

NON-ISOLATED DC/DC CONVERTERS

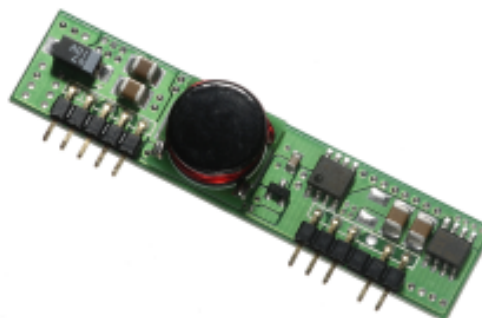
12V Input / 1.5 – 3.3V Output / 7A



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 _{in}	-0.3		15	V
Output Enable Terminal Voltage	V _{outen}	-0.3		15	V
Ambient Temperature	T _{amb}	0		70	°C
Storage Temperature	T _{stor}	-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 _{in}	10.8		13.2	V
Input Current	I _{in}			3	A
No Load Input Current				50	mA
Remote Off Input Current			3	10	mA
Input Reflected Ripple Current ¹			19	40	mA _{rms}
Input Reflected Ripple Current (P-P) ¹				150	mApk
I ² t Inrush Current Transient			0.04	0.08	A ² 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 ¹	3.3V 2.5V 1.5V	V _{out}	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 ²	All			50	100	mVp-p
Output Ripple and Noise ²	All			15	25	mVrms
Output Current Range	All	I _{out}	0		7	A
Output DC Current Limit	All	I _{outlim}	8.4		15.4	A
Short Circuit Surge	3.3V 2.5V 1.5V	I _{out} surge		0.4 0.9 1.6	1.0 2.0 2.5	A ² s
Turn on Time	3.3V 2.5V 1.5V	T _{on}		20 40 100	40 60 120	ms
Overshoot at Turn On	All			0	3	%
Output Capacitance	All	C _{out}	470		2800	μF

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

1. V_{in} = 12V, I_{out} = full load, T_a = 25° C.

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

Output Specifications

Parameter	Module	Symbol	Min	Typical	Max	Units
Transient Response ³						
ΔV 50% to 100% of Max Load	3.3V			50	165	mV
Settling Time		Ts		30	100	μs
ΔV 100% to 50% of Max Load				50	165	mV
Settling Time		Ts		30	100	μs
Transient Response ³						
ΔV 50% to 100% of Max Load	2.5V			50	130	mV
Settling Time		Ts		30	100	μs
ΔV 100% to 50% of Max Load				50	130	mV
Settling Time		Ts		30	100	μs
Transient Response ³						
ΔV 50% to 100% of Max Load	1.5V			50	130	mV
Settling Time		Ts		30	100	μs
ΔV 100% to 50% of Max Load				50	130	mV
Settling Time		Ts		30	100	μs

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

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General Specifications

Parameter	Module	Symbol	Min	Typical	Max	Units
Efficiency ¹	3.3V 2.5V 1.5V	η	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

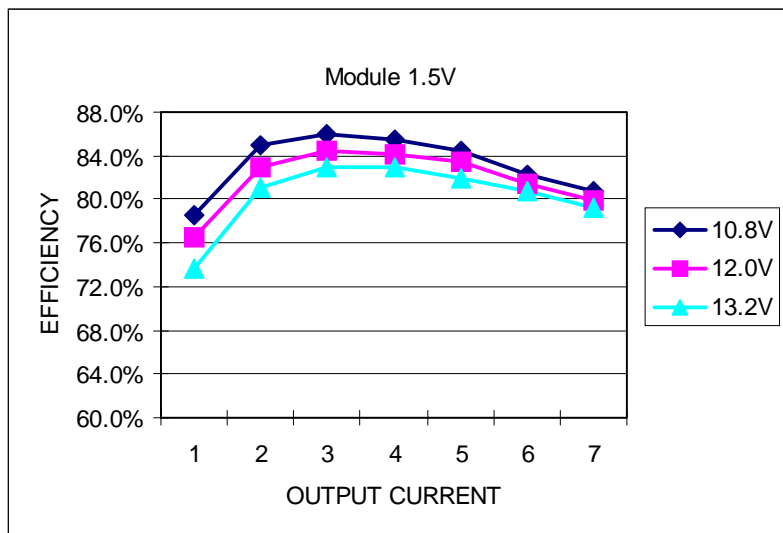
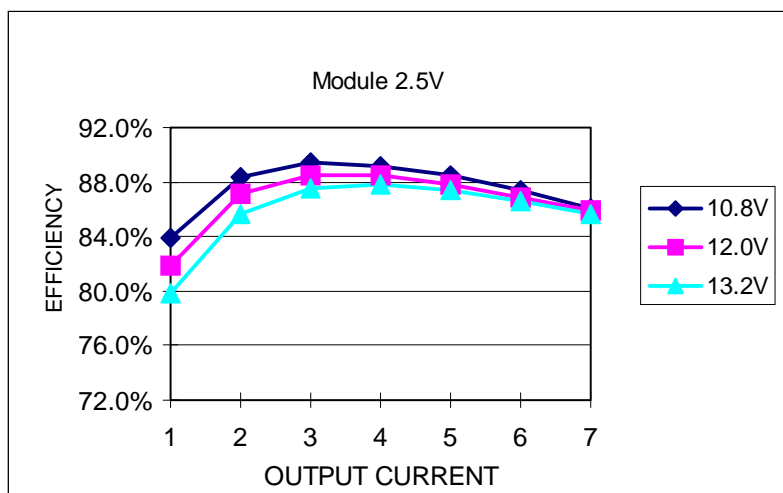
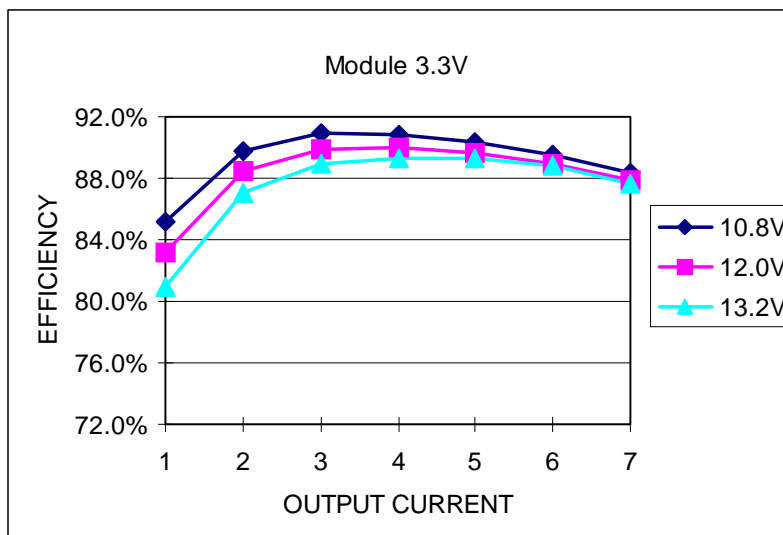
1. Vin=12V, full load and Ta=25° C.

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



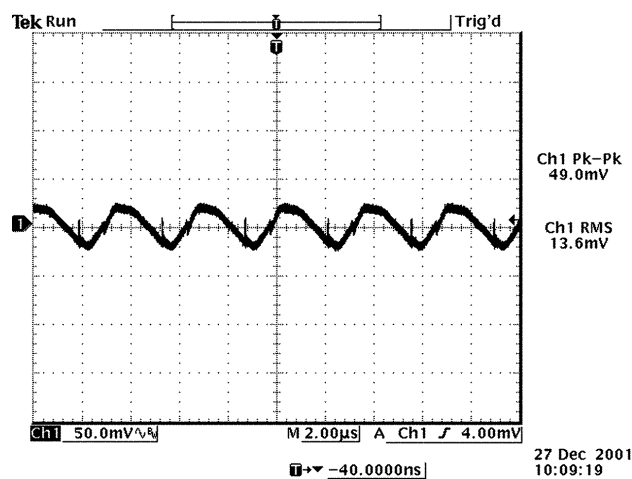
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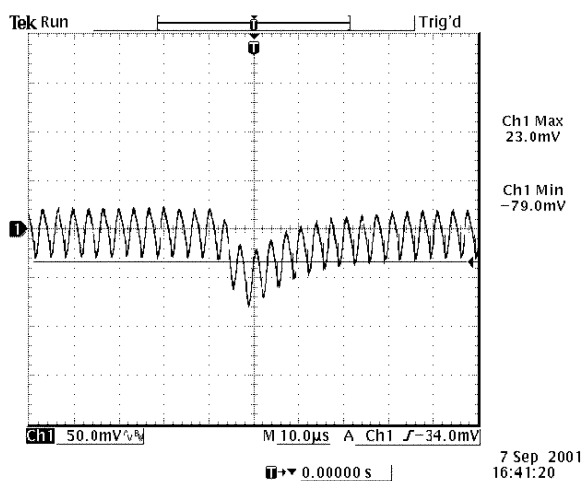
Ripple and Noise



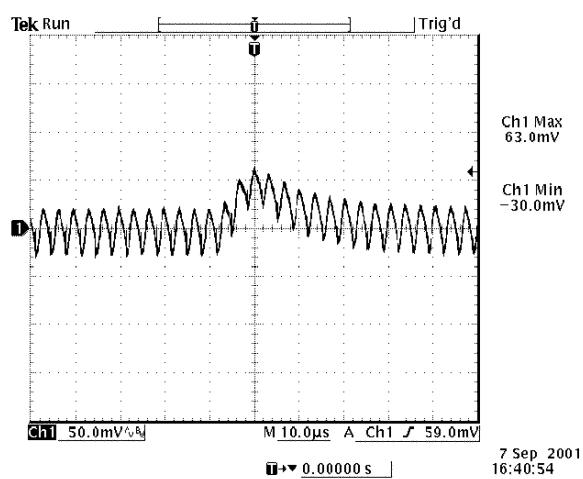
Ripple and noise at full load and 12Vdc input and $T_a=25^\circ\text{C}$

Transient Response

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

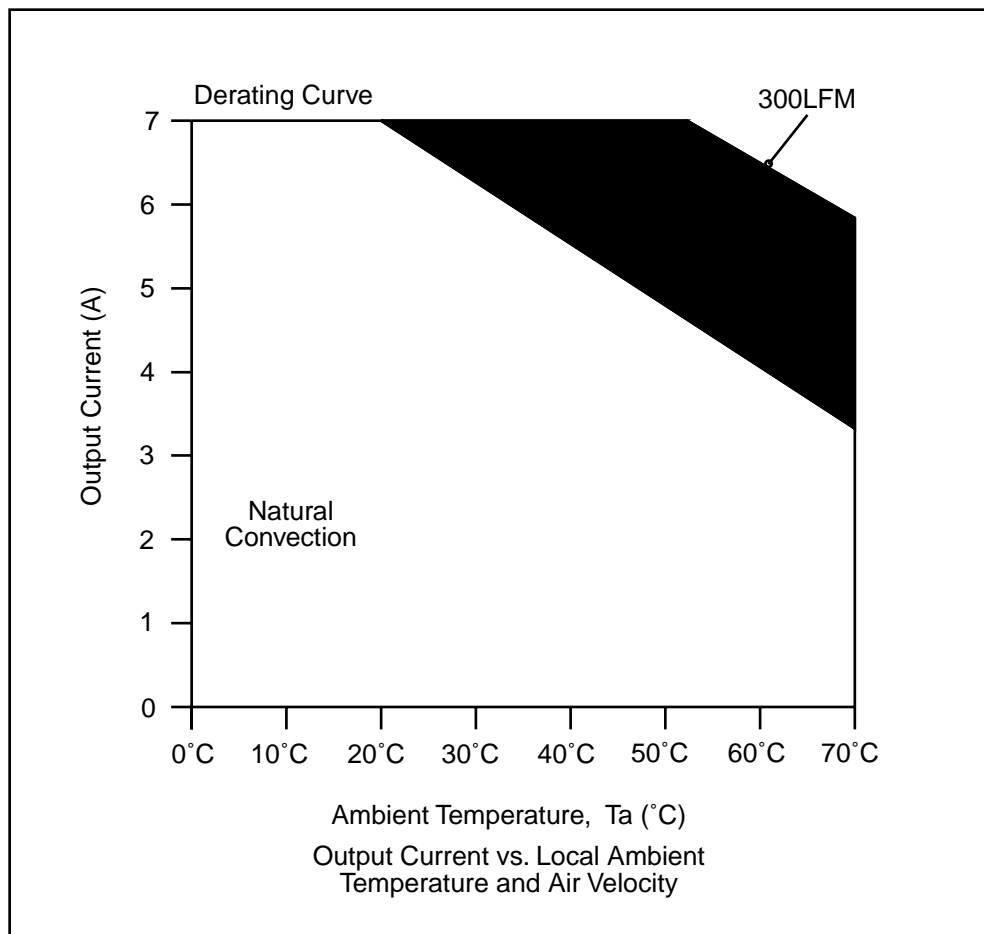


50% to 100% load transients at 12V input and $T_a=25^\circ\text{C}$



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

Thermal Considerations



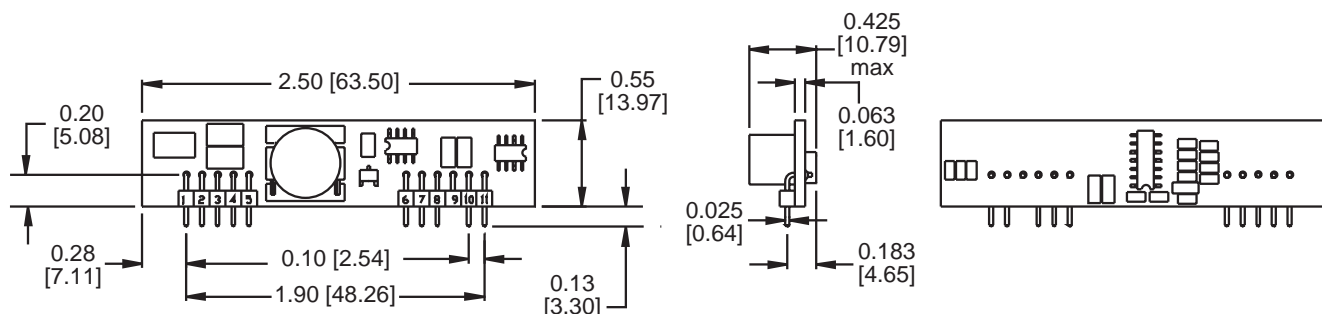
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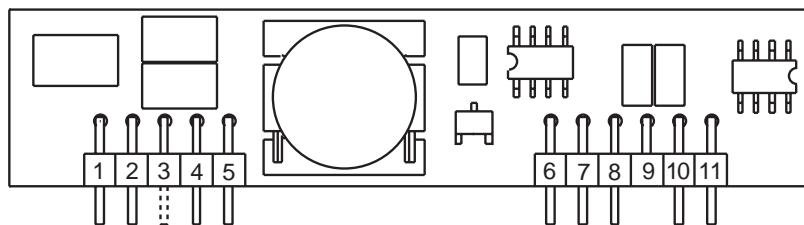
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Mechanical



Dimensions are in inches [millimeters].
Standard dimension tolerance is ± 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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