

ISOLATED DC/DC CONVERTERS

48 Vdc Input 12 Vdc/18 A Output

bel
POWER PRODUCTS

0RX3-D2T12x

RoHS Compliant

Rev.C

- Isolated
- High Efficiency
- High Power Density
- Low Cost
- Fixed Frequency (300 kHz)
- Input Under-voltage Lockout
- Input Over-voltage Lockout
- Output Over-voltage Protection
- OCP/SCP
- Over Temperature Protection
- Remote On/Off
- Basic Insulation
- Baseplate



Description

The 0RX3-D2T12x is an isolated dc/dc converter that operates from a nominal 48 Vdc source. This unit will provide up to 216 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 over-voltage protection. The converter is provided in an industry standard quarter 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 V	36 V - 75 V	18 A	216 W	95%	0RX3-D2T120	0RX3-D2T12L

- 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	
Input voltage Transient Protection	-	-	100 V	Operating for 100mS
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	36 V	48 V	75 V	
Input Current (full load)	-	-	7.0 A	
Input Current (no load)	-	80 mA	150 mA	
Remote Off Input Current	-	10 mA	20 mA	
Input Reflected Ripple Current (pk-pk)	-	20 mA	30 mA	Tested with simulated source impedance of 10 uH, 5 Hz to 20 MHz; use a 100 uF /100 V electrolytic capacitor with ESR = 1 ohm max. at 200 kHz at 25 °C.
Input Reflected Ripple Current (rms)	-	5 mA	10 mA	
I ² t Inrush Current Transient	-	-	1 A ² s	
Turn-on Voltage Threshold	-	34.5 V	35.5 V	
Turn-off Voltage Threshold	32.5 V	33.5 V	-	

- Notes:** 1. Should place at least 100uF/100V electrolytic capacitor directly adjacent to the input pin of the module.
2. All specifications are typical at nominal input, full load at 25 °C unless noted.

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Output Specifications

Parameter	Min	Typ	Max	Notes
Output Voltage Set Point	-	12 V	-	Vin=48 V, Io=50% full load
Line Regulation	-	±50 mV	±100 mV	
Load Regulation	-	±300 mV	±500 mV	
Regulation Over Temperature (-40 °C to +85 °C)	-	±150 mV	±250 mV	
Output Current	0 A	-	18 A	
Current Limit Threshold	-	20 A	-	
Short Circuit Surge Transient	-	-	5 A ² s	
Ripple and Noise (rms)	-	25 mV	50 mV	0-20 MHz BW, with a 1 uF ceramic capacitor and a 10 uF Tantalum capacitor at the output.
Ripple and Noise (pk-pk)	-	70 mV	120 mV	
Turn on Time	-	30 mS	-	Ton(Enable form Vin)
	-	10 mS	-	Ton(Enable form ON/OFF)
Overshoot at Turn on	-	0%	3%	
Output Capacitance	0 uF	-	10000 uF	
Transient Response				
50% ~ 75% Max Load	Overshoot	-	300 mV	Test conditions: di/dt = 0.1 A/uS, Vin=48 V, with a 1 uF ceramic capacitor and a 10 uF Tantalum capacitor at the output.
	Settling Time	-	500 uS	
75% ~ 50% Max Load	Overshoot	-	300 mV	
	Settling Time	-	500 uS	

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

General Specifications

Parameter	Min	Typ	Max	Notes
Efficiency	-	95%	-	Vin=48 V, full load, Ta=25 °C
Switching Frequency	-	300 kHz	-	
Isolation capacitance	-	2200 pF	-	
Input to Output Isolation Voltage	-	-	1500 V	
Isolation Resistance	10M ohm	-	-	
Over Temperature Protection	-	125 °C	130 °C	
Over Voltage Protection	-	14.5 V	-	
Temperature Limits for Power Derating Curves				
Semiconductor Junction Temperature	-	-	120 °C	Package rated to 150°C
Board Temperature	-	-	125 °C	UL rated max operating temp 130°C
Transformer Temperature	-	-	125 °C	
MTBF	1,791,138 hours			Calculated Per Bell Core SR-332 (Vin=48 V, Vo=12 V, Io = 14.4 A, 300LFM forced air flow; Ta = 25 °C)
Dimensions	Inches	2.28 x 1.45 x 0.50		
	millimeters	57.91 x 36.83 x 12.70		
Weight	-	70 g	-	

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

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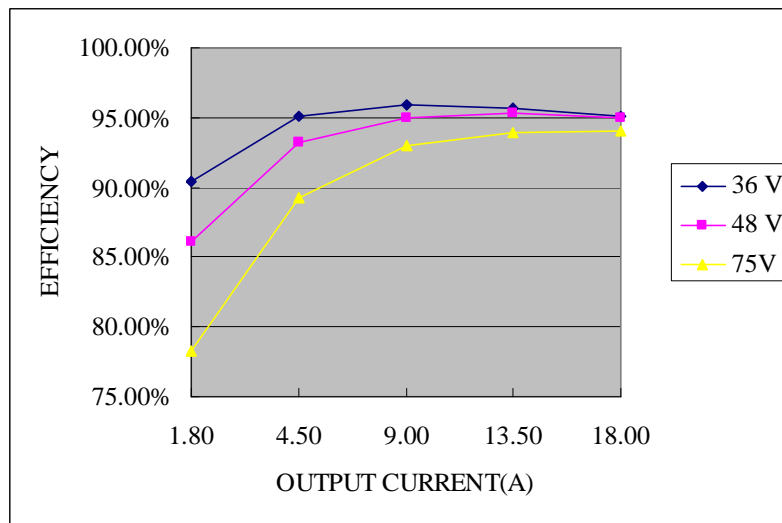
48 Vdc Input 12 Vdc/18 A Output



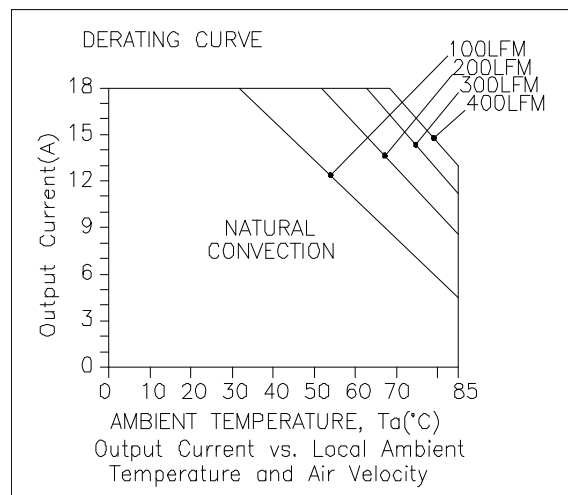
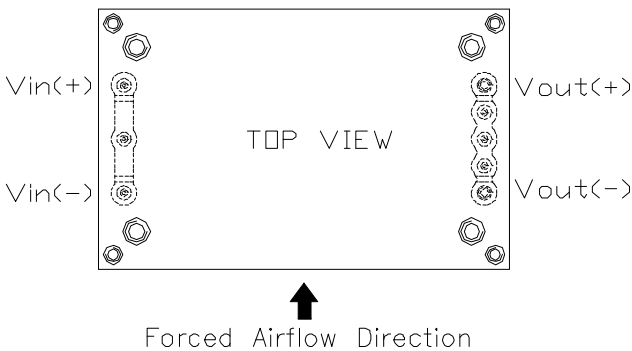
Control Specifications

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)		2.4 V	-	18 V	
Signal Low (Unit Off)	Active High	-0.3 V	-	0.8 V	
Signal High (Unit On)		2.4 V	-	18 V	
Current Sink		0 mA	-	0.75 mA	

Efficiency Data



Thermal Derating Curve



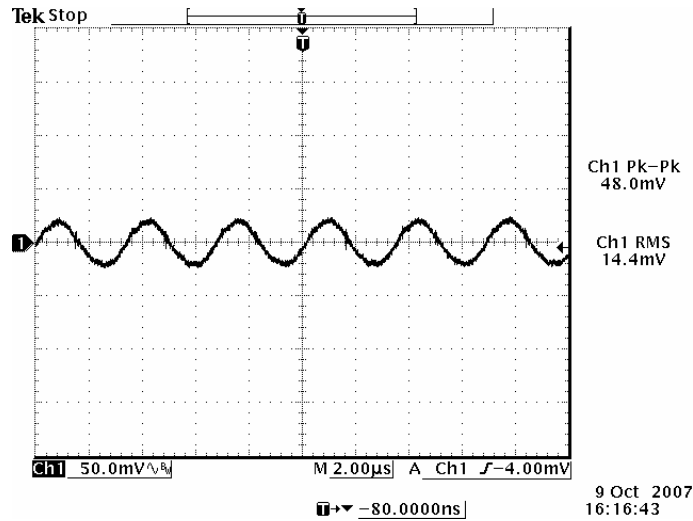
Output current derating versus ambient temperature and airflow @Vin=48V

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48 Vdc Input 12 Vdc/18 A Output



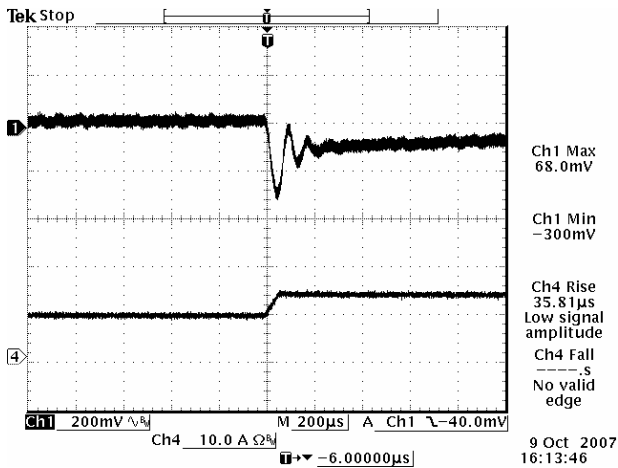
Ripple and Noise Waveform



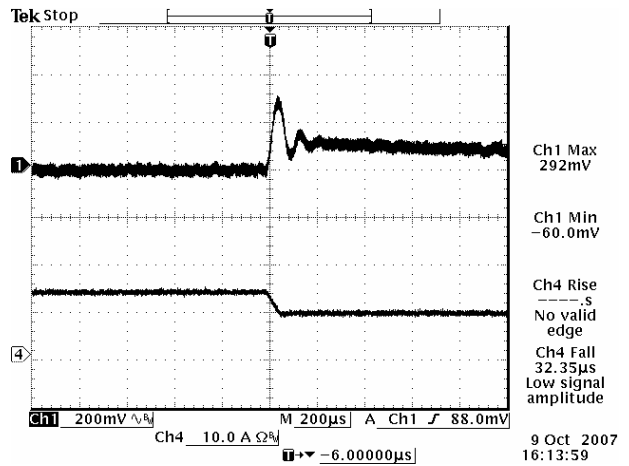
48 Vdc input, 12 Vdc/18 A output

Note: Ripple and noise at full load, with a 1µF ceramic cap and a 10 µF Tantalum cap at output, Ta=25°C.

Transient Response Waveforms



Vout=12 Vdc, 50% to 75% Load Transients



Vout=12 Vdc, 75% to 50% Load Transients

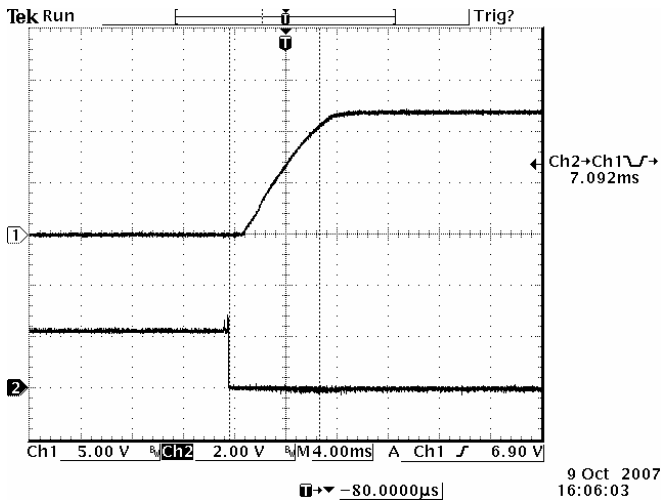
Note: Transient response at di/dt=0.1 A/µs, Vin=48 Vdc, Ta=25°C, with a 1µF ceramic capacitor and a 10µF tantalum cap at output.

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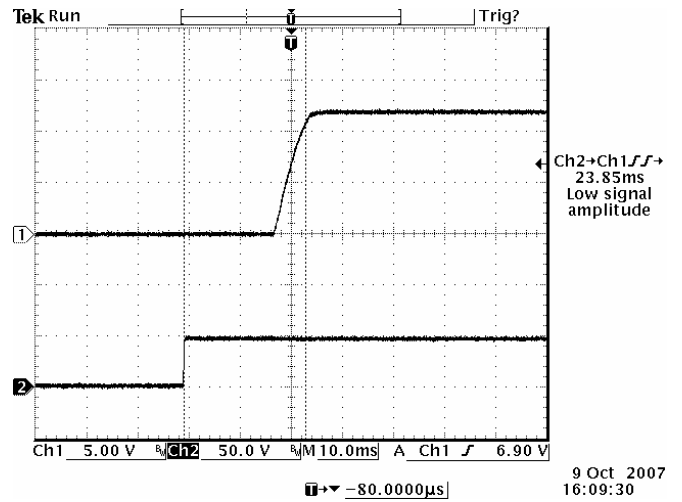
48 Vdc Input 12 Vdc/18 A Output



Start-Up Time



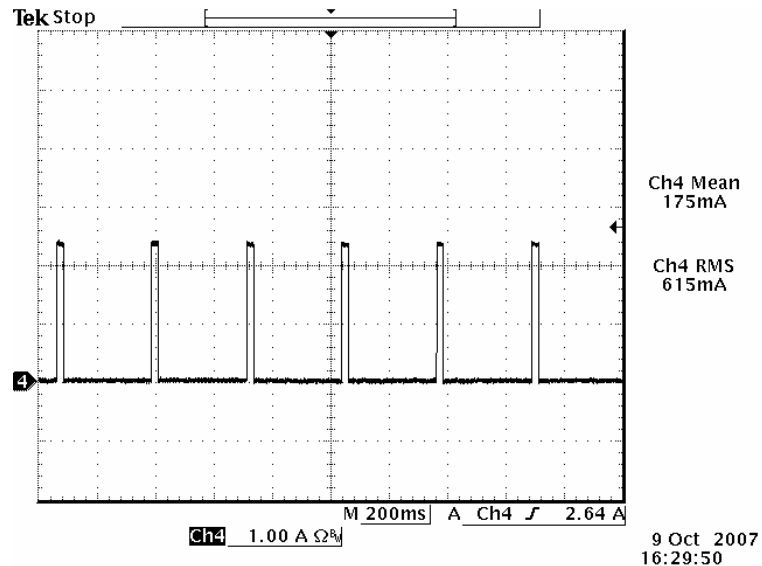
Start up time with remote on/off



Start up time with Vin

Note: Test at 48Vdc input, 12Vdc/18A output, Ta=25 deg C, and with a 1uF ceramic cap and a 10000 uF AL cap at output.

Over Current Protection



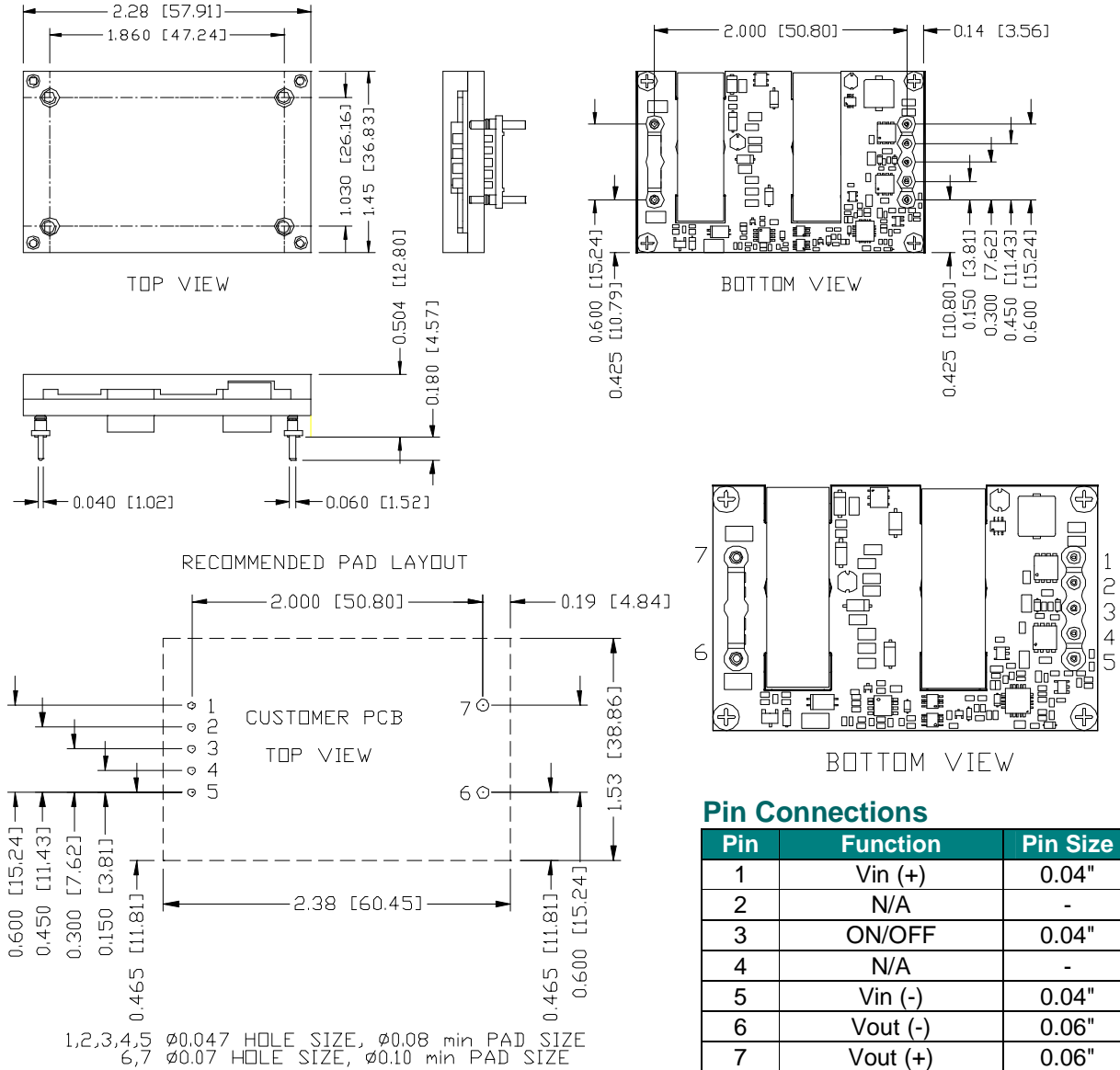
In hiccup mode @48Vdc input Ta=25 deg C

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Mechanical Outline



Pin Connections

Pin	Function	Pin Size
1	Vin (+)	0.04"
2	N/A	-
3	ON/OFF	0.04"
4	N/A	-
5	Vin (-)	0.04"
6	Vout (-)	0.06"
7	Vout (+)	0.06"

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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