

DESCRIPTIONS

DC-DC converter, 1W, Fixed input, Isolated and unregulated single output



Report

EN62368-1



Report

BS EN62368-1

FEATURES

- Continuous short-circuit protection
- No-load input current as low as 8mA
- Operating ambient temperature range: -40°C to +105°C
- High efficiency up to 85%
- Compact SMD package
- I/O isolation test voltage: 3k VDC
- Industry standard pin-out

APPLICATIONS

- pure digital circuits
- low frequency analog circuits
- relay-driven circuits
- data switching circuits

Selection Guide

Certification	Part No.	Input Voltage (VDC)	Output		Full Load Efficiency (%) Min./Typ.	Capacitive Load(μF) Max.
		Nominal (Range)	Voltage (VDC)	Current (mA) Max./Min.		
EN/BS EN	DFXT1-F0303	3.3	3.3	303/30	73/77	2400
	DFXT1-F0305	(2.97-3.63)	5	200/20	78/82	2400
	DFXT1-F0503	5 (4.5-5.5)	3.3	303/30	70/74	2400
	DFXT1-F0505		5	200/20	78/82	2400
	DFXT1-F0509		9	111/12	79/83	1000
	DFXT1-F0512		12	84/9	79/83	560
	DFXT1-F0515		15	67/7	79/83	560
	DFXT1-F0524		24	42/4	81/85	220
	DFXT1-F1203	12 (10.8-13.2)	3.3	303/30	72/76	2400
	DFXT1-F1205		5	200/20	78/82	2400
	DFXT1-F1209		9	111/12	79/83	1000
	DFXT1-F1212		12	84/9	79/83	560
	DFXT1-F1215		15	67/7	79/83	560

	DFXT1-F1224		24	42/4	81/85	220
	DFXT1-F1505	15 (13.5-16.5)	5	200/20	78/82	2400
	DFXT1-F1509		9	111/12	78/82	1000
	DFXT1-F1515		15	67/7	79/83	560
	DFXT1-F2403	24 (21.6-26.4)	3.3	303/30	72/76	2400
	DFXT1-F2405		5	200/20	74/80	2400
	DFXT1-F2409		9	111/12	74/80	1000
	DFXT1-F2412		12	84/9	74/80	560
	DFXT1-F2415		15	67/7	74/80	560
	DFXT1-F2424		24	42/4	74/80	220

Product characteristics

Product characteristics	Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	Input Current (full load / no-load)	3.3VDC input	3.3VDC output	--	394/12	416/--	mA
			5VDC output	--	370/12	389/--	
		5VDC input	3.3VDC/5VDC output	--	270/8	286/--	
			9VDC/12VDC output	--	241/12	254/--	
			15VDC/24VDC output	--	241/18	254/--	
		12VDC input	3.3VDC output	--	110/8	116/--	
			5VDC output	--	102/8	107/--	
			9VDC/12VDC/15V DC output	--	101/8	106/--	
			24VDC output	--	99/8	103/--	
		15VDC input	5VDC/9VDC output	--	82/8	86/--	
			15VDC output	--	81/8	85/--	
		24VDC input	3.3VDC output	--	55/8	58/--	
			5VDC output	--	53/8	57/--	
			9VDC/12VDC/15V DC output	--	51/8	55/--	
			24VDC output	--	53/8	57/--	
	Reflected Ripple Current*	3.3VDC input		--	30	--	VDC
		Other input		--	15	--	
	Surge Voltage(1sec. max.)	3.3VDC input		-0.7	--	5	
		5VDC input		-0.7	--	9	
		12VDC input		-0.7	--	18	
		15VDC input		-0.7	--	21	
		24VDC input		-0.7	--	30	
	Input Filter	Capacitance filter					

	Hot Plug	Unavailable
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Output Specifications	Voltage Accuracy				See output regulation curves (Fig. 1)			
	Linear Regulation	Input voltage change: ±1%		3.3VDC output	--	--	1.5	--
				Others	--	--	1.2	
	Load Regulation	10%-10 0% load	3.3VDC input	3.3VDC output	--	15	20	%
				5VDC output	--	10	15	
			5VDC input	3.3VDC output	--	15	20	
				5VDC output	--	10	15	
				9VDC output	--	8	10	
				12VDC output	--	7	10	
				15VDC output	--	6	10	
				24VDC output	--	5	10	
	Load Regulation	10%-10 0% load	12VDC/15VDC/ 24VDC input	3.3VDC output	--	8	20	%
				5VDC output	--	5	15	
				9VDC output	--	3	10	
				12VDC output	--	3	10	
15VDC output				--	3	10		
24VDC output				--	2	10		
Ripple & Noise*	20MHz bandwidth	3.3VDC input		--	50	100	mVp-p	
		5VDC/12VDC/15V DC/24VDC input	Other output	--	30	75		
			24VDC output	--	50	100		
Temperature Coefficient	Full load				--	±0.02	--	%/°C
Short-Circuit Protection					Continuous, self-recovery			
General Specifications	Isolation	Input-output electric strength test for 1 minute with a leakage current of 1mA max.			3000	--	--	VDC
	Insulation Resistance	Input-output resistance at 500VDC			1000	--	--	MΩ
	Isolation Capacitance	Input-output capacitance at 100kHz/0.1V			--	20	--	pF
	Operating Temperature	3.3VDC input	Derating when operating temperature≥85°C, (see Fig. 2)		-40	--	105	°C
		Other input	Derating when operating temperature≥100°C, (see Fig. 2)					
	Storage Temperature				-55	--	125	
	Case Temperature Rise	Ta=25°C	5VDC input	3.3VDC output	--	25	--	
				Other output	--	15	--	
			Other input		--	25	--	
	Storage Humidity	Non-condensing		5VDC input	--	--	95	%RH
Other input				5	--	95		
Reflow Soldering					Peak temp.≤245°C, maximum duration times≤			

	Temperature*			60s over 217°C			
	Vibration	3.3VDC/12VDC/15VDC/24VDC input		10-150Hz, 5G, 0.75mm. along X, Y and Z			
	Switching Frequency	Full load, nominal input voltage	3.3VDC input	--	220	--	kHz
			5VDC input	--	270	--	
			12VDC/15VDC/24VDC input	--	260	--	
	MTBF	MIL-HDBK-217F@25°C		3500	--	--	k hours
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1		Level 1				
Mechanical Specifications	Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)					
	Dimensions	13.20 x 11.40 x 7.25 mm					
	Weight	1.4g(Typ.)					
	Cooling Method	Free air convection					

Note:

* Refer to DC-DC Converter Application Notes for detailed description of reflected ripple current test method.

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

*Please refer to IPC/JEDEC J-STD-020D.1.

Electromagnetic Compatibility (EMC)

Emissions	CE		CISPR32/EN55032	CLASS B	
	RE		CISPR32/EN55032	CLASS B	
Immunity	ESD	5VDC input	IEC/EN61000-4-2	Air ±8kV, Contact ±4kV	perf. Criteria B
		other input	IEC/EN61000-4-2	Air ±8kV, Contact ±6kV	perf. Criteria B

Note: Refer to Fig. 4 for recommended circuit test.

Typical Performance Curves

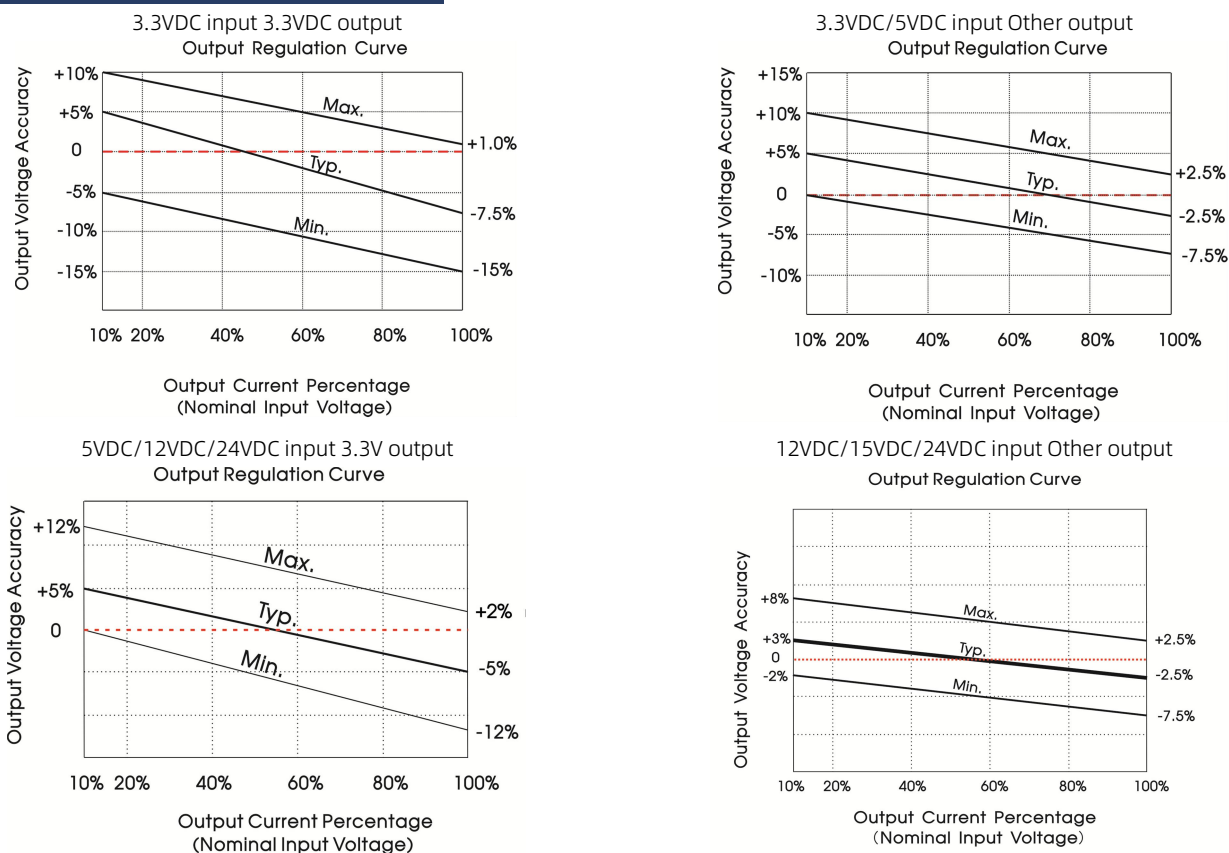


Fig. 1

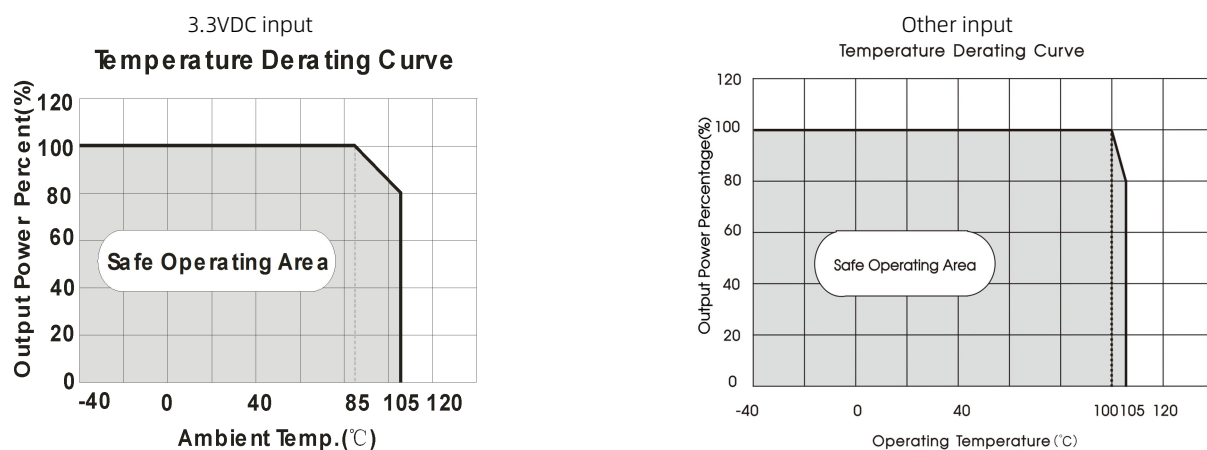
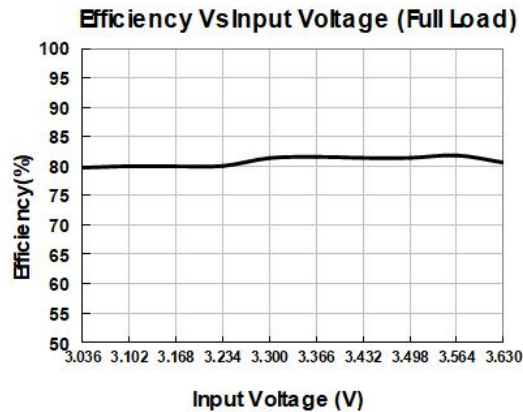


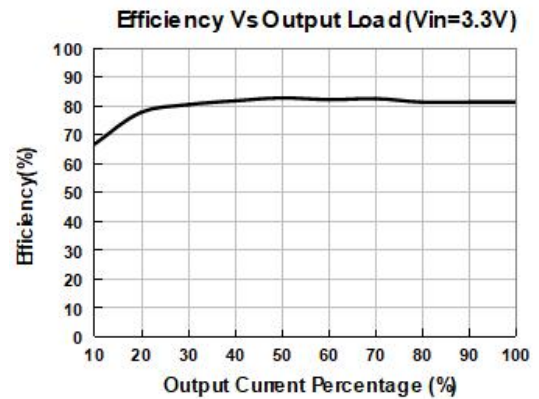
Fig. 2

3.3VDC input 5V output

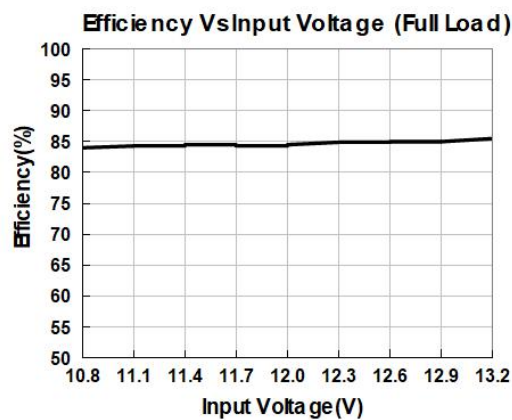
3.3VDC input 5V output



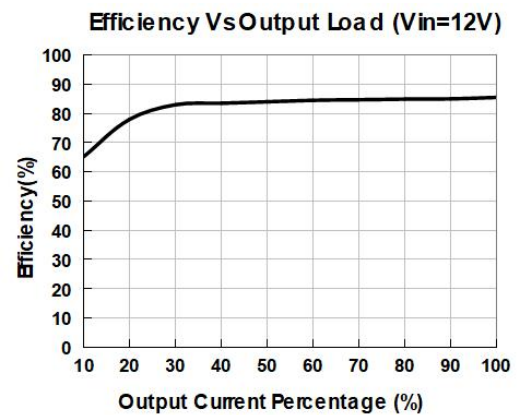
12VDC input 5V output



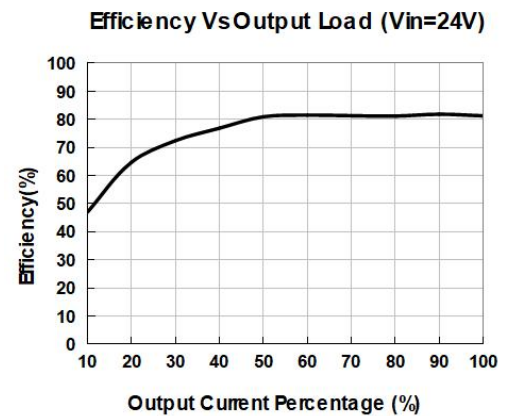
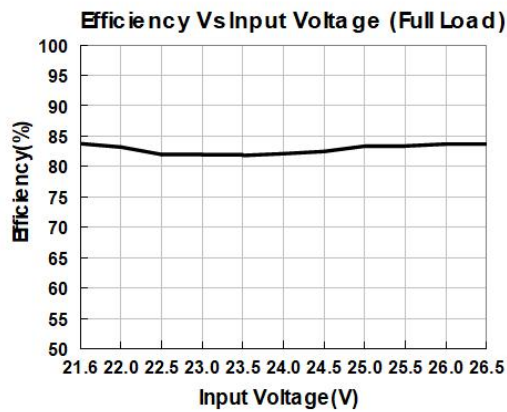
12VDC input 5V output



24VDC input 5V output



24VDC input 5V output



Design Reference

1. Typical application

Input and/or output ripple can be further reduced, by connecting a filter capacitor from the input and/or output terminals to ground as shown in Fig. 3.

Choosing suitable filter capacitor values is very important for a smooth operation of the modules, particularly to avoid start-up problems caused by capacitor values that are too high. For recommended input and output capacitor values refer to Table 1.

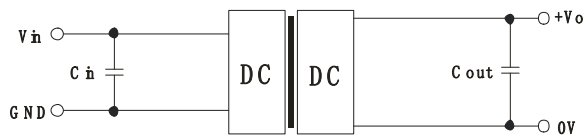


Fig. 3

Table2: Recommended input and output capacitor values

Vin	Cin	Vo	Cout
3.3VDC	4.7μF/16V	3.3VDC/5VDC	10μF/16V
5VDC	4.7μF/16V	9VDC	2.2μF/16V
12VDC	2.2μF/25V	12VDC	2.2μF/25V
15VDC	2.2μF/25V	15VDC	1μF/25V
24VDC	1μF/50V	24VDC	1μF/50V

2. EMC compliance circuit

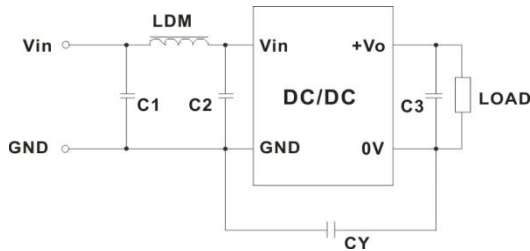


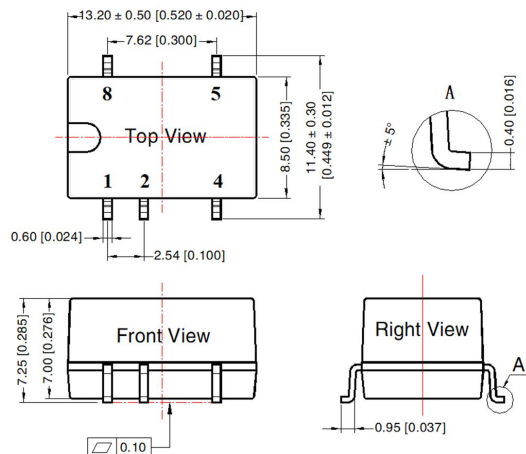
Fig. 4

Table2: EMC recommended circuit value table

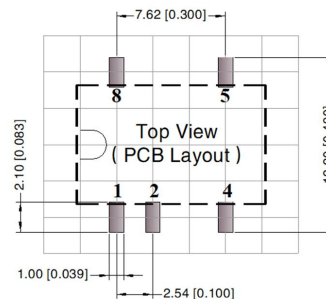
Input voltage		3.3VDC Input	5VDC Input		12/15/24VDC Input
Output voltage		--	3.3/5/9 VDC	12/15/24 VDC	--
EMI	C1, C2	4.7μF/16V	4.7μF/25V		4.7μF/50V
	CY	270pF/4kV	100pF/4kV	1000pF/4 kV	270pF/4kV
	C3	Refer to the Cout in table 1			
	LDM	6.8μH			

Note: In the case of actual use, the requirements for EMI are high, it is subject to CY.

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION 

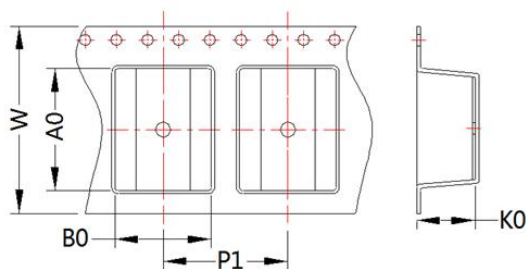
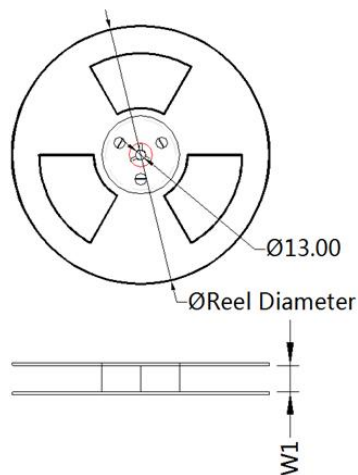
Note:
Unit: mm[inch]
Pin section tolerances: ± 0.10 [± 0.004]
General tolerances: ± 0.25 [± 0.010]



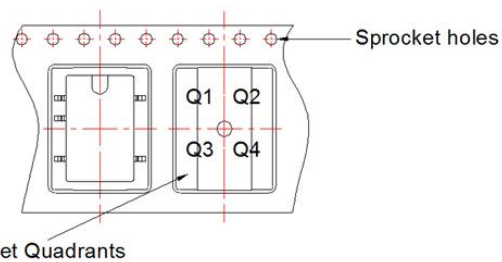
Note: Grid 2.54*2.54mm

Pin-Out	
Pin	Mark
1	GND
2	Vin
4	0V
5	+Vo
8	NC

NC: Pin to be isolated from circuitry



Quadrant assignments for PIN 1 orientation in tape



Pocket Quadrants

Package Type	Pin	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SMD	5	500	330.0	24.5	13.4	11.7	7.5	16.0	24.0	Q1

Notes:

- 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 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 our company corporate standards;
- 5.Products are related to laws and regulations: see "Features" and "EMC";
- 6.Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.