DF04S/D Series

4W DC/DC CONVERTER, DIP-Package, 4:1 Wide Input Range

FEATURES

- Efficiency up to 85%
- DIP Package with Industry Standard Pinout
- Short Circuit Protection
- 4:1 Wide Input Range
- UL60950-1 Safety Approval
- Complies with EN55022 Class A
- Temperature Performance -40℃ to +71℃
- 1500VDC Voltage Isolation
- Internal SMD Construction
- Lead free, RoHs Compliant
- 3 Years Product Warranty

The DF04S/D series are miniature, DIP Package, isolated 4W DC/DC converters. It allows a wide over input voltage ranges of 9-36VDC and 18-75VDC. It alos offers short circuit protection and allows a wide operating temperature range of –40°C to +71°C. These isolated DC/DC converters are the latest offering from a world leader in power systems technology and manufacturing — Delta Electronics, Inc. With creative design technology and optimization of component placement, these converters possess outstanding electrical and thermal performance, as well as extremely high reliability under highly stressful operating conditions.

Model List

Model Number	Input Voltage (Range)	Output Voltage	Output Current		Input Current		Reflected Ripple Current	Max. capacitive Load	Efficiency (typ.)
			Max.	Min.	@Max. Load	@No Load			@Max. Load
	VDC	VDC	mA	mA	mA(typ.)	mA(typ.)	mA(typ.)	uF	%
DF04S2403A	24 (9 ~ 36)	3.3	900	90	161	20	5	3000	77
DF04S2405A		5	660	66	170				81
DF04S2412A		12	333	33	201				83
DF04S2415A		15	267	27	201				83
DF04D2405A		±5	±300	±30	156			680*	80
DF04D2412A		±12	±167	±17	201				83
DF04D2415A		±15	±133	±13	201				83
DF04S4803A	48 (18 ~ 75)	3.3	900	90	79	10	5	3000	78
DF04S4805A		5	660	66	84				82
DF04S4812A		12	333	33	98				85
DF04S4815A		15	267	27	98				85
DF04D4805A		±5	±300	±30	76			680*	82
DF04D4812A		±12	±167	±17	98				85
DF04D4815A		±15	±133	±13	98				85

* For each output

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Input Characteristics

Parameter	Model	Min.	Typ.	Max.	Unit
Input Surge Voltage (1 sec. max.)	24V Input Models	-0.7	---	50	VDC
	48V Input Models	-0.7	---	100	
Start-Up Voltage	24V Input Models	4.5	6	8.5	
	48V Input Models	8.5	12	17	
Under Voltage Shutdown	24V Input Models	---	---	8	
	48V Input Models	---	---	16	
Reverse Polarity Input Current	All Models	---	---	1	A
Short Circuit Input Power		---	1000	2000	mW
Internal Power Dissipation		---	---	2500	mW
Conducted EMI		Compliance to EN 55022,class A and FCC part 15,class A			

Output Characteristics

Parameter	Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		---	±0.5	±1.0	%
Output Voltage Balance	Dual Output, Balanced Loads	---	±0.5	±2.0	%
Line Regulation	Vin=Min. to Max.	---	±0.2	±0.5	%
Load Regulation	Io=10% to 100%	---	±0.3	±1.0	%
Ripple & Noise (20MHz)		---	50	75	mV_{P-P}
Ripple & Noise (20MHz)	Over Line, Load & Temp.	---	---	100	mV_{P-P}
Ripple & Noise (20MHz)		---	---	15	mV rms
Transient Recovery Time	25% Load Step Change	---	150	500	uS
Transient Response Deviation		---	±2	---	%
Temperature Coefficient		---	±0.01	±0.02	%/℃
Over Load Protection	Foldback	120	TBD	---	%
Short Circuit Protection	Continuous				

General Characteristics

Parameter	Conditions	Min.	Typ.	Max.	Unit
I/O Isolation Voltage (rated)	60 Seconds	1500	---	---	VDC
I/O Isolation Resistance	500 VDC	1000	---	---	MΩ
I/O Isolation Capacitance	100KHz, 1V	---	380	500	pF
Switching Frequency		---	350	---	KHz
MTBF (calculated)	MIL-HDBK-217F@25℃, Ground Benign	1,000,000	---	---	Hours
Safety Approvals	UL/cUL 60950-1 recognition(UL certificate), IEC/EN 60950-1				

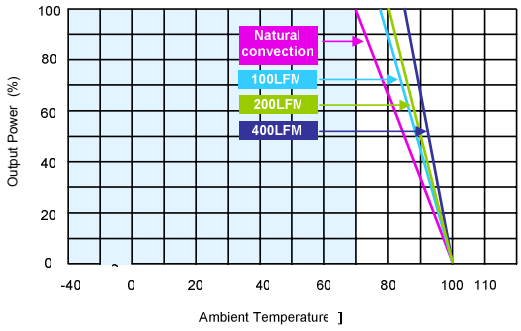
Recommended Input Fuse

24V Input Models	48V Input Models
1000mA Slow-Blow Type	500mA Slow-Blow Type

Environmental Characteristics

Parameter	Conditions	Min.	Max.	Unit
Operating Temperature Range (with Derating)	Ambient	-40	+85	℃
Case Temperature		---	+90	℃
Storage Temperature Range		-50	+125	℃
Humidity (non condensing)		---	95	% rel. H
Cooling	Free-Air convection			
Lead Temperature (1.5mm from case for 10Sec.)		---	260	℃

Power Derating Curve

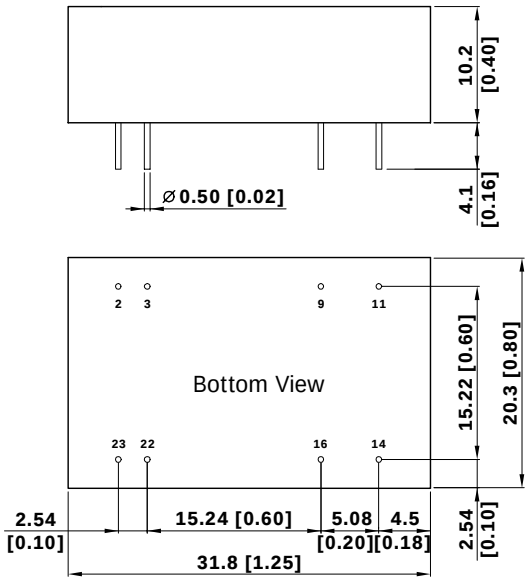


Notes

1 Specifications typical at Ta=+25℃, resistive load, nominal input voltage and rated output current unless otherwise noted.
2 Transient recovery time is measured to within 1% error band for a step change in output load of 50% to 100%
3 Ripple & Noise measurement bandwidth is 0-20MHz.
4 These power converters require a minimum output loading to maintain specified regulation, operation under no-load conditions will not damage these modules; however they may not meet all specifications listed.
5 All DC/DC converters should be externally fused at the front end for protection.
6 Specifications subject to change without notice.

Mechancial Drawing

Mechanical Dimensions



Pin Connections

Pin	Single Output	Dual Output
2	-Vin	-Vin
3	-Vin	-Vin
9	No Pin	Common
11	NC	-Vout
14	+Vout	+Vout
16	-Vout	Common
22	+Vin	+Vin
23	+Vin	+Vin

NC: No Connection

- ▶All dimensions in mm (inches)
- ▶Tolerance: X.X±0.25 (X.XX±0.01)
  X.XX±0.13 (X.XXX±0.005)
- ▶Pin diameter ⇔ 0.5 ±0.05 (0.02±0.002)

Physical Outline

Case Size	:	31.8x20.3x10.2mm (1.25x0.80x0.40 Inches)
Case Material	:	Metal With Non-Conductive Baseplate
Weight	:	16.2g

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Part Numbering System

D	F	04	S	24	05	A
Form factor	Family series	Watt	Number of Outputs	Input Voltage	Output Voltage	Option Code
D-DIP	A~Z	01:1W	S - Single	03:3.3V	03:3.3V	A - Std. Functions
P-SIP		02:2W	D- Dual	05: 5V	05: 5V	
S-SMD		03:3W		12:12V	12:12V	
		04:4W		24: 24V	15: 15V	
		06:6W		48:48V	24: 24V	

WARRANTY

Delta offers a three(3) years limited warranty. Complete warranty information is listed on our web site or is available upon request from Delta.

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DF04D2415A DF04S4812A DF04S2415A DF04S4805A DF04D2412A DF04S2412A DF04D4815A DF04D4812A DF04S2405A DF04S2403A DF04D4805A DF04S4803A DF04D2405A DF04S4815A