ISOLATED DC/DC CONVERTERS

48V Input 3.3V/60A, 5V/40A, 12V/17A Output

07HB-D0T Series PRELIMINARY

- Isolated
- High Efficiency
- High Power Density
- Excellent Thermal Performance
- Low Cost
- Input Under Voltage Lockout
- Fixed frequency(315KHz)
- Output Over Voltage Shutdown
- OCP/SCP
- Over Temperature Protection
- Remote On/Off
- Output Voltage Trim
- Positive/Negative Remote Sense

Description

The 07HB-D0T Series are isolated DC/DC converters that operate from a nominal 48V source. These units provide up to 200W of output power from a nominal 48V input. These units are designed to be highly efficient and low cost. Features include remote on/off, over current protection and under voltage lockout. These converters are provided in an industry standard half-brick package.

Part Selection

Output Voltage	Input Voltage	Max. Output Current	Max. Output Power	Typical Efficiency	Model Number Active High	Model Number Active Low
12.0V	48V	17A	200W	93%	07HB-D0T120	07HB-D0T12L
5.0V	48V	40A	200W	93%	07HB-D0T050	07HB-D0T05L
3.3V	48V	60A	200W	92%	07HB-D0T033	07HB-D0T03L

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)	-0.3V	-	80V	
Remote On/Off	-0.3V	-	18V	
I/O Isolation Voltage	-	-	2000V	
Ambient Temperature	-40°C	-	85°C	
Storage Temperature	-55°C	-	125°C	

Input Specifications

Parameter	Min	Typ	Max	Notes
Input Voltage	36V	48V	75V	
Input Current (full load)	-	-	6.4A	
Input Current (no load)	-	120mA	180mA	
Remote Off Input Current		5mA	10mA	
Input Reflected Ripple Current (pk-pk)	-	20mA	40mA	Tested with simulated source impedance of 10uH, 5Hz to 20MHz; use a 100uF/100V electrolytic capacitor with ESR = 1 ohm max. at 200KHz at 25°C.
Input Reflected Ripple Current (RMS)	-	5mA	10mA	
I^2t Inrush Current Transient	-	$0.05A^2s$	$0.1A^2s$	
Turn-on Voltage Threshold	32V	34V	35V	
Turn-off Voltage Threshold	30V	32V	33V	

Output Specifications

Parameter			Min	Typ	Max	Notes
Output Voltage Set Point						
	Vo=12.0V		11.820V	12.0V	12.180V	Vin=48V, Io=50% full load, Ta=25°C.
	Vo=5.0V		4.925V	5.0V	5.075V	
	Vo=3.3V		3.250V	3.3V	3.350V	
Line Regulation						
	Vo=12.0V		-	±12mV	±24mV	
	Vo=5.0V		-	±5mV	±10mV	
	Vo=3.3V		-	±3mV	±7mV	
Load Regulation						
	Vo=12.0V		-	±30mV	±60mV	
	Vo=5.0V		-	±10mV	±20mV	
	Vo=3.3V		-	±7mV	±15mV	
Regulation Over Temperature (-40°C to +85°C)						
	Vo=12.0V		-	±60mV	±100mV	
	Vo=5.0V		-	±45mV	±75mV	
	Vo=3.3V		-	±30mV	±50mV	
Output Current						
	Vo=12.0V		0A	-	17A	
	Vo=5.0V		0A	-	40A	
	Vo=3.3V		0A	-	60A	
Current Limit Threshold						
	Vo=12.0V		20A	24A	28A	
	Vo=5.0V		48A	54A	60A	
	Vo=3.3V		72A	81A	90A	
Short Circuit Surge Transient			-	$3A^2s$	$5A^2s$	
Ripple and Noise (RMS)						
	Vo=12.0V		-	25mV	50mV	Test conditions: 0-20MHz BW, with a 1uF ceramic capacitor and a 10uF Tantalum capacitor at the output.
	Vo=5.0V		-	25mV	50mV	
	Vo=3.3V		-	15mV	30mV	
Ripple and Noise (pk-pk)						
	Vo=12.0V		-	100mV	150mV	
	Vo=5.0V		-	100mV	150mV	
	Vo=3.3V		-	55mV	100mV	
Turn on Time			-	15mS	30mS	
Overshoot at Turn on			-	0%	5%	
Output Capacitance						
	Vo=12.0V		0uF	-	1000uF	
	Vo=5.0V		0uF	-	10000uF	
	Vo=3.3V		0uF	-	20000uF	
Transient Response						
25% ~ 50% Max Load	Overshoot	Vo=12.0V	-	200mV	400mV	Test conditions: di/dt = 0.1A/uS, Vin=48V, Ta=25°C with a 1uF ceramic capacitor and a 10uF Tantalum capacitor at the output.
	Settling Time		-	250uS	400uS	
50% ~ 25% Max Load	Overshoot		-	200mV	400mV	
	Settling Time		-	250uS	400uS	
25% ~ 50% Max Load	Overshoot	Vo=5.0V	-	150mV	300mV	
	Settling Time		-	200uS	300uS	
50% ~ 25% Max Load	Overshoot		-	150mV	300mV	
	Settling Time		-	200uS	300uS	
25% ~ 50% Max Load	Overshoot	Vo=3.3V	-	100mV	200mV	
	Settling Time		-	200uS	300uS	
50% ~ 25% Max Load	Overshoot		-	100mV	200mV	
	Settling Time		-	200uS	300uS	

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

General Specifications

Parameter	Min	Typ	Max	Notes
Efficiency Vo=12.0V Vo=5.0V Vo=3.3V	 90% 90% 89%	 93% 93% 92%	 - - -	Vin=48V, full load , Ta=25°C
Switching Frequency	280KHz	315KHz	350KHz	
Isolation capacitance	-	1500pF	-	
Output Voltage Trim Range	80%Vo	-	110%Vo	
Over Temperature Protection	-	125°C	-	
Over Voltage Protection	117%Vo	122%Vo	127%Vo	
MTBF	TBD			Calculated Per Bell Core TR-332 (Io = Nominal; Ta = 25°C)
Dimensions Inches millimeters	 2.28 x 2.4 x 0.42 57.51 x 60.98 x 10.67			
Weight	-	76g	-	

Control Specifications

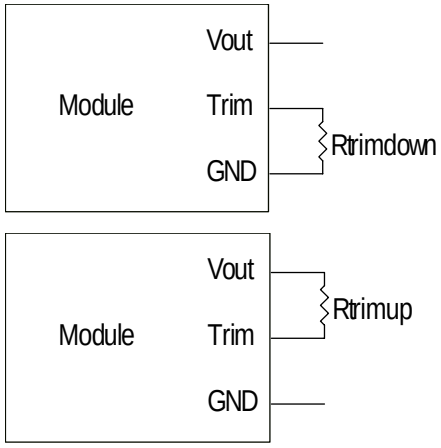
Parameter		Min	Typ	Max	Notes
Remote On/Off					
Signal Low (Unit On)	Active Low	-0.3V	-	0.8V	07HB-D0TxxL. The remote on/off pin open, Unit on.
Signal High (Unit Off)		2.4V	-	18V	
Signal Low (Unit Off)	Active High	-0.3V	-	0.8V	07HB-D0Txx0. The remote on/off pin open, Unit on.
Signal High (Unit On)		2.4V	-	18V	
Current Sink		0mA	-	0.75mA	

Output Trim Equations

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

$$Rtrimdown = \frac{100}{|delta|} - 2[k\Omega]$$

$$Rtrimup = \frac{(100 + delta) \cdot Vo - 122.5}{1.225 \cdot delta} - 2[k\Omega]$$



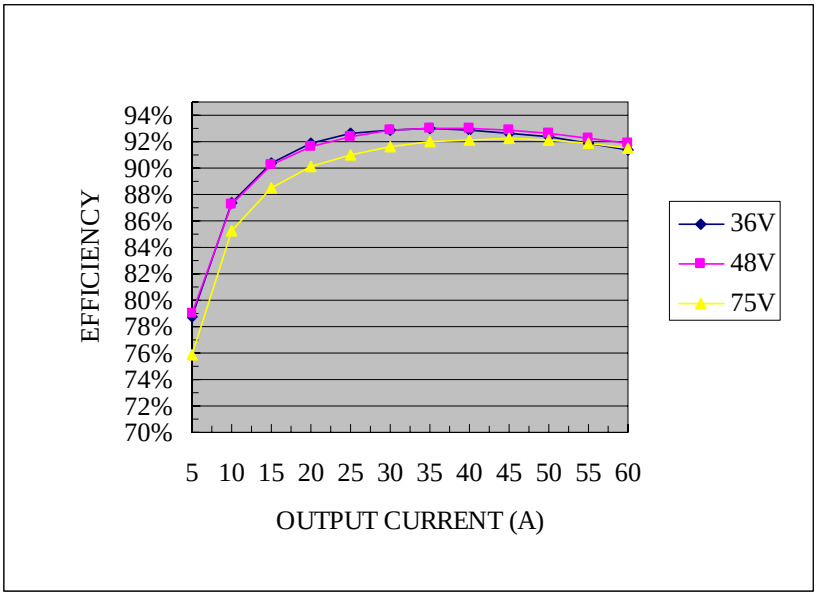
Notes:

$$delta = \frac{(Vo\_req - Vo)}{Vo} \times 100[\%]$$

Vo_req=Desired(trimmed) output voltage[V]

Output voltage Vo=3.308V for 3.3V output; Vo=5.000V for 5.0V; Vo=12.000V for 12V output

Efficiency Data



Vo=3.3V

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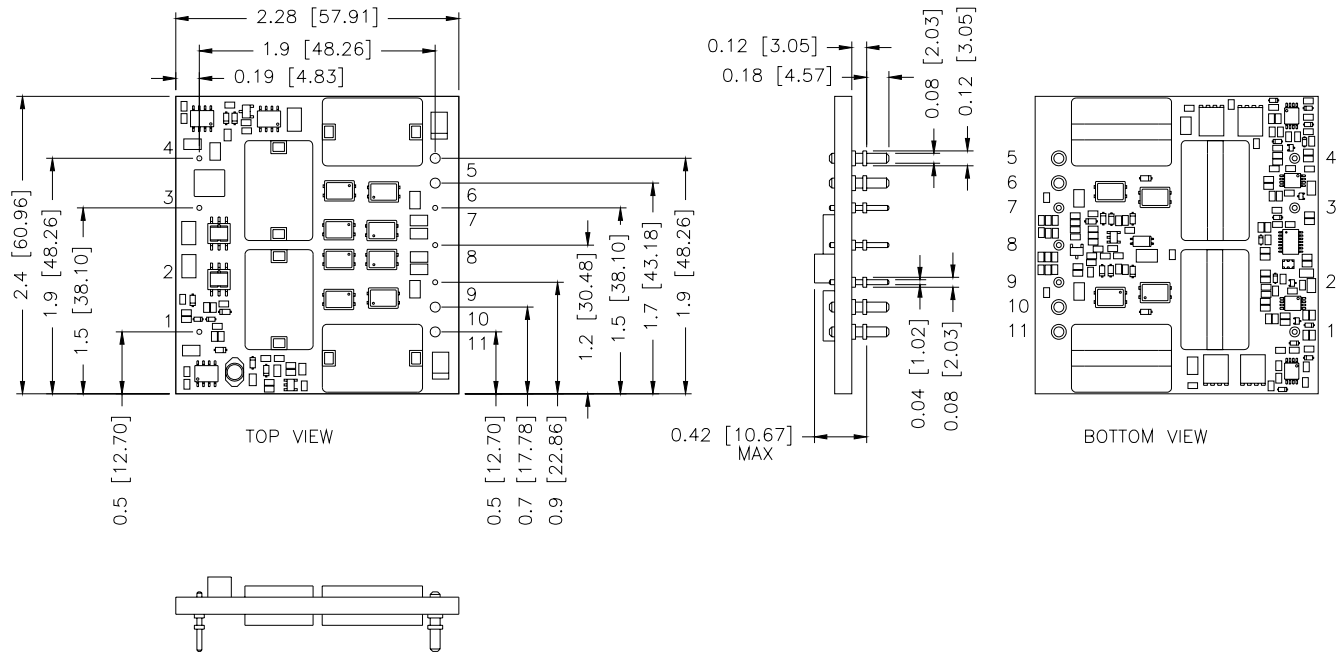

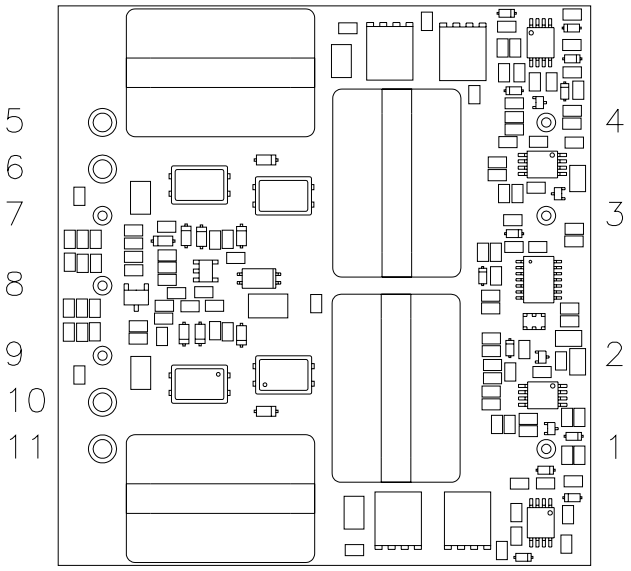

BOTTOM VIEW

Pin Connections

pin#	function	pin size
1	-Input	0.04"
2	N/A	
3	On/Off	0.04"
4	+Input	0.04"
5	+Output	0.08"
6	+Output	0.08"
7	+Sense	0.04"
8	Trim	0.04"
9	-Sense	0.04"
10	-Output	0.08"
11	-Output	0.08"

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