AC DC LEAKAGE SENSOR
MD0630STA-PM

More Optimization on Integration Unit based on Customized Solutions

1. Product Introduction

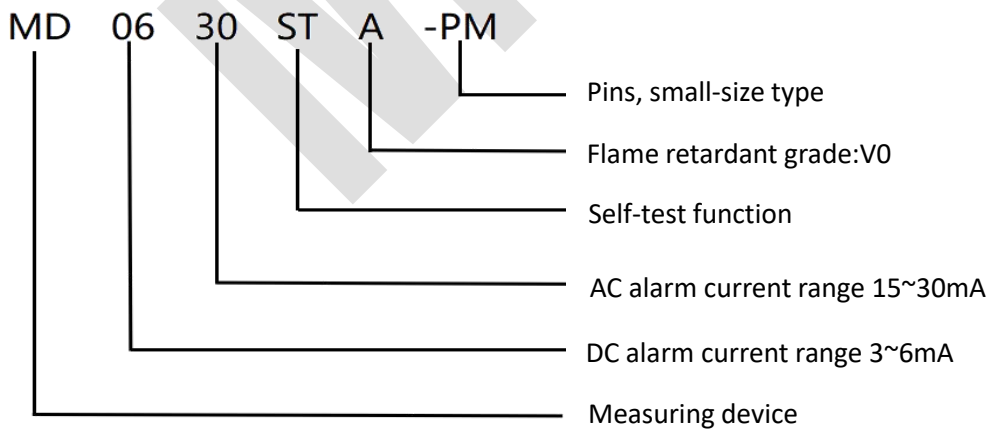
This is an ACDC leakage current sensor featuring high sensitivity, accurate measurement, small size and integration. It will output an alarm signal when a DC leakage current of 3~6mA or an AC leakage current of 15~30mA is detected. Meanwhile, it is equipped with a self-test function, which can be used to real-time determine whether the sensor is in normal working condition. If the sensor fails, the self-test output terminal will not be able to output a feedback signal.

This series of products has important applications in multiple fields such as industrial equipment, medical instruments, instrumentation, new energy, smart cities and the Internet of Things. It is particularly suitable for charging electric vehicles, electric motorcycles and electric bicycles in various public places, as well as for charging fee collection and electricity safety management. It is simple to use and convenient to install.

2. Technical Parameters

Wide voltage input	DC4.85-5.5V
Measurement current range	DC 2-15mA, AC 3-100mA
Alarm current range	DC 3-6mA, AC 15-30mA
Alarm output	Open Collector output
Self-test function	Self-test, through the test pin to judge whether the sensor is working normally
Operation temperature	-25~+80℃
Appearance	Plastic casing (Flame Retardant Grade: V0)

3. Naming Rule



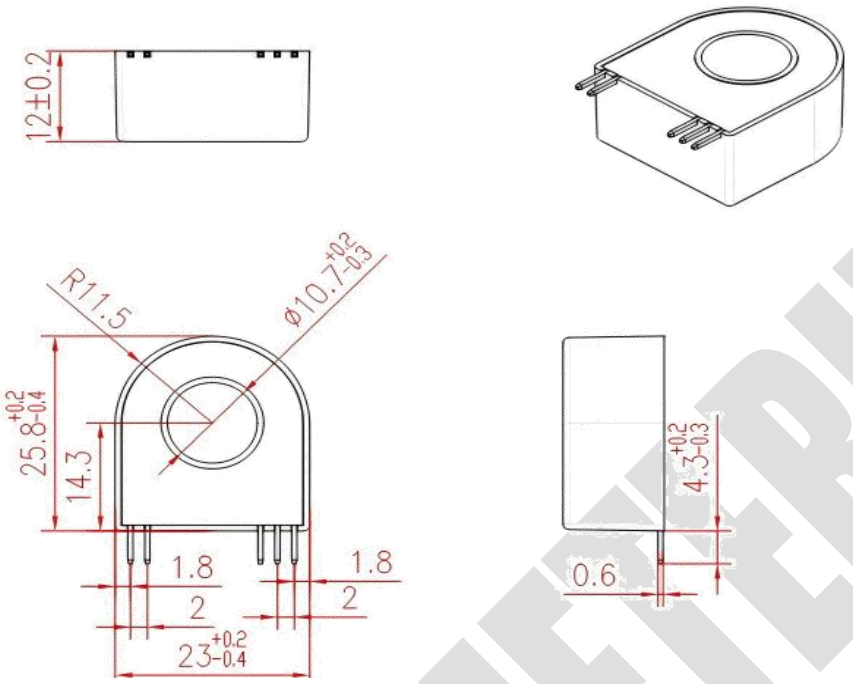
4. Pin Definition

1	Vcc	4.85-5.5V (DC power input)
2	GND	GND (ground)
3	FT	Factory test (used by the factory test, not used as a port for users)
4	DA	AC DC leakage alarm & self-test signal output, Open Collector output
5	ST	Test (Self-test power input, U = DC5V)

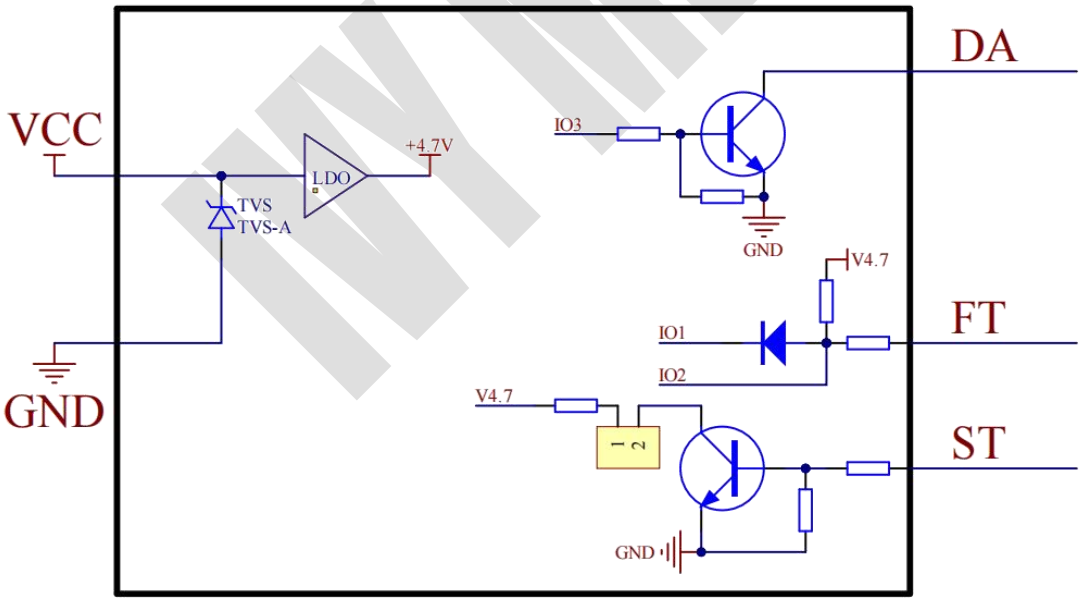
Note:

1. Please start the self-test function when the circuit to be tested is powered off. After the self-test is completed, the self-test should be turned off. At this time, the leakage sensor enters the leakage current detection stage.
2. The ST pin is for self - test signal input (DC5V input). When a voltage signal is detected, the sensor starts self - testing. If it works normally, a signal (low level 0V) will be output at the DA pin.
3. The DA pin is for DC/AC leakage current alarm & self - test alarm signal output (OC output). When a DC leakage current of 3 - 6mA is detected and there is a voltage input at the ST pin, or an AC leakage current of 15 - 30mA is detected, the DA pin will output an alarm signal (low level 0V).
4. The open - collector output is not limited by voltage and can be pulled up to any voltage from 3V to 25V according to the external circuit. The pull - up resistor should be adjusted according to the voltage level, and the current should not exceed 100mA. When there is a signal output, the OC port will output a low level.

5. Dimensions(mm)



6. Internal Principle



7. Detection Type

Meets the residual current operation characteristic requirements for Mode 2 charging specified in GB/T 41589 (IEC62752)

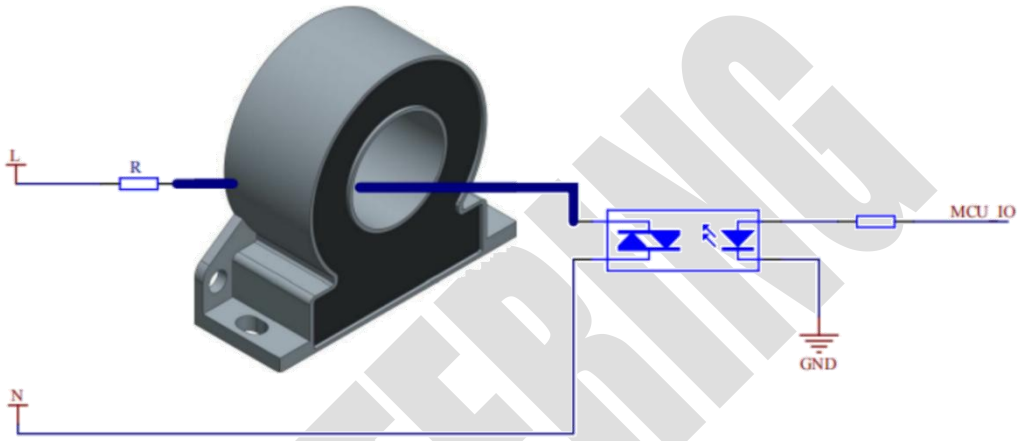
Meets the residual current operation characteristic requirements for RDC-PD in Mode 3 charging specified in GB/T 40820 (IEC 62955)

Meets the basic residual current operation characteristic requirements specified in GB/T 22794 (IEC 62423) and is compatible with the DC 6mA testing requirement

Current Detection Type	Frequency	Standard Alarm Range	Whether Alarm	Residual Current (IΔn)	IΔn T Alarm≤300ms	2IΔn T Alarm≤150ms	5IΔn Alarm≤40ms	Conclusion
AC	50Hz	1-5IΔn	√	30mA	12.0ms	18.8ms	12.4ms	Qualified
					20.8ms	18.8ms	22.8ms	Qualified
					17.6ms	22.8ms	13.2ms	Qualified
					22.8ms	20.0ms	22.8ms	Qualified
					17.2ms	25.2ms	15.6ms	Qualified
Current detection type		Standard Alarm Range	Whether alarm	Residual current (IΔn)	IΔn T alarm≤10s	10IΔn T alarm≤300ms	200mA alarm≤100ms	Conclusion
Smooth DC		IΔn-200mA	√	6mA	13.2ms	12.2ms	8.3ms	Qualified
					15.6ms	15.8ms	15.4ms	Qualified
					13.6ms	17.4ms	15.0ms	Qualified
					16.4ms	9.3ms	15.5ms	Qualified
					12.0ms	8.3ms	11.2ms	Qualified
Current detection type		Standard Alarm Range	Whether alarm	Residual current (IΔn)	IΔn alarm≤300ms	2IΔn alarm≤150ms	5IΔn alarm≤40ms	Conclusion
Half-wave DC (Forward)		1-5IΔn	√	6mA	14.4ms	19.4ms	18.8ms	Qualified
					17.4ms	14.2ms	12.6ms	Qualified
Half-wave DC (Reverse)		1-5IΔn	√	6mA	13.6ms	15.0ms	10.6ms	Qualified
					14.7ms	3.0ms	8.4ms	Qualified
Current detection type		Standard Alarm Range	Whether alarm	Residual current (IΔn)	IΔn+6mA alarm≤300ms	2IΔn+6mA alarm≤150ms	5IΔn+6mA alarm≤40ms	Conclusion
Smooth DC+Half-wave DC		1-5IΔn+6mA	√	6mA	21.0ms	16.2ms	13.0ms	Only for reference
					18.0ms	17.7ms	25.3ms	Only for reference

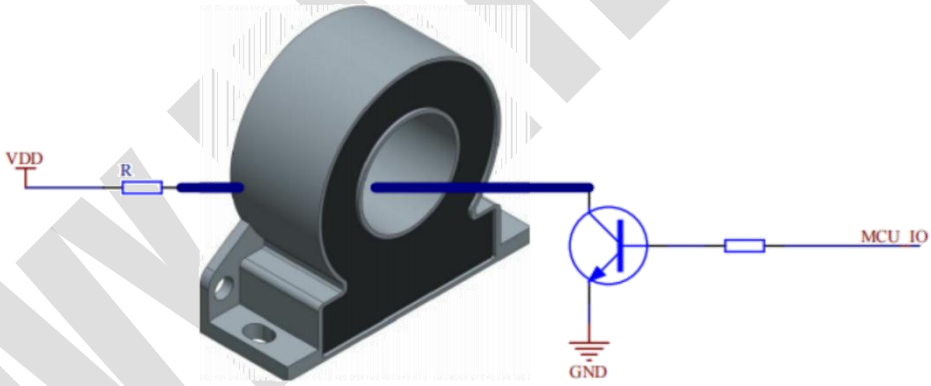
8. ACDC Leakage Detection Solution (For Reference)

AC detection：



Iac=VLN/R

DC detection：

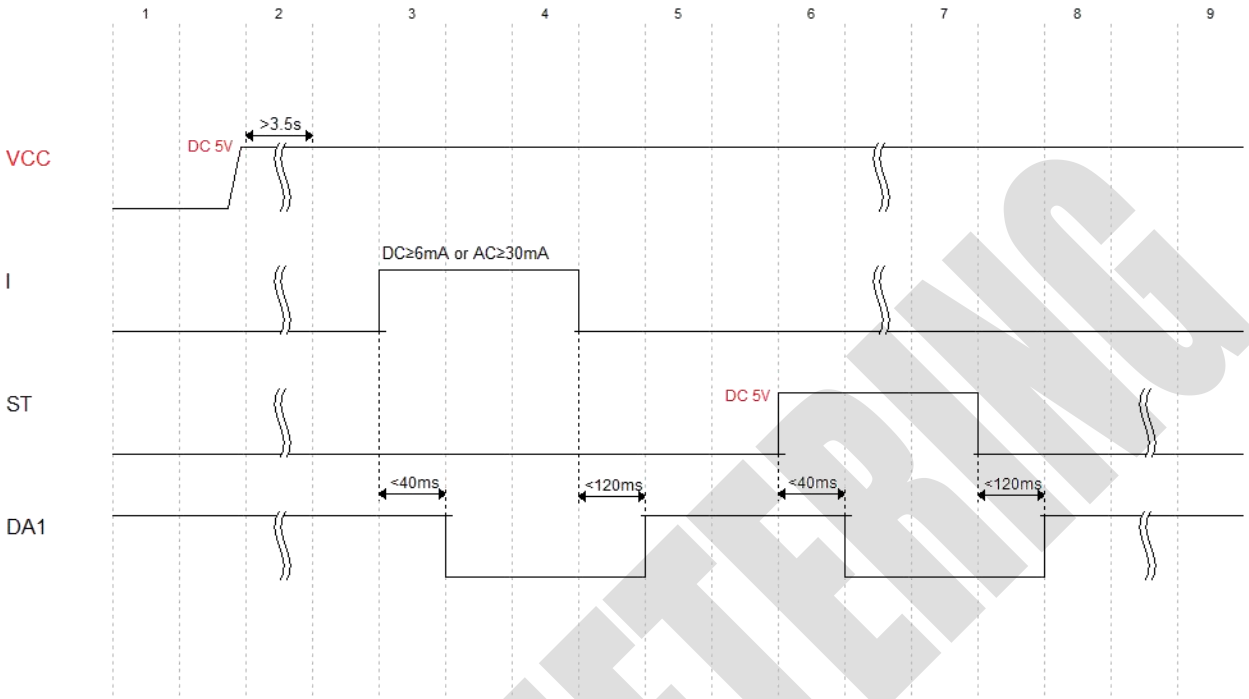


Idc=(VDD-0.2)/R

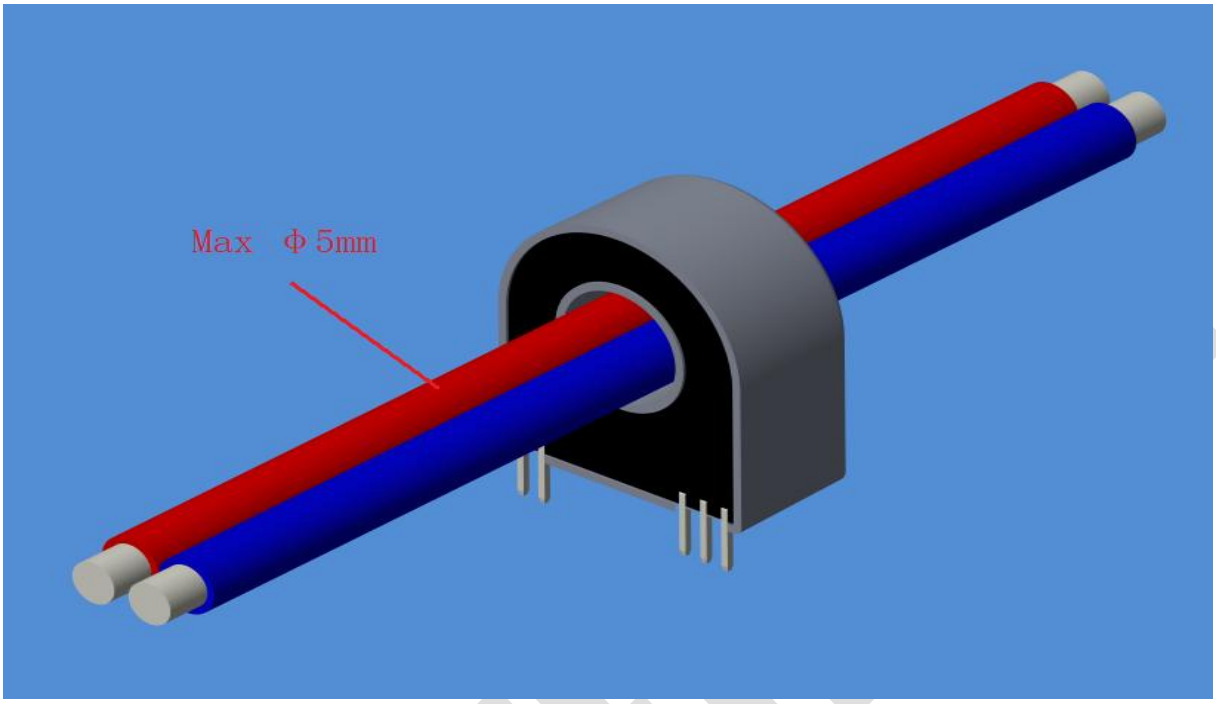
Note: The above diagram shows a reference scheme for the simulated test of leakage current by the electrical sensor. In actual use of the product, both the live wire and the neutral wire should be passed through the central hole to monitor the leakage current.

9. Timing Diagram

Leakage alarm& Self-test timing diagram:



10. Installation Diagram And Precautions



Note: Max wire diameter for single-phase installation: 5mm (for reference)

Installation Notes:

- Before power on, make sure that the power pins (Vcc and GND) are connected normally and are in firm Contact.
- During the test, the GND connection must be stable, and poor contact may cause chip damage.
- Vcc pin cannot be short-circuited with other pins, otherwise it will cause damage to internal devices.
- When installing the connection, avoid direct contact with the connection pins to prevent electrostatic Damage.

11. Transportation & Storage

The leakage sensor should not be subjected to severe shock during transportation and storage, and should be transported and stored according to the provisions of GB13384-2008 "General technical conditions for instrument packaging"; The leakage sensor should be kept in the original package, and temperature range of the place where it is kept is 0- 50℃, the relative humidity is no more than 50% and no corrosive gas in the air; The leakage sensor should be stored in the warehouse and put on the shelves. The stack height should not exceed 10 boxes. After unpacking, the stack height of single packed leakage sensor should not exceed 5 layers.

12. Quality Assurance

12.1 Calculation method of warranty period:

Warranty is handled according to the commercial invoice issued by our company, and the time is 18 months from the date when the leakage sensor is shipped from the warehouse, minus the maintenance time and delivery time for no spare parts.

12.2 Warranty coverage

12.2.1 When the user fully follows up the transportation, storage, installation and application of the leakage sensor, and the company's conditions of sealing integrity (in the case of no printing and dis-assembly), the leakage sensor that does not meet the quality requirements and valid evidence (For example, desks, certificate photos, feedback documents from customers' local users, relevant government departments, documents, etc.) should be provided by the customer.

12.2.2 We will repair, replace or return the leakage sensor in the following cases:

- No demonstration and no prior explanation;
- Does not meet the implementation standards indicated on the product or its packaging;
- (If the standard on the product/package is required by the customer, but does not meet the company's product implementation standard, the customer should make a corresponding responsibility commitment);
- Does not meet the quality status indicated by product instructions, physical samples, etc.

Unqualified leakage sensor should be determined in consultation with the user. Generally, we will repair or replenish in the next order. Special circumstances shall be determined through consultation between the two parties.

Note: The quality guarantee is not applicable. If there is no valid invoice, the evidence corresponding to thequality problem of the order cannot be provided, and the damage caused by force majeure or the warranty beyond the validity period, but can be recovered for repair (transportation and other related costs need to be borne by the customer)

13. Technical Support

Users' manual is mainly used to guide users to better utilize this series of leakage sensor. If unclear please contact with us at any time, we will give you a satisfactory answer.

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