

## Coreless, High Precision, Hall-Effect Current Sensor IC with Common-Mode Field Rejection and High Bandwidth (240 kHz)

### FEATURES AND BENEFITS

- Eliminates need for concentrator core or shield
- Suited for applications where current flows through busbar or PCB
- Very wide sensing range (2.5 to 20 mV/G)
  - Ideal for sensing currents from <200 A to >1000 A
- Factory-programmed segmented linear temperature compensation (TC) provides low thermal drift
  - Sensitivity  $\pm 1\%$  (typ)
  - Offset  $\pm 3$  mV (typ)
- Differential Hall sensing rejects common-mode magnetic fields
- High operating bandwidth: DC to 240 kHz
- AEC-Q100 Grade 0, automotive qualified
- Contactless, lossless, non-invasive current sensing
- Very fast response time ( $< 2$   $\mu$ s typ)
- 3.3 or 5.0 V single supply operation
- Ratiometric output with unidirectional and bidirectional modes
- Immune to mechanical stress
- Monolithic Hall IC for high reliability
- Wide ambient temperature range:  $-40^{\circ}\text{C}$  to  $150^{\circ}\text{C}$
- Surface mount, small footprint, low-profile TSSOP8 package

### PACKAGE:

8-pin TSSOP package (suffix LU)



*Not to scale*

### DESCRIPTION

The Allegro ACS37612 current sensor IC enables low-cost solutions for AC and DC current sensing without the need for an external field concentrator core or shield. It is designed for applications where hundreds of amps flow through a busbar or PCB.

Applied current through a busbar or PCB traces generates a magnetic field that is sensed by the monolithic, low-offset, linear Hall IC. The differential sensing topology virtually eliminates all types of errors due to common-mode stray magnetic fields. High isolation is achieved via the no-contact nature of this simple assembly.

The ACS37612 is offered in 140 kHz and 240 kHz bandwidth options, making it ideal for inverter phase current sensing, load detection and management, power supplies, and DC/DC converters where fast switching is required. The high response time enables overcurrent fault detection in safety-critical applications. A  $-40^{\circ}\text{C}$  to  $150^{\circ}\text{C}$  ambient operating temperature range and a stellar ESD rating make it ready for harsh automotive environments.

The ACS37612 is suitable for space-constrained applications because of its low-profile 8-pin surface mount TSSOP package (thin-shrink small outline package, suffix LU) that is lead (Pb) free, with 100% matte tin leadframe plating.

### TYPICAL APPLICATIONS

- High voltage traction motor inverter
- 48 V / 12 V auxiliary inverter
- Battery monitoring
- Overcurrent detection
- DC/DC converter
- Smart fuse
- Power distribution unit (PDU)
- Power supply

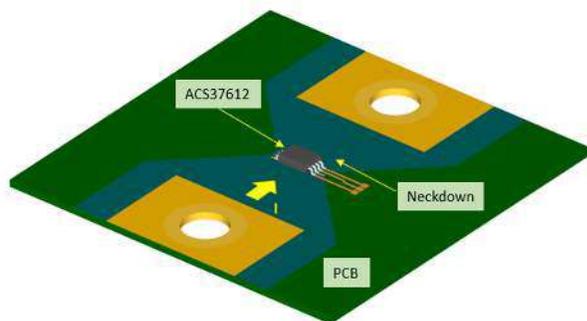


Figure 1: Current Through PCB

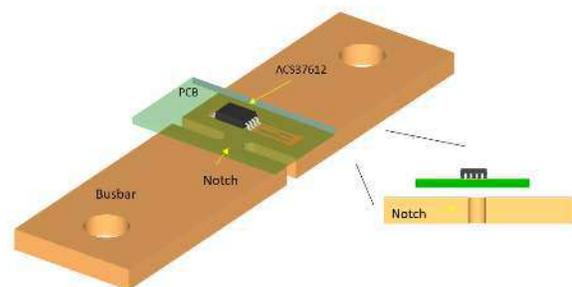


Figure 2: Current Through Busbar

# ACS37612

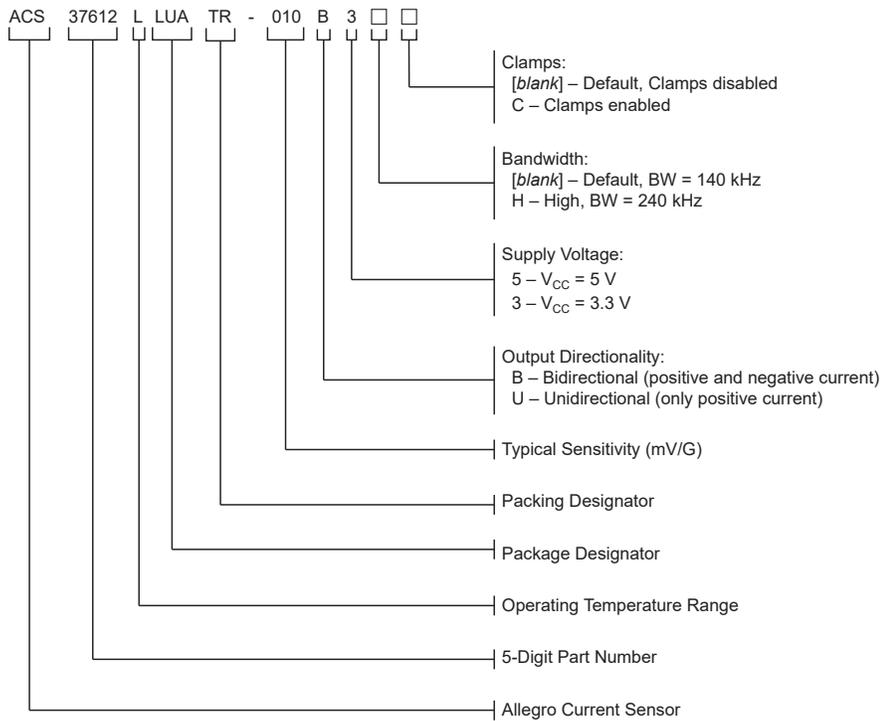
## Coreless, High Precision, Hall-Effect Current Sensor IC with Common-Mode Field Rejection and High Bandwidth (240 kHz)

### SELECTION GUIDE

Part Number	Differential Magnetic Input Range, (G)	Sensitivity Sens (Typ.) (mV/G) [1]	Nominal Supply Voltage (V)	Bandwidth (kHz)	T <sub>A</sub> (°C)	Packing [2]
ACS37612LLUATR-005B5	±400	5	5	140	-40 to 150	4000 pieces per 13-inch reel
ACS37612LLUATR-010B3	±135	10	3.3			
ACS37612LLUATR-010B5	±200	10	5			
ACS37612LLUATR-015B5	±130	15	5			
ACS37612LLUATR-015U5	0 to 265	15	5			

[1] Measured at nominal supply voltage. Contact Allegro for other sensitivity options.

[2] Contact Allegro for additional packing options.



### ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Notes	Rating	Unit
Supply Voltage	$V_{CC}$		6.5	V
Reverse Supply Voltage	$V_{RCC}$		-0.5	V
Output Voltage	$V_{IOUT}$		6.5	V
Reverse Output Voltage	$V_{RIOUT}$		-0.5	V
Output Source Current	$I_{OUT(SOURCE)}$	VOUT to GND	3	mA
Output Sink Current	$I_{OUT(SINK)}$	Minimum pull-up resistor of 500 $\Omega$	10	mA
Nominal Operating Ambient Temperature	$T_A$	Range L	-40 to 150	$^{\circ}C$
Maximum Junction Temperature	$T_J(max)$		165	$^{\circ}C$
Storage Temperature	$T_{stg}$		-65 to 165	$^{\circ}C$

### ESD RATINGS

Characteristic	Symbol	Test Conditions	Value	Unit
Human Body Model	$V_{HBM}$	Per AEC-Q100	$\pm 12$	kV
Charged Device Model	$V_{CDM}$	Per AEC-Q100	$\pm 1$	kV

### THERMAL CHARACTERISTICS: May require derating at maximum conditions; see application information

Characteristic	Symbol	Test Conditions*	Value	Unit
Package Thermal Resistance	$R_{\theta JA}$	LU package, on 4-layer PCB based on JEDEC standard	145	$^{\circ}C/W$

\*Additional thermal information available on the Allegro website

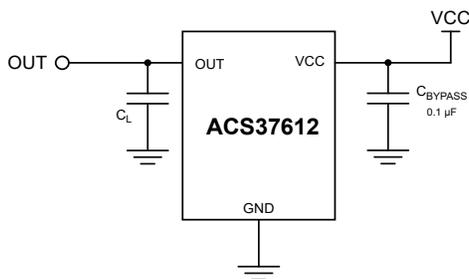


Figure 3: Typical Application Circuit

The ACS37612 outputs an analog signal,  $V_{OUT}$ , that varies linearly with the bi-directional AC or DC field sensed within the range specified.  $C_L$  is for optimal noise management, with values that depend on the application.

**Per visualizzare il catalogo completo siete invitati ad [effettuare il login sul sito](#) oppure ad [effettuare la registrazione gratuita](#).**