# ATC210 Dual-Input Bus Converter

## Integrated Power Conversion and Power Management Solution

Embedded Power for Business-Critical Continuity



## ATC210 Dual-Input Bus Converter

**Total Power:** 210 W
**Input Voltage:** 75 VDC
**# of Outputs:** Dual


### Special Features

- Footprint optimized for high-density ATCA applications
- Accepts inputs from both -48 V “A” and “B” feeds
- Power management functions include ORing, inrush control and transient protection
- 210 W on 12 V Intermediate Bus
- 6 W on 3.3 V Management Power Bus
- I2C serial bus interface for monitoring and reporting
- Programmable alarm thresholds via I2C Bus
- Hardware alarms via opto-isolators for loss of A or B feeds
- Comprehensive protection circuitry - current, voltage and temperature
- RoHS compliant
- 2 year warranty

The dual input ATC210 bus converter provides AdvancedTCA (ATCA/PICMG3.0) board designers a compact and rugged solution for generating intermediate bus voltages in a footprint-optimized package.

The ATC210 is more than a power converter. It also provides power interface and power management functionality. The power interface functions include ORing, filtering and inrush control, while power management functionality is facilitated by both I2C serial bus and direct high-speed interfaces.

Critical alarms, such as loss of A or B feeds, are hardware-implemented. Other alarms are implemented over an I2C serial bus which is enhanced with an interrupt pin.

The solution is provided in a 2.3 x 1.8 inch (59mm x 46mm) footprint and provides an optimized solution for space-constrained systems that employ distributed power architectures.

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Stresses in excess of the maximum ratings can cause permanent damage to the device. Operation of the device is not implied at these or any other conditions in excess of those given in the specification. Exposure to absolute maximum ratings can adversely affect device reliability.

**Absolute Maximum Ratings**

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Input voltage - continuous | $V_{in\ (cont)}$ | 0 | | | -75 | Vdc $V_{in}(+) - V_{in}(-)$ |
| Input voltage - peak | $V_{in\ (peak)}$ | | | | -100 | Vdc Transients of 1 ms or less duration |
| Operating temperature | $T_{op}$ | -25 | | | 85 | ˚C Refer to thermal specification section for derating guidelines |
| Storage temperature | $T_{storage}$ | -40 | | | 125 | ˚C |
| Output power | $P_{out\ (max)}$ | 0 | | | 210 | W Main output load current must not exceed 17.5 A. Combined power not to exceed 210 Watts |

All specifications are typical at nominal input Vin = 48 V, full load under any resistive load combination at 25 ˚C unless otherwise stated.

**Input Characteristics**

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Input voltage - operating | $V_{in\ (oper)}$ | -36 | | -72 | Vdc | Management power available down to lower UVLO threshold |
| Input current - quiescent | $I_{in(off)}$ | | | 10 | mAdc | Outside working voltage range for 2 s or more |
| Input Current - operating no load on 12 Vout and 3.3 Vout | $I_{in\ (cont)\_48\ V}$<br>$I_{in\ (cont)\_60\ V}$ | | 0.142<br>0.137 | | A<br>A | @ 55.2 Vin<br>@ 69.0 Vin<br>Typical float voltage for 48 V and 60 V systems |
| Input capacitance requirement (external) | $C_{i/p}$ | | | 82 | µF | See Application Note 205 |
| Inrush current, maximum amplitude | $I_{inrush}$ | | 8.8 | 10.30 | A | Compliant with PICMG 3.0 sec 4.1.4.1 for boards |
| Inrush current, duration | $T_{inrush}$ | | | 2.00 | ms | Compliant with PICMG 3.0 sec 4.1.4.1 for boards |
| Input fuse | | | | 10/12 | A | In –48_A,B / RTN A,B lines* |

*See Application Note 205 (Section 5.2) for manufacturer and part number.

**Input Characteristics - Overload and Short Circuit Protection**

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Primary overload current<br>Primary overload duration | $I_{pri\_OL}$<br>$T_{pri\_OL}$ | 7.7 | 8.8<br>2.8 | 10.3<br>3.0 | A<br>ms | Maximum current draw during overload event |
| Short circuit protection across inrush capacitance (pin 11 wrt pin 10). Also includes the main power line from post inrush circuit up to and including the IBC input | $I_{S/C\_switch\ on}$<br>$T_{S/C\_switch\ on}$<br>$I_{S/C\_operational}$<br>$T_{S/C\_operational}$ | 1.8<br>2.0 | <br>2.4<br><br>12 | 5.7<br>2.6<br>85 | A<br>ms<br>A<br>ms | Maximum at 36 Volts Vin<br><br>Worse case at 72 Volts Vin |

For all above overload and short circuit conditions, the unit shuts off safely. The unit can be restarted, providing the fault condition is no longer present.

**Turn On/Off**

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Input voltage - turn-on | $V_{in\ (on)}$ | | | -36 | Vdc | |
| Input voltage - turn-off | $V_{in\ (uvlo)}$ | -32 | | | Vdc | |
| Input voltage - turn-on | $V_{in\ (on)}$ | -72 | | | Vdc | |
| Input voltage - turn-off | $V_{in\ (ovlo)}$ | | | -77.5 | Vdc | |
| Rise time | $T_{rise\_3.3\ V}$ | | | 1.1 | ms | 0 to 90%, full load, max output capacitance. 3.3 V comes up first |
| | $T_{rise\_12\ V}$ | | | 20 | ms | 0 to 90%, full load, max output capacitance. |

**Signal Electrical Interface**

| Characteristic - Signal Name | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Remote ON/OFF (Input only) pins 14 and 13 | | | | | | Isolated floating opto coupler input. Can use 3.3 V output (secondary) or directly use enable A or B (primary) to turn on main 12 V output |
| Input current | $I_{ih}$ | 1.6 | | 5.0 | mA | Current flowing (into pin 14, out of pin 13) to turn on 12 V output |
| Acceptable high level | $I_{ih\ (leakage)}$ | | | 10 | µA | Acceptable leakage current (into pin 14, out of pin 13) |
| Low level input voltage | $V_{il}$ | 3.0 | | | V | Converter is guaranteed on when r/c voltage (pin 14 wrt to pin 13) is equal to or greater than Vil (min) |
| Opto coupler voltage drop | $V_{d(on)}$ | | | 1.5 | V | Maximum photodiode voltage drop |
| Internal resistance | $R_{int}$ | | 1.0 | | kW | Series resistance between pin 14 and pin 13 |
| Isolation | | | Basic | | | Isolation of signal from primary and from secondary circuits according to EN60950 and UL60950 |
| A_OK# and B_OK# (Output only) pins 15 and 16 | | | | | | Two open collector outputs, used to monitor the status of -48 V_A and -48 V_B buses respectively. Signal is active low, when buses are 'OK' |
| Input Voltage (IBC) | | 35.0 | | | | Minimum voltage required at the input to IBC for A_OK# and B_OK# to be okay |
| Input current (sink) | $I_{ol}$ | 0.3 | 0.8 | 3.4 | mA | Sink current capability of each pin |
| Maximum allowable leakage current | $I_{ol\_leakage}$ | | | 10 | µA | Maximum leakage current in open collector transistor when pin is pulled to 3.3 V |
| Isolation | | | Basic | | | Isolation of signal pins from primary circuits according to EN60950 and UL60950 |
| 3.3 V Trim (Input only) pin 27/28 | | | | | | Allows the 3.3 V to be trimmed up and down |
| Controlled output voltage range | $V_{o\ trim\ up}$<br>$V_{o\ trim\ down}$ | <br>3.13 | 3.48<br>3.16 | 3.52 | V<br>V | Connect trim pin to output return to trim high, and to 3.3 Vout to trim low. See Application Note 205 |
| Programme/V select law | $R_{control}$ | | 8.06 | | kW | V/mA, current from pin increases output voltage See Application Note 205 for further details |

**Signal Electrical Interface Contd.**

| Characteristic - Signal Name | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Interrupt (output only) pin 18 | | | | | | Output, which goes active low when any of the measured parameters goes outside its limits. See Application Note 205 for further detail |
| High level output voltage | $V_{oh}$ | 2.90 | 3.10 | 3.30 | V | Interrupt is not active |
| Low level output voltage | $V_{ol}$ | | | 0.1 | V | Interrupt is active |
| High level output current | $I_{oh}$ | | | 5.0 | mA | Output source current |
| Low level sink current | $I_{ol}$ | | | 5.0 | mA | Output sink current |
| $I^2C$ Bus (input and output) pins 20 and 22<br>Low level sink current | $I_{ol}$ | | | 5.0 | mA | SDA and SCL referenced to secondary side 3.3 V return provide the communication path with the 'host' system.<br>See Application Note 205 for further details |
| Clock frequency | $I^2C_{freq}$ | | 100 | | kHz | This value is fixed |
| Address A0, A1, A2<br>pins 21, 19 and 17 (input only) | | | | | | Forms part of the $I^2C$ binary address. These are hardwired to logic '1' via 10 k pull-ups, but can be configured to logic '0' by connecting to 3.3 V output return via zero W link(s).<br>See Application Note 205 for further details |
| Enable A & B (input only) | | | | | | These two inputs effectively connect to their respective returns once the Zone1 connector mates with the Zone1 socket on the backplane. Both Enables must mate to start up the unit |

**Holdup Characteristics**

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Hold up capacitance requirement | $C_{holdup}$ | Chold_min | | 8,000 | µF | Chold_min depends on load and hold up requirement on customer system. See Application Note 205 |
| Clamp voltage | $V_{cl}$ | 41.0 | 41.5 | | V | Voltage on hold up capacitors (pin 12 wrt pin 9) when input is 43 V and 210 W load |
| Clamp voltage OVP | $V_{cl\_ovp}$ | | | 48.0 | V | If the clamp voltage exceeds $V_{cl\_ovp}$, the unit trips. Reset is achieved by cycling the input power |

## Common Protection/Control

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Overtemperature protection (IBC) | $T_{op}$ | 120 | 125 | 130 | ˚C | The IBC shuts down, resulting in both shut down of 3.3 V and 12 V. Once the substrate temperature has decreased by 5˚C, the IBC turns back on enabling both voltages |
| Overtemperature protection (main unit) | | | | | | Temperature sensors are on primary and secondary side. |
| Primary side threshold | $T_{pri}$ | | 107 | | ˚C | Once the thresholds have been |
| Secondary side threshold | $T_{sec}$ | | 102 | | ˚C | exceeded, the 12 V output is |
| Primary side hysterisis | $T_{pri\_hys}$ | | 20 | | ˚C | disabled, but the 3.3 V remains. |
| Secondary side hysterisis | $T_{sec\_hys}$ | | 10 | | ˚C | The 12 V output can only be enabled by cycling power or through the I²C interface provided that the temperature has decreased below its hysterisis level. Adjustable primary and secondary thresholds are also provided and can be set lower than the fixed thresholds. See Application Note 205. |

## Reliability and Service Life

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Mean time between failure | MTBF | | 2,008,000 | | Hours | Telcordia SR-332 $V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (max)}$; ambient 25 ˚C; ground benign environment |

## Other Specifications

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Switching frequency | $F_{sw}$ | | 400 | | kHz | As determined by IBC |
| Weight | | | 80 | | g | |

## Environmental Specifications

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Thermal Performance | $T_{op}$ | -25 | | 85 | ˚C | See derating curves (Figures 1,2) |

## EMC Electromagnetic Compatibility

| Phenomenon | Port | Standard | Test level | Criteria | Notes and conditions |
|---|---|---|---|---|---|
| Immunity: | | | | | |
| Radiated immunity | | EN61000-4-3 | | | |
| ESD | Enclosure | EN61000-4-2 | 6 kV contact<br>8 kV air | | As per ETS 300 386-1 table 5 |
| Emissions: | | | | | |
| Conducted emission | -48 V A or B bus and returns | EN55022 | A/B | Conducted | See Application Note 205 for guidelines on how to meet the required EMI standard |

Referenced ETSI standards:
ETS 300 386-1 table 5 (1997): Public telecommunication network equipment, EMC requirements
ETS 300 132-2 (1996): Power supply interface at the input to telecommunication equipment: Part 2 operated by direct current (dc)
ETR 283 (1997): Transient voltages at interface A on telecommunication direct current (dc) power distributions
PICMG® 3.0 rev 2.0 : AdvancedTCA™ Base Specification

## Safety Agency Approvals

| Characteristic | Notes and Conditions |
|---|---|
| UL/cUL60950-1 | E174104 |
| TÜV Product Services EN60950-1 | B051138572060 |
| CB certficate and report to IEC60950-1 | DE3-53905 |

## Material Ratings

| Characteristic | Notes and Conditions |
|---|---|
| Flammability rating | UL94V-0 |

## Model Numbers

| Model Number | Input Voltage | Output Voltage | Output Current (Max.) | Typical Efficiency | Max. Load Regulation | Note |
|---|---|---|---|---|---|---|
| ATC210-48D12-03J | -36 to -72 Vdc | 12 V | 17.5 A | 89% @ full load | ±5% | Total output power = 210 W |
| | | 3.3 V | 1.8 A | | ±3% | Management power |

### RoHS Compliance Ordering Information

RoHS 2002/95/EC

The 'J' at the end of the part number indicates that the part is Pb-free (RoHS 6/6 compliant). TSE RoHS 5/6 (non Pb-free) compliant versions may be available on special request, please contact your local sales representative for details.

Electrical Characteristics - O/P

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Main Output - 12V | | | | | | |
| Nominal set-point voltage | $V_{o\ (nom)}$ | | 12.2 | | Vdc | $V_{in} = V_{in\ (nom)}$ |
| Total regulation band | $V_o$ | 11.4 | | 12.6 | V | For all line, static load and temperature variations |
| Output current continuous | $I_{out}$ | 0 | | 17.5 | Adc | |
| Output current limit | $I_{ocp}$ | 21.6 | 22.5 | 23.4<br>See Application Note 205 | Adc<br>enabled by the fault condition has cleared. | During a short-circuit or when current limit of 12 V is exceeded, 12 V latches off, 3.3 V remains on. The 12 V can only be cycling power, or via the I²C interface, providing |
| Overvoltage protection for IBC | $V_{ovp}$ | 13.4 | 14.6 | 15.9 | | OVP response time is 50 µs (typ.) |
| Output voltage - noise, pk-pk | $V_{pk-pk}$<br>$V_{rms}$ | 0<br>0 | 50<br>20 | 100<br>50 | mV p-p<br>mVrms | Measurement bandwidth 20 MHz<br>Measurement bandwidth 20 MHz |
| Output voltage during hold up event | $V_{o\ (hold)}$ | 11 | | | Vdc | Lowest value of $V_o$ @ $I_{out}$ max. with input removed for hold up duration with recommended hold up capacitance |
| Output capacitance | $C_{o/p}$ | 1000 | | 6000 | µF | Capacitance should be low ESR type. See Application Note 205 |

**Electrical Characteristics - O/P**

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Management Power - 3.3V | | | | | | |
| Nominal set-point voltage | $V_{o\ (nom)}$ | | 3.32 | | Vdc | $V_{in} = V_{in(nom)}$ |
| Total regulation band | $V_o$ | 3.20 | | 3.40 | V | For all line, static load and temperature variations |
| Output current continuous | $I_{out}$ | | | 1.81 | Adc | |
| Output current limit | $I_{out\_95\%}$ | | 2.7 | | Adc | Current measured at approximately 95% of output voltage |
| Output current at short circuit | $I_{s/c}$ | | 3.7 | 4.0 | Adc | Short circuit of less than 10 mW Output self recovers upon removal of the short circuit |
| Output voltage monitor limits | $V_{uvp}$<br>$V_{ovp}$ | 2.94 | 3.00<br>3.60 | <br>3.67 | Vdc<br>Vdc | If the 3.3 V goes outside these limits, the 12 V output is disabled. The 12 V output is enabled again by cycling input power, or by resetting via I²C |
| Output voltage - noise, pk-pk | $V_{pk-pk}$<br>$V_{rms}$ | 0<br>0 | 25<br>8 | 50<br>22 | mV p-p<br>mV rms | Measurement bandwidth 20 MHz<br>Measurement bandwidth 20 MHz |
| Output voltage during hold up event | $V_{o\ (hold)}$ | 3.25 | | | Vdc | Lowest value of $V_o$ @ $I_{out}$ max with input removed for hold up duration with recommended hold up capacitance |
| Output capacitance | $C_{o/p}$ | 100 | | 1000 | µF | Capacitance should be low ESR type. See Application Note 205 |

## Efficiency

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Efficiency | h | 86 | 89 | | % | full load, low to high line (12 V and 3.3 V = 210 W) |

## Isolation Characteristics

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Input to output insulation system | | | | | Basic | |
| Input to output test voltage | | | | 2,250 | Vdc | Test duration 1s |
| Input to output capacitance | | | 2,000 | | pF | |
| Input to output resistance | | 100 | | | MW | Measured with 500 Vdc |
| A_OK# and B_OK# | | | | | Basic | Isolation from primary circuit |
| ON/OFF+ and ON/OFF- | | | | | Basic | Isolation from both primary and secondary circuits |

## I²C Serial bus Interface - This page is a summary of the I²C features set for further detail refer to App 206 I²C Serial Bus nterface

### I²C Addressing and Access

**Value Registers, Address 20 h to 28 h**

| Type | Parameter Name | Description | Scaling Factor | Address |
|---|---|---|---|---|
| Voltage (Pri) | -48 V | Voltage between HU- and HU+IN | 0.2915 V/bit | 20 h |
| Current (Pri) | -48 V | Current after input OR-ing | 0.0273 A/bit | 21 h |
| Voltage (Pri) | -48 V_A | Voltage between –48V A and RTN A | 0.2817 V/bit | 22 h |
| Voltage (Pri) | -48 V_B | Voltage between –48V A and RTN A | 0.2817 V/bit | 23 h |
| Voltage (Sec) | 3.3 V | Management power voltage | 0.0170 V/bit | 24 h |
| Voltage (Sec) | 12 V | Intermediate bus voltage | 0.0598 V/bit | 25 h |
| Current (Sec) | 12 V | Current in intermediate bus | 0.1082 A/Bit | 26 h |
| Temperature (Sec) | Temp | Secondary side temperature | 0.5 ˚C/bit-10˚C | 27 h |
| Temperature (Pri) | Temp | Primary side temperature | 0.5 ˚C/bit-10 ˚C | 28 h |

The temperature parameter is scaled at 0.5 ºC/bit with an offset of -10 ºC for a range of -10 ºC (00 h) to 117 ºC (FFh).

### Serial Bus Interface

**General Description**

| Characteristic | Notes and Conditions |
|---|---|
| Bus type | I²C |
| Clock frequency | 100 kHz |
| Supply Voltage (Note 1) | 3.3 V |

**Inventory Data**

| Parameter Name | Address | Field Size |
|---|---|---|
| Firmware revision (primary) | 40 h-47 h | 8 |
| Firmware revision (secondary) | 48 h-4F h | 8 |
| Firmware P/N (primary) | 50 h-5F h | 16 |
| Firmware P/V (secondary) | 60 h-6F h | 16 |
| ATC210 P/N (Artesyn format) | 70 h-87 h | 24 |
| ATC210 Revision | 88 h-8F h | 8 |
| ATC210 Serial No. | 90 h-97 h | 8 |
| ATC210 Date Code | 98 h-9F h | 8 |
| ATC210 Vendor (Artesyn) | A0 h-A7 h | 8 |

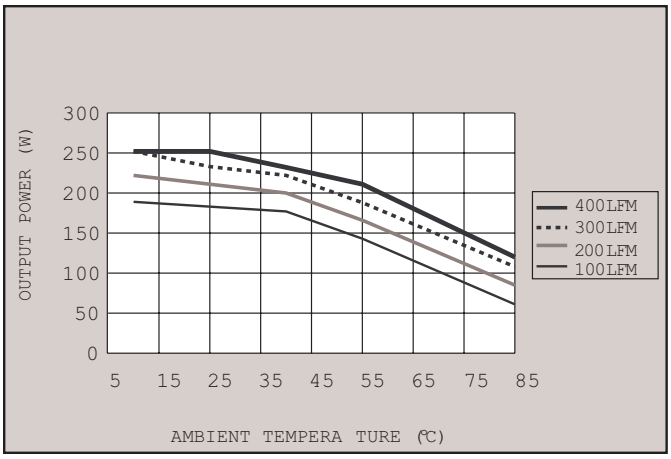



**Figure 1: Derating Curve with Forced Air**
**-39 V to -60 V input**

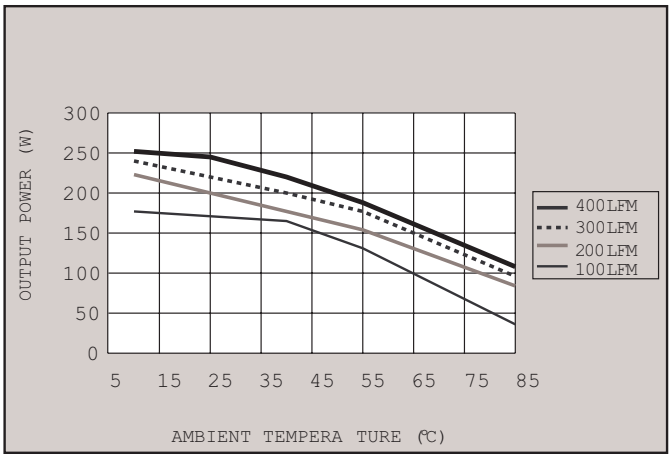



**Figure 2: Derating Curve with Forced Air**
**-36 V to -72 V input**

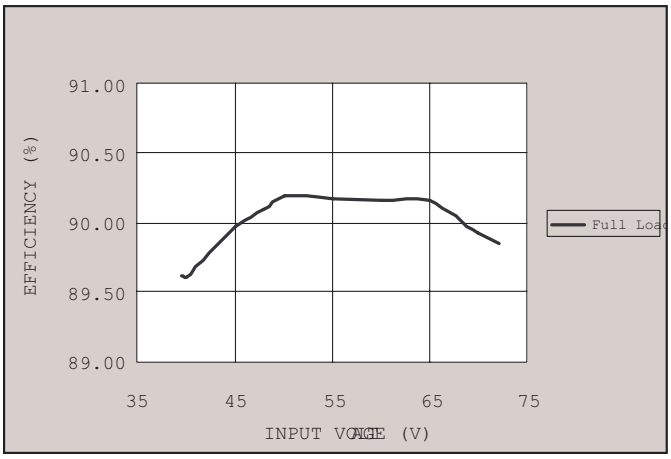



**Figure 3: Efficiency vs. Line (Full Load)**

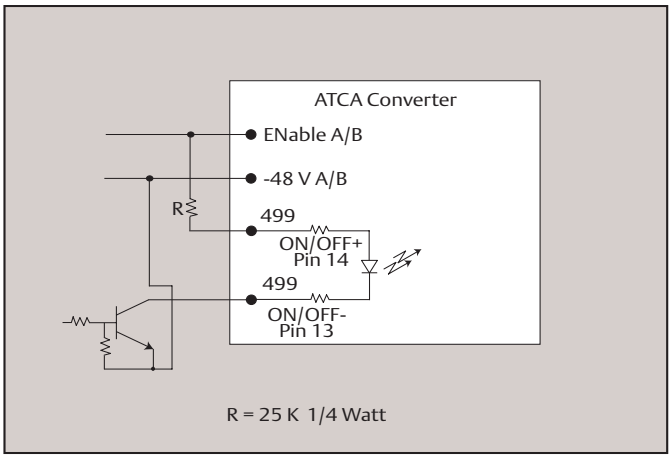



**Figure 4: Efficiency vs. Load**

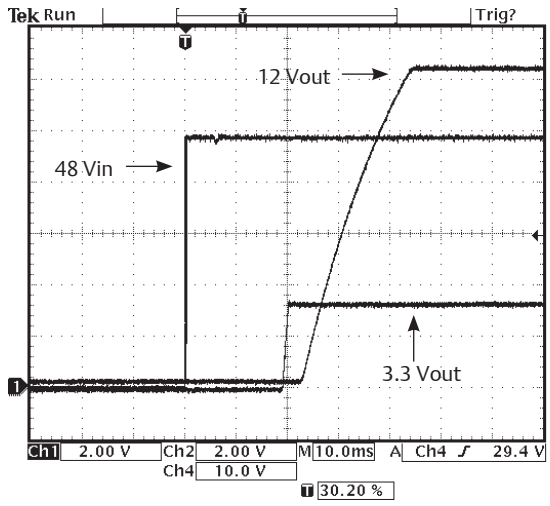



**Figure 5: Turn-On Characteristic (48 Vin)**
**Channel 1: 12 Vout; Channel 2: 3.3 Vout; Channel 4: 48 Vin**

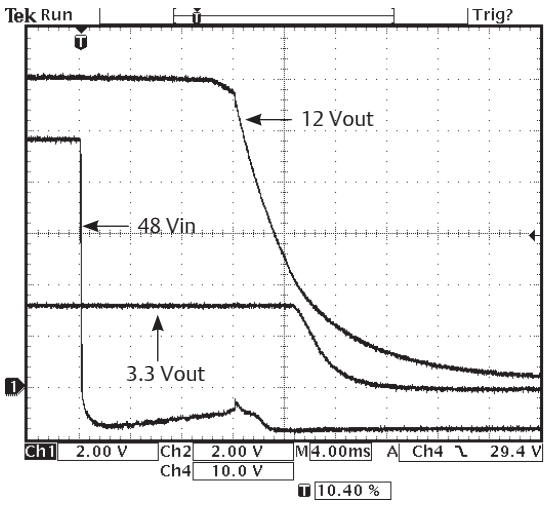



**Figure 6: Turn-Off Characteristic**
**Full Resistive Load (Input Power Removed)**
**Channel 1: 12 Vout; Channel 2: 3.3 Vout; Channel 4: 48 Vin**

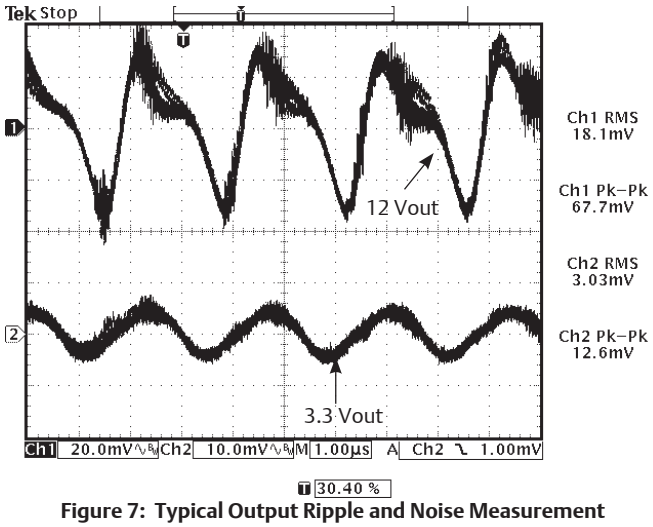



**Figure 7: Typical Output Ripple and Noise Measurement**
**Channel 1: 12 Vout; Channel 2: 3.3 Vout**

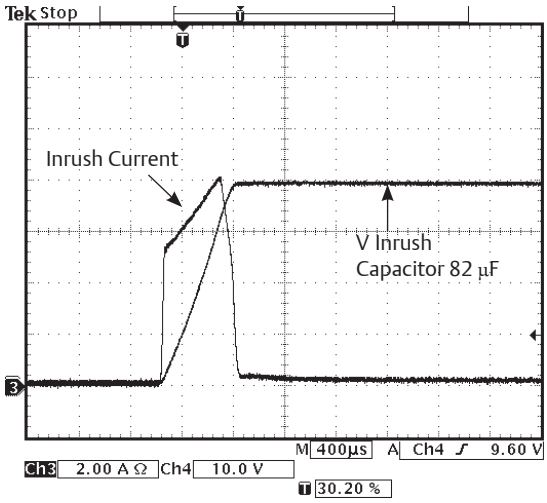



**Figure 8: Inrush Current (39.5 V)**
**Channel 3: Inrush Current;**
**Channel 4: Voltage Across Inrush Capacitor**

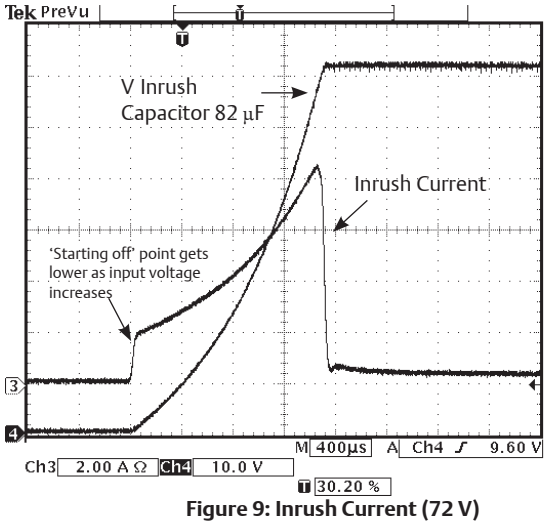



**Figure 9: Inrush Current (72 V)**
**Channel 3: Inrush Current;**
**Channel 4: Voltage Across Inrush Capacitor**

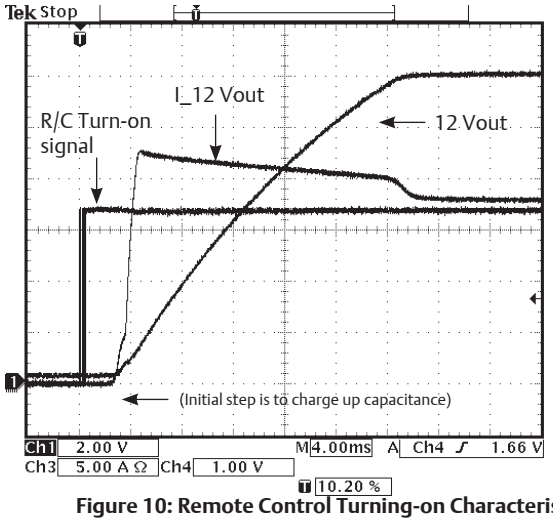



**Figure 10: Remote Control Turning-on Characteristic.**
**Vin = 48 Volts, Turning-on into Full Load for 12 Vout and 3.3 Vout**

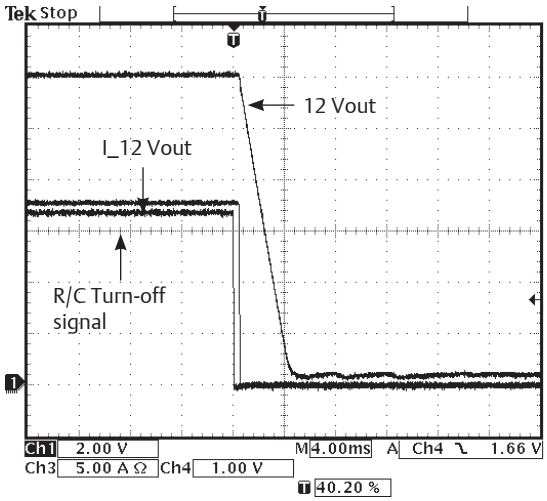



**Figure 11: Remote Control Turning-off Characteristic.**
**Vin = 48 Volts, Turning-off into Full Load for 12 Vout and 3.3 Vout**

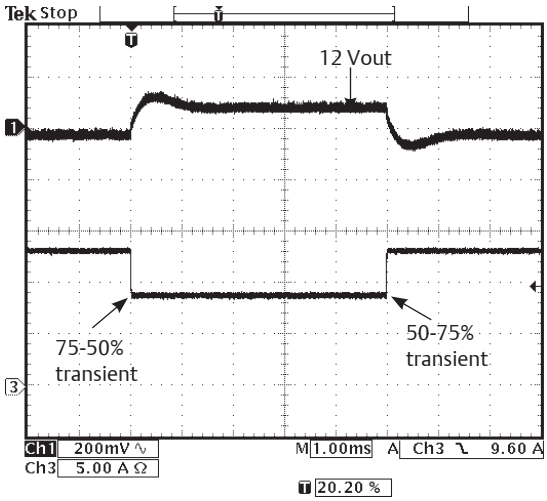



**Figure 12: Typical Transient Response 75-50% and 50-75%**
**Step Load Change (1 A/µs),**
**Channel 1: 12 Vout; Channel 3: Iout (12 Vout). Cout = 6000 mF**

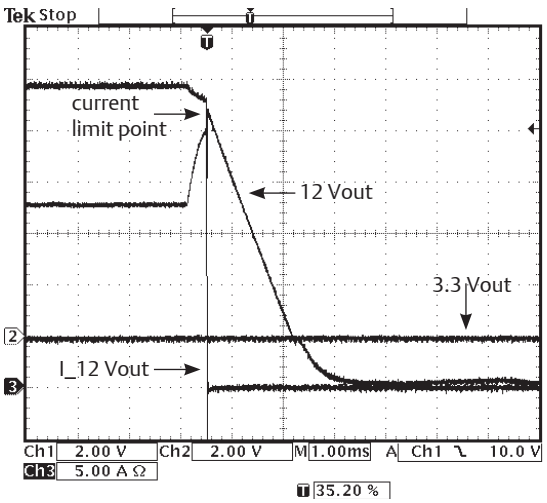



**Figure 13: 12 Vout Current Limit**
**Channel 1: 12 Vout; Channel 2: 3.3 Vout**
**Channel 3: Iout (12 Vout)**

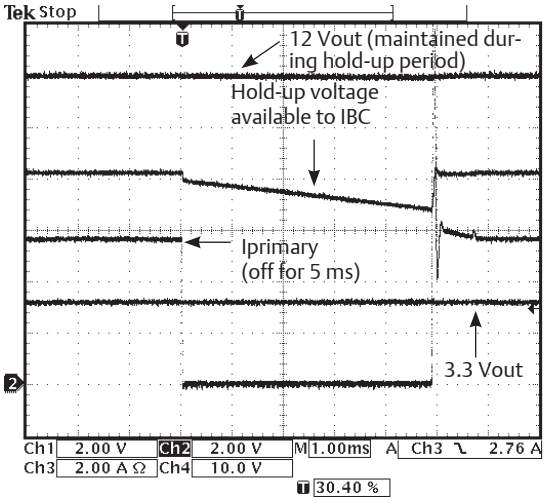
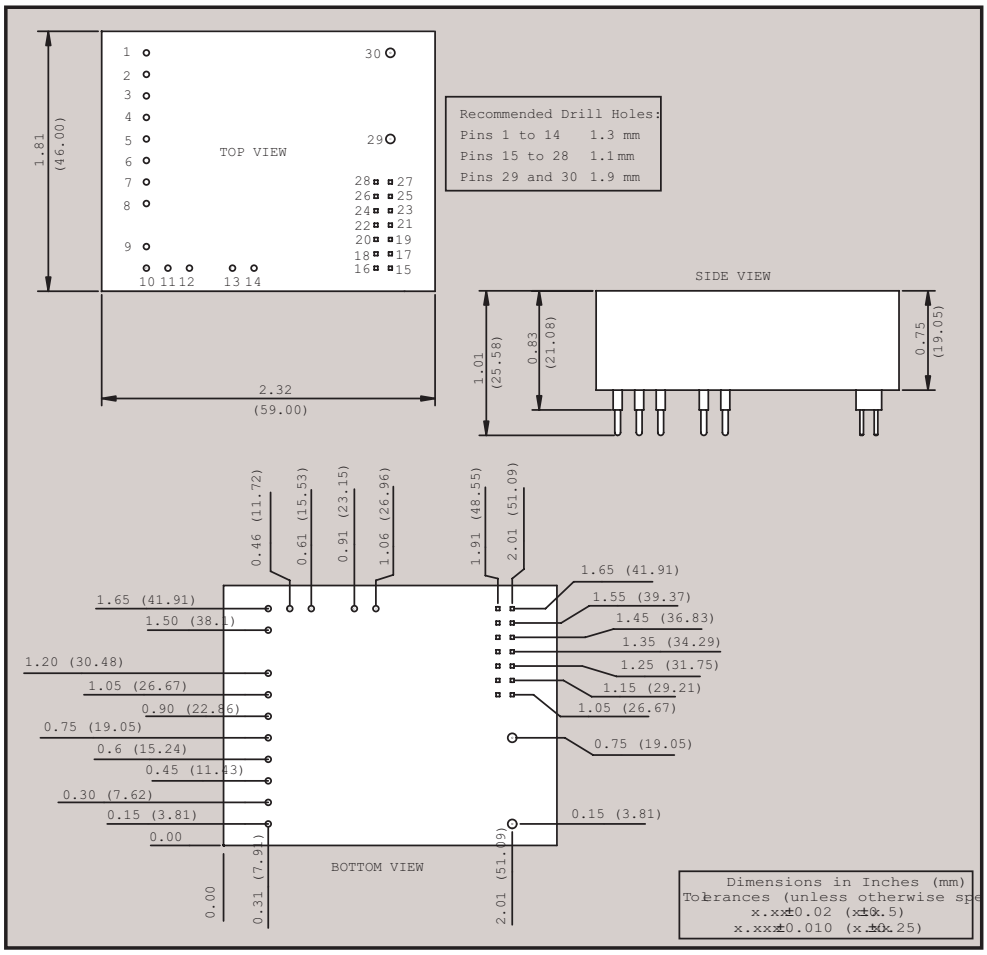



**Figure 14: Hold-up Characteristic**
**Vin = 43 Volts, 12 Vout @ 17.5 Amps, 3.3 Vout @ 1.81 Amps**




**Pin Functionality**

| Pin Number / | Pin Name | Pin Size |
|---|---|---|
| 1 | -48V A | 1.02 mm |
| 2 | -48V B | 1.02 mm |
| 3 | Reserved | See Note 2 |
| 4 | Reserved | See Note 2 |
| 5 | RTN A | 1.02 mm |
| 6 | RTN B | 1.02 mm |
| 7 | ENA | 1.02 mm |
| 8 | ENB | 1.02 mm |
| 9 | C_CL- | 1.02 mm |
| 10 | HU- | 1.02 mm |
| 11 | HU+OUT | 1.02 mm mm |
| 12 | HU+IN | 1.02 mm |
| 13 | ON/OFF- | 1.02 mm |
| 14 | ON/OFF+ | 1.02 mm |
| 15 | B_OK# | 0.64 mm Sq |

**Pin Functionality Continued**

| Pin Number / | Pin Name | Pin Size |
|---|---|---|
| 16 | A_OK# | 0.64 mm Sq |
| 17 | A2 | 0.64 mm Sq |
| 18 | INTRPT | 0.64 mm Sq |
| 19 | A1 | 0.64 mm Sq |
| 20 | SCL | 0.64 mm Sq |
| 21 | A0 | 0.64 mm Sq |
| 22 | SDA | 0.64 mm Sq |
| 23 | 3V3 RTN | 0.64 mm Sq |
| 24 | 3V3 RTN | 0.64 mm Sq |
| 25 | 3V3 OUT | 0.64 mm Sq |
| 26 | 3V3 OUT | 0.64 mm Sq |
| 27 | 3V3 TRIM | 0.64 mm Sq |
| 28 | 3V3 TRIM | 0.64 mm Sq |
| 29 | 12V RTN | 1.58 mm |
| 30 | 12V OUT | 1.58 mm |

**Figure 15 - Mechanical Drawing and Assignment Table (Pin Size is Diameter unless Otherwise Stated)**

## Pin Functionality

| Pin Number / | Pin Name | Function | Note |
|---|---|---|---|
| 1 | -48V A | Power input from 'A' bus | Connects to ATCA Zone 1 connector pin 33 via external 10 A fuse |
| 2 | -48V B | Power input from 'B' bus | Connects to ATCA Zone 1 connector pin 34 via external 10 A fuse |
| 3 | Reserved | For future use | |
| 4 | Reserved | For future use | |
| 5 | RTN A | Power return from 'A' bus | Connects to ATCA Zone 1 connector pin 28 via external 12 A fuse |
| 6 | RTN B | Power return from 'B' bus | Connects to ATCA Zone 1 connector pin 29 via external 12 A fuse |
| 7 | ENA | When connected to RTN A, turns ON isolated open collector 'A enabled' device (See Note 3) | Connects to ATCA Zone 1 connector pin 32 via external 1 A fuse. Used to signal to management system correct board insertion and presence of 'A' bus |
| 8 | ENB | When connected to RTN B, turns ON isolated open collector 'B enabled' device (See Note 3) | Connects to ATCA Zone 1 connector pin 27 via external 1 A fuse. Used to signal to management system correct board insertion and presence of 'B' bus |
| 9 | C_CL- | Connection to module of auxilliary capacitor hold up array -ve | Utilises greater capacitance in a given can size of lower voltage capacitors. Clamped to –50 V wrt HU+OUT |
| 10 | HU- | Connection to module of hold up capacitor array -ve | |
| 11 | HU+OUT | Connection from on board filter and management circuits to hold up capacitor array +ve | May also connect to input of boost module to reduce hold up storage area |
| 12 | HU+IN | Connection to main power converter from hold up capacitor array +ve | May also connect to output of boost module to reduce hold up storage area |
| 13 | ON/OFF- | Current from pin to turn main output ON | Fully floating remote ON/OFF signal, may be used with management system or ATCA ENABLE_A/B via R-D network |
| 14 | ON/OFF+ | Current into pin to turn main output ON | Fully floating remote ON/OFF signal, may be used with management system or ATCA ENABLE_A/B via R-D network |
| 15 | B_OK# | Open collector signal, monitors status of "B" feed | Low when "OK" |
| 16 | A_OK# | Open collector signal, monitors status of "B" feed | Low when "OK" |
| 17 | A2 | | $I^2C$ lines, address strapping |
| 18 | INTRPT | Interrupt Alarm | $I^2C$ Register out of limits, LM80 pin 'INT#' direct connection |
| 19 | A1 | | $I^2C$ lines, address strapping |
| 20 | SCL | Clock | $I^2C$ lines, clock line input |
| 21 | A0 | | $I^2C$ lines, address strapping |
| 22 | SDA | Data | $I^2C$ lines, serial data |
| 23, 24 | 3V3 RTN | Management power return and $I^2C$ | Also return for 'A _OK#' and 'B_OK#' signals. Externally connected to ATCA Zone 1 connector pin 26 |
| 25, 26 | 3V3 OUT | 3V3, 6 W management power | |
| 27, 28 | 3V3 TRIM | Trim pin for management power | |
| 29 | 12V RTN | 12 V return | Externally connected to ATCA Zone 1 connector pin 26 |
| 30 | 12V OUT | 12 V power | |

**Pin-Out Table**

# ATC210 Dual-Input Bus Converter
## Integrated Power Conversion and Power Management Solution

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