Technical Specification

EVN1F Series (SIP7)

Fixed Input, 1W DC/DC Converters

FEATURES

- Low cost
- Efficiency up to 82%
- 3KVDC isolation
- Fixed input : 3.3, 5, 12, 24VDC (±10%)
- Single and bipolar isolated outputs: 3.3, 5, 9, 12, 15, 24, ±3.3, ±5, ±9, ±12, ±15, ±24VDC
- Fixed switching frequency
- Industrial standard footprint: SIP7
- Build-in short protection, OTP
- Operating temperature range: -40°C to +105°C
- All material compliance with UL94V-0
- Fully encapsulated, high reliability
- MTBF up to 3.5K hours
- RoHS Compliance

PRODUCT OVERVIEW

The EVN1F modules are highly reliable, and efficient isolated DC/DC converter with industrial potted module technology. Wide temperature range and encapsulated package is ideal for industrial applications. Intended target markets include industrial control, power electronics, instrumentations, medical systems, transportation where power modules must meet rugged environmental requirements, impact size and isolated output voltages are required.

The EVN1F modules provide voltage isolation from input to output up to 3KVDC. The operation temperature range is from -40 ℃ to +105 ℃ . These modules are ideal for applications that do not require any heat sink or forced air cooling.

The EVN1F series are designed to IEC/EN 62368-1 safety standards.

Models Selections

Basic Models	Input Voltage [VDC]	Input Voltage Range [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency Typ. [%]	Capacitive Load Max. [μF]	Package [inch]
EVN1F03S03S	3.3	2.97-3.63	3.3	303	78	220	0.77"×0.24"×0.40" SIP7
EVN1F03S05S	3.3	2.97-3.63	5	200	80	220	
EVN1F03S09S	3.3	2.97-3.63	9	111	80	220	
EVN1F03S12S	3.3	2.97-3.63	12	84	82	220	
EVN1F05S03S	5	4.5-5.5	3.3	303	78	220	
EVN1F05S05S	5	4.5-5.5	5	200	80	220	
EVN1F05S09S	5	4.5-5.5	9	111	80	220	
EVN1F05S12S	5	4.5-5.5	12	84	80	220	
EVN1F05S15S	5	4.5-5.5	15	67	80	220	
EVN1F05S24S	5	4.5-5.5	24	42	85	220	
EVN1F05B05S	5	4.5-5.5	±5	±100	80	±220	
EVN1F05B09S	5	4.5-5.5	±9	±56	80	±220	
EVN1F05B12S	5	4.5-5.5	±12	±42	80	±220	
EVN1F05B15S	5	4.5-5.5	±15	±34	80	±220	

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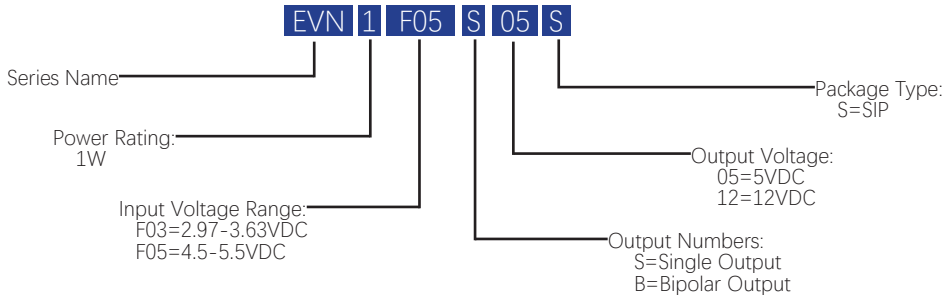
EVN1F12S03S	12	10.8-13.2	3.3	303	78	220	0.77"×0.24"×0.40" SIP7
EVN1F12S05S	12	10.8-13.2	5	200	80	220	
EVN1F12S09S	12	10.8-13.2	9	111	80	220	
EVN1F12S12S	12	10.8-13.2	12	84	80	220	
EVN1F12S15S	12	10.8-13.2	15	67	80	220	
EVN1F12S24S	12	10.8-13.2	24	42	80	220	
EVN1F12B03S	12	10.8-13.2	±3.3	±152	78	±220	
EVN1F12B05S	12	10.8-13.2	±5	±100	80	±220	
EVN1F12B09S	12	10.8-13.2	±9	±56	80	±220	
EVN1F12B12S	12	10.8-13.2	±12	±42	80	±220	
EVN1F12B15S	12	10.8-13.2	±15	±33	80	±220	
EVN1F12B24S	12	10.8-13.2	±24	±21	80	±220	
EVN1F24S03S	24	22-26.5	3.3	303	78	220	
EVN1F24S05S	24	22-26.5	5	200	80	220	
EVN1F24S09S	24	22-26.5	9	111	80	220	
EVN1F24S12S	24	22-26.5	12	84	80	220	
EVN1F24S15S	24	22-26.5	15	67	80	220	
EVN1F24S24S	24	22-26.5	24	42	80	220	
EVN1F24B05S	24	22-26.5	±5	±100	80	±220	
EVN1F24B09S	24	22-26.5	±9	±56	80	±220	
EVN1F24B12S	24	22-26.5	±12	±42	80	±220	
EVN1F24B15S	24	22-26.5	±15	±34	80	±220	
EVN1F24B24S	24	22-26.5	±24	±21	80	±220	

Model Numbering



Absolute Maximum Ratings					
Parameters	Conditions	Min.	Typ.	Max.	Units
Input Voltage	3.3Vin type	-0.7		5	VDC
	5Vin type	-0.7		9	VDC
	12Vin type	-0.7		18	VDC
	24Vin type	-0.7		30	VDC
Operating Environment Temperature	⩾ 85℃ with derating	-40		105	°C
Storage Temperature Range		-55		125	°C
Soldering Temperature	Lead temperature, 1.5mm from case for 10 seconds			300	°C

General Specifications					
Parameters	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	Test for 1 minute	3000			VDC
Isolation Resistance	Viso=1000VDC	1000			MΩ
Isolation Capacitance	Input to output		20		pF
Case Temperature Above Ambient			25		℃
Switching Frequency			220		KHz
Relative Humidity				95	%
Cooling	Free air convection				

Input Specifications					
Parameters	Conditions	Min.	Typ.	Max.	Units
Input Voltage Range	See the Model Selection on page 1-2.				
Input Current @ No Load	3.3 Vin		10	20	mA
	5Vin		12	24	mA
	12Vin		15	25	mA
	24Vin		18	30	mA
Input Current @ Min. Line	3.3 Vin		370		mA
	5Vin		235		mA
	12Vin		99		mA
	24Vin		51		mA
Reflected Ripple Current			15		mA p-p

Output Specifications					
Parameters	Conditions	Min.	Typ.	Max.	Units
Vout Accuracy	See voltage accuracy envelope on page 5.				
Line Regulation	3.3 Vout type			1.5	%/%
	Other types			1.2	%/%
Load Regulation	3.3 Vout type		15		%
	5 Vout type		10		%
	9 Vout type		8		%
	12 Vout type		7		%
	15 Vout type		6		%
Ripple & Noise ①			60	150	mV
Minimum Load ②		0			%
Output Short Protection	Continuous short protection, auto-recover				

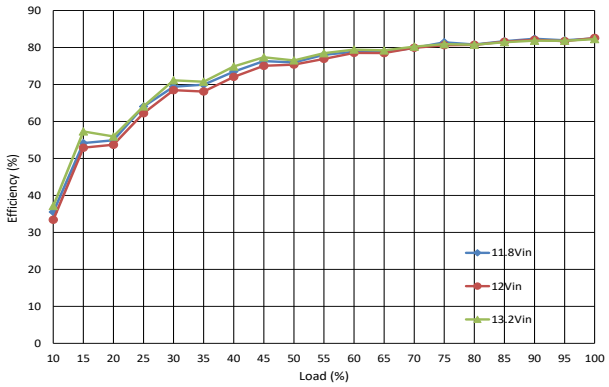
Notes:
① For output ripple & noise test conditions, please see output ripple & noise in technical notes on page 8 for details.
② Operating below 10% load will not harm the converter, but specifications may not be met, such as the output voltage may be higher than rated output voltage.

All specifications are tested at 25 °C ambient temperature, nominal input voltage, rated output current conditions unless otherwise specified.

Performance Data

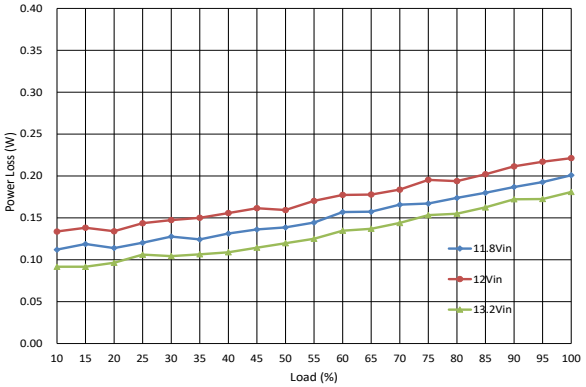
EFFICIENCY VS LOAD

EVN1F12S05 Module

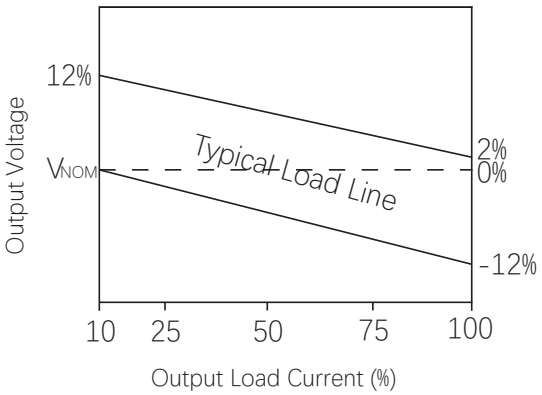


POWER LOSS VS LOAD

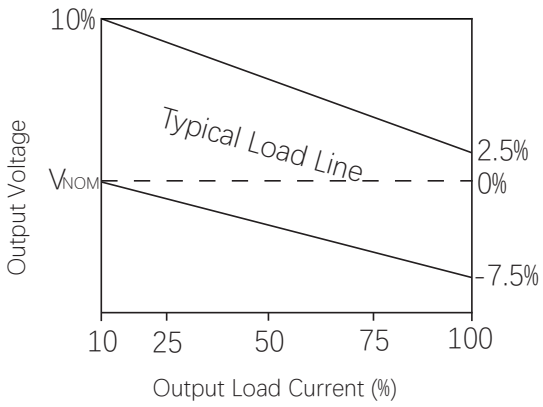
EVN1F12S05 Module



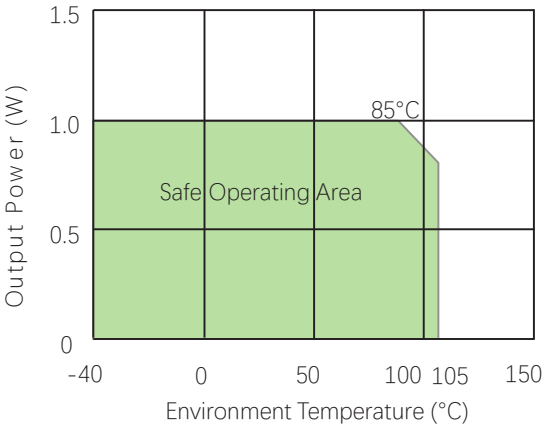
VOUT ACCURACY ENVELOPE (3.3 VOUT TYPE)



VOUT ACCURACY ENVELOPE (OTHER TYPES)

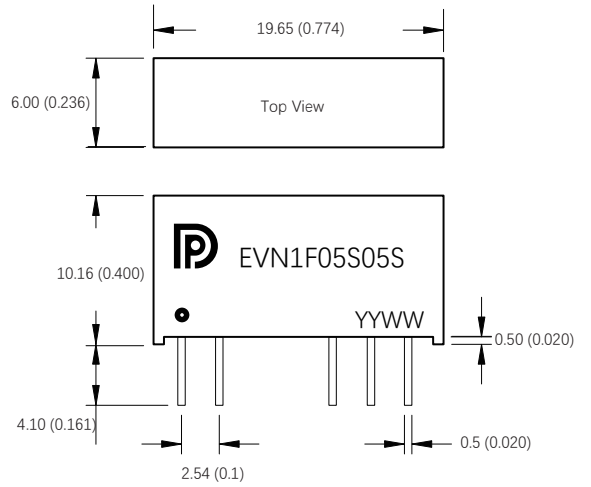


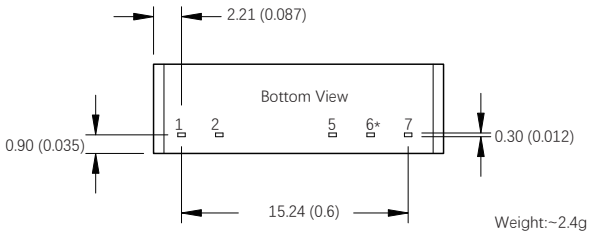
TEMPERATURE DERATING



Mechanical Specifications

MECHANICAL DIMENSIONS

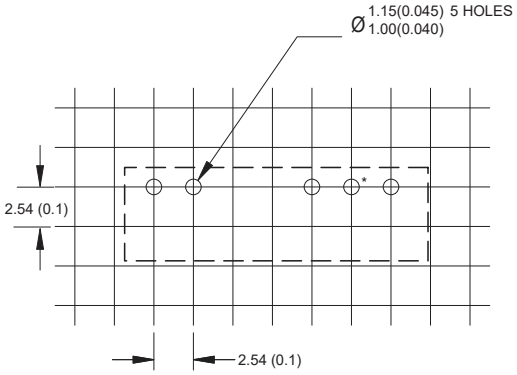




*Pin is not fitted on single output modules.
Unless otherwise specified, all dimensions are in mm±0.25 (inches ±0.01).

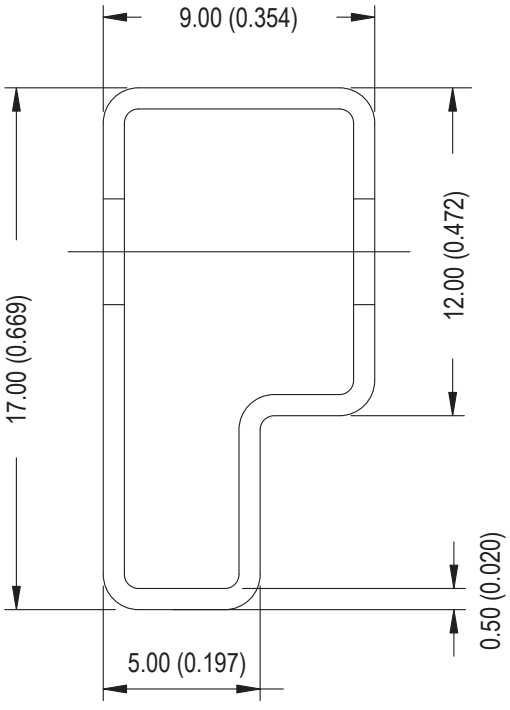
PIN Connections			
Single Output		Bipolar Output	
Pin	Function	Pin	Function
1	+Vin	1	+Vin
2	-Vin	2	-Vin
5	-Vout	5	-Vout
7	+Vout	6	GND
		7	+Vout

RECOMMENDED FOOTPRINT DETAILS



*Hole is not required for single output modules.
Unless otherwise specified, all dimensions are in mm ±0.5 (inches±0.02).

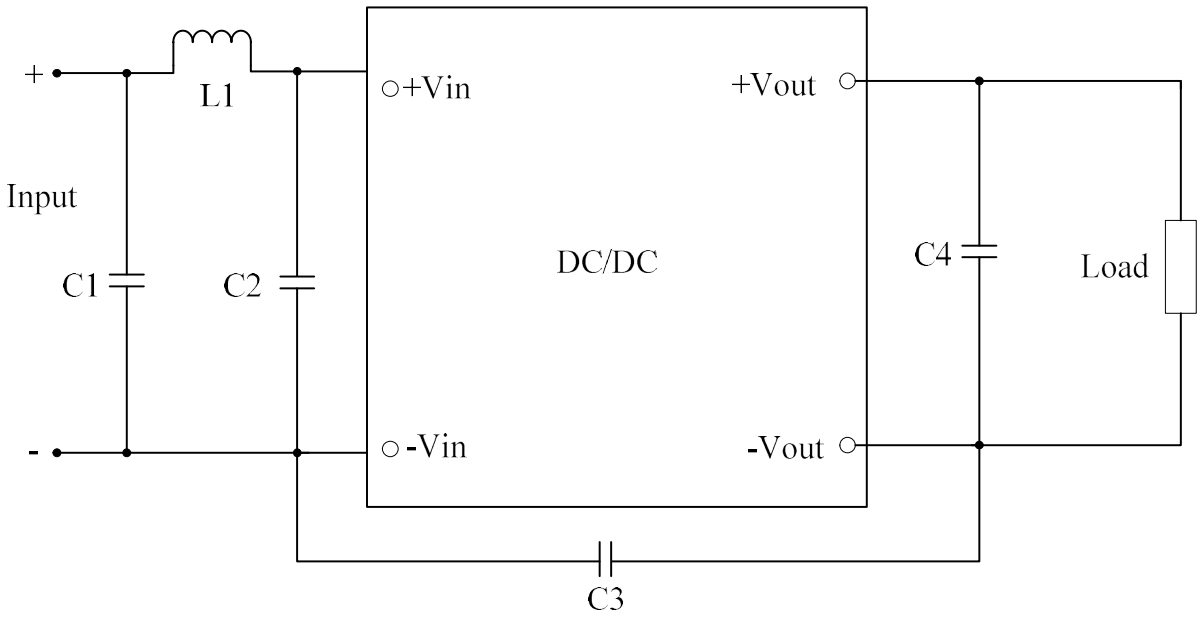
TUBE OUTLINE DIMENSIONS



Unless otherwise specified, all dimensions are in mm ±0.5 (inches±0.02).
Tube length : 520mm ±2mm (20.87)
Tube quantity : 25pcs

Emissions Performance

Density Power measures its products for emissions against the CISPR32/EN55032 standards. The maximum output power of the module is 1W and the conduction limits can meet class B.



Conducted Emissions Test Circuit

Conducted Emissions Parts List

REFERENCE	DESCRIPTION	REFERENCE	DESCRIPTION
C1	10μF	C3	2.2nF
C2	4.7μF	C4	According to capacitive loading in table on page 1
L1	6.8μH		

Technical Notes

INPUT FUSING

Certain applications may require fuse at the inputs of power conversion components. Fuses should also be used when there is possibility of sustained input voltage reversal which is not current limited. The EVN1F modules are not internally fused. We strongly recommend a slow blow fuse to be used in the ungrounded input supply line.

For safety agency approvals, the installer must install the converter in compliance with the end user safety standard.

OUTPUT RIPPLE & NOISE

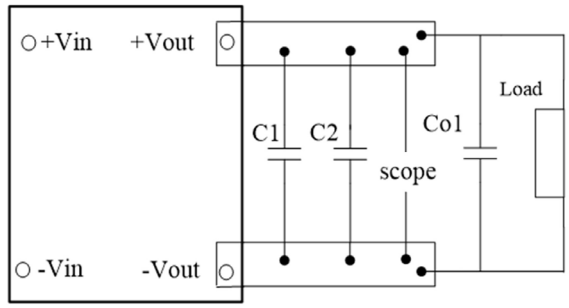


Figure 1 Output Ripple & Noise for Single Output

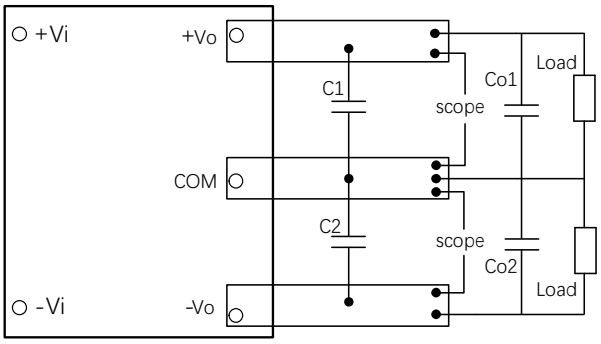


Figure 2 Output Ripple & Noise for Bipolar Outputs

These EVN1F series' output ripple and noise is measured at the rated input voltage and output current, along with 10uF and 0.1uF MLCC are used in parallel with appropriate voltage ratings. The oscilloscope bandwidth is set to 20MHz.

External output capacitors are required to reduce the ripple & noise. The output capacitors should be low ESR and appropriate frequency response with appropriate voltage ratings, and must be located as close to the converters as possible, also particular load and layout must be taken into consideration.

ISOLATION VOLTAGE

The EVN1F series are 100% production tested at their specified isolation voltage. Parts can be expected to withstand the specified test voltage several times. But it is well known that repeated high-voltage isolation testing will degrade isolation capability which is depending on materials, construction and environment. Thus, the number of tests should be strictly limited and we strongly advise against repeated high voltage isolation testing.

This product is subject to the following operating requirements and the Life and Safety Critical Application Sales Policy:
Refer to: http://www.densitypower.com