

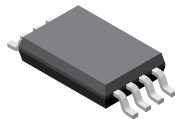
Coreless, High Precision, Hall-Effect Current Sensor IC with Common-Mode Field Rejection and High Bandwidth (240 kHz)

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 ± 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 μ 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°C to 150°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.

Current flowing through a busbar or PCB trace 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 120 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°C to 150°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

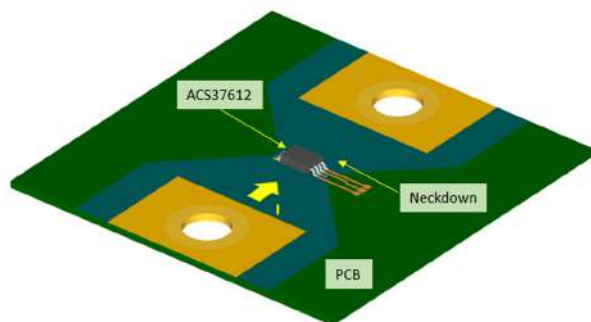


Figure 1: Current Through PCB

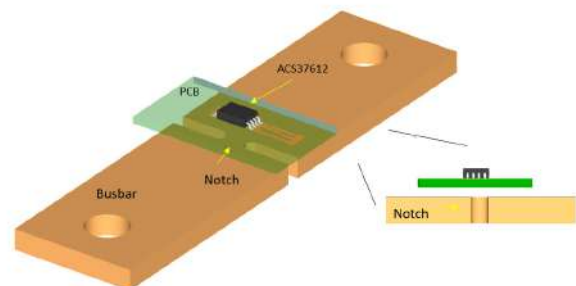


Figure 2: Current Through Busbar

ACS37612

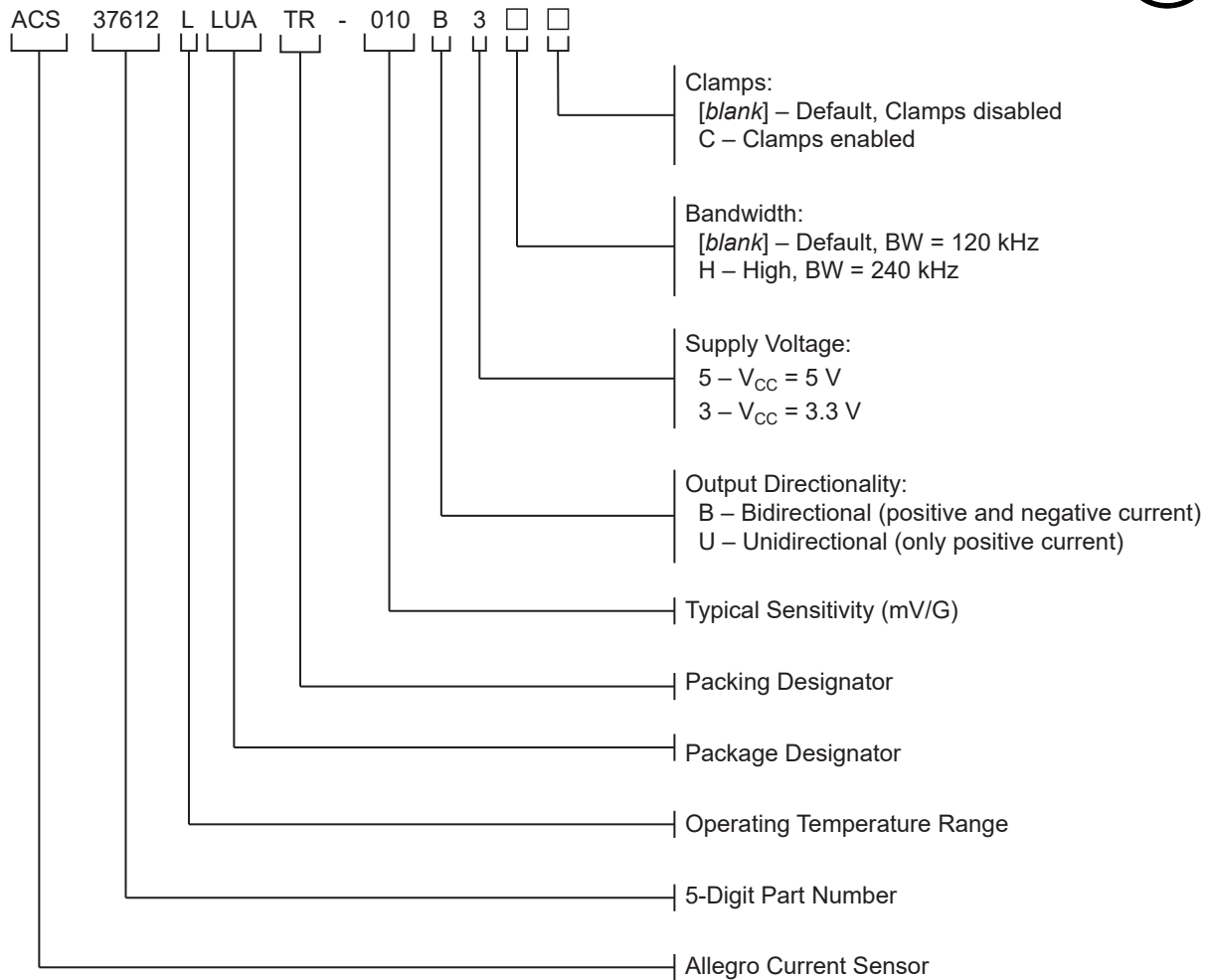
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SELECTION GUIDE

Part Number	Nominal Supply Voltage (V)	Differential Magnetic Input Range, (G)	Sensitivity Sens (Typ.) (mV/G) ^[1]	Bandwidth (kHz)	T _A (°C)	Packing ^[2]
ACS37612LLUATR-010B3	3.3	±135	10	120	-40 to 150	4000 pieces per 13-inch reel
ACS37612LLUATR-005B5	5	±400	5			
ACS37612LLUATR-010B5	5	±200	10			
ACS37612LLUATR-015B5	5	±130	15			
ACS37612LLUATR-015U5	5	0 to 265	15			

^[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_{OUT}		6.5	V
Reverse Output Voltage	V_{ROUT}		-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 Ω	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	± 12	kV
Charged Device Model	V_{CDM}	Per AEC-Q100	± 1	kV

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

Characteristic	Symbol	Test Conditions [1]	Value	Unit
Package Thermal Resistance	$R_{\theta JA}$	LU package, on 4-layer PCB based on JEDEC standard	145	$^{\circ}C/W$

[1] Additional thermal information available on the Allegro website.

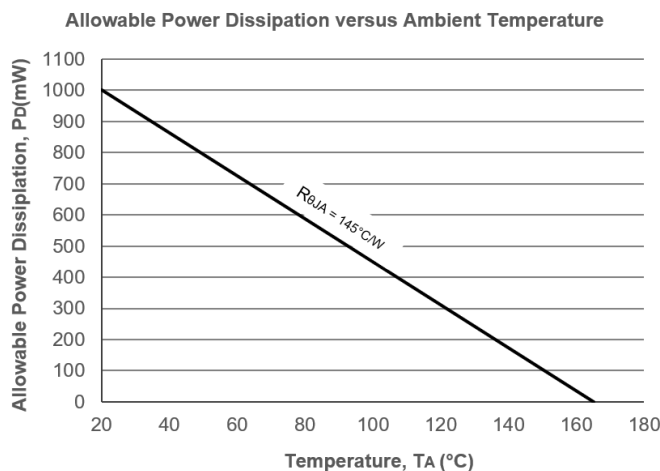


Figure 3: Allowable Power Dissipation

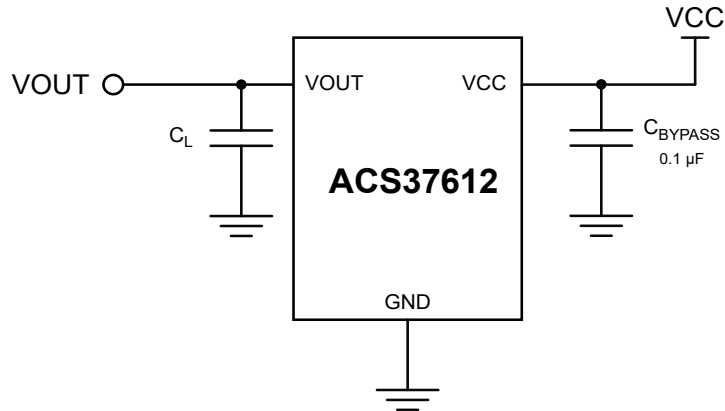


Figure 4: Typical Application Circuit

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.

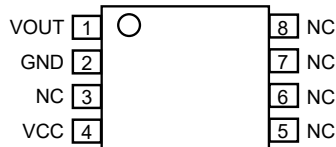


Figure 5: Pinout Diagram

Pinout List

Number	Name	Description
1	VOUT	Analog output signal, also used for programming
2	GND	Ground pin
3, 5, 6, 7, 8	NC	Not connect; tie to GND for optimal ESD performance
4	VCC	Input power supply, also used for programming

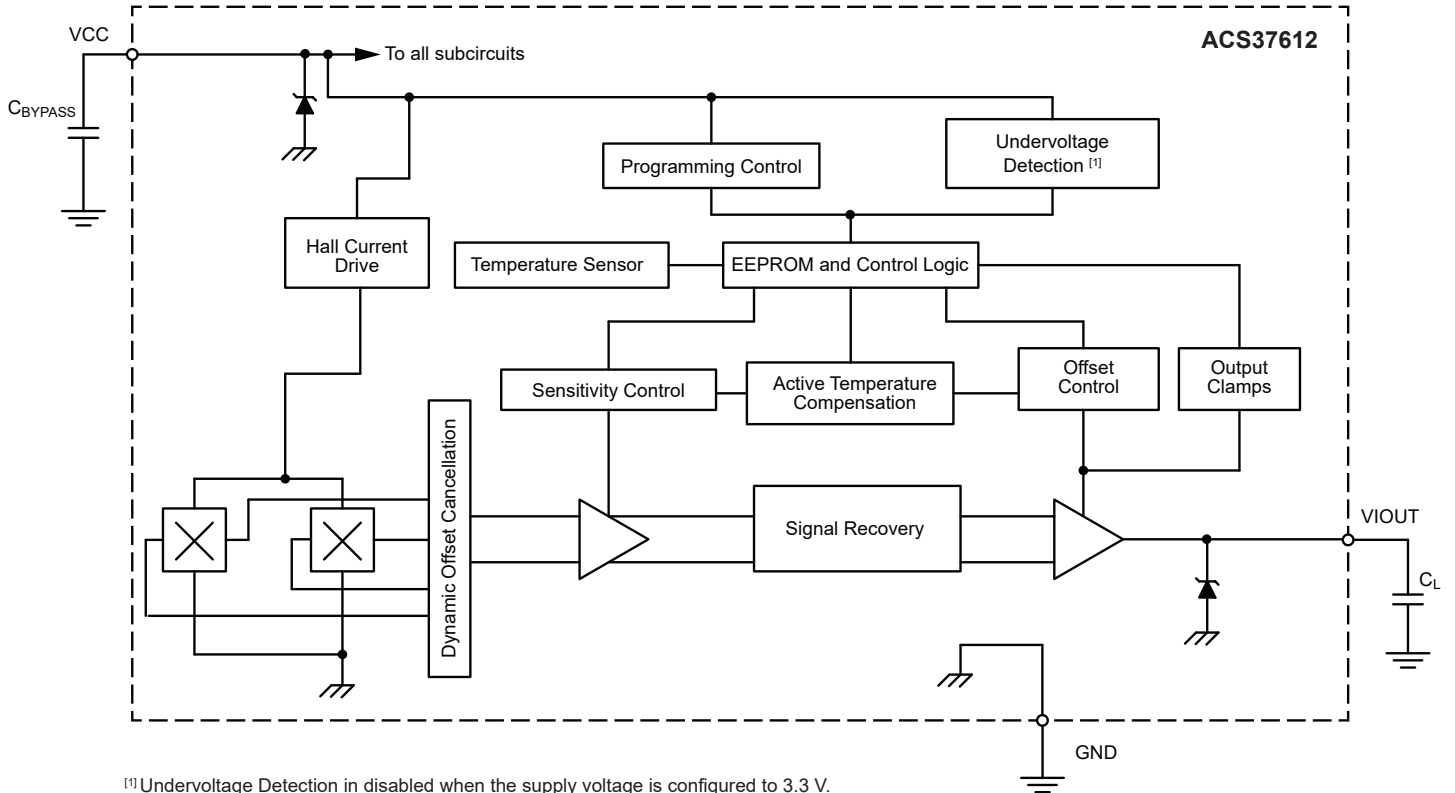


Figure 6: Functional Block Diagram

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