NON-ISOLATED DC/DC CONVERTERS

10 V-14 V Input 1.2 V-5.0 V/10 A Output

SRBC-10Axx0 Series RoHS Compliant

- Non-Isolated
- High Efficiency
- High Power Density
- Excellent Thermal Performance
- Low Cost
- Remote Sense
- Under-voltage Lockout (UVLO)
- Over Temperature Protection
- OCP/SCP
- Remote On/Off
- Industrial Temperature Range

Description

The Bel SRBC-10Axx0 modules are a series of non-isolated dc/dc converters that deliver up to 10 A of output current with full load efficiency of 93% at 3.3 V output. The open-frame construction and small footprint enable designers to develop cost and space-efficient solutions. Standard features include remote On/Off, over current protection, short current protection, and wide input.

Part Selection

Output Voltage	Input Voltage	Max. Output Current	Max. Output Power	Typical Efficiency	Model Number Active High
5.0 V	10 V – 14 V	10 A	50.0 W	95%	SRBC-10A500
3.3 V	10 V – 14 V	10 A	33.0 W	93%	SRBC-10A330
2.5 V	10 V – 14 V	10 A	25.0 W	92%	SRBC-10A250
1.8 V	10 V – 14 V	10 A	18.0 W	90%	SRBC-10A180
1.5 V	10 V – 14 V	10 A	15.0 W	89%	SRBC-10A150
1.2 V	10 V – 14 V	10 A	12.0 W	87.5%	SRBC-10A120

Note: Add “G” suffix at the end of the model number to indicate “Tray Packaging”.

Absolute Maximum Ratings

Parameter	Min	Typ	Max	Notes
Input Voltage (continuous)	-0.3 V	-	15 V	
Output Enable Terminal Voltage	-0.3 V	-	15 V	
Ambient Temperature	-40 °C	-	85 °C	
Storage Temperature	-55 °C	-	125 °C	

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

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Input Specifications

Parameter	Min	Typ	Max	Notes
Input Voltage	10 V	-	14 V	
Input Current (full load)	-	-	5.7 A	An input line fuse must always be used.
Input Current (no load)	-	-	60 mA	
Remote Off Input Current	-	3 mA	10 mA	
Input Reflected Ripple Current (pk-pk)	-	100 mA	-	Tested with one 1000 uF/25 V Electrolytic capacitor and four 47 uF tan capacitors and one 1 uH inductor at the input.
Input Reflected Ripple Current (rms)	-	50 mA	-	
I^2t Inrush Current Transient	-	0.05 A^2s	0.1 A^2s	
Turn-on Voltage Threshold 1.2 V - 3.3 V 5.0 V	 - -	 7.8 V 9.4 V	 - -	
Turn-off Voltage Threshold 1.2 V - 3.3 V 5.0 V	 6.7 V 8.0 V	 - -	 7.9 V 9.0 V	

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

Output Specifications

Parameter		Min	Typ	Max	Notes
Output Voltage Set Point		-2% Vo,set	-	2% Vo,set	Vin=12 V, full load
Load Regulation		-	10 mV	-	
Line Regulation		-	10 mV	-	
Regulation Over Temperature (-40 °C to +85 °C)		-	15 mV	-	Tref=Ta, min to Ta, max
Output Current		0 A	-	10 A	
Current Limit Threshold		-	200% Io	-	
Short Circuit Surge Transient		-	0.5 A^2s	1 A^2s	
Ripple and Noise (pk-pk)		-	50 mV	100 mV	Tested with 0-20 MHz
Ripple and Noise (rms)		-	20 mV	40 mV	
Turn on Time		-	7 mS	10 mS	
Overshoot at Turn on		-	-	1% Vo,set	
Output Capacitance		-	-	5000 uF	
Transient Response					
50% ~ 100% Max Load	Vo = 1.2 V -5.0 V	-	200 mV	-	di/dt=2.5 A/uS, Vin=12 V
Settling Time		-	25 uS	-	
100% ~ 50% Max Load		-	200 mV	-	
Settling Time		-	25 uS	-	

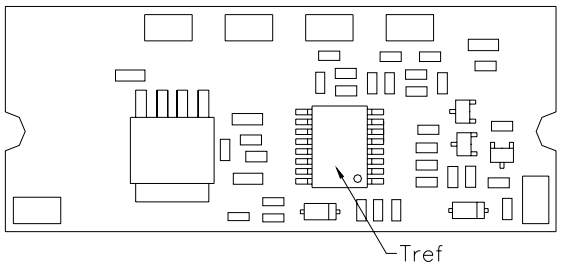
Note: All specifications are typical at nominal input, full load at 25 °C unless otherwise stated.

General Specifications

Parameter	Min	Typ	Max	Notes
Efficiency Vo=5.0 V Vo=3.3 V Vo=2.5 V Vo=1.8 V Vo=1.5 V Vo=1.2 V	 - - - - - -	 95% 93% 92% 90% 89% 87.5%	 - - - - - -	Measured at Vin=12 V, full load
Switching Frequency	265 kHz	300 kHz	335 kHz	
Over Temperature Shutdown[1]	-	130 °C	-	
Output Voltage Trim Range 1.5 V~5.0 V 1.2 V	 90% Vo -	 - -	 110% Vo 110% Vo	
MTBF	4,982,651 hours			Calculated Per Bell Core SR-332 (Io = 80% Io, max; Vo=5.0 V; Vin=12 V; Ta = 25 °C)
Dimensions Inches (L × W × H) Millimeters (L × W × H)	 1.3 x 0.53 x 0.315 33.02 x 13.46 x 8.00			
Weight	-	7.8 g	-	

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

1. The Tref temperature measurement location:



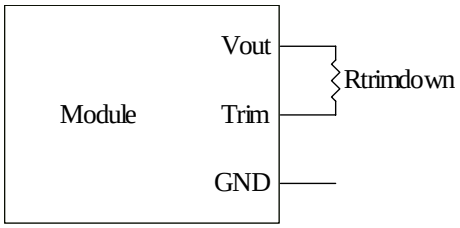
Control Specifications

Parameter	Min	Typ	Max	Notes
Remote On/Off				
Signal Low (Unit Off)	-0.3 V	-	0.3 V	Remote On/Off pin open, Unit on.
Signal High (Unit On)	1 V	-	14 V	

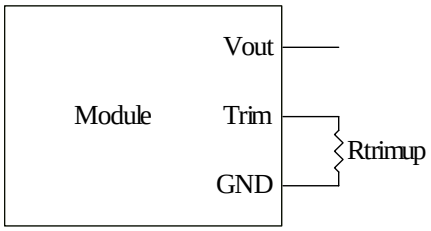
Output Trim Equations

Equations for calculating the trim resistor (in kΩ) given the desired adjusted voltage (Vadj) and the nominal output voltage of the converter (Vnom) are shown below. The Trim Down resistor should be connected between the Trim pin and Vout. The Trim Up resistor should be connected between the Trim pin and Ground. Only one of the resistors should be used for any given application.

$$R_{trimdown} = \frac{A}{V_{nom} - V_{adj}} - B$$

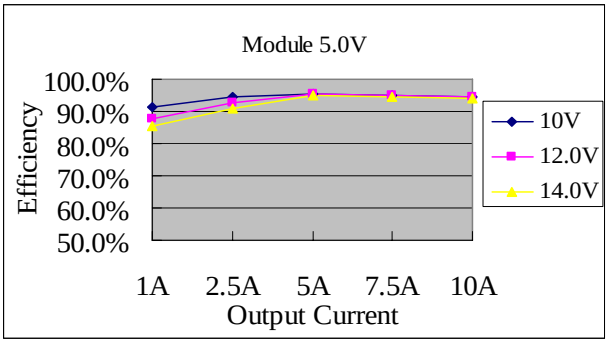


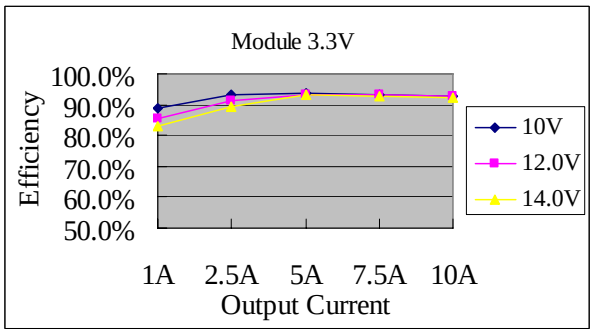
$$R_{trimup} = \frac{C}{V_{adj} - V_{nom}} - D$$

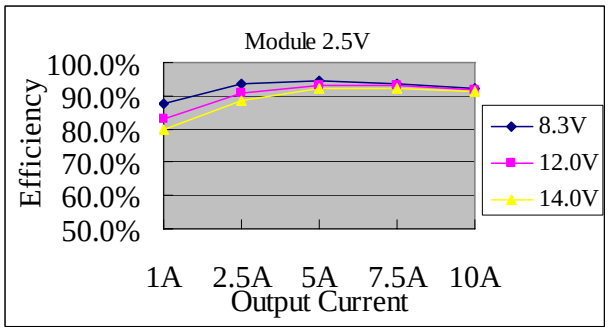


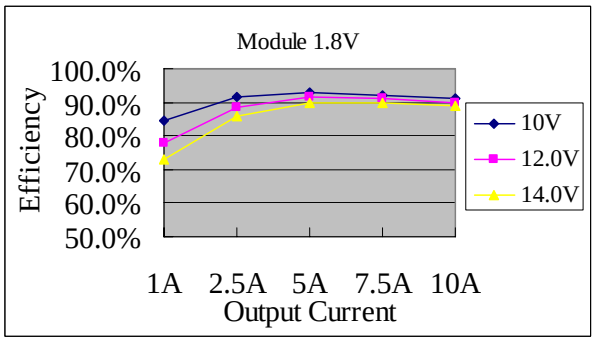
Vnom	A	B	C	D
5.0	64.6353	16.01	10.507	1
3.3	39.1049	16.01	10.507	1
2.5	27.0561	16.01	10.507	1
1.8	16.5749	16.01	10.507	1
1.5	12.0693	16.01	10.507	1
1.2	-	-	10.507	1

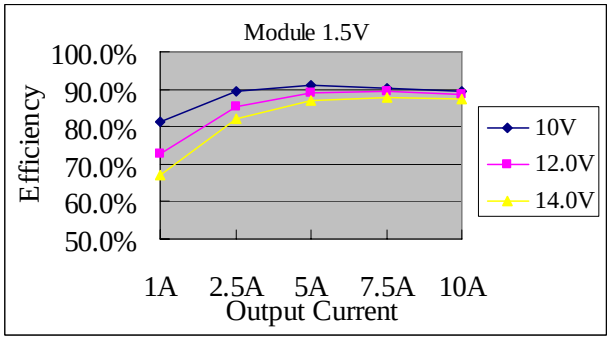
Efficiency Data

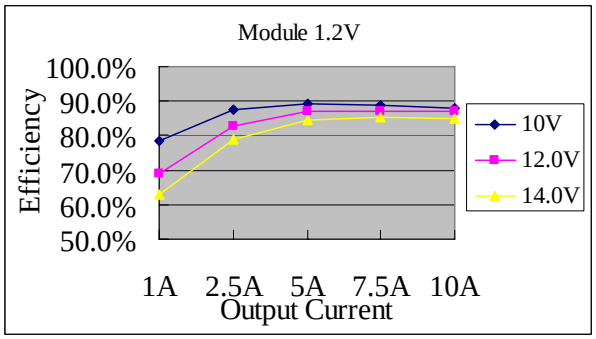




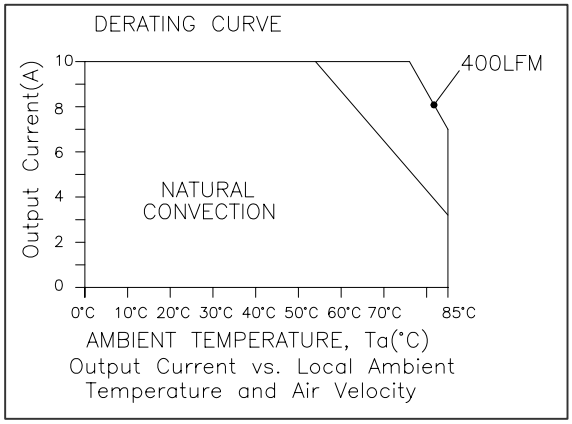








Thermal Derating Curve



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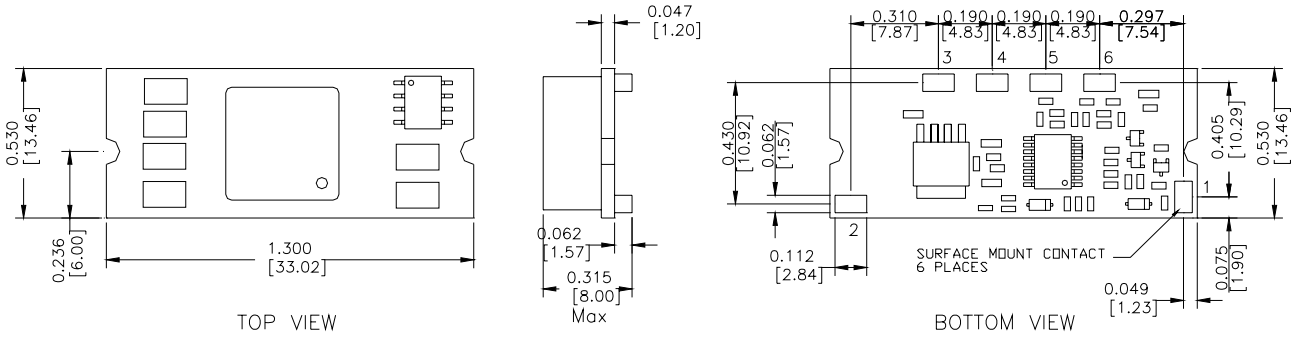
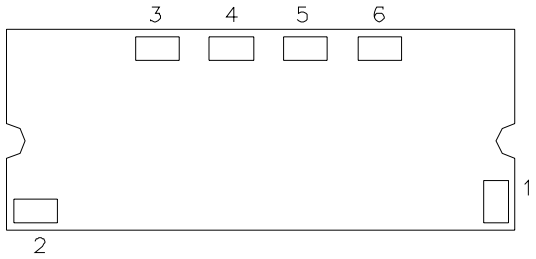
Mechanical Outline

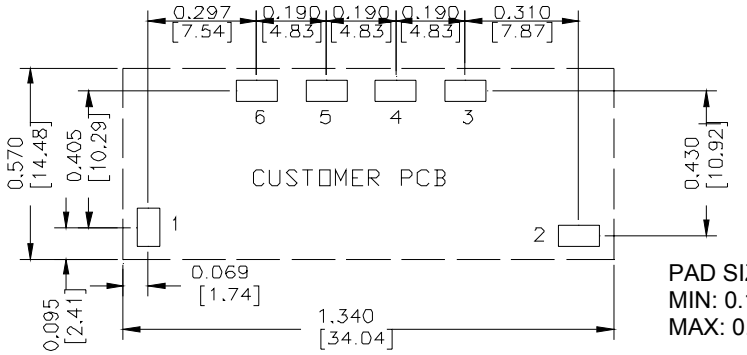




Pin Connections

Pin	Function
1	Remote On/Off
2	Vin
3	Ground
4	Vout
5	Trim
6	Remote Sense

RECOMMENDED PAD LAYOUT



PAD SIZE:
MIN: 0.14"* 0.095" (3.56mm * 2.41mm)
MAX: 0.165"* 0.11" (4.19mm * 2.79mm)

RoHS Compliance

Complies with the European Directive 2002/95/EC, calling for the elimination of lead and other hazardous substances from electronic products.

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