

# NON-ISOLATED DC/DC CONVERTERS

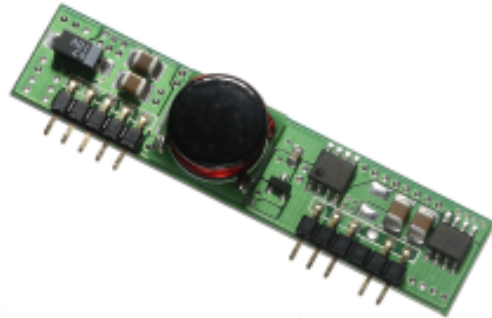
## 12V Input / 1.5 – 3.3V Output / 7A



BP01V7PC-07A

### V7PC-07A Series

- Nonisolated
- Industry standard pinout
- Fixed frequency
- High efficiency means less power dissipation
- Optimized for cost
- Remote on/off
- Undervoltage lockout
- Over current and short circuit protection



### Description

The Bel V7PC-07A series modules are non-isolated, step down DC/DC power converters that operate from a nominal 12V source. These converters are available in a range of output voltages from 1.5V to 3.3V. They are packaged in an industry standard single-in-line footprint and provide a maximum 7A output. Standard features include remote on/off, over current protection and output voltage adjust. Remote sense is an optional feature. These products may be used almost anywhere low-voltage silicon is employed and a 12V source is available. Typical applications include file servers, routers, line cards and other computing and communications equipment.

### Applications

- Telecommunications
- Networking
- Computers and peripherals

### Options

- Remote sense

### Part Number Selection

Output Voltage	Input Voltage	Max. Output Current	Max. Output Power	Typical Efficiency	Part Number	Part Number Remote Sense Option
3.3V	12V	7A	23W	88%	V7PC-07A330	V7PC-07A33S
2.5V	12V	7A	17.5W	86%	V7PC-07A250	V7PC-07A25S
1.5V	12V	7A	10.5W	80%	V7PC-07A150	V7PC-07A15S

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### Absolute Maximum Ratings

Parameter	Symbol	Min	Typical	Max	Unit
Continuous Input Voltage	V <sub>in</sub>	-0.3		15	V
Output Enable Terminal Voltage	V <sub>outen</sub>	-0.3		15	V
Ambient Temperature	T <sub>amb</sub>	0		70	°C
Storage Temperature	T <sub>stor</sub>	-40		100	°C

Note: Use beyond the maximum ratings may cause a reliability degradation of the DC/DC converter or may permanently damage the device.

### Input Specifications

Parameter	Symbol	Min	Typical	Max	Units
Operating Input Voltage	V <sub>in</sub>	10.8		13.2	V
Input Current	I <sub>in</sub>			3	A
No Load Input Current				50	mA
Remote Off Input Current			3	10	mA
Input Reflected Ripple Current <sup>1</sup>			19	40	mA <sub>rms</sub>
Input Reflected Ripple Current (P-P) <sup>1</sup>				150	mApk
I <sup>2</sup> t Inrush Current Transient			0.04	0.08	A <sup>2</sup> s
Turn On Voltage Threshold			9.7		V
Turn Off Voltage Threshold		8	8.8	10	V

Note: Input capacitance 470µF/16V, ESR = 0.03 Ω max at 100kHz @ 25° C.

1. With simulated source impedance of 500nH, 5Hz to 20MHz.

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### Output Specifications

Parameter	Module	Symbol	Min	Typical	Max	Units
Output Voltage Set Point <sup>1</sup>	3.3V 2.5V 1.5V	Vout	3.247 2.460 1.476	3.3 2.5 1.5	3.353 2.540 1.524	V
Load Regulation	3.3V 2.5V 1.5V			7 5 3	20 10 10	mV
Line Regulation	All			3	10	mV
Regulation Over Temperature 0° - 70° C	3.3V 2.5V 1.5V			5 5 5	45 35 20	mV
Total Output Voltage Regulation	3.3V 2.5V 1.5V			15 13 12	75 55 40	mV
Output Ripple and Noise <sup>2</sup>	All			50	100	mVp-p
Output Ripple and Noise <sup>2</sup>	All			15	25	mVrms
Output Current Range	All	Iout	0		7	A
Output DC Current Limit	All	Ioutlim	8.4		15.4	A
Short Circuit Surge	3.3V 2.5V 1.5V	Ioutsurge		0.4 0.9 1.6	1.0 2.0 2.5	A <sup>2</sup> s
Turn on Time	3.3V 2.5V 1.5V	Ton		20 40 100	40 60 120	ms
Overshoot at Turn On	All			0	3	%
Output Capacitance	All	Cout	470		2800	μF

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

1. Vin = 12V, Iout = full load, Ta = 25° C.

2. 0 - 20MHz BW, 0.1μF ceramic cap on output.

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## Output Specifications

Parameter	Module	Symbol	Min	Typical	Max	Units
<b>Transient Response <sup>3</sup></b>						
$\Delta V$ 50% to 100% of Max Load	3.3V			50	165	mV
Settling Time		Ts		30	100	$\mu s$
$\Delta V$ 100% to 50% of Max Load				50	165	mV
Settling Time		Ts		30	100	$\mu s$
<b>Transient Response <sup>3</sup></b>						
$\Delta V$ 50% to 100% of Max Load	2.5V			50	130	mV
Settling Time		Ts		30	100	$\mu s$
$\Delta V$ 100% to 50% of Max Load				50	130	mV
Settling Time		Ts		30	100	$\mu s$
<b>Transient Response <sup>3</sup></b>						
$\Delta V$ 50% to 100% of Max Load	1.5V			50	130	mV
Settling Time		Ts		30	100	$\mu s$
$\Delta V$ 100% to 50% of Max Load				50	130	mV
Settling Time		Ts		30	100	$\mu s$

Note: All specifications are typical at nominal input, full load at 25° C unless otherwise stated.  
 3. di/dt = 0.5A/ $\mu s$ , Vin = 12VDC, Ta = 25° C, and with a 470 $\mu F$  aluminum cap on output.

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### General Specifications

Parameter	Module	Symbol	Min	Typical	Max	Units
Efficiency <sup>1</sup>	3.3V 2.5V 1.5V	$\eta$	83 79 76	88 86 80		%
Switching Frequency	3.3V 2.5V 1.5V	Fsw	255 210 210	300 250 250	345 290 290	kHz
Output Voltage Trim Range	3.3V 2.5V 1.5V		70 80 90		110 110 110	%
Remote Sense Compensation	All				0.5	V
Weight	All			8.5		g

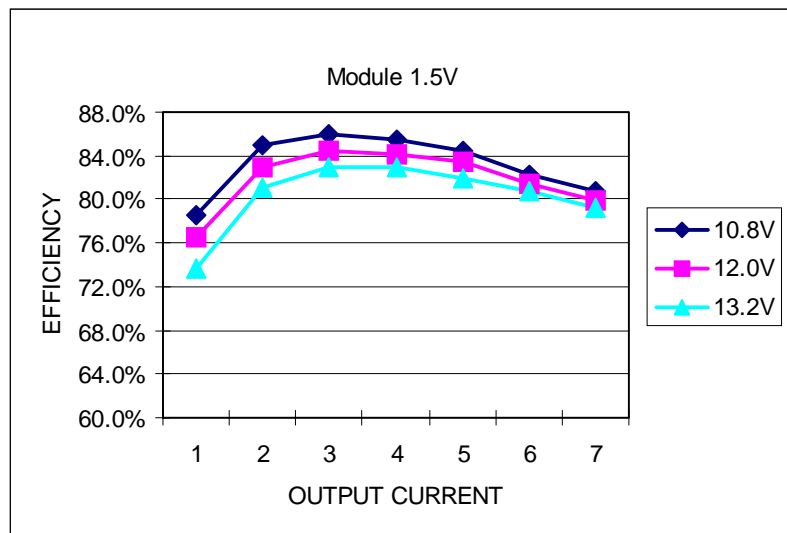
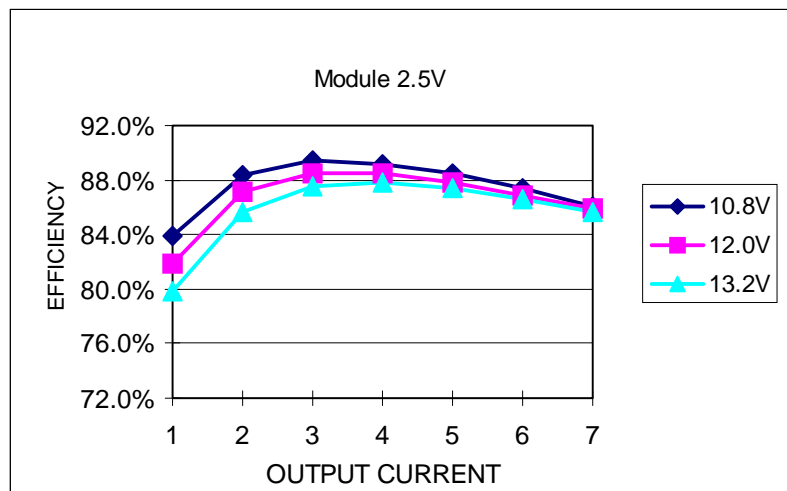
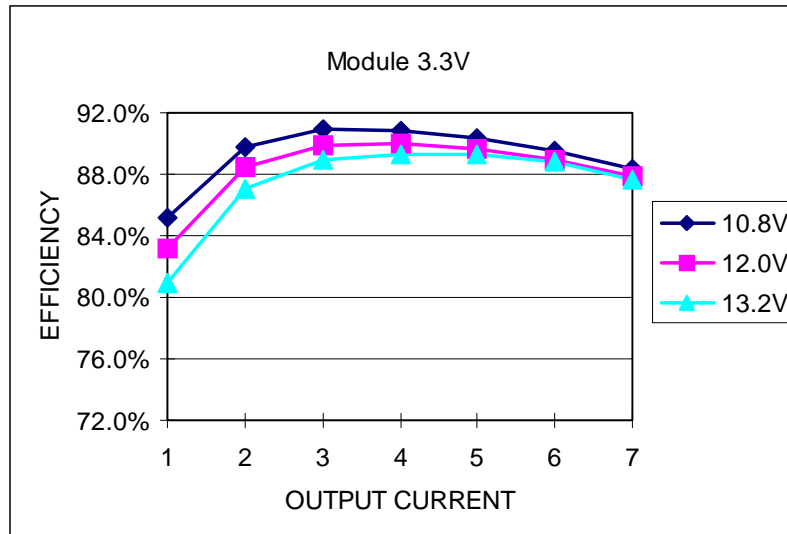
1. Vin=12V, full load and Ta=25° C.

### Control Specifications

Parameter	Module	Symbol	Min	Typical	Max	Units
Remote On/Off	All	Vouten				V
Signal Low (Unit Off)	All		-0.3		0.3	V
Signal High (Unit On)	All		2.8		13.2	V

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**Efficiency Data**



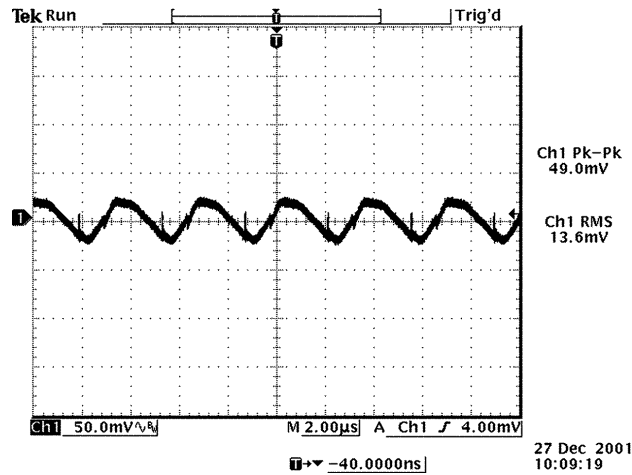
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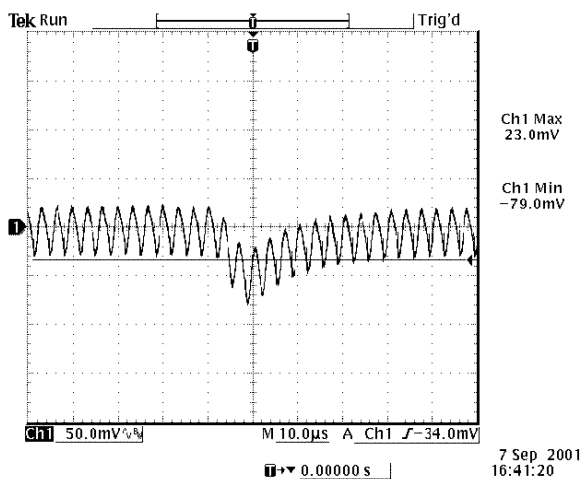
## Ripple and Noise



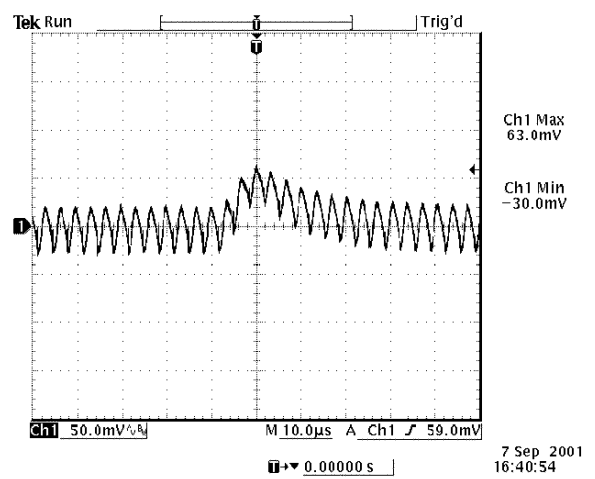
Ripple and noise at full load and 12Vdc input and Ta=25° C

## Transient Response

Transient response:  $di/dt = 0.5A/\mu S$ , external load capacitance  $C_o = 470\mu F$  (electrolytic)



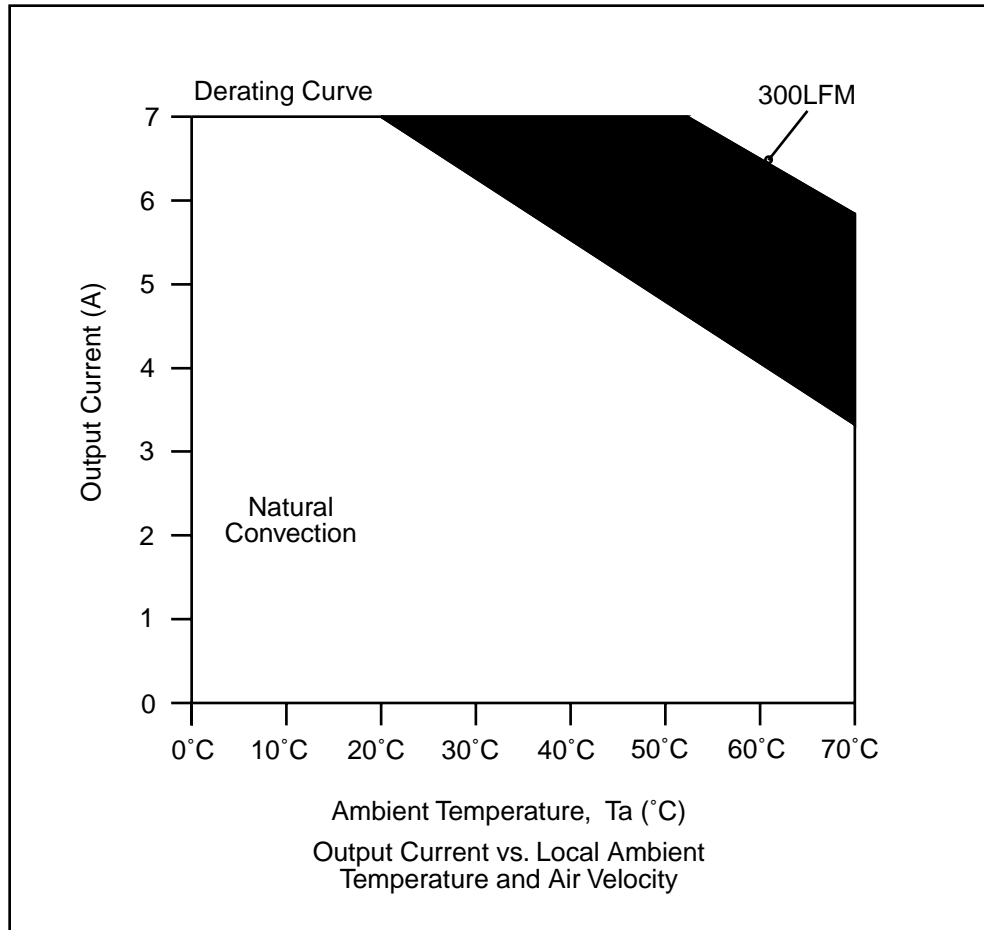
50% to 100% load transients at 12V input and Ta=25° C



100% to 50% load transients at 12V input and Ta=25° C

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### Thermal Considerations





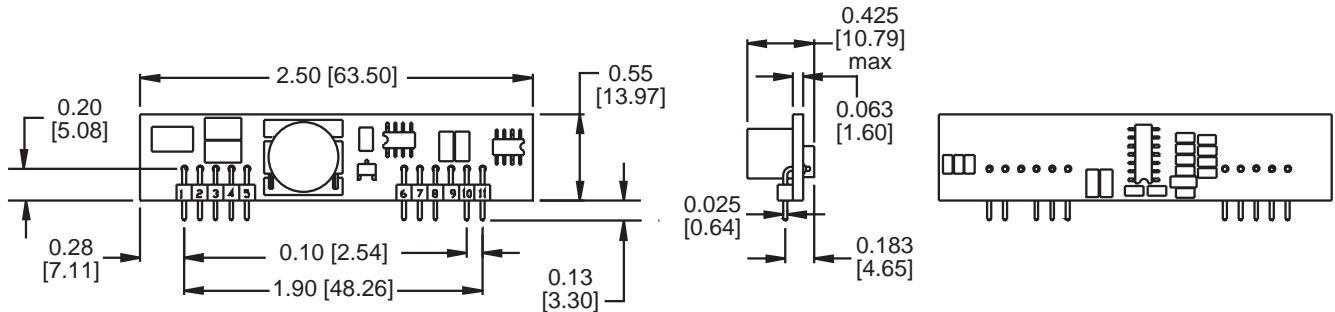
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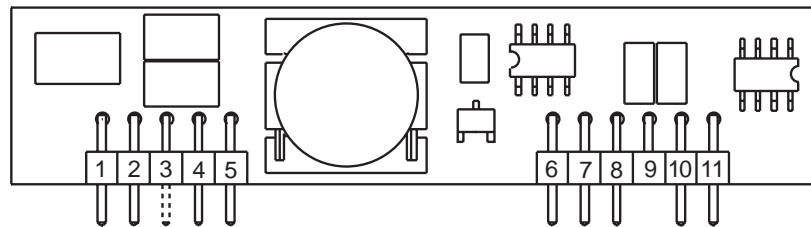
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### Mechanical



Dimensions are in inches [millimeters].  
Standard dimension tolerance is  $\pm 0.005$  [0.13] unless otherwise noted.

Pin	Function
1	+Vo
2	+Vo
3*	No Pin
4	+Vo
5	Ground
6	Ground
7	+Vin
8	+Vin
9	No Pin
10	Trim
11	Remote On/Off



\*Pin 3 used for remote sense option.

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