

ISOLATED DC/DC CONVERTERS

36 Vdc - 75 Vdc Input, 12 Vdc/5 A Output



Apr. 29, 2011

Bel Power Inc., a subsidiary of Bel Fuse Inc.

SRSB-50T12C RoHS Compliant PRELIMINARY Rev.A

Features

- Isolated
- High Efficiency
- Fixed Frequency (600 kHz)
- High Power Density
- Input Under Voltage Lockout
- Low Cost
- Class 2, Category 2, Isolated DC/DC Converter (refer to IPC-9592)
- UL60950-1 Recognized (UL/cUL) (Pending)
- Output Over Voltage Shutdown
- Over Temperature Protection
- SCP/OCP
- Basic Insulation
- Remote On/Off

Applications

- Networking
- Computers and peripherals
- Telecommunications

Description

The SRSB-50T12C is an isolated dc/dc converter that operates from a nominal 48 Vdc source. The unit will provide up to 60 W of output power from a nominal 48 Vdc input. The unit is designed to be highly efficient and low cost. Features include remote on/off, over current protection and under-voltage lockout. The converter is provided in an industry standard sixteenth brick package.

Part Selection

Output Voltage	Input Voltage	Max. Output Current	Max. Output Power	Typical Efficiency	Model Number Active Low
12 Vdc	36 Vdc - 75 Vdc	5 A	60 W	89%	SRSB-50T12C

Notes: Add "G" suffix at the end of the model number to indicate Tray Packaging.

Part Number Explanation

$\frac{S}{1} \frac{R}{2} \frac{SB}{3} - \frac{50}{4} \frac{T}{5} \frac{12}{6} \frac{C}{7}$

1---Surface Mount

2---RoHS 6, change "R" to "7" means RoHS 5

3---Series name, 1/16 brick

4---Series code

5---Input range (36-75V)

6---Output voltage (12V)

7---Option, "x" of the model part number to be 0-9, A-Z, which will represent the special request of customer.

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Absolute Maximum Ratings

Parameter	Min	Typ	Max	Unit	Notes
Continuous Input Voltage	-0.3	-	80	V	
Input Transient Voltage	-0.3	-	100	V	100mS maximum
Remote On/Off	-0.3	-	18	V	
I/O Isolation Voltage	-	-	1500	V	
Ambient Temperature	-40	-	85	°C	
Storage Temperature	-55	-	125	°C	

Note: Ratings used beyond the maximum ratings may cause a reliability degradation of the converter or may permanently damage the device.

Input Specifications

Parameter	Min	Typ	Max	Unit	Notes
Operating Input Voltage	36	48	75	V	
Input Current (full load)	-	-	2.4	A	
Input Current (no load)	-	70	120	mA	
Remote Off Input Current	-	1	3	mA	
Input Reflected Ripple Current (rms)	-	3	7	mA	With simulated source impedance of 15uH, 5Hz to 20MHz; use a 100uF/100V electrolytic capacitor with ESR=1 ohm max, at 200KHz@25°C.
Input Reflected Ripple Current (pk-pk)	-	20	50	mA	
I ² t Inrush Current Transient	-	0.01	0.02	A ² s	
Turn-on Voltage Threshold	31	32	35	V	
Turn-off Voltage Threshold	30	31	34	V	

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

Output Specifications

Parameter	Min	Typ	Max	Unit	Notes
Output Voltage Set Point	11.75	12.00	12.25	V	V _{in} =48 V, I _o =50%Load
Load Regulation	-	±9	±18	mV	
Line Regulation	-	±10	±25	mV	
Regulation Over Temperature (-40deg.C-85deg.C)	-	±20	±35	mV	
Total Regulation	-	±39	±78	mV	
Output Ripple and Noise (pk-pk)	-	90	180	mV	0-20MHz BW, with a 1µF ceramic capacitor and the minimum external Tantalum cap at output.
Output Ripple and Noise (rms)	-	30	55	mV	
Output Current Range	0	-	5	A	
Output DC Current Limit	5.2	6.5	8.5	A	

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Output Specifications (continued)

Parameter		Min	Typ	Max	Unit	Notes	
Short Circuit Surge Transient		-	0.5	1	A ² s		
Turn on Time		-	35	70	mS		
Overshoot at Turn on		-	0	5	%		
Output Capacitance		22	-	470	uF		
Transient Response							
ΔV 25%~50% of Max Load	Overshoot	V _O = 12 V	-	400	650	mV	di/dt=0.1A/us, V _{in} =48Vdc, T _a =25°C, with a 1μF ceramic capacitor and the minimum external Tantalum cap at output.
	Settling Time		-	150	300	uS	
ΔV 50%~25% of Max Load	Overshoot		-	400	650	mV	
	Settling Time		-	150	300	uS	

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

General Specifications

Parameter	Min	Typ	Max	Unit	Notes
Efficiency	86	89	-	%	V _{in} =48 V, full load.
Switching Frequency	-	600	-	kHz	
Over Temperature Protection	-	125	-	°C	The OTP threshold is set at 125°C in non-latch mode, and the module will restart automatically when temperature falls down to 115°C.
Over Voltage Protection (Static)	-	130	160	%	This voltage is achieved by trimming up output slowly.
Weight	-	TBD	-	g	
Dimensions Inches (L × W × H) Millimeters (L × W × H)	1.300 x 0.900 x 0.364 33.02 x 22.86 x 9.24			-	
Isolation characteristics					
Input to Output	-	-	1500	V	
Isolation Resistance	10M	-	-	Ohm	
Isolation Capacitance	-	3900	-	pF	

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

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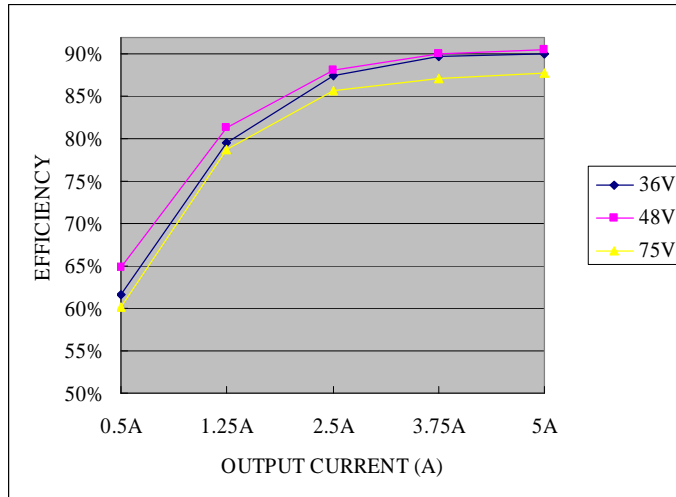
36 Vdc - 75 Vdc Input, 12 Vdc/5 A Output



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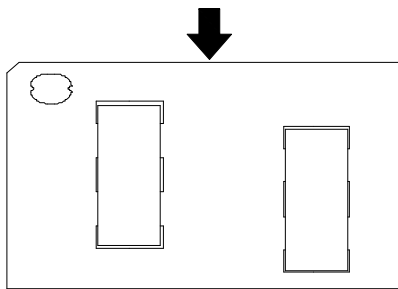
Efficiency Data



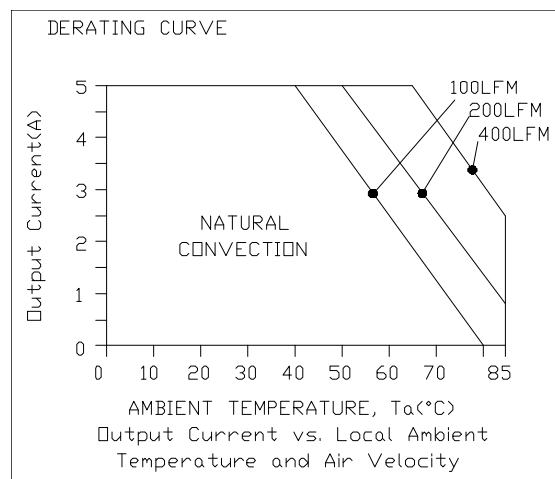
Thermal Derating Curve

Maximum junction temperature of semiconductors derated to 120 degree C.

Forced Airflow Direction



TOP VIEW



Derating curve under 48V input range

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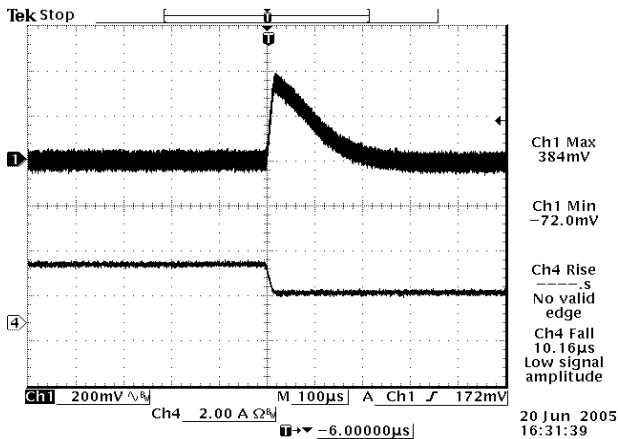
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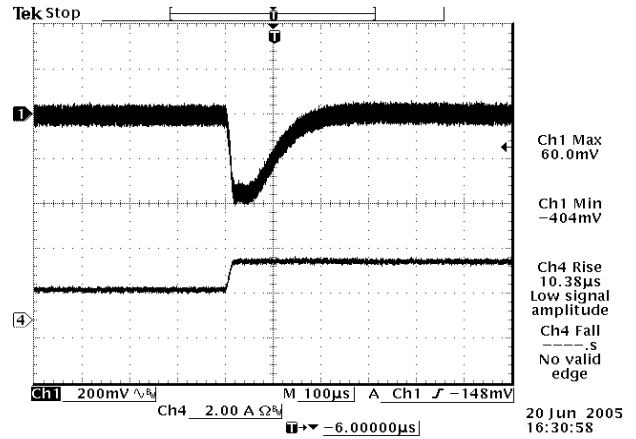
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Transient Response Waveforms



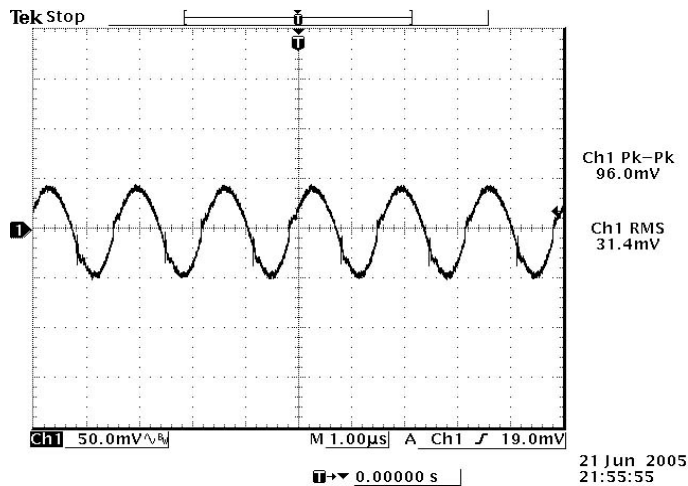
50%-25% Load Transients at Vin=48 V



25%-50% Load Transients at Vin=48 V

Note: Transient response at Vout=12V, di/dt=0.1A/us, External 22uF Tantalum Cap and 1uF Ceramic Cap, and Ta=25 deg C.

Ripple and Noise Waveform



48 Vdc input, 12 Vdc/5 A output

Note: Ripple and noise at full load, and with a 1uF ceramic cap and a 22 uF Tantalum cap at output, Ta=25 deg C.

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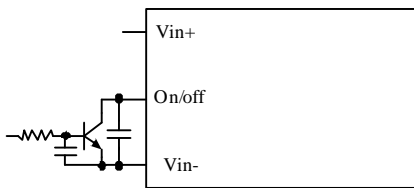
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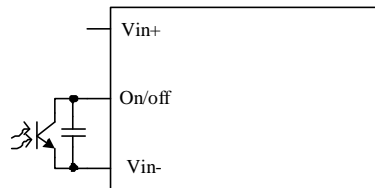
Remote On/Off

Parameter	Min	Typ	Max	Unit	Notes
Signal Low (Unit On)	-0.3	-	0.8	V	The remote on/off pin open, Unit off.
Signal High (Unit Off)	2.95	-	18	V	
Current Sink	0	-	1	mA	

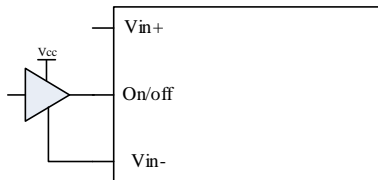
Recommended remote on/off circuit for active low



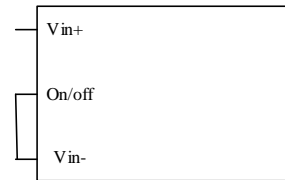
Control with open collector/drain circuit



Control with photocoupler circuit



Control with logic circuit



Permanently on

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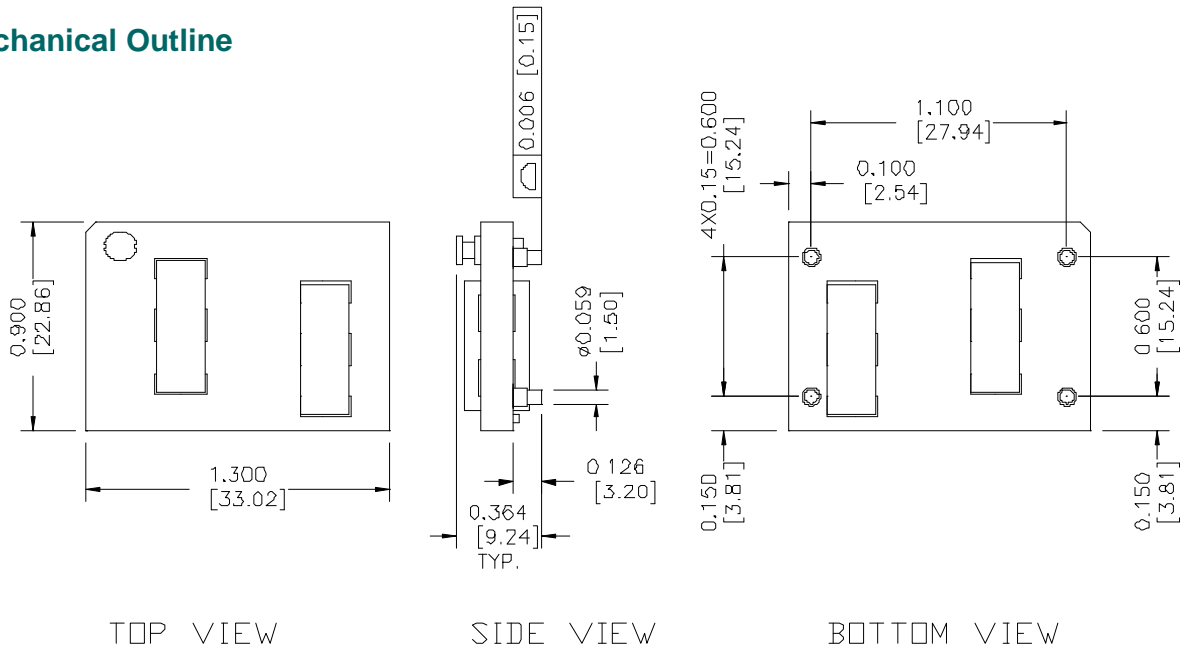
12 Vdc/5 A Output



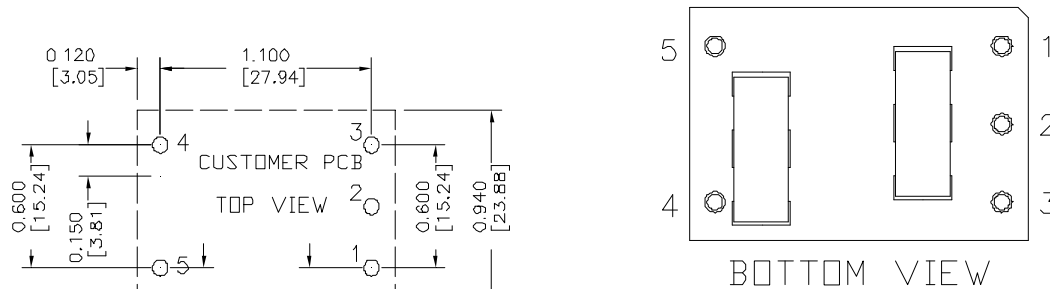
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Mechanical Outline



RECOMMENDED PCB PAD LAYOUT



Recommended Surface Mount Pads
 Min. ϕ 0.080" [2.03]
 Max. ϕ 0.092" [2.34]

Pin Connections

pin#	function
1	Vin (+)
2	On/Off
3	Vin (-)
4	Vout (-)
5	Vout (+)

Note: This module is recommended and compatible with Pb-Free Reflow Soldering and must be soldered using a reflow profile with a peak temperature of no more than 260°C for less than 5 seconds.

Note:

- 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).

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Revision History

Date	Version	Changes Detail	Approval
2010-04-29	PA	First release	JZ Wang

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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