

Features

General Description

The MAX4374 evaluation kit (EV kit) provides a proven design to evaluate the MAX4374 low-cost, micropower, high-side current-sense supervisor that contains a highside current-sense amplifier, bandgap reference, and comparator with latching output. This EV kit demonstrates the MAX4374 in a 10-pin µMAX® package. The MAX4374 is also available in 14-pin SO, but that package is not compatible with this EV kit.

The MAX4374 EV kit PCB comes with a MAX4374FEUB+ installed, which is the 50V/V gain version. The MAX4374 EV kit can also be used to evaluate the MAX4374T (20V/V gain version), MAX4374H (100V/V gain version), MAX4375T (20V/V gain version), MAX4375F (50V/V gain version), and MAX4375H (100V/V gain version). Contact the factory for free samples of the pin-compatible MAX4374TEUB+, MAX4374HEUB+, MAX4375TEUB+, MAX4375FEUB+, or MAX4375HEUB+ devices.

- Precision Real-Time Current Monitoring
- Overcurrent Protection and Reset Circuits
- Overvoltage Indicator Circuit
- O to 28V Input Common-Mode Range
- ♦ 50µA Supply Current
- 1mV (max) Input Offset Voltage
- 2% (max) Full-Scale Accuracy
- Lead(Pb)-Free and RoHS Compliant
- Proven PCB Lavout
- Fully Assembled and Tested

Ordering Information

PART	ТҮРЕ
MAX4374EVKIT+	EV Kit

+Denotes lead(Pb)-free and RoHS compliant.

µMAX is a registered trademark of Maxim Integrated Products, Inc.

DESIGNATION QTY DESCRIPTION 0.1µF ±10%, 16V X7R ceramic C1 1 capacitor (0603) Murata GRM188R71C104K 4.7µF ±10%, 6.3V X5R ceramic C2 1 capacitor (0603) Murata GRM188R60J475K 0.22µF ±10%, 16V X7R ceramic СЗ 1 capacitor (0603) Murata GRM188R71C224K 10µF ±20%, 25V X5R ceramic C4 1 capacitor (1206) Murata GRM31CR61E106K C5 0 Not installed, capacitor 30V, 12A p-channel MOSFET (6 SC70) M1 1 Vishay SiA421DJ 30V, 2.5A dual n-channel MOSFET M2 1 (6 SuperSOT) Fairchild FDC6561AN

DESIGNATION	QTY	DESCRIPTION
RSENSE	1	0.075Ω ±1%, 1/2W sensing resistor (1206) IRC LRC-LR1206LF-01-R075-F
R1, R3	2	10k Ω ±5% resistors (0603)
R2	1	100k Ω ±5% resistor (0603)
R4	1	20k Ω ±5% resistor (0603)
R5	1	470k Ω ±5% resistor (0603)
R6	1	52.3k Ω ±1% resistor (0603)
R8	1	205k Ω ±1% resistor (0603)
R7, R9	2	$10k\Omega \pm 1\%$ resistors (0603)
S1	1	Pushbutton switch
U1	1	Current-sense amplifier (10 µMAX) Maxim MAX4374FEUB+
	1	PCB: MAX4374 Evaluation Kit+

Maxim Integrated Products 1

valuates: MAX4374/MAX437 **Component List**

For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim's website at www.maxim-ic.com.

MAX4374 Evaluation Kit

Component Suppliers

SUPPLIER	PHONE	WEBSITE
Fairchild Semiconductor	888-522-5372	www.fairchildsemi.com
IRC, Inc.	361-992-7900	www.irctt.com
Murata Electronics North America, Inc.	770-436-1300	www.murata-northamerica.com
Vishay	402-563-6866	www.vishay.com

Note: Indicate that you are using the MAX4374 when contacting these component suppliers.

_Quick Start

Recommended Equipment

- MAX4374 EV kit
- 5V/10mA DC power supply
- 12V/1.5A DC power supply
- An electronic load capable of sinking 1.1A (e.g., HP 6060B)
- Two digital voltmeters

Procedure

The MAX4374 EV kit is fully assembled and tested. Follow the steps below to verify the board operation. **Caution: Do not turn on power supply or the electronic load until all connections are completed.**

- Connect the positive terminal of the 5V supply to the VCC pad. Connect the negative terminal of the 5V supply to the GND pad.
- Connect the positive terminal of the 12V supply to the VIN pad. Connect the negative terminal of the 12V supply to the GND pad.
- 3) Set the electronic load to sink 500mA.
- Connect the electronic load's positive terminal to the LOAD pad and the negative terminal to the GND pad.
- 5) Connect the first voltmeter across the OUT and GND pads.
- 6) Connect the second voltmeter across the COUT2 and GND pads.
- 7) Turn on the power supplies.
- 8) Turn on the electronic load.
- 9) Verify that the OUT voltmeter reading is approximately 1.875V and the COUT2 voltmeter is approximately 0V.

- 10) Slowly increase the sink current to above 1A. When the OUT voltage reaches approximately 3.75V, the comparator output of the part trips the PMOS switches and shuts off the load-current path.
- 11) Verify that the overcurrent circuitry shuts off the load current.
- 12) Reset the current path by pressing the S1 pushbutton after an overcurrent condition.

_Detailed Description of Hardware

The MAX4374 evaluation kit (EV kit) provides a proven design to evaluate the MAX4374 low-cost, micropower, high-side current-sense supervisor that contains a high-side current-sense amplifier, bandgap reference, and comparator with latching output. This EV kit demonstrates the MAX4374 in a 10-pin μ MAX package. The MAX4374 is also available in 14-pin SO, but that package is not compatible with this EV kit.

Measuring the Load Current

The load current is measured as a voltage drop (VSENSE) across an external sense resistor. This voltage is then amplified by the current-sense amplifier and presented as a voltage at its output pin (OUT). Like all differential amplifiers, the output voltage has two components of error, an offset error and a gain error. The offset error affects accuracy at low VSENSE and the gain error affects accuracy at large VSENSE. By minimizing both offset and gain errors, accuracy can be optimized over a wide dynamic range.

Output-Voltage Calculation

The MAX4374 EV kit is installed with a MAX4374FEUB+, which has a gain of 50V/V. The current-sense resistor (Rsense) value is 0.075Ω with ±1% tolerance. The V_{OUT} is given by:

VOUT = ILOAD X RSENSE X AV

where AV is the gain and I_{LOAD} is the current load applied to the device. Note that AV for the MAX4374FEUB+ is 50V/V.

M/IXI/M

MAX4374 Evaluation Kit

Overcurrent Protection Circuit

The MAX4374 evaluation kit (EV kit) has an on-board overcurrent protection circuit. The overcurrent protection circuit uses the latched output (COUT1) to control the external p-channel MOSFET (M1) through a level translator (M2). M1, controlled by the MAX4374, opens the current path during overload conditions. When the load current exceeds 1A, COUT1 turns M1 off. Reset the current path by pressing the pushbutton (S1) after an overcurrent condition.

Overvoltage Indicator Circuit

The MAX4374 evaluation kit (EV kit) uses the opendrain comparator output (COUT2) as the overvoltage indicator. The COUT2 pin is at 0V when VIN is below 13V. When VIN is above 13V, COUT2 will be pulled high to VCC by the external pullup resistor.

MAX4374 Evaluation Kit



Figure 1. MAX4374 EV Kit Schematic



Figure 2. MAX4374 EV Kit Component Placement Guide



Figure 3. MAX4374 EV Kit PCB Layout—Component Side



Figure 4. MAX4374 EV Kit PCB Layout—Solder Side

Maxim cannot assume responsibility for use of any circuitry other than circuitry entirely embodied in a Maxim product. No circuit patent licenses are implied. Maxim reserves the right to change the circuitry and specifications without notice at any time.

Maxim Integrated Products, 120 San Gabriel Drive, Sunnyvale, CA 94086 408-737-7600 _

5