

24 Channel Data Acquisition System with Motor Control

Description

The LX4580 Actuation System Manager AFE contains a combination of functions for monitoring sensors, and for controlling motion. The LX4580 interfaces with a microprocessor system or an FPGA to execute digital control system algorithms in real time. The robust sensor interfaces are designed to operate in a DO-160 aircraft environment. The microprocessor / FPGA interface is based on an ECC code over a redundant slave SPI or UART interface. The LX4580 is typically powered from +15V and generates its own intermediate power rails.

The LX4580 offers a register file model to read / write information.

Five temperature sensor monitors, a voltage monitor and three pressure sensor monitors are provided. Each sensor has a dedicated instrumentation amplifier. Each temperature sensor has a programmable current source and each pressure sensor has a power off switch. All nine amplifiers use a common MUX and a set of two SAR ADCs.

Up to four LVDT/resolver sensor outputs and 5 current sense channels can be monitored using the LX4580; each of these two types of sensors have a dedicated second order sigma delta modulator with a sample rate up to 2MHz. The LVDT channels can additionally provide the RMS value of the respective input signal. Two efficient full bridge drivers are provided to drive two independent LVDT primaries. These can be used to drive a PWM modulated sine wave with external filtering or any desired waveform from a DDS-type table

There are several digital IOs that are used to signal fault conditions, to synchronize the external control with the PWM switching cycles and LVDT driver programmed waveform and to read other digital output sensors such as Hall effect sensor outputs. There are 8 PWM outputs used to drive upper and lower MOSFET gate drivers in a four half-bridge application (e.g. motor and solenoid drive). The LX4580 default configuration (calibration data and communications parameters) is stored into an internal OTP memory and is loaded at power-up into the configuration registers. The configuration can be loaded via the SPI or UART interface by the external processing.

The analog inputs, LVDT drivers and the PWM outputs are designed to be cold spared such that two LX4580 ICs can operate in a redundant configuration with one powered on while the other is off (with RESET asserted).

The package is a 144-pin LQFP. The chip operates over a -55°C to 110°C temperature range. Consult factory for higher temperature operation

Features

- Redundant SPI or UART interface to external processing
- 5 Temperature sensor interfaces
- 3 Pressure sensor interfaces
- 2 LVDT drivers and driver monitors
- 4 LVDT monitor differential pairs with instantaneous and RMS outputs
- 5 current sense interfaces
- 1 differential voltage measurement interface
- 3 Hall effect proximity sensor inputs
- 8 PWM outputs
- On chip power regulators
- Register programmable GPIOs
- Advanced fault detection and signaling
- JTAG scan and test IF
- Small 144 pin LQFP pin package

Applications

Motor or actuator servo control

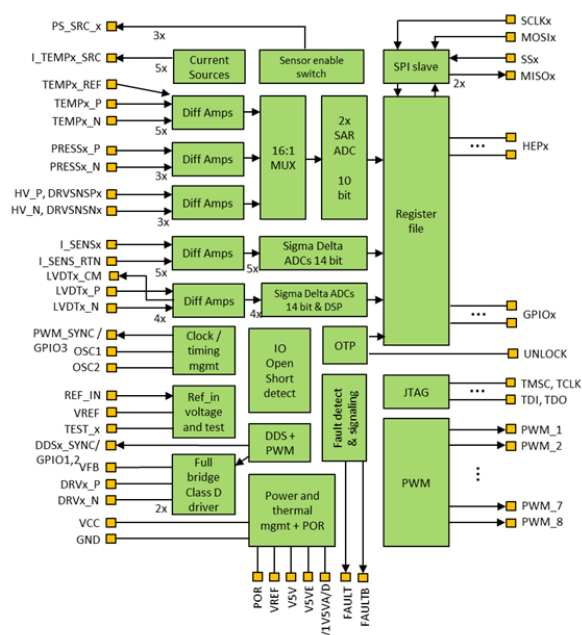


Figure 1: **Product summary**

Pin Configuration and Pin-out

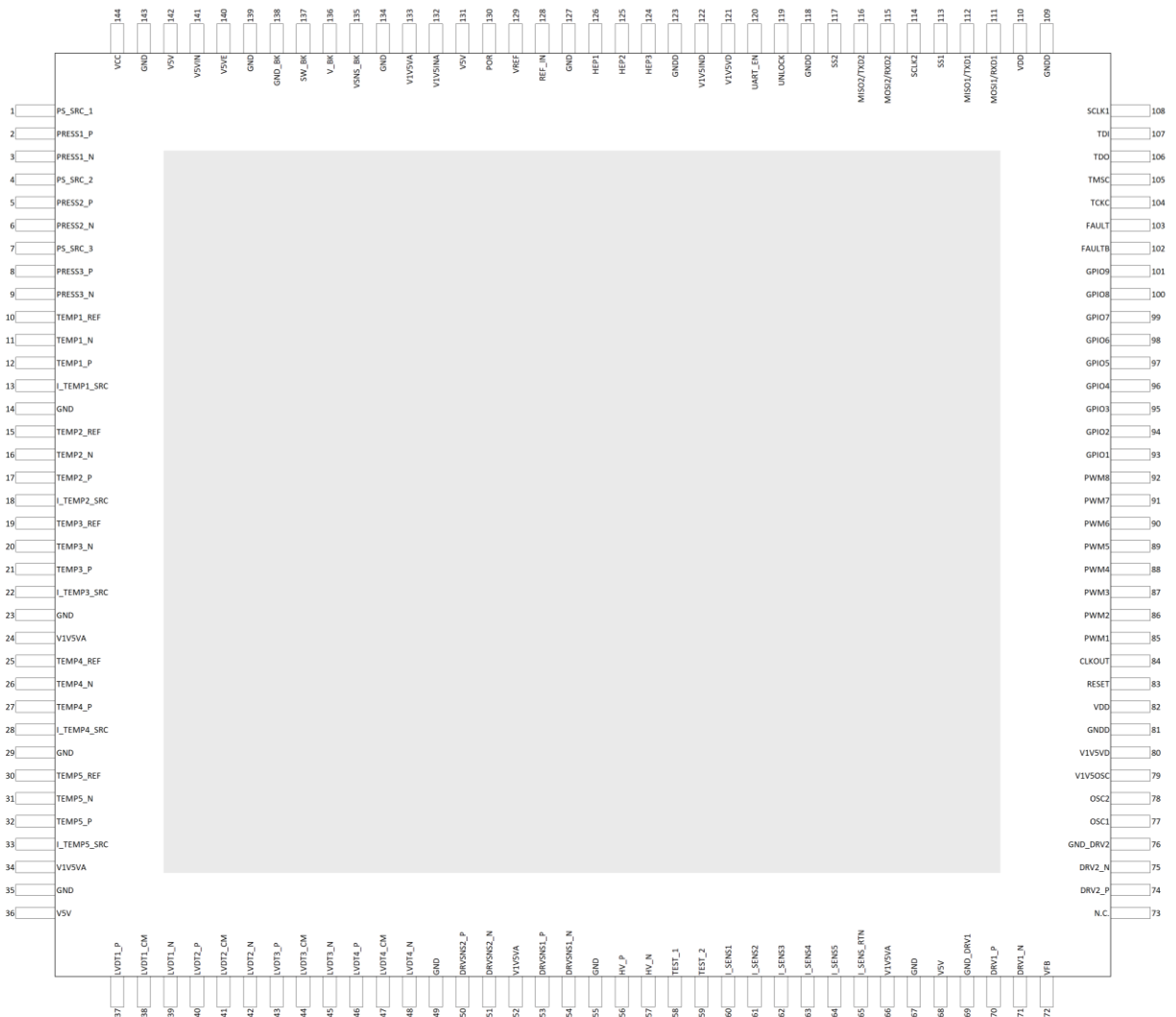


Figure 2 · Pin-out (top view)

Ordering Information

| Ambient Temperature | Type | Package | Part Number | Packaging Type |
|---------------------|------|----------|-------------|----------------|
| -55°C to 110°C | | LQFP-144 | LX4580 | Bulk / Tray |