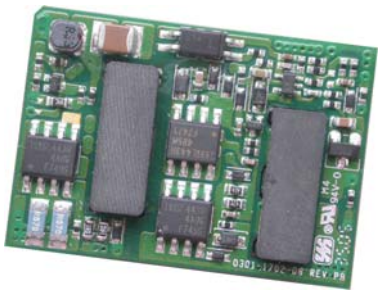
ISOLATED DC/DC CONVERTERS

24 Vdc Input 8 Vdc / 5 A Output 1/16 Brick

xRSB-50R08x RoHS Compliant Rev.A

- Isolated
- Fixed Frequency (600 kHz)
- High Efficiency
- High Power Density
- Low Cost
- Output Voltage Trim
- Basic Insulation
- Input Under Voltage Lockout
- Output Over Voltage Shutdown
- OCP/SCP
- Over Temperature Protection
- Remote On/Off (option)
- Positive/Negative Remote Sense
- Through Hole and SMT (option)



Description

The xRSB-50R08x series are isolated dc/dc converters that operate from a nominal 24 Vdc source. These units will provide up to 40 W of output power from a nominal 24 Vdc input. These units are designed to be highly efficient and low cost. Features include remote on/off, over current protection and under voltage lockout. These converters are provided in an industry standard sixteenth brick package.

Part Selection

Output Voltage	Input Voltage	Max. Output Current	Max. Output Power	Typical Efficiency	Model Number Active Low	Model Number Active High
8 V	18 V - 36 V	5 A	40 W	90%	xRSB-50R08L	xRSB-50R080

Notes: 1. Add “G” suffix at the end of the model number to indicate Tray Packaging. Replace”x” with “S” to indicate SMT package, or “0” to indicate through hole package.
2. All part numbers above indicate RoHS 6. Change the second letter "R" to "7" for RoHS 5 part numbers.

Absolute Maximum Ratings

Parameter	Min	Typ	Max	Notes
Input Voltage (continuous)	-0.3 V	-	40 V	
Remote On/Off	-0.3 V	-	18 V	
I/O Isolation Voltage	-	-	1500 V	
Ambient Temperature	-40 °C	-	85 °C	
Storage Temperature	-55 °C	-	125 °C	

Input Specifications

Parameter	Min	Typ	Max	Notes
Input Voltage	18 V	24 V	36 V	
Input Current (full load)	-	-	3.5 A	
Input Current (no load)	-	80 mA	160 mA	
Remote Off Input Current	-	1 mA	3 mA	
Input Reflected Ripple Current (pk-pk)	-	20 mA	50 mA	Tested with simulated source impedance of 15 uH, 5 Hz to 20 MHz; use a 100 uF/100 V electrolytic capacitor with ESR=1 ohm max at 200 kHz at the input.
Input Reflected Ripple Current (rms)	-	3 mA	7 mA	
I^2t Inrush Current Transient	-	0.01 A^2s	0.02 A^2s	
Turn On Voltage Threshold	-	17 V	-	
Turn Off Voltage Threshold	-	16 V	-	

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

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bel POWER PRODUCTS

Output Specifications

Parameter			Min	Typ	Max	Notes
Output Voltage Set Point			7.88 V	8 V	8.12 V	Vin=24 V; Io=50% load
Line Regulation			-	±5 mV	±10 mV	
Load Regulation			-	±5 mV	±10 mV	
Regulation Over Temperature(-40 °C to +85 °C)			-	±20 mV	±35 mV	
Output Current			0 A	-	5 A	
Current Limit Threshold			6 A	7.5 A	9 A	
Short Circuit Surge Transient			-	0.5 A^2s	1 A^2s	
Ripple and Noise (rms)			-	10 mV	20 mV	Tested at 0-20 MHz BW, with a 1 uF ceramic capacitor and a 10 uF Tantalum capacitor at the output.
Ripple and Noise (pk-pk)			-	40 mV	75 mV	
Turn on Time			-	24 mS	50 mS	
Overshoot at Turn on			-	0%	5%	
Output Capacitance			100 uF	-	680 uF	
Transient Response						
25% ~ 50% Max Load	Overshoot	Vo=8 V	-	150 mV	250 mV	Test conditions: di/dt = 0.1 A/uS, Vin=24 V, with a 1 uF ceramic capacitor and a 10 uF Tantalum capacitor at the output.
	Settling Time		-	120 uS	250 uS	
50% ~ 25% Max Load	Overshoot		-	150 mV	250 mV	
	Settling Time		-	120 uS	250 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	87%	90%	-	Vin=24 V; Io=Io, max; full load
Switching Frequency	540 kHz	600 kHz	660 kHz	
Isolation Capacitance	-	3900 pF	-	
Output Voltage Trim Range	90% Vo	-	110% Vo	
Over Temperature Protection	120 °C	-	140 °C	
Over Voltage Protection	-	130% Vo	140% Vo	Test conditions: Vin=24 V, full load and short the feedback optocoupler.
MTBF	TBD			Calculated Per Bell Core SR-332 (I_O = Nominal; T_a = 25 °C)
Dimensions Inches (L × W × H) Millimeters (L × W × H)	1.3 x 0.9 x 0.334 33.0 x 22.9 x 8.49			SMT Package
Dimensions Inches (L × W × H) Millimeters (L × W × H)	1.3 x 0.9 x 0.378 33.0 x 22.9 x 9.60			Through Hole Package
Weight	-	13 g	-	

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

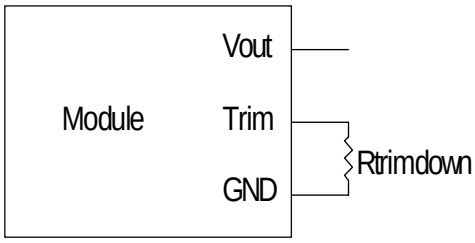
Control Specifications

Parameter		Min	Typ	Max	Notes
Remote On/Off					
Signal Low (Unit On)	Active Low	-0.3 V	-	0.8 V	When Remote On/Off pin is open, for active low option, unit is off; for active high option, unit is on
Signal High (Unit Off)		2.95 V	-	18 V	
Signal Low (Unit Off)	Active High	-0.3 V	-	0.8 V	
Signal High (Unit On)		2.95 V	-	18 V	
Current Sink	-	0 mA	-	1 mA	

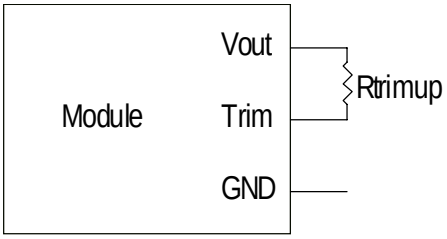
Output Trim Equations

Equations for calculating the trim resistor are shown below. The Trim Down resistor should be connected between the Trim pin and Ground pin. The Trim Up resistor should be connected between the Trim pin and the Vout. Only one of the resistors should be used for any given application.

$$Rtrimdown = \frac{511}{|delta|} - 10.22[k\Omega]$$



$$Rtrimup = \frac{(100 + delta) \cdot Vo \cdot 5.11 - 626}{1.225 \cdot delta} - 10.22[k\Omega]$$

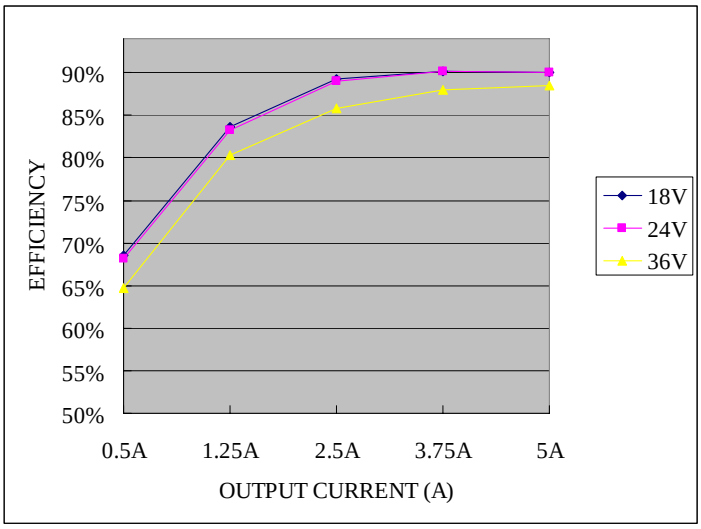


Note：

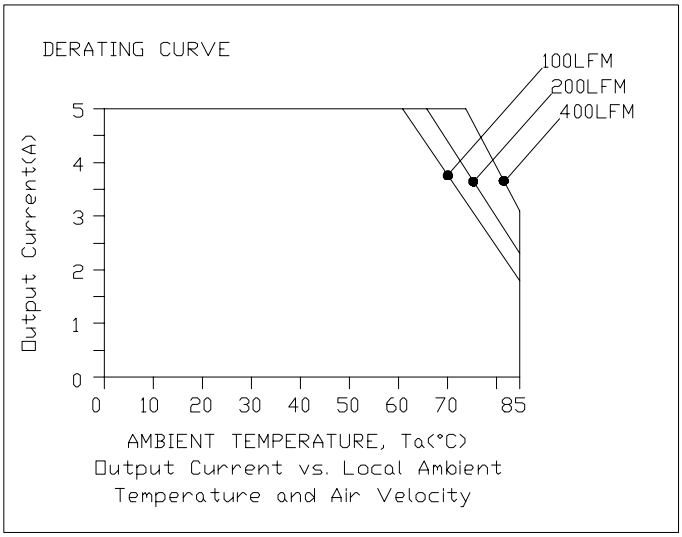
$$delta = \frac{(Vo_req - Vo)}{Vo} \times 100[\%]$$

Vo_req=Desired (trimmed) output voltage[V]
Output voltage Vo=8.003 V

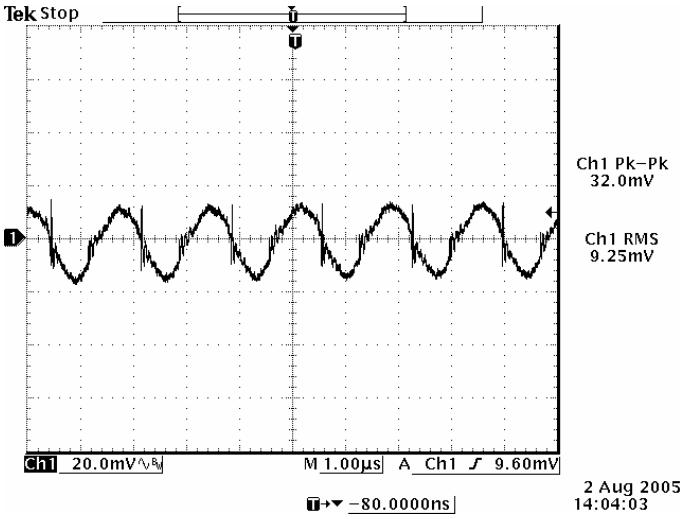
Efficiency Data



Thermal Derating Curve



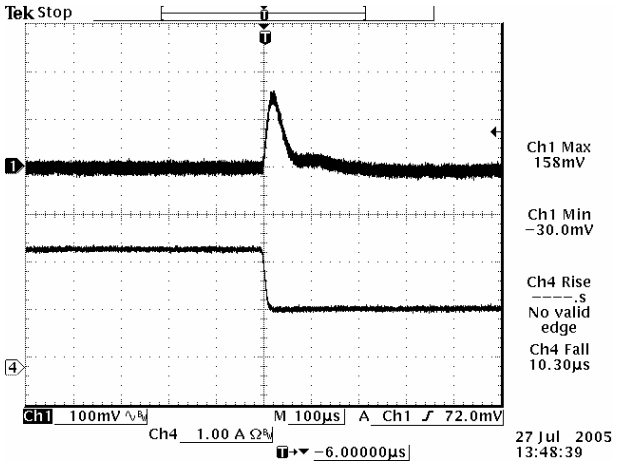
Ripple and Noise Waveform



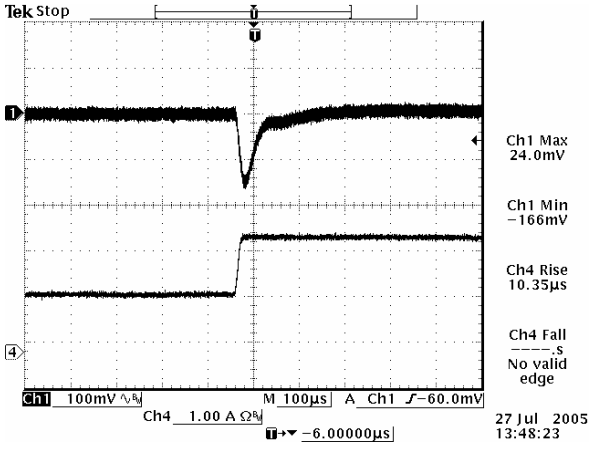
24 Vdc input, 1.2 V output

Note: Ripple and noise at full load, with a 1uF ceramic cap and a 100 uF Tantalum cap at output, Ta=25 deg C.

Transient Response Waveforms



Vout=8.0 V 50% to 25% Load Transients

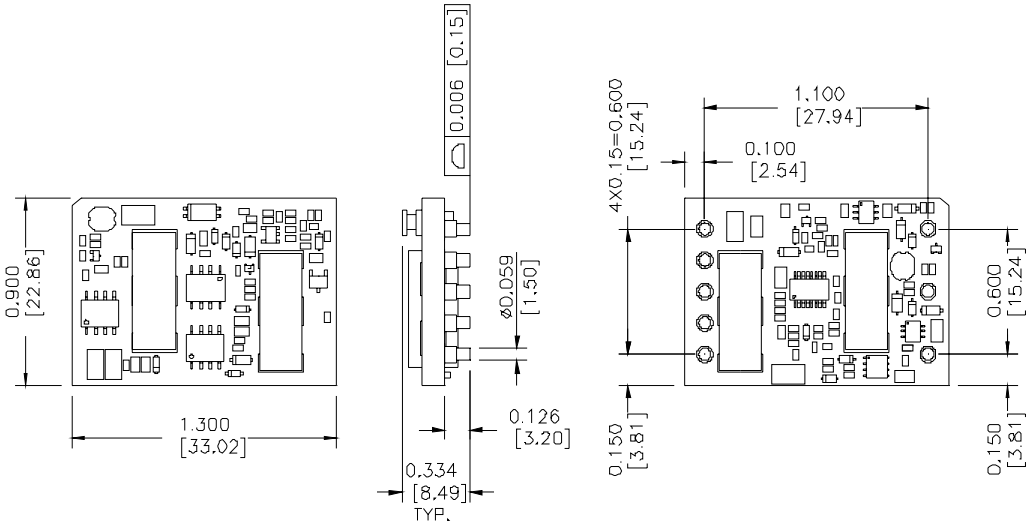


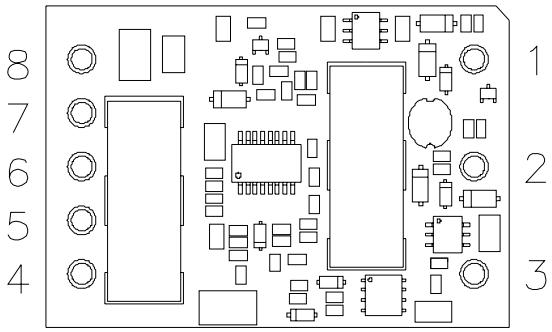
Vout=8.0 V 25% to 50% Load Transients

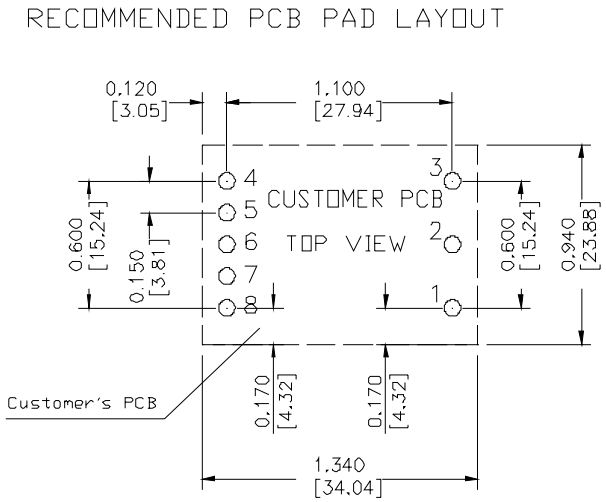
Note: Transient Response at Vin=48 V, di/dt=0.1A/uS, external 100 uF Tantalum cap and 1uF Ceramic cap, Ta=25 deg C.

Mechanical Outline

SMT Package







Recommended Surface Mount Pads
Min. Ø0.080" [2.03]
Max. Ø0.092" [2.34]

Pin Connections

Pin	Function
1	Vin (+)
2	Remote On/Off
3	Vin (-)
4	Vout-
5	Remote Sense (-)
6	Trim
7	Remote Sense (+)
8	Vout (+)

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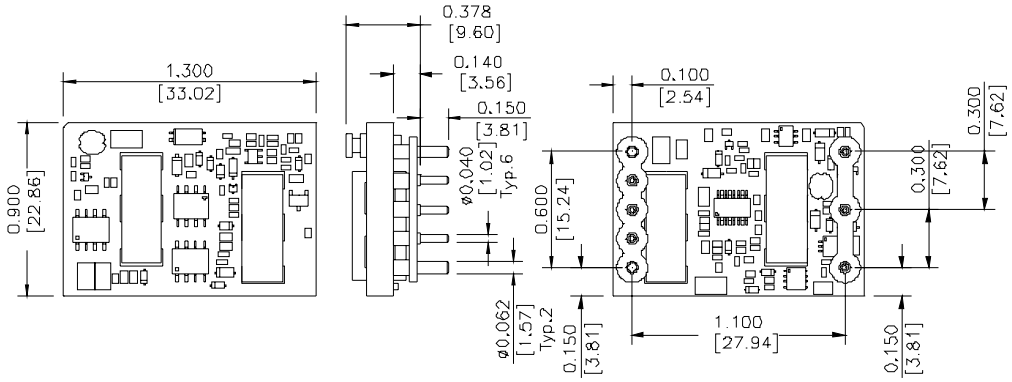
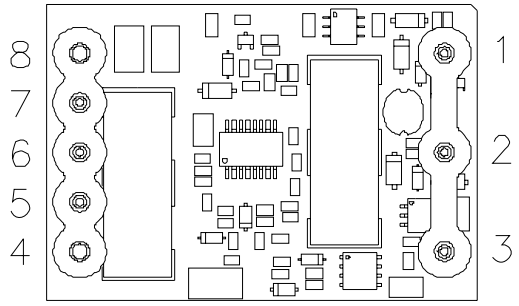
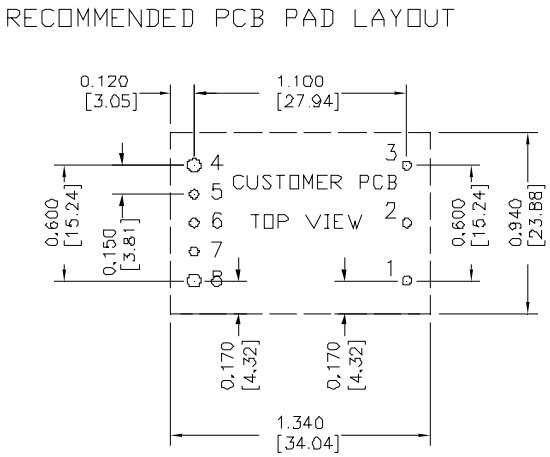
Through Hole Package







HOLE SIZE: 1-3, 5-7 ø0.047[1.19],
4,8 ø0.07 [1.78]
PAD SIZE: 1-3, 5-7 ø0.08[2.03]
4,8 ø0.10 [2.54]

Pin Connections

Pin	Function
1	Vin (+)
2	Remote On/Off
3	Vin (-)
4	Vout-
5	Remote Sense (-)
6	Trim
7	Remote Sense (+)
8	Vout (+)

RoHS Compliance

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

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