

# Tsi257-CED:

## Power Subsystem Controller with Fault Log

Product Feature Sheet

### Features

- Fully interlocked management of six power supplies
  - Programmable sequencing for startup, shutdown, and fault conditions
  - Programmable output OV and UV warning and fault thresholds
  - Multiple sequencing topologies supported
  - Startup and shutdown sequencing controlled via internal configuration, external hardware, or software triggers
- 10-bit, highly accurate ( $\pm 0.4\%$ ) ADC read back of secondary side voltages
- 10-bit, highly accurate ( $\pm 0.4\%$ ) ADC read back of primary side voltage and current transmitted from the Tsi20x
- Monitors intermediate bus power
  - Determines bus voltage is appropriate for startup sequencing
  - Reacts to OV/UV warning and fault conditions
- Internal 4-Kb EEPROM with 2-kb user-accessible scratchpad
- Fault log records last 14 faults
- Two-wire I<sup>2</sup>C CPU interface
- Programmable auto retry from faults
- GPIO pins
  - Enable inputs
  - Power Good/Bad outputs
  - Interrupt for OV/UV warnings
  - Primary side fault indication
  - Primary side shutdown signal
- One-pin interface to Tsi20x for monitoring of primary side analog and digital parameters
- Can be cascaded to control additional DC-DC converters
- IEEE 1149 (JTAG) compatible

### Packaging

- 48-pin QFP package

### Device Overview

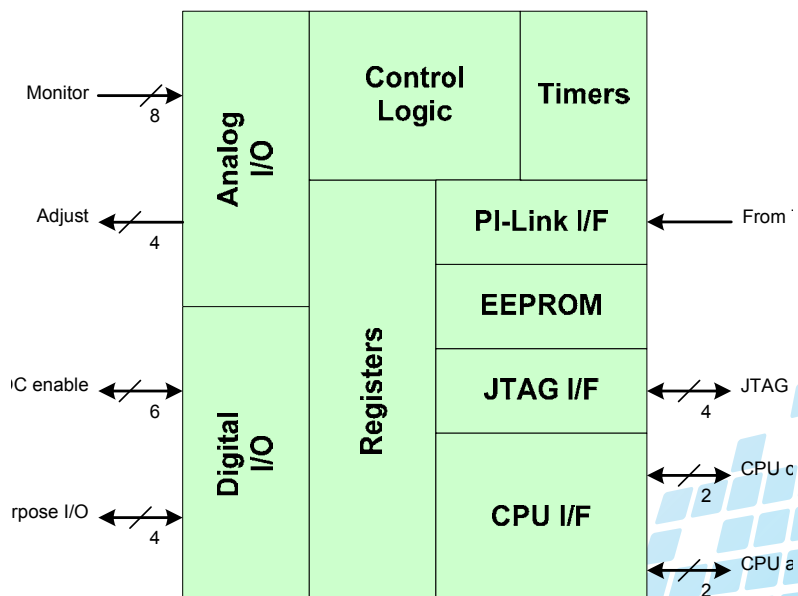
The Tsi257™ provides comprehensive and configurable power management for six non-isolated DC-DC converters.

Four general purpose I/O pins can be mapped as multiple hardware enable inputs, or three Power Good outputs and one Power Bad output. These can be allocated to any of the six monitored power rails, or in the case of Power Good/Power Bad, to the intermediate bus. The GPIO pins can also be configured as an interrupt for OV/UV warnings, primary side fault indication, or primary side shutdown.

The PI-Link interface (a simple one-pin interface to the Tsi206™ Primary Side Monitor) enables monitoring of various parameters, such as fuse status and card current, on the primary side of the safety isolation barrier.

Configuration data for the Tsi257™ is stored in an internal non-volatile EEPROM which can be programmed either through the I<sup>2</sup>C interface or the JTAG port according to the customer's manufacturing preferences. If required, parameters can be changed during operation using the Tsi257™ registers.

### Tsi257 Block Diagram



# Tsi257™: Power Subsystem Controller with Fault Log

## Benefits

### Extensive flexibility and configurability

Startup thresholds, interlock thresholds, OV/UV trip values, sequencing delays, trim values, and hardware enable interfaces, are all fully configurable via the easy-to-use PowerCenter Designer.

### Fault logging

The Tsi257™ provides non-volatile fault logging, enhancing troubleshooting during product design and during failure analysis.

### Primary side monitoring

With a Tsi20x device on the primary side, the Tsi257™ can monitor various analog and digital system parameters:

- Status of A and B fuses
- Overall -48 V card current
- -48 V input voltage measurement
- Primary side faults (overcurrent, brownout, fuse faults, and overvoltage)

### Alarms

Indicates to interrupt pin power rails have drifted outside of configured warning thresholds. This feature is useful to maximize system uptime by predicting failures before they occur.

### Retries

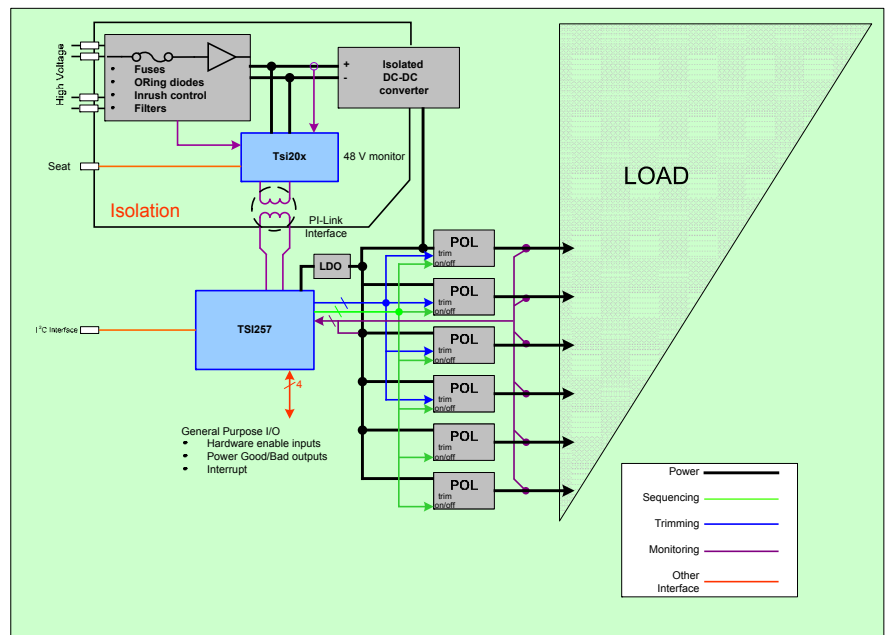
Retry power sequencing after responding to a fault condition.

### Cascade of multiple Tsi257™ devices

Supports cascading of multiple controllers for high output rail count designs.

## Typical Applications

The following application diagram shows a typical system configuration using the Tsi257™ Power Subsystem Controller in conjunction with a TSI20x Primary Side Monitor.



The Tsi257™ controls startup and shutdown sequencing, monitoring, trimming, and fault handling of any combination of six non-isolated DC-DC converters. Also, the Tsi257™ can monitor the intermediate bus and one additional voltage.

Sequencing thresholds, delay and trim values, overvoltage (OV) and undervoltage (UV) fault thresholds, as well as warning and fault thresholds are programmed through the PowerCenter Designer, an easy-to-use Windows® application available.

Configuration values and all monitored voltages are accessible through the I²C interface. You can also access -48 V primary side parameters such as voltage, current, and fuse status transmitted from the Tsi20x.

The Tsi257™ uses an internal EEPROM to store configuration information and provide field-level rewrite capability for configuration parameters. The EEPROM contains a fault log which records the last 14 faults.