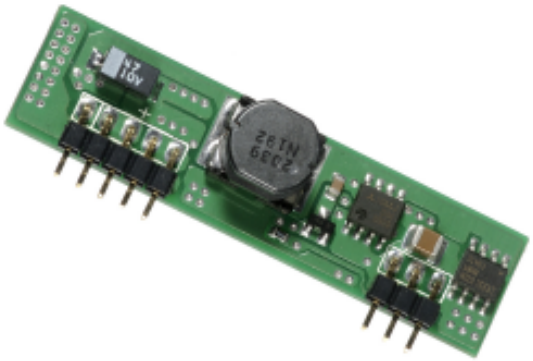
NON-ISOLATED DC/DC CONVERTERS
12V Input / 1.5 – 3.3V Output / 3A

bel POWER PRODUCTS

BP01V7PA-03A

V7PA-03A Series

- Nonisolated
- 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 V7PA-03A 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 a single-in-line footprint and provide a maximum 3A output. Standard features include remote on/off, over current protection and output voltage adjust. 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

Part Number Selection

Output Voltage	Input Voltage	Max. Output Current	Max. Output Power	Typical Efficiency	Part Number
3.3V	12V	3A	10W	89%	V7PA-03A330
2.5V	12V	3A	7.5W	86%	V7PA-03A250
1.5V	12V	3A	4.5W	82%	V7PA-03A150

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Absolute Maximum Ratings

Parameter	Symbol	Min	Typical	Max	Unit
Continuous Input Voltage	Vin	-0.3		15	V
Output Enable Terminal Voltage	Vouten	-0.3		15	V
Ambient Temperature	Tamb	0		70	°C
Storage Temperature	Tstor	-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	Vin	10.8		13.2	V
Input Current	Iin			1.3	A
No Load Input Current				50	mA
Remote Off Input Current			3	15	mA
Input Reflected Ripple Current[1]			20	30	mA_{rms}
Input Reflected Ripple Current (P-P)[1]			65	100	mApk
I^2t Inrush Current Transient			0.03	0.06	A^2s
Turn On Voltage Threshold			9.7		V
Turn Off Voltage Threshold		8	8.8	10	V

Note: Input capacitance 270µF/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	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	16 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 8 8	70 55 40	mV
Output Ripple and Noise[2]	All			70	100	mVp-p
Output Ripple and Noise[2]	All			19	25	mVrms
Output Current Range	All	Iout	0		3	A
Output DC Current Limit	All	Ioutlim	3.6		7.5	A
Short Circuit Surge	3.3V 2.5V 1.5V	Ioutsurge		0.005 0.012 0.017	0.010 0.024 0.034	A^2s
Turn on Time	All	Ton		40	60	ms
Overshoot at Turn On	All			0	3	%
Output Capacitance	All	Cout	220		1500	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
Transient Response[3]						
ΔV 50% to 100% of Max Load	3.3V			70	165	mV
Settling Time		Ts		60	100	µs
ΔV 100% to 50% of Max Load				70	165	mV
Settling Time		Ts		60	100	µs
Transient Response[3]						
ΔV 50% to 100% of Max Load	2.5V			58	165	mV
Settling Time		Ts		80	100	µs
ΔV 100% to 50% of Max Load				48	165	mV
Settling Time		Ts		80	100	µs
Transient Response[3]						
ΔV 50% to 100% of Max Load	1.5V			58	165	mV
Settling Time		Ts		50	100	µs
ΔV 100% to 50% of Max Load				46	165	mV
Settling Time		Ts		52	100	µs

Note: All specifications are typical at nominal input, full load at 25° C unless otherwise stated.
3. di/dt = 0.5A/uS, Vin = 12VDC, Ta = 25° C, and with a 220µF 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	86 83 79	89 86 82		%
Switching Frequency	3.3V 2.5V 1.5V	Fsw	255 255 195	300 300 230	345 345 265	kHz
Output Voltage Trim Range	3.3V 2.5V 1.5V		70 70 90		110 110 120	%
Remote Sense Compensation	All			N/A		V
Weight	All			6.3		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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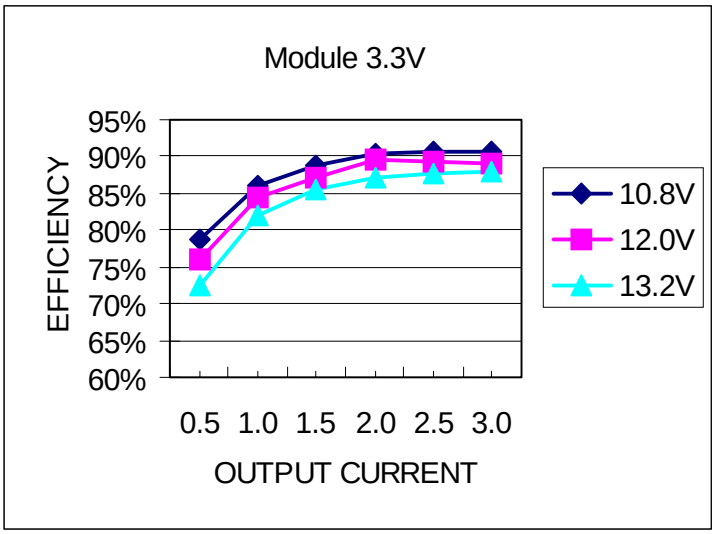
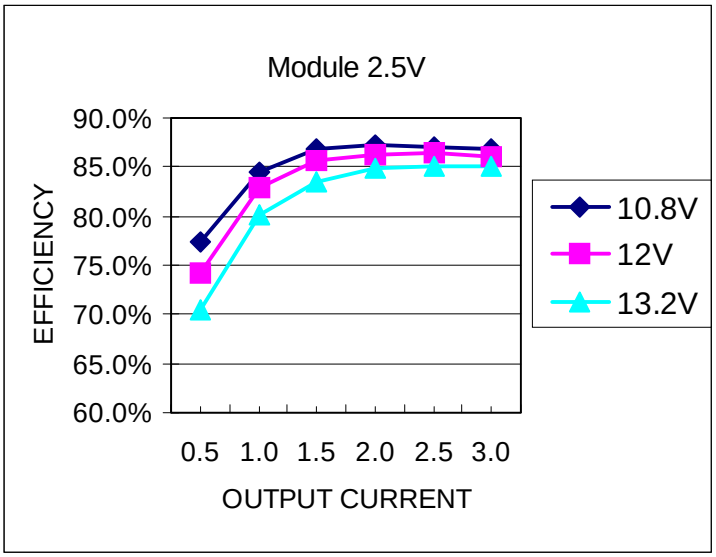
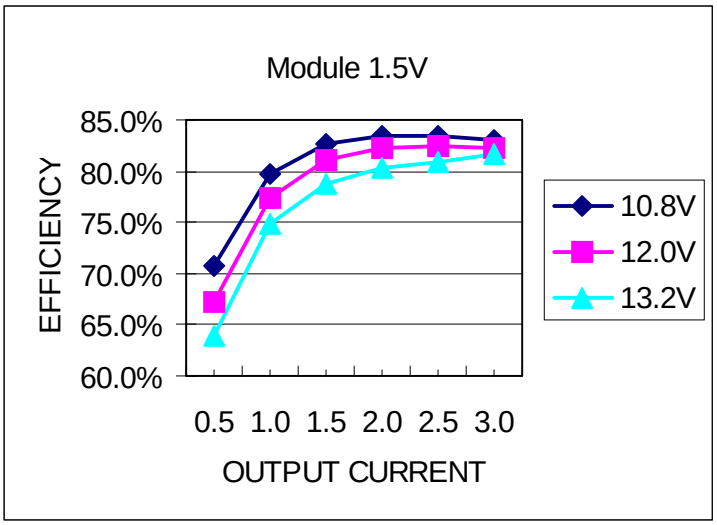
BP01V7PA-03A

Efficiency Data







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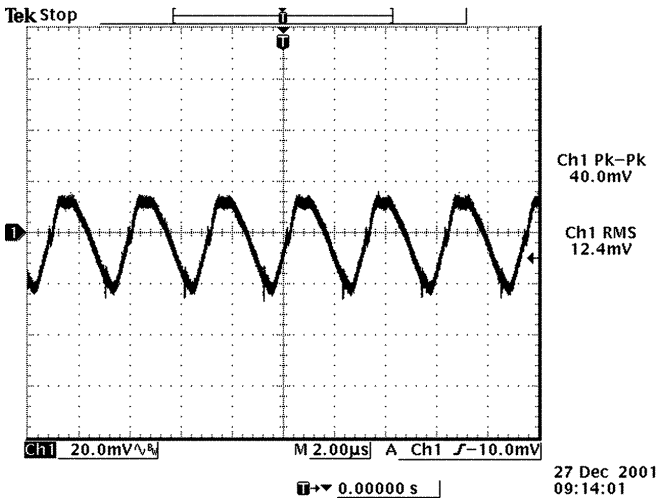
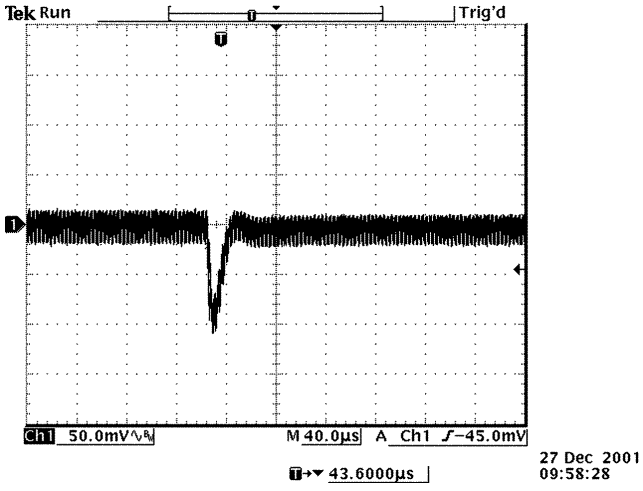
Ripple and Noise



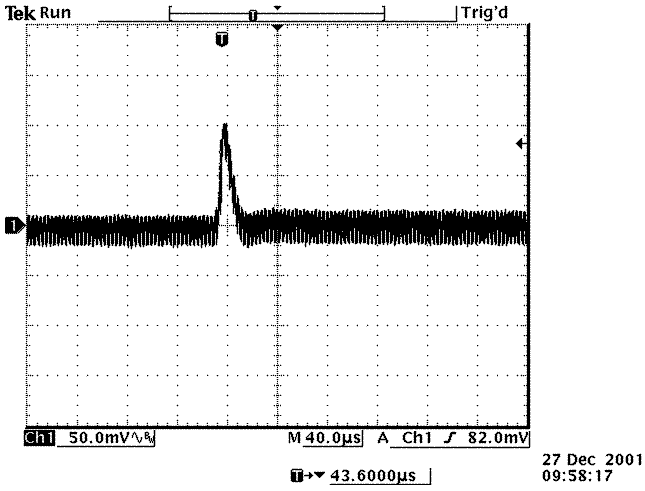
Ripple and noise at full load and 12Vdc input and Ta=25° C

Transient Response

Transient response: di/dt = 0.5A/µS, external load capacitance Co = 220µF (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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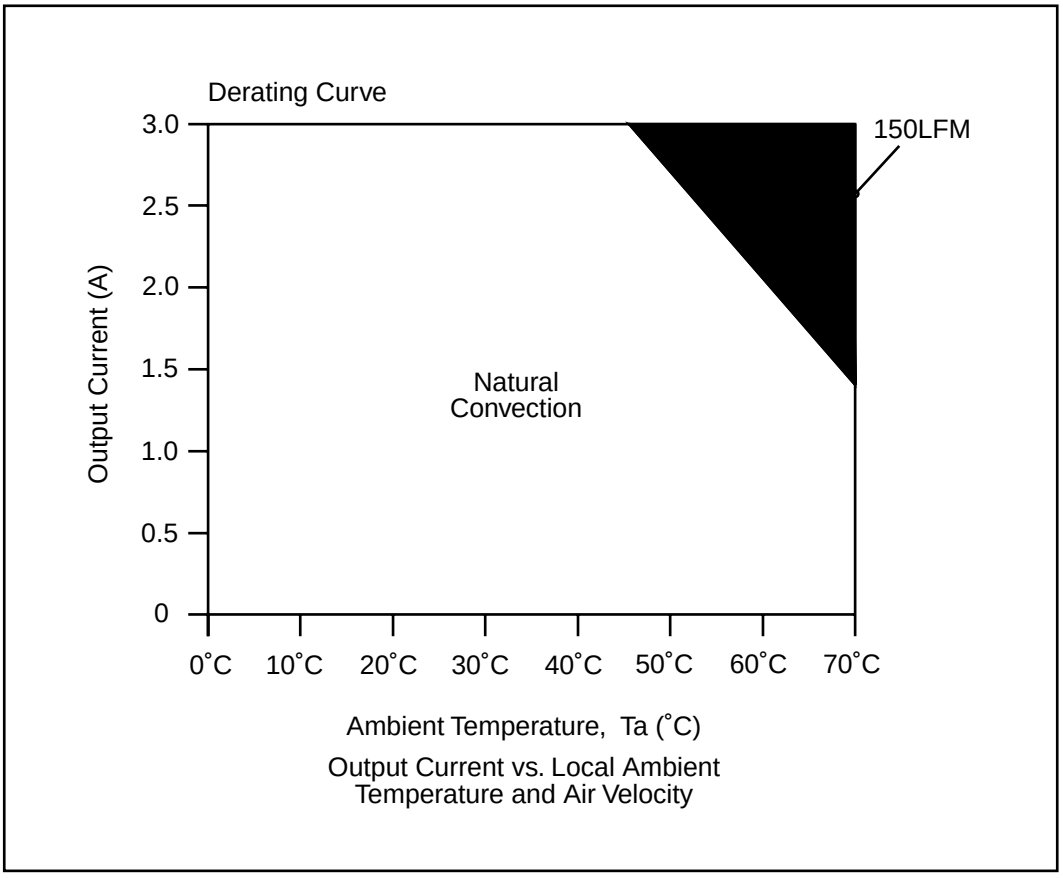
Thermal Considerations



Output Current vs. Local Ambient Temperature and Air Velocity

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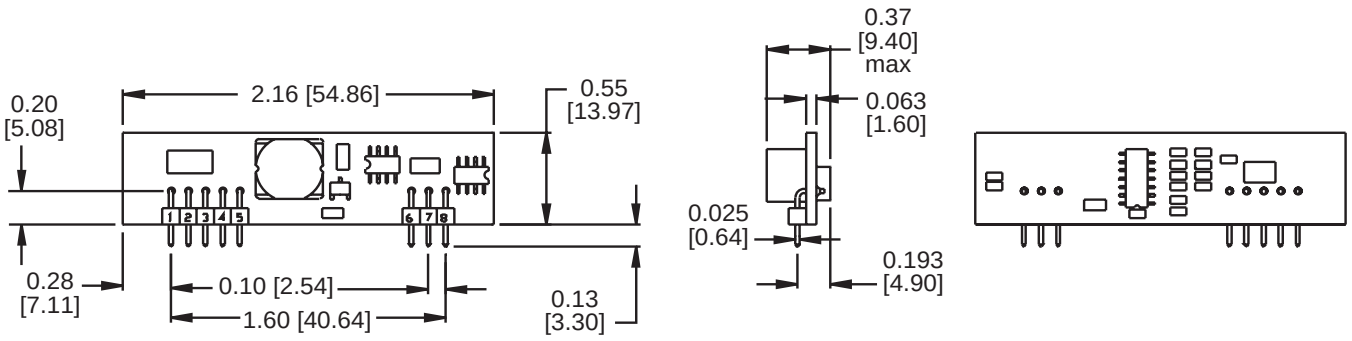
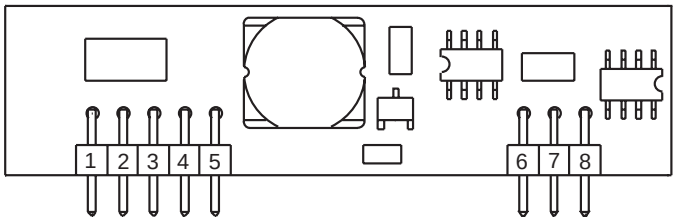
Mechanical



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

Pin	Function
1	Trim
2	+Vo
3	+Vo
4	Ground
5	Ground
6	Ground
7	+Vin
8	Remote On/Off



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