

NON-ISOLATED DC/DC CONVERTER

3.3V Input 0.9V to 2.5V/12A Output



S7DB-12C1AH

- Non-Isolated
- Fixed frequency (300kHz)
- Low profile package (8.5mm)
- Remote Sense
- Remote On/Off (Active High Logic)
- Input Under-voltage Lockout (UVLO)
- OCP/SCP
- Wide Trim Output



Description

The S7DB-12C1AH is part of the low cost non-isolated DC/DC power converter series. The module uses a DIP package for ease of layout and space savings, with a low profile of 8.5mm. The output is widely trimmed from 0.9V to 2.5V, and the efficiency of 2.5V output module is typically 92% at full load. Features include remote sense, remote on/off, short circuit protection, over current protection and input under-voltage lockout.

Part Selection

Output Voltage	Input Voltage	Max. Output Current	Max. Output Power	Typical Efficiency	Model Number
0.9 – 2.5V	3.3V	12A	30W	92%	S7DB-12C1AH

Note: Add “R” suffix at the end of the model number to indicate “Reel Packaging”, and “G” for “Tray Packaging”.

Absolute Maximum Ratings

Parameter	Min	Typ	Max	Notes
Input Voltage (continuous)	-0.3V	-	7V	
Output Enable Terminal Voltage	-0.3V	-	3.9V	
Ambient Temperature	-40°C	-	85°C	
Storage Temperature	-55°C	-	100°C	

Input Specifications

Parameter	Min	Typ	Max	Notes
Input Voltage	3V	3.3V	3.6V	
Input Current (full load)				
Vo=2.5V	-	-	12.0A	
Vo=1.8V	-	-	9.3A	
Vo=1.5V	-	-	8.0A	
Vo=1.2V	-	-	6.6A	
Vo=1.0V	-	-	5.7A	
Vo=0.9V	-	-	5.2A	
Input Current (no load)	-	-	150mA	
Remote Off Input Current		10mA	20mA	
Input Reflected Ripple Current (pk-pk)	-	80mA	160mA	Tested with simulated source impedance of 500Hz to 20MHz & two 270uF/10V Oscon capacitors with ESR=0.018 ohm max. at 100KHz
Input Reflected Ripple Current (RMS)	-	25mA	50mA	
I ² t Inrush Current Transient	-	0.1A ² s	0.2A ² s	
Turn-on Voltage Threshold	-	2.85V	-	
Turn-off Voltage Threshold	-	2.3V	-	

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

NON-ISOLATED DC/DC CONVERTER

3.3V Input 0.9V to 2.5V/12A Output



Output Specifications

Parameter		Min	Typ	Max	Notes	
Output Voltage Set Point					Vin=3.3V, full load.	
	Vo=2.5V	2.450V	2.500V	2.550V		
	Vo=1.8V	1.764V	1.800V	1.836V		
	Vo=1.5V	1.470V	1.500V	1.530V		
	Vo=1.2V	1.176V	1.200V	1.224V		
	Vo=1.0V	0.980V	1.000V	1.020V		
	Vo=0.9V	0.882V	0.900V	0.918V		
Line Regulation		-	2mV	5mV		
Load Regulation		-	4mV	8mV		
Regulation Over Temperature (-40°C to +85°C)						
	Vo=2.5V	-	19mV	38mV		
	Vo=1.8V	-	13mV	26mV		
	Vo=1.5V	-	11mV	22mV		
	Vo=1.2V	-	9mV	18mV		
	Vo=1.0V	-	6mV	12mV		
	Vo=0.9V	-	5mV	10mV		
Output Current		0A	-	12A		
Current Limit Threshold		15.6A	-	30A		
Ripple and Noise (RMS)		-	10mV	25mV	Test conditions: 0-20MHz BW; 1uFceramic capacitor & 10uF aluminum capacitor at the output.	
Ripple and Noise (pk-pk)						
	Vo=2.5V	-	35mV	75mV		
	Vo=1.8V	-	40mV	80mV		
	Vo=1.5V	-	40mV	80mV		
	Vo=1.2V	-	40mV	80mV		
	Vo=1.0V	-	35mV	75mV		
	Vo=0.9V	-	35mV	75mV		
Short Circuit Surge Transient		-	0.2A ² s	0.4A ² s		
Turn on Time		-	10mS	20mS		
Overshoot at Turn on		-	0%	3%		
Output Capacitance		0uF		4800uF		
Transient Response						
50% ~ 100% Max Load	Overshoot	Vo=1.8V to 2.5V	-	100mV	140mV	Test conditions: di/dt=0.5A/uS, Vin=3.3V, with a 470uF (ESR=0.9 ohm) tantalum capacitor at the output.
	Settling Time		-	50uS	100uS	
100% ~ 50% Max Load	Overshoot		-	100mV	140mV	
	Settling Time		-	50uS	100uS	
50% ~ 100% Max Load	Overshoot	Vo=0.9V to 1.5V	-	90mV	130mV	
	Settling Time		-	50uS	100uS	
100% ~ 50% Max Load	Overshoot		-	90mV	130mV	
	Settling Time		-	50uS	100uS	

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

NON-ISOLATED DC/DC CONVERTER

3.3V Input 0.9V to 2.5V/12A Output



General Specifications

Parameter	Min	Typ	Max	Notes
Efficiency				Vin=3.3V, full load
Vo=2.5V	89%	92%	-	
Vo=1.8V	85%	88%	-	
Vo=1.5V	83%	86%	-	
Vo=1.2V	80%	83%	-	
Vo=1.0V	78%	81%	-	
Vo=0.9V	77%	80%	-	
Switching Frequency	250KHz	300KHz	340KHz	
Output Voltage Trim Range	0.855V	-	2.625V	Total adjustment of trim, setpoint and remote sense combined should not exceed 2.625V. Vo=0.9V when trim pin open
Remote Sense Compensation	-	-	10%	
MTBF	5,443,290 hours			Calculated Per Bell Core TR-332 (Io =9.6A, Vin=3.3V; Ta = 25°C)
Dimensions	Inches millimeters	1.22 x 0.827 x 0.345 31.0 x 21.0 x 8.75		
Weight	-	10.5g	-	

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)	Active High	-0.3V	-	Remote on/off pin open, unit on.
Signal High (Unit On)		2.8V	-	

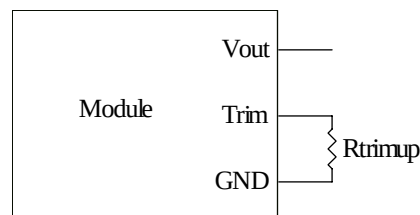
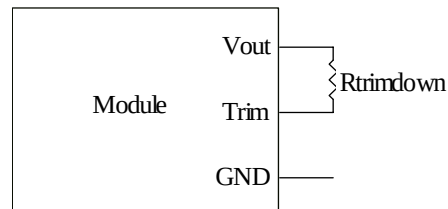
Output Trim Equations

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.

$$R_{TrimDown} = \frac{0.697}{V_{nom} - V_{adj}} - 8.28$$

$$R_{TrimUp} = \frac{5.2}{V_{adj} - V_{nom}} - 1.78$$

Note: The output voltage Vnom = 0.907V.

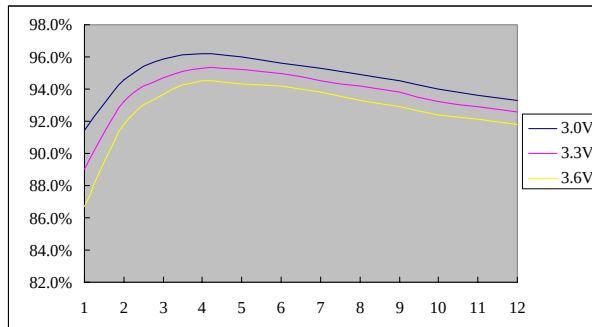


NON-ISOLATED DC/DC CONVERTER

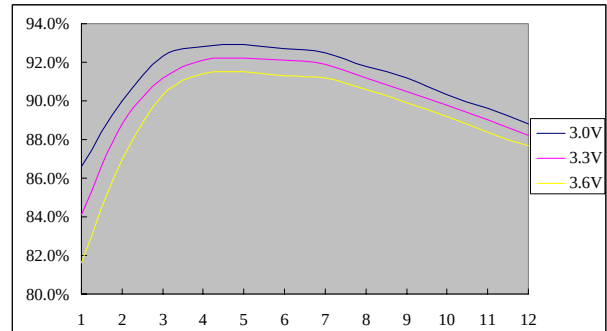
3.3V Input 0.9V to 2.5V/12A Output



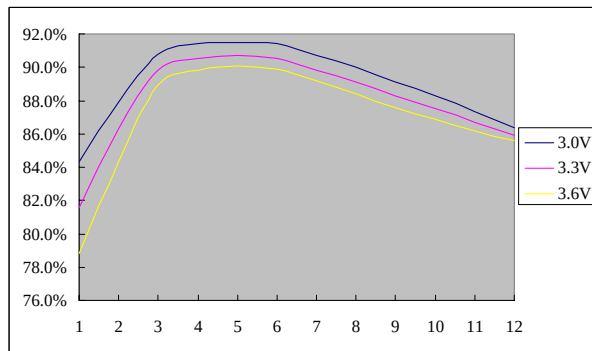
Efficiency Data



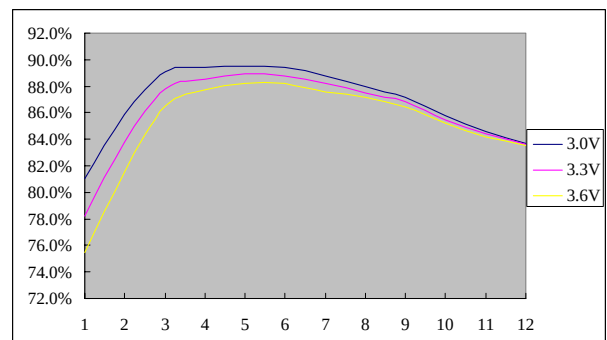
$V_o = 2.5V$



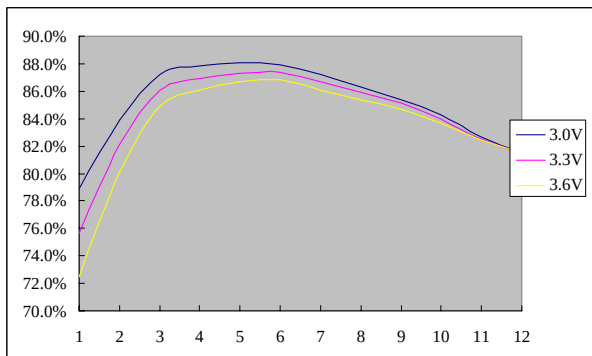
$V_o = 1.8V$



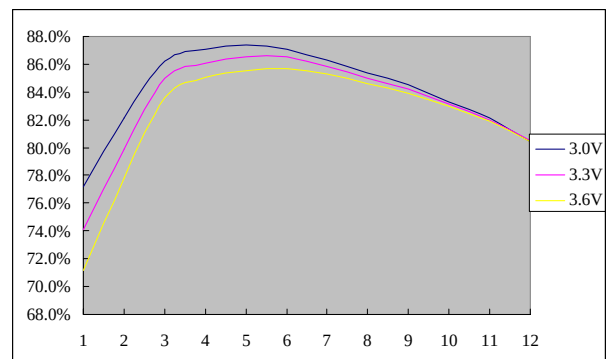
$V_o = 1.5V$



$V_o = 1.2V$



$V_o = 1.0V$



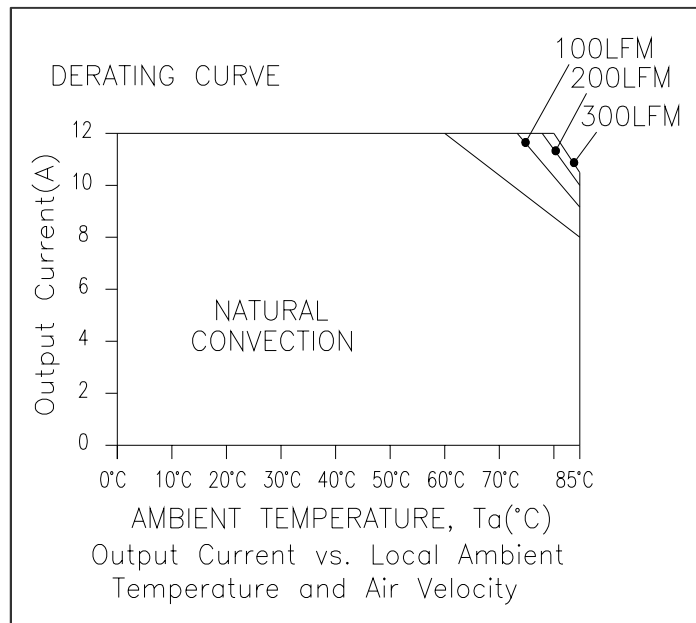
$V_o = 0.9V$

NON-ISOLATED DC/DC CONVERTER

3.3V Input 0.9V to 2.5V/12A Output



Thermal Derating Curve

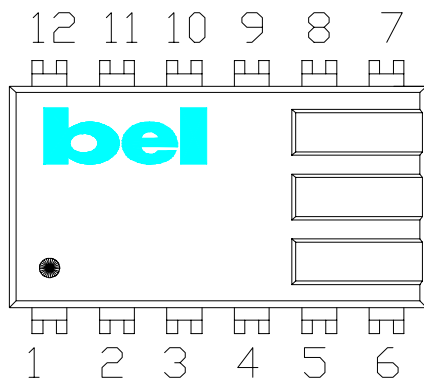
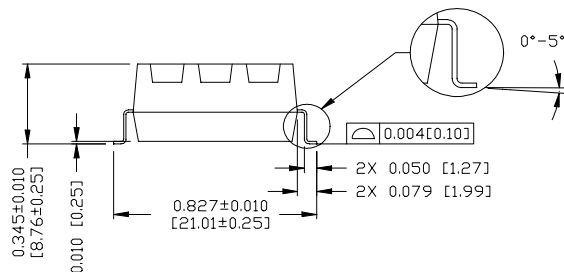
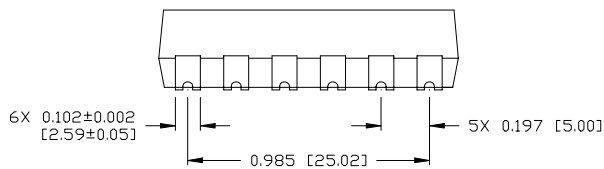
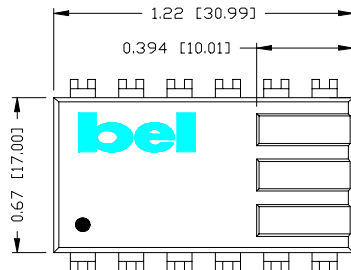


Test Condition: Derating curve is tested at nominal input voltage.

NON-ISOLATED DC/DC CONVERTER

3.3V Input 0.9V to 2.5V/12A Output

bel
POWER PRODUCTS



Pin Connections

Pin	Function
1	GND
2	GND
3	GND
4	GND
5	Vin
6	Vin
7	Trim
8	Remote On/Off
9	Remote Sense(+)
10	Vo
11	Vo
12	Vo

©2004 Bel Fuse Inc. Specifications subject to change without notice. 112604

CORPORATE

Bel Fuse Inc.
206 Van Vorst Street
Jersey City, NJ 07302
Tel 201-432-0463
Fax 201-432-9542
www.belfuse.com

FAR EAST

Bel Fuse Ltd.
8F/ 8 Luk Hop Street
San Po Kong
Kowloon, Hong Kong
Tel 852-2328-5515
Fax 852-2352-3706
www.belfuse.com

EUROPE

Bel Fuse Europe Ltd.
Preston Technology Management Centre
Marsh Lane, Suite G7, Preston
Lancashire, PR1 8UD, U.K.
Tel 44-1772-556601
Fax 44-1772-888366
www.belfuse.com