

# NON-ISOLATED DC/DC CONVERTERS

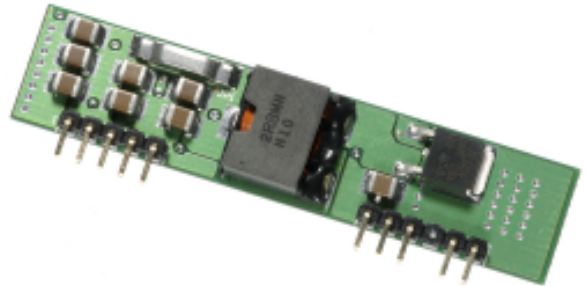
12V Input / 1.5 – 3.3V Output / 10A



BP01V7PC-10A

## V7PC-10A 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-10A 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 10A 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	10A	33W	91%	V7PC-10A330	V7PC-10A33S
2.5V	12V	10A	25W	89%	V7PC-10A250	V7PC-10A25S
1.5V	12V	10A	15W	85%	V7PC-10A150	V7PC-10A15S

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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>			3.8	A
No Load Input Current				50	mA
Remote Off Input Current			3	15	mA
Input Reflected Ripple Current <sup>1</sup>				50	mA <sub>rms</sub>
Input Reflected Ripple Current (P-P) <sup>1</sup>				180	mApk
I <sup>2</sup> t Inrush Current Transient			0.08	0.16	A <sup>2</sup> s
Turn On Voltage Threshold			9.7		V
Turn Off Voltage Threshold		8.0	8.8	10.0	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	Vout	3.247	3.3	3.353	V
	2.5V					
	1.5V					
Load Regulation	3.3V			7	16	mV
	2.5V			5	10	
	1.5V			3	10	
Line Regulation	All			3	10	mV
Regulation Over Temperature 0° - 70° C	3.3V			5	46	mV
	2.5V			5	35	
	1.5V			5	20	
Total Output Voltage Regulation	3.3V			15	72	mV
	2.5V			10	55	
	1.5V			10	40	
Output Ripple and Noise <sup>2</sup>	3.3V			55	100	mVp-p
	2.5V			50	100	
	1.5V			45	100	
Output Ripple and Noise <sup>2</sup>	3.3V			17	25	mVrms
	2.5V			15	25	
	1.5V			10	25	
Output Current Range	All	Iout	0		10	A
Output DC Current Limit	All	Ioutlim	13		22	A
Short Circuit Surge	3.3V	Ioutsurge		0.35	0.7	A <sup>2</sup> s
	2.5V			0.40	0.8	
	1.5V			0.35	0.7	
Turn on Time	All	Ton		50	80	ms
Overshoot at Turn On	All			0	3	%
Output Capacitance	All	Cout	100		3300	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			100	150	mV
Settling Time		Ts		40	70	$\mu s$
$\Delta V$ 100% to 50% of Max Load				100	150	mV
Settling Time		Ts		40	70	$\mu s$
<b>Transient Response <sup>3</sup></b>						
$\Delta V$ 50% to 100% of Max Load	2.5V			80	150	mV
Settling Time		Ts		30	70	$\mu s$
$\Delta V$ 100% to 50% of Max Load				80	150	mV
Settling Time		Ts		30	70	$\mu s$
<b>Transient Response <sup>3</sup></b>						
$\Delta V$ 50% to 100% of Max Load	1.5V			60	150	mV
Settling Time		Ts		30	70	$\mu s$
$\Delta V$ 100% to 50% of Max Load				60	150	mV
Settling Time		Ts		30	70	$\mu s$

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>	c	$\eta$	88 86 82	91 89 85		%
Switching Frequency	All	Fsw	180	200	220	kHz
Output Voltage Trim Range	3.3V 2.5V 1.5V		85 70 90		110 120 120	%
Remote Sense Compensation	All				0.5	V
Weight	All			9.5		g

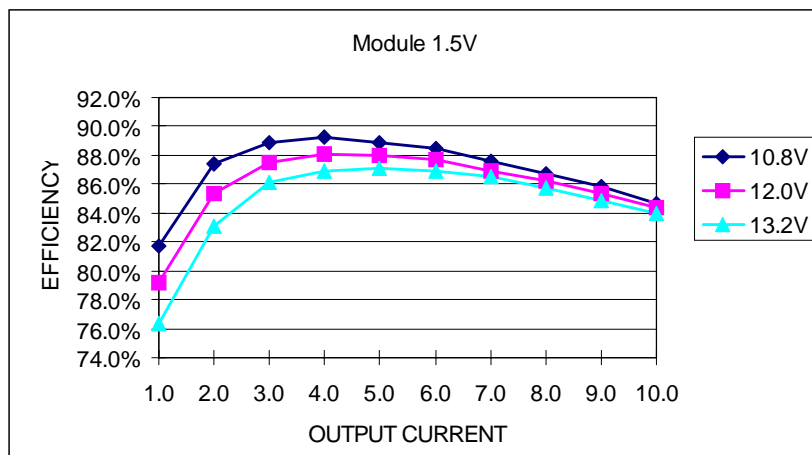
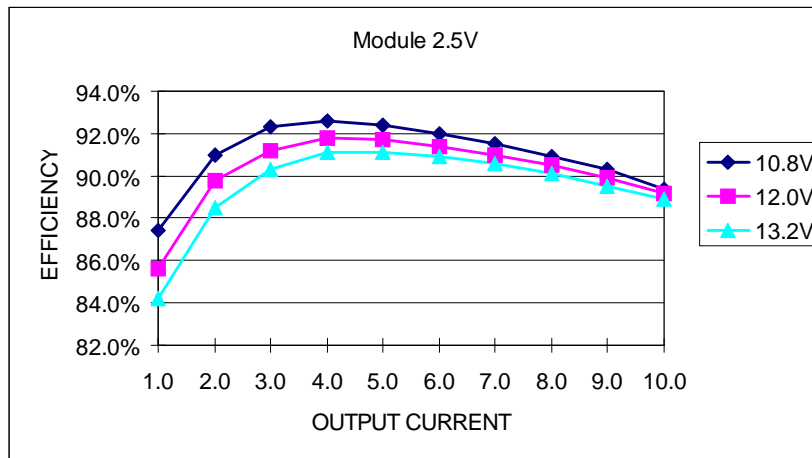
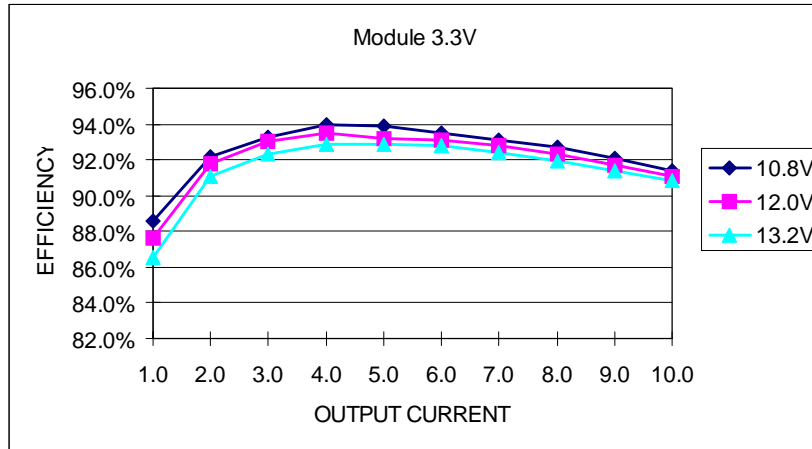
1. Vin=12V, full load and Ta=25° C.

### 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**



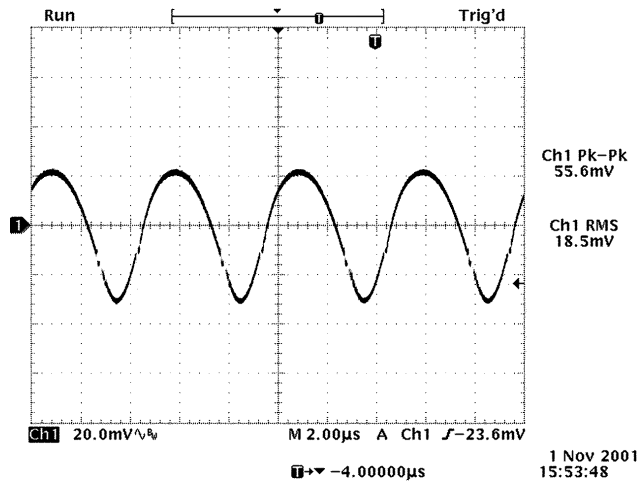
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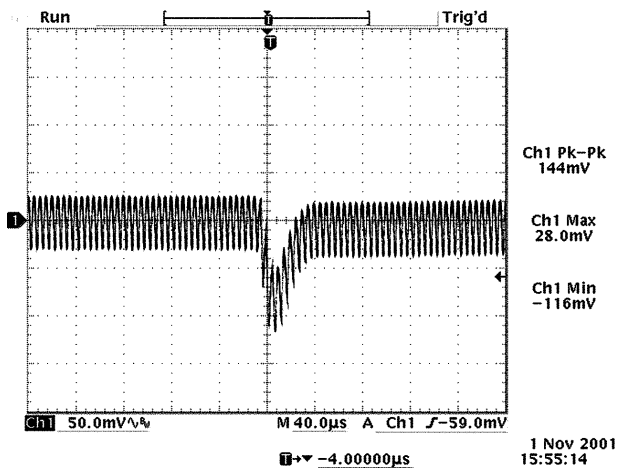
### Ripple and Noise



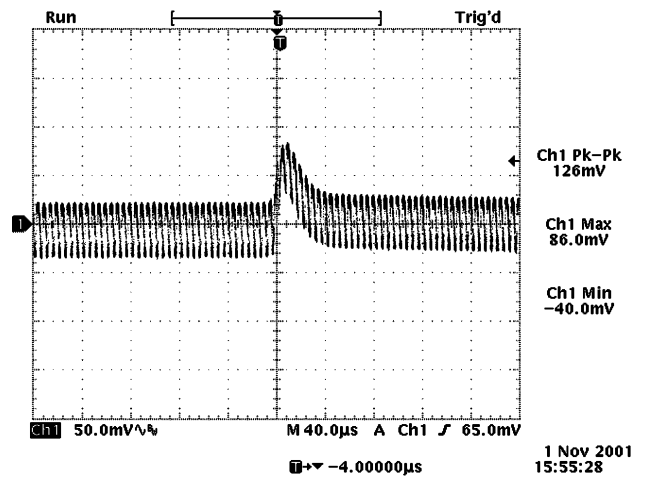
Ripple and noise at full load and 12Vdc input and  $T_a=25^\circ\text{C}$

### Transient Response

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



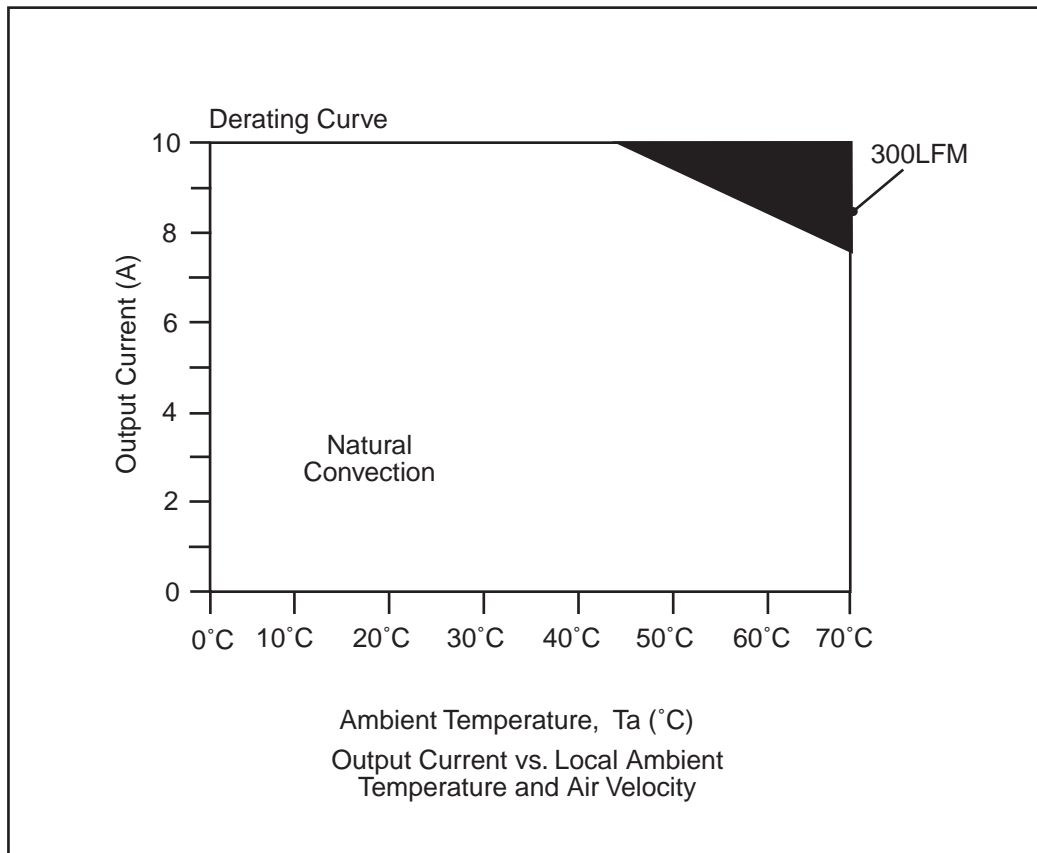
50% to 100% load transients at 12V input and  $T_a=25^\circ\text{C}$



100% to 50% load transients at 12V input and  $T_a=25^\circ\text{C}$

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### Thermal Considerations





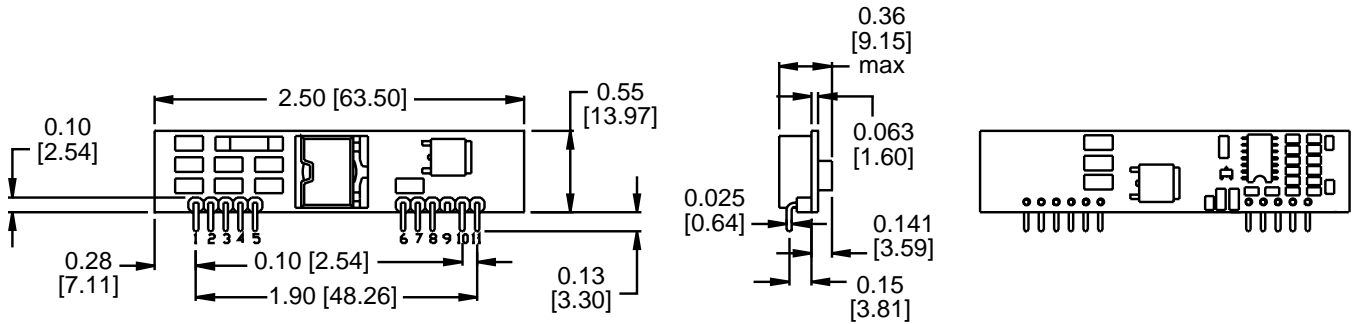
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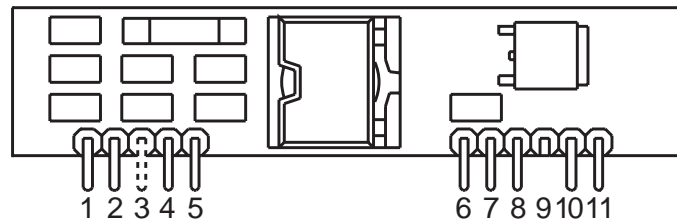
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### Mechanical



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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