DC-DC Converters

## Product Feature

1. Package Type：SIP8
2. Operating Temperature Range：-40℃ - +105℃
3. Isolation Voltage：1500VDC
4. 2:1 Wide Input Voltage Range
5. With the output overcurrent protection and output short-circuit protection mechanism
6. Fields of application：electric power, industrial control, communication, Internet of Things, automobile, etc.
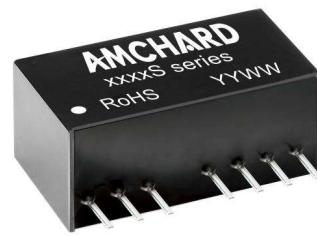
RoHS CE 3 years Warranty

Selection Guide

Part No.	Input Voltage (VDC) Nominal (Range)	Output Voltage (VDC)	Output Current (mA) Max.	Output Current (mA) Min.	Ripple & noise （Typ./Max.）(mVp-p)	Full Load Efficiency% （Min./Typ.）	Capacitive Load Max. (μF)
BTB0503S-1WR2	5 (4.5-9)	3.3	303	15	70/100	66/68	1800
BTB0505S-1WR2		5	200	10		71/73	2200
BTB0512S-1WR2		12	83	4		75/77	681
BTB0515S-1WR2		15	67	3		72/74	470
BTB0524S-1WR2		24	42	2		74/76	330
BTA0505S-1WR2		±5	±100	±5		72/74	#1000
BTA0512S-1WR2		±12	±42	±2		75/77	#470
BTA0515S-1WR2		±15	±33	±2		75/77	#330
BTB1203S-1WR2	12 (9-18)	3.3	303	15	100/150	73/75	2700
BTB1205S-1WR2		5	200	10		74/76	2200
BTB1209S-1WR2		9	111	6		76/78	1000
BTB1212S-1WR2		12	83	4		80/82	680
BTB1215S-1WR2		15	67	3		81/83	471
BTB1224S-1WR2		24	42	2		79/81	330
BTA1205S-1WR2		±5	±100	±5		76/78	#1000
BTA1212S-1WR2		±12	±42	±2		77/79	#470
BTA1215S-1WR2		±15	±33	±2		78/80	#330
BTB2403S-1WR2	24 (18-36)	3.3	303	15	70/100	72/74	2700
BTB2405S-1WR2		5	200	10		79/81	2200
BTB2412S-1WR2		12	83	4		81/83	680
BTB2415S-1WR2		15	67	3		81/83	470
BTB2424S-1WR2		24	42	2		81/83	330
BTA2405S-1WR2		±5	±100	±5		77/79	#1000
BTA2412S-1WR2		±12	±42	±2		81/83	#470
BTA2415S-1WR2		±15	±33	±2		81/83	#330
BTB0503S-1WR2	48 (36-75)	3.3	303	15	100/150	73/75	2700
BTB0505S-1WR2		5	200	10		74/76	2200
BTB0512S-1WR2		12	83	4		78/80	680
BTB0515S-1WR2		15	67	3		82/84	470
BTB0524S-1WR2		±5	±100	±5		77/79	#1000

BTA0505S-1WR2		±12	±42	±2		80/82	#470
BTA0512S-1WR2		±15	±33	±2		80/82	#330

each output

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load/no load)	5VDC input	--	281/40	290/60	mA
	12VDC input	--	111/15	114/30	
	24VDC input	--	55/6	57/10	
	48VDC input	--	27/4	28/6	
Reflected Ripple Current	5VDC input	--	30	--	
	12VDC input	--	40	--	
	24VDC input	--	55	--	
	48VDC input	--	4	--	
Impulse Voltage	5VDC input	-0.7	--	12	VDC
	12VDC input	-0.7	--	25	
	24VDC input	-0.7	--	50	
	48VDC input	-0.7	--	100	
Starting Voltage	5VDC input	--	--	4.5	
	12VDC input	--	--	9	
	24VDC input	--	--	18	
	48VDC input	--	--	36	
Input Filter	Capacitance Filter				
Hot Plug	Unavailable				
CTRL	Module off	0-0.7V turn off			
	Module on	No connect or 3.5-12V on			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	5% - 100% Load,Input Voltage Range	--	±1.0	±3.0	%
No-load Output Voltage Accuracy	Input Voltage Range	--	±1.5	±5.0	
Linear Regulation	Full load, Intput voltage from low limit to high limit	--	±0.2	±0.5	
Load Regulation	5% - 100% Load	--	±0.4	±0.75	
Transient Recovery Time	25% load step change	--	0.5	2	ms
Transient Response Deviation		--	±2.5	±5	%
Temperature Coeffcient	Full Load	--	±0.02	±0.03	%/°C
Short-circuit Protection	Continuous, Self-Recovery				

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Insulation Voltage	Input-output, test time 1 minute, leakage current less than 1mA	1500	--	--	VDC
Insulation Resistance	Input-output, insulated voltage 500VDC	1000	--	--	MΩ

Isolation Capacitance	Input-output, 100KHz/0.1V	--	120	--	pF
Operating Temperature	Derating when operating temperature≥85℃, (See Figure 1)	-40	--	85	℃
Storage Temperature		-55	--	105	
Storage Humidity	Non-condensing	--	--	95	%RH
Pin welding can withstand the highest temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	300	℃
Switching Frequency	Full load, nominal input voltage	150	208	300	kHz
MTBF	MIL-HDBK-217F@25℃	>1000Kh			

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant（UL94V-0）
Package Dimensions	22.00 * 12.00 * 9.50 mm
Weight	3.8g(Typ.)
Cooling Method	Free air convection

EMC Specifications

| EMI	CE	CISPR32/EN55032 CLASS B (The recommended circuit is shown in Figure 3-②)	
	RE	CISPR32/EN55032 CLASS B (The recommended circuit is shown in Figure 3-②)	
EMS	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 (The recommended circuit is shown in Figure 3-①)	Perf.Criteria B
	Surge	IEC/EN61000-4-5 line to line±2KV (The recommended circuit is shown in Figure 3-①)	Perf.Criteria B
	Cs	IEC/EN61000-4-6 3 Vr.m.s	Perf.Criteria A

Typical Characteristic Curves

Figure 1

Efficiency VS Input Voltage (full load)

BTA2405S-1WR2

Efficiency VS Output Load（Vin=24V）

BTA2405S-1WR2

Efficiency VS Input Voltage (full load)

BTB2405S-1WR2

Efficiency VS Output Load（Vin=24V）

BTB2405S-1WR2
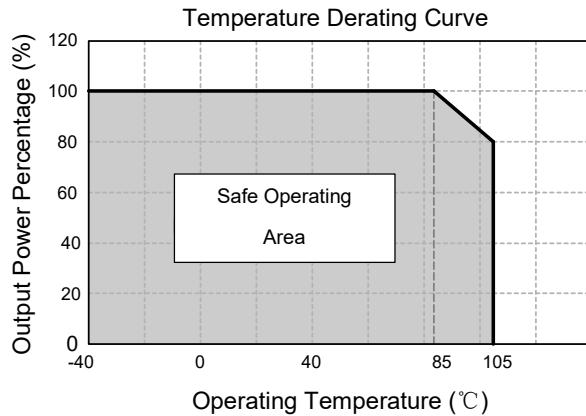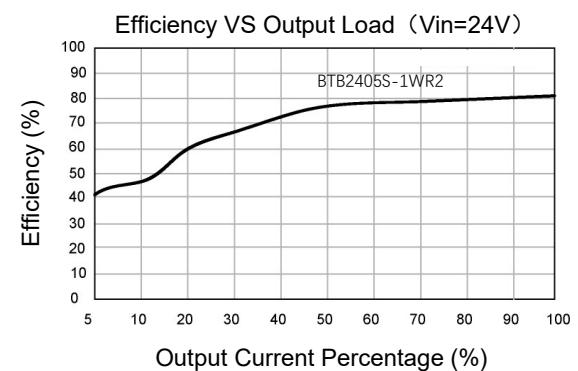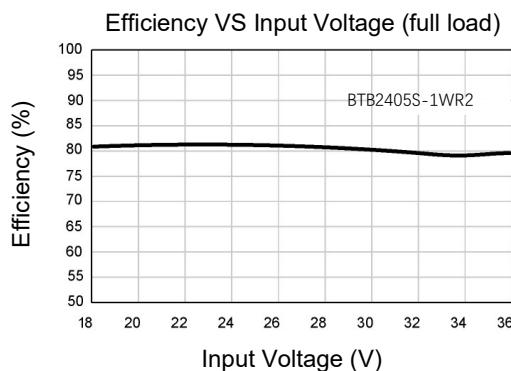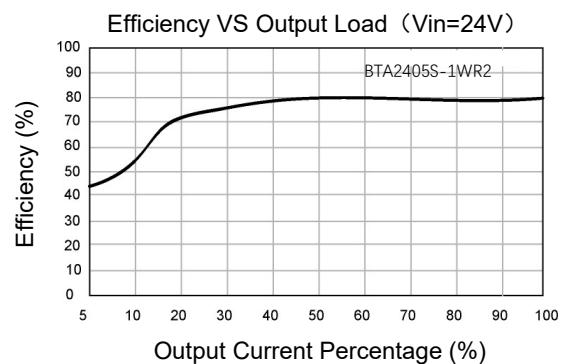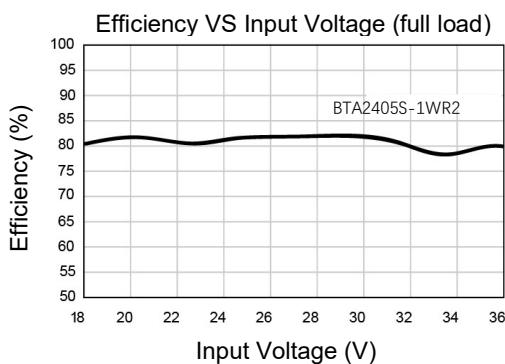
Circuit Design and Application

Figure 2
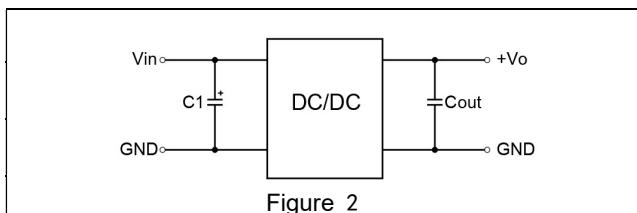
Recommended Capacitive Load Value Table	
Cin(µF)	Cout(µF)
100	10

Figure 3
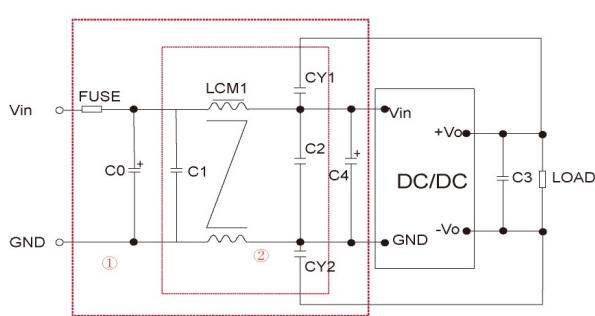
EMI Recommended Parameter Table		
Model	Vin:12V	Vin:24V
FUSE	Select according to the actual input current of the customer	
C0、C4	330uF/35V	330uF/50V
C1、C2	10µF/50V	
LCM1	1.4-1.7mH	
C3	22µF/50V	
CY1、CY2	1nF/400VAC	

Note: Part 1 in Figure 3 is for EMC testing; The second part is used for EMI filtering, which can be selected according to the demand.

Dimensions and Recommended Layout

Dimensions	PCB Printing Layout & Pin Definition Table

Front View

22,00 [0,866]
12,00 [0,472]
4,00 [0,157]
0,50 [0,020]
2,54 [0,100]
5,08 [0,200]

Bottom View

9,50 [0,374]
0,30 [0,012]
0,50 [0,020]
2,50 [0,098]

Ø1.0[Ø0.039]
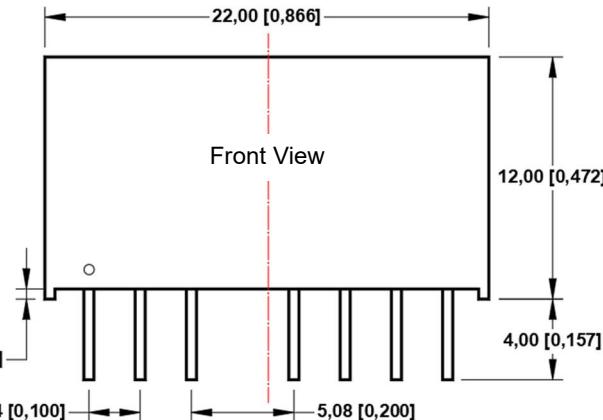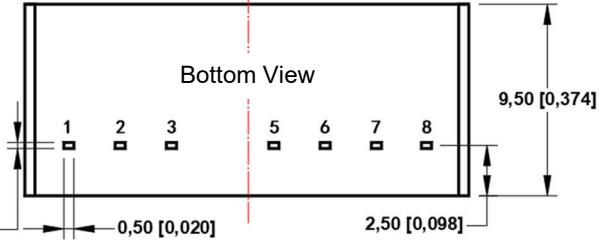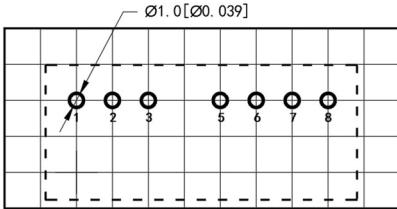
Note：The grid distance is

| Pin	Function (single)	Function (double)
1	GND	GND
2	Vin	Vin
3	CTRL	CTRL
5	NC	NC
6	+Vo	+Vo
7	-Vo	COM
8	NC	-Vo

NC：Pin to be isolated from circuity

Note:
Unit: mm[inch]
Pin section tolerances:±0.10[±0.004]
General tolerances:±0.50[±0.020]

Note:

1. If the product works under the minimum required load, it cannot guarantee that the performance of the product complies with all the performance indicators in this manual;

2. The maximum capacitive load is tested under the input voltage range and full load condition;

3. Unless otherwise stated, all indexes in this manual are measured at Ta=25℃, humidity <75%RH, nominal input voltage and rated output load;

4. All index testing methods in this manual are based on the enterprise standards of the company;

5. Our company can provide product customization, specific needs can directly contact our technical staff.