

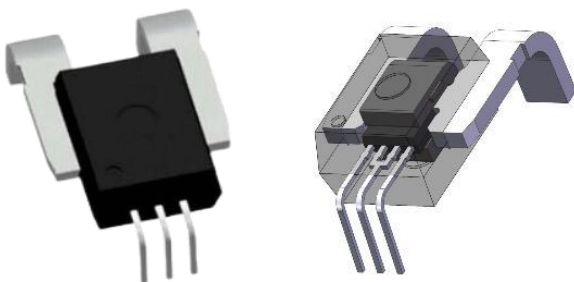
VCS758

Wide temperature range-large range current sensor

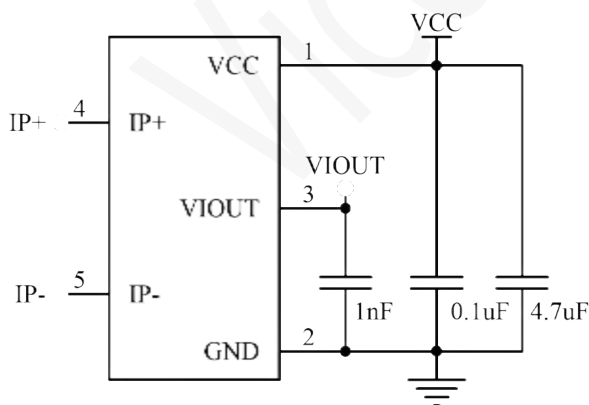
Characteristic:

- Isolation measurement, isolation withstand voltage up to 5kV@50HZ, 1min can measure $\pm 50\sim\pm 280A$ AC and DC current
- 3.3V/5V power supply
- PFF package
- Extremely low current lead impedance: 1m
- Response time as low as 4 μ S
- Wide operating temperature range: -40~125°C/-55~125°C for selection High accuracy: <1% accuracy error at normal temperature
- Accuracy error <3% in the whole temperature range
- Strong driving capability, load as low as 3k
- Extremely easy-to-use peripheral circuits
- Surge current: 20kA8/20 μ S
- Resistant to interference from wire magnetic fields, external magnetic fields, and geomagnetic fields, high power supply rejection ratio

Product appearance picture:



Typical application diagram:



Overview:

WKW VCS758 series of current sensor ICs provide an economical and accurate solution for AC or DC current sensing. A fully independent and controllable open-loop Hall current sensor module developed from chip design to module assembly process. The device consists of a precision, low-offset linear Hall circuit with a copper conductive path located near the die. An applied current flowing through this copper conductive path creates a magnetic field, which the Hall IC converts into a proportional voltage. Device accuracy is optimized through the close proximity of the magnetic signal to the Hall transducer. Low-offset, chopper-stabilized BiCMOS Hall ICs provide precise ratiometric output voltages and are precisely programmed at the factory.

VCS758 adopts fully automatic production and processing, which can bring customers consistency, high quality and high reliability that cannot be matched by module technology. Typical applications for this product include motor control, load sensing and management, power supply and DC-DC converter control, inverter control and overcurrent fault detection.

WKW is committed to researching core chip technology. The proprietary integrated shielding technology provides a high level of immunity to current conductor dV/dt and stray electric fields, ensuring low Output voltage ripple and low offset to bring the best to customers. The aim is to provide the best current sensing solutions.

SJ20790-2000 认证



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Selection table:

Model	Temp Range	Detect curr	Sensitivity(mV/A)	Zero output(V)	Rated output (V)	Special Co	Voltage Reference(V)
VCS758I-050B5F	(-40~125°C)	±50	40	B(0.5Vcc)	2	F	NC
VCS758I-100B5F		±100	20				
VCS758I-150B5F		±150	13.33				
VCS758I-200B5F		±200	10				
VCS758I-250B5F		±250	8				
VCS758I-280B5F		±280	7.14				
VCS758I-050U5F		50	80	U(0.1Vcc)	4		
VCS758I-100U5F		100	40				
VCS758I-150U5F		150	26.66				
VCS758I-200U5F		200	20				
VCS758I-050B3F		±50	26.4	B(0.5Vcc)	1.32		
VCS758I-100B3F		±100	13.2				
VCS758I-150B3F		±150	8.8				
VCS758I-200B3F		±200	6.6				
VCS758I-250B3F		±250	5.28				
VCS758I-280B3F		±280	4.72				
VCS758I-050U3F		50	52.8	U(0.1Vcc)	2.64		
VCS758I-100U3F		100	26.4				
VCS758I-150U3F		150	17.6				
VCS758I-200U3F		200	13.2				

Remark: -55~125°C (VCS758J) products are available. For more ordering models, please contact Wakeway technical staff.

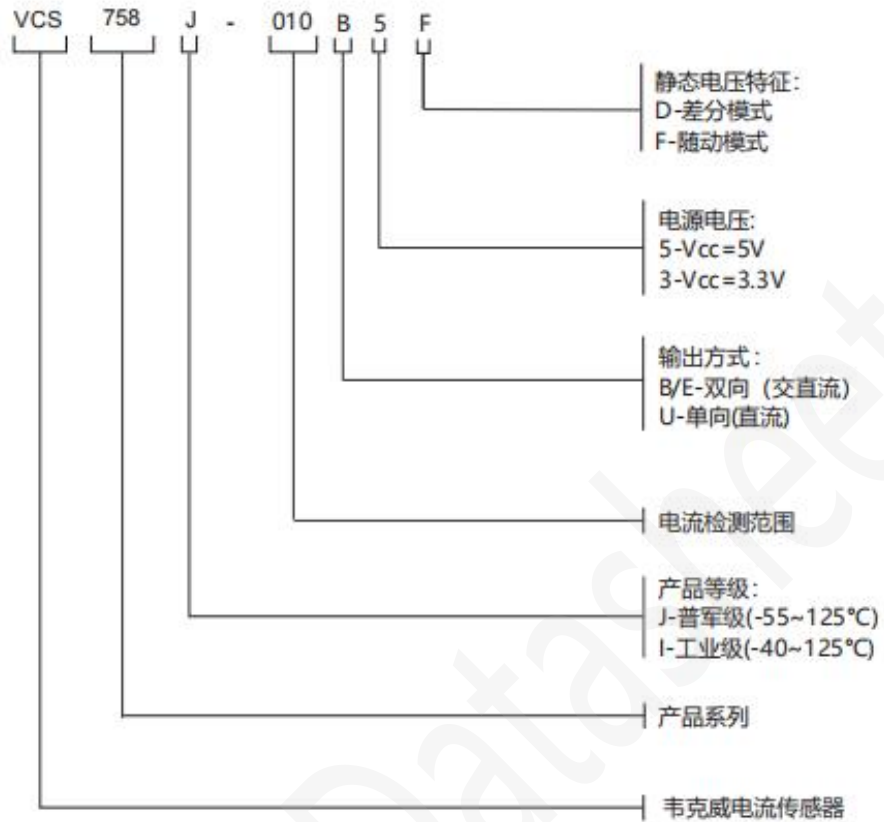
B	When there is no current in the IP, VIOUT@0A=0.5VCC, which is suitable for bidirectional current detection. The zero point and Sensitivity change with the VCC ratio.
U	When there is no current in the IP, VIOUT@0A=0.1VCC, which is suitable for unidirectional current detection. The zero point and Sensitivity change with the VCC ratio.
F	Follow-up mode, the chip has no VREF reference pin, suitable for typical circuit design

Remark1: Sensitivity size is equal to Rated output/Rated current

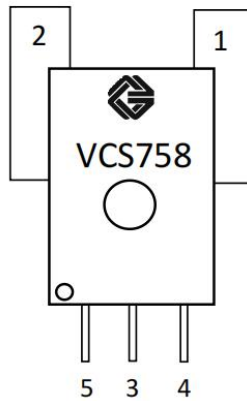
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Naming rules:



Pin definition:



Pin numbe	Pin name	Describe
1	IP+	Primary current input positive terminal
2	IP-	Primary current output negative terminal
3	GND	Weak current GND isolated from primary current lines
4	VIOUT	Output voltage equal to the primary current, and $IP+VIOUT$ in the same direction= $IP \times \text{Sensitivity} + VIOUT$ (0A)
5	VCC	Chip Supply voltage

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Limit parameters:

Characteristic	Symbol	Max	Unit	Remark
Voltage	Vcc	6	V	
Output voltage	VIOUT	6	V	
Max junction temperature	TJ (max)	165	°C	
1 minute isolation withstand voltage test (50Hz)	VISO	5000	VRMS	
Under ambient temperature conditions,Continuously load the maximum IP value	IPmax	160	A	It is directly related to the heat dissipation capacity of the PCB. This data is based on WKW demo test board.
Under ambient temperature conditions,Transient Overload IP Line End Capability	IPOver	1000	A	It is directly related to the heat dissipation capacity of the PCB demo. This data is based on Wakeway's test board 1pulse100ms, 1% duty cycle.

Electrical performance parameters:

Characteristic	Symbol	Min	Typical val	Max	Unit	Remark/Condition
Supply voltage	Vcc	4.5	5	5.5	V	
		3.0	3.3	3.6	V	
Supply current	ICC		12		mA	
Primary current impedance	RP		1		mΩ	
Zero output	Voq		0.5vcc		V	B,See selection table for details
			0.1vcc		V	U,See selection table for details
Rated output (Viout– Vref)	VFS		2		V	The suffix isB5F
			4		V	The suffix isU5F,See selection table for details
			1.32		V	The suffix isB3F,See selection table for details
			2.64		V	The suffix isU3F,See selection table for details
Sensitivity	Sens		VFS/IPR		mV/A	See selection table for details
Rated current	IPR	50		280	A	See selection table for details
Zero drift	YD	-3	±1	3	%	
Thermal zero drift	δT	-1	±0.5	1	%	
Ripple	Voq_pp		20		mV	
Response time	tresponse			10	uS	
Bandwidth	f			250	kHz	
Linearity	ELIN		±1		%	
Accuracy	ACC		±1		%	25°C
Full temperature range accuracy	ACC	-3		3	%	See selection table for full temperature range

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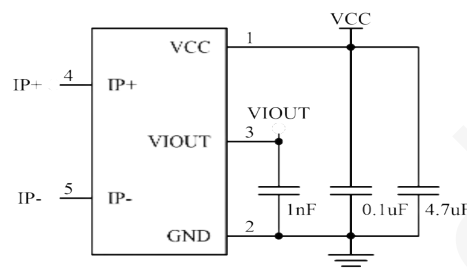
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Application circuit:

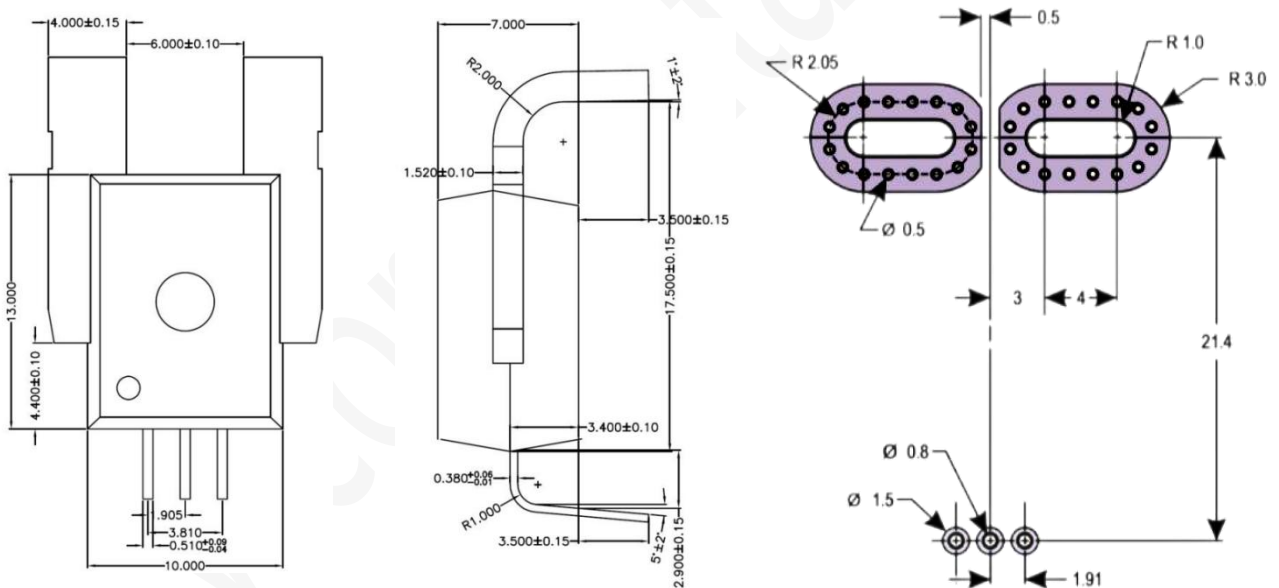
Introduction: This type of current sensor has good anti-interference performance and simple peripheral circuit. Designers can refer to the typical application circuit; Note:

- ① The output capacitance at the VIOUT terminal can be adjusted according to frequency and ripple requirements (the larger the capacitance, the lower the ripple and frequency)
- ② When designing, it is necessary to consider whether the sensor output voltage is within the ADC acquisition range.

● Typical application circuit



Package information:



Precautions:

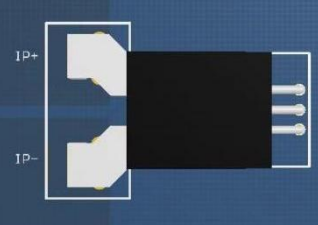
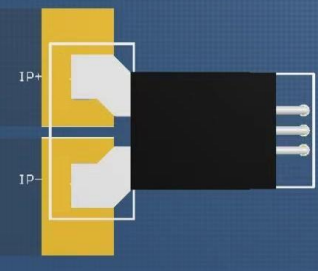
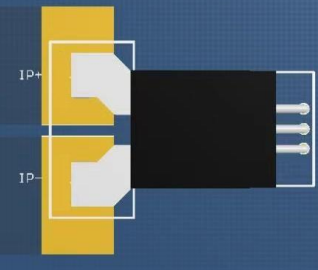
1. General tolerances: linear ± 0.05 , angle $\pm 1^\circ$, radius ± 0.05
2. PKG surface $Ra=0.70\sim 0.90\mu m$, except for smooth areas
3. Ejection and indexing pin mark depth 20 ± 0.10
4. General corner radius $R0.15$
5. The maximum protrusion amount of the resin gate is 0.25MAX
6. All dimensions are in millimeters.

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Wiring reference:

The VCS758 model current sensor adopts PFF package and has good overcurrent capability, but the current measurement range is large. The following suggestions are recommended for PCB layout design

Continuous current	Cabling recommendations	Arrangement
< 60A	<ul style="list-style-type: none"> ● Standard SOIP-16 package wiring can be used, and the pin ends should be fully covered with solder; ● If window wiring design is adopted, temperature drift can be reduced; 	
≥ 60A	<ul style="list-style-type: none"> ● Adopt the wiring in the figure below, and adopt the window design on the IP end surface; ● The surface of the window is covered with solder, and the pin end should be fully covered with solder; 	
≥ 120A	<ul style="list-style-type: none"> ● The window surface is covered with solder H>0.5mm, and the pin end should be fully covered with solder; ● It is recommended that the copper foil thickness be ≥ 4 ounces, use multi-layer over-current design or special PCB boards such as aluminum substrates; 	

Note: If the temperature of the current sensor rises above 165°C for more than 1 minute, the current sensor package may be cracked or damaged due to internal heat shrinkage reaction. The 165°C temperature standard refers to the packaging material properties (please consult technical personnel for details on the overcurrent capability of special PCB boards).

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Document modification record:

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VCS758 Product Specification	1.0	Document archiving	Yin	2024.1.26

Vicorv Datasheet