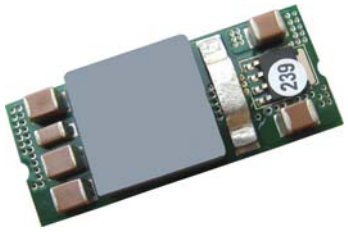
NON-ISOLATED DC/DC CONVERTERS

4.5 Vdc - 14 Vdc Input 0.75 Vdc - 3.63 Vdc/16 A Output

SRBC-16E2Ax RoHS Compliant Rev.A

- Non-Isolated
- High Efficiency
- High Power Density
- Excellent Thermal Performance
- Low Cost
- Flexible Output Voltage Sequencing (option)
- Able to Sink & Source Current
- Industrial Temperature Range
- Under-voltage Lockout (UVLO)
- Over Temperature Protection
- OCP/SCP
- Wide Input
- Wide Trim
- Remote On/Off
- Active Low/High (option)
- Remote Sense



Description

The Bel SRBC-16E2Ax is part of the non-isolated dc/dc converter series. The modules use a SMT package. These converters are available in a range of output voltages from 0.75 Vdc to 3.63 Vdc over a wide range of input voltage (Vin = 4.5 Vdc - 14 Vdc). The Bel SRBC-16E2Ax has a sequencing feature that enables designers to implement various types of output voltage sequencing when powering. The efficiency is typically 92% at 3.3 Vdc output at full load.

Part Selection

Output Voltage	Input Voltage	Max. Output Current	Max. Output Power	Typical Efficiency	Model Number Active Low	Model Number Active High
0.75 V - 3.63 V	4.5 V - 14 V	16 A	58 W	92%	SRBC-16E2AL	SRBC-16E2A0

Notes: 1. All part numbers above indicate RoHS 6. Change the second letter "R" to "7" for RoHS 5 part numbers.
2. Add “G” suffix at the end of the model number to indicate Tray Packaging.

Absolute Maximum Ratings

Parameter	Min	Typ	Max	Notes
Input Voltage (continuous)	-0.3 V	-	15 V	
Output Enable Terminal Voltage	-0.3 V	-	15 V	
Sequencing Voltage [1]	-0.3 V	-	Vin	
Ambient Temperature	-40 °C	-	85 °C	
Storage Temperature	-55 °C	-	125 °C	

Notes: All specifications are typical at 25 °C unless otherwise stated.
1. SRBC-16E2Ax series of modules include a sequencing feature that enables users to implement various types of output voltage sequencing in their applications. This is accomplished via an additional sequencing pin. When not using the sequencing feature, either, tie the SEQ pin to Vin or leave it unconnected.

Input Specifications

Parameter	Min	Typ	Max	Notes
Input Voltage Vo,set < 3.0 V Vo,set ≥ 3.0 V	 4.5 V Vo,set +1.5 V	 - -	 14 V 14 V	
Input Current (full load)	-	-	15 A	
Input Current (no load)	-	100 mA	-	
Remote Off Input Current	-	2 mA	-	
Input Reflected Ripple Current (pk-pk)	-	-	400 mA	Tested with one 1000 uF/25 V AL input capacitor with ESR=0.03 ohm max and 6 × 47 uF/16 V tantalum capacitors with ESR=0.013 ohm max at 100 kHz, & simulated source impedance of 1000 nH, 5 Hz to 20 MHz.
Input Reflected Ripple Current (rms)	-	-	150 mA	
I^2t Inrush Current Transient	-	0.2 A^2s	0.4 A^2s	
Turn-on Voltage Threshold	-	4.2 V	-	
Turn-off Voltage Threshold	3.7 V	-	4.2 V	

Output Specifications

Parameter	Min	Typ	Max	Notes
Output Voltage Set Point	-2% Vo,set	-	2% Vo,set	Vin=12 V, full load
Load Regulation	-	0.1% Vo,set	-	Io=Iomin to Iomax
Line Regulation	-	0.1% Vo,set	-	Vin=Vinmin to Vinmax
Regulation Over Temperature (-40 °C to +85 °C)	-	0.3% Vo,set	-	Tref=Tamin to Tamax
Output Current	0 A	-	16 A	
Current Limit Threshold	-	180% Io	-	
Short Circuit Surge Transient	-	1 A^2s	3 A^2s	
Ripple and Noise (pk-pk)	-	30 mV	75 mV	Tested with 0-20 MHz, 10 uF tantalum capacitor & 1 uF TDK ceramic capacitor at the output
Ripple and Noise (rms)	-	12 mV	30 mV	
Turn on Time	-	12 mS	20 mS	
Overshoot at Turn on	-	-	1% Vo,set	
Output Capacitance	-	-	5000 uF	
Transient Response				
50% ~ 100% Max Load	All	-	150 mV	-	di/dt=2.5 A/uS; Vin=12 V; and with 2 × 150 uF polymer capacitors at the output
Settling Time		-	50 uS	-	
100% ~ 50% Max Load		-	150 mV	-	
Settling Time		-	50 uS	-	

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

General Specifications

Parameter	Min	Typ	Max	Notes
Efficiency				
Vo=3.3 V	-	92%	-	Measured at Vin=12 V, full load
Vo=2.5 V	-	90%	-	
Vo=1.8 V	-	88%	-	
Vo=1.5 V	-	87%	-	
Vo=1.2 V	-	85%	-	
Vo=0.75 V	-	79%	-	
Efficiency				
Vo=3.3 V	-	92%	-	Measured at Vin=5 V, full load
Vo=2.5 V	-	90%	-	
Vo=1.8 V	-	87%	-	
Vo=1.5 V	-	86%	-	
Vo=1.2 V	-	83%	-	
Vo=0.75 V	-	78%	-	
Switching Frequency	200 kHz	230 kHz	260 kHz	
Over Temperature Shutdown[1]	-	130 °C	-	
Output Trim Range (Wide Trim)	0.7525 V	-	3.63 V	
Remote Sense Compensation	-	-	0.5 V	
MTBF	2,666,488 hours			Calculated Per Bell Core SR-332 (I_O =80% Iomax; Vo=3.3 V; Vin=12 V; T_a = 25 °C)
Dimensions				
Inches (L × W × H)	1.30 x 0.53 x 0.315			
Millimeters (L × W × H)	33.02 x 13.46 x 8.00			
Weight	-	8 g	-	

Note: All specifications are typical at 25 °C unless otherwise stated.

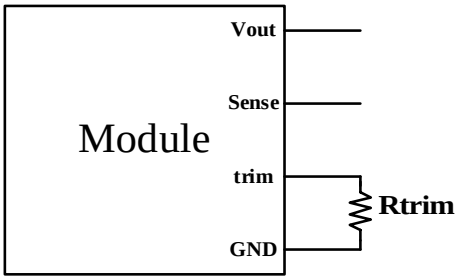
Control Specifications

Parameter	Min	Typ	Max	Notes
Remote On/Off				
Signal Low (Unit Off)	-0.2 V	-	0.3 V	SRBC-16E2A0; Remote On/Off pin open, Unit on.
Signal High (Unit On)	-	-	Vin, max	
Signal Low (Unit On)	-0.2 V	-	0.3 V	SRBC-16E2AL; Remote On/Off pin open, Unit on.
Signal High (Unit Off)	2.5 V	-	Vin, max	
Voltage Sequencing				
Sequencing Delay Time	25 mS	-	-	Delay from Vinmin to application of voltage on SEQ pin
Sequencing Slew Rate Capability	-	-	2 V/mS	Vinmin to Vinmax; Iomin to Iomax; Vseq<Vo
Tracking Accuracy				
Power-Up	-	100 mV	200 mV	
Power-Down	-	200 mV	400 mV	

Output Trim Equations

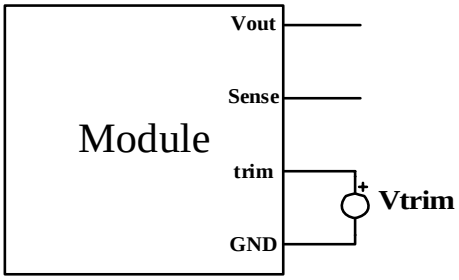
Equation for calculating the trim resistor (in Ω) given the desired output voltage (Vo) is shown below. The Trim Up resistor should be connected between the Trim pin and Ground.

$$R_{trimup} = \frac{10500}{Vo - 0.7525} - 1000$$

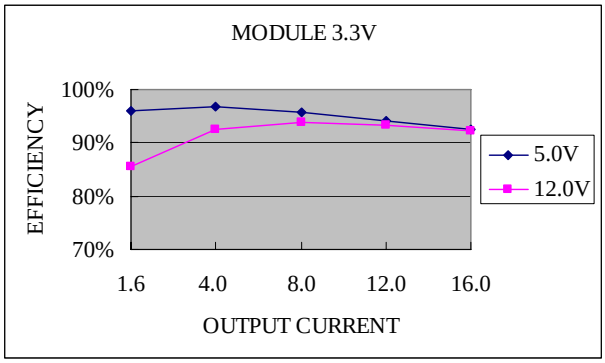


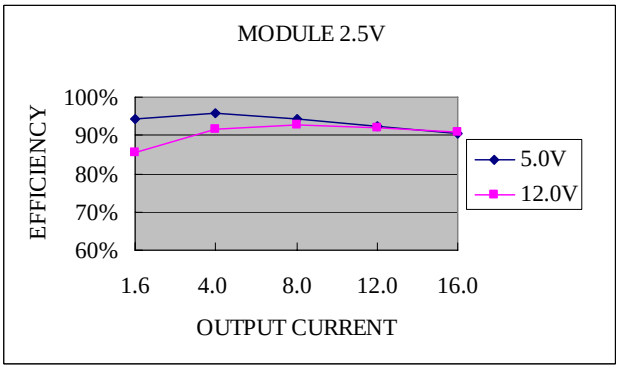
Equation for calculating the trim voltage (in V) given the desired output voltage (Vo) is shown below. The Trim Up voltage should be connected between the Trim pin and Ground.

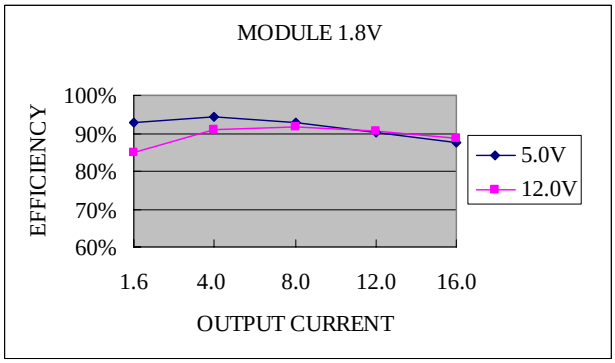
$$V_{trimup} = 0.7 - 0.0667 \times (Vo - 0.7525)$$

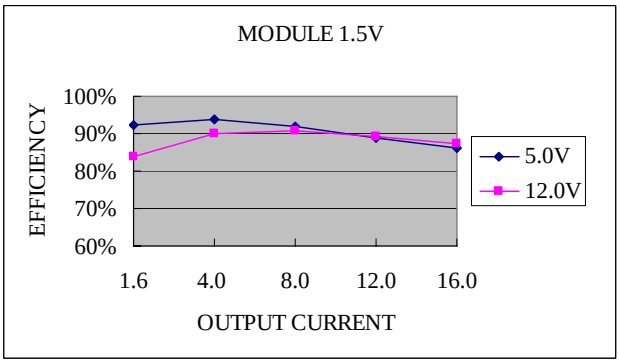


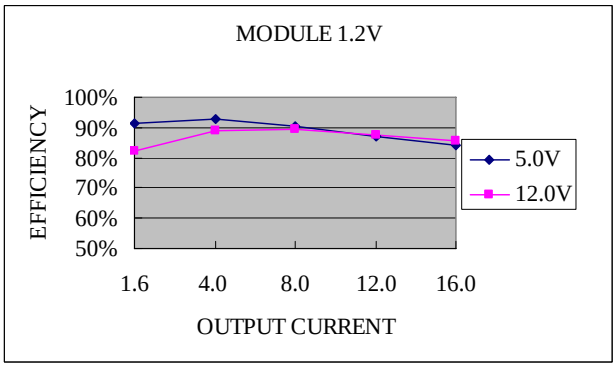
Efficiency Data

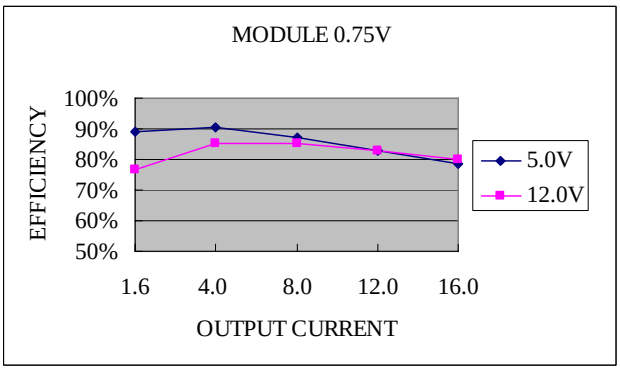




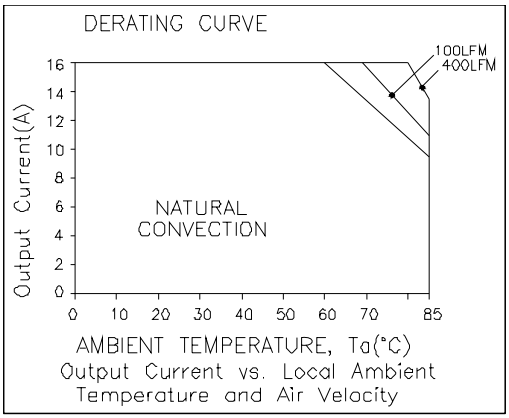




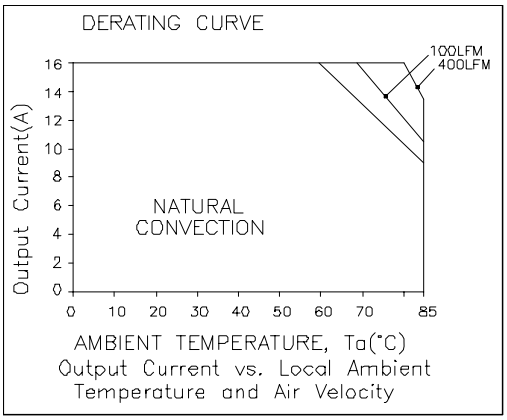




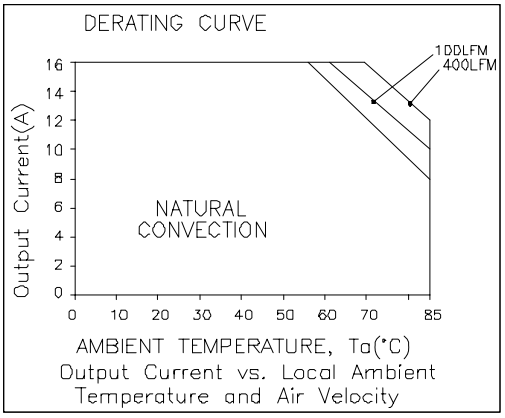
Thermal Derating Curves



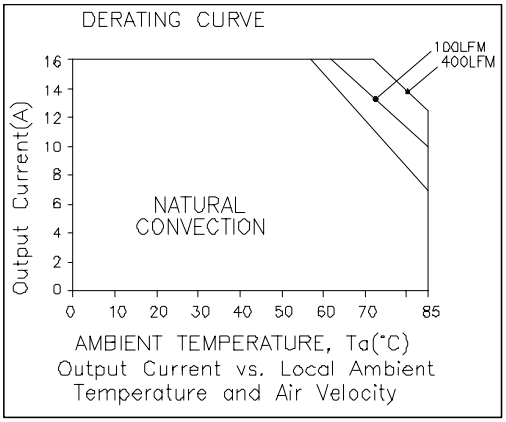
Vin=5 V, Vo=0.75 V



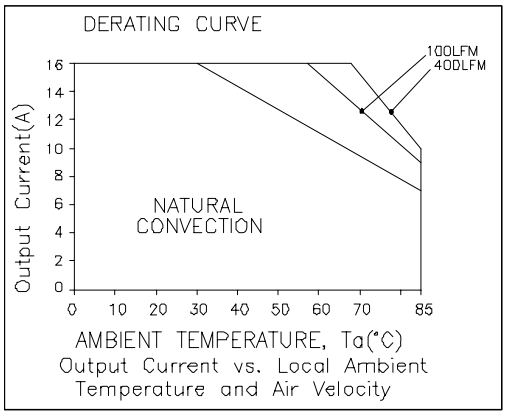
Vin=12 V, Vo=0.75 V



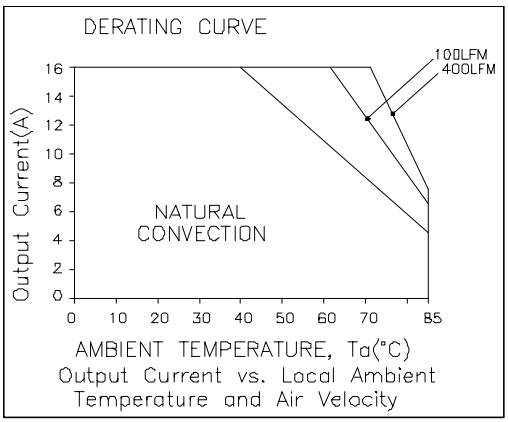
Vin=5 V, Vo=1.8 V



Vin=12 V, Vo=1.8 V

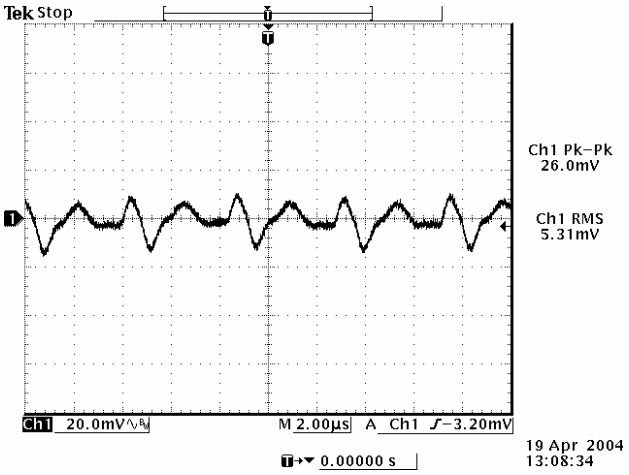


Vin=5 V, Vo=3.3 V

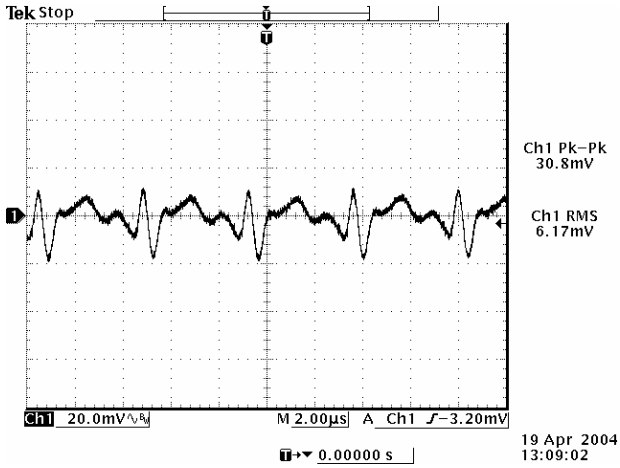


Vin=12 V, Vo=3.3 V

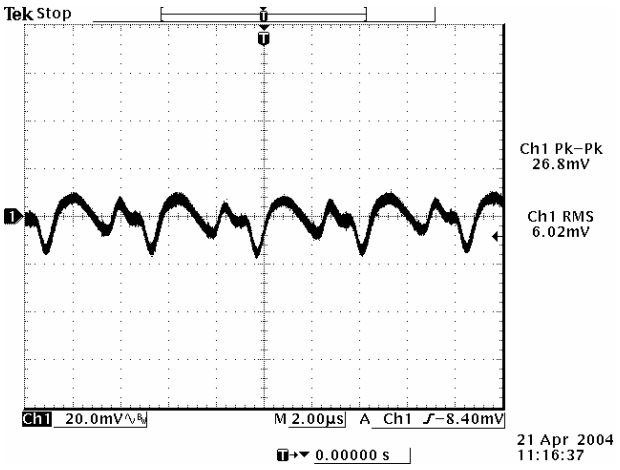
Ripple and Noise Waveforms



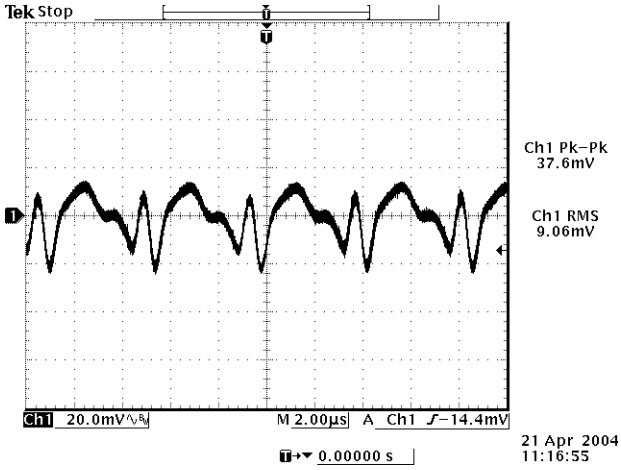
Vin=5 V, Vo=0.7525 V



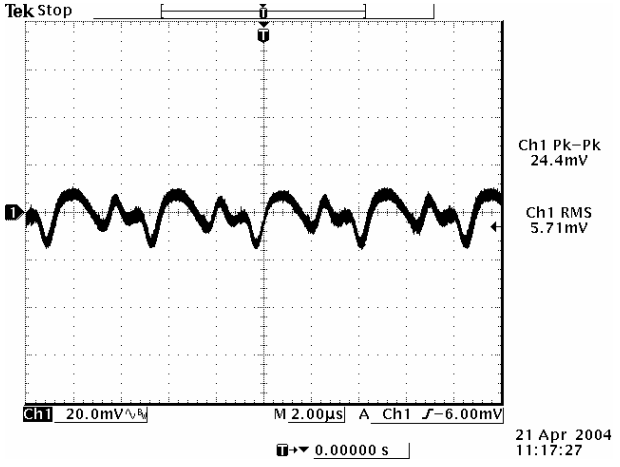
Vin=12 V, Vo=0.7525 V



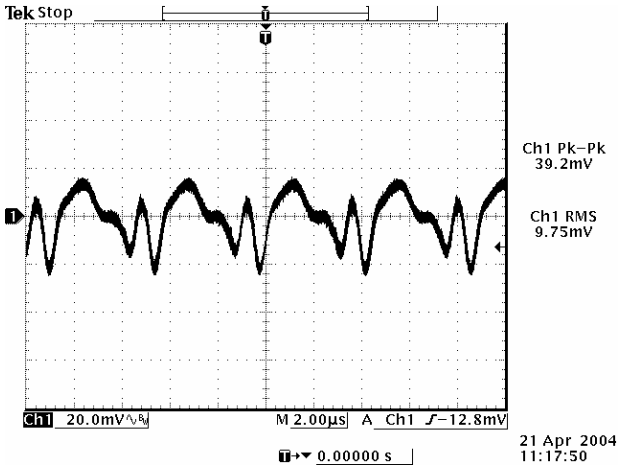
Vin=5 V, Vo=1.2 V



Vin=12 V, Vo=1.2 V

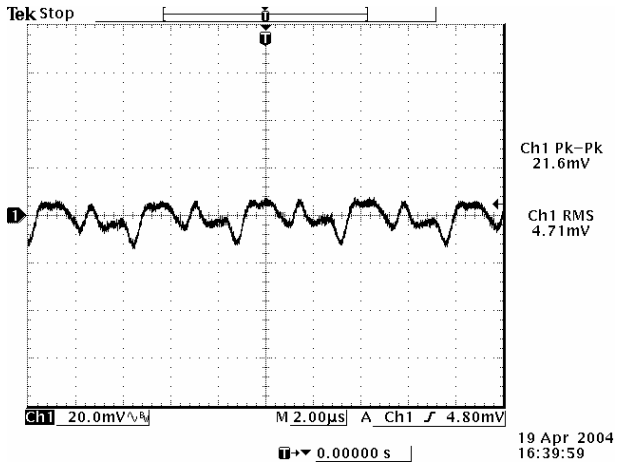


Vin=5 V, Vo=1.5 V

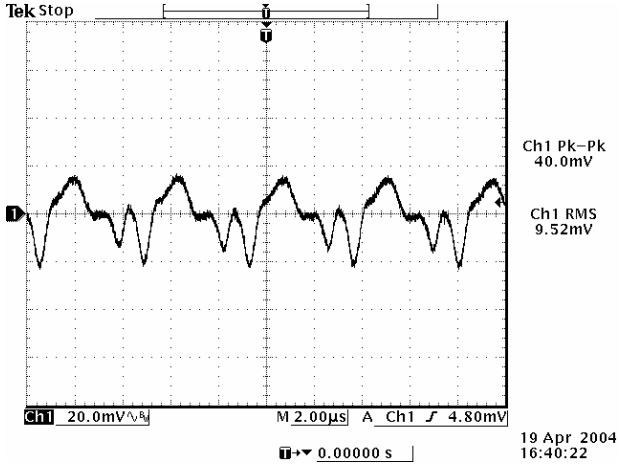


Vin=12 V, Vo=1.5 V

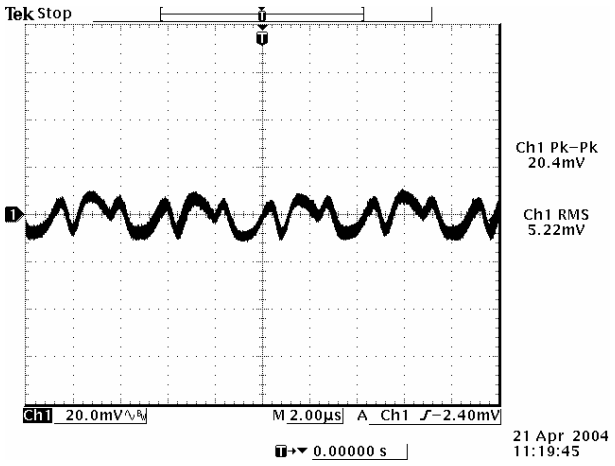
Ripple and Noise Waveforms (continued)



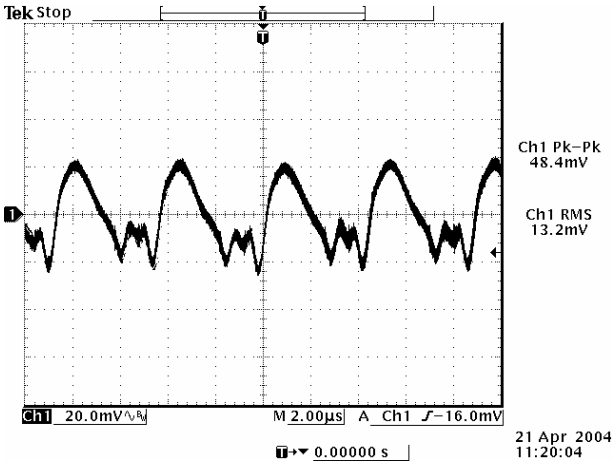
Vin=5 V, Vo=1.8 V



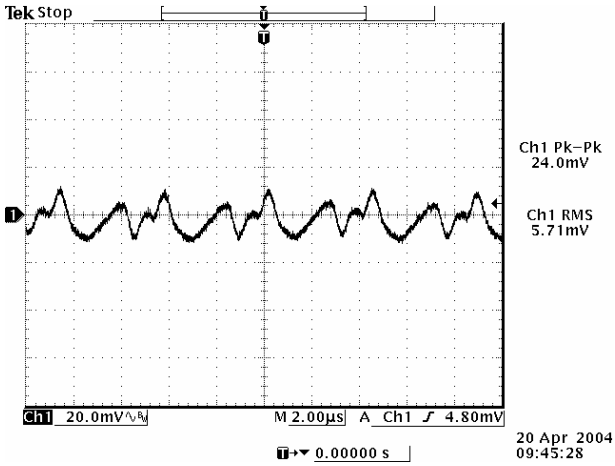
Vin=12 V, Vo=1.8 V



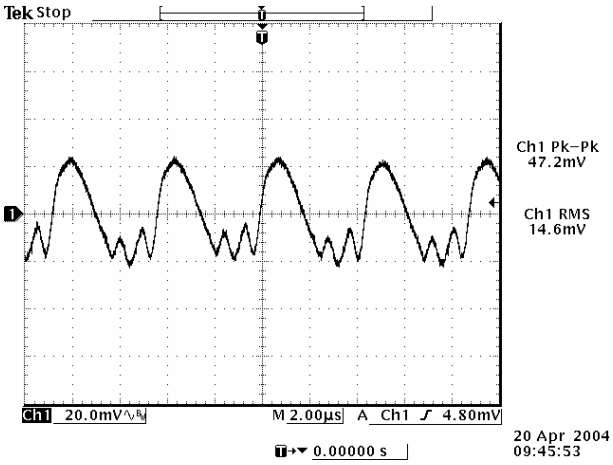
Vin=5 V, Vo=2.5 V



Vin=12 V, Vo=2.5 V



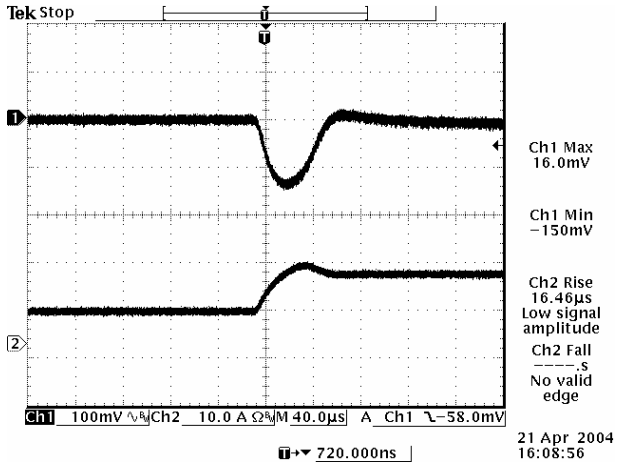
Vin=5 V, Vo=3.3 V



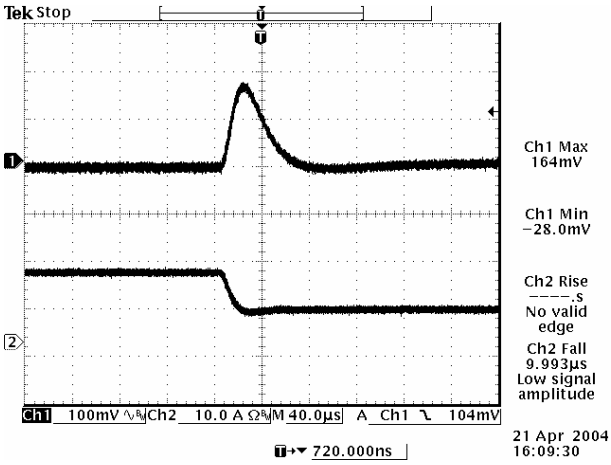
Vin=12 V, Vo=3.3 V

Note: Ripple and noise at full load, with 10uF tantalum capacitor and 1uF ceramic at the output, and Ta=25℃.

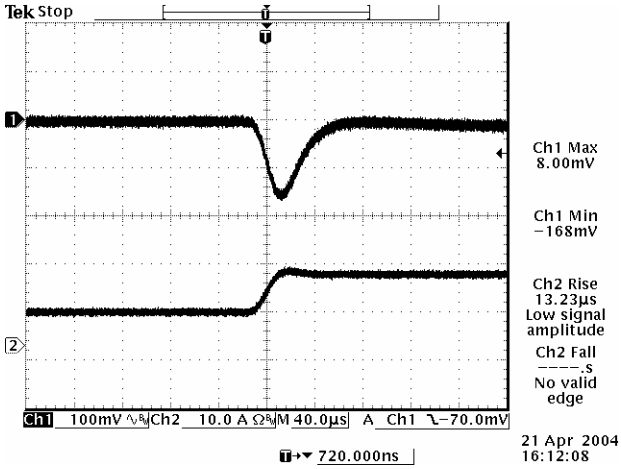
Transient Response Waveforms



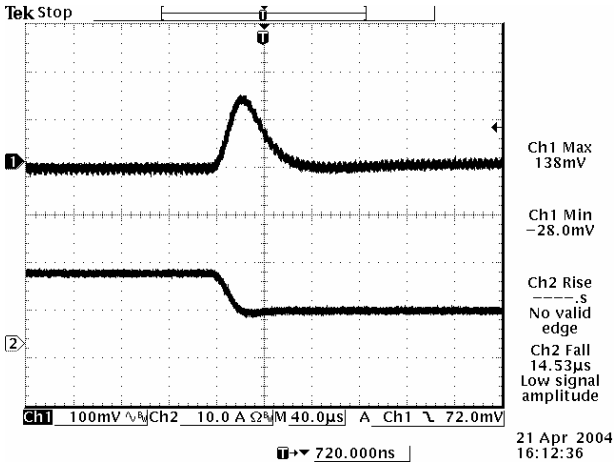
50% to 100% load Transient at Vin=5 V, Vo=0.75 V



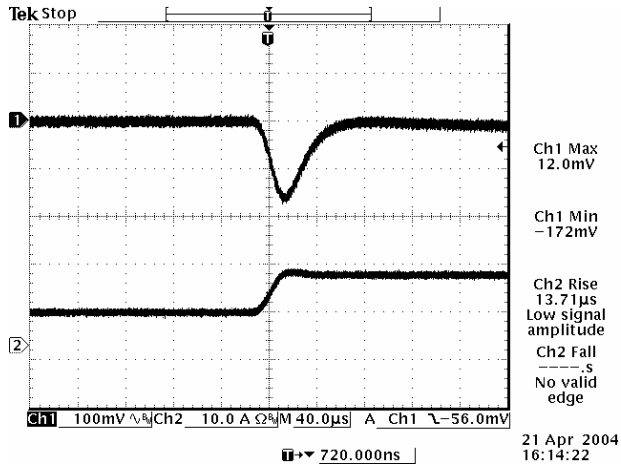
100% to 50% load Transient at Vin=5 V, Vo=0.75 V



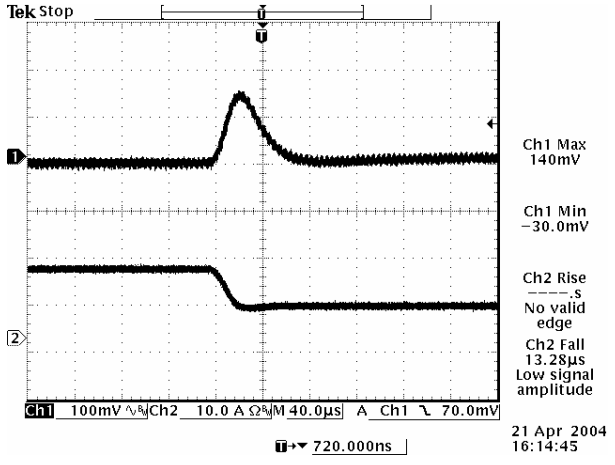
50% to 100% load Transient at Vin=5 V, Vo=1.2 V



100% to 50% load Transient at Vin=5 V, Vo=1.2 V

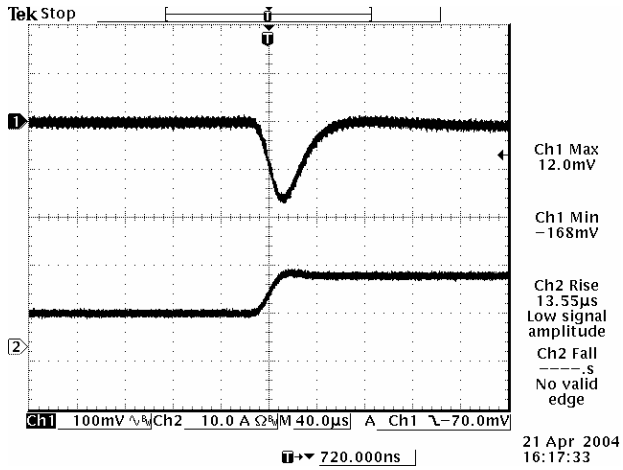


50% to 100% load Transient at Vin=5 V, Vo=1.5 V

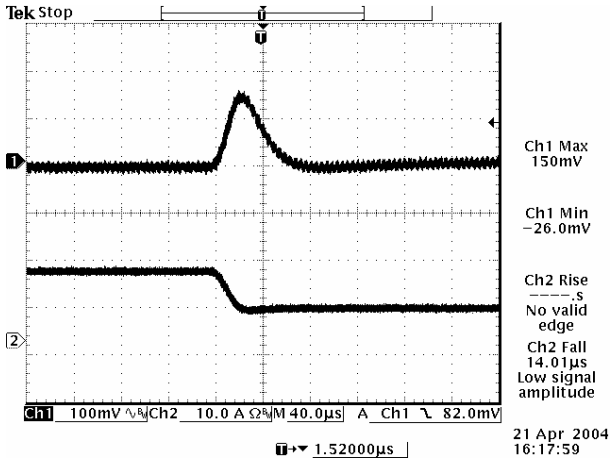


100% to 50% load Transient at Vin=5 V, Vo=1.5 V

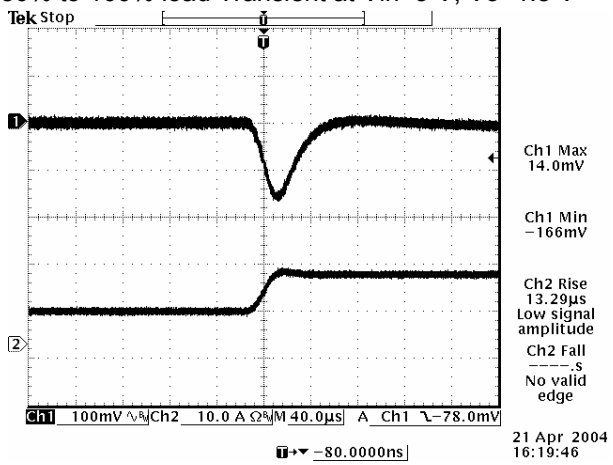
Transient Response Waveforms (continued)



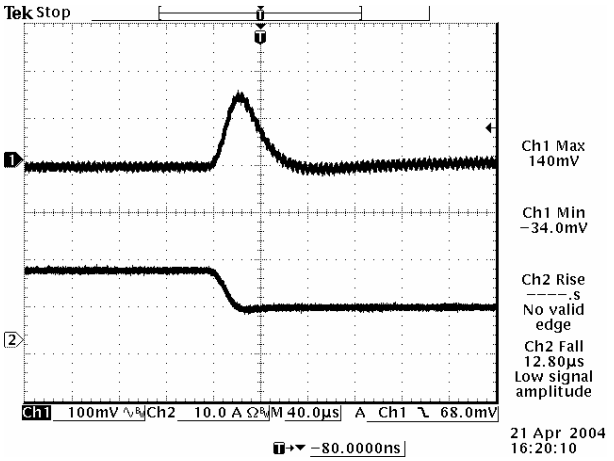
50% to 100% load Transient at Vin=5 V, Vo=1.8 V



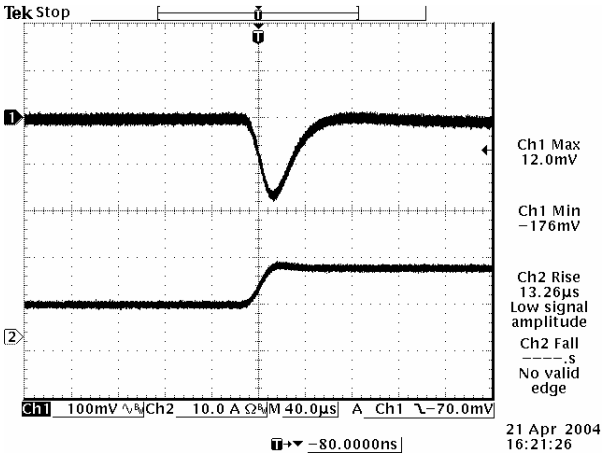
100% to 50% load Transient at Vin=5 V, Vo=1.8 V



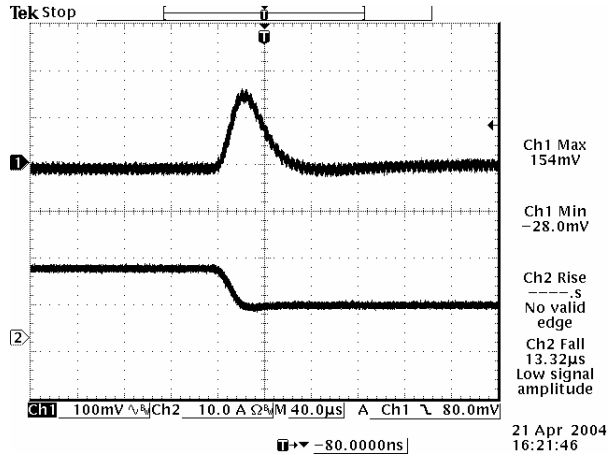
50% to 100% load Transient at Vin=5 V, Vo=2.5 V



100% to 50% load Transient at Vin=5 V, Vo=2.5 V

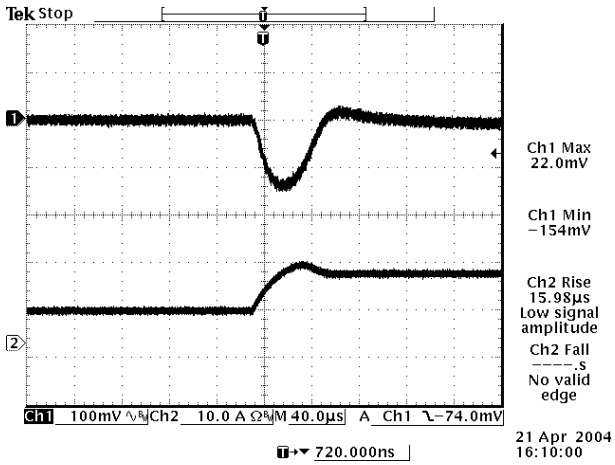


50% to 100% load Transient at Vin=5 V, Vo=3.3 V

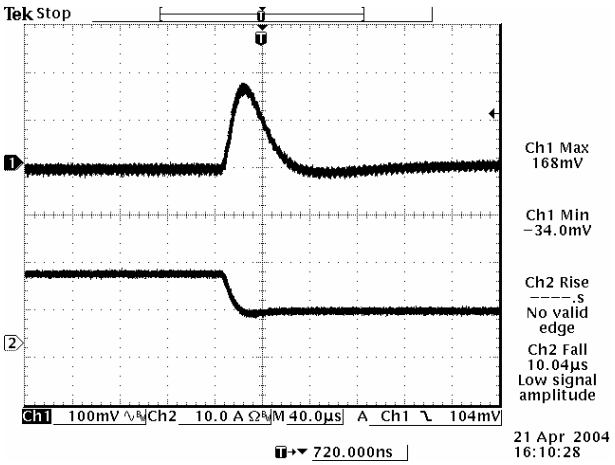


100% to 50% load Transient at Vin=5 V, Vo=3.3 V

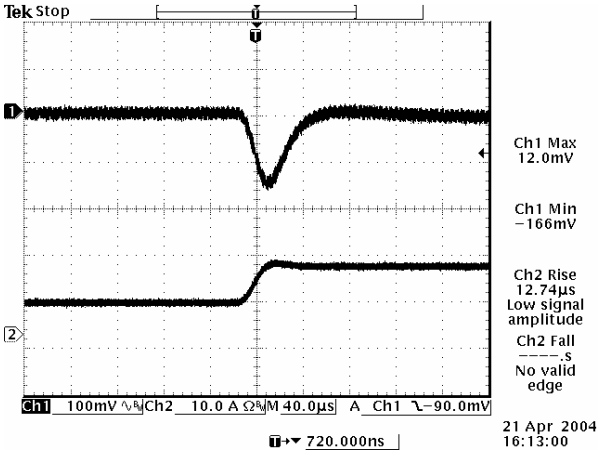
Transient Response Waveforms (continued)



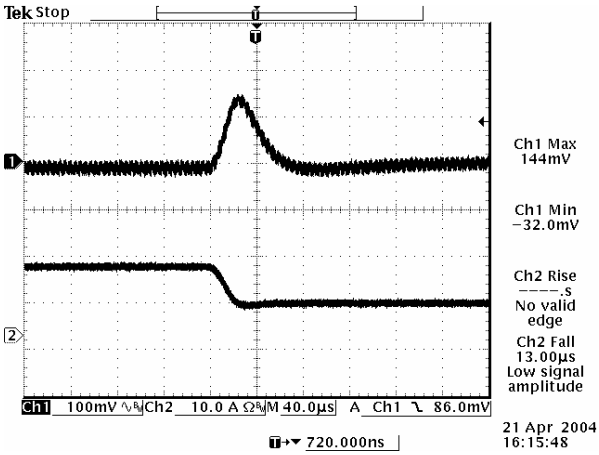
50% to 100% load Transient at Vin=12 V, Vo=0.75 V



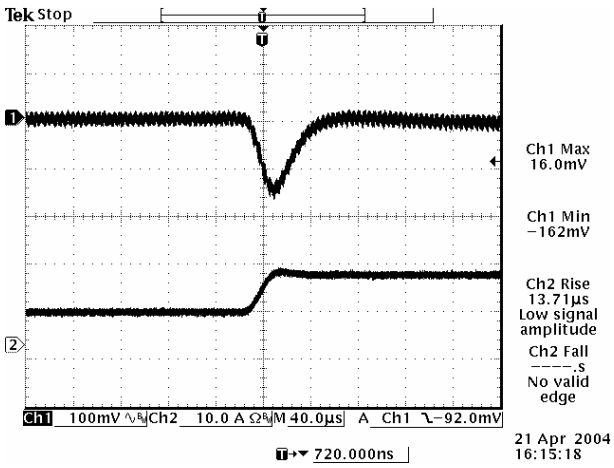
100% to 50% load Transient at Vin=12 V, Vo=0.75 V



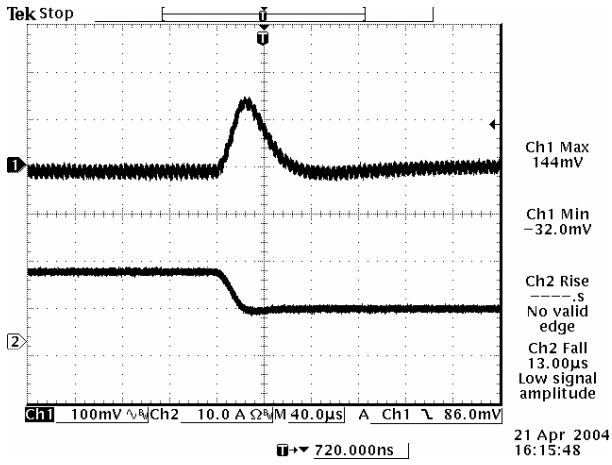
50% to 100% load Transient at Vin=12 V, Vo=1.2 V



100% to 50% load Transient at Vin=12 V, Vo=1.2 V

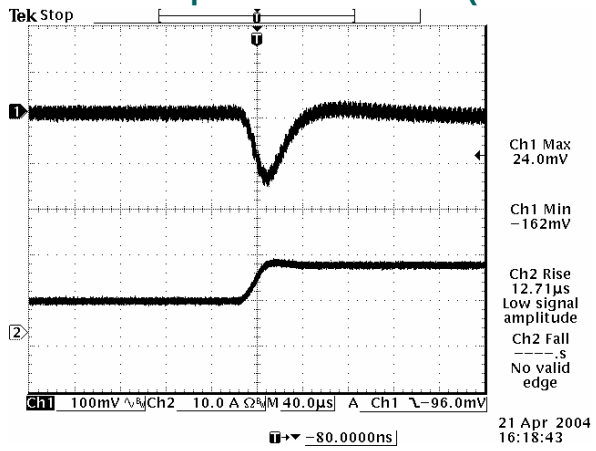


50% to 100% load Transient at Vin=12 V, Vo=1.5 V

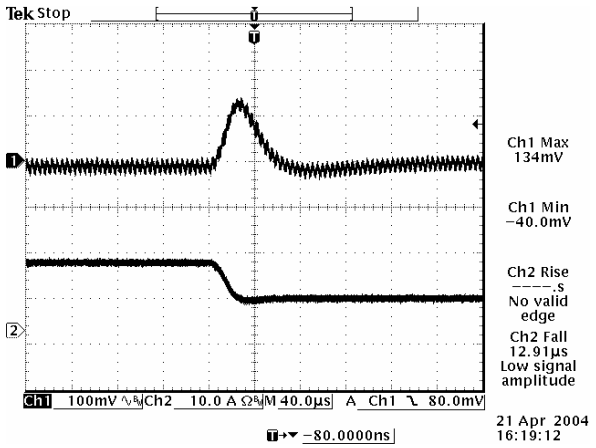


100% to 50% load Transient at Vin=12 V, Vo=1.5 V

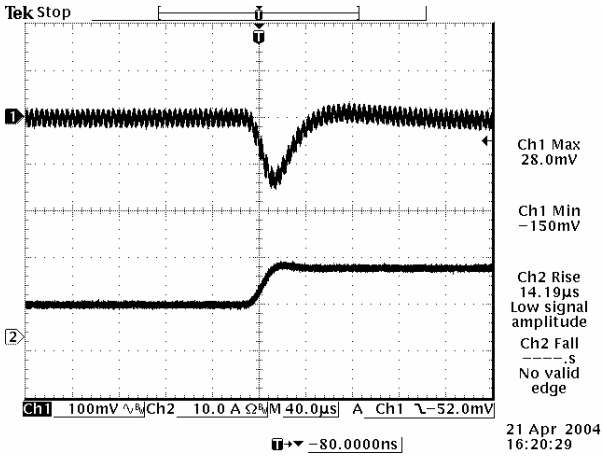
Transient Response Waveforms (continued)



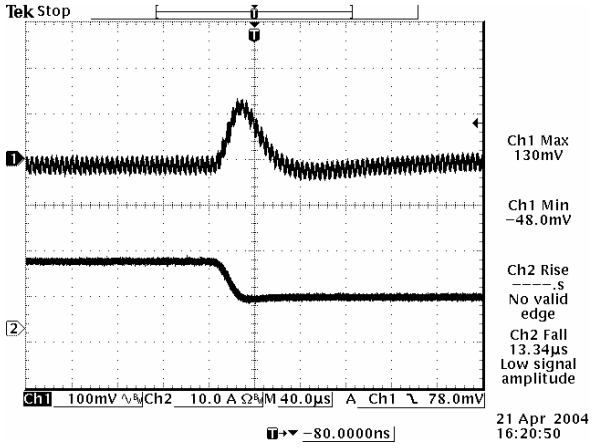
50% to 100% load Transient at Vin=12 V, Vo=1.8 V



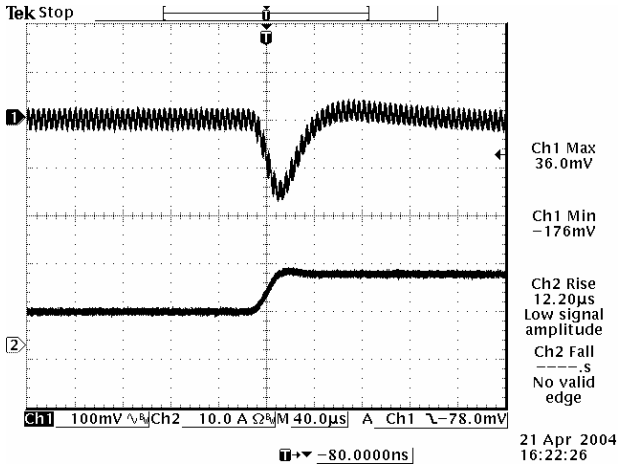
100% to 50% load Transient at Vin=12 V, Vo=1.8 V



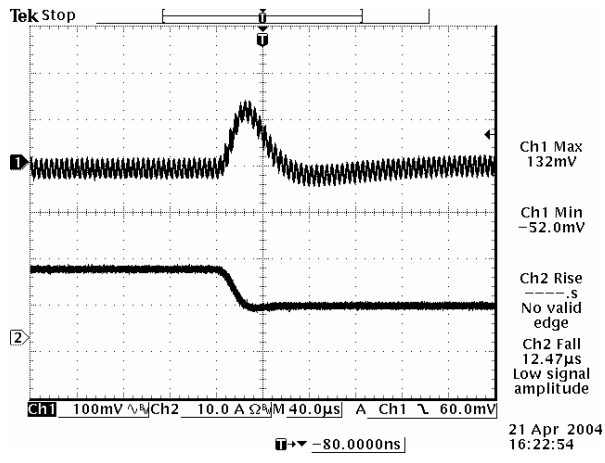
50% to 100% load Transient at Vin=12 V, Vo=2.5 V



100% to 50% load Transient at Vin=12 V, Vo=2.5 V



50% to 100% load Transient at Vin=12 V, Vo=3.3 V



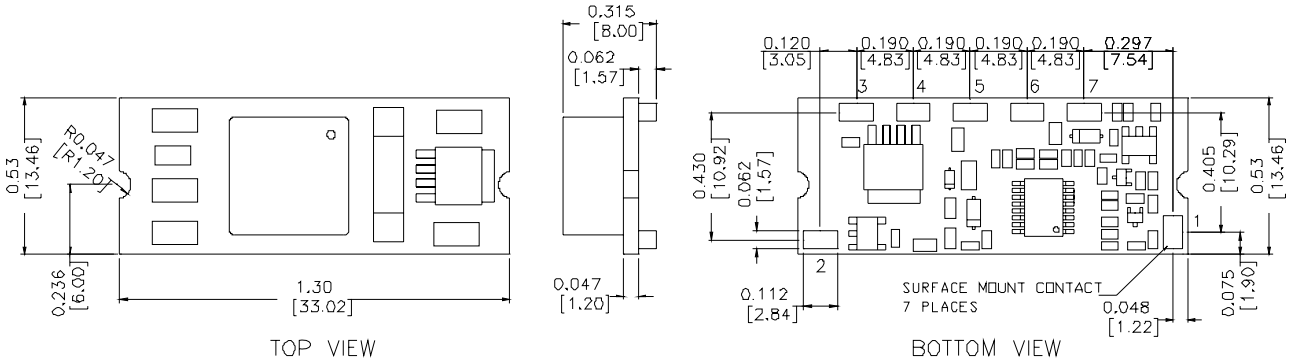
100% to 50% load Transient at Vin=12 V, Vo=3.3 V

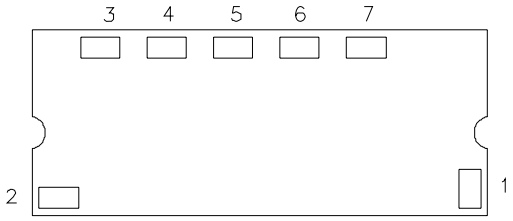
Note: Transient response with external load capacitance Cext=2x150uF (Polymer capacitors), and Ta=25℃.

NON-ISOLATED DC/DC CONVERTERS

4.5 Vdc - 14 Vdc Input 0.75 Vdc - 3.63 Vdc/16 A Output

Mechanical Outline

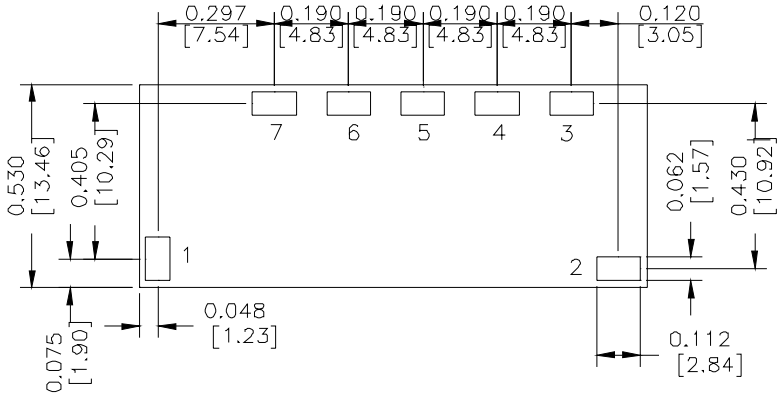




Pin Connections

Pin	Function
1	Remote On/Off
2	Vin
3	SEQ
4	Ground
5	Vout
6	Trim
7	Remote Sense

RECOMMENDED PAD LAYOUT



PAD SIZE:
MIN: 0.14"* 0.095" (3.56mm * 2.41mm)
MAX: 0.165"* 0.11" (4.19mm * 2.79mm)

RoHS Compliance

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

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

LifeElectronics
Живое партнерство

ООО «ЛайфЭлектроникс» **“LifeElectronics” LLC**

ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- *Конкурентоспособные цены и скидки постоянным клиентам.*
- *Специальные условия для постоянных клиентов.*
- *Подбор аналогов.*
- *Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.*

- *Приемлемые сроки поставки, возможна ускоренная поставка.*
- *Доставку товара в любую точку России и стран СНГ.*
- *Комплексную поставку.*
- *Работу по проектам и поставку образцов.*
- *Формирование склада под заказчика.*

- *Сертификаты соответствия на поставляемую продукцию (по желанию клиента).*
- *Тестирование поставляемой продукции.*
- *Поставку компонентов, требующих военную и космическую приемку.*
- *Входной контроль качества.*
- *Наличие сертификата ISO.*

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- *Регистрацию проекта у производителя компонентов.*
- *Техническую поддержку проекта.*
- *Защиту от снятия компонента с производства.*
- *Оценку стоимости проекта по компонентам.*
- *Изготовление тестовой платы монтаж и пусконаладочные работы.*

Тел: +7 (812) 336 43 04 (многоканальный)
Email: org@lifeelectronics.ru

www.lifeelectronics.ru