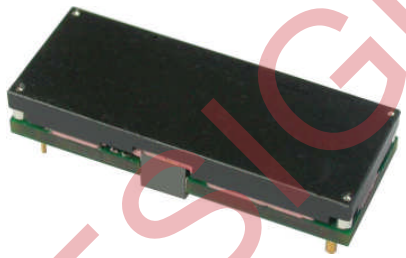
ISOLATED DC/DC CONVERTERS

48 Vdc Input 12 Vdc /12 A Output

0RCY-C2T12x RoHS Compliant Rev.B

- Isolated
- High Efficiency
- High Power Density
- Fixed Frequency (300 kHz)
- Low Cost
- Input Under-Voltage Lockout
- Basic Insulation
- Output Over-Voltage Shutdown
- OCP/SCP
- Over Temperature Protection
- Output Voltage Trim
- Remote On/Off
- Positive/Negative Remote Sense



Description

The 0RCY-C2T12x is isolated dc/dc converter that operates from a nominal 48 Vdc source. This unit will provide up to 144 W of output power from a nominal 48 Vdc input. This unit is designed to be highly efficient and low cost. Features include remote on/off, over current protection and under-voltage lockout. This converter is provided in an industry standard eighth brick package.

Part Selection

Output Voltage	Input Voltage	Max. Output Current	Max. Output Power	Typical Efficiency	Model Number Active High	Model Number Active Low
12 Vdc	48 Vdc	12 A	144 W	93%	0RCY-C2T120	0RCY-C2T12L

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	-	80 V	
Input Voltage (Transient)	-	-	100 V	100 mS
Remote On/Off	-0.3 V	-	18 V	
Ambient Temperature	-40 °C	-	85 °C	
Storage Temperature	-55 °C	-	125 °C	

Input Specifications

Parameter	Min	Typ	Max	Notes
Input Voltage	36 V	48 V	75 V	
Input Current (full load)	-	-	5.0 A	
Input Current (no load)	-	60 mA	120 mA	
Remote Off Input Current	-	10 mA	15 mA	
Input Reflected Ripple Current (rms)	-	5 mA	10 mA	With simulated source impedance of 10 uH, 5Hz to 20MHz. Use a 100 uF/100 V electrolytic cap with ESR=1 ohm max, at 200 KHz@25°C.
Input Reflected Ripple Current (pk-pk)	-	25 mA	40 mA	
I^2t Inrush Current Transient	-	0.1 A^2s	0.5 A^2s	
Turn-on Voltage Threshold	33 V	34 V	36 V	
Turn-off Voltage Threshold	31 V	32 V	34 V	

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

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Output Specifications

Parameter	Min	Typ	Max	Notes
Output Voltage Set Point	11.76 V	12.0 V	12.24 V	Vin=48 V, Io=50%load
Load Regulation	-	±12 mV	±24 mV	
line Regulation	-	±12 mV	±24 mV	
Regulation Over Temperature (-40deg.C-85deg.C)	-	±30 mV	±60 mV	
Ripple and Noise (rms)	-	30 mV	50 mV	0-20MHz BW, with a 1µF ceramic capacitor and a 10 µF Tantalum cap at output.
Ripple and Noise (pk-pk)	-	90 mV	150 mV	
Output Current Range	0 A	-	12 A	
Output DC Current Limit	13 A	15 A	17 A	
Short Circuit Surge Transient	-	2 A^2s	4 A^2s	
Turn on Time	-	60 mS	100 mS	
Overshoot at Turn on	-	0%	-	
Output Capacitance	0 uF	-	680 uF	
Transient Response				
25% ~ 50% Max Load	Overshoot	Vo=12 V	-	400 mV	600 mV	di/dt=0.1A/us, Vin=48Vdc, Ta=25°C, with a 1µF ceramic capacitor and a 10 µF Tantalum cap at output.
	Settling Time		-	200 uS	300 uS	
50% ~ 25% Max Load	Overshoot		-	400 mV	600 mV	
	Settling Time		-	200 uS	300 uS	

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

General Specifications

Parameter	Min	Typ	Max	Notes
Efficiency	91%	93%	-	Measured at Vin=48 V, full load.
Switching Frequency	270 kHz	300 kHz	330 kHz	
Output Voltage Trim Range	80%	-	110%	The total voltage increased by trim and remote sense should not exceed 10%Vo.
Remote Sense Compensation	-	-	10%	
Over Temperature Protection	-	125 °C	-	
Over Voltage Protection	-	125 %	-	Vin=48 V, full load, in hiccup Mode
MTBF	TBD			Calculated Per Bell Core SR-332 (Io=80%load, Ta = 25 °C)
Dimensions Inches (L × W × H) Millimeters (L × W × H)	2.30 x 0.90 x 0.54 58.42 x 22.78 x 13.73			
Weight	-	47 g	-	
Isolation characteristics				
Isolation capacitance	-	3900 pF	-	
Input to Output Isolation Voltage	1500 V	-	-	
Input to Baseplate Isolation Voltage	1500 V	-	-	
Output to Baseplate Isolation Voltage	500 V	-	-	

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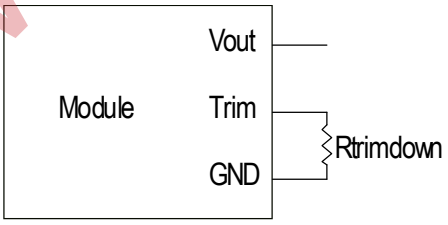
Control Specifications

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, unit is off.
Signal High (Unit Off)		2.4 V	-	18 V	
Signal Low (Unit Off)	Active High	-0.3 V	-	0.8 V	When Remote On/Off pin is open, unit is on.
Signal High (Unit On)					
Current Sink		0 mA	-	1 mA	

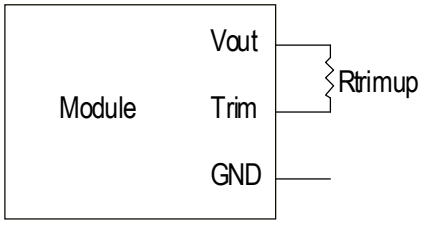
Output Trim Equations

Equations for calculating the trim resistor are shown below. The Trim Down resistor should be connected between the Trim pin and GND pin. The Trim Up resistor should be connected between the Trim pin and the Vout pin. 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=12.0 V

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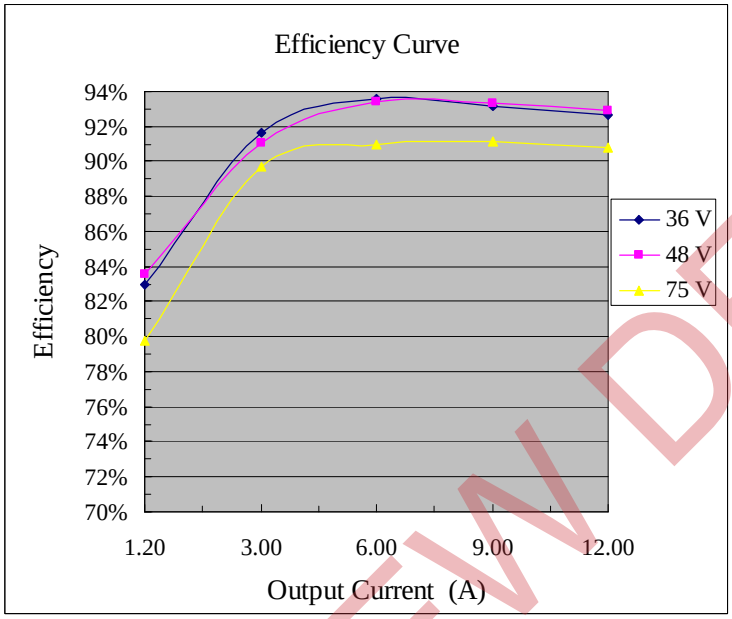
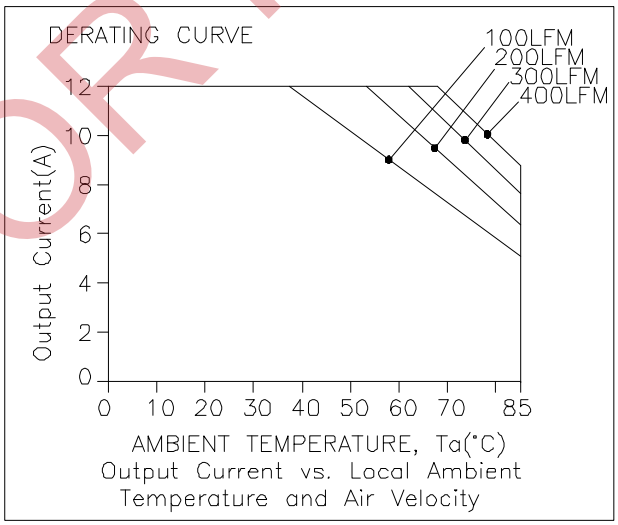
Efficiency Data



Thermal Derating Curve



Vin=48 V, with maximum junction temperature of semiconductors derated to 120 degree C.

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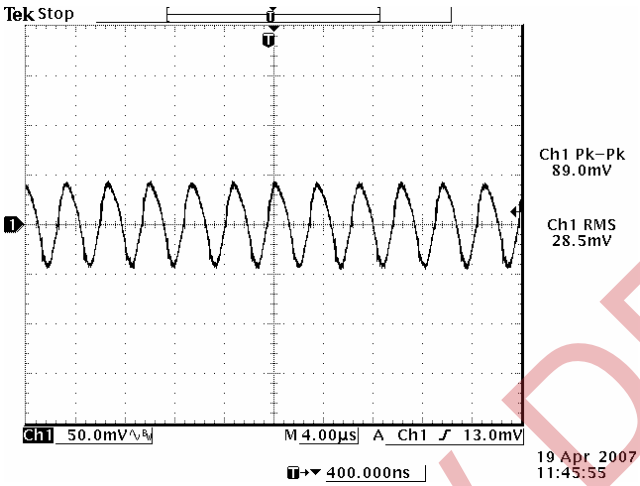
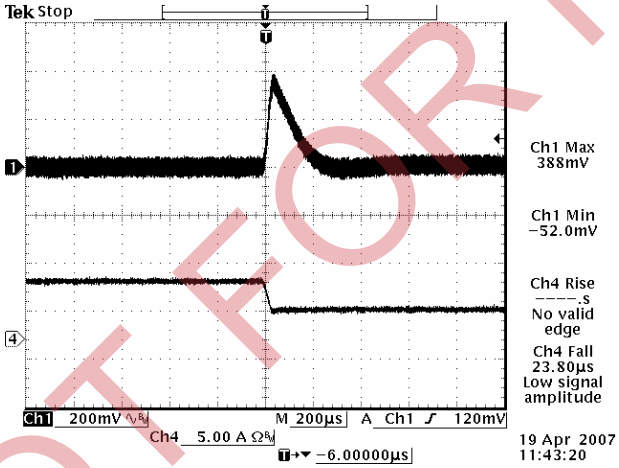
Ripple and Noise Waveform



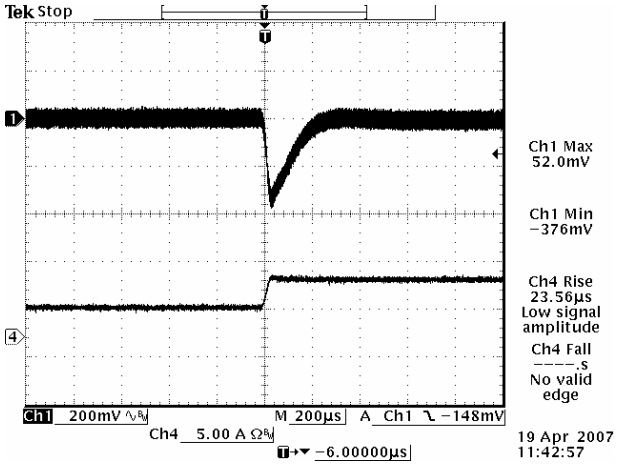
48 Vdc input, 12.0 Vdc/12 A output

Note: Ripple and noise at full load, 0-20 MHz BW, Ta=25 deg C, with a 1uF ceramic cap and a 10 uF Tantalum cap at output.

Transient Response Waveforms



Vout=12.0 V, 50%-25% Load Transient



Vout=12.0 V, 25%-50% Load Transient

Note: Transient Response at Vin=48 V, di/dt=0.1 A/uS, external 10 uF tantalum Cap and 1uF ceramic Cap at the output, Ta=25 deg C.

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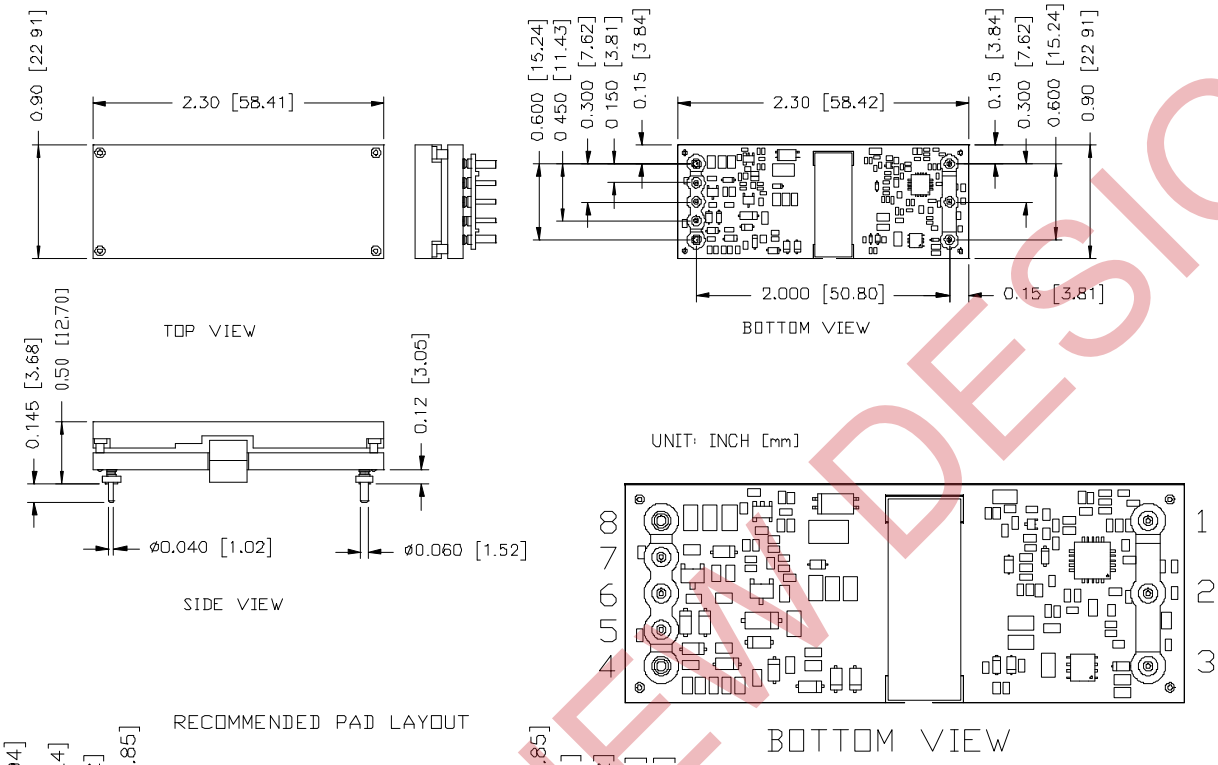
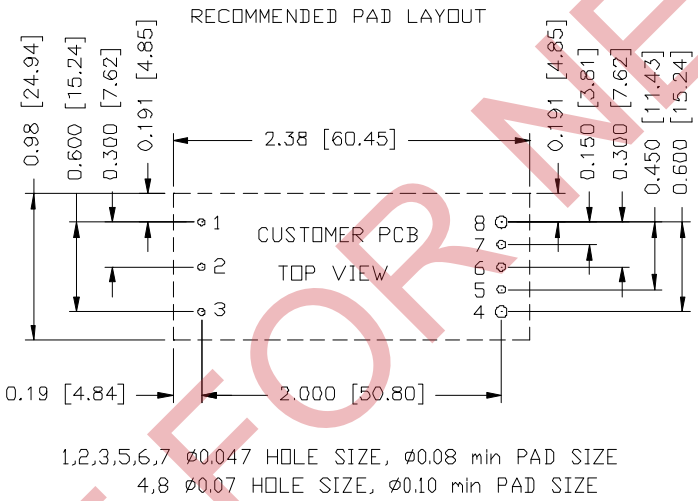
Mechanical Outline





Pin Connections

Pin	Name	Pin Dia
1	Vin+	0.040”
2	On/Off	0.040”
3	Vin-	0.040”
4	Vout-	0.062”
5	Sense-	0.040”
6	Trim	0.040”
7	Sense+	0.040”
8	Vout+	0.062”

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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