

MX884

High-Side Current Monitor With 10-Bit Serial Digital Output

Features:

- 3-60 V Operating Voltage Range
- Integrated 10-bit ADC
- 3 wire serial interface
- Microcontroller Compatible
- Low Power
- Minimum External Components
- TSOT-23 RoHS Compliant Package

Applications:

- Lighting Management
- Current Shunt Measurement
- Remote Sensing
- Battery Monitoring
- Microprocessor Controlled Power Management

Ordering Information

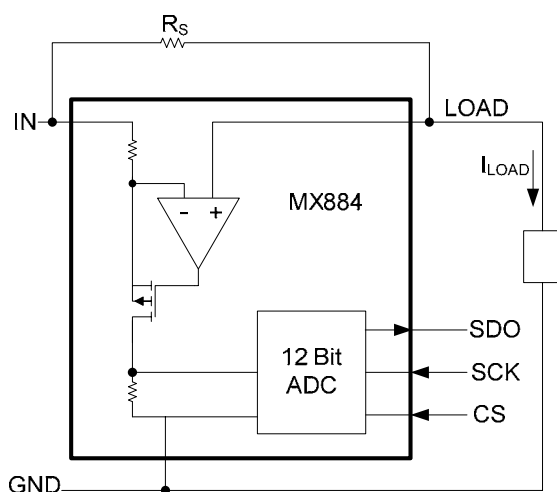
| Part No. | Description | Qty |
|-----------|-----------------------|-------|
| MX884HTTR | 6L TSOT23 Tape & Reel | 3,000 |

General Description

The MX884 targets power management applications where high noise immunity and low cost are primary requirements. Its integrated 10-bit ADC provides high resolution, making it ideal for current monitoring systems. The MX884 enables digital power management, in which a microcontroller can readily monitor the current in a system and perform other control functions in power systems and motion control products.

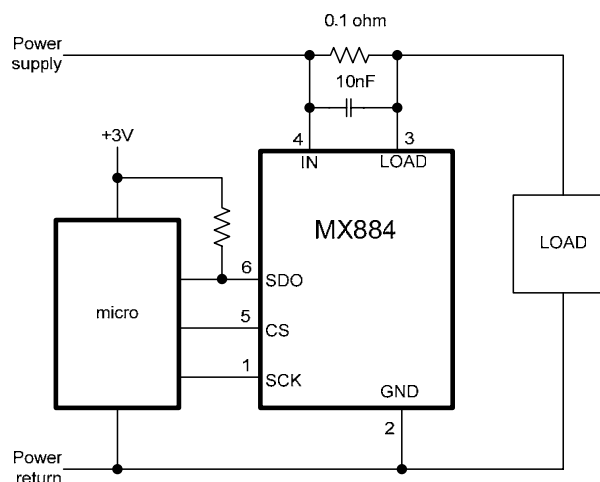
The MX884 converts a small voltage developed across an external "current" sense resistor to a 10-bit digital output. It features a wide common mode input supply voltage range of 3V to 60V and easily interfaces to most microcontrollers. The design is simple yet cost-effective, requiring very few external components, making it especially suitable for high volume applications.

Functional Block Diagram



Typical Application Circuit

(1 Amp full scale)



Absolute Maximum Ratings

T_A = +25°C unless otherwise noted, Voltages with respect to GND = 0V

| Parameter | Symbol | Min | Max | Unit |
|--------------------------------|------------------|-----|------|------|
| IN Supply Voltage | | | 70 | V |
| LOAD | | | 70 | V |
| SCK, CS Input Voltage | | | 6 | V |
| SDO Open Drain Pull Up Voltage | | | 6 | V |
| Operating Temperature Range | T _A | -40 | +85 | °C |
| Storage Temperature Range | T _{STG} | -55 | +150 | °C |

Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this data sheet is not implied. Exposure of the device to the absolute maximum ratings for an extended period may degrade the device and affect its reliability.

Pin Description and Configuration

| Pin No. | Name | Description |
|---------|------|---|
| 1 | SCK | Serial Clock |
| 2 | GND | Ground |
| 3 | LOAD | Load-Side Connection to the External Sense Resistor |
| 4 | IN | Positive Supply Terminal and Power Connection for the External Sense Resistor |
| 5 | CS | Chip Select (Active Low) |
| 6 | SDO | Serial Data Output (Open Drain) |

DC Electrical Characteristics

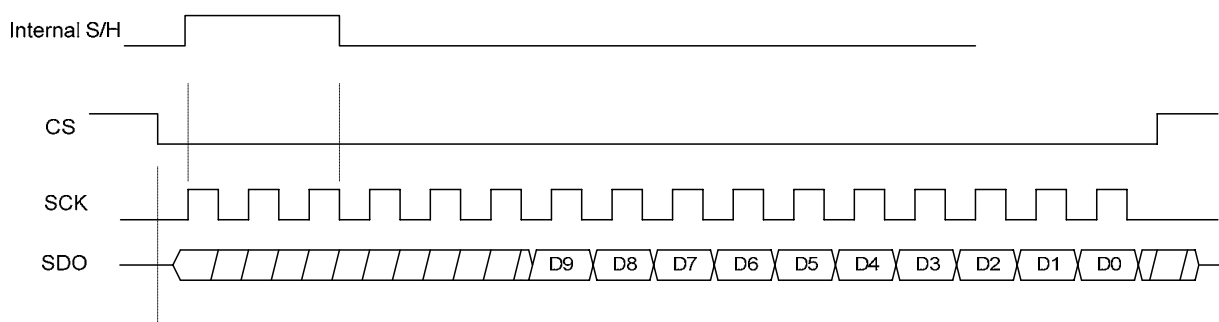
V_{IN} = 5 V, T = +25°C

| Parameter | Condition | Min | Typ | Max | Unit |
|--|--|---------------------|------|------|---------|
| Operating Voltage Range (V _{IN}) | | 3 | | 60 | V |
| Supply Current | I _{LOAD} =0 | | 0.25 | | mA |
| Average A/D Reading | 10 mV Sense Voltage | 90 | 100 | 110 | LSB |
| Average A/D Reading | 100 mV Sense Voltage | 992 | 1000 | 1008 | LSB |
| Output Noise | C _S 10nF parallel R _S =10 ohm | | 1.5 | | RMS LSB |
| SCK pulse period | | 5 | | | μS |
| SCK pulse width | high or low | 200 | | | nS |
| CS pulse period | | 100 | | | μS |
| CS falling to first SCK rising | | 200 | | | nS |
| Last SCK falling to CS rising | | 100 | | | nS |
| SCK falling to SDO valid | SDO falling | | | 80 | nS |
| | SDO rising | Depends on SDO R, C | | | |

Functional Description

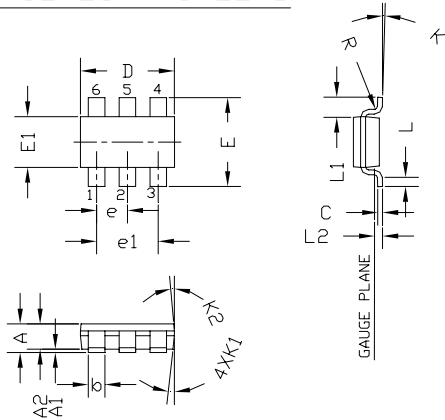
The MX884 converts a small voltage developed across an external sense resistor (R_s) to a 10-bit digital output. Pin IN connects to the 3V to 60V power input. The external current sense resistor connects between pins IN and LOAD. The nominal A/D range is $100 \text{ mV } V(\text{IN}) - V(\text{LOAD})$ across R_s . The A/D least significant bit typically equals 0.1 mV across R_s . Inputs CS and SCK are TTL-level compatible, 5.5V maximum input voltage. Inputs can be driven from CMOS microcontrollers operating at supply voltages of 2.4 to 5.5V. Serial data output pin SDO is configured as open drain, maximum 5.5V external pull-up. SCK is used internally to clock the successive approximation register of the A/D.

Serial Timing Diagram



TSOT-23 6 Lead

TSOT23 - 6 LEAD



3. PACKAGE TOP MAY BE SMALLER THAN PACKAGE BOTTOM. DIMENSIONS D AND E1 ARE DETERMINED AT THE OUTERMOST EXTREME OF THE PLASTIC BODY EXCLUDING MOLD FLASH, TIE BAR BURRS, GATE BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN TOP AND BOTTOM OF THE PLASTIC BODY.
2. DIMENSION 'E' DOES NOT INCLUDE INTER-LEAD FLASH OR PROTRUSIONS. INTER-LEAD FLASH AND PROTRUSION SHALL NOT EXCEED .006" (0.15MM) PER SIDE.
1. DIMENSION 'D' DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS AND GATE BURRS SHALL NOT EXCEED .004 IN. (0.10MM) PER SIDE.

NOTES: (UNLESS OTHERWISE SPECIFIED)

| DIM. | DIMENSIONS | | | | | |
|------|------------|-------|-------|------------|------|------|
| | INCH | | | MILLIMETER | | |
| | MIN. | NOM. | MAX. | MIN. | NOM. | MAX. |
| A | 0.030 | - | 0.035 | 0.75 | - | 0.90 |
| A1 | 0.000 | - | 0.004 | 0.00 | - | 0.10 |
| A2 | 0.028 | 0.030 | 0.031 | 0.70 | 0.75 | 0.80 |
| b | 0.014 | - | 0.020 | 0.35 | - | 0.51 |
| c | 0.004 | - | 0.010 | 0.10 | - | 0.25 |
| D | 0.110 | 0.114 | 0.118 | 2.80 | 2.90 | 3.00 |
| E | 0.102 | 0.110 | 0.118 | 2.60 | 2.80 | 3.00 |
| E1 | 0.059 | 0.063 | 0.067 | 1.50 | 1.60 | 1.70 |
| e | 0.0374 BSC | | | 0.95 BSC | | |
| e1 | 0.0748 BSC | | | 1.90 BSC | | |
| L | 0.015 | - | - | 0.37 | - | - |
| L1 | 0.0236 REF | | | 0.60 REF | | |
| L2 | 0.0098 BSC | | | 0.25 BSC | | |
| y | - | - | 0.004 | - | - | 0.10 |
| R | 0.004 | - | - | 0.10 | - | - |
| K | 0° | - | 8° | 0° | - | 8° |
| K1 | 7° NOM | | | 7° NOM | | |
| K2 | 5° NOM | | | 5° NOM | | |

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