



Features:

Dimensions:

50.8 × 12.7 × 8.1 mm

- Operating temperature range: -40 ~ 85°C
- Input Voltage Range: 3.0 ~ 5.5Vdc
- Output voltage Precision: -3% ~ +3%
- Remote sense
- Low output noise & ripple
- Output short-circuit protection
- Output over-current protection
- RoHS (2002/95/EC) compliant
- EN60950-1 Certified

Numbering Convention:

BSN 10A - 3 S X - G
 1 2 3 4 5 6

NO	Features	Descriptions
1	Product Series	BSN Series
2	Typical Output Current	10 -Typical Output current10A
3	Typical Input Voltage	5 -Typical Input Voltage: 5V
4	Number of Outputs	S - Single Output
		D - Dual Output
5	Typical Output Voltage	X-Output Voltage adjustable wide-range of arbitrary
6	RoHS	G - lead-free,ROHS6

1. Description

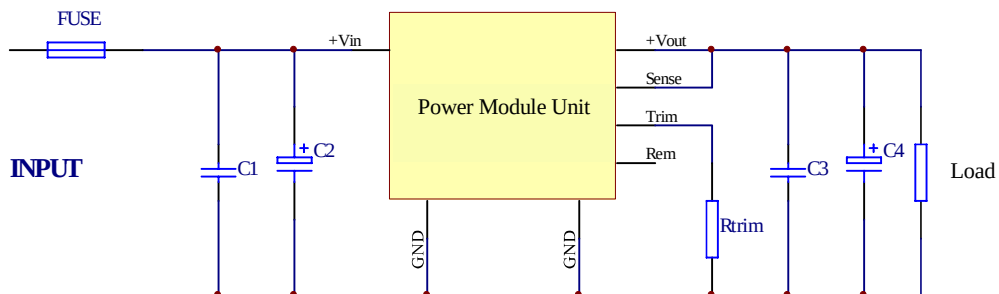
The BSN10A-3SXG series power modules are open frame DC-DC converters using non-isolated buck-boost technologies and synchronous rectifier technologies, and feature high efficiency, high reliability, high stability, remote on/off, and short-circuit protection. All devices are surface mounted. The converts operate at an input voltage of 3.0Vdc or 5.5Vdc, and provide an adjustable output voltage of 0.75Vdc to 3.63Vdc and a 10A output current. The output voltage is initially set as 0.75Vdc, and can be trimmed to 0.75Vdc, 1.2Vdc, 1.5Vdc, 1.8Vdc, 2.5Vdc or 3.3Vdc by adding an external resistor between Trim and GND.

2 Specifications (Unless otherwise stated, all specifications are typical at nominal input, full load and 25°C.)

Parameter		Test Condition	Min	Typ	Max	Unit
2.1 Absolute Maximum Ratings						
Input Voltage (Vi)		Non-operating, continuous	0	—	5.8	Vdc
Max Output Power (Pomax)		Allowable operating conditions	—	—	33	W
2.2 Input Specifications						
Typical Input Voltage (Vinom)		—	—	5.0	—	Vdc
Input Voltage Range	Vo≤2.5Vdc	Vo≤Vi-0.5	3.0	—	5.5	Vdc
	Vo≥3.3Vdc		4.5	—	5.5	Vdc
Remote	On	Open Circuit or Low Level (0~0.4V _{DC}) or connected to GND				
	Off	High Level(2.5~5.5V _{DC} /1mA)				
2.3 Output Specifications						
Typical Output Voltage (Vonom)		Vinom, Ionom	—	0.75	—	Vdc
			—	1.2	—	Vdc
			—	1.5	—	Vdc
			—	1.8	—	Vdc
			—	2.5	—	Vdc
			—	3.3	—	Vdc
Typical Output Current (Ionom)		—	—	10	—	A
Typical Output Voltage Precision (%)		Vinom, Ionom	-2	—	+2	%
Output Voltage Trim(Voadj)		Add external adjusting resistor	0.7525	—	3.63	Vdc
Output Voltage Trim Precision (%)		Add external adjusting resistor	-3	—	+3	%
Line Regulation(ΔV _{OV})		Vimin~Vimax, Ionom	-1	—	+1	%
Load Regulation(ΔV _{OL})		0~100%Ionom, Vinom	-1	—	+1	%
Output Over-current Protection (A)		Vinom,Ionom	11	17	—	A
Output Short-circuit Protection		Continuous, Auto-recovery				
Dynamic Load Response	Peak Deviation	50%~100%~50% Ionom di/dt=1A/μS	—	200	—	mV
	Settling Time		—	35	—	μs
Output Ripple & Noise (Peak-to-Peak)		20MHz	—	—	50	mV(pk-pk)

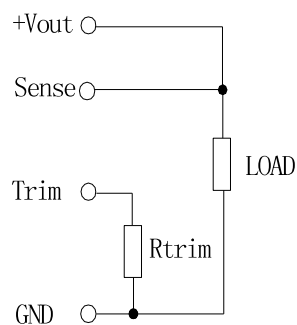
Parameter		Test Condition	Min	Typ	Max	Unit
External Output Capacitance (Conom)		——	——	——	4700	μF
Power-on Delay Time		Io=Ionom, From 10%Vin to 90%Vo	——	8	——	ms
Output Voltage Rise Time		Vin=Vinom, Io=Ionom, From 10%Vo to 90%Vo	——	4	——	ms
2.4 Safety Specifications						
Safety Certificate		EN 60950-1: 2001				
2.5 Reliability						
Vibration Test(sine)		ΔIo/Δt=: 10~55Hz Amplitude: 0.35mm Acceleration: 50m/s ² Cycle: X,Y,Z 30min each axis	After being tested, no damage to the converter and its components, the appearance, output voltage and output ripple and noise (p-p) meet the data sheet requirements.			
Impact Test (half-sine)		Peak Acceleration: 300m/s ² Duration: 6ms 6 times for three perpendicular directions	After being tested, no damage to the converter and its components, the appearance, output voltage and output ripple and noise (p-p) meet the data sheet requirements.			
MTBF		Bellcore TR-332	2×10 ⁶			h
2.6 Environmental Specifications						
Relative Humidity		(40±2) °C, No dew	——	——	95	%RH
Cooling		——	Natural Convention or Forced-air Cooling			
Storage Temperature (Tst)		Non-operating	-55	——	+125	°C
Operating Temperature	Baseplate Temp.(Tc)	——	-40	——	+110	°C
	Ambient Temp.(Ta)	——	-40	——	+85	°C
2.7 General Specifications						
Switching Frequency (f)		——	——	300	——	kHz
Typical Weight		——	——	8	——	g
Temperature coefficient (Tcoeff)		——	——	±0.02	——	%/°C
Over-temperature Protection		Auto-recovery	——	+110	——	°C
Efficiency (η)	Vonom=0.75Vdc	Vinom,Ionom	——	81	——	%
	Vonom=1.2Vdc		——	86	——	%
	Vonom=1.5Vdc		——	88	——	%
	Vonom=1.8Vdc		——	89	——	%
	Vonom=2.5Vdc		——	92	——	%
	Vonom=3.3Vdc		——	94	——	%
RoHS		RoHS (2002/95/EC)				

3 Basic Application Circuit and Considerations



Recommended: C1: two 10 μ ceramic capacitors in parallel, C2: two 100 μ F tantalum electrolytic capacitors in parallel, C3: 1 μ F ceramic capacitor, C4: 10 μ F tantalum electrolytic capacitor, Fuse: 20A/32V. All the capacitors shall have a low ESR, and the external capacitors shall be put as close as to input/output.

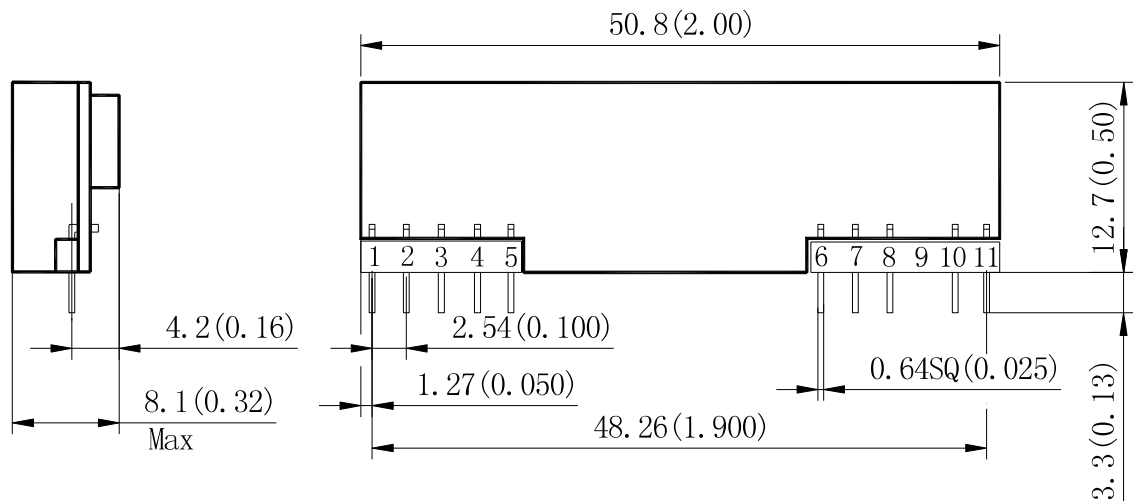
4 Output Voltage Adjustment (Trim)



Output Voltage Trim Equation: $R_{trim} = \frac{21.070}{V_o - 0.7525} - 5.110(k\Omega)$

Vo (Vdc)	Rtrim (k Ω)
0.7525	Open
1.2	41.973
1.5	23.077
1.8	15.004
2.5	6.947
3.3	3.160

Rtrim Vs. Output Voltage

6 Dimensions and Pin Definition**6.1 Dimensions**

Unit: mm(inch) Tolerances .X $\pm$ 0.5mm , .XX $\pm$ 0.2mm

6.2 Pin Definition

No.	1	2	3	4	5	6	7	8	9	10	11
Symbol	+Vout	+Vout	Sense	+Vout	GND	GND	+Vin	+Vin	NP	Trim	Rem
Definition	Positive Output	Positive Output	Remote Sense	Positive Output	Ground	Ground	Positive Input	Positive Input	No Pin	Trim	Remote on/off