

### FEATURES

- Design to meet AEC-Q200 standard
- IATF16949 certified manufacturing
- Ultra high efficiency up to 87.5%
- Super capacitive load capability, up to 2700uF
- 3KVDC, 5KVDC isolation options
- Fixed input : 3.3, 5VDC ( $\pm 10\%$ )
- Single and bipolar isolated outputs: 3.3, 5, 9, 12, 15,  $\pm 5$ ,  $\pm 9$ ,  $\pm 12$ ,  $\pm 15$ VDC
- Fixed switching frequency
- Industrial standard footprint: SIP7
- Output short protection
- Operating temperature range:  $-40^{\circ}\text{C}$  to  $105^{\circ}\text{C}$  without derating
- All material compliance with UL94V-0
- Fully encapsulated, high reliability
- MTBF up to 4M hours
- RoHS Compliance



### PRODUCT OVERVIEW

The DVN1F-V1 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 DVN1F-V1 modules provide voltage isolation from input to output up to 5KVDC. The operation temperature range is  $-40^{\circ}\text{C}$  to  $+105^{\circ}\text{C}$ , the module delivers full output power @  $105^{\circ}\text{C}$  ambient temperature under free air convection. These modules are ideal for applications that do not require any heat sink or forced air cooling.

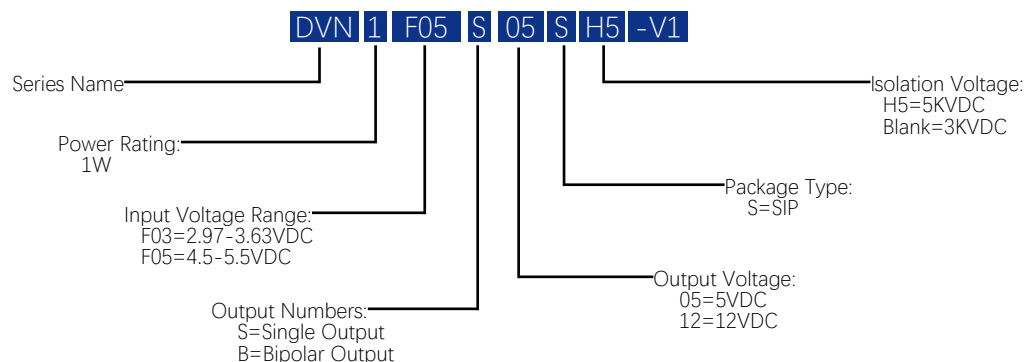
The DVN1F-V1 series are designed to IEC/EN 62368-1 safety standards.

### Models Selections

Basic Models	Input Voltage [VDC]	Input Voltage Range [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency Typ. [%]	Ripple & Noise [mVp-p] <sup>①</sup>	Package [inch]
DVN1F03S03S-V1	3	2.97-3.63	3.3	303	76	30	0.77"×0.24"×0.40" SIP7
DVN1F05S05S-V1	5	4.5-5.5	5	200	84	28	
DVN1F05S09S-V1	5	4.5-5.5	9	111	88	35	
DVN1F05S12S-V1	5	4.5-5.5	12	84	90	45	
DVN1F05S15S-V1	5	4.5-5.5	15	67	89	50	
DVN1F05S24S-V1	5	4.5-5.5	24	42	91	60	
DVN1F05B05S-V1	5	4.5-5.5	$\pm 5$	$\pm 100$	90	30	
DVN1F05B09S-V1	5	4.5-5.5	$\pm 9$	$\pm 56$	88	43	
DVN1F05B12S-V1	5	4.5-5.5	$\pm 12$	$\pm 42$	91	45	
DVN1F05B15S-V1	5	4.5-5.5	$\pm 15$	$\pm 33$	91	50	

Note: <sup>①</sup> For output ripple & noise test conditions, please see output ripple & noise in technical notes on page 7 for details.

### Model Numbering



### Absolute Maximum Ratings

Parameters	Conditions	Min.	Typ.	Max.	Units
Input Voltage	3.3 Vin type			5	VDC
	5 Vin type			6	VDC
Operating Environment Temperature		-40		105	°C
Storage Temperature Range		-50		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	Standard mode, test for 1 minute.	3000			VDC
	H5 type, test for 1 minute.	5000			VDC
Isolation Resistance	Viso=1000VDC	10			GΩ
Case Temperature Above Ambient				20	°C
Switching Frequency			500		KHz
Relative Humidity		5		95	%
Cooling	Free air convection				

# Technical Specification

## DVN1F-V1 Series (SIP7)

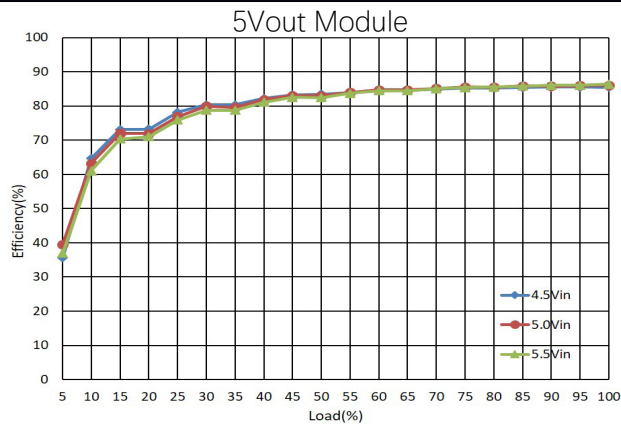
Fixed Input, 5KVDC Isolated 1W DC/DC Converters

Input Specifications					
Parameters	Conditions	Min.	Typ.	Max.	Units
Input Voltage Range	3.3 Vin type	2.97	3.3	3.63	VDC
	5 Vin type	4.5	5	5.5	VDC
Reflected Ripple Current			11	20	mA p-p
Output Specifications					
Parameters	Conditions	Min.	Typ.	Max.	Units
Output Power				1	W
Vout Accuracy	See voltage accuracy envelope on page 3.				
Line Regulation			1.05	1.1	%/%
Minimum Load <sup>①</sup>		0			%
Output Short Protection	Continuous short protection.				
Note: ① 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.					

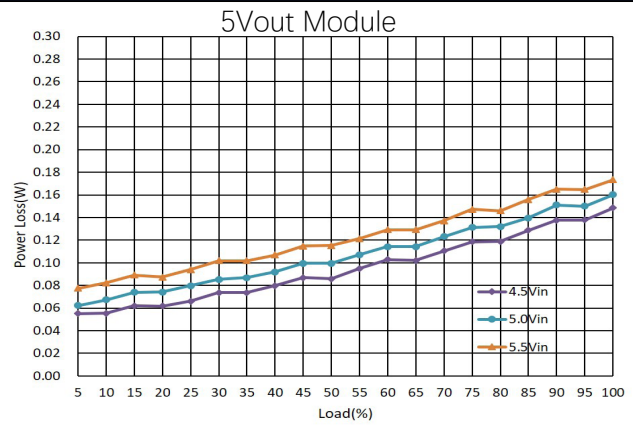
All specifications are tested at 25 °C ambient temperature, nominal input voltage, rated output current conditions unless otherwise specified.

### Performance Data

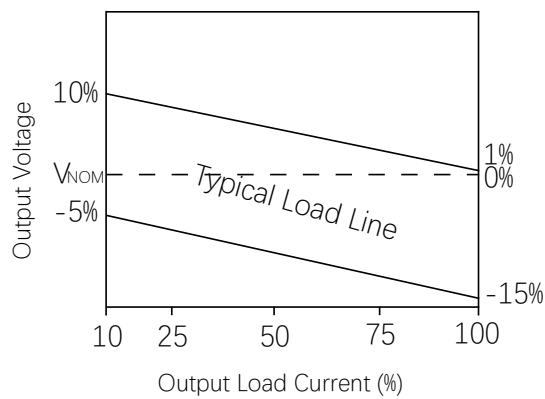
#### EFFICIENCY VS LOAD



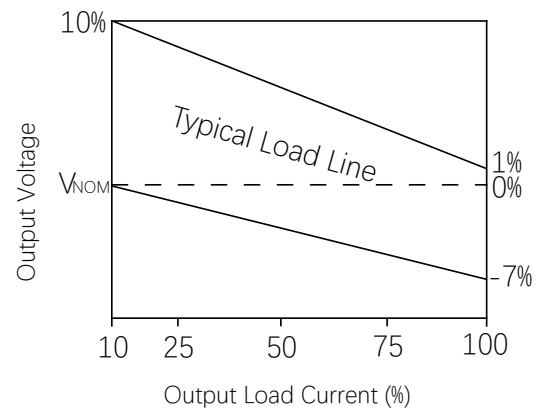
#### POWER LOSS VS LOAD



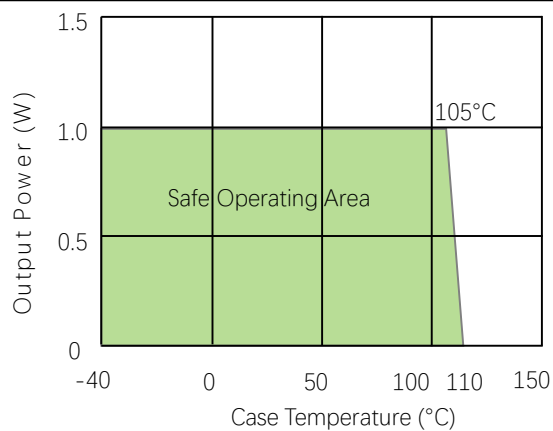
#### VOUT ACCURACY ENVELOPE (3.3 Vin TYPE)



#### VOUT ACCURACY ENVELOPE (OTHER TYPES)

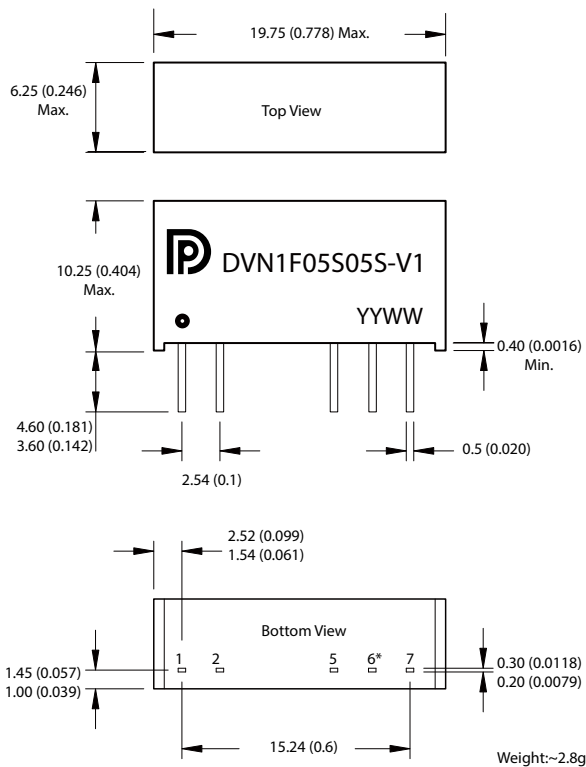


#### TEMPERATURE DERATING



### Mechanical Specifications

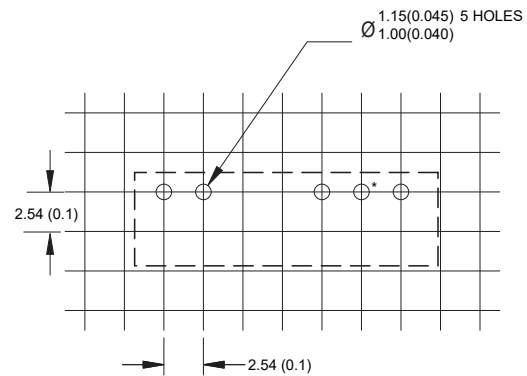
#### MECHANICAL DIMENSIONS



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

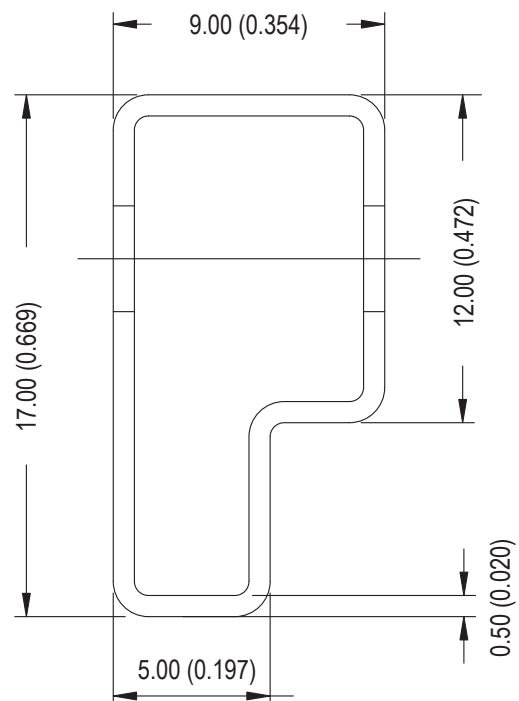
PIN Connections			
Single Output		Bipolar Output	
Pin	Function	Pin	Function
1	+Vin	1	+Vin
2	-Vin	2	-Vin
5	-Vout	5	-Vout
7	+Vout	6	GND
		7	+Vout

#### RECOMMENDED FOOTPRINT DETAILS



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

#### TUBE OUTLINE DIMENSIONS



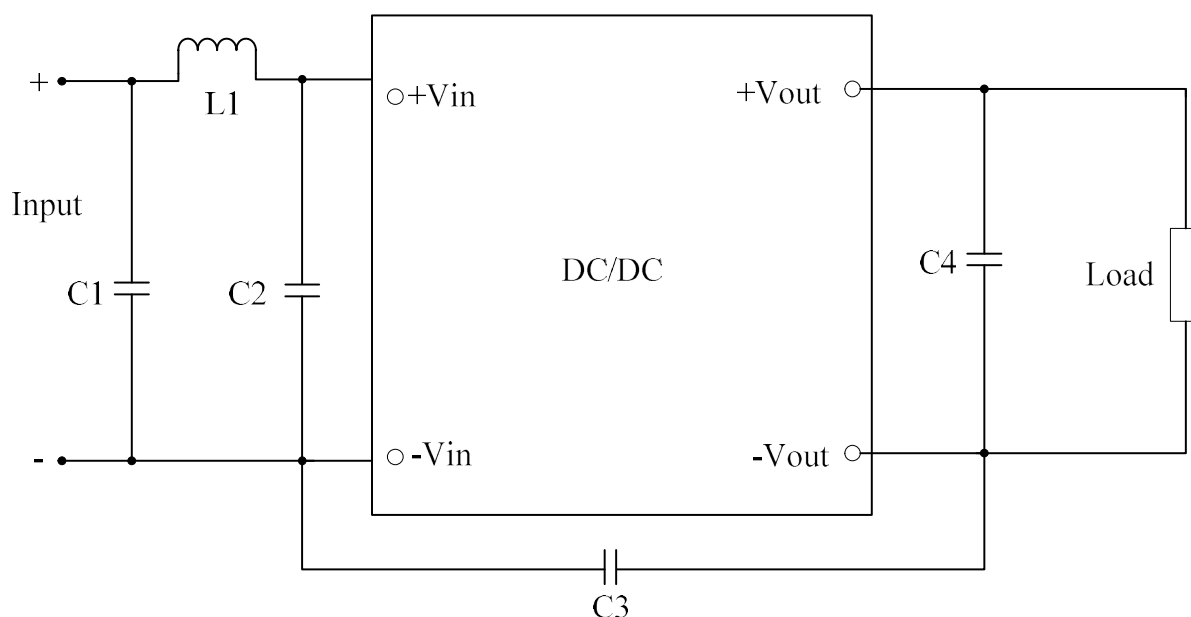
Unless otherwise specified, all dimensions are in mm  $\pm$ 0.5 (inches $\pm$ 0.02).

Tube length : 530mm  $\pm$ 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

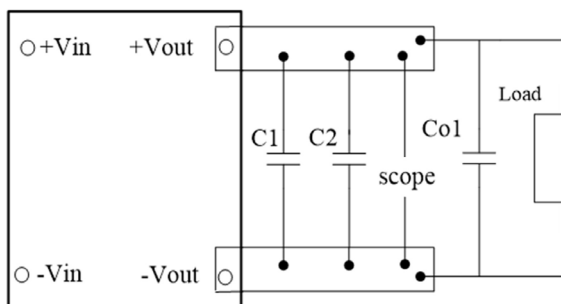
REFERENCE	DESCRIPTION	REFERENCE	DESCRIPTION
C1	10 $\mu$ F	C3	2.2nF
C2	4.7 $\mu$ F	C4	According to capacitive loading in technical notes on page 6
L1	6.8 $\mu$ H		

### 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 DVN1F-V1 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



These DVN1F-V1 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 DVN1F-V1 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.

#### CAPACITIVE LOADING

The DVN1F-V1 series are optimized for robust output capacitance load capability. It can start up with 2700uF capacitance @ 100% rated output current within 20mS.



This product is subject to the following operating requirements and the Life and Safety Critical Application Sales Policy:

Refer to: <http://www.densitypower.com>

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