ISOLATED DC/DC CONVERTERS

18 Vdc - 62.5 Vdc Input 3.3 Vdc /8 A Output

0RCY-30U03C RoHS Compliant PRELIMINARY Rev.B

- Isolated
- High Efficiency
- High Power Density
- Fixed Frequency (330 kHz)
- Input Under-Voltage Lockout
- Input Over-Voltage Lockout
- Ultra Wide Input Range: 18 Vdc - 62.5 Vdc
- TUV Certified to EN 60950-1
- Output Over-Voltage Shutdown
- OCP/SCP
- Over Temperature Protection
- Low Cost
- Output Voltage Trim
- Positive/Negative Remote Sense
- Basic Insulation
- Remote On/Off

Description

The 0RCY-30U03C is isolated dc/dc converter that operates from a wide input range (18 Vdc - 62.5 Vdc) and can cover both 24Vin and 48Vin input range. This unit will provide up to 26.4 W of output power. This unit is designed to be highly efficient and low cost. Features include remote on/off, over current protection, over voltage shut down, over temperature protection and under-voltage lockout. This converter is provided in an industry standard 1/8 brick package.

Part Selection

Output Voltage	Input Voltage	Max. Output Current	Max. Output Power	Typical Efficiency	Model Number Active Low
3.3 Vdc	18 Vdc - 62.5 Vdc	8 A	26.4 W	89.5%	0RCY-30U03C

Notes: 1. Add “G” suffix at the end of the model number to indicate Tray Packaging.
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	-	80 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/48 V	62.5 V	
Input Current (full load) Vin=18 V Vin=24 V Vin=48 V Vin=62.5 V	 0.13 A 0.10 A 0.05 A 0.05 A	 1.65 A 1.25 A 0.65 A 0.50 A	 3.5 A 2.6 A 1.4 A 1.1 A	
Input Current (no load)	-	100 mA	150 mA	
Remote Off Input Current	-	10 mA	15 mA	
Input Reflected Ripple Current (rms)		2 mA	5 mA	Tested with simulated source impedance of 10 uH, 5 Hz to 20 MHz; use a 0.47uF/100 V ceramic capacitor and a 100uF/100 V electrolytic capacitor with ESR=1 ohm max, at 200KHz@25℃.
Input Reflected Ripple Current (pk-pk)	-	10 mA	20 mA	
I^2t Inrush Current Transient	-	0.05 A^2s	0.1 A^2s	
Turn-on Voltage Threshold	15.5 V	16.0 V	16.5 V	

Input Specifications (continued)

Parameter	Min	Typ	Max	Notes
Turn-off Voltage Threshold	15.0 V	15.5 V	16.0 V	
Input Over Voltage Lockout	75 V	76 V	77 V	

Output Specifications

Parameter	Min	Typ	Max	Notes
Output Voltage Set Point	3.25 V	3.30 V	3.35 V	Vin=48 V, Io=50% load
Load Regulation	-	±3 mV	±10 mV	
line Regulation	-	±3 mV	±10 mV	
Regulation Over Temperature (-40deg.C-85deg.C)	-	±30 mV	±50 mV	
Ripple and Noise (rms)	-	10 mV	15 mV	0-20 MHz BW, with a 10 µF tantalum cap and a 0.1µF ceramic cap at the output.
Ripple and Noise (pk-pk)	-	30 mV	40 mV	
Ripple and Noise (pk-pk)	-	5 mV	10 mV	0-20 MHz BW, with a 300 µF ceramic capacitor at the output.
Output Current Range	0 A	-	8 A	
Output DC Current Limit	10.5 A	-	17 A	Vin=48 V , in Latch mode
Short Circuit Surge Transient	-	3 A^2s	5 A^2s	
Turn on Time	10 mS	-	50 mS	
Overshoot at Turn on	-	0%	4%	
Output Capacitance	0 uF	-	4800 uF	
Transient Response				
100% ~ 50% Max Load — Overshoot	-	70 mV	100 mV	di/dt=1 A/us, Vin=24 Vdc, Ta=25 ℃, with a 300 µF ceramic capacitor at output.
100% ~ 50% Max Load — Settling Time	-	400 uS	1000 uS	
50% ~ 100% Max Load — Overshoot	-	70 mV	100 mV	
50% ~ 100% Max Load — Settling Time	-	400 uS	1000 uS	

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

General Specifications

Parameter	Min	Typ	Max	Notes
Efficiency Vin=24 V Vin=48 V	 88% 87%	 89.5% 88.5%	 - -	Measured at normal Vin, full load.
Switching Frequency	310 kHz	330 kHz	350 kHz	
Isolation capacitance	-	1500 pF	-	
Remote Sense Compensation	-	-	10%	The total voltage increased by trim and remote sense should not exceed 10%Vo.
Output Voltage Trim Range	90%	-	110%	
Over Temperature Protection	-	125 °C	-	
Over Voltage Protection	-	3.87 V	-	Vin=48 V, full load, in Latch mode.
MTBF	TBD			Calculated Per Bell Core SR-332 (Vin=24 V, Vo=3.3 V, Io=80%load, T_a = 25 °C)
Dimensions Inches (L × W × H) Millimeters (L × W × H)	 2.30 x 0.90 x 0.95 58.42 x 22.76 x 24.13			
Weight	-	31.2 g	-	

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

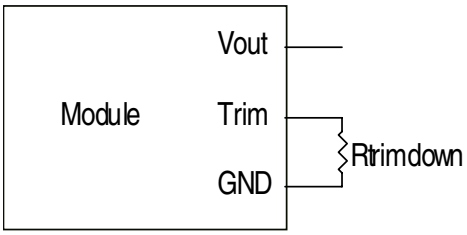
Control Specifications

Parameter		Min	Typ	Max	Notes
Remote On/Off					
Signal Low (Unit On)	Active Low	-0.3 V	-	0.8 V	The remote on/off pin open, Unit off.
Signal High (Unit Off)		2.4 V	-	18 V	
Current Sink		0 mA	-	0.75 mA	

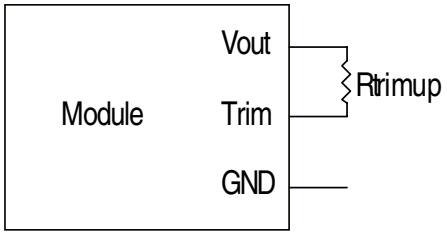
Output Trim Equations

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.

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



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

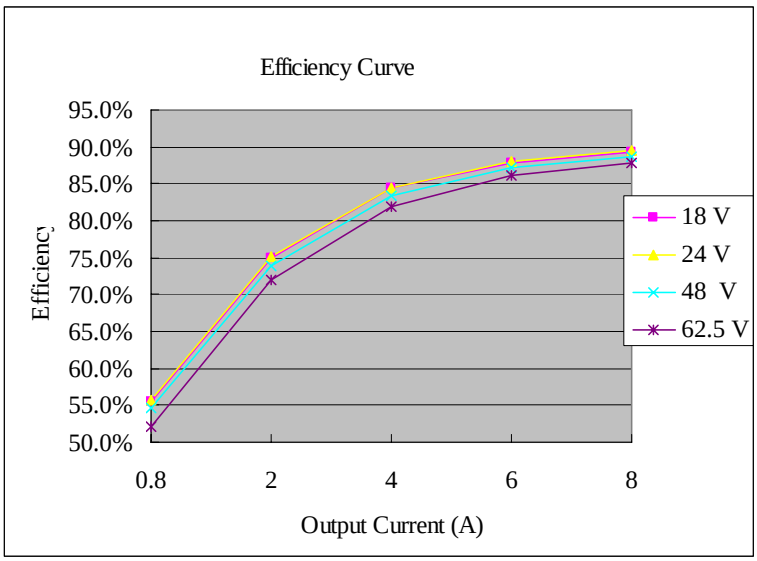


Note:

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

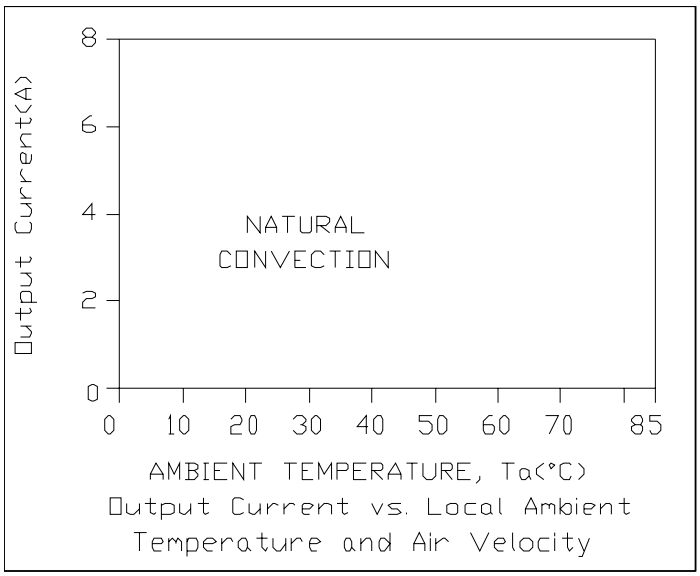
Vo_req=Desired (trimmed) output voltage [V]
Output voltage Vo=3.300 V

Efficiency Data

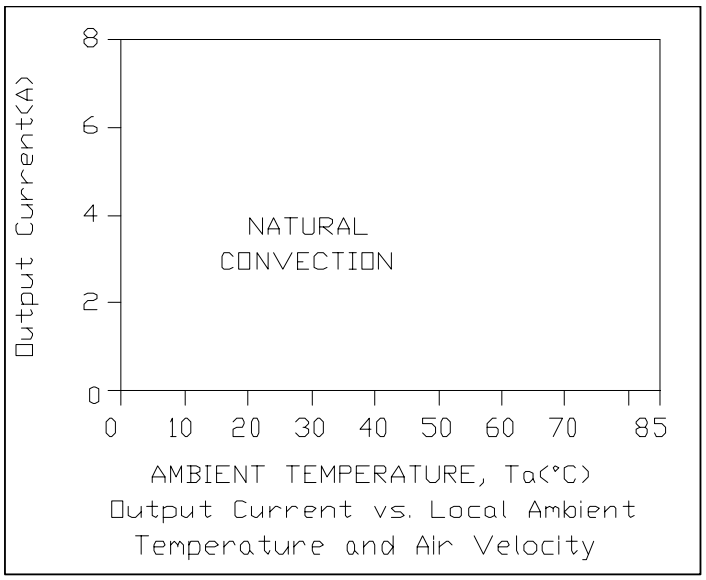


Thermal Derating Curves

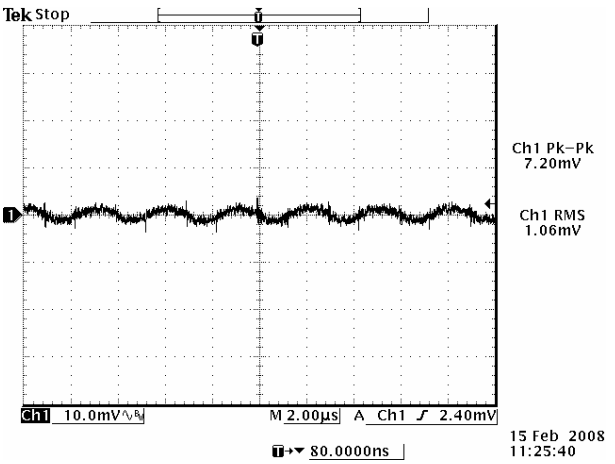
Vin=24 V, Vo=3.3 V; Maximum FET junction temperature derated to 120C



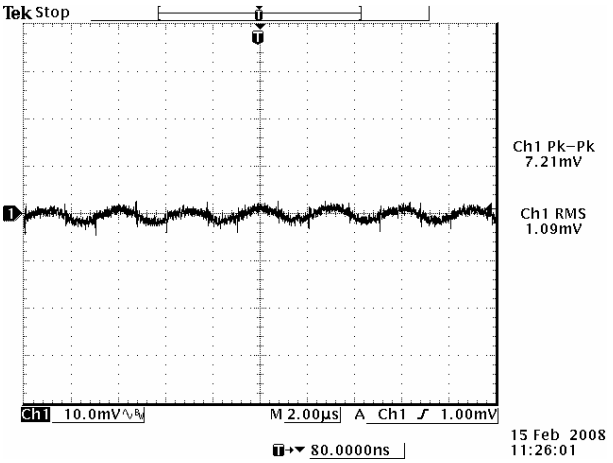
Vin=48 V, Vo=3.3 V; Maximum FET junction temperature derated to 120C



Ripple and Noise Waveforms



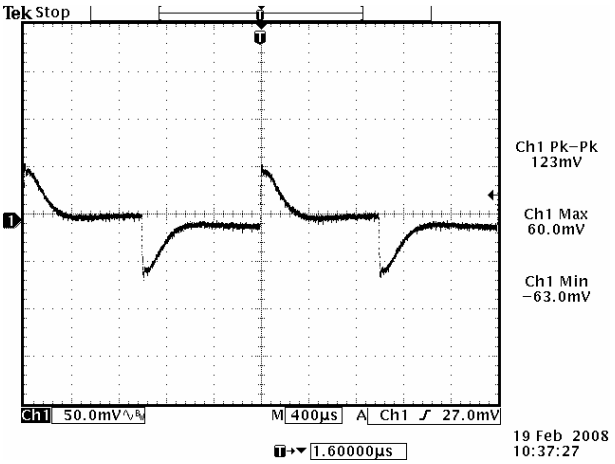
24 V input, 3.3 V/8 A output



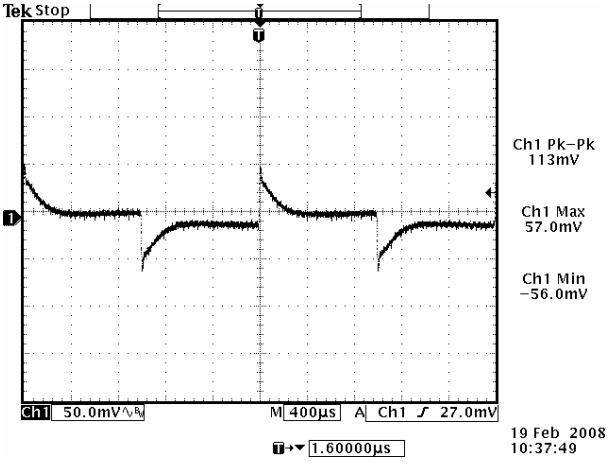
48 V input, 3.3 V/8 A output

Note: Ripple and noise at full load, 0-20 MHz BW, and with a 300 uF ceramic cap at output, Ta=25 deg C.

Transient Response Waveforms



50%-100%-50% Load Transients at Vin=24 V



50%-100%-50% Load Transients at Vin=48 V

Note: Transients at di/dt=1 A/us, with a 300 µF ceramic capacitor at output.

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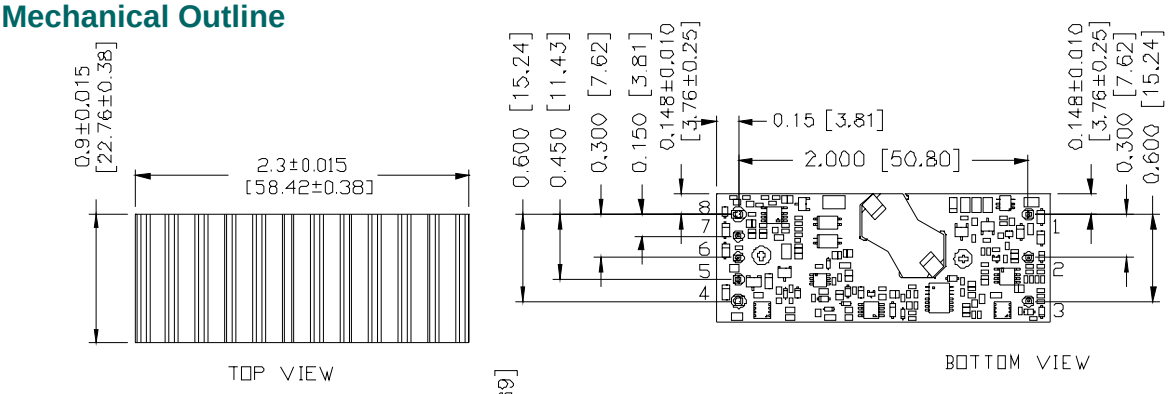
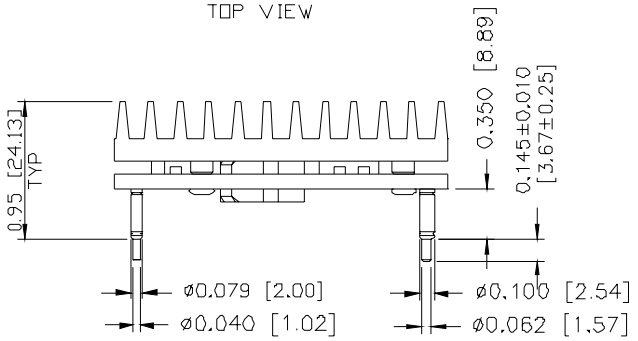
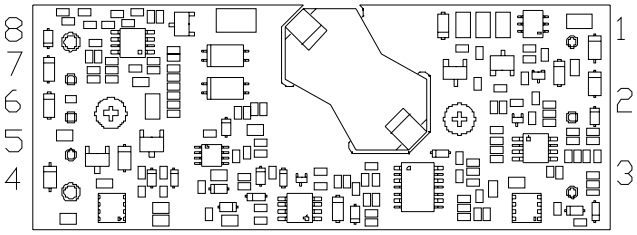
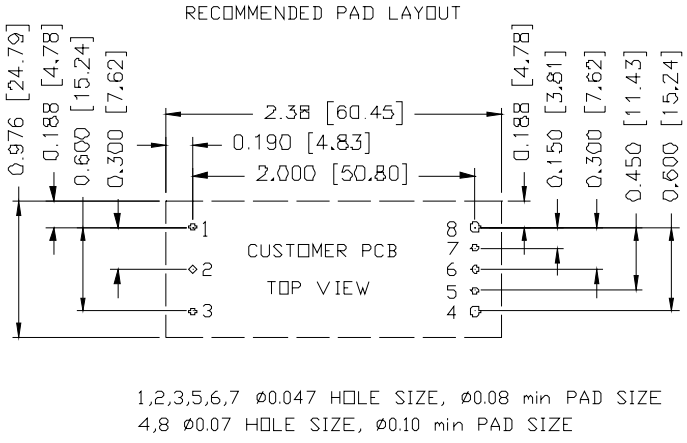
Mechanical Outline









Pin Connections

Pin	Name	Function	Pin Dia
1	Vin+	Positive input voltage	0.040”
2	On/Off	Input to turn converter on and off, referenced to Vin-	0.040”
3	Vin-	Negative input voltage	0.040”
4	Vout-	Negative output voltage	0.062”
5	Sense-	Negative remote sense	0.040”
6	Trim	Output voltage trim	0.040”
7	Sense+	Positive output voltage	0.040”
8	Vout+	Positive output voltage	0.062”

Notes: 1. Pin 5 must be connected to Vout-.
2. Leave Pin 6 open for nominal voltage.
3. Pin 7 must be connected to Vout+.

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INSTALLATION INSTRUCTION

1) The DC-DC Converter can be operated at an ambient temperature up to 85℃ maximum.
2) The DC-DC Converter is a built-in component. During installation into certain equipment the relevant requirements of EN 60950-1:2001 + A11 and IEC 60950-1:2001 shall be maintained.
3) The creepage distances, clearances and thickness of insulation between unearthed hazardous voltage input and SELV output circuits have complied with basic insulation requirements according to EN 60950-1:2001 + A11 and IEC 60950-1:2001.
4) The output ratings as shown on the label must not be exceeded.
5) The equipment is to be supplied from a DC source which is separated from AC mains by double or reinforced insulation, or by basic insulation and suitable earthing providing equivalent protection.
6) The equipment is intended to be installed into a class I or class II system, when installed into class I system, protective earth has to be reliably identified and suitable external protection devices have to be provided in the final system.

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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