

DESCRIPTIONS

DC-DC converters, 1W, flexed input, unregulated single output



Report



Report

CB

RoHS

UL62368-1

EN62368-1

BS EN62368-1

IEC62368-1

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%
- I/O isolation test voltage: 1.5k 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	DFS1-B0303	3.3 (2.97-3.63)	3.3	303/30	75/79	2400
	DFS1-B0305		5	200/20	78/82	2400
	DFS1-B0309		9	111/11	81/85	1000
	DFS1-B0312		12	83/8	78/82	560
	DFS1-B0315		15	67/7	78/82	560
	DFS1-B0324		24	42/4	80/84	220
	DFS1-B0503	5 (4.5-5.5)	3.3	303/30	70/74	2400
UL/EN/ BS EN/IEC	DFS1-B0505		5	200/20	78/82	2400
EN/ BS EN	DFS1-B0509		9	111/12	79/83	1000
	DFS1-B0512		12	84/9	79/83	560
	DFS1-B0515		15	67/7	79/83	560
	DFS1-B0524		24	42/4	81/85	220
EN/ BS EN	DFS1-B1203	12 (10.8-13.2)	3.3	303/30	71/75	2400
	DFS1-B1205		5	200/20	76/80	2400
	DFS1-B1209		9	111/12	76/80	1000

	DFS1-B1212		12	83/9	76/80	560
	DFS1-B1215		15	67/7	77/81	560
	DFS1-B1224		24	42/5	77/81	220
	DFS1-B1505	15 (13.5-16.5)	5	200/20	76/80	2400
	DFS1-B1509		9	111/12	76/80	1000
	DFS1-B1512		12	83/9	76/80	560
	DFS1-B1515		15	67/7	77/81	560
--	DFS1-B1524		24	42/5	77/81	220
EN/ BS EN	DFS1-B2403	24 (21.6-26.4)	3.3	303/30	69/75	2400
	DFS1-B2405		5	200/20	73/79	2400
	DFS1-B2409		9	111/12	74/80	1000
	DFS1-B2412		12	83/9	75/81	560
	DFS1-B2415		15	67/7	75/81	560
	DFS1-B2424		24	42/5	75/81	220

Specifications

Characteristic	Item	Operating Conditions		Min.	Typ.	Max.	Unit	
Input Specifications	Input Current (full load / no-load)	3.3V input	3.3VDC output	--	384/10	405/--	mA	
			Other output	--	370/18	389/--		
		5V input	3.3VDC output	--	271/8	286/--		
			5VDC output	--	244/8	257/--		
			9VDC/12VDC/15VDC output	--	241/12	254/--		
			24VDC output	--	241/18	254/--		
		12V input	3.3VDC output	--	112/8	118/--		
			5VDC/9VDC/12VDC output	--	105/8	110/--		
			15VDC/24VDC output	--	103/8	109 /--		
		15V input	5VDC/9VDC/12VDC output	--	84/8	88/--		
			15VDC/24VDC output	--	83/8	87/--		
		24V input	3.3VDC output	--	56/8	61/--		
			5VDC output	--	53/8	58/--		
			9VDC output	--	53/8	57/--		
			12VDC/15VDC/24VDC output	--	52/8	56/--		
	Reflected Ripple Current				--	15	--	mA
	Surge Voltage(1sec. max.)	3.3VDC input		-0.7	--	5	VDC	
		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			

Output Specifications	Voltage Accuracy			See output regulation curves (Fig. 1)			
	Linear Regulation	Input voltage change: ±1%	3.3VDC output	--	--	1.5	--
			Other output	--	--	1.2	
	Load Regulation	3.3VDC input 10%-100% load	3.3VDC output	--	12	18	%
			Other output	--	8	15	
		5VDC input 10%-100% load	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	
		12VDC/15VDC/24VDC input 10%-100% load	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	Other output	--	30	75	mVp-p	
		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.		1500	--	--	VDC
		5V input, input-output electric strength test for 1 second with a leakage current of 1mA max.		3000	--	--	
	Insulation Resistance	Input-output resistance at 500VDC		1000	--	--	MΩ
	Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		--	20	--	pF
	Operating Temperature	3.3V input	Derating when operating temperature≥100°C, (see Fig. 2)	-40	--	105	°C
		Other input	Derating when operating temperature≥85°C, (see Fig. 2)				
	Storage Temperature			-55	--	125	
	Case Temperature Rise	Ta=25°C		--	25	--	
	Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds		--	--	300	
	Storage Humidity	Non-condensing	5V input	--	--	95	%RH
			Other output	5	--	95	
	Vibration	3.3V/12V/15V/24V input		10-150Hz, 5G, 0.75mm. along X, Y and Z			
	Switching Frequency	3.3V input, full load, nominal input voltage		--	220	--	kHz
		5V input, full load, nominal input voltage		--	270	--	
		12V/15V/24V input, full load, nominal input voltage		--	260	--	
	MTBF	MIL-HDBK-217F @ 25°C		3500	--	--	k hours

Mechanical Specifications	Case Material	Black plastic; flame-retardant and heat-resistant (UL94 V-0)
	Dimensions	11.60 x 6.00 x 10.16 mm
	Weight	1.3g (Typ.)
	Cooling Method	Free air convection
Note: The "parallel cable" method is used for Ripple and Noise test		

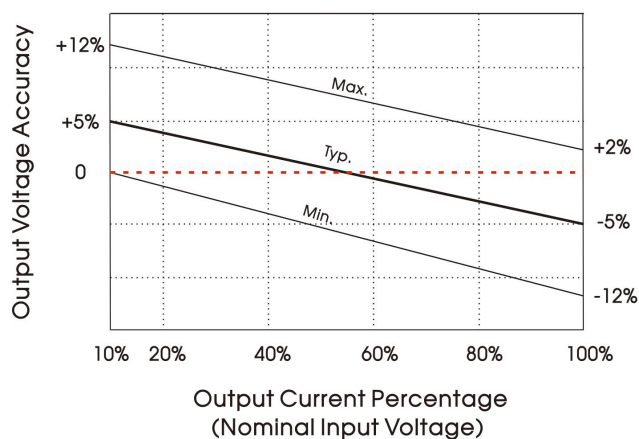
Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS B
	RE	CISPR32/EN55032	CLASS B
Immunity	ESD	IEC/EN61000-4-2	Air ±8kV, Contact ±6kV perf. Criteria B
Note: Refer to Fig. 4 for recommended circuit test.			

Typical Performance Curves

3.3VDC output

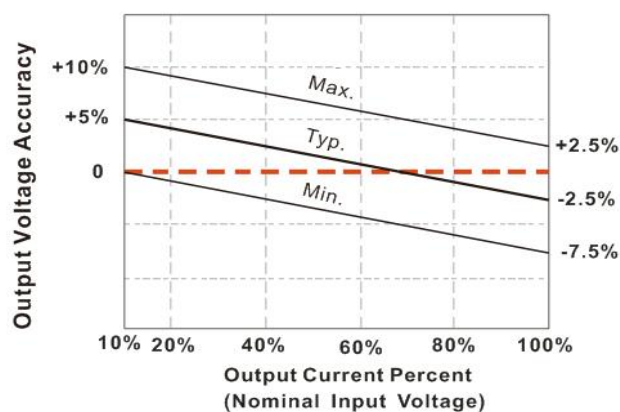
Output Regulation Curve



3.3/5VDC input

Other output

Output Regulation Curve



12VDC/15VDC/24VDC input

Other output

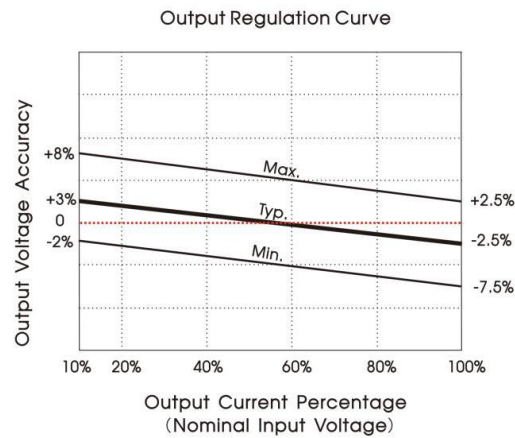


Fig. 1

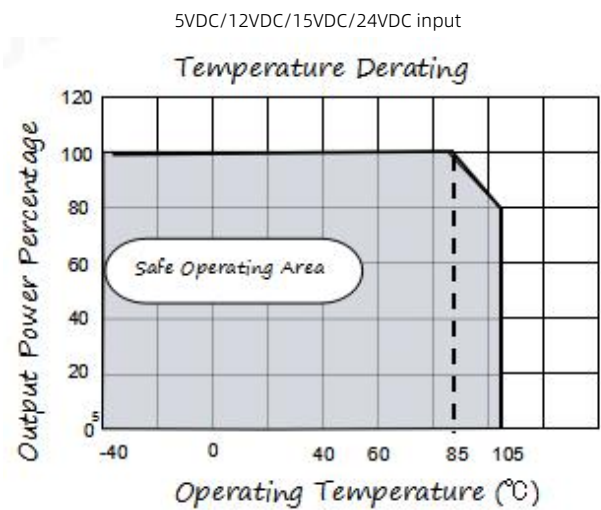
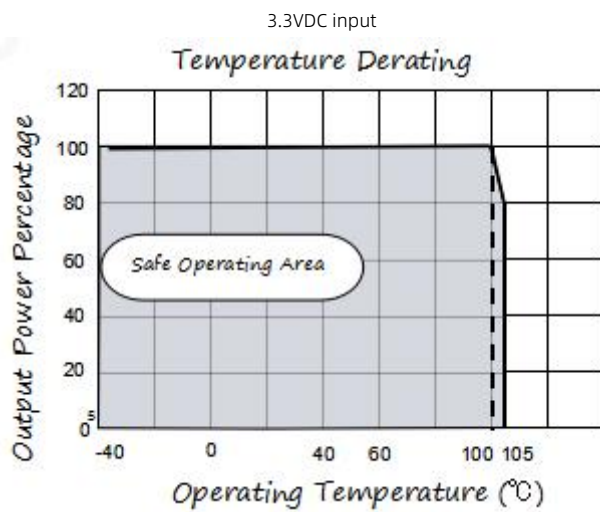
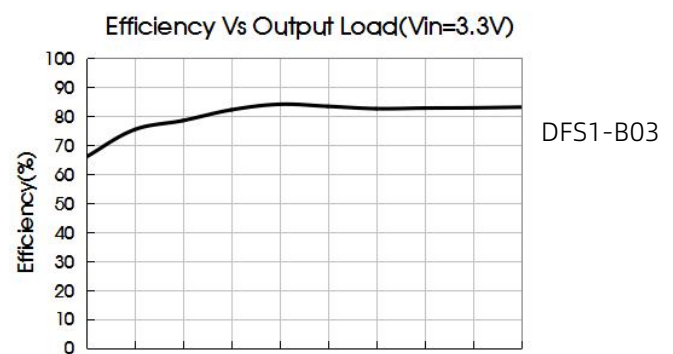
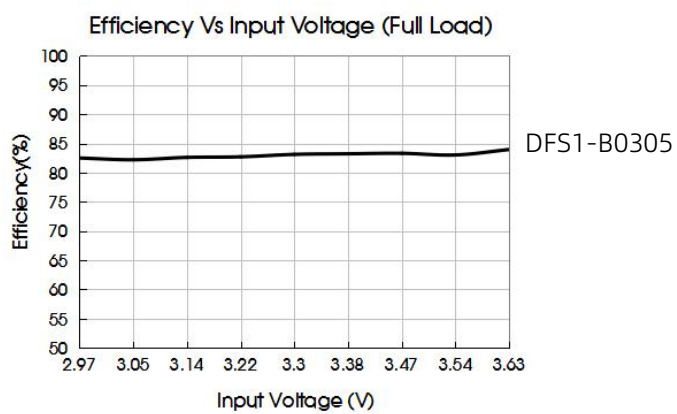
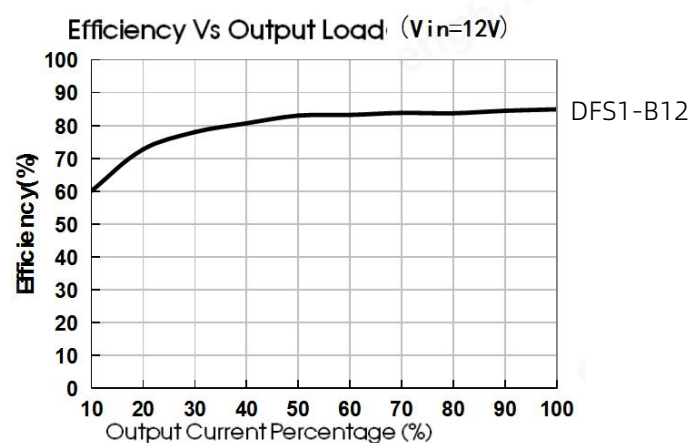
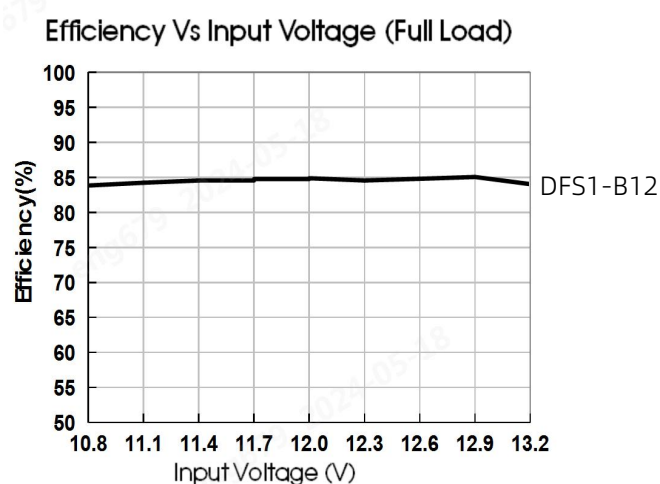
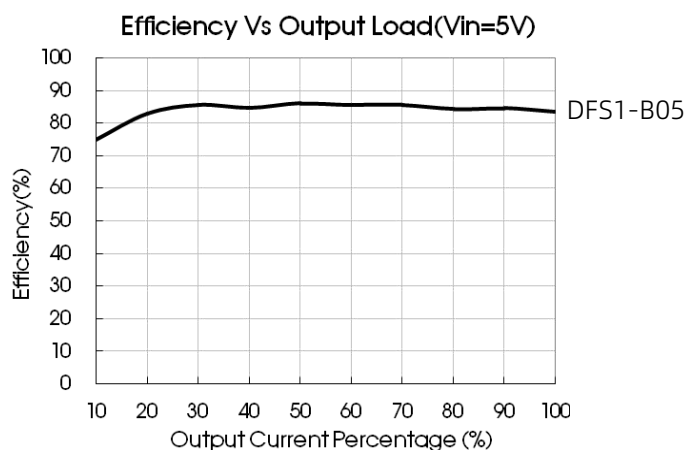
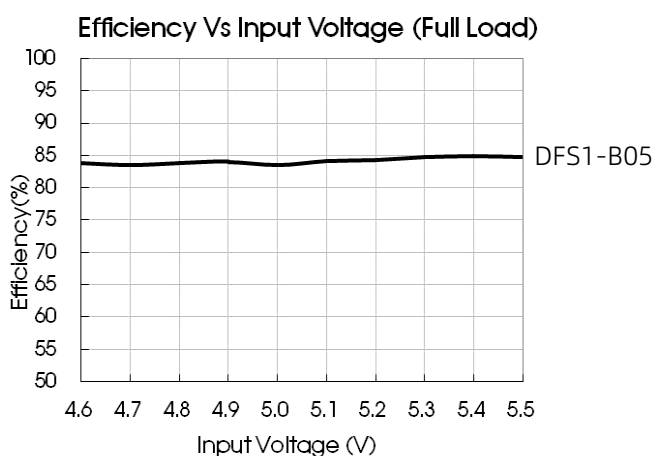


Fig. 2





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.

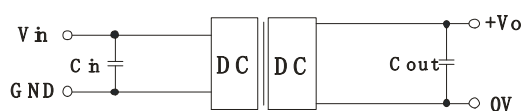


Fig.3

Table 1: Recommended input and output capacitor values

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

2. EMC compliance circuit

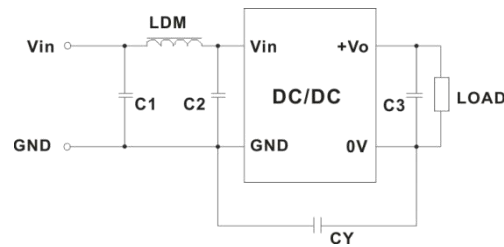
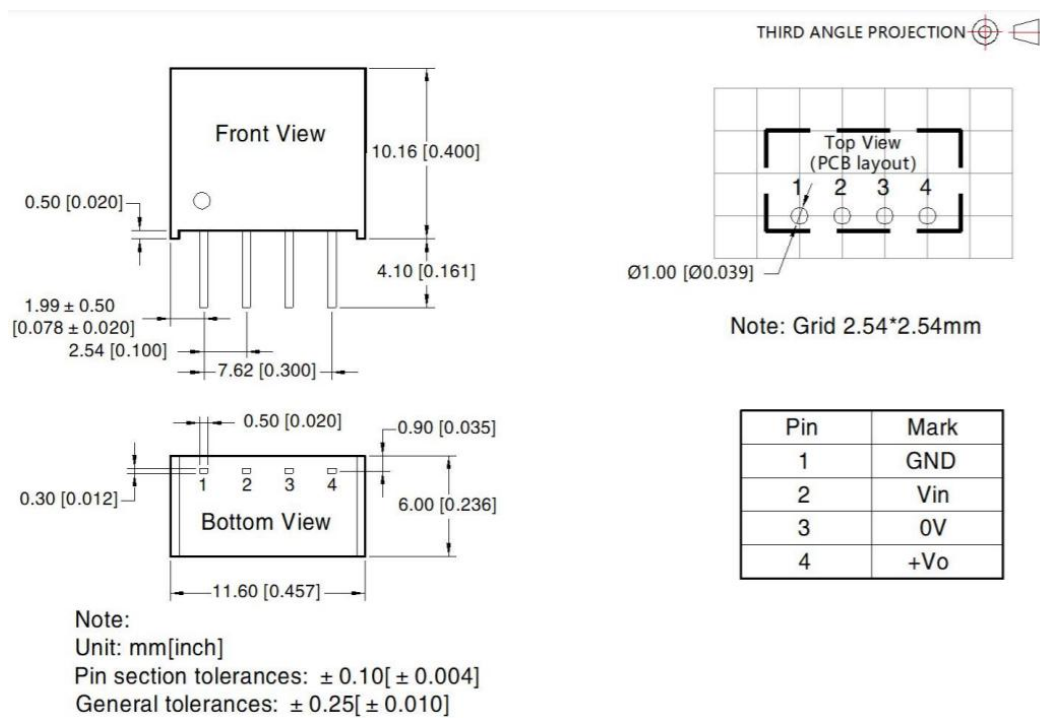


Fig. 4

Table 2: Recommended EMC filter values

Input voltage		3.3DVC		5DVC		12/15/24DVC
Output voltage		3.3/5VDC	9/12/15/24VDC	3.3/5/9VDC	12/15/24VDC	--
Emissions	C1/C2	4.7 μ F /16V	4.7 μ F /16V	4.7 μ F /25V	4.7 μ F /25V	4.7 μ F /50V
	CY	--	270pF /4kVDC VISHAY HGZ102MBP	100pF/4kV	1000pF/4kV	270pF/2kV
	C3	Refer to the Cout in table 1				
	LDM	6.8 μ H				

Dimensions and Recommended Layout



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 $T_a=25^{\circ}\text{C}$, 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.