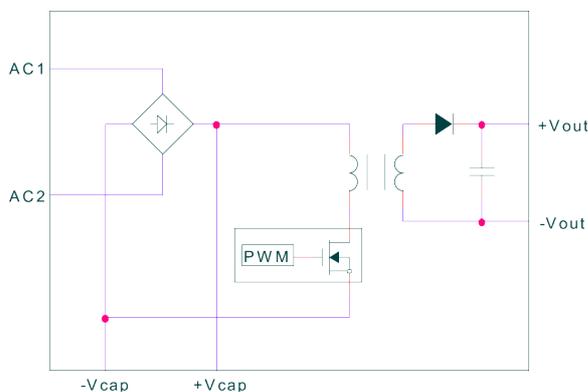


VFS5 Series – Isolated AC/DC Converters
85 – 264Vac Input, Maximum Power: 5WData Sheet
May 12, 2025**VFS5 Series –small size isolated AC/DC converters****Features**

- Open type compact size
- High Efficiency
- Low input current at no load
(0.1 W@220VAC)
- Universal input range
- Over current protection(Hiccup)
- Output short circuit protection
(Auto recovery)
- Input – Output Isolated(AC 3KV_{rms})
- RoHS directive

**Block diagram****Applications**

- Telecommunication
- Datacom
- Instrumentation
- Distributed Power System

Description

VFS5 Series is a High Efficiency AC/DC Converter that provides up to 5 watts of output power in ultra compact size. This module has low input power(0.1W) at no load and it offers a high efficiency at light load. This module has an over current and output short circuit protection mode and wide operating temperature range from -40°C to +85°C.



VFS5 Series – Isolated AC/DC Converters

85 – 264Vac Input, Maximum Power: 5W

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Absolute Maximum Ratings

Parameter	Min	Typ	Max	Unit	Notes
Input Voltage Continuous	85	-	264	VAC	
Operating Ambient Temperature	-40	-	85	°C	
Storage Temperature	-40	-	105	°C	
I/O Isolation Voltage	-	-	3000	VAC	

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device

Electrical Specifications

Input Characteristics

T_A = +25°C, V_{in} = 85 ~ 264VAC After warm up unless otherwise specified

Parameter	Symbol	Min	Typ	Max	Unit
Operating voltage Range		85		264	Vac
Input current (@ 220V / @110V)	I _{in}				A
VFS5-3R3			0.08(0.05)		
VFS5-5			0.11(0.07)		
VFS5-9			0.11(0.07)		
VFS5-12			0.11(0.07)		
VFS5-15			0.11(0.07)		
VFS5-24			0.1(0.07)		
No load Input Power					W
VFS5-3R3			0.1		
VFS5-5			0.1		
VFS5-9			0.1		
VFS5-12			0.1		
VFS5-15			0.1		
VFS5-24			0.1		
Inrush Current@Cold start				30A max 60A max	@110VAC @220VAC
Operating Frequency		47		63	Hz

**VFS5 Series – Isolated AC/DC Converters**
85 – 264Vac Input, Maximum Power: 5WData Sheet
May 12, 2025**Output Characteristics**T_A = +25°C, V_{in} = 85 ~ 264VAC After warm up unless otherwise specified

Parameter	Symbol	Min	Typ	Max	Unit
Output Voltage tolerance	V _o	-	-	±5	%
Output Current	I _o				
VFS5-3R3				1	A
VFS5-5				1	A
VFS5-9				0.56	A
VFS5-12				0.42	A
VFS5-15				0.34	A
VFS5-24				0.21	A
Output Regulation;					
- Line Regulation (From minimum input voltage to maximum input voltage, constant load)		-	-	±1.5	%
- Load Regulation (From 10% load to maximum load, Constant load)		-	-	±3	%
Output Current Limit (Automatic recovery)		>105			%
Output Ripple and noise (V _{in} = 220Vac, and I _o = Max Output Current Bandwidth 20MHz, 1uF Ceramic cap)	mVp-p	-	80	150	mV
Efficiency					
VFS5-3R3			67		%
VFS5-5			75		%
FPS5-9			76		%
VFS5-12			77		%
VFS5-15			79		%
VFS5-24			80		%
(100% of max I _o , V _{in} = 220VAC)					


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Maximum output capacitance					
VFS5-3R3				1500	μF
VFS5-5				1200	
VFS5-9				330	
VFS5-12				220	
VFS5-15				100	
VFS5-24				68	

Isolation Specifications

Parameter	Symbol	Min	Typ	Max	Unit
I/O Isolation Voltage (AC500V, 1 Min)					
- Input-Output:			-	3000	VAC
- Input-Case:			-		VAC
- Output-case:			-		VAC
Isolation Resistance - Output-Case (at DC500V at 25°C And 70%RH for 1 min)	RISO		-	-	M Ω
Isolation Capacitance	CISO		50		pF

General Specifications

Parameter	Symbol	Min	Typ	Max	Unit
Max switching Frequency			115		KHz
MTBF (MiL-HDBK- 217F)		6.6 x 10 ⁵			hrs
Dimensions		19.43 x 30.98 x 11.5			mm
Weight			50		Grams



VFS5 Series – Isolated AC/DC Converters

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Environmental

Parameter	Symbol	Min	Typ	Max	Unit
Operating Temperature		-40		85	°C
Operating Humidity (RH non-condensing)		5		95	%
Storage Temperature		-40		105	°C
Vibration @10G(98m/s ²)		10		55	Hz

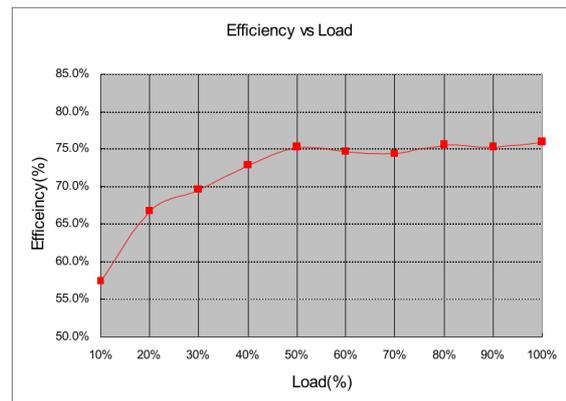
Characteristic Curves

Efficiency Curve

VFS5-3R3



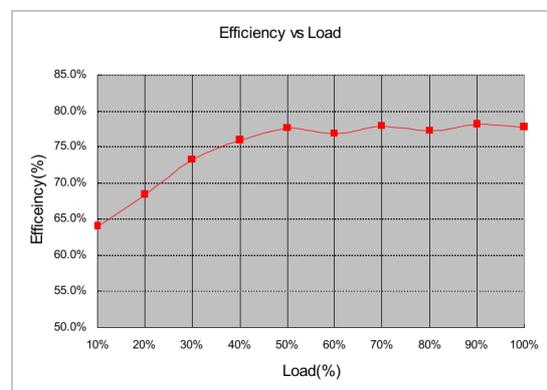
VFS5-5



VFS5-9



VFS5-12

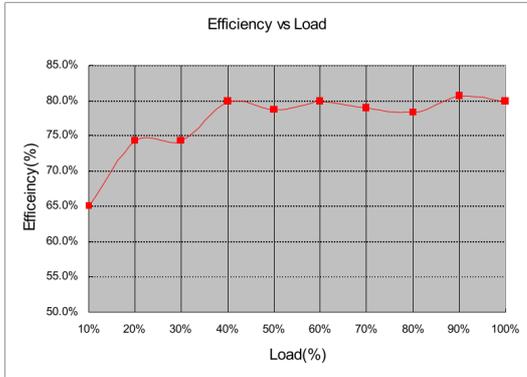




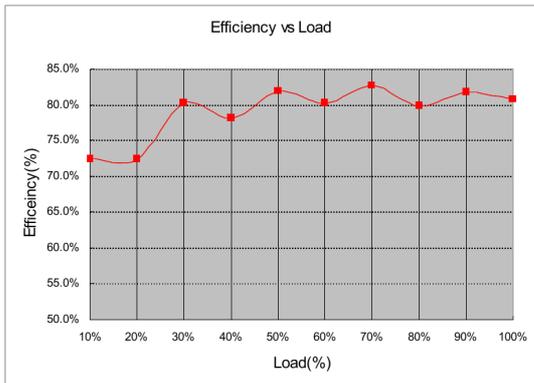
VFS5 Series – Isolated AC/DC Converters
85 – 264Vac Input, Maximum Power: 5W

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VFS5-15



VFS5-24



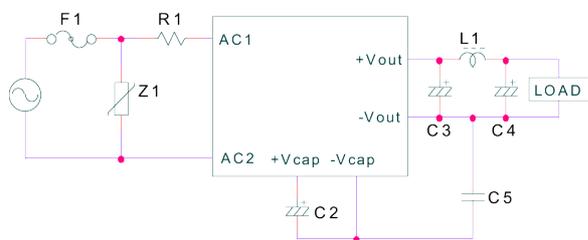
Instruction manual

VFS5 Series – Isolated AC/DC Converters

85 – 264Vac Input, Maximum Power: 5W

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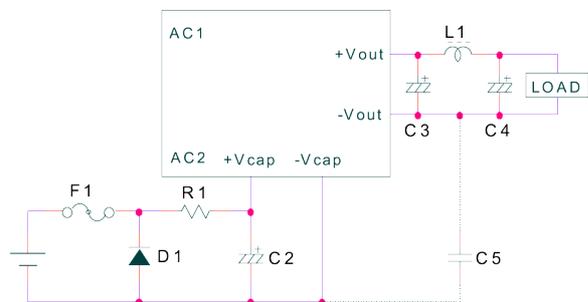
AC input or DC input



Part No	C3	C4
VFS5-3R3	1500 μ F (solid-state capacitor)	100 μ F
VFS5-5	1200 μ F (solid-state capacitor)	100 μ F
VFS5-9	330 μ F (solid-state capacitor)	47 μ F
VFS5-12	220 μ F (solid-state capacitor)	47 μ F
VFS5-15	150 μ F (solid-state capacitor)	47 μ F
VFS5-24	100 μ F	47 μ F

We recommend using a low ESR capacitor at C3, like solid state capacitor.

DC input



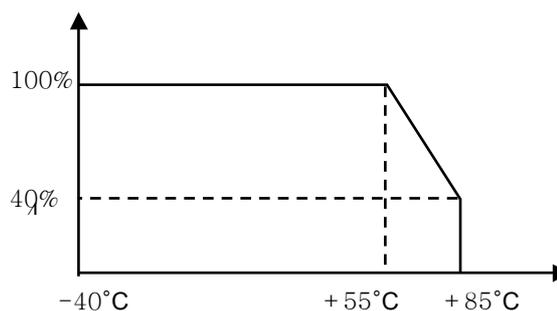
To use VFS5 series, external component are required at input and output

F1 (Input fuse)	1A (Slow blow type)
R1 (Inrush current limit resistor)	10 Ω /3W (Wire wound resistor)
	* Do not use film resistor
F1 (Input Fuse)	1A / 220V Slow-blow
C2 (Smoothing capacitor)	10~22 μ F (DC 400V)
C5 (Primary to Secondary capacitor)	2200pF (AC 250V) Y1 class
L1 (Output inductor)	2.2uH(1.9A, 80m Ω)
D1 (Reverse voltage protection)	

Thermal Considerations

VFS5 series has wide operating temperature range from -40°C to +85°C.

However, it should be required a enough air flow for more reliable operation. Output derating curve provide designers with a quantity of a current under the desired ambient temperature and velocity of an air flow.



Maximum Output capacitance

Feature Description

VFS5 Series – Isolated AC/DC Converters 85 – 264Vac Input, Maximum Power: 5W

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Input Fuse

VFS5 series is not built in input fuse. In order to comply with safety requirements, external fuse is required at the input of the device.

Input Output Filter

VFS5 series is not built in EMI filter. To reduce conducted noise, additional external input filter is required

To reduce an output ripple and noise, external LC filter is required at the output of the device

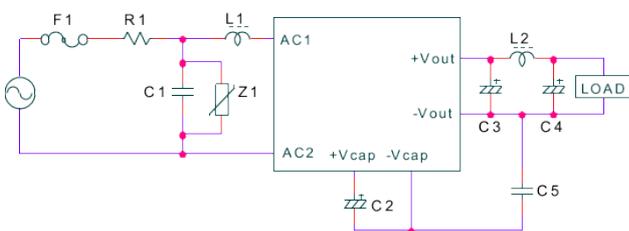
Over current Protection (OCP)

VFS5 series built in over current protection circuit which operates when the output current is over 105% of rating and automatically recovers when over current condition is removed

If the short or overload condition continues, the power module could be damaged.

EMI Characteristic (conducted Emission)

In order to reduce conducted noise, install an external input filter as shown in below.



Model No	L1	C1	C5
VFS5-12	3~5mH	220nF (AC 250V)	2.2nF (AC 250V, Y1)

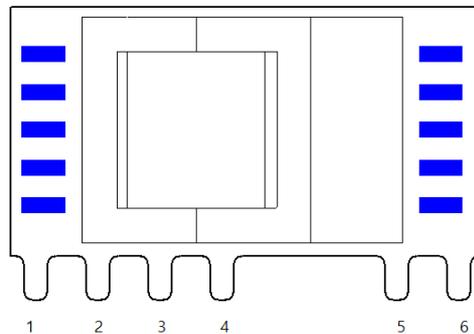
VFS5 Series – Isolated AC/DC Converters

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Pin assignments

TOP VIEW

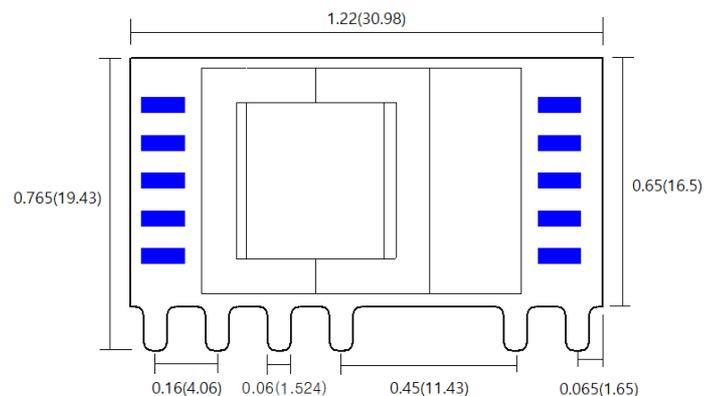


Single Output

PIN NO	NAME	FUNCTION
1	AC(L)	AC Input
2	AC(N)	AC Input
3	+Vcap	Positive side of Bulk capacitor
4	-Vcap	Negative side of Bulk capacitor
5	GND	Output ground
6	+Vout	Positive side of output voltage

Mechanical Specification

TOP VIEW





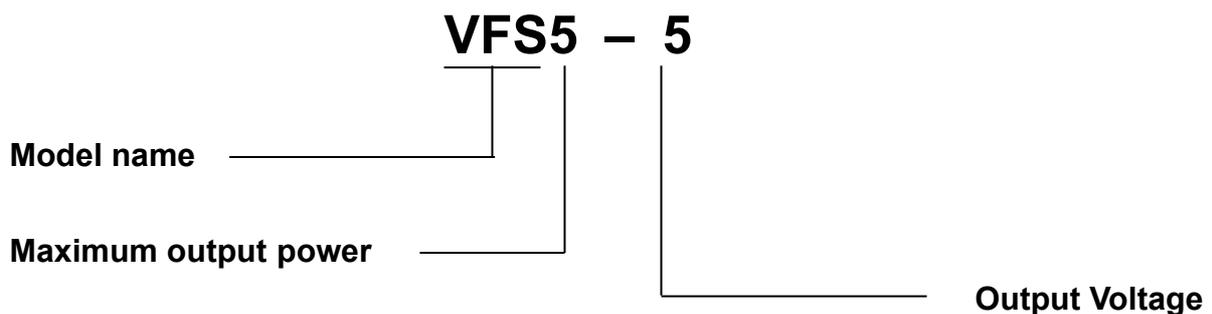
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Ordering Information

Input	Output1, Output2	Maximum Power	Ripple & Noise Typ / max(mVp-p)	Efficiency Typ.	Model Number
85 – 264V	3.3V@1A	3.3W	80 / 150	67%	VFS5-3R3
	5V@1A	5W	80 / 150	75%	VFS5-5
	9V@0.56A	5W	80 / 150	76%	VFS5-9
	12V@0.42A	5W	80 / 150	77%	VFS5-12
	15V@0.34A	5W	80 / 150	79%	VFS5-15
	24V@0.21A	5W	80 / 150	80%	VFS5-24

Part number structure



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