

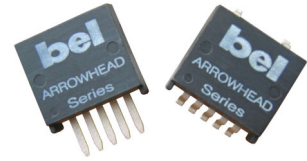
## NON-ISOLATED DC/DC CONVERTER

5V Input     $V_{ref}/2$  / 5A Output

**bel**  
POWER PRODUCTS

### x7AH-05BT50

- Non-Isolated
- Fixed frequency (300kHz)
- Under-voltage lockout (UVLO)
- Remote On/Off
- OCP/SCP
- Low Profile Package (7.82mm)



### Description

The Bel x7AH-05BT50 is part of the low cost non-isolated DC/DC converter series. The converter is designed specifically to provide bus termination voltage in application such as DDR (double data rate) memory where the bus termination voltage must closely track the I/O bus voltage. The converter accepts a reference input and programs its output voltage to 50% of the reference. The modules use a SMD or vertical mount package for ease of layout and space savings.

### Part Selection

Output Voltage	Input Voltage	Max. Output Current	Max. Output Power	Typical Efficiency	Part Number Surface Mount	Part Number Vertical Mount
$V_{ref}/2$	5V	5A	6.25W	82%	S7AH-05BT50	V7AH-05BT50

**Note:** Add "0" suffix at the end of the model number to indicate "Tube Packaging", and "R" for "Reel Packaging", and "G" for "Tray Packaging".

### Absolute Maximum Ratings

Parameter	Min	Typ	Max	Notes
Input Voltage (continuous)	-0.3V	-	6V	
Output Enable Terminal Voltage	-0.3V	-	6V	
Ambient Temperature	-40°C	-	85°C	
Storage Temperature	-55°C	-	125°C	

### Input Specifications

Parameter	Min	Typ	Max	Notes
Input Voltage	4.5V	5.0V	5.5V	
Input Current	-	-	2A	
Input Current (No load)	-	-	60mA	
Remote Off Input Current	-	9mA	15mA	
Input Reflected Ripple Current (RMS)	-	30mA	50mA	Measured with simulated source impedance of 500nH, 5Hz to 20MHz; & one 270uF/16V capacitor with ESR = 0.018 ohm max. at 100KHz
Input Reflected Ripple Current (pk-pk)	-	110mA	140mA	
$I^2t$ Inrush Current Transient	-	0.02A <sup>2</sup> s	0.05A <sup>2</sup> s	
Turn-on Voltage Threshold	4.19V	4.3V	4.5V	
Turn Off Voltage threshold	-	3.8V	4.49V	

- Notes:** 1. All tests are measured at  $V_{ref} = 2.5V$ .  
2. All specifications are typical at 25°C unless otherwise stated.

# NON-ISOLATED DC/DC CONVERTER

5V Input    Vref/2 / 5A Output



## Output Specifications

Parameter	Min	Typ	Max	Notes
Output Voltage Set Point	0.99* (Vref/2) V	Vref/2	1.01* (Vref/2) V	Vin=5V, Iout=full load.
Load Regulation	-	3mV	6mV	
Line Regulation	-	1mV	3mV	
Regulation Over Temperature (-40°C to +85°C)	-	15mV	20mV	
Output Current	0A	-	5A	
Output Current Threshold	6.5A	-	12.5A	
Short Circuit Surge Transient	-	0.04A <sup>2</sup> s	0.08A <sup>2</sup> s	
Ripple and Noise (RMS)	-	12mV	20mV	Tested at: 0-20MHz BW; with 1uF ceramic capacitor at the output
Ripple and Noise (pk-pk)	-	45mV	90mV	
Turn On Time	-	12mS	20mS	
Overshoot at Turn on	-	0%	5%	
Output Capacitance	-	-	2200uF	

- Notes:**
1. All specifications are typical at nominal input, full load at 25°C unless otherwise stated.
  2. The modules track the transient response of the reference input. See the figure in TR data on Page 3.
  3. The turn-off undershoot of the module is below 100mV if a 220uF aluminum cap is added at the output.
  4. All tests are measured at Vref=2.5V.

## General Specifications

Parameter	Min	Typ	Max	Notes
Efficiency	79%	82%	-	Measured at Vin=5V, full load
Switching Frequency	250KHz	300KHz	340KHz	
MTBF	8,841,119 hours			Calculated Per Bell Core TR-332 (Io =4A, Vin=5V, Vref=2.5V; Ta = 25°C)
Dimensions (surface mount)				
Inches (L x W x H)	0.78 x 0.7 x 0.32			
Millimeters (L x W x H)	19.812 x 17.78 x 8.128			
Dimensions (vertical)				
Inches (L x W x H)	0.7 x 0.308 x 0.65			
Millimeters (L x W x H)	17.78 x 7.82 x 16.51			
Weight	-	4.7g	-	

**Note:** All specifications are typical at nominal input, full load at 25°C unless otherwise stated. All tests are measured at Vref=2.5V

## Control Specifications

Parameter	Min	Typ	Max	Notes
<b>Remote On/Off</b>				
Signal Low (Unit Off)	-0.3V	-	1.35V (Vin=4.5V)	Remote on/off pin open, unit on
	-0.3V	-	1.65V (Vin=5.5V)	
Signal High (Unit On)	3.15 V(Vin=4.5V)	-	5.5V	
	3.85 V(Vin=5.5V)	-	5.5V	

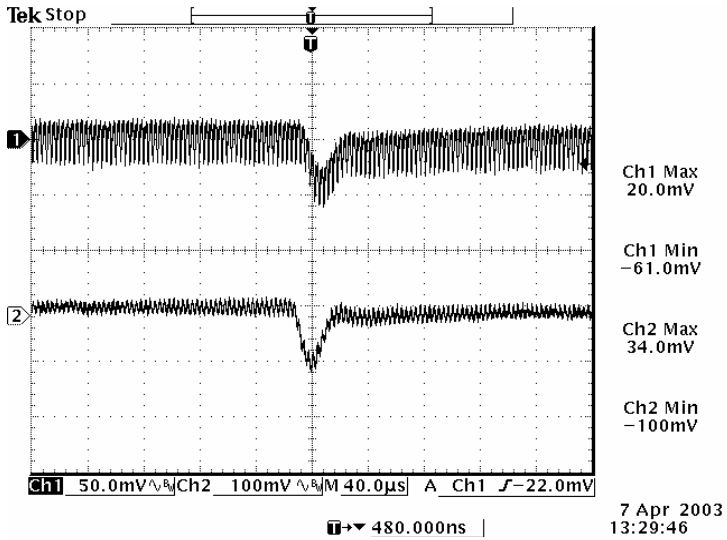
**Note:** All tests are measured at Vref=2.5V.

# NON-ISOLATED DC/DC CONVERTER

5V Input    Vref/2 / 5A Output



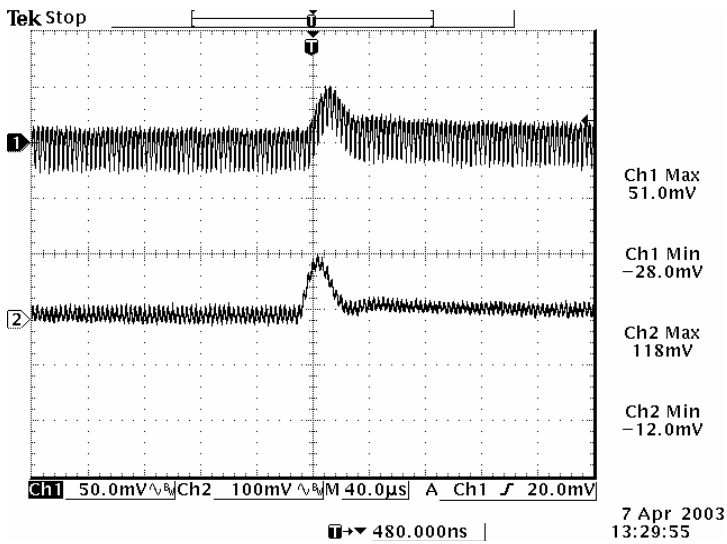
**Transient Response:** track the transient response of the reference input. No External Load Capacitance.



Channel 1: Transient response tracking.

Channel 2: Transient response of the reference input.

Ta = 25°C

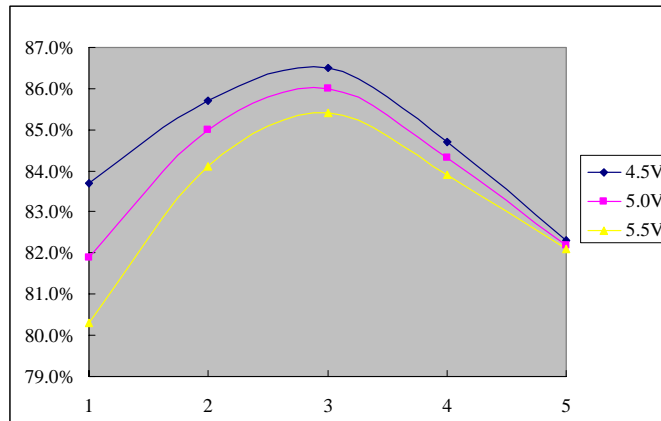


# NON-ISOLATED DC/DC CONVERTER

5V Input     $V_{ref}/2$  / 5A Output

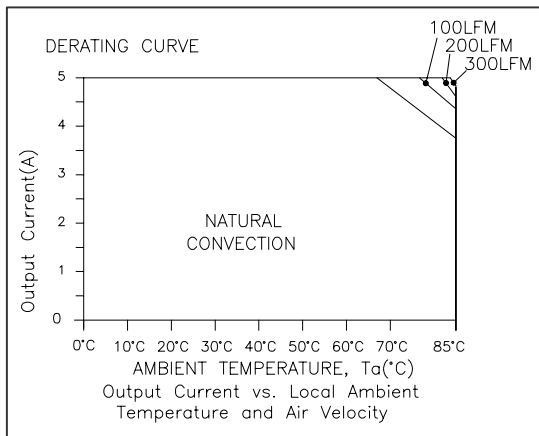


## Efficiency Data

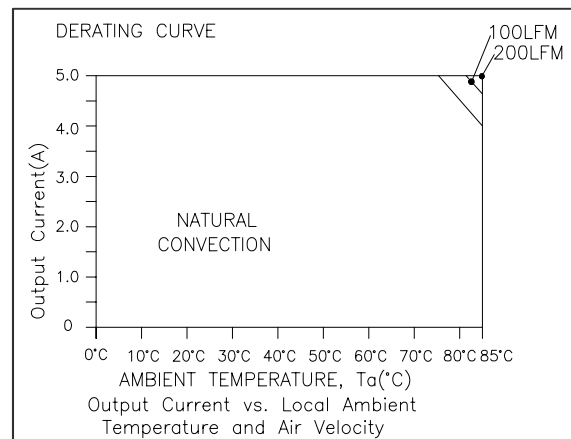


Efficiency is tested at  $V_{ref}=2.5V$ .

## Thermal Derating Curves



V7AH-05BT50



S7AH-05BT50

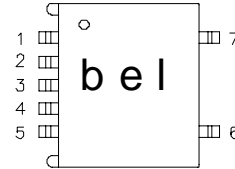
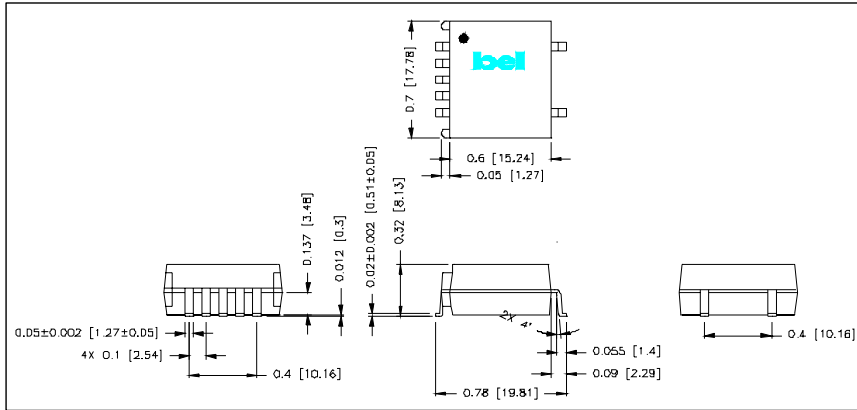
**Test Condition:** Derating curves are tested at nominal input voltage and  $V_{ref}=2.5V$ .

# NON-ISOLATED DC/DC CONVERTER

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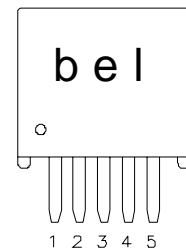
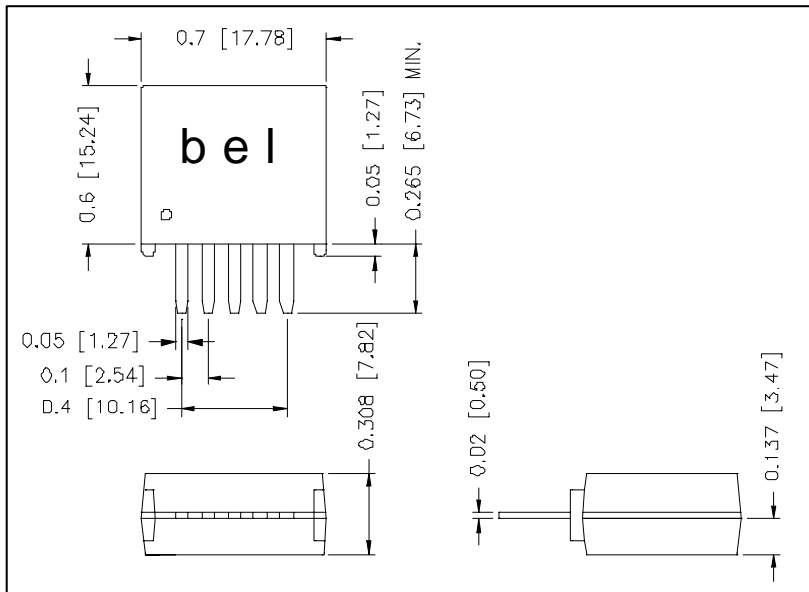
## S7AH-05BT50



### Pin Connections

Pin	Function
1	Remote On/Off (option)
2	Vin
3	Ground
4	Vout
5	Vref
6	N/A
7	N/A

## V7AH-05BT50



### Pin Connections

Pin	Function
1	Remote On/Off (option)
2	Vin
3	Ground
4	Vout
5	Vref

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