

FHNB0.3AM10 Series High-temperature Reversing Switching Regulator

Features:

- : Working temperature: ambient temperature: $-55^{\circ}\text{C} \sim +175^{\circ}\text{C}$ and max. shell temperature: $+185^{\circ}\text{C}$
- : Size: L:19.1×W:12.4×H:8.0mm
- : Input range: 3.0~16.5V
- : Output voltage: -2.5V, -3.3V, -5.0V, -7.0V, -8.0V, -9.0V, -10.0V, -12.0V, -15.0V
- : Output current: 0.3A~1.0A
- : 100uA static working current
- : 5uA cut-off holding current
- : Cut-off terminal with output
- : Conversion efficiency: typical 85%
- : Sealed metal casting: impact and moist resistance and electromagnetic radiation protection
- : Provide rated power without deduction at 185°C
- : Over-voltage and over-current failure switch-off delay restart

Description:

FHNB0.3AM10 series high-temperature reversing switching regulators outputting current 0.3A ~ 1.0A, are specially designed for electronic equipment working in the harsh environment and can continuously work for 1,200 hours at shell temperature 150°C , for 500 hours at shell temperature 175°C and for 48 hours at shell temperature 185°C . With features of being resistant to high temperature, impact and humidity, it is particularly suitable for being used as power supply system for petroleum prospecting logging tool, petroleum drilling instrument, geophysical detecting instrument, vehicles, telecommunication, network infrastructures, enterprise and high-performance calculation, etc. Its input ranges from 3.0V to 16.5V, providing non-isolated single-way fixed voltage with output ranging from $-2.5\text{V} \sim -15.0\text{V}$. Within the entire range of working temperature and conversion between full load and no-load, the output voltage fluctuation is within 0.1V. Under the condition without adding any filtering, its output voltage ripple is typically less than 50mV. Within the entire temperature range, temperature drift of output voltage is 50 PPM/°C.

FHNB0.3AM10 is a switching regulator providing reversing output voltage. It starts to work when input voltage is greater than 3.0V. The maximum output voltage is +16.5V and the difference between input voltage and output voltage shall be not greater than 20V. The following table shows the combinations of its input and output voltages. It is known that its maximum output current is 1.0A and maximum output power is 4.5W. When current is outputted at 0.3A, its conversion efficiency is the largest despite of its output voltage, reaching 88% at most.

Output voltage (V)	Input voltage (V)	Output current (A)
-2.5	+3~+16.5	1.0
-3.0	+3~+16.5	1.0
-5.0	+3~+15.0	0.9
-12.0	+3~+8.0	0.35
-15.0	+3~+5.0	0.3

FHNB0.3AM10 comes with a cutoff enabling terminal which has high level enabling output and low level cutoff output. This facilitates low-power consumption system to shut off the system that does not need to work so as to save input power. The maximum consumption after cutoff is only 5μA. If it does not need to be cut off, short-circuit EN terminal and input terminal for leading wire.

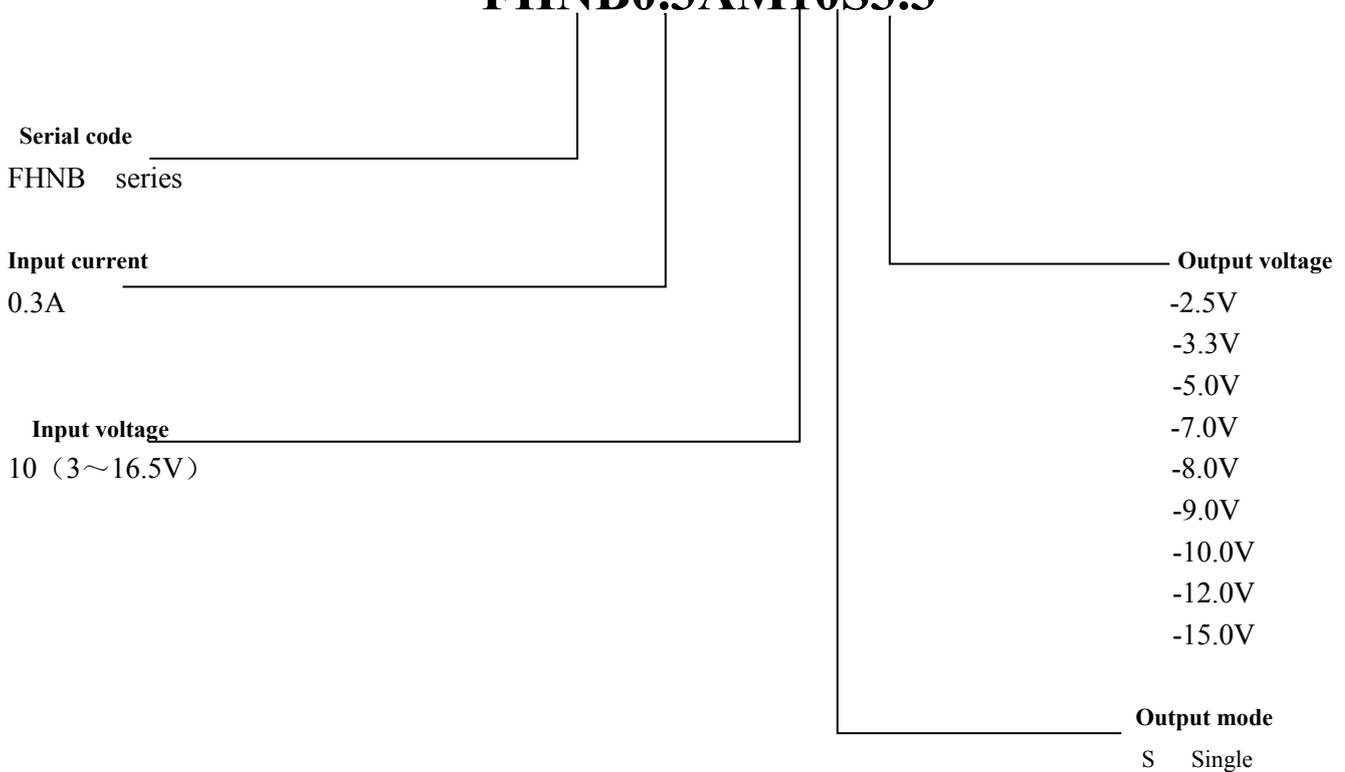
FHNB0.3AM10 series power converter contains under-voltage cut-off functions, which enables the converter to stop working when the input voltage is less than 3.0V for the purpose of protecting the converter.

FHNB0.3AM10 contains output short-circuit and overload auto-cutoff circuit. When output continues to exceed 1.5A for 0.1 second, converter will cut off output; after overcurrent fault is removed, converter will automatically continue to output voltage.

Key components used for FHNB0.3AM10 series power converter are purchased in military level and completely pass the in-factory test in strict accordance with the national military product quality standard. The factory test includes 24~72-hour live aging and screening under the temperature of +175°C. All finished products have experienced 8-hour full-load operation under the temperature of +175 °C before delivery so as to fully check the damage to the components during the production process and hence ensure the reliability of products.

Type Selection:

FHNB0.3AM10S3.3



Technical Parameters:

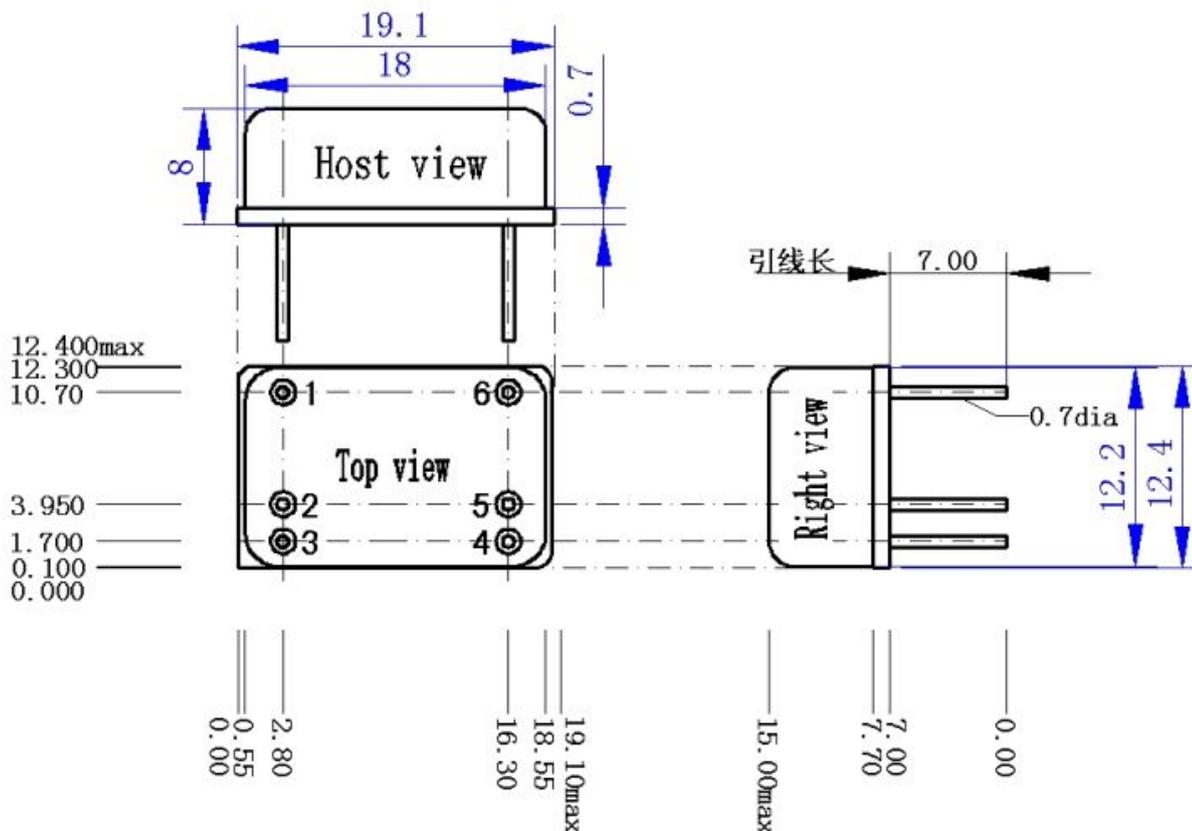
Item	Description	Value			Unit
		Min	Typical	Max.	
Working temperature	Shell temperature of converter	-55		+185	℃
Input voltage		3.0		16.5	V
Output voltage	Able to output the following voltages -2.5V,-3.3V,-5.0V,-7.0V,-8.0V,-9.0V,-10.0V,-12.0V,-15.0V	-2.5		-15.0	V
Maximum difference between input and output voltages	VIN-VOUT	20			V
Output power	VOUT*ILOAD	4.5			W
Mechanical size	Error: ±0.5mm	L:W:H:19.1*12.4*8.0			mm
Input current	V+=16.5V,SHDN≤0.3V			100	uA
Output current		0	300	1000	mA
Output ripple			50	100	mVp-p
Output temperature drift			50		ppm/℃
Precision of output voltage			4.0		%/
Output efficiency	Vin = 5.0V, ILOAD = 300mA, vout=-12V		85		%/
Undervoltage lock			2.75	3.0	V
On/off frequency				300	kHz
Shutdown current	EN=16.5, Vin=16.5V, TC=175℃			5	uA
Linear adjust rate	Vin=3.0V to 16.5.V			0.137	mV/V
Load adjust rate	ILOAD≤300mA			1.5	mV/A
EN terminal voltage	High level shutdown	1.6		VIN+0.3	V
	Low level enable	-0.3		0.3	V
EN terminal input current	V+ = 16.5V, SHDN = 0V or V+			±1.0	uA
Output short-circuit current	TC=25℃		1.5A		V
Vibration	MIL-STD-810D Method 514.3	Each axis circulates for 10 times Frequency: 20-50Hz/50Hz-2KHz, Amplitude/rate: 0.5mm/10g			OK
Shock	MIL-STD-810D Method 516.3	Shock three times for each Spike rate: 100g Holding time: 6ms			OK

Service Requirement:

The shell of the converter is isolated from the input and output. During the use, it is directly mounted on printed circuit board and the top of converter is connected to cooler. As converter's efficiency is rather higher and its output power is low, it is unnecessary to take cooling into account if the condition is inadmissible. The shell can be suspended or connected to GND. It can prevent radiation if it is connected to GND. If it is required to be suspended and prevent radiation, a 1000PF capacitor should be connected between GND and shell.

During use, if ripple is a little bit bigger for circuit, it is possible to use capacitor or LC network to filter it.

Outline Diagram



Definition of Pins

Pin No.	Output Definition
1	Input +
2	Input GND
3	EN
4	Output -
5	NC
6	Output GND

**Product performance, reliability and information are subject to change without prior notice.
September 25th, 2014**