MIT-LF006S2 Residual Current Sensor

Ip＝DC 6mA & AC 30mA

1、Product description

MIT-LF006S2 charging station residual current sensor is a type A residual current sensor with 6mA or higher smooth DC residual current protection. It complies with the latest national standards, is easy to install, has a small size and saves space, and has strong anti-interference capabilities. It is applied in new energy vehicle charging systems, such as vehicle-mounted chargers, mode two charging cables, and mode three AC charging stations, providing reliable protection for the residual current detection and protection of the charging system.

2、Product features

- Special A+6 type residual current sensor for charging stations
- Highly integrated digital residual current action indicator

3、Executive standard

- Meet the residual current action characteristics requirements of GB/T 18487.1-2023
- Meet the requirements for residual current action characteristics of Mode 3 charging RDC-PD as stipulated in GB/T 40820-2021 and IEC 62955-2018
- Meet the test requirements for in-cable control and protection devices for electric vehicle mode 2 charging as stipulated in GB/T 41589-2022 and IEC 62752-2018

4、Specification parameter

Parameter	Symbol	Value	Unit	Comment
Rated residual current	$I_{\Delta ndc}$	6	mA	DC
	$I_{\Delta nac}$	30	mA	AC
Supply voltage	V_{CC}	5	V	4.85V~5.15V
Current consumption	I_C	＜30	mA	
Output voltage (TRIP)	TRIP	VCC	V	
Check enable voltage	V_{CE}	VCC	V	(VCC-0.3)~VCC
Check disabled voltage	V_{CD}	＜0.2	V	
Self-Check current	I_{CK}	7.5	mA	
Power on initialization	T_{ON}	60	ms	

5、General parameter

Parameter	Symbol	Value	Unit
Working temperature	T_A	-40~85	℃
Storage temperature	T_S	-40~105	℃
Mass	W	10	g

6、Electrical data

Parameter	Symbol	Value	Unit
RMS voltage for AC test 50Hz/1min(Note1)	U_D	3	kV
Impulse withstand voltage 1.2/50μs(Note2)	U_W	7	kV
Lightning surge current 8/20μs(Note3)	I_{LS}	3.3	kA
Application example(RMS)	V_S	600	V
Comparative tracking index	CTI	250~400	V
Electric clearance	D_{Cl}	13	mm
Creepage distances	D_{CP}	13	mm

Note: ①Refer to section 9.7.3 to 9.7.4 of GB/T 400820-2021 for information on insulation resistance and dielectric strength..

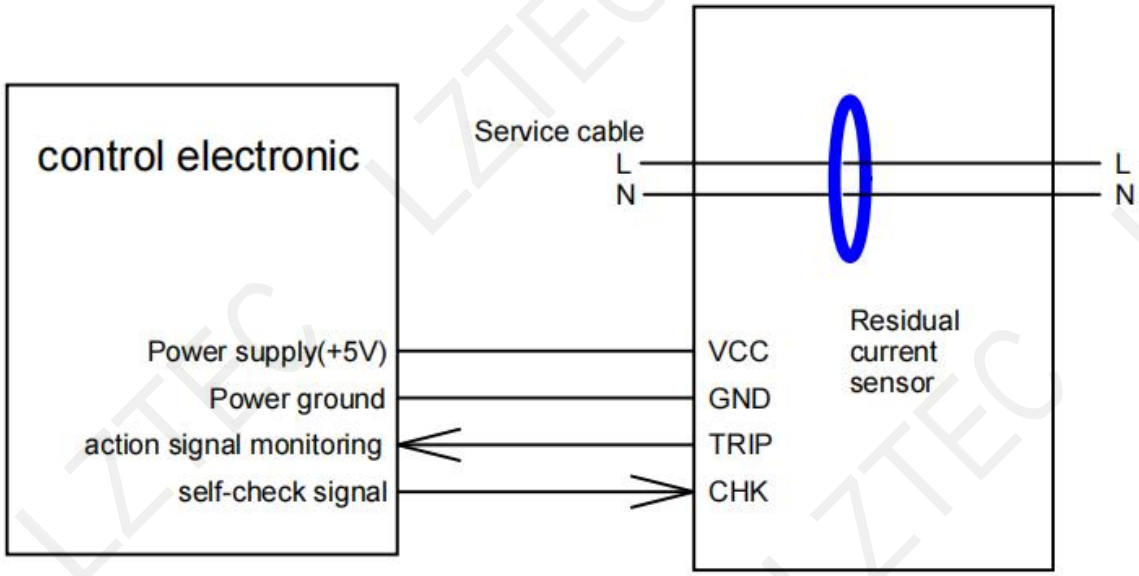
②Refer to section 9.5.5.2 of GB/T 41589-2022 for details.

③ Please refer to Clause 9.19.2 of GB/T 16917.1 for the description of surge current performance.

7、Operating characteristic

Parameter	Symbol	Description	Min	Typ	Max	Unit
Residual operating current	$I_{\Delta n\_AC50}$	50Hz alternating current	15	22	30	mA
	$I_{\Delta n\_A0}$	0-degree pulsating direct current	4.5	15	42	
	$I_{\Delta n\_A90}$	90-degree pulsating direct current	6.3	12		
	$I_{\Delta n\_A135}$	135-degree pulsating direct current	3.3	16		
	$I_{\Delta n\_FH}$	F(50Hz＋1KHz)	15	30	42	
	$I_{\Delta n\_SDC}$	smooth direct current	3	4.5	6	
	$I_{\Delta n\_2PDC}$	Two-phase rectified waveform	3.5	5.5	7	
	$I_{\Delta n\_3PDC}$	Three-phase rectifier waveform	3.1	4.5	6.2	
Interrupting time		30mA of 50Hz alternating current	--	12	300	ms
		60mA of 50Hz alternating current	--	8	150	
		150mA of 50Hz alternating current	--	8	40	
		6mA of smooth direct current	--	22	1000	
		60mA of smooth direct current	--	10	300	
		300mA of smooth direct current	--	8	40	

8、Typical application



The residual current sensor of the charging station is usually installed in isolation on the cable line, passing through a relay and then supplying power to the load equipment (such as electric vehicles). The sensor is powered by the controller motherboard (such as the control motherboard of the charging station). The controller motherboard can control the residual current sensor to perform self-check by outputting a CHK self-check signal. The self-check result is output through TRIP (high or low level), and the system control board can obtain the residual current result based on the output level of TRIP.

9、Time chart

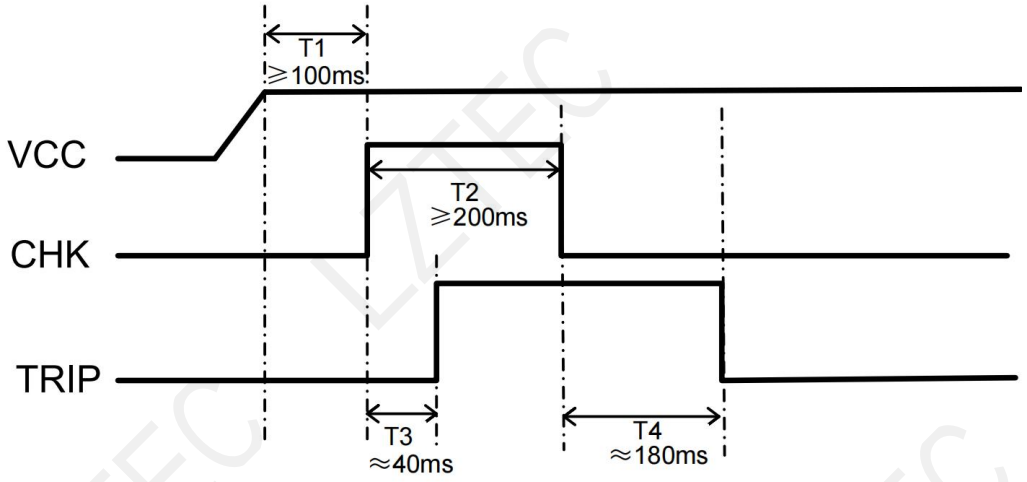
①It is recommended that VCC be powered on from 0V, and the power-up process should be monotonic with a duration of less than 15ms;

②T1 represents the waiting time after power-on completion. It is recommended that T1 be greater than or equal to 100ms;

③T2 represents the enable time for self-checking signals. It is recommended that T2 be set to 200ms;

④T3 represents the delay time for the action signal, and T3 is approximately 40 milliseconds;

⑤T4 represents the duration for which the action signal remains active after the self-check is completed, and T4 is approximately 180 milliseconds.

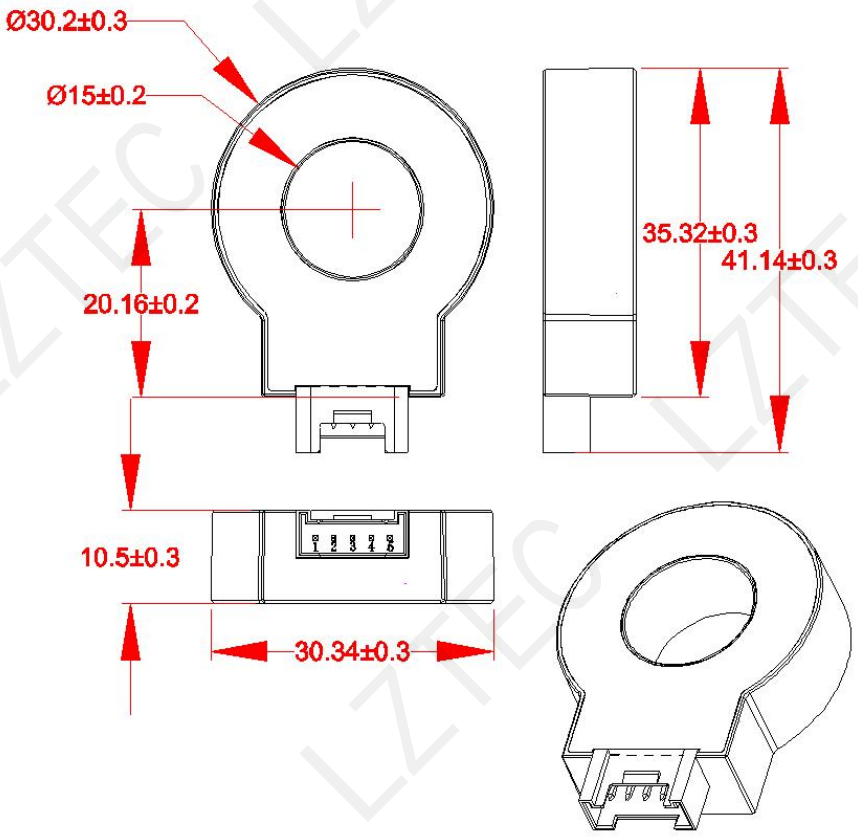


Note:

① When the CHK signal T2 is greater than or equal to 500ms, the new zero point will be automatically written into the flash. After the zeroing process is completed, TRIP returns to a low level, indicating that the zeroing is successful; otherwise, it indicates that the zeroing has failed.

② During the self-check process, that is, during (T1 + T2), do not close the main circuit switch to prevent residual current in the circuit from affecting the self-check calibration process. Once the TRIP pin group is flipped, it can be determined whether the RCD module is working properly for subsequent operations.

10、Dimensions



11、Pin Definition

PIN	1	2	3	4	5
Symbol	VCC	TRIP	GND	NC	CHK

VCC——Product power supply pin,requires DC 5V supply

TRIP——Product action signal output pin， When a residual current of more than 6mA (direct current) or more than 30mA (alternating current) is detected, this pin is set high, generating a trip signal.

GND——Product power grounding pin

NC——No-connection

CHK——Self-check pin ,When this pin is input with a high voltage, an internal residual current will be generated, causing the action signal to activate and verifying whether the product functions are normal. It can be designed for periodic self-checks of the product.

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