FD-4~6W Series

4~6W 2:1 Regulated Single & Dual output

Features

- Wide 2:1 Input Range
- 4.5V~9V Wide Input Range
- Full SMD Technology
- 1500VDC Isolation,Up to 3500VDC
- Continuous Short Circuit Protection
- Efficiency up to 83%
- -40~85°C Operation Temperature Range
- EMI Complies With EN55032 Class A

CE

The FD-4~6W series is a family of cost effective 4.0W~6.0W single & dual output DC-DC converters. These converters are consisted with Nickle-coated copper in a 24-pin DIL package with high performance features such as 1500 VDC ~ 3500VDC input/output isolation voltage, continuous short circuit protection with automatic restart and tight line / load regulation. Devices are encapsulated using flame retardant resin. Input voltages of 05 with output voltage of 3.3,5,12,15, ±3.3, ±5, ±12, ±15 Vdc. High performance features include high efficiency operation up to 83% .

All specifications typical at Ta=25°C, nominal input voltage and full load unless otherwise specified

OUTPUT SPECIFICATIONS

Voltage accuracy	±1%
(Output: 3.3V / ±3.3V Model)	±2.0%
Line regulation	±0.5%
Load regulation	±0.5%
(Output: 3.3V / ±3.3V Model)	±1.5%
Cross Regulation (Dual Output) (1)	±5%
Ripple & noise (20 MHz bandwidth)(2)	60mV pk-pk
Over Load Protection (Nominal Vin)	150% of FL,typ.
Short circuit protection	Indefinite(hiccup) (Automatic Recovery)
Temperature coefficient	±0.02%/°C
Capacitor load(3)	See table
Transient Recovery Time (4)	250us, typ.
Transient Response Deviation(4)	±3%, max.

INPUT SPECIFICATIONS

Voltage Range	See table
Start up Time	20mS, typ.
(Nominal Vin and constant resistive load)	See table
Max. Input Current	See table
No-Load Input Current	35mA pk-pk
Input Filter	LC Type

GENERAL SPECIFICATIONS

Efficiency	See table, typ.
I/O Isolation Voltage(60sec)	
Input/Output	1500~3500Vdc
Case/Input & Output	1000Vdc
I/O Isolation Capacitance	500 pF, typ.
I/O Isolation Resistance	1000M Ohm
Switching Frequency	Typical 266kHz
Humidity	95% rel H
Reliability Calculated MTBF(MIL-HDBK-217 F)	>1.121 Mhrs
Safety Standard : (designed to meet)	IEC/EN 60950-1 , 62368-1
	UL/cUL 60950-1 , 62368-1

PHYSICAL SPECIFICATIONS

Case Material	Nickel-coated Copper
Pin Material	Φ0.5mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	17.0g
Dimensions	1.25"x0.8"x0.4"

ENVIRONMENT SPECIFICATIONS

Operating Temperature	-40°C~85°C(See Derating Curve)
	-40°C ~ +60°C(For 100% load)
Maximum Case Temperature	100°C
Storage Temperature	-40°C~125°C
Cooling	Nature Convection

EMC SPECIFICATIONS

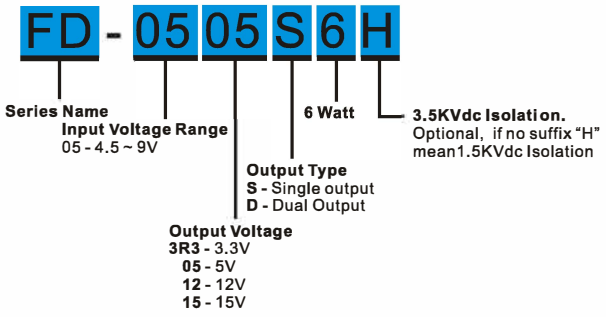
Radiated Emissions	EN55032	CLASS A
Conducted Emissions (5)	EN55032	CLASS A
ESD	IEC 61000-4-2	Perf. Criteria A
RS	IEC 61000-4-3	Perf. Criteria A
EFT(5)	IEC 61000-4-4	Perf. Criteria A
Surge(5)	IEC 61000-4-5	Perf. Criteria A
CS	IEC 61000-4-6	Perf. Criteria A
PFMF	IEC 61000-4-8	Perf. Criteria A

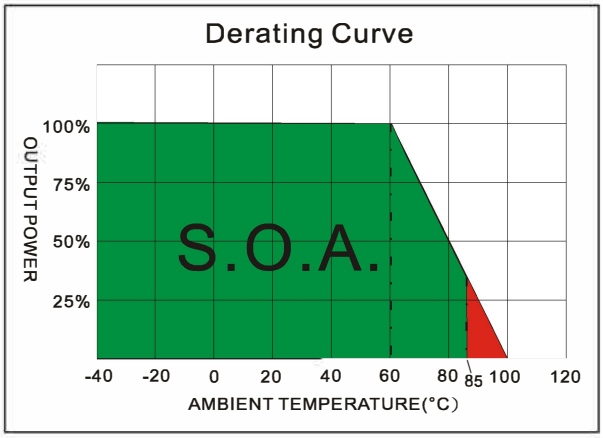
ABSOLUTE MAXIMUM RATINGS(6)

These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.

Input Surge Voltage(100mS)	
05 Models	15 Vdc, max.
Soldering Temperature (1.5mm from case 10sec max.)	260°C, max.

PART NUMBER STRUCTURE





MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current No-Load (mA)	INPUT Current Full Load (mA)	OUTPUT Voltage (Vdc)	OUTPUT Current Min. load (mA)	OUTPUT Current Full load (mA)	EFFICIENCY @FL(%)	Capacitor Load(uF)
FD-053R3S6	4.5-9	25	1292	3.3	0	1400	73	1000
FD-0505S6	4.5-9	25	1600	5	0	1200	76	1000
FD-0512S6	4.5-9	30	1490	12	0	500	82	330
FD-0515S6	4.5-9	30	1472	15	0	400	82	220
FD-053R3D6	4.5-9	25	1658	±3.3	0	±909	75	±680
FD-0505D6	4.5-9	25	1548	±5	0	±600	79	±330
FD-0512D6	4.5-9	35	1500	±12	0	±250	83	±100
FD-0515D6	4.5-9	40	1481	±15	0	±200	83	±47
FD-053R3S5	4.5-9	25	1200	3.3	0	1300	73	1000
FD-0505S5	4.5-9	25	1333	5	0	1000	77	1000
FD-0512S5	4.5-9	30	1235	12	0	417	82	330
FD-0515S5	4.5-9	30	1280	15	0	333	82	220
FD-053R3D5	4.5-9	25	1320	±3.3	0	±750	76	±680
FD-0505D5	4.5-9	30	1282	±5	0	±500	79	±330
FD-0512D5	4.5-9	35	1232	±12	0	±208	82	±100
FD-0515D5	4.5-9	40	1244	±15	0	±167	82	±47
FD-053R3S4	4.5-9	25	1100	3.3	0	1200	73	3300
FD-0505S4	4.5-9	25	1073	5	0	800	77	1000
FD-0512S4	4.5-9	30	993	12	0	333	81	220
FD-0515S4	4.5-9	30	991	15	0	266	82	100
FD-053R3D4	4.5-9	25	1077	±3.3	0	±600	76	±680
FD-0505D4	4.5-9	30	1032	±5	0	±400	79	±470
FD-0512D4	4.5-9	35	996	±12	0	±166	81	±100
FD-0515D4	4.5-9	40	997	±15	0	±133	81	±47

Suffix "H" means 3.5KVdc isolation

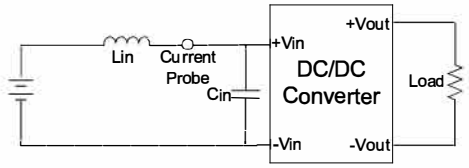
NOTE

1. One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.
2. Ripple/Noise measured with a 1uF ceramic capacitor.
3. Test by nominal input voltage and constant resistor load.
4. Tested by normal Vin and 25% load step change (75%-50%-25% of Io).
5. Input filter components are be required to help meet conducted emission class A, IEC61000-4-4 and IEC61000-4-5, which application refer to the EMI Filter of design & feature configuration.
6. Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.

TEST CONFIGURATIONS

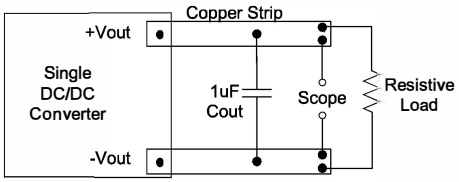
Input Reflected Ripple Current Test Step

Input reflected ripple current is measured through a source inductor Lin(12uH) and a source capacitor Cin(100uF, ESR<1.0Ω at 100KHz) at nominal input and full load.



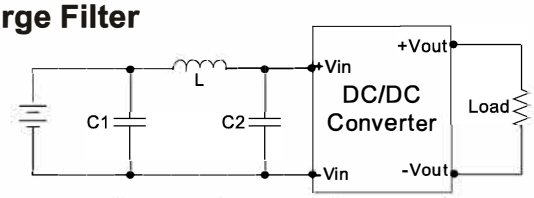
Output Ripple & Noise Measurement Test

Use a capacitor Cout(1.0uF) measurement.
The Scope measurement bandwidth is 0-20MHz.



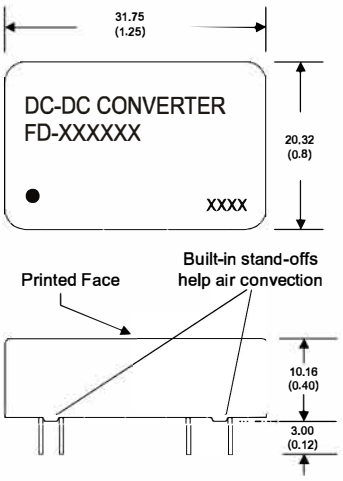
EMI and EFT / Surge Filter

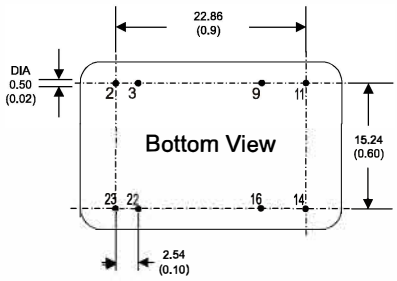
Input filter components (C1, C2, L) are used to help meet conducted emissions,IEC61000-4-4 and IEC61000-4-5, requirement for the module.
These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



C1	L	C2
330uF, 100V	1.8uH	470uF, 100V

MECHANICAL SPECIFICATIONS





24 Pin DIL Package
Nickel-Coated Copper

Notes: All dimensions are typical in millimeters (inches)
1. Pin diameter: 0.5 ±0.05 (0.02 ±0.002)
2. Pin pitch and length tolerance: ±0.35 (±0.014)
3. Case Tolerance: ±0.5 (±0.02)

PIN CONNECTIONS		
PIN NUMBER	SINGLE	DUAL
2	−V Input	−V Input
3	−V Input	−V Input
9	N.P.	Common
11	N.C.	−V Output
14	+V Output	+V Output
16	−V Output	Common
22	+V Input	+V Input
23	+V Input	+V Input

(The Pin Connection of high isolation one is the same with normal one.)

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