

SRBL-30A1A0

Non-Isolated DC-DC Converter

Power Block Series

The Bel's SRBL-30A1A0 is part of non-isolated DC-DC Converter Power Block Series.

This converter is available in a range of output voltages from 0.8 VDC to 5.0 VDC over a wide input voltage range and uses an SMD package.



Key Features & Benefits

- Input Voltage 13.2 VDC max.
- Output Voltage range 0.8 VDC – 5.0 VDC / 35 A
- Non-Isolated
- Low Cost
- High Efficiency
- High Power Density
- Approved to UL/CSA 60950-1, 2nd ed.
Class II, Category 2, Isolated DC/DC Converter

Applications

- Computers and Peripherals
- Networking
- Telecommunications



1. MODEL SELECTION

OUTPUT VOLTAGE	MAX. INPUT VOLTAGE	MAX. OUTPUT CURRENT	TYPICAL EFFICIENCY (V _o = 1.8 V)	MODEL NUMBER
0.8 – 5.0 VDC	13.2 VDC	35 A	92%	SRBL-30A1A0

NOTE: Add “G” suffix at the end of the model number to indicate tray package.

PART NUMBER EXPLANATION

S	R	BL	-	30	A	1A	0	x
Mounting type	RoHS status	Series name		Output current	Wide input range	Output voltage	Option	Package
SMD package	RoHS 6	SRBL seires		35 A	13.2 V Max	0.8 – 5.0 V output	Standard	G – Tray

2. ABSOLUTE MAXIMUM RATINGS

PARAMETER	DESCRIPTION	MIN	TYP	MAX	UNITS
Continuous Input Voltage		-0.3	-	15	V
Voltage at Pin5 (+7 V)		-0.3	-	8.8	V
Voltage at Pin3 (PWM)		-0.3	-	8.8	V
Operating Temperature	Please see the TD curve for detail.	-5	-	113	°C
Storage Temperature		-40	-	125	°C

NOTE: All specifications are typical at 25°C unless otherwise stated.

3. INPUT SPECIFICATIONS

PARAMETER	DESCRIPTION	MIN	TYP	MAX	UNIT
Operating Input Voltage		-	-	13.2	V
Input Current	Tested at V _{in} = 7 V, V _{out} = 5 V, I _{out} = 30 A	-	-	23.5	A
Input Current (no load)		-	-	80	mA
Input Capacitance ^{1,2}		-	40	-	μF
+7 V (Pin5)	Operating	6.7	7.0	7.5	V
	Under-voltage lockout, rising	-	-	6.7	V
	Under-voltage lockout, falling	4.7	-	-	V
	Hysteresis	-	1.0	-	V
	Current (switching at 500 kHz)	-	-	100	mA
PWM (Pin3) ³	High	4	-	5.5	V
	Low	-	-	0.4	V
	Tri-state current ¹	-10	-	10	μA

NOTES:

¹ 4x 10 μF / 16 V on power block

² Additional input capacitors are to be added externally as part of the buck regulator design.

³ Sourcing or sinking current to/from PWM (Pin 3) without the specified range will result in both high and low-side MOSFET's to be held off by the gate-driver circuitry.

4. OUTPUT SPECIFICATIONS

PARAMETER		DESCRIPTION	MIN	TYP	MAX	UNIT
Output Current Range ¹		Vout = 1.0 V	0	-	35	A
Output Current Range ¹		Vout = 1.8 V	0	-	30	A
Output Capacitance ^{2,3}			-	20	-	μF
Output-to-GND Resistor ⁴			-	200	-	Ω
Inductor	Inductance		-	380	-	nH
	DCR (25°C) ⁵		0.51		0.57	mΩ
	Isat (125°C)		-	40	-	A

NOTES:

- ¹ Vin from 7V to 12V input, switching at 500 KHz.
- ² 2x 10μF/0805/6.3V/X7R + 1x 0402/0.1μF/16V/X7R on power block.
- ³ Additional output capacitors are to be added externally as part of the buck regulator design.
- ⁴ 0805 resistor on power block.
- ⁵ See Block Diagram for DCR sense requirements.
- ⁶ All specifications are typical at nominal input, 25°C unless otherwise stated.

5. GENERAL SPECIFICATIONS

PARAMETER		DESCRIPTION	MIN	TYP	MAX	UNIT
Efficiency ^{1,2}		Vo = 1.0 V, Io = 35 A	-	87.5	-	%
		Vo = 1.8 V, Io = 30 A	-	92	-	%
Output Voltage Range			0.8	-	5.0	V
Temperature Sense		Bias current sourced from controller (into Pin 4)	-	495	-	μA
		Voltage at 25°C (Pin 4)	1.345	1.35	1.355	V
		Temperature coefficient (0 to 130°C)	-	-4.4	-	mV/C
Weight			-	8.1	-	g
Dimensions (L × W × H)			1.00 × 0.50 × 0.48			in
			25.40 × 12.70 × 12.19			mm

NOTES:

- ¹ Vin from 7 V to 12 V input full load output current, switching at 450 kHz with 200 LFM at 55 °C.
- ² Gate drive is included. For the purpose of this calculation, gate drive loss is assumed to be 0.2 W.

6. EFFICIENCY DATA

7 V to 12 V input, switching at 400 kHz, with 200 LFM at 25 °C.

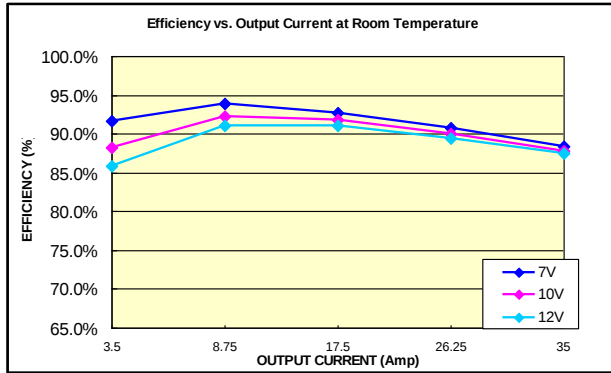


Figure 1. Vo = 1.0 V

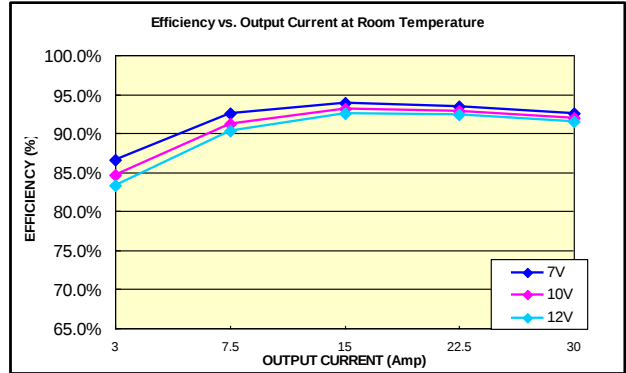


Figure 2. Vo = 1.8 V

7. TEMPERATURE SENSE

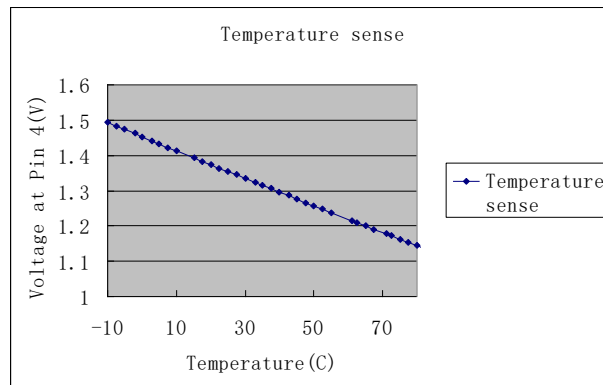


Figure 3. Temperature Sense

8. THERMAL DERATING CURVES

The module's maximum hot spot temperature is +113°C. To enhance system reliability, the power module should always be operated below the maximum operating temperature. If the temperature exceeds the maximum module temperature, reliability of the unit may be affected.

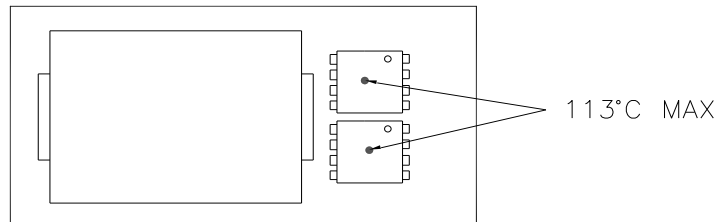


Figure 4. Temperature reference point

Thermal derating curve, $V_{in} = 12\text{ V}$, switching at 500 KHz.

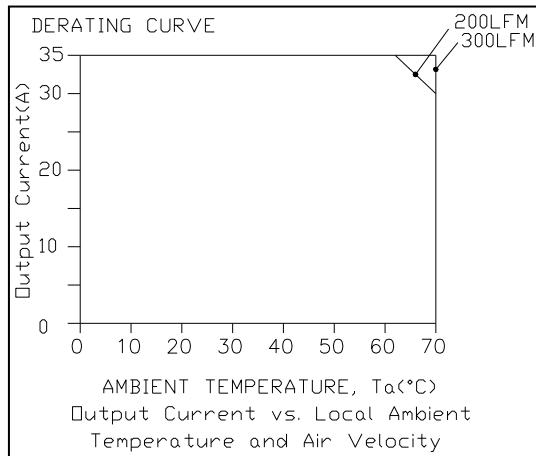


Figure 5. $V_{out} = 1.0\text{ V}$

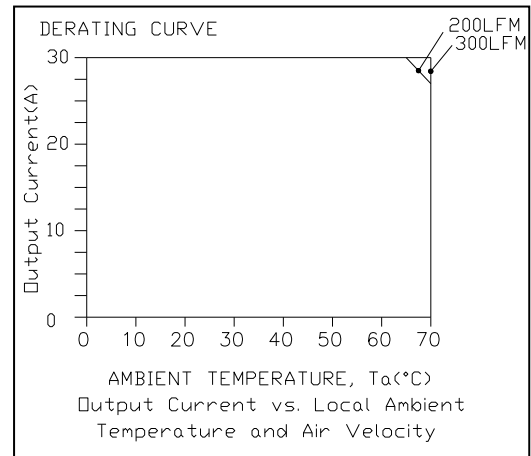
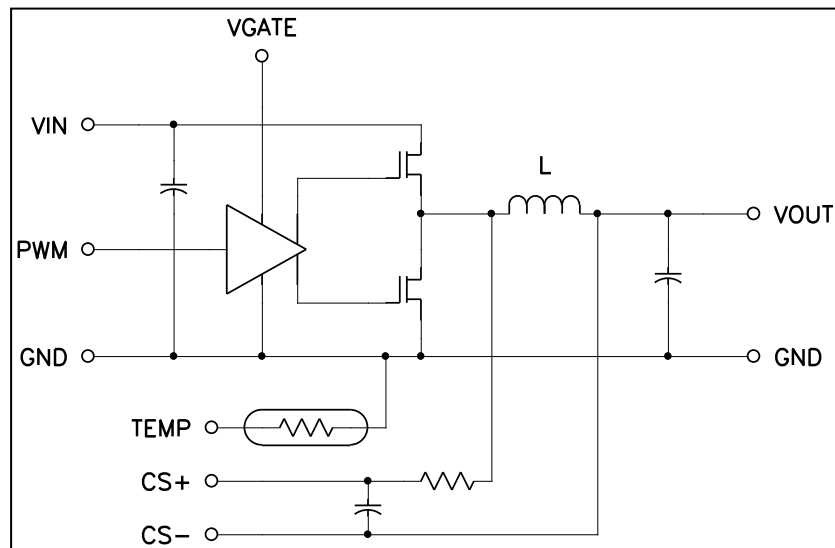


Figure 5. $V_{out} = 1.8\text{ V}$

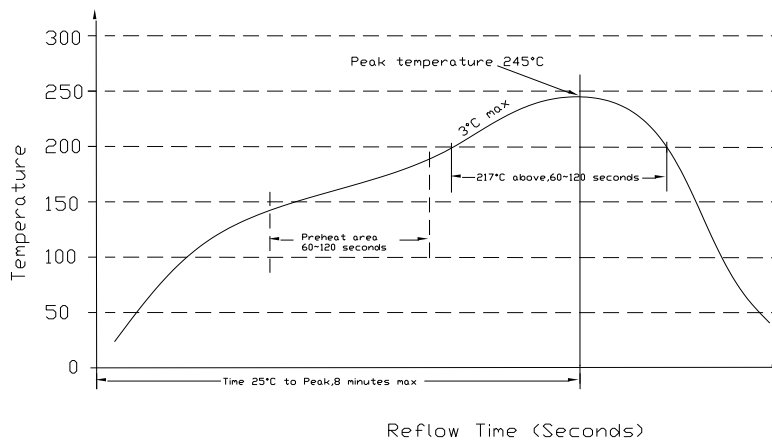
9. BLOCK DIAGRAM



For DCR sensing, there shall be an external capacitor (between CS+ and CS-) to work with the 2.37K on power block (between CS+ and output inductor as shown).

10. SOLDERING INFORMATION

The SRBL-30A1A0 modules are designed to be compatible with reflow soldering process. The suggested Pb-free solder paste is Sn/Ag/Cu (SAC). The recommended reflow profile using Sn/Ag/Cu solder is shown in the following. Recommended reflow peak temperature is 245 °C while the part can withstand peak temperature of 260 °C maximum for 10 seconds. This profile should be used only as a guideline. Many other factors influence the success of SMT reflow soldering. Since your production environment may differ, please thoroughly review these guidelines with your process engineers.



11. MSL RATING

The SRBL-30A1A0 modules have a MSL rating of 3.

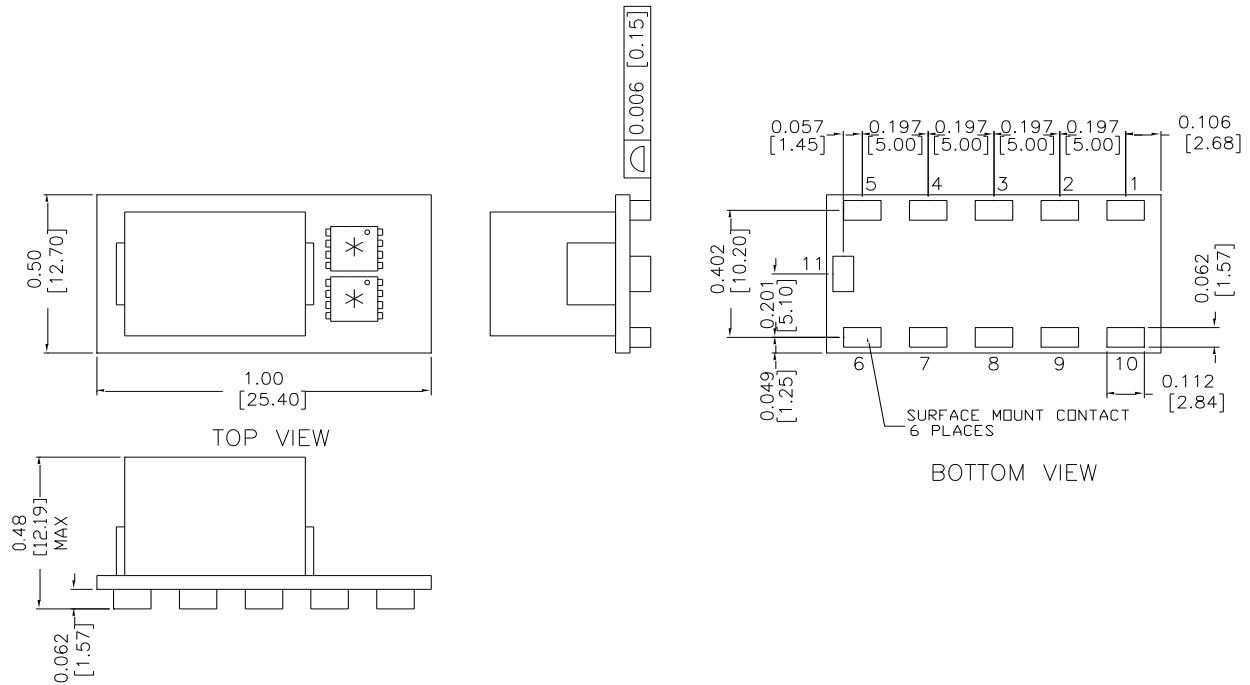
12. STORAGE AND HANDLING

The SRBL-30A1A0 modules are designed to be compatible with J-STD-033 Rev:A (Handling, Packing, Shipping and Use of Moisture /Reflow Sensitive surface Mount devices). Moisture barrier bags (MBB) with desiccant are applied. The recommended storage environment and handling procedure is detailed in J-STD-033.

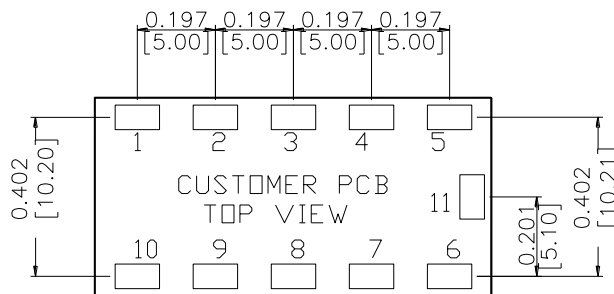
13. PRE-BAKING

This component has been designed, handled, and packaged ready for Pb-free reflow soldering. If the assembly shop follows J-STD-033 guidelines, no pre-bake of this component is required before being reflowed to a PCB. However, if the J-STD-033 guidelines are not followed by the assembler, Bel recommends that the modules should be pre-baked @ 120~125 °C for a minimum of 4 hours (preferably 24 hours) before reflow soldering.

14. MECHANICAL OUTLINE

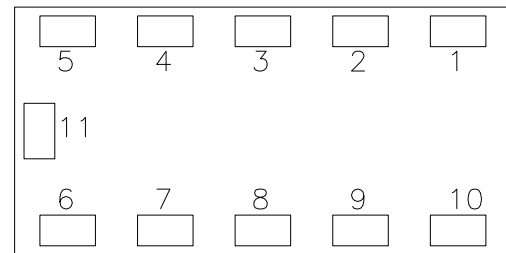


RECOMMENDED PAD LAYOUT



PAD SIZE:

0.157" * 0.103" (4.0mm * 2.6mm)



BOTTOM VIEW

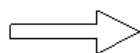
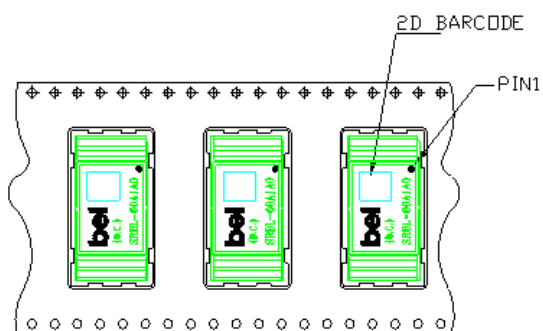
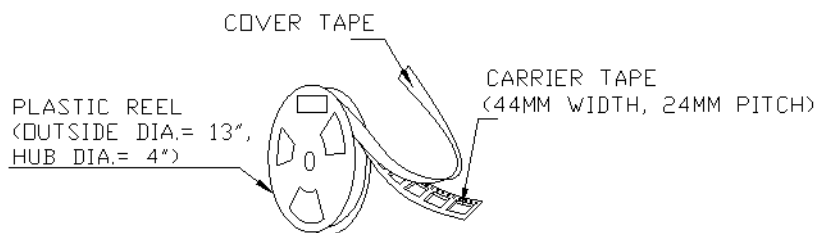
PIN CONNECTIONS

PIN	FUNCTION	PIN	FUNCTION
1	Vout	6	Vin
2	GND	7	-CS
3	PWM	8	+CS
4	TEMP	9	GND
5	+7 V	10	Vout
-	-	11	GND

NOTE: These parts are not however compatible with the higher temperatures associated with lead free solder processes and must be soldered using a reflow profile with a peak temperature of no more than 245 °C.

- NOTES:** 1) All Pins: Material - Copper Alloy;
Finish - 3 micro inches minimum Gold over 50 micro inches minimum Nickel plate
2) Undimensioned components are shown for visual reference only.
3) All dimensions in inches (mm); Tolerances: x.xx +/-0.02 in. (x.x +/-0.5mm) x.xxx +/-0.010 in. (x.xx +/-0.25mm).

15. PACKAGING DETAILS



USER FEED DIRECTION

ORIENTATION OF COMPONENT INSIDE POCKET

TAPE WIDTH	44MM
POCKET PITCH	24MM
QUANTITY OF COMPONENTS PER REEL	160
PLASTIC REEL OUTER DIAMETER	13 INCHES
PLASTIC REEL HUB DIAMETER	4 INCHES
COMPLY WITH EIA 481-2-A	

16. REVISION HISTORY

DATE	REVISION	CHANGES DETAIL	APPROVAL
2012-01-17	PA	First Release	XF Jiang
2012-11-16	PB	Updated TD, Operation Temperature.	XF Jiang
2019-03-20	AC		

For more information on these products consult: tech.support@psbel.com

NUCLEAR AND MEDICAL APPLICATIONS - Products are not designed or intended for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems.

TECHNICAL REVISIONS - The appearance of products, including safety agency certifications pictured on labels, may change depending on the date manufactured. Specifications are subject to change without notice.



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