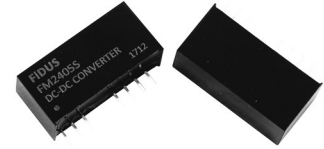


## 2 Watts

- High reliability MTBF >1.212Mhrs
- 4:1 Input range
- Single and Dual output
- Remote on/off
- Operating Temperature -40 to 85°C
- 5 Year warranty



The FM series of low cost DC/DC converters come in both single and dual outputs in a SIP 9 pin package. Inputs are available in 24 & 48V versions with a 4:1 range and outputs from 3.3 to 15V single and dual. The units operate from -40 to +85°C and come complete with remote on/off function. All models have a FiDUS 5 year warranty.

Dimensions:

1.02 x 0.36 x 0.49" (26.0 x 9.3 x 12.5mm)

## Models & Ratings

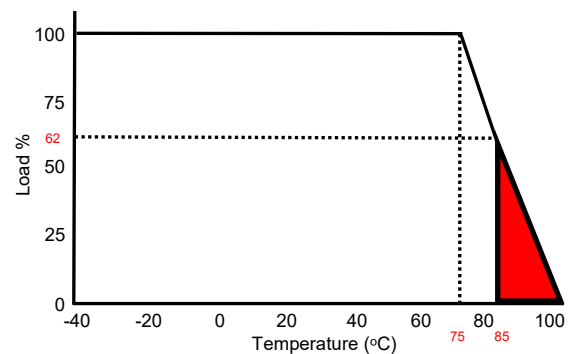
Model Number	Input Voltage	Output Voltage	Output Current	Input Current		Maximum Capacitive Load	Efficiency
				No Load	Full Load		
FM2403S	9-36V	3.3V	500mA	10mA	92mA	2200uF	75%
FM2405S		5V	400mA	10mA	103mA	1000uF	81%
FM2412S		12V	165mA	10mA	100mA	165uF	84%
FM2415S		15V	135mA	10mA	98mA	100uF	85%
FM2405D		±5V	±200mA	10mA	103mA	±470uF	81%
FM2412D		±12V	±85mA	10mA	101mA	±100uF	83%
FM2415D		±15V	±65mA	15mA	102mA	±47uF	82%
FM4803S	18-75V	3.3V	500mA	5mA	46mA	2200uF	75%
FM4805S		5V	400mA	5mA	53mA	1000uF	80%
FM4812S		12V	165mA	5mA	50mA	165uF	84%
FM4815S		15V	135mA	5mA	50mA	100uF	84%
FM4805D		±5V	±200mA	5mA	53mA	±470uF	80%
FM4812D		±12V	±85mA	5mA	52mA	±100uF	81%
FM4815D		±15V	±65mA	5mA	50mA	±47uF	84%

## Notes

1. Under no load conditions the unit may not meet all specifications
2. Do not operate continuously in the red area of the derating curve

Input	
Parameter	Rating
Input voltage range	See table
Input reflected ripple current	20mA pk-pk through 12uH inductor & 47uF ESR<1Ωat 100KHz
Input surge (100mS max)	24V Models 50VDC Max. 48V Models 100VDC Max.
Input filter	Capacitor

## Derating curve



## Output

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Output voltage	3.3		15	VDC	See Model & Ratings table
Set point accuracy			±1	%	
Line regulation			±0.5	%	Low line to High line
Load regulation	10 to 100% load, ±0.5% 0 to 100% load, ±0.5% for 12 and 15V outputs. ±1% for 3.3 and 5V outputs.			%	
Minimum load		0		%	Under no load conditions the unit may not meet all specifications
Cross regulation			±5	%	On dual output models when one load is varied by 25 to 100% and the other is 100% load.
Ripple & Noise			50	mV pk-pk	Measured with 20MHz bandwidth, may be larger at low loads
Transient response			±3	% Deviation	Within 300uS typically
Short circuit protection					Continuous with automatic recovery
Maximum capacitive load					See Model and Ratings table
Remote on/off	Open circuit or 0-0.6VDC ON. 2.7-15V OFF (typical idle current 5mA). See application notes.				

## General

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency	75		85	%	See Model & Ratings table
Isolation			1500	VDC	Input to output
Isolation resistance	1000			M Ohm	
Isolation capacitance			500	pF	
Switching frequency		250		KHz	
Power density			11.1	W/In <sup>3</sup>	
MTBF		>1.212		MHrs	As per MIL-HDBK-217F, 25°C GB

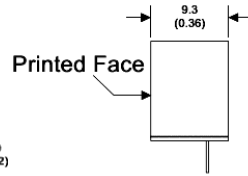
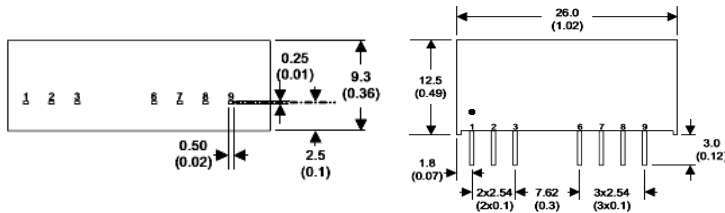
## Environmental

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating temperature	-40		85	°C	Derate linearly from 100% load at 75°C to 0% load at 100°C.
Storage temperature	-40		125	°C	
Case temperature			100	°C	
Cooling					Convection cooled
Humidity			95	% RH	Non-condensing
Temperature coefficient			±0.02	%/°C	

## EMC

	Standard	Test level	Criteria	Notes & Conditions
Conducted	EN55032	A	-	See application notes
Radiated	EN55032	A	-	
ESD	IEC 61000-4-2	3	A	8kV air discharge, 6kV contact discharge
RS	IEC 61000-4-3	3	A	80~1000 MHz, 10V/m, 80% AM (1kHz)
EFT	IEC 61000-4-4	3	A	Power line : 2kV, 220uF /100V capacitor required
Surge	IEC 61000-4-5	2	B	1.2/50 μs Open Circuit Voltage, 8/20 μs Short Circuit Current, DC Port, Line to line : 1.0kV, 220uF /100V capacitor required
CS	IEC 61000-4-6	3	A	0.15 ~ 80 MHz, 10Vrms, 80% AM (1kHz)
PFFM	IEC 61000-4-8	1	A	50Hz, 1A/m

## Mechanical Details



Pin Connections		
Pin	Single	Dual
1	-Vin	-Vin
2	+Vin	+Vin
3	Remote On/Off	Remote On/Off
6	+Vout	+Vout
7	N.C	0V
8	N.C	N.C
9	-Vout	-Vout

Physical	
Parameter	Rating
Case material	Non-conductive black plastic (UL94V-0)
Pin material	C5191R-H Solder coated
Potting material	Epoxy (UL94V-0)
Weight	6.5g
Dimensions	1.02 x 0.36 x 0.49"
Soldering temperature	1.5mm from case, 10s and 260°C max.

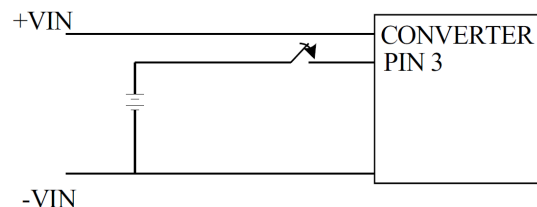
### Notes

1. All dimensions shown in millimetres (inches)
2. Pin diameter 1.0 ±0.05 (0.04 ±0.002)
3. Case tolerance ±0.5 (±0.002)

## Application notes

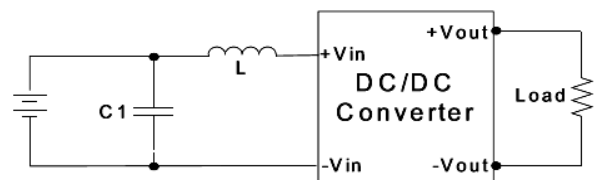
### Remote ON/OFF

The FM series output can be turned on and off using the remote on/off function. If Pin 3 is left open circuit or 0-0.6VDC then the unit is ON. 2.5-15VDC is OFF with 5mA of idle current.



### EMI Filter

The input filter components can be fitted to help meet conducted emission requirements for the system. They should be mounted as close as possible to the module. Lead lengths should be minimized and where possible avoid running input and output tracks under the module as part of good design practice for best EMC performance. If the module is embedded in a system running from an AC/DC converter, this will have its own additional immunity protection and EMI filtering that will impact the overall system EMI performance.



Model number	C1	L
FM24XX	2.2uF/100V x 2pcs (parallel)	6.8uH
FM48XX	1uF/100V	56uH