



Features:

Dimensions:

25.4 ×12.7 ×6.16 mm

- Operating temperature range:-40~85°C
- Input Voltage Range:2.4~5.5Vdc
- Output voltage Precision: -2% ~ +2%
- Remote sense
- Low output noise & ripple
- Output short-circuit protection
- Output over-current protection
- RoHS (2002/95/EC) complaint
- EN60950-1 Certified

Numbering Convention:

BAN 6A - 3 S X - L - G

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NO	Features	Descriptions
1	Product Series	BAN Series
2	Typical Output Current	6 -Typical Output current:6A
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 BAN6A-3SX(-L)G power modules are open frame DC-DC converters using non-isolated buck-boost technologies and synchronous rectifier technologies, and feature high reliability, high stability, short-circuit protection and remote on/off. All devices are surface mounted. The converts 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 6A 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.

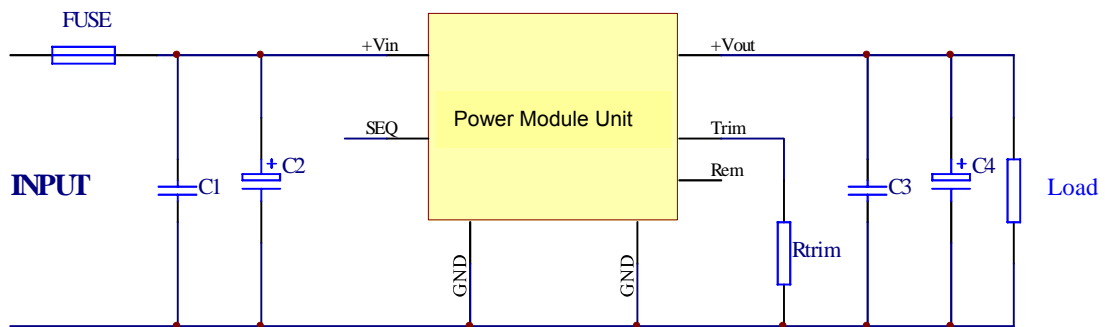
2 Technical Specifications (Unless otherwise stated, all the specifications are typical at nominal input, full load and Ta=25°C. Add a filter circuit to the input and output of test tooling, C1:1000µF Al- electrolytic capacitor; C2: 200µF tantalum electrolytic capacitor (TPSD227M010R100); C3: 1µF ceramic capacitor; C4: 10µF tantalum electrolytic capacitor. All the capacitors have a low-ESR.

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	—	—	21.8	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 (Vishl)	Threshold	Ionom	1.8	2.0	—	Vdc
	Recovery	Ionom	—	2.05	2.4	Vdc
Remote	Positive Logic	On	Open circuit or high level (1.5~5.5V _{DC})			BAN6A-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			BAN6A-3SX-LG
		Off	High level(1.5~5.5V _{DC})			
Time Sequence		Voltage	0~Vin		V	
		ΔV/Δt	≤2		V/mS	
		Delay Time	≥10		mS	
		tracking precision, turn on:	≤200		mV	
2.3 Output Specifications						
Output Voltage (Vonom)		Vinom, Ionom	—	0.75	—	Vdc
			—	1.2	—	Vdc
			—	1.5	—	Vdc
			—	1.8	—	Vdc
			—	2.5	—	Vdc
			—	3.3	—	Vdc

Parameter		Test Condition	Min	Typ	Max	Unit
Typical Output Current (I _{onom})		—	—	6	—	A
Output Voltage Set-point Precision (%)		V _{inom} , 50%I _{onom}	-2	—	+2	%
Output Voltage Trim (V _{oadj})		Add external resistor to trim	0.7525	—	3.63	V _{dc}
Precision of voltage stabilization (%)		V _{imin} ~V _{imax} , I _{omin} ~I _{omax}	-2	—	+2	%
Line Regulation (V _{ov})		V _{imin} ~V _{imax} , I _{onom}	—	±0.3	±1	%
Load Regulation (V _{ol})		0~50%~100%I _{onom} , V _{inom}	—	±0.4	±1	%
Output Over-current Protection		V _{inom}	9	—	18	A
Output Short-circuit Protection		Continuous, Auto-recovery				
Dynamic Load Response	Peak Deviation	50%~100%~50% I _{onom} di/dt=2.5A/μS	—	130	—	mV
	Settling Time		—	25	—	μs
Output Ripple and Noise		20MHz	—	40	70	mV(pk-pk)
External Output Capacitance(C _o)		ESR≥1mΩ	0	—	1000	μF
		ESR≥10mΩ	0	—	3000	μF
Turn-on Time (T _s)		V _{inom} , I _{onom}	—	—	10	ms
2.4 Safety Specifications						
Safety Certificate		EN60950-1				
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 (T _{st})		Non-operating, continuous	-55	—	+125	°C
Operating Temperature	Ambient Temp. (T _a)	See the derating curve	-40	—	+85	°C
2.7 General Specifications						
Switching Frequency (f)		—	—	300	—	kHz

Parameter	Test Condition	Min	Typ	Max	Unit	
Weight	—	—	5	—	g	
Temperature Coefficient (Tcoeff)	Tamin ~ Tamax	—	0.4	—	%	
Over-temperature Protection	Auto-recovery	—	+135	—	°C	
Efficiency (η)	Vonom=0.75Vdc	Vinom, Ionom	75	78	—	%
	Vonom=1.2Vdc		81	84	—	%
	Vonom=1.5Vdc		84	87	—	%
	Vonom=1.8Vdc		85	88	—	%
	Vonom=2.5Vdc		88	91	—	%
	Vonom=3.3Vdc		90	93	—	%
RoHS	RoHS (2002/95/EC) Directive					

3 Basic Application Circuit and Considerations



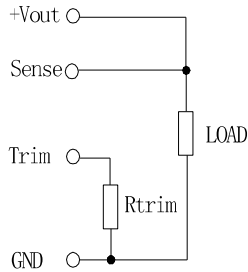
Recommended: C1:1000µF Al- electrolytic capacitor; C2: 200µF tantalum electrolytic capacitor (TPSD227M010R0100);

C3: 1µF ceramic capacitor; C4: 10µF tantalum electrolytic capacitor. All the capacitors have a low-ESR.

The external capacitors shall be close to Vin/Vout as near as possible.

Note: the modules include a sequencing feature that enables users to implement various types of output voltage sequencing in their applications. This is accomplished via an additional sequencing pin. When not using sequencing feature, tie the SEQ pin to Vin.

4 Output Voltage Adjustment (Trim)



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

R_{trim} can refer to the table below:

V_o (V _{dc})	R_{trim} (k Ω)
0.75	Open
1.2	41.973
1.5	23.077
1.8	15.004
2.5	6.947
3.3	3.160

5 Thermal Derating Curve

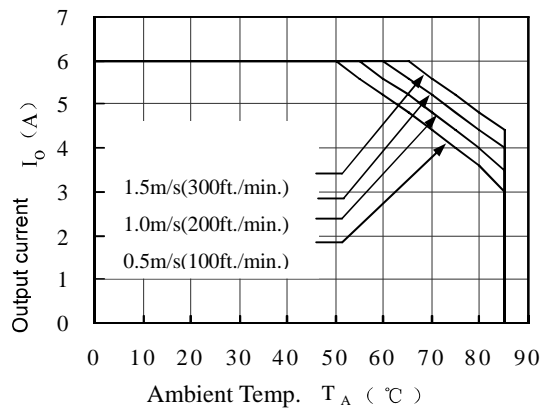


Figure 1 Derating Curve at $V_{in}=5.0V$, $V_o=3.3V$

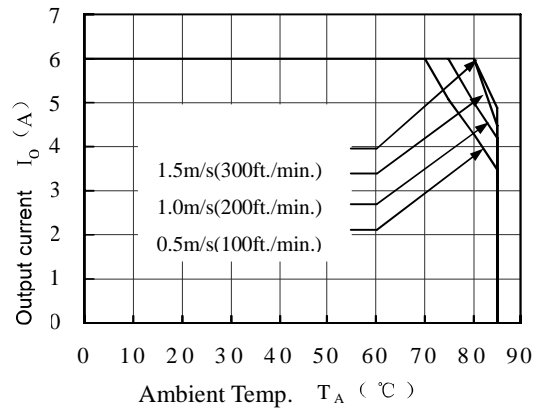
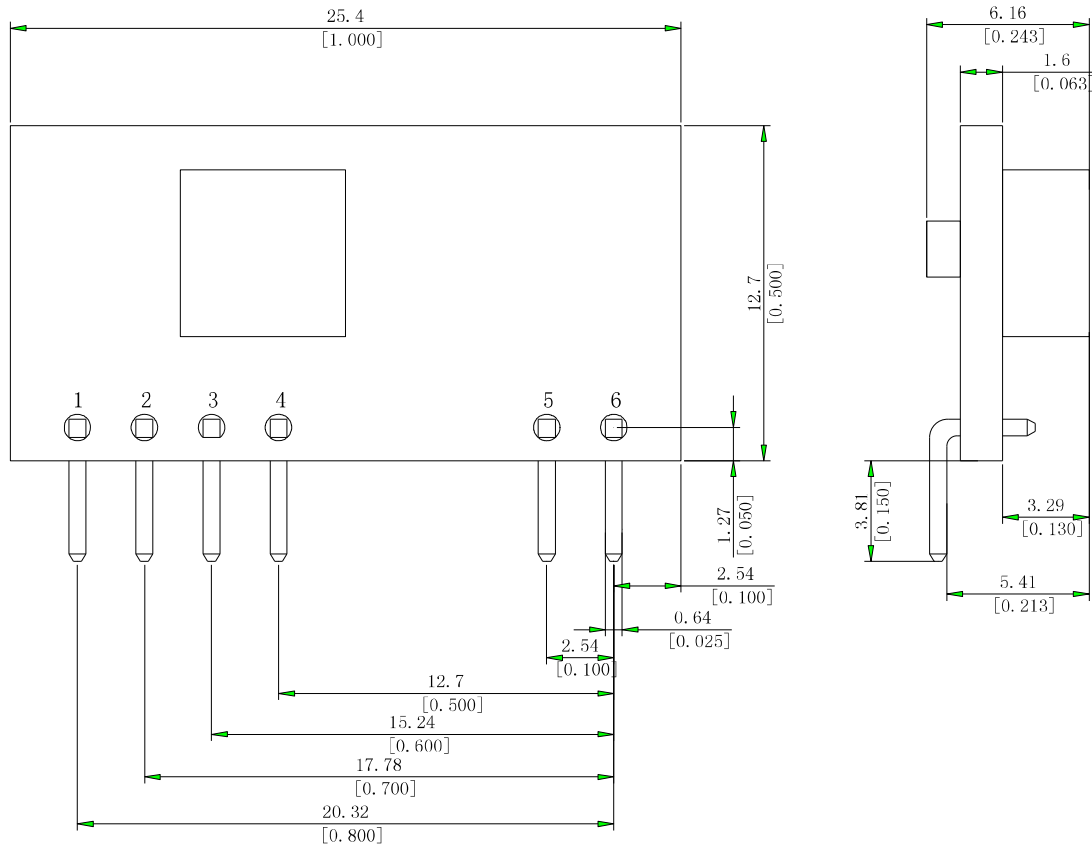


Figure 2 Derating Curve at $V_{in}=3.3V$, $V_o=0.75V$

6 Dimensions and Pin definition

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



2). Pin definition:

No	1	2	3	4	5	6
Symbol	+Vout	Trim	GND	SEQ	+Vin	Rem
Definition	Positive Output	Trim	Grounding	Sequencing	Positive Input	Rem