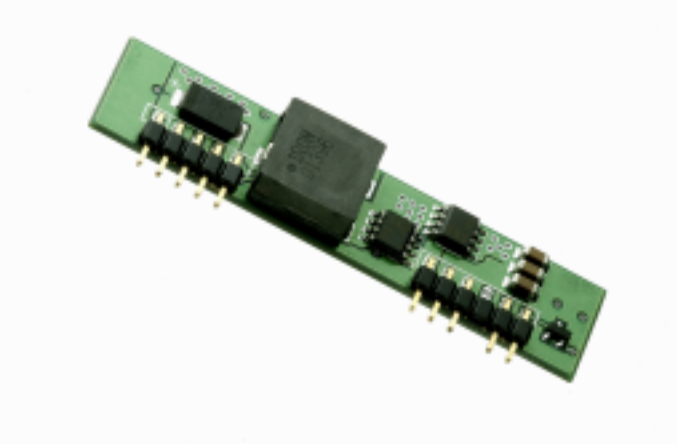
NON-ISOLATED DC/DC CONVERTERS
3.3V Input / 1.5 – 2.5V Output / 10A

bel POWER PRODUCTS

BP06VRPC-10C

VRPC-10C Series **RoHS Compliant**

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



Description

The Bel VRPC-10C series modules are non-isolated, DC/DC power converters that operate from a nominal 3.3V source. These converters are available in a range of output voltages from 1.5V to 2.5V. They are packaged in an industry standard single-in-line footprint with 10A maximum output. Standard features include remote on/off, over current and short circuit 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 3.3V 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
2.5V	3.3V	10A	25W	92%	VRPC-10C250	VRPC-10C25S
1.8V	3.3V	10A	18W	87%	VRPC-10C180	VRPC-10C18S
1.5V	3.3V	10A	15W	86%	VRPC-10C150	VRPC-10C15S

©2006 Bel Fuse Inc. Specifications subject to change without notice. 06.06

Absolute Maximum Ratings

Parameter	Symbol	Min	Typical	Max	Unit
Continuous Input Voltage	Vin	-0.3		4	V
Output Enable Terminal Voltage	Vouten	-0.3		4	V
Ambient Temperature	Tamb	0		70	°C
Storage Temperature	Tstor	-40		125	°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	3	3.3	3.6	V
Input Current	Iin			9.2	A
No Load Input Current				100	mA
Remote Off Input Current			10	22	mA
Input Reflected Ripple Current[1]			20	40	mA_{rms}
Input Reflected Ripple Current (P-P)[1]			90	150	mApk
I^2t Inrush Current Transient			0.02	0.05	A^2s
Turn On Voltage Threshold			2.85		V
Turn Off Voltage Threshold			2.3		V

Note: Input capacitance 2 x 270µF/16V, ESR = 0.03 Ω max at 100kHz @ 25° C.
1. With simulated source impedance of 500nH, 5Hz to 20MHz.

©2006 Bel Fuse Inc. Specifications subject to change without notice. 06.06

Output Specifications

Parameter	Module	Symbol	Min	Typical	Max	Units
Output Voltage Set Point[1]	2.5V 1.8V 1.5V	Vout	2.45 1.76 1.47	2.5 1.8 1.5	2.55 1.84 1.53	V
Load Regulation	2.5V 1.8V 1.5V			7.5 5.4 4.5	12.5 9.0 7.5	mV
Line Regulation	2.5V 1.8V 1.5V			3 2.5 2	7.5 5.4 4.5	mV
Regulation Over Temperature 0° - 70° C	2.5V 1.8V 1.5V			12 10 7	30 20 15	mV
Total Output Voltage Regulation	2.5V 1.8V 1.5V				50 34.4 27	mV
Output Ripple and Noise[2]	All			70	100	mVp-p
Output Ripple and Noise[2]	All			18	25	mVrms
Output Current Range	All	Iout	0		10	A
Output DC Current Limit	All	Ioutlim	13		25	A
Short Circuit Surge	2.5V 1.8V 1.5V	Ioutsurge		0.15 0.27 0.27	0.2 0.5 0.5	A^2s
Turn on Time	All	Ton		10	20	ms
Overshoot at Turn On	All				3	%
Output Capacitance	All	Cout	0		4000	µF

Note: All specifications are typical at nominal input, full load at 25° C unless otherwise stated.
1. Vin = 3.3V, Iout = full load, Ta = 25° C.
2. 0 - 20MHz BW, 0.1µF ceramic cap on output.

©2006 Bel Fuse Inc. Specifications subject to change without notice. 06.06

Output Specifications

Parameter	Module	Symbol	Min	Typical	Max	Units
Transient Response [3]						
ΔV 50% to 100% of Max Load	2.5V			100	150	mV
Settling Time		Ts		35	50	µs
ΔV 100% to 50% of Max Load				100	150	mV
Settling Time		Ts		35	50	µs
Transient Response [3]						
ΔV 50% to 100% of Max Load	1.8V			100	150	mV
Settling Time		Ts		35	50	µs
ΔV 100% to 50% of Max Load				100	150	mV
Settling Time		Ts		35	50	µs
Transient Response [3]						
ΔV 50% to 100% of Max Load	1.5V			100	150	mV
Settling Time		Ts		35	50	µs
ΔV 100% to 50% of Max Load				100	150	mV
Settling Time		Ts		35	50	µs

Note: All specifications are typical at nominal input, full load at 25° C unless otherwise stated.
3. di/dt = 0.5A/uS, Vin = 3.3VDC, Ta = 25° C, and with a 470µF aluminum cap on output.

©2006 Bel Fuse Inc. Specifications subject to change without notice. 06.06

General Specifications

Parameter	Module	Symbol	Min	Typical	Max	Units
Efficiency[1]	2.5V 1.8V 1.5V	η	88 84 82	92 87 86		%
Switching Frequency	All	Fsw	250	300	340	kHz
Output Voltage Trim Range[2]	2.5V 1.8V 1.5V		90 90 90		105 110 110	%
Remote Sense Compensation	2.5V 1.8V 1.5V				5 10 10	%
Weight	All			8.3		g

1. Vin=3.3V, full load and Ta=25° C.
2. Total adjustment of trim, setpoint and remote sense combined should not exceed 5% @nominal Vin, 25° C ambient for the 2.5V output module.

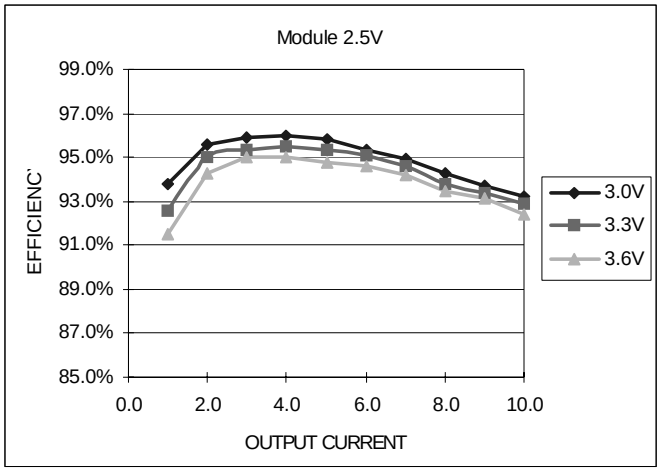
Control Specifications

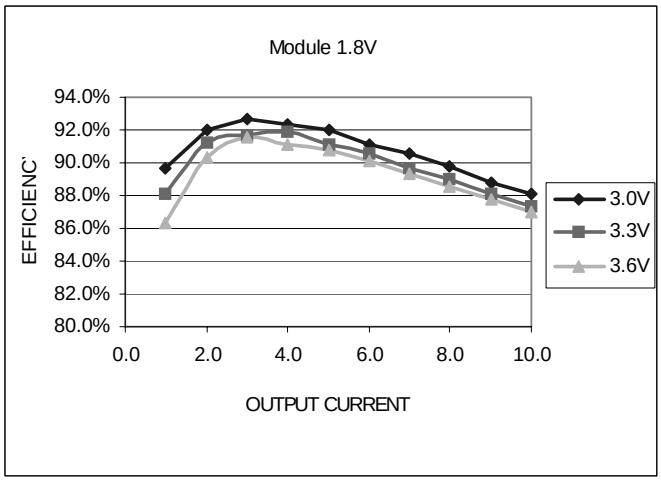
Parameter	Module	Symbol	Min	Typical	Max	Units
Remote On/Off	All	Vouten				V
Signal Low (Unit Off)	All		-0.3		0.3	V
Signal High (Unit On)	All		2.8		4	V

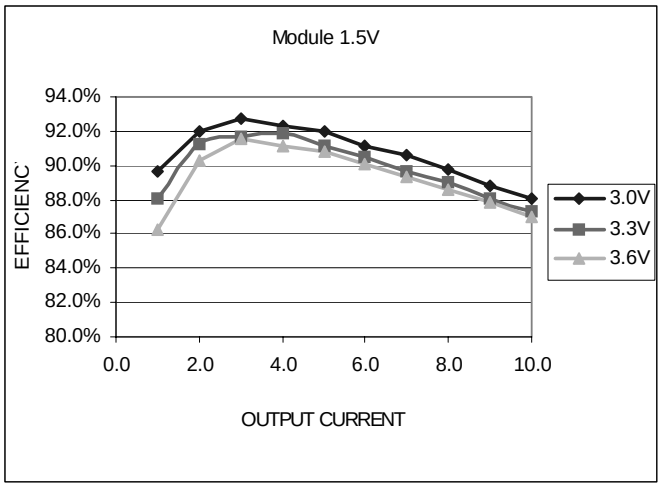
©2006 Bel Fuse Inc. Specifications subject to change without notice. 06.06

BP06VRPC-10C

Efficiency Data







©2006 Bel Fuse Inc. Specifications subject to change without notice. 06.06

CORPORATE

Bel Fuse Inc.
206 Van Vorst Street
Jersey City, NJ 07302
Tel 201-432-0463
Fax 201-432-9542
www.belfuse.com

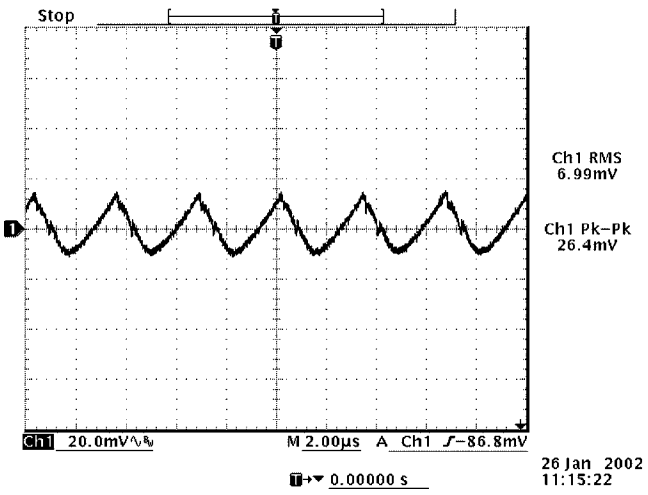
FAR EAST

Bel Fuse Ltd.
8F / 8 Luk Hop Street
San Po Kong
Kowloon, Hong Kong
Tel 852-2328-5515
Fax 852-2352-3706
www.belfuse.com

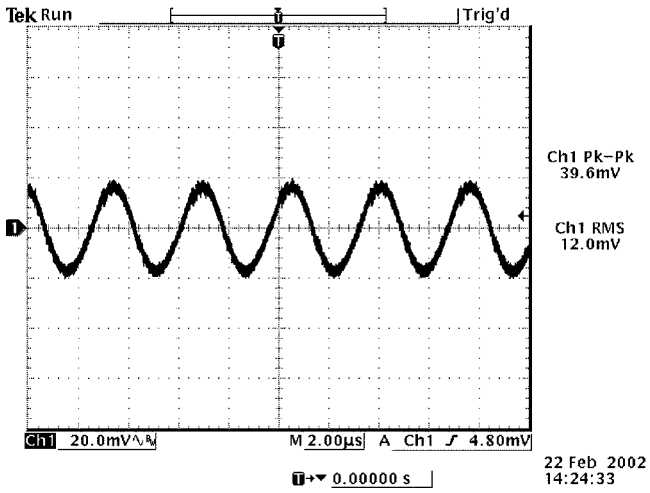
EUROPE

Bel Fuse Europe Ltd.
Preston Technology Management Centre
Marsh Lane, Suite G7, Preston
Lancashire, PR1 8UD, U.K.
Tel 44-1772-556601
Fax 44-1772-888366
www.belfuse.com

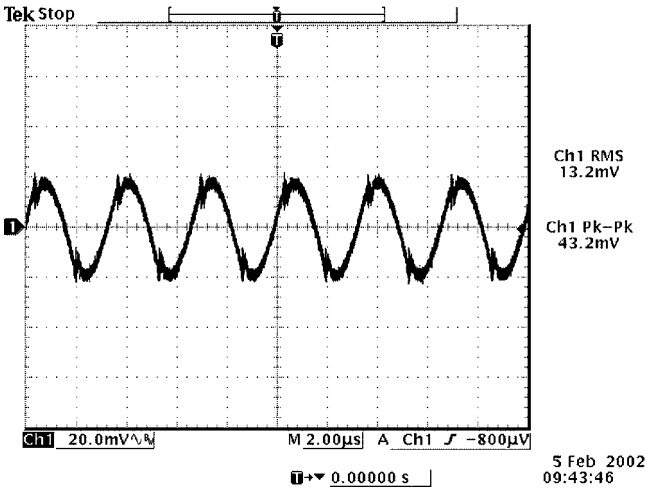
Ripple and Noise



Ripple and noise at full load and 3.3Vdc input, 2.5V output and Ta=25° C



Ripple and noise at full load and 3.3Vdc input, 1.8V output and Ta=25° C



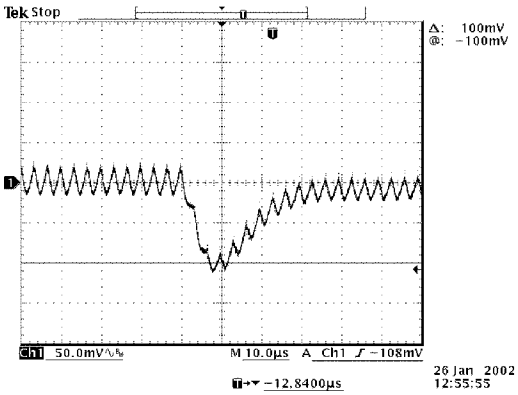
Ripple and noise at full load and 3.3Vdc input, 1.5V output and Ta=25° C

©2006 Bel Fuse Inc. Specifications subject to change without notice. 06.06

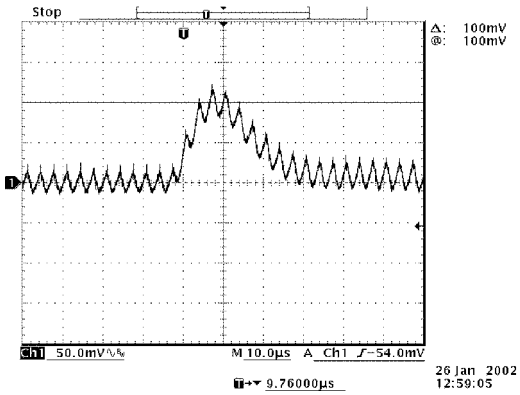
BP06VRPC-10C

Transient Response

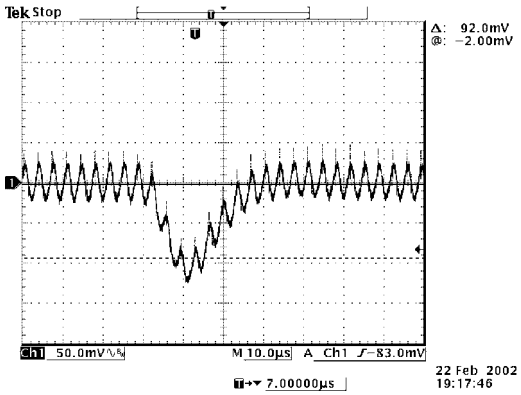
Transient response: di/dt = 0.5A/µS, external load capacitance Co = 470µF (electrolytic)



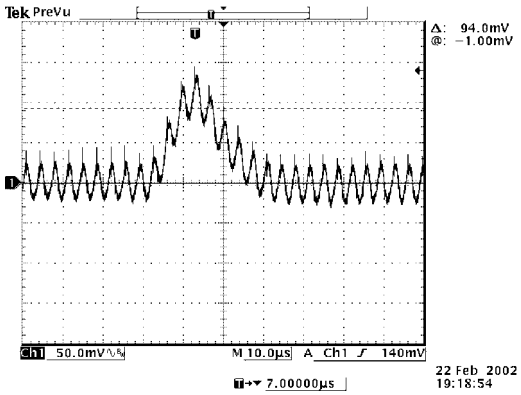
Vout=2.5V
50% to 100% load transients at 3.3V input and Ta=25° C



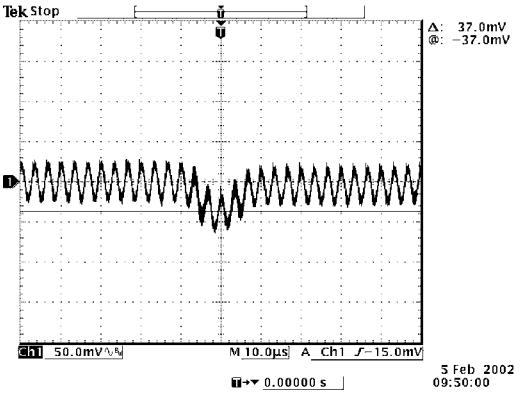
Vout=2.5V
100% to 50% load transients at 3.3V input and Ta=25° C



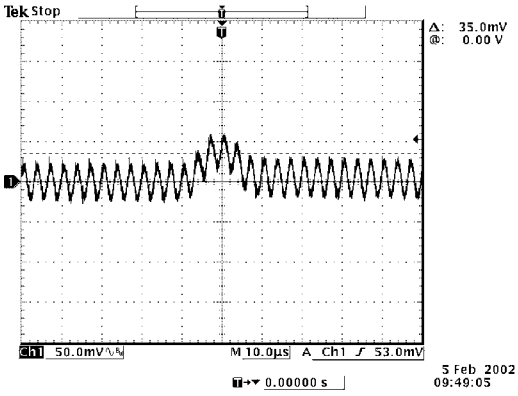
Vout=1.8V
50% to 100% load transients at 3.3V input and Ta=25° C



Vout=1.8V
100% to 50% load transients at 3.3V input and Ta=25° C



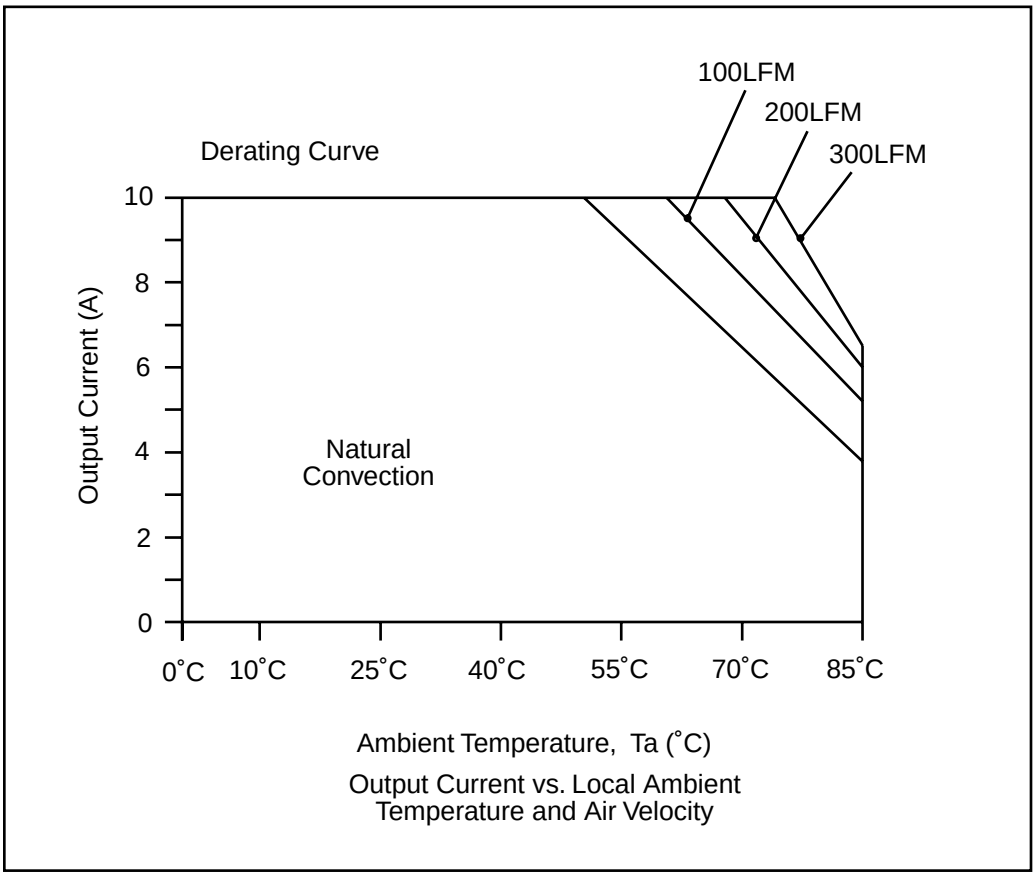
Vout=1.5V
50% to 100% load transients at 3.3V input and Ta=25° C



Vout=1.5V
100% to 50% load transients at 3.3V input and Ta=25° C

©2006 Bel Fuse Inc. Specifications subject to change without notice. 06.06

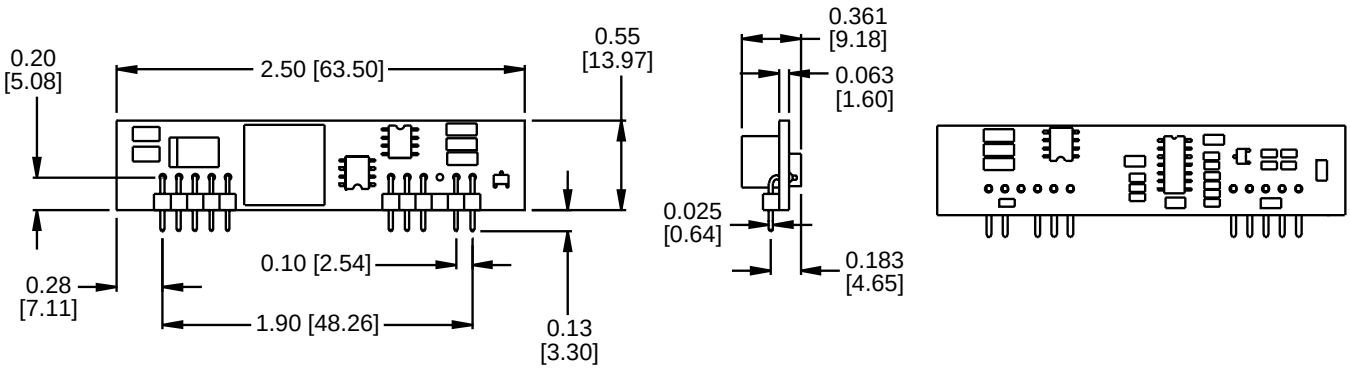
Thermal Considerations



Output Current vs. Local Ambient Temperature and Air Velocity

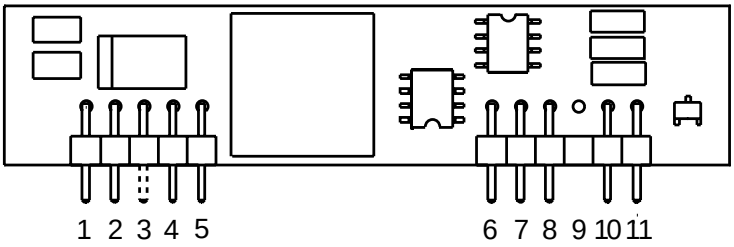
©2006 Bel Fuse Inc. Specifications subject to change without notice. 06.06

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.

RoHS Compliance
Complies with the European Directive 2002/95/EC, calling for the elimination of lead and other hazardous substances from electronic products.

©2006 Bel Fuse Inc. Specifications subject to change without notice. 06.06

CORPORATE

Bel Fuse Inc.
206 Van Vorst Street
Jersey City, NJ 07302
Tel 201-432-0463
Fax 201-432-9542
www.belfuse.com

FAR EAST

Bel Fuse Ltd.
8F / 8 Luk Hop Street
San Po Kong
Kowloon, Hong Kong
Tel 852-2328-5515
Fax 852-2352-3706
www.belfuse.com

EUROPE

Bel Fuse Europe Ltd.
Preston Technology Management Centre
Marsh Lane, Suite G7, Preston
Lancashire, PR1 8UD, U.K.
Tel 44-1772-556601
Fax 44-1772-888366
www.belfuse.com