Chipsmall

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We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

NON-ISOLATED DC/DC CONVERTERS

**8.3 Vdc - 14 Vdc Input**   **0.75 Vdc - 5.0 Vdc/3 A Output**

bel
POWER PRODUCTS
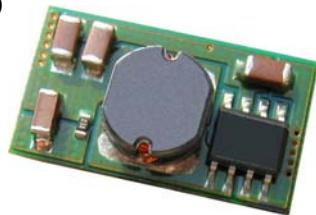
SRBA-03A1Ax   RoHS Compliant   Rev.A

- Non-Isolated
- Fixed Frequency
- High Efficiency
- High Power Density
- Active Low/High (Option)

- Under-Voltage Lockout (UVLO)
- OCP/SCP
- Remote On/Off
- Wide Trim Range
- Wide Input Range

Description

The Bel SRBA-03A1Ax modules are a series of non-isolated dc/dc converters that deliver up to 3 A of output current with full load efficiency of 93% at 5.0 Vdc output. These modules provide precisely regulated voltage programmable via external resistor from 0.75 Vdc to 5.5 Vdc over a wide range of input voltage. Their open-frame construction and small footprint enable designers to develop cost and space-efficient solutions. Standard features include remote On/Off, programmable output voltage, over-temperature protection, over current protection, short circuit protection, and under-voltage lockout.

Part Selection

Output Voltage	Input Voltage	Max. Output Current	Max. Output Power	Typical Efficiency at 5.0V	Model Number Active High	Model Number Active Low
0.75 V - 5.0 V	8.3 V - 14 V	3 A	15 W	93%	SRBA-03A1A0	SRBA-03A1AL

Notes: 1.Add "G" suffix at the end of the model number to indicate Tray Packaging.
2. All part numbers above indicate RoHS 6. Change the second letter "R" to "7" for RoHS 5 part numbers.

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.

Input Specifications

Parameter	Min	Typ	Max	Notes
Input Voltage	8.3 V	12 V	14 V	
Input Current (full load)				
Vo=5.0 V	-	1.35 A	2.00 A	
Vo=3.3 V	-	0.90 A	1.30 A	
Vo=0.75 V	-	0.24 A	0.35 A	
Input Current (no load)				
Vo=5.0 V	-	55 mA	65 mA	
Vo=3.3 V	-	40 mA	50 mA	
Vo=0.75 V	-	15 mA	20 mA	

Input Specifications (continued)

Parameter	Min	Typ	Max	Notes
Remote Off Input Current	-	3 mA	6 mA	
Input Reflected Ripple Current (pk-pk) Vo=5.0 V Vo=3.3 V Vo=0.75 V	- - -	75 mA 50 mA 20 mA	120 mA 90 mA 35 mA	Tested with two 100 uF/25 V tantalum input capacitors & simulated source impedance of 1 uH, 5 Hz to 20 MHz.
Input Reflected Ripple Current (rms) Vo=5.0 V Vo=3.3 V Vo=0.75 V	- - -	20 mA 15 mA 5 mA	60 mA 30 mA 15 mA	
I^2t Inrush Current Transient	-	0.01 A^2s	0.02 A^2s	
Turn-on Voltage Threshold	7.6V	7.9 V	8.2 V	
Turn-off Voltage Threshold	7.0V	7.8 V	8.1 V	

Output Specifications

Parameter	Min	Typ	Max	Notes
Output Voltage Set Point	-2% Vo,set	-	2% Vo,set	Vin=12 V, Io=Iomax, full load
Output Voltage Set Point	-2.5% Vo,set	-	3.5% Vo,set	Over all operating input voltages, resistive loads and temperature conditions
Load Regulation	0.5% Vo,set	0.4% Vo,set	0.5% Vo,set	Io=Iomin to Iomax
Line Regulation	0.4% Vo,set	0.3% Vo,set	0.4% Vo,set	Vin=Vinmin to Vinmax
Regulation Over Temperature (-40 °C to +85 °C)	-	0.5% Vo,set	0.8% Vo,set	
Output Current	0 A	-	3 A	
Current Limit Threshold	5 A	-	12 A	
Short Circuit Surge Transient	-	0.15 A^2s	-	
Ripple and Noise (pk-pk) Vo=5.0 V Vo=3.3 V Vo=0.75 V	- - -	65 mV 45 mV 20 mV	100 mV 80 mV 35 mV	Tested with 0-20 MHz, with 10 uF/10 V tantalum capacitor and 1uF/10 V ceramic capacitor at the output
Ripple and Noise (rms) Vo=5.0 V Vo=3.3 V Vo=0.75 V	- - -	20 mV 10 mV 5 mV	40 mV 25 mV 15 mV	
Turn on Time	-	5 mS	8 mS	
Overshoot at Turn on	-	0%	3%	
Output Capacitance	0 uF	-	1200 uF	
Transient Response				
50% ~ 100% Max Load		-	200 mV	300 mV	di/dt=2.5 A/uS; Vin=12 V; and with 10 uF/10 V tantalum capacitor and 1 uF/10 V ceramic capacitor at the output
Settling Time	All	-	50 uS	80 uS	
100% ~ 50% Max Load		-	200 mV	300 mV	
Settling Time		-	50 uS	80 uS	

Note: All specifications are typical at nominal input (Vin=12 V), full load at 25 °C unless otherwise stated.

NON-ISOLATED DC/DC CONVERTERS
**8.3 Vdc - 14 Vdc Input**   **0.75 Vdc - 5.0 Vdc/3 A Output**

General Specifications

Parameter	Min	Typ	Max	Notes

Efficiency
        Vo=5.0 V
        Vo=3.3 V
        Vo=0.75 V
	
	90%
	88%
	76%
		
		93%
		91%
		80%
			
			-
			-
			-
				Measured at Vin=12 V, full load (Current Source)

Switching Frequency	-	300 kHz	-	
Over Temperature Shutdown	-	135 °C	-	
MTBF	6,740,000 hours			Calculated Per Bell Core SR-332 (Io = 80% load; Ta = 25 °C)

Dimensions (Surface Mount)
    Inches (L × W × H)
    Millimeters (L × W × H)
	0.8 x 0.45 x 0.251
	20.32 x 11.42 x 6.38			

Weight	-	3 g	-	

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

Control Specifications

Parameter	Min	Typ	Max	Notes
Remote On/Off				
Signal Low (Unit Off)	-0.3 V	-	0.4 V	SRBA-03A1A0; Remote On/Off pin open, Unit on.
Signal High (Unit On)	2.5 V	-	14 V	
Signal Low (Unit On)	-0.3 V	-	0.4 V	SRBA-03A1AL; Remote On/Off pin open, Unit on.
Signal High (Unit Off)	2.5 V	-	14 V	
Output Voltage Trim Range (Wide Trim)	0.7525 V	-	5.0 V	
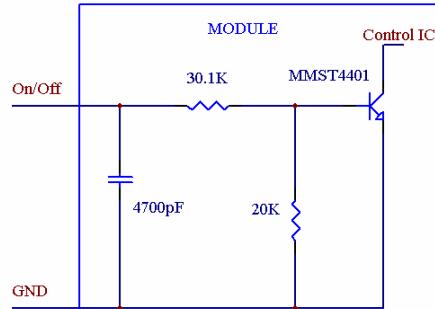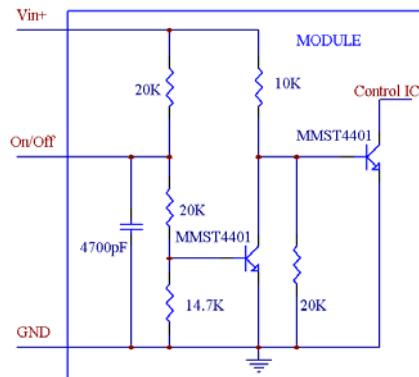
Remote Enable Specifications

The SRBA-03A1AL modules feature an enable pin with negative logic. If not using the enable pin, leave the pin open (the module will be on). During logic_high, the module is turned off, during logic_low, the module is turned on. It inner circuit impedance is showed as figure.

SRBA-03A1AL

The SRBA-03A1A0 modules feature an enable pin with Positive logic. If not using the enable pin, leave the pin open (the module will be on). During logic_high, the module is turned on, during logic_low, the module is turned off. It inner circuit impedance is showed as figure.
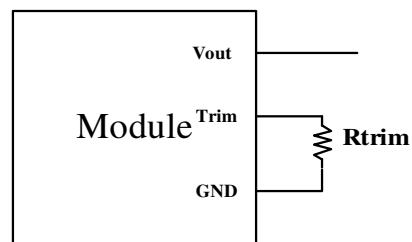
SRBA-03A1A0

Output Trim Equations
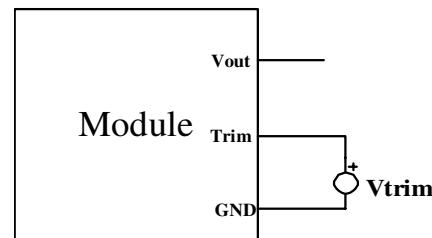
Equation for calculating the trim resistor (in kΩ) given the desired adjusted voltage (Vadj) is shown below. The Trim Up resistor should be connected between the Trim pin and Ground.

$$R_{trim} = \frac{10.507}{V_{adj} - 0.7525} - 1$$

Equation for calculating the trim voltage (in V) given the desired adjusted voltage (Vadj) is shown below. The Trim Up voltage should be connected between the Trim pin and Ground.

$$V_{trim} = 0.7 - 0.0667 \times (V_{adj} - 0.7525)$$
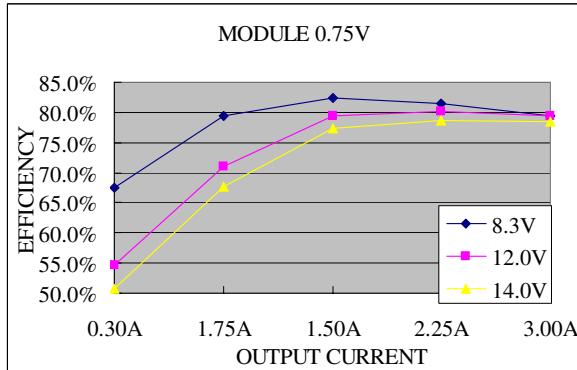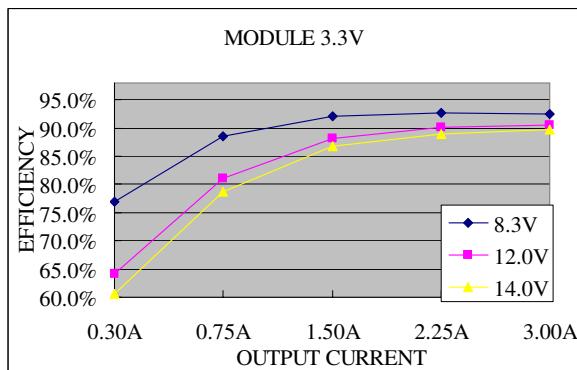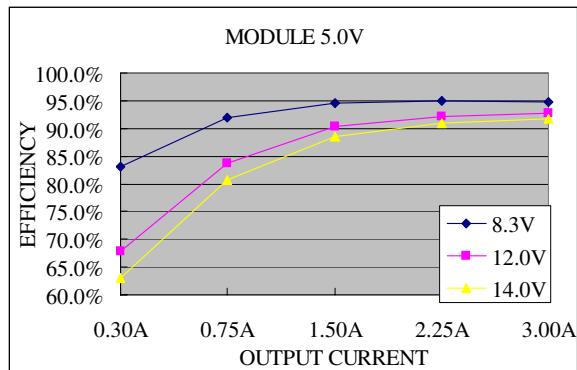
Efficiency Data

MODULE 5.0V

MODULE 3.3V

MODULE 0.75V
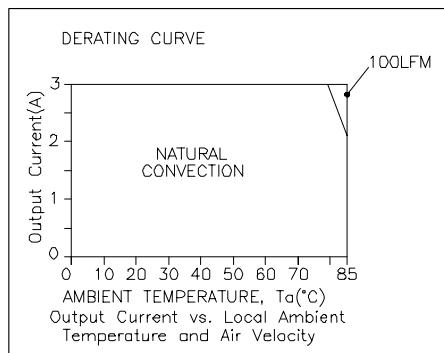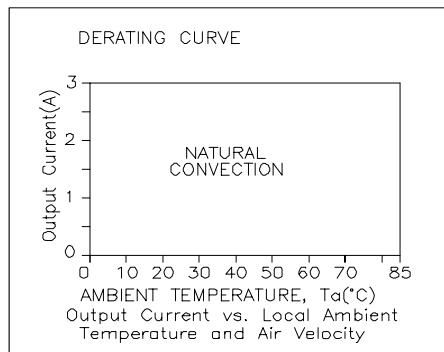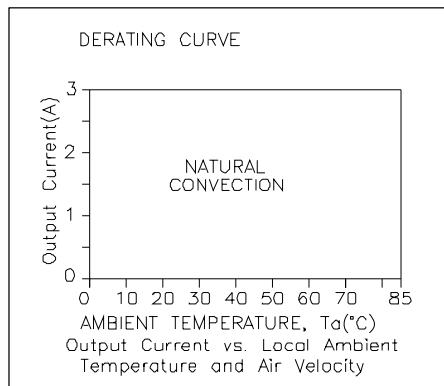
Thermal Derating Curves

Vin=12 V, Vo=5.0 V

Vin=12 V, Vo=3.3 V
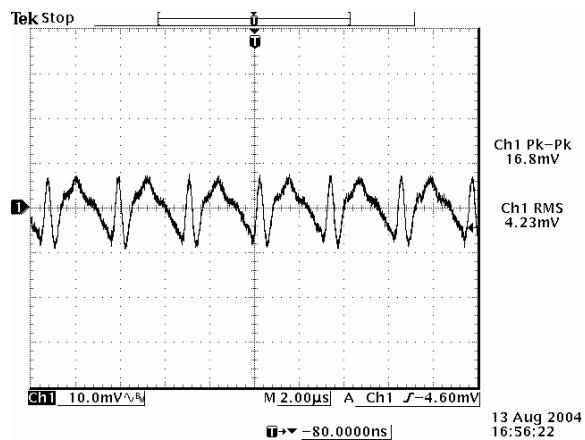
Vin=12 V, Vo=0.75 V
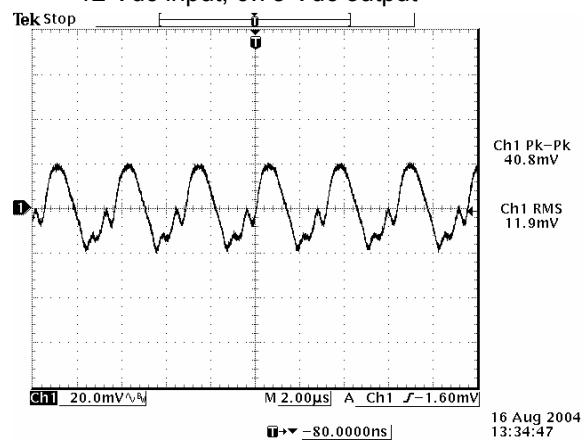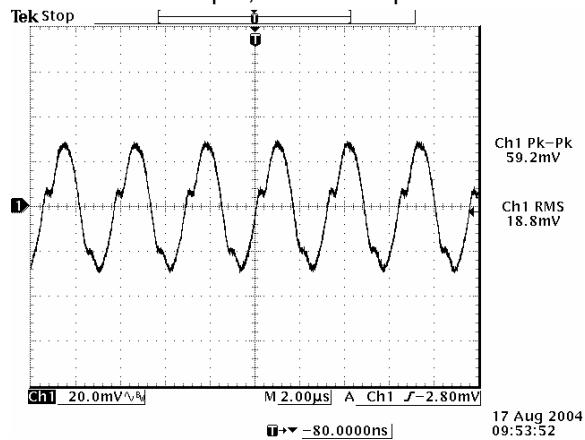
Ripple and Noise Waveforms

12 Vdc input, 0.75 Vdc output

12 Vdc input, 3.3 Vdc output

12 Vdc input, 5.0 Vdc output
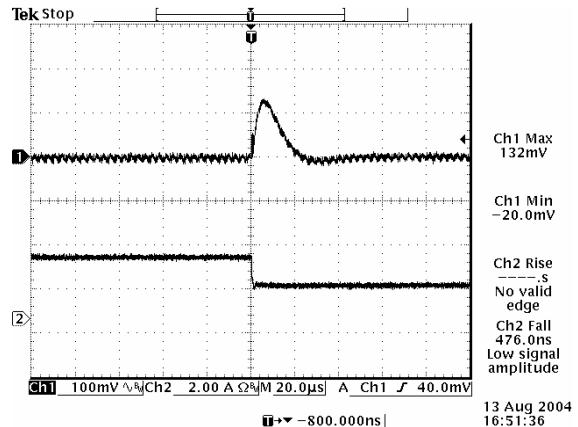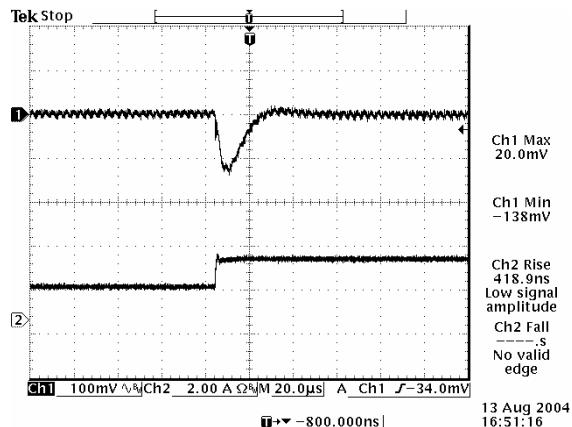
Note: Ripple and noise at full load, 0-20 MHz BW, with 10 uF/10 V tantalum cap and 1 uF/10 V ceramic cap at the output, and Ta=25 deg C.

bel
POWER PRODUCTS
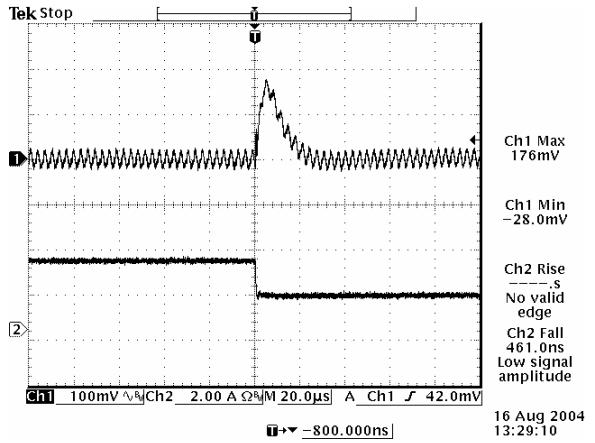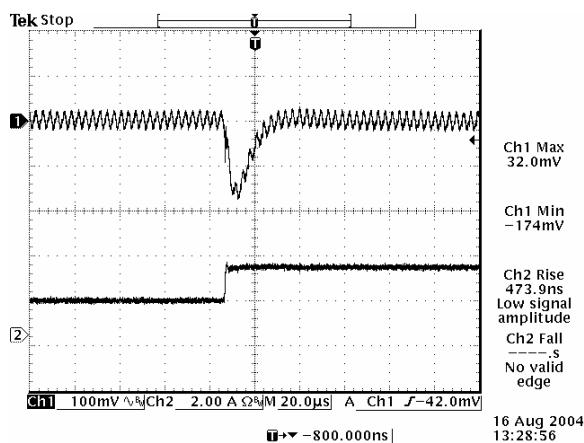
## Transient Response Waveforms
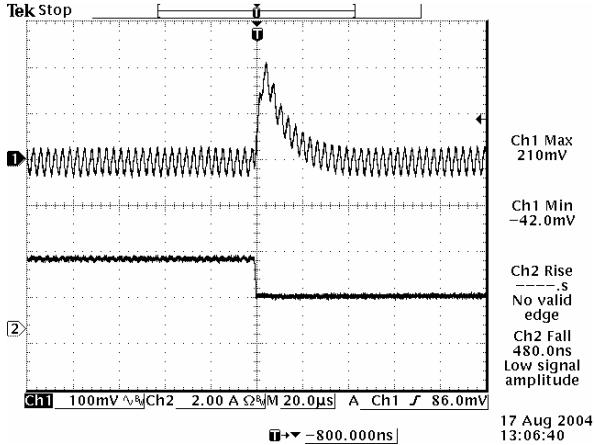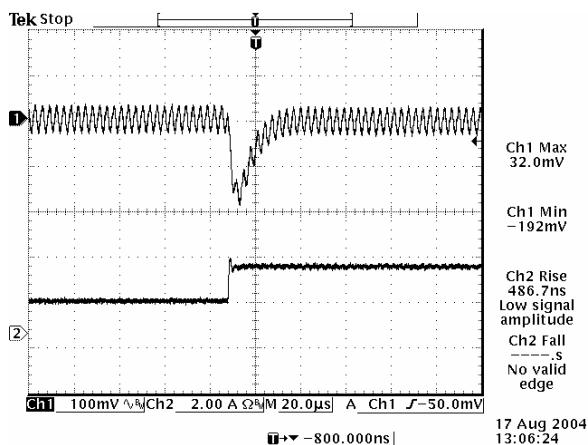
Transients 50% to 100% load 0.75 Vdc output

Transients 100% to 50% load 0.75 Vdc output

Transients 50% to 100% load 3.3 Vdc output

Transients 100% to 50% load 3.3 Vdc output

Transients 50% to 100% load 5.0 Vdc output

Transients 100% to 50% load 5.0 Vdc output

Note: Transient response at 12 Vdc input, di/dt=2.5 A/uS, with 10 uF/10 V tantalum cap and 1 uF/10 V ceramic cap at the output, Ta=25 deg C.
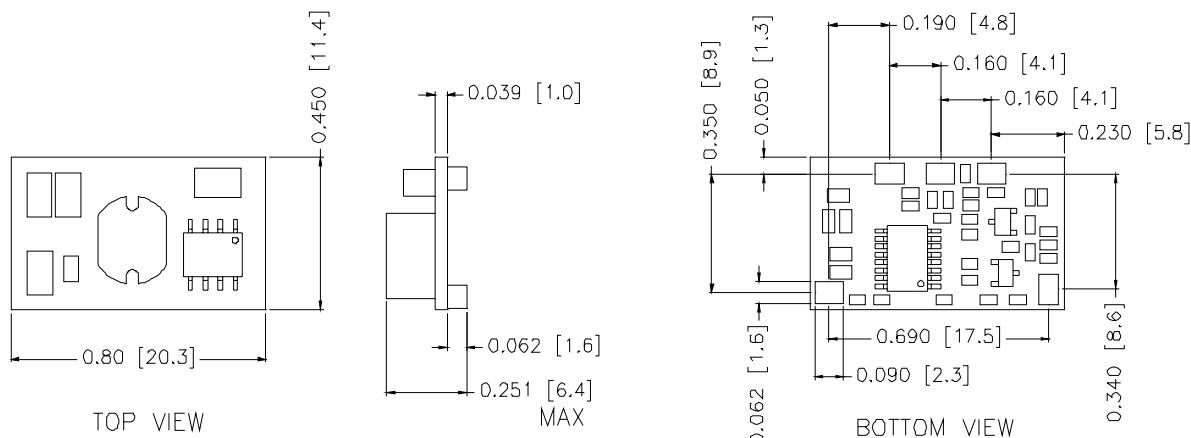
Mechanical Outline

0.450 [11.4]

0.039 [1.0]

0.062 [1.6]

0.251 [6.4]
MAX

0.80 [20.3]

TOP VIEW

0.350 [8.9]

0.050 [1.3]

0.190 [4.8]

0.160 [4.1]

0.160 [4.1]

0.230 [5.8]

0.062 [1.6]

0.690 [17.5]

0.090 [2.3]

0.340 [8.6]

BOTTOM VIEW

3   4   5

2   1
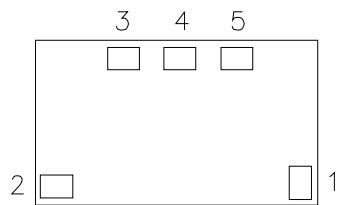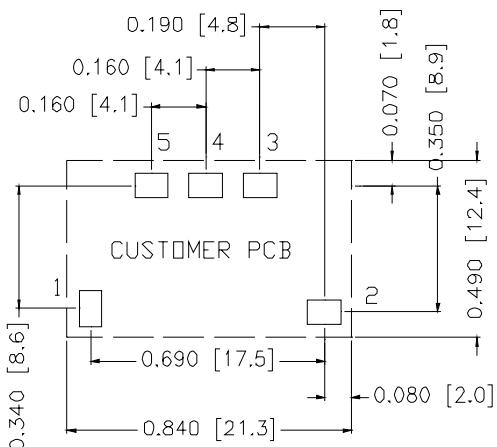
Pin Connections

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

RECOMMENDED PAD LAYOUT

0.190 [4.8]

0.160 [4.1]

0.160 [4.1]

0.070 [1.8]

0.350 [8.9]

5   4   3

CUSTOMER PCB

0.490 [12.4]

1

2

0.340 [8.6]

0.690 [17.5]

0.080 [2.0]

0.840 [21.3]

PAD SIZE:
MIN: 0.12"* 0.095" (3.05mm * 2.41mm)
MAX: 0.135"* 0.11" (3.43mm * 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.

RoHS
2002/95/EC