# DC to DC CONVERTER

# SPECIFICATION

| | |
|---|---|
| **Model Number** | **: GP83** |
| **Revision** | **: A1** |
| **Date** | **: 2008/10/18** |
| **Form Factors** | **: ATX** |

| Approval | Check | Prepared |
|---|---|---|
| | | |

## Engineering Change History

| Rev. No. | Item | Descriptions of Change | | Change Date |
|---|---|---|---|---|
| | | Before | After | |
| A1 | | | Initial release. | 2008/10/18 |

# CONTENTS

# CONTENTS

# 1. Scope

This specification defines the performances and characteristics of a ***160*** watts, ***5*** output level DC to DC converter for use in ITX computer system product.

# 2. DC Input

## 2.1 Input Requirements

| Parameter | Minimum | Nominal | Maximum | Unit |
|---|---|---|---|---|
| Vin | ***8*** | | ***28*** | VDC |
| Iin | | | ***15*** | A |
| Ripple & Noise | | | ***300*** | mVp-p |

## 2.2 Efficiency

The converter efficiency should not be less than ***90%*** at the maximum load of section 3.1 with nominal DC input voltage specified in section 2.1.

# 3. DC Output

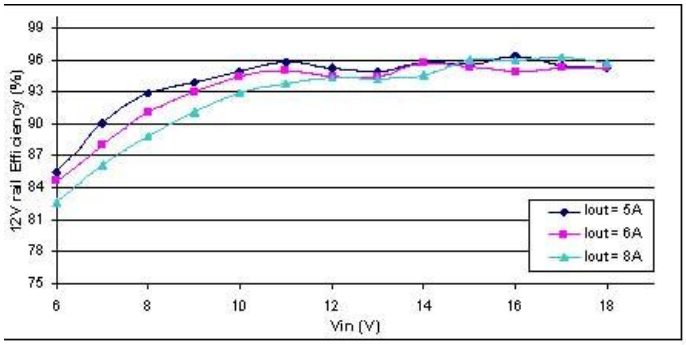
## 3.1 Output Connector

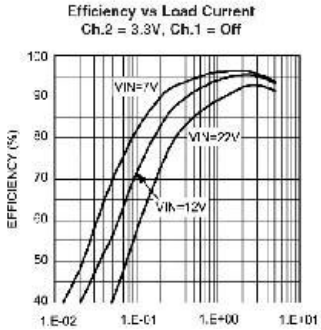
| | |
|---|---|
| Output Connector | ATX Power 20 pin (Molex P/N 39-01-2200) |

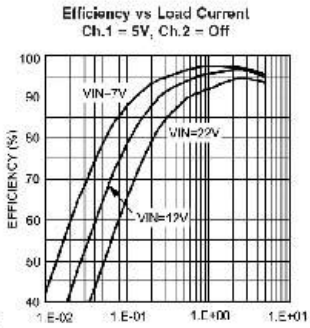
## 3.2Maximum Power Characteristics

| Output Rail | Current (Max) | Current Peak (<60 seconds) | Regulation |
|---|---|---|---|
| 5V | 8A | 12A | 1.5% |
| 3.3V | 8A | 12A | 1.5% |
| 5VSB | 1.5A | 2A | 1.5% |
| -12V | 0.15A | 0.2A | 5-% |
| 12V | 8A* (see below) | 9A | 2% |

Total power = 160 Watts




*Units starts failing at ~115 Celsius. Operating at temperatures above 85C / 185F will drastically reduce the MTBF. When operating at high temperatures or fanless operation, must reduce PSU load by 25%.

When operating at 24V or extreme temperatures, de-rate by 25%, ventilation will be required.

12V Rail Output Current

| Input (V) | 12V rail current | Input (V) | 12V rail current |
|---|---|---|---|
| 8V | 6A | 12V | 8A |
| 9V | 7A | 14V | 8.5A |
| 10V | 8A | 14-18V | 9A |
| 11V | 8A | 20-28V | 7A |

For low input voltage (8-10V) ventilation might be required for peak load

### 3.3 Output Voltage Regulation

| Output | Range | Minimum | Nominal | Maximum | Unit |
|---|---|---|---|---|---|
| +12V | ±5% | ***11.40*** | ***12.00*** | ***12.60*** | Volts |
| +5V | ±5% | ***4.75*** | ***5.00*** | ***5.25*** | Volts |
| +3.3V | ±5% | ***3.14*** | ***3.30*** | ***3.46*** | Volts |
| -12V | ±10% | ***-10.8*** | ***-12.00*** | ***-13.2*** | Volts |
| +5VSB | ±5% | ***4.75*** | ***5.00*** | ***5.25*** | Volts |

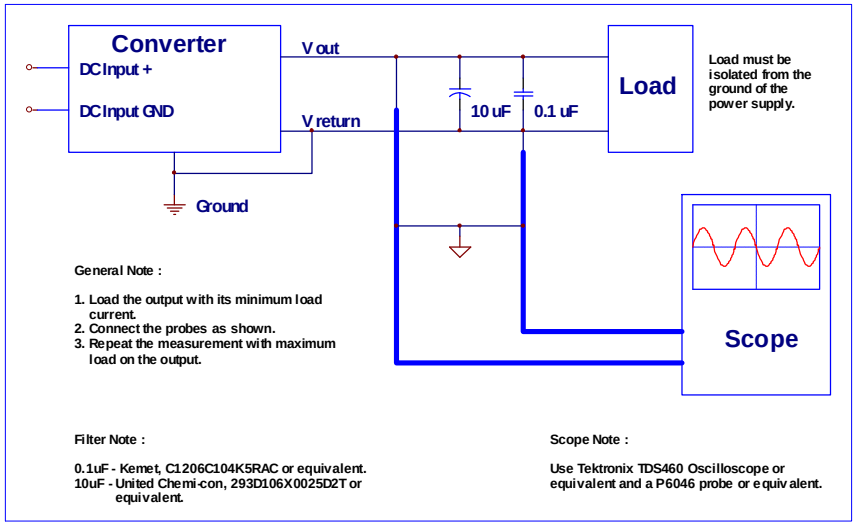
### 3.4 Output Ripple and Noise

3.3.1 The output ripple & noise requirements listed in below should be met throughout the load ranges specified in section 3.1 and under all input voltage conditions as specified in section 2.1

3.3.2 Ripple and noise are defined as periodic or random signals over frequency band of 10Hz to 20MHz. Measurement shall be made with an oscilloscope with 20MHz bandwidth. Output should be bypass at the connector with a 0.1uF ceramic disk capacitor and a 10uF electrolytic capacitor to simulate system loading.

3.3.3 Specification:

| Output | Maximum Ripple & Noise ( mVp-p ) |
|---|---|
| +12V | ***120*** |
| +5V | ***50*** |
| +3.3V | ***50*** |
| -12V | ***120*** |
| +5VSB | ***50*** |




**Differential Noise Test Setup**

### 3.5 +5VSB Output

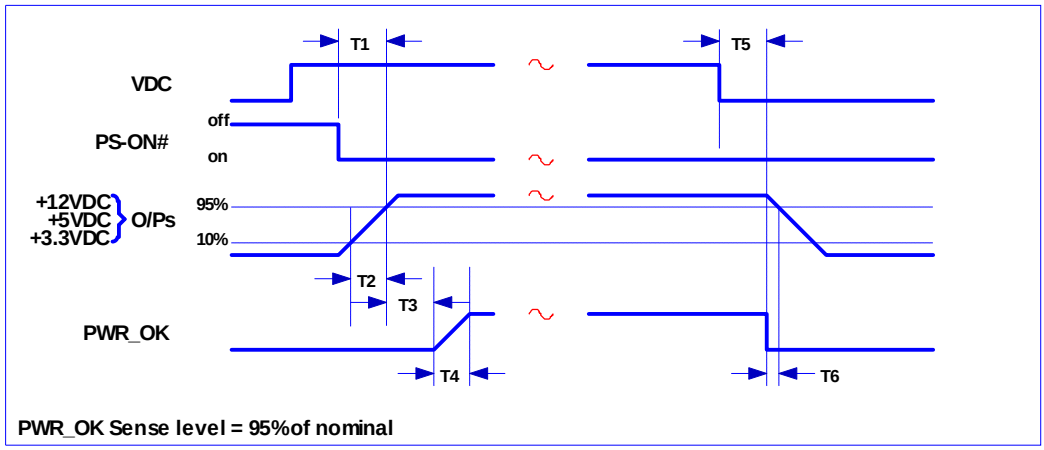
The +5VSB is a standby supply output is active whenever the DC input is present.

### 3.6 DC Output

This DC output +5VSB is controlled by the DC input, but the other DC output is controlled by the " PS-ON# " signal and DC input.

## 4. Timing and Signal

### 4.1 Signal Time Drawing




Signal Timing Drawing

### 4.2 Overshoot and Undershoot

Any overshoot at turn on or undershoot at turn off shall be less than ***±10%*** of the nominal output voltage values.

### 4.3 Power-on Time

The Power-on time is defined as the time from when PS-ON# is pulled low to when the +12VDC, +5VDC, and +3.3VDC output are within the regulation range specified in section 3.2. The power-on time shall be less than ***500ms*** ( $T_1 < 500ms$ ).

### 4.4 Rise Time

The output voltage shall rise from 10% of nominal to within the regulation ranges specified in section 3.1 within ***0.2ms*** to ***20ms*** ( $0.2ms \leq T_2 \leq 20ms$ ).

### 4.5 Power Good Signal

This is a TTL-compatible signal, At power turn on, the power good signal shall have a turn on delay of at least ***100ms*** , but no greater than ***500ms*** after +5V output has reached its minimum sense level 4.75V. At power turn off, the power good signal shall go to a down level at least ***1ms*** before +5V fall below the regulation limits described in section 3.2 ( 100ms≦$T_3$≦500ms and $T_6$≧1ms ).

### 4.6 PS-ON# Signal

PS-ON# is an active-low, TTL-compatible signal. When PS-ON# is pulled to TTL low, the converter should turn on the four main DC output rails: +12VDC, +5VDC, +3.3VDC, and –12VDC. When PS-ON# is pulled to TTL high or open-circuit, the DC output rails should not deliver current. PS-ON# has no effect on +5VSB output, which is always enable whenever the DC input is present.

**Logic level：“High ” is 2.0V ~ 5.25V**

**“Low ” is 0.0V ~ 0.8V**

## 5. Output Protection

### 5.1 Over Voltage Protection

When the +12VDC, +5Vdc, and +3.3VDC output have over voltage condition, the converter shall provide latch mode over voltage protection as defined in following table.

| Output | Minimum | Nominal | Maximum | Unit |
|---|---|---|---|---|
| +12V | ***13.4*** | ***13.8*** | ***15.6*** | Volts |
| +5V | ***5.7*** | ***6.1*** | ***7.0*** | Volts |
| +3.3V | ***3.7*** | ***3.9*** | ***4.3*** | Volts |

### 5.2 Short Circuit Protection

An output short circuit is defined as any output impedance of less than 0.1 ohms. The converter shall shut down and latch off for shorting the +3.3VDC, +5VDC, or +12VDC rails to return or any other rail. Shorts between main output rails and +5Vsb shall not cause any damage to converter. The converter shall either shut down and latch off or fold back for shorting the negative rails. +5Vsb must be capable of being shorted indefinitely, but when the short is removed, the +5Vsb output shall recovery automatically or by cycling PS-ON#. The converter shall be capable of withstanding a continuous short-circuit to the output without damage or overstress to the unit.