NON-ISOLATED DC/DC CONVERTER

9.0 - 32V Input **10 - 12V/3.5A Output**

bel POWER PRODUCTS

S7DB-04HX20 PRELIMINARY

- Non-Isolated
- Fixed Frequency (300kHz)
- Over Current Protection
- Remote Sense
- Low Profile Package (8.5mm)
- Remote On/Off (Active Low)

Description

The S7DB-04HX20 is part of the low cost non-isolated DC/DC power converter. The module uses a DIP package for ease of layout and space savings, with a low profile of 8.5mm. The output is closely regulated and the efficiency of 12V is typically 86% at full load. Features include remote sense, over current protection and remote on/off.

Part Selection

Output Voltage	Input Voltage	Max. Output Current	Max. Output Power	Typical Efficiency	Model Number
10V-12V	9.0V-32V	3.5A	42W	86%	S7DB-04HX20

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	-	36V	
Output Enable Voltage	-0.3V	-	12V	
Ambient Temperature	-40°C	-	85°C	
Storage Temperature	-55°C	-	125°C	

Input Specifications

Parameter	Min	Typ	Max	Notes
Input Voltage	9V	20V	32V	
Input Current (Full load)	-	-	5.6A	
Input Current (No load)	-	50mA	100mA	
Remote Off Input Current	-	1mA	3mA	
Input Reflected Ripple Current (pk-pk)	-	500mA	750mA	Tested with simulated source impedance of 500nH, 5Hz to 20MHz; and two 100uF/50V electrolytic capacitors and a 3.3uF/50V ceramic capacitor at the input.
Input Reflected Ripple Current (RMS)	-	170mA	250mA	
I^2t Inrush Current Transient	-	$0.05A^2s$	$0.1A^2s$	
Turn-on Voltage Threshold	-	8.5V	9.0V	

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

NON-ISOLATED DC/DC CONVERTER

9.0 - 32V Input **10 - 12V/3.5A Output**

Output Specifications

Parameter	Min	Typ	Max	Notes
Output Voltage Set Point	11.89V	12.13V	12.37V	Vin=20V, Iout=50% full load
Line Regulation	-	±12mV	±24mV	
Load Regulation	-	±12mV	±24mV	
Regulation Over Temperature (-40°C to 85°C)	-	±30mV	±50mV	
Ripple and Noise (RMS)	-	2.5mV	5mV	Test conditions: 0-20MHz BW; with 33uF-0.5uH-33uF second stage filter.
Ripple and Noise (pk-pk)	-	10mV	20mV	
Output Current	0A	-	3.5A	
Output Current Limit Threshold	4A	-	9A	
Short Circuit Surge Transient	-	$0.2A^2s$	$0.5A^2s$	
Turn on Time	-	3.5mS	10mS	
Overshoot at Turn on	-	2%	5%	
Output Capacitance	0uF		220uF	
Transient Response				
50% ~ 100% Max Load	Overshoot	-	220mV	250mV	Tested at di/dt=0.5A/us, Vin=20V, with 33uF-0.5uH-33uF second stage filter.
	Settling Time	-	300uS	500uS	
100% ~ 50% Max Load	Overshoot	-	130mV	250mV	
	Settling Time	-	300uS	500uS	

Note: All specifications are typical at 20V input, full load at 25°C unless otherwise stated.

General Specifications

Parameter	Min	Typ	Max	Notes
Efficiency	80%	86%	-	Vin=20V, full load
Switching Frequency	270KHz	300KHz	330KHz	
Output Voltage Trim Range	80%Vo	-	105%Vo	
Remote Sense Compensation	-	-	5%	
MTBF	TBD			Calculated Per Bell Core TR-332 (Io = Nominal; Ta = 25°C)
Dimensions Inches millimeters	1.22 x 0.827 x 0.345 30.99 x 21.00 x 8.76			
Weight	-	5.1g	-	

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

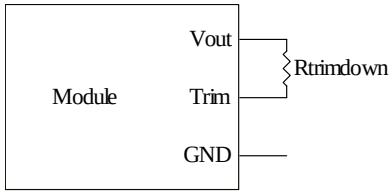
Control Specifications

Parameter	Min	Typ	Max	Notes
Remote On/Off				
Signal Low (Unit On)	-0.3V	-	1V	Remote on/off pin open, unit on.
Signal High (Unit Off)	2.8V	-	12V	

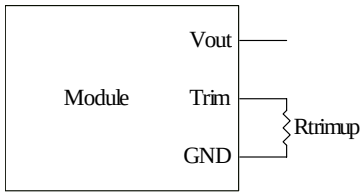
Output Trim Equations

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.

$$R_{TrimDown} = \frac{83.408}{V_{nom} - V_{adj}} - 8.66$$

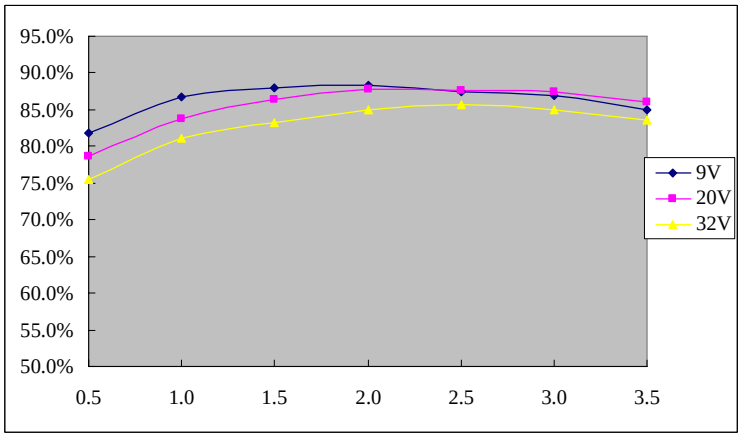


$$R_{TrimUp} = \frac{21.65}{V_{adj} - V_{nom}}$$

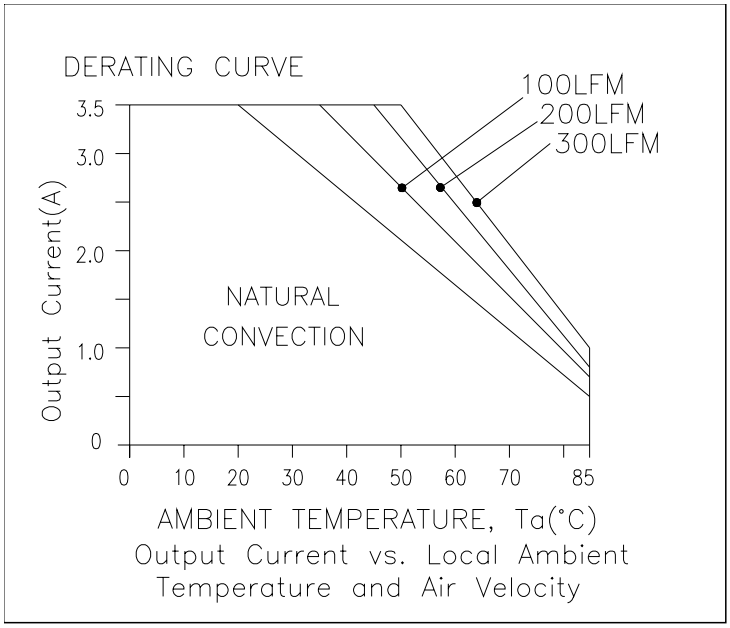


Note: The output voltage Vnom = 12.13V.

Efficiency Data



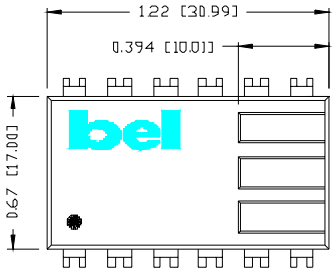
Thermal Derating Curve

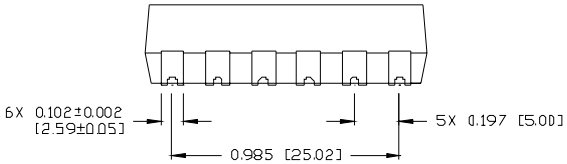


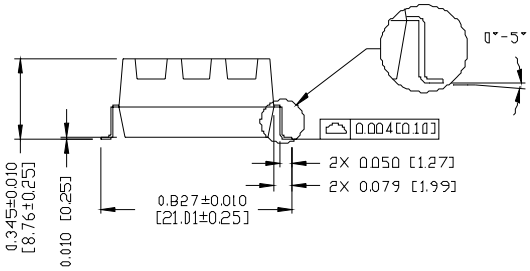
Note: Derating curve is for 12V output and tested at nominal input voltage.

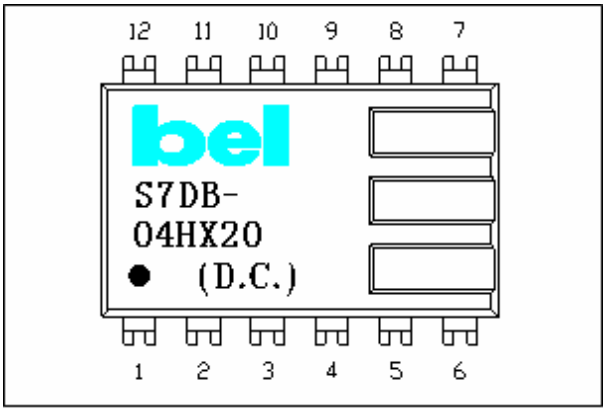
NON-ISOLATED DC/DC CONVERTERS

9.0 - 32V Input **10 - 12V/3.5A Output**









Pin Connections

Pin	Function
1	Trim
2	Remote On/Off
3	Remote Sense(+)
4	Vo
5	Vo
6	Vo
7	Ground
8	Ground
9	Ground
10	N/A (Leave this pin unconnected)
11	Vin
12	Vin

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