MT	48 (18-75)	80	3.3	728/0	73/75	2200
	DUT3-4805MT			5	600/0	77/79	2200
	DUT3-4812MT			12	250/0	80/82	680
	DUT3-4815MT			15	200/0	82/84	470
	DUT3-4824MT			24	125/0	80/82	100

Notes:
①Exceeding the maximum input voltage may cause permanent damage;efficiency is measured at nominal input voltage and rated output load.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	24VDC input series nominal input voltage	3.3V Output	--	134/4	138/7	mA
		24V Output	--	152/4	156/12	
		Others	--	154/4	161/7	
	48VDC input series nominal input voltage	3.3V Output	--	67/4	69/7	
		Others	--	77/4	82/7	
Reflected Ripple Current	Nominal 24VDC input series		--	120	--	
	Nominal 48VDC input series		--	60	--	

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Surge Voltage (1sec. max.)	Nominal 24VDC input series	-0.7	--	50	VDC
	Nominal 48VDC input series	-0.7	--	100	
Start-up Voltage	Nominal 24VDC input series	--	--	9	
	Nominal 48VDC input series	--	--	18	
Input Under-voltage Protection	Nominal 24VDC input series	5.5	6.5	--	
	Nominal 48VDC input series	13	15.5	--	
Start-up Time	Nominal input voltage & constant resistance load	--	10	--	ms
Input Filter		C filter			
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
Hot Plug		Unavailable			

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

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Voltage Accuracy		--	±1	±3	%
Linear Regulation	Input voltage variation from low to high at full load	--	±0.2	±0.5	
Load Regulation	0%-100% load	--	±0.5	±1	
Transient Recovery Time	25% load step change, nominal input voltage	--	300	500	μs
Transient Response Deviation		--	±3	±5	%
Temperature Coefficient	Full load	--	--	±0.03	%/°C
Ripple & Noise*	20MHz bandwidth , 5%-100% load	--	30	120	mVp-p
Over-current Protection	Input voltage range	--	150	250	%Io
Short-circuit Protection		Continuous			

Note: *Under 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	°C
Storage Temperature		-55	--	+125	
Case Temperature Rise	Ta=25°C, nominal input, full load output	--	+40	--	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	+300	
Storage Humidity	Non-condensing	5	--	95	%RH
Reflow Soldering Temperature		Peak temp.≤245°C, maximum duration time≤60s at 217°C. For actual application, please refer to IPC/JEDEC J-STD-020D.1.			
Vibration		10-55Hz, 10G, 30 Min. along X, Y and Z			
Switching Frequency *	PWM Mode	--	350	--	kHz
MTBF	MIL-HDBK-217F@25°C	1000	--	--	k hours
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1	Level 1			

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

Physical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant
Dimensions	19.20 x 18.10 x 10.16 mm
Weight	3.5g(Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B (see Fig.3-② for recommended circuit)
	RE	CISPR32/EN55032 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.3-① for 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

Typical Characteristic Curves

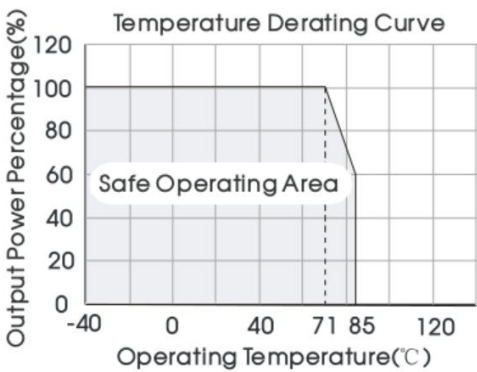
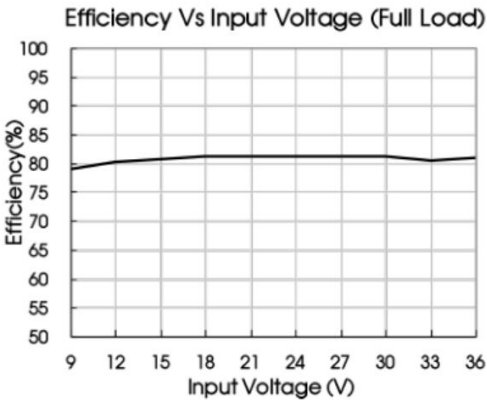
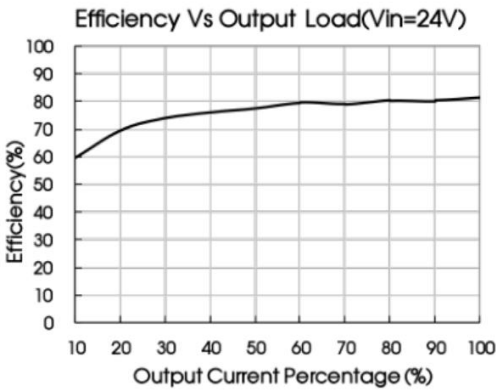


Fig. 1

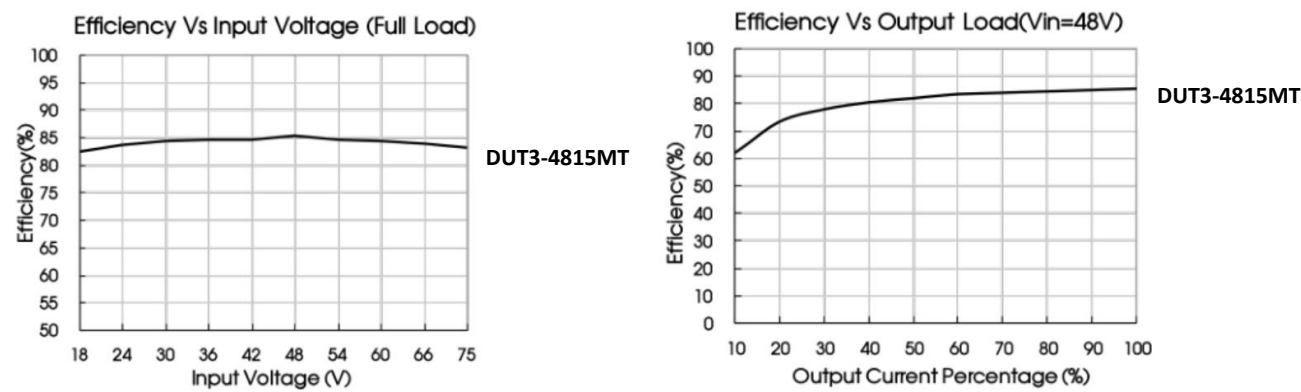


DUT3-2405MT



DUT3-2405MT

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 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 specified max. capacitive load value of the product.



Fig. 2

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

2. EMC compliance circuit

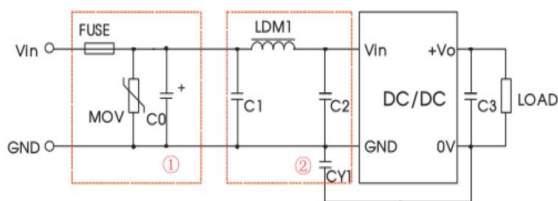


Fig. 3

Notes: We use Part ① in Fig. 3 for Immunity and part ② for emissions test. Selecting based on needs.

Parameter description:

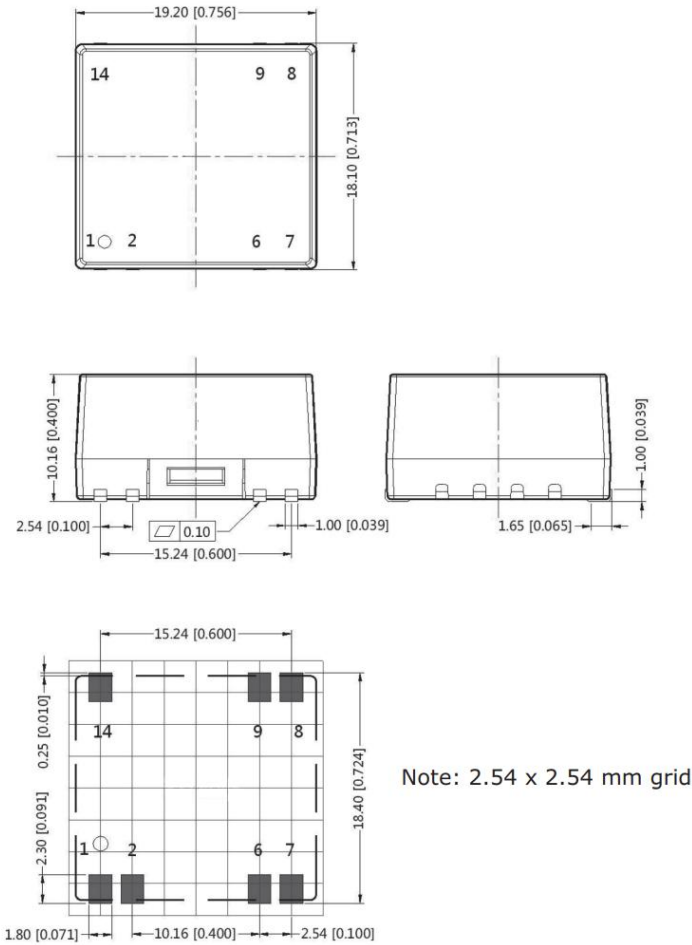
Model	Vin: 24VDC	Vin: 48VDC
FUSE	Choose according to actual input current	
MOV	S20K30	S14K60
C0	680μF/50V	680μF/100V
C1/C2	4.7μF/50V	4.7μF/100V
C3	Refer to the Cout in Fig.2	
LDM1	12μH	
CY1	1nF/2kV	

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
1	GND
2	CTRL
6	NC
7	NC
8	+Vout
9	0V
14	Vin

NC=no connection



Recommended PCB Layout
Top View

- Note:
- 1. Recommend to use module with more than 5% load, if not, the ripple of the product may exceeds the specification, but does not affect the reliability of the product;
 - 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°C, 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. 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";