



Features:

Dimensions:

22.86 × 10.16 × 6.63 mm

- Operating temperature range: -40~85°C
- Input Voltage Range: 2.4~5.5Vdc
- Output voltage Precision: -3% ~ +3%
- Remote sense
- Low output noise & ripple
- Output short-circuit protection
- Output over-current protection
- RoHS (2002/95/EC) complaint
- EN60950-1 Certified

Numbering Convention:

BBN 3A - 3 S X - L - G
 1 2 3 4 5 6 7

NO	Features	Descriptions
1	Product Series	BBN Series
2	Typical Output Current	3 -Typical Output current:3A
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	Remote on/off Logic	L - Negative Logic
		H or Default - Positive Logic
7	RoHS	G - lead-free,ROHS6

1 Description

The BBN3A-3SX(-L)G 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, short-circuit protection and remote on/off. All devices are surface mounted. The converters operate at an input voltage of 2.4Vdc to 5.5Vdc, and provide an adjustable output voltage of 0.75Vdc to 3.63Vdc and up to 3A output current. The rated output voltage is initially set as 0.75Vdc, and can be trimmed to 1.2Vdc, 1.5Vdc, 1.8Vdc, 2.5Vdc or 3.3Vdc by adjusting the resistance between Trim and GND.

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

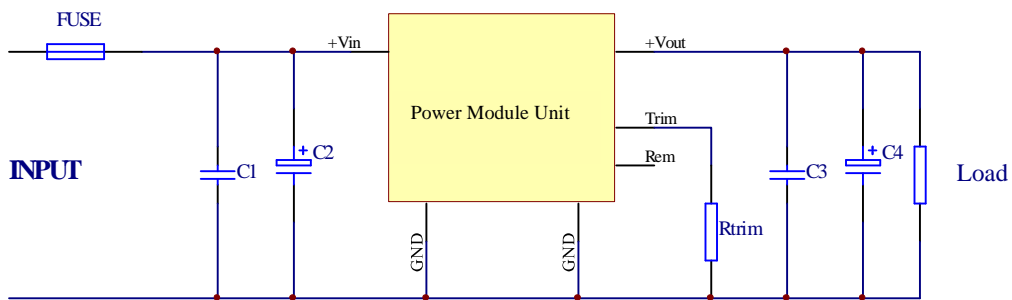
Parameter		Test Condition	Min	Typ	Max	unit
2.1 Absolute Maximum Ratings						
Input Voltage (Vin)		Non-operating, continuous	0	—	5.8	Vdc
Max Output Power (Pomax)		allowable operating conditions	—	—	10.89	W
2.2 Input Specifications						
Typical Input Voltage(Vinom)		—	—	5.0	—	Vdc
Input Voltage Range		Vo≤1.5Vdc	2.4	—	5.5	Vdc
		Vo=1.8Vdc	3.0	—	5.5	Vdc
		2.5≤Vo≤3.3Vdc	4.5	—	5.5	Vdc
Input Under-voltage Protection		Ionom	1.8	2.0	—	Vdc
Input Under-voltage Recovery Point		Ionom	—	2.05	2.4	Vdc
Remote	Positive Logic	On	Open circuit or high level (1.5~5.5V _{DC})			BBN3A-3SXG
		Off	Low level (0~0.4V _{DC} or shorted to GND)			
	Negative Logic	On	Open circuit or Low level (0~0.4V _{DC} or shorted to GND)			BBN3A-3SX-LG
		Off	high level (1.5~5.5V _{DC})			
2.3 Output Specifications						
Output Voltage Set-point (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)		—	—	3	—	A
Output Voltage Precision (%)		Vinom, Ionom	-2	—	+2	%
Output Voltage Trim (Voadj)		Add external adjusting resistor	0.7525	—	3.63	Vdc
Voltage Regulation Precision		Vimin~Vimax, Iomin~Iomax	-3	—	+3	%

Parameter		Test Condition	Min	Typ	Max	unit
Line Regulation (Vov)		V _{in} ~V _{imax} , I _{on} m	—	0.4	—	%
Load Regulation (Vol)		0~50%~100%I _{on} m, V _{in} m	—	0.4	—	%
Output Over-current Protection		V _{in} m, I _{on} m	—	6.6	—	A
Output Short-circuit Protection		Auto-recovery, continuous				
Dynamic Load Response	Peak Deviation	50%~100%~50% I _{on} m di/dt=2.5A/μS	—	250	—	mV
	Settling Time		—	50	—	μs
Output Ripple and Noise		20MHz	—	—	50	mV(pk-pk)
External Output Capacitance(Co)		ESR≥1mΩ	—	—	1000	μF
		ESR≥10mΩ	—	—	3000	μF
Turn-on Time (Ts)		V _{in} m, I _{on} m	—	—	10	ms
2.4 Safety Specifications						
Safety Certificate		EN 60950-1				
2.5 Reliability						
Vibration Test(sine)		Frequency: 10~55Hz Amplitude: 0.35mm Acceleration: 10m/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	3×10 ⁶			h
2.6 Environmental Specifications						
Relative Humidity		(40±2) °C, No dew	—	—	95	%RH
Cooling		—	Natural Cooling or Heat Sink			
Storage Temperature (Tst)		no operating, continuous	-55	—	+125	°C
Ambient Temperature (Ta)		—	-40	—	+85	°C
2.7 General Specifications						
Switching Frequency		—	—	300	—	kHz
Weight		—	—	2.8	—	g
Temperature Coefficient (Tcoeff)		T _{amin} ~ T _{amax}	—	0.4	—	%
Over-temperature Protection		Auto-recovery	—	+140	—	°C

Parameter		Test Condition	Min	Typ	Max	unit
Efficiency (η)	V _{nom} =0.75Vdc	V _{in,lonom}	—	81.5	—	%
	V _{nom} =1.2Vdc		—	87.0	—	%
	V _{nom} =1.5Vdc		—	89.0	—	%
	V _{nom} =1.8Vdc		—	90.0	—	%
	V _{nom} =2.5Vdc		—	93.0	—	%
	V _{nom} =3.3Vdc		—	94.0	—	%
RoHS		RoHS (2002/95/EC) Directive				

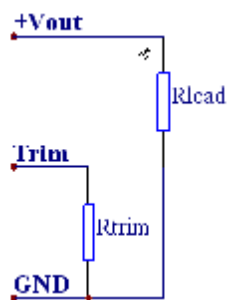
Note: All tests are conducted with a 1000µF/10V aluminum electrolytic capacitor and a 220µF/10V tantalum capacitor parallel to input and a 100µF/10V tantalum capacitor and a 22µF/10V Ceramic capacitor parallel to output .

3 Basic Application Circuit and Considerations



Recommended: C1 1000µF/10V Aluminum capacitor; C2: 220µF Tantalum electrolytic capacitor (TPSD227M010R0100); C3: 22µF ceramic capacitor (C3225X5R1A226KT); C4: 100µF Tantalum electrolytic capacitor (TPSD107K010R0100); FUSE: 10A/32V. All capacitors shall have a low ESR, and external capacitors shall be put as closed to Vin/Vout as possible.

4 Output Voltage Adjustment (Trim)



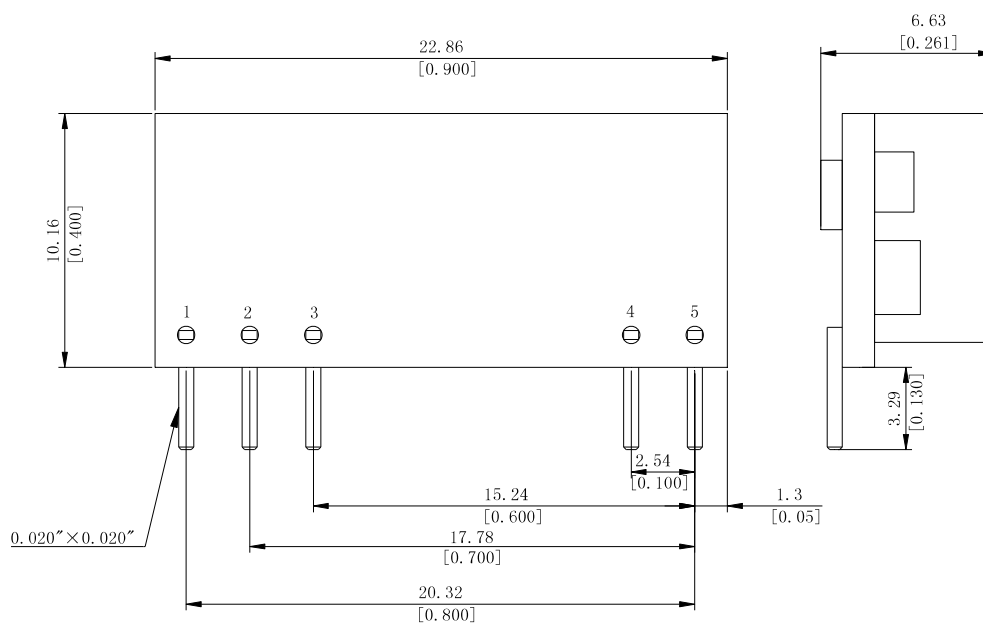
Output Voltage Trim Equation:
$$R_{trim} = \frac{21.070}{V_o - 0.7525} - 5.110(k\Omega)$$

R_{trim} shall refer to the table below:

Vo (Vdc)	Rtrim (kΩ)
0.75	Open
1.2	41.973
1.5	23.077
1.8	15.004
2.5	6.947
3.3	3.160

5 Dimensions and Pin definition

1) Dimensions (Tolerance: $x.xx \pm 0.5mm(x.xx \pm 0.02inch)$ $x.xx \pm 0.25mm(x.xxx \pm 0.010inch)$)



2) Pin definition:

No	1	2	3	4	5
Symbol	+Vout	Trim	GND	+Vin	Rem
Definition	Positive Output	Trim	Grounding	Positive Input	Remote