

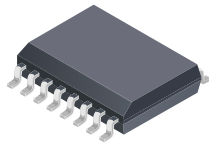
400 kHz, High Accuracy Current Sensor with Pin-Selectable Gains and Adjustable Overcurrent Fast Fault in SOICW-16 Package

FEATURES AND BENEFITS

- High operating bandwidth for fast control loops or where high-speed currents are monitored
 - 400 kHz bandwidth
 - 2 μ s typical response time
- High accuracy
 - 1% maximum sensitivity error over temperature (K series)
 - 6 mV maximum offset voltage over temperature
 - Non-ratiometric operation with V_{REF} output
 - Low noise LA package
 - ◇ 160 mV_{RMS} for 3.3 V supply
 - ◇ 124 mV_{RMS} for 5 V supply
 - Differential sensing for high immunity to external magnetic fields
 - No magnetic hysteresis
- Adjustable fast overcurrent fault
 - 1 μ s typical response time
 - Pin adjustable threshold
- Externally configurable gain settings using two logic pins
 - Four adjustable gain levels for increased design flexibility

Continued on the next page...

PACKAGE: 16-Pin SOICW (suffix MA/LA)



Not to scale

DESCRIPTION

The ACS37002 is a fully integrated Hall-effect current sensor in an SOICW-16 package that is factory-trimmed to provide high accuracy over the entire operating range without the need for customer programming. The current is sensed differentially by two Hall plates that subtract out interfering external common-mode magnetic fields.

The package construction provides high isolation by magnetically coupling the field generated by the current in the conductor to the monolithic Hall sensor IC which has no physical connection to the integrated current conductor. The MA package is optimized for higher isolation with withstand voltage, 4.8 kV_{RMS}, and 0.85 m Ω conductor resistance. The LA package is optimized for lower noise with 3.6 kV_{RMS} withstand voltage and 1 m Ω conductor resistance.

The ACS37002 has functional features that are externally configurable and robust without the need for programming. Two logic gain selection pins can be used to configure the device to one of four defined sensitivities and corresponding current ranges. A fast overcurrent fault output provides short-circuit detection for system protection with a fault threshold that is proportional to the current range and can be set with an analog input. The reference pin provides a stable voltage that corresponds to the 0A output voltage. This reference voltage allows for differential measurements as well as a device-referred voltage to set the overcurrent fault threshold.

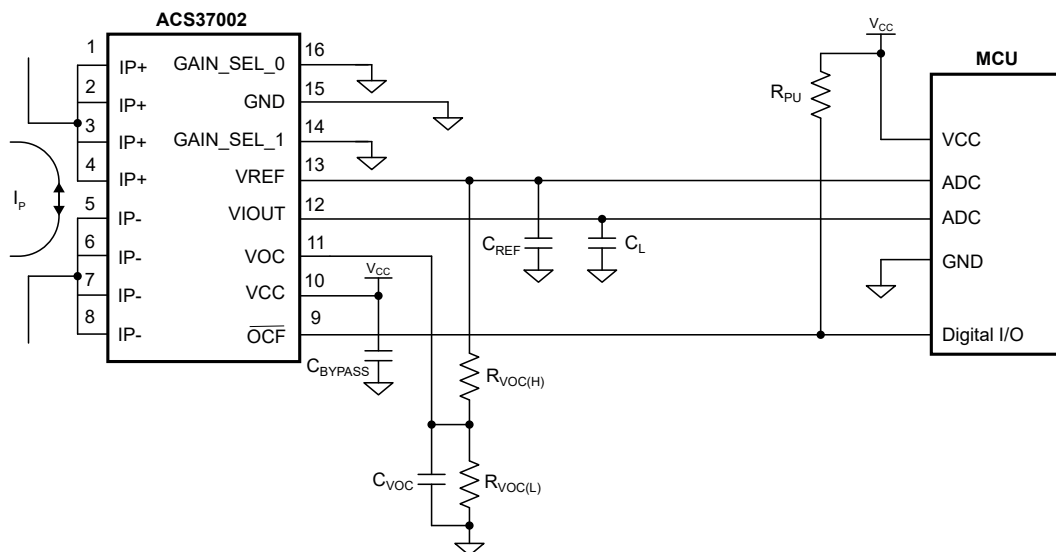
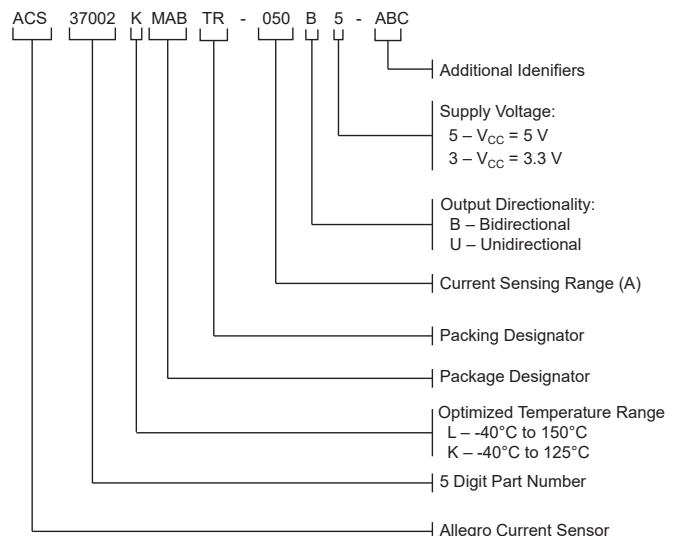
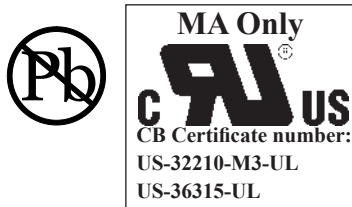


Figure 1: Typical Bidirectional Application
For more application circuits, refer to the Application and Theory section

FEATURES AND BENEFITS (continued)

- Enabling measurement ranges from 10 to 133 A in both unidirectional and bidirectional modes
- Low internal primary conductor resistance 0.85 mΩ (MA) and 1 mΩ (LA) for better power efficiency
- UL60950-1 (ed. 2) and UL 62368 (ed. 1) certification, highly isolated compact SOICW-16 surface mount package (MA)
 - 4.8 kV_{RMS} rated isolation voltage
 - 1097 V_{RMS} / 1550 V_{DC} basic isolation voltages
 - 565 V_{RMS} / 880 V_{DC} reinforced isolation voltages
- Wide operating temperature, -40°C to 150°C
- AEC-Q100 Grade 0, automotive qualified



SELECTION GUIDE

Part Number <small>(click number to go to Performance Characteristics)</small>	Current Sensing Range, I _{PR} (A)	Sensitivity [1] (mV/A)	Nominal V _{CC} (V)	Optimized Temp. Range T _A (°C)	Packing [2]
MA Package, 16-Pin SOICW					
ACS37002LMABTR-050B5	±33, ±40, ±50, ±66	60, 50, 40, 30	5	-40 to 150	1000 pieces per 13-inch reel
ACS37002LMABTR-066B5	±66, ±80, ±100, ±133	30, 25, 20, 15			
ACS37002LMABTR-050U5	33, 40, 50, 66	120, 100, 80, 60			
ACS37002LMABTR-066U5	66, 80, 100, 133	60, 50, 40, 30			
ACS37002LMABTR-050B3	±33, ±40, ±50, ±66	39.6, 33, 26.4, 19.8	3.3		
ACS37002LMABTR-066B3	±66, ±80, ±100, ±133	19.8, 16.5, 13.2, 9.9			
ACS37002LMABTR-050U3	33, 40, 50, 66	79.2, 66, 52.8, 39.6			
ACS37002LMABTR-066U3	66, 80, 100, 133	39.6, 33, 26.4, 19.8			
ACS37002KMABTR-050B5	±33, ±40, ±50, ±66	60, 50, 40, 30	5	-40 to 125 [3]	
ACS37002KMABTR-050B3	±33, ±40, ±50, ±66	39.6, 33, 26.4, 19.8	3.3		
LA Package [4], 16-Pin SOICW					
ACS37002LLAATR-015B5	±10, ±12, ±15, ±20	200, 166.6, 133.3, 100	5	-40 to 150	1000 pieces per 13-inch reel
ACS37002LLAATR-025B5	±25, ±30, ±37.5, ±50	80, 66.6, 53.3, 40			
ACS37002LLAATR-015B3	±10, ±12, ±15, ±20	132, 110, 88, 66	3.3		
ACS37002LLAATR-025U3	25, 30, 37.5, 50	105.6, 88, 70.4, 52.8			

[1] Refer to the part specific performance characteristics sections for Gain_Sel configuration.

[2] Contact Allegro for additional options.

[3] The device performance is optimized from -40°C to 125°C; however, the device can still operate to an ambient temperature of 150°C. The device shares the same qualifications as the L temperature devices unless otherwise stated.

[4] Advanced information. LA package variation is not yet released.

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