

DESCRIPTION

The series of DC-DC medical converter in industrial standard pin-out DIP24 package, are capable of delivering 11 watts. They are designed for medical equipment, industrial control system, battery management system, telecom application.

FEATURES

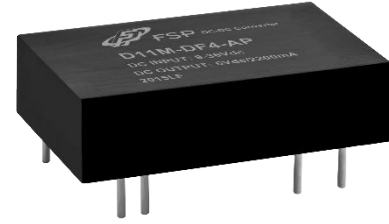
- 4:1 Wide input range voltage
- 11W power in standard DIP 24 package
- 8mm Clearance and creepage distance @ 250Vac working voltage
- 5000Vac isolation for 2MOPP application
- Continuous short circuit protection
- Under voltage lockout function
- Medical safety meets 2xMOPP per 3rd Edition of IEC/EN 60601-1
- EMI class A without external circuit
- Low leakage current

WATTAGE

Wattage: 11W

DIMENSION

Dimension: 31.8(L) x 20.3(W) x 10.2(H)mm



SAFETY STANDARD APPROVAL

Medical safety meets 2xMOPP per 3rd Edition of IEC/EN 60601-1

ENVIRONMENTAL SPECIFICATION

Operating temperature: -40°C to +105°C

Storage temperature: -55°C to +125°C

SELECTION GUIDE

Part number	Input voltage	Output voltage	Output current @ full load	Input current @ no load	Efficiency (1)	Capacitive load (2)
					(typ.)	(max.)
D11M-DF4-AP	9-36 Vdc Nom. 24Vdc	5Vdc	2200mA	6mA	85.5%	2500uF
D11M-DF4-AH		12Vdc	916mA	6mA	87.5%	430uF
D11M-DF4-AG		15Vdc	733mA	6mA	88.0%	350uF
D11M-DF4-AA		24Vdc	458mA	6mA	87.5%	125uF
D11M-DF4-FP	18-75Vdc Nom. 48Vdc	5Vdc	2200mA	6mA	85.5%	2500uF
D11M-DF4-FH		12Vdc	916mA	6mA	87.5%	430uF
D11M-DF4-FG		15Vdc	733mA	6mA	87.5%	350uF
D11M-DF4-FA		24Vdc	458mA	6mA	87.5%	125uF

SPECIFICATION

	Parameter	Conditions	Min.	Typ.	Max.	Unit	
Input	Input filter			Pi type			
	Voltage range		9 18		36 75	VDC	
	Input surge voltage (1s max.)	24V input 48V input			50 100	VDC	
	Under voltage lockout (0%~100% load)	24V input 48V input			7.5 16	VDC	
	Start-up voltage (0%~100% load)	24V input 48V input			9 18	VDC	
	Start-up time	100% load at nominal Vin			30	ms	
	Output	Voltage accuracy				±1	%
Line voltage regulation		LL-HL at 100% load			±0.2	%	
Load voltage regulation		0%~100% load			±0.2	%	
Minimum load					0	%	
Ripple & noise (1)			Vo=5V			30	mVp-p
			Vo=12/15V			40	mVp-p
			Vo=24V			50	mVp-p
Operating frequency		Vo=5/12/15V		300		KHz	
		Vo=24V		350		KHz	
Transient response recovery time	25% load step change (75%~100% load)			250		µs	
Environment	Operating temperature	Vo= 5V	-40		105	°C	
	Storage temperature		-55		125	°C	
	Relative humidity		5		95	%RH	
	MTBF (MIL-HDBK-217F)	+25°C	1192			KHrs	
Function	Short Circuit Protection			Continuous, automatic recovery			
	Isolation voltage	1 minute, Input to output Cut-off current: 1mA for Vdc	5			KVAC	
	Isolation capacitance				15	pF	
	Isolation resistance		1000			MΩ	
	Over load protection				150	%	
	Over voltage protection (Zener diode clamp)	Vo= 5V Vo= 12V		5.6		8.0	VDC
			13.4		19.2	VDC	

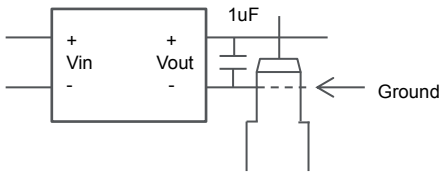
This content is subject to change, please refer to specification for more detail.
FSP reserve the right to change the content without prior notice.

		Vo= 15V	16.8	22.5	VDC
		Vo= 24V	26.9	31.2	VDC
Physical	Safety	Medical safety meets 2xMOPP per 3rd Edition of IEC/EN 60601-1			
	Vibration	MIL-STD-202G, IEC68-2-6			
	Dimension	31.8x20.3x10.2 mm			
	Weight	13		g	
	Cooling method	Nature convection			
	Case material	Plastic			
EMC	Potting material	Silicone			
	EMI ⁽²⁾	EN55011	Class A		
	ESD	EN61000-4-2, Air±15kV; Contact±8kV	Criteria A		
	Radiated immunity	EN61000-4-3, 10V/m	Criteria A		
	Fast transient ⁽³⁾	EN61000-4-4, ±2kV	Criteria A		
	Surge ⁽³⁾	EN61000-4-5, ±2kV	Criteria A		
	Conducted immunity	EN61000-4-6, 10V/rms	Criteria A		
	Magnetic field immunity	EN61000-4-8, 30A/m	Criteria A		
<ol style="list-style-type: none"> Ripple & noise: 20MHz BW at Vin range with a 1µF/50V X7R MLCC. EMI filtering suggestion as following, class A without external circuit. Test with E-CAP 220µF/100V at input terminal. All specifications valid at nominal input voltage, full load and 25°C after warm-up time unless otherwise stated. The product information and specifications are subject to change without prior notice. 					

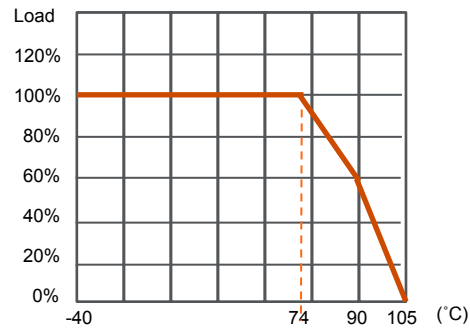
RIPPLE & NOISE

DERATING CURVE

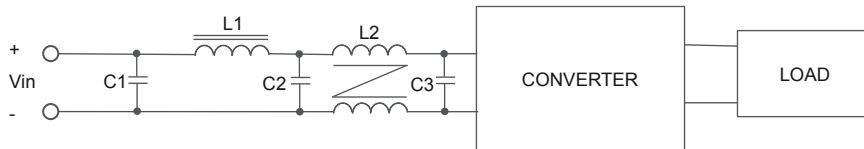
Ambient temperature nature convection (Nominal Vin)



*Measured with 20MHz bandwidth and 1µF ceramic capacitor.



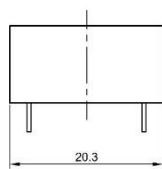
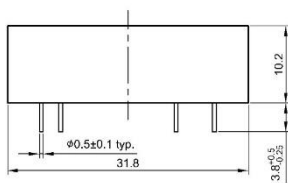
EMI FILTERING SUGGESTION



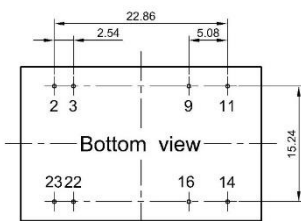
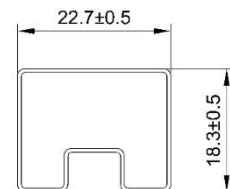
	C1	C2	C3	L1	L2
Class B	4.7µF	4.7µF	4.7µF	10µH	290µH Common choke

MECHANICAL SPECIFICATION

PACKAGE



Pin	Single
2, 3	-Vin
9	No pin
11	No pin
14	+Vout
16	-Vout
22, 23	+Vin



Projection : Third angle projection
Unit : mm
Tolerance : ±0.25mm

UNIT:mm
1 Tube = 15 pcs
Length:520±2mm