Figure 1. Physical Photo of APAIDC24V5V1WSM

FEATURES

- Output Voltage Proportional to Input Voltage
- High Isolation Voltage: 1500VDC
- Input Voltage Range: 21.6V ~ 26.4V
- Max. Output Current: 200mA
- High Efficiency: 86% @V_{IN} = 24V & I_{OUT} = 200mA
- Switching Frequency: 450kHz
- Compact SIP package
- Wide Operating Temperature Range: −50°C ~ 115°C

APPLICATIONS

Isolated DC-DC converter modules are electronic devices that convert a DC input into a DC output voltage proportional to the input voltage value with galvanic isolation between the input and output circuits. Our newly developed power supply module, APAIDC24V5V1WSM, is designed to have a high isolation voltage capability, 1500V, at an efficiency of up to 86%. Here are some common applications of isolated DC-DC converter modules:

1. Power supplies for telecommunications and networking equipment: Isolated DC-DC converter modules are commonly used to power telecom and networking equipment, such as routers, switches, and base stations. They provide high efficiency and reliability in a compact form factor, making them ideal for use in these applications.

2. Industrial automation and control systems: Isolated DC-DC converter modules are used in a wide range of industrial automation and control systems, such as robotics, process control, and factory automation. They provide reliable and stable power to sensitive control circuits and sensors.

3. Medical devices: Isolated DC-DC converter modules are used in various medical devices, such as patient monitoring systems, infusion pumps, and imaging equipment. They offer reliable and efficient power conversion while providing safety and protection to patients and medical staff.

4. Renewable energy systems: Isolated DC-DC converter modules are used in renewable energy systems, such as solar power and wind power systems, to convert the DC output from the renewable energy source to a regulated DC voltage suitable for charging batteries or powering electronic devices.

5. Automotive electronics: Isolated DC-DC converter modules are used in automotive electronics, such as infotainment systems, powertrain control modules, and advanced driver assistance systems. They provide reliable and efficient power conversion in the harsh automotive environment, where high temperatures and voltage spikes are common.

Overall, isolated DC-DC converter modules are used in various applications where reliable, efficient, and regulated power conversion is required with galvanic isolation between the input and output circuits.

This product line offers a variety of input and output voltages, its full families are shown in Table 4. on page 7.

DESCRIPTION AND SPECIFICATIONS

Our power supply unit is designed to withstand extreme temperatures, with a wide operating range of −50°C to +115°C. This makes it a versatile and reliable choice for use in a variety of industrial and commercial settings. With a mean time between failure of 30×10^5 hours (equivalent to 340 years of continuous use), you can trust that it will keep your equipment running smoothly for years to come.

Table 1. Pin Names AND Functions.

No.	Name	Type	Description
1	VIN−	Power Ground	Negative Input Voltage
2	VIN+	Power Input	Positive Input Voltage
4	GND	Power Output	Negative Output Voltage
5	VOUT+	Power Output	Positive Output Voltage
8	NC	-	-

Table 2. Specifications

INPUT						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit/Note**
Input Voltage	V_{IN}		21.6	24	26.4	V
Input Current	I_{IN}	Full Load		47		mA
		No Load		3		mA
Surge Voltage			−0.7		30	VDC
Surge Current				0.8		A
Reflected Ripple Current				15		mA
Filter			Capacitor			
OUTPUT						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit/Note**
Output Power	P		0.1		1	W
Output Voltage	V_{OUT}			5		V
Output Current	I_{OUT}				200	mA
Output Voltage Accuracy			See Figure 2 and Figure 3			
Line Regulation	$\Delta V_{OUT}/\Delta V_{VPS}$	Input voltage change: ±1%	−1.5		1.5	%
Load Regulation	$\Delta V_{OUT}/\Delta I_{OUT}$	Load change from 10% to 100%	10		15	%
Ripple & Noise		Full Load Bandwidth = 20MHz	50		100	mV_{p-p}

Capacitive Load				3000		μF
Efficiency	η		84		86	%
Temperature Coefficient		Full Load	−0.03		0.03	%/°C
Short Circuit Protection			Continuous, self-recovery (The APAIDC24V5V1WSM lacks short circuit protection)			

GENERAL CHARACTERISTIC

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit/Note
Isolation Voltage	V_{IS}	t_{test}= 60s, I_L≤ 0.5mA	1500			VDC
Isolation Capacitance		100kHz/0.1V		20		pF
Isolation Resistance				1000		MΩ
Switching Frequency	f_{SW}			450		kHz
Operating Temperature Range	T_{opr}		−50		115	°C
Storage Temperature Range	T_{stg}		−55		135	°C
Case Temperature Rise	T_{cr}	T_A = 25°C		15		°C
Pin Soldering Temperature		1times	270		280	°C
		3 times			270	°C
Storage Relative Humidity Range	RH				95	%
Mean Time Between Failure	MTBF	MIL-HDBK-217F@25°C		30×10^5		Hrs
Case Material			Black thermoplastic UL94V-0			
Weight				1.4		g
				0.003		lbs
				0.049		Oz

TYPICAL PERFORMANCE CHARACTERISTICS

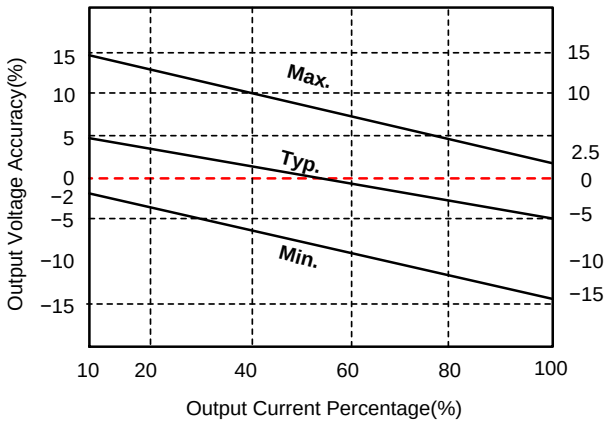

Figure 2. Load vs. Output Voltage

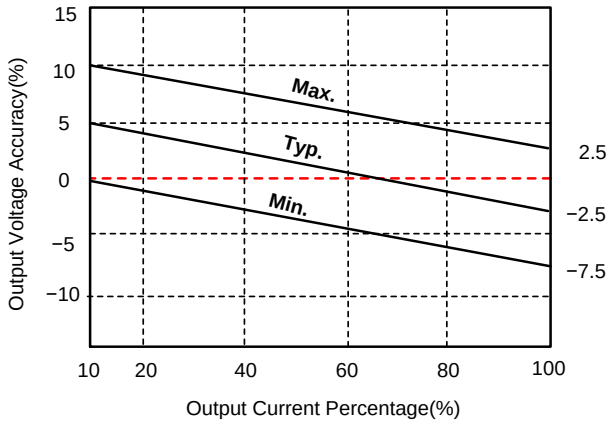

Figure 3. Load vs. Output Voltage

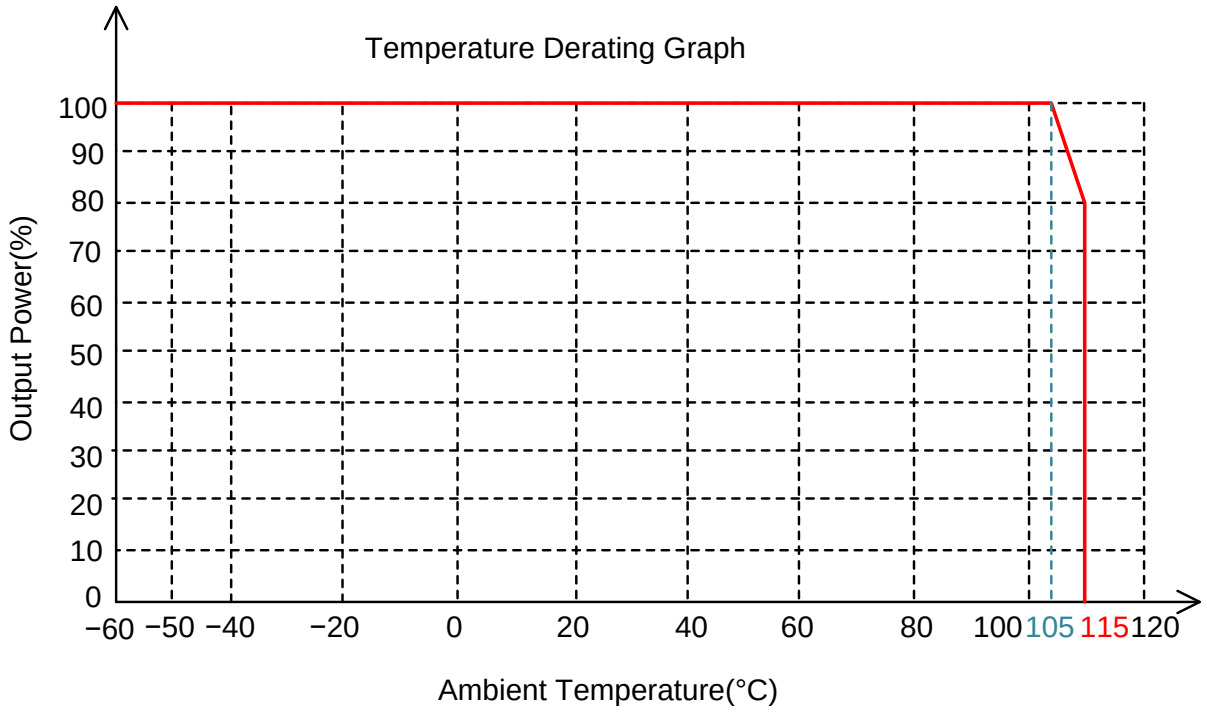

Figure 4. Derating Curve

TYPICAL APPLICATIONS

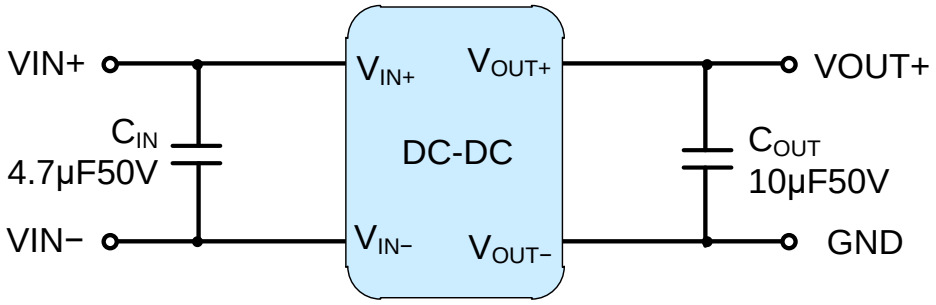

Figure 5. Recommended Circuit

The simplest way to use APAIDC24V5V1WSM is shown in Figure 5, where C_{IN} can be 4.7μF50V and C_{OUT} 10μF50V. Choose a low ESR capacitor, such as MLCC (Multi-Layer Ceramic Capacitor) type, with appropriate voltage ratings.

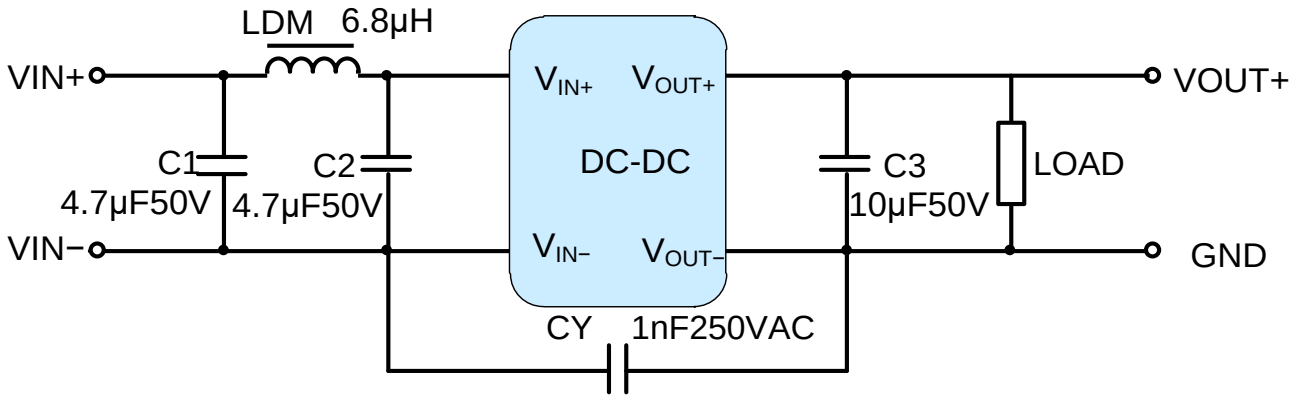

Figure 6. Output Voltage Regulator and Overvoltage Protection Circuit

1. Parallel usage and hot-swapping are not supported by this product.
2. To ensure that the power module operates efficiently and reliably, it is recommended that the minimum load not be less than 10% of the rated resistive load. If the required power is lower than this, it is advised to connect a resistor at the output end that is equivalent to 10% of the rated load.
3. The maximum capacitive load of the product is based on the rated full-load test, and should not be exceeded when in use. Otherwise, it may cause difficulties in starting and damage the product.

OUTLINE DIMENSIONS

Surface Mount Package (SM)

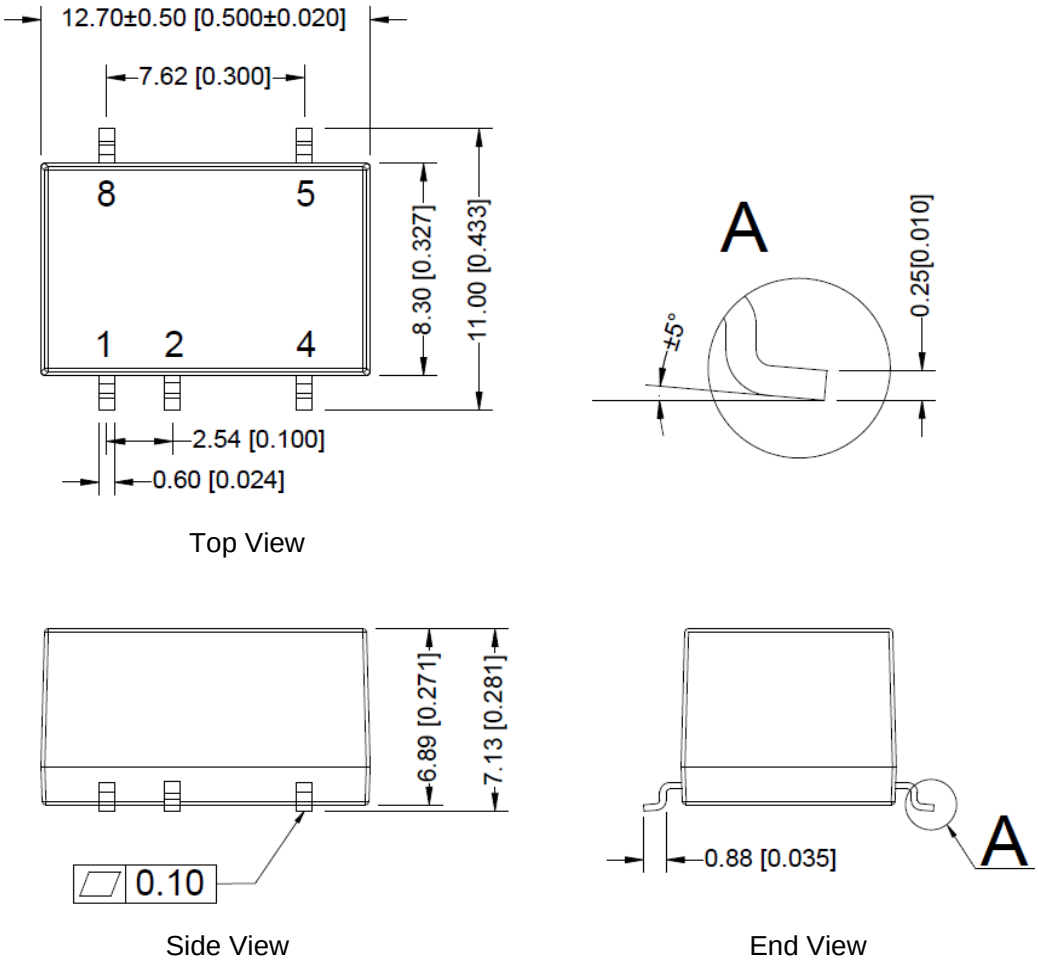

Figure 7. Dimensions

ORDING INFORMATION

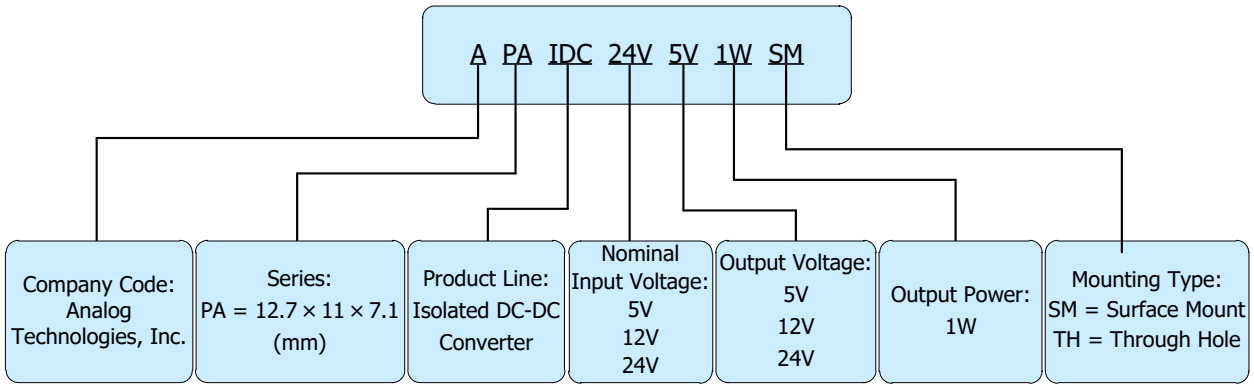

Figure 8. Naming Convention of APAIDC24V5V1WSM

Table 3.

Part Number	Buy Now
APAIDC24V5V1WSM	* *

*: both and are our online store icons. Our products can be ordered from either one of them with the same pricing and delivery time.

Related Products

Table 4. APAIDC24V5V1WSM Families with Different V_{IN}

Product Model	Datasheet	Input Voltage		Output Voltage	Output Current		MAX. Capacitive Load	Ripple & Noise		Efficiency		Buy Now*
		Typ.	Range	V	mA		μF	mV_{p-p}		%		
					Max.	Min.		Typ.	Max.	Min.	Typ.	
APAIDC3V33V31WSM	Contact Us	3.3V	2.97 ~ 3.63V	3.3	303	30	10000	50	100	74	76	Contact Us
APAIDC3V35V21WSM	Contact Us			5	200	20	10000	50	100	80	82	Contact Us
APAIDC3V39V1WSM	Contact Us			9	111	11	10000	50	100	83	85	Contact Us
APAIDC3V312V1WSM	Contact Us			12	83	8	10000	100	150	85	87	Contact Us
APAIDC3V315V1WSM	Contact Us			15	67	7	10000	100	150	85	87	Contact Us
APAIDC3V324V1WSM	Contact Us			24	42	4	10000	100	150	83	85	Contact Us
APAIDC5V3V31WSM	Contact Us	5V	4.5 ~ 5.5V	3.3	303	30	10000	50	100	78	80	Contact Us
APAIDC5V5V1WSM	Contact Us			5	200	20	10000	50	100	83	85	Contact Us
APAIDC5V9V1WSM	Contact Us			9	111	11	10000	50	100	84	86	Contact Us
APAIDC5V12V1WSM	Contact Us			12	83	8	10000	100	150	85	87	Contact Us
APAIDC5V15V1WSM	Contact Us			15	67	7	10000	100	150	85	87	Contact Us
APAIDC5V24V1WSM	Contact Us			24	42	4	10000	100	150	86	88	Contact Us
APAIDC12V3V31WSM	Contact Us	12V	10.8 ~ 13.2V	3.3	303	30	1000	50	100	80	82	Contact Us
APAIDC12V5V1WSM	Contact Us			5	200	20	3000	50	100	84	86	Contact Us
APAIDC12V12V1WSM	Contact Us			12	83	8	2200	50	100	84	86	Contact Us
APAIDC12V15V1WSM	Contact Us			15	67	6	1000	50	100	84	86	Contact Us
APAIDC12V24V1WSM	Contact Us			24	42	4	560	50	100	84	86	Contact Us
APAIDC15V5V1WSM	Contact Us	15V	13.5 ~ 16.5V	5	200	20	2200	50	100	83	85	Contact Us
APAIDC24V5V1WSM		24V	21.6 ~ 26.4V	5	200	20	3000	50	100	84	86	* *
APAIDC24V12V1WSM	Contact Us			12	83	8	2200	50	100	84	86	Contact Us
APAIDC24V15V1WSM	Contact Us			15	67	6	1000	50	100	84	86	Contact Us
APAIDC24V24V1WSM	Contact Us			24	42	4	560	50	100	84	86	Contact Us

NOTICE

1. It is important to carefully read and follow the warnings, cautions, and product-specific notes provided with electronic components. These instructions are designed to ensure the safe and proper use of the component and to prevent damage to the component or surrounding equipment. Failure to follow these instructions could result in malfunction or failure of the component, damage to surrounding equipment, or even injury or harm to individuals. Always take the necessary precautions and seek professional assistance if unsure about proper use or handling of electronic components.
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