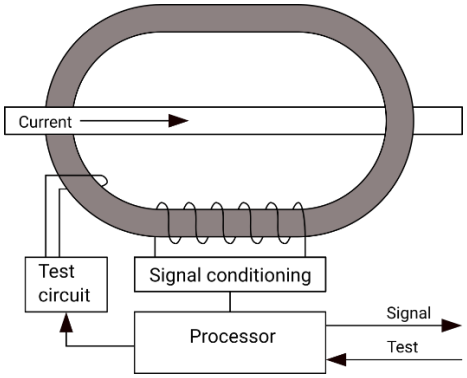
AC and DC Leakage Current Sensor

Overview

The **ATM2802** sensor is a high-sensitivity AC and DC leakage current sensor with analog output for leakage current indication.

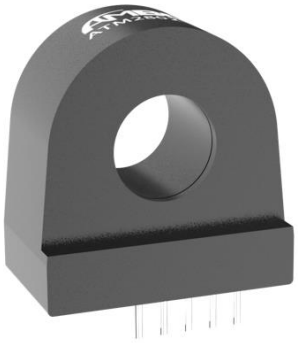


Applications

Typical applications include residual current sensor for In-Cable Control and Protection Devices (IC-CPD) or Wallbox.

Benefits

- Small size with fluxgate-based current sensor
- High resolution
- PCB mounting
- Conform to IEC62752:2016
- Conform to UL 2231-2
- RoHS compliant



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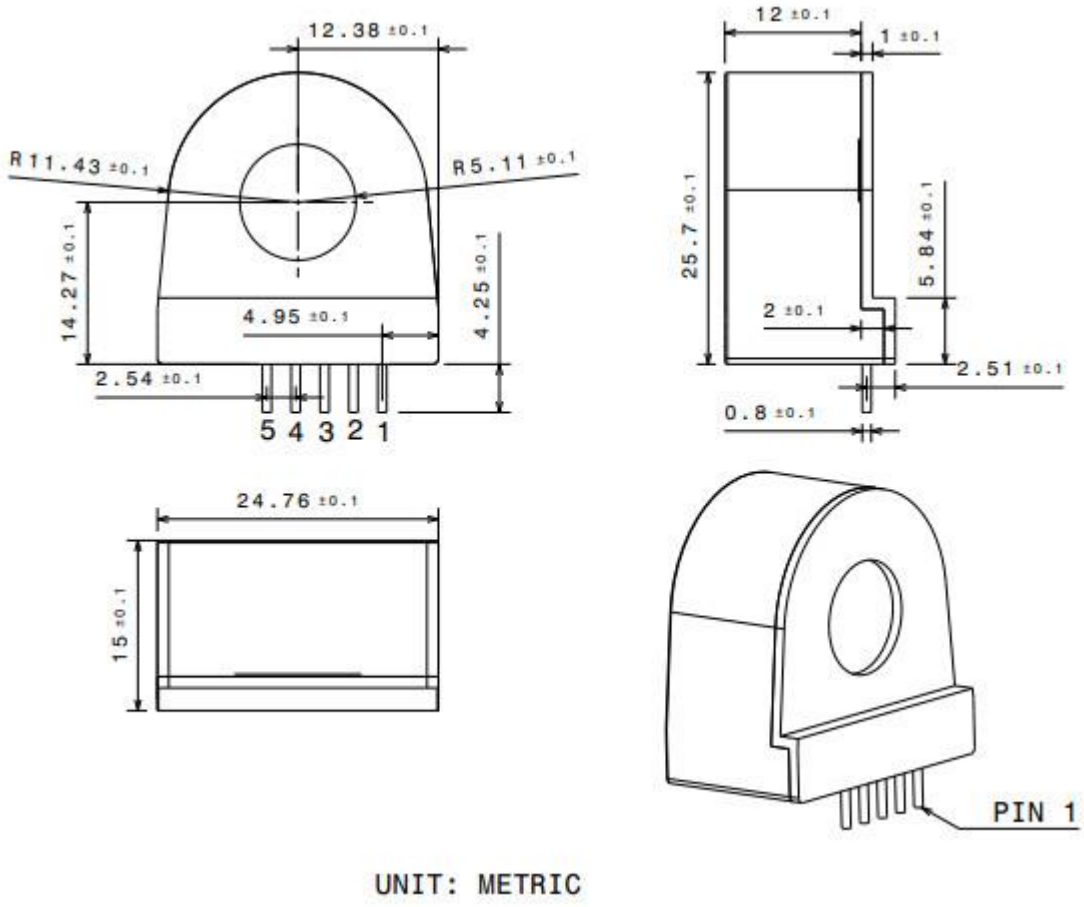
Ordering information

ATM2802 – R2

Module name **Revision**

Dimensions in mm

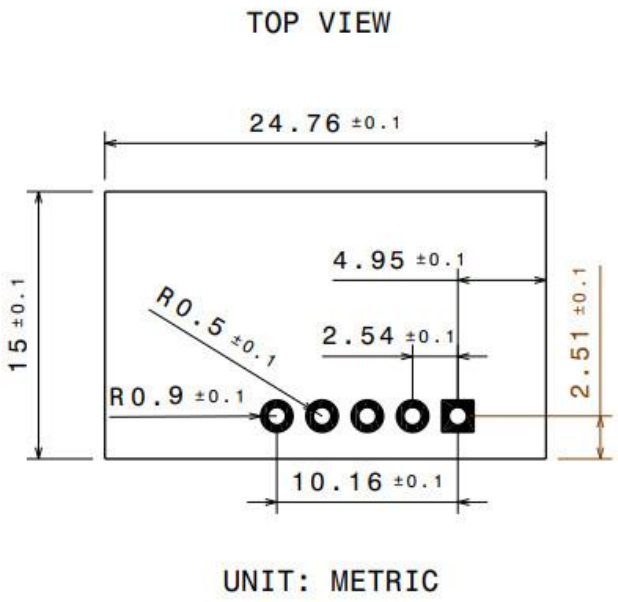


UNIT: METRIC

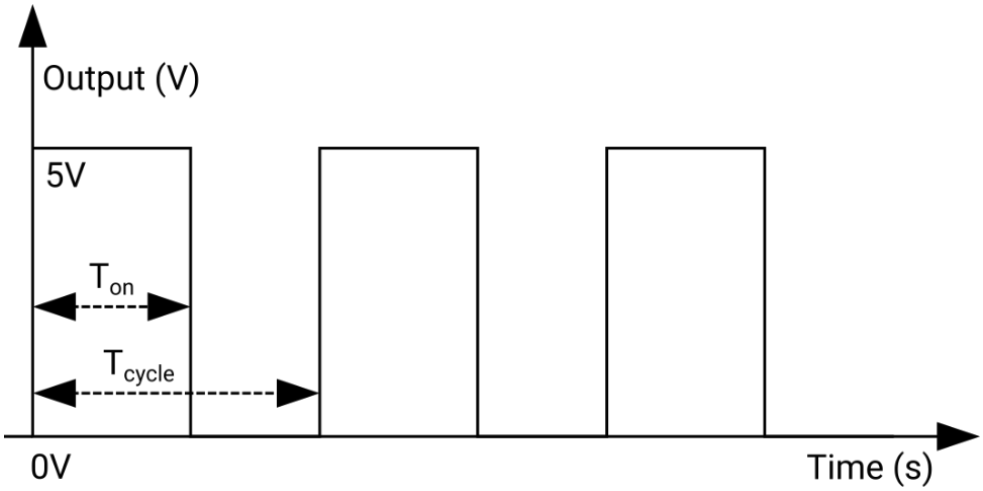
Pin Number	Symbol	Pin Type	Functions
1	NC	Signal	Reserved
2	TEST	Input	Test input
3	OUT	OUT output	Output signal

4	VCC	Power	Power supply, 5V
5	GND	Power	Ground

PCB Footprint - Top View



Output Characteristics



Symbol	Value
T_{on}	0.1 ms – 0.9ms
T_{cycle}	1 ms

Output state

Duty cycle	Value
12.5%	Normal condition
17.5%	DC alarm
22.5%	AC alarm
27.5%	Both alarm
32.5%	Test ok
37.5%	Test fail

Specifications

Item	Performance Characteristics
Primary Rated Voltage	250 V
Primary Nominal Current	40/20 A Maximum (1 phase/3 phase)
Supply Voltage Range	4.75 – 5.25 V (5 V typical)

Maximum Input Voltage of Digital Output	Supply Voltage + 0.3 V
Maximum Sink Current of Digital Output	10 mA
Current Consumption	3 mA (at measurement 0 mA)
Operating Temperature Range	−40°C to +85°C
Storage Temperature Range	−40°C to +85°C

Tests

ESD Test

DC Detection Current within specifications as per Table 1 – Ratings & Part Number Reference after ESD test.

Parameter	Result
Electrostatic Discharge Voltage Human-Body Model (HBM) R = 1,500Ω, C = 100pF, U= ±2,000V	Passed
Electrostatic Discharge Voltage Charged-Device Model (CDM) U=±800V	Passed

EMC Test

DC Alarm and AC Alarm do not malfunction during noise stimulation.

Parameter	Conditions	Result
IEC 61000-4-3 Radiated, radio-frequency, electromagnetic field immunity	30 V/m, 80 MHz – 1 GHz 80% AM 1 kHz	Passed
ISO 11452-2 (ALSE) Electrical disturbances from narrowband radiated electromagnetic energy	50 V/m 200 MHz – 800 MHz 80% AM 1 kHz, 800 MHz – 2 GHz PM	Passed
ISO 11452-4 (BCI) Electrical disturbances from narrowband radiated electromagnetic energy	100 mA 20 MHz – 200 MHz 80% AM 1 kHz	Passed

Tests cont.

Dielectric Strength

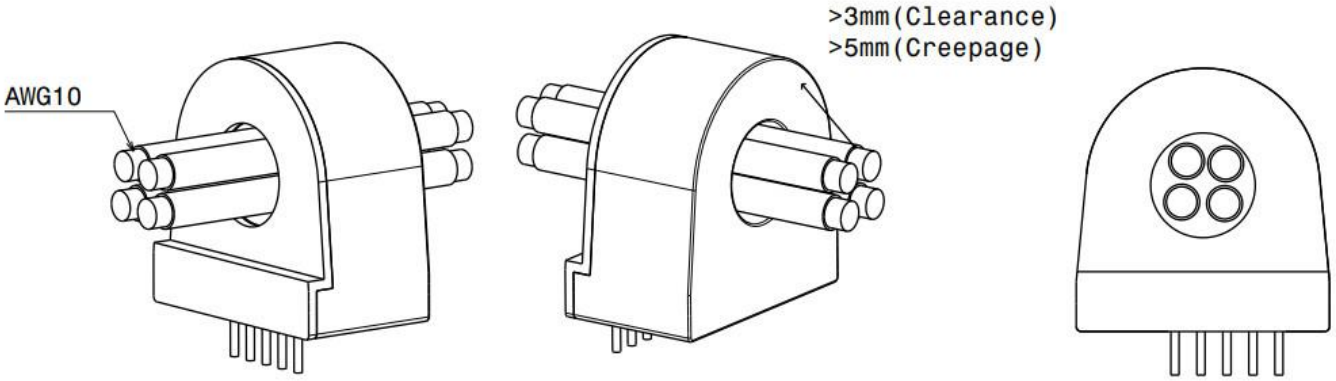
Parameter	Conditions	Values
UW, prim-sec	Impulse (1.2 µs/50 µs), PIN 1- vs insulated primary wire, 5 pulse -> polarity +, 5 pulse -> polarity -	5,500 Vrms
Ud	Test voltage, 60 seconds PIN 1-8 vs insulated primary wire	1,500 Vrms
$U_{PDx1.5}$	Partial discharge voltage, PIN 1-8 vs insulated primary wire	1,200 Vrms
UPDx1.875	Partial discharge voltage, PIN 1-8 vs insulated primary wire	1,500 Vrms

** IEC 61800-5-1:2007*

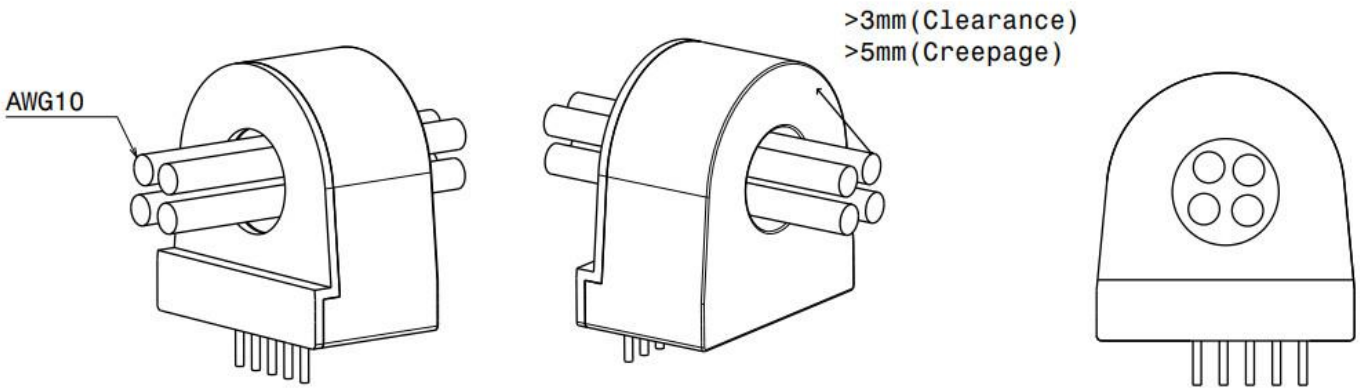
Recommended Wire Configurations

In Case of Insulated Wire

Three phase system < 480 V



In Case of Bare Wire



Reinforced insulation, insulation material group III, pollution degree 2, altitude < 5,000 m and overvoltage category II. Please take enough creepage distance between each pin.

Soldering Process

ATM2802

Wave Soldering	Preheating temperature	100 – 140°C
	Preheating time	within 40 seconds
	Heating temperature	260°C
	Heating time	within 10 seconds

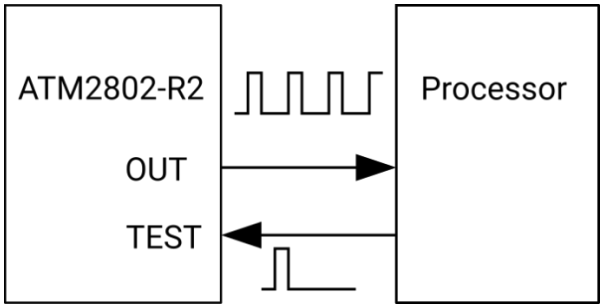
Packaging

Part Number	Packaging Type	Pieces Per Box
ATM2802-R2	Tray	100

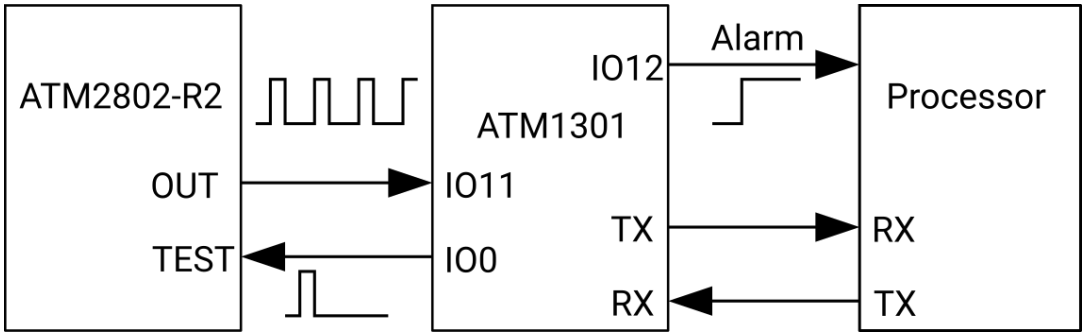
The product is packed in antistatic trays.

Recommended Circuit

Typical circuit:



Recommended circuit with ATM1301 module:



ATM2802-H work with ATM1301 ratings

	Current	Description
Measurement Range (mA)	−50mA- +50mA	
DC Detection Current (mA)	4.5 typical 3 minimum 6 maximum	50 typical, 500 maximum at 6mA 10 typical, 100 maximum at 60mA 5 typical, 15 maximum at 300 mA
AC Detection Current (mArms)	20 typical 15 minimum 30 maximum	50 typical, 200 maximum at 30mArms 30 typical, 60 maximum at 60mArms 10 typical, 15 maximum at 150mArms 5 typical, 15 maximum at > 5 Arms

Handling Precautions

Precautions for Product Storage

Current sensors should be stored in normal working environments. While the sensors are quite robust in other environments, exposure to high temperatures, high humidity, corrosive atmospheres, and long-term storage degrade solderability.

AMBO recommends that maximum storage temperature not exceed 85°C and atmospheres should be free of chlorine and sulfur-bearing compounds. Temperature fluctuations should be minimized to avoid condensation on the parts. Avoid storage near strong magnetic fields, as they can magnetize the product and cause its characteristics to change. Limit ambient magnetic fields to 50e or less.

For optimized solderability, the stock of current sensors should be used within 12 months of receipt.

Before Using Fluxgate-Based Residual Current Sensors

- Do NOT drop or apply any other mechanical stress, as such stresses may change performance characteristics.
- Do NOT exceed 260°C for 10 seconds when soldering. This is the maximum heat resistance grade of these sensors. Use a low-corrosion type flux when soldering.
- Do NOT allow strong static electricity near the sensor, as the circuit uses ICs. Static electricity can cause damage. Take static electricity precautions when handling.
- The case is Insulation Materials Group III. When designing the primary wire, be careful of clearance and creepage distance from the input/output terminal.

Disclaimer

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Although all product–related warnings, cautions and notes must be observed, the customer should not assume that all safety measures are indicted or that other measures may not be required.

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