CC6922-Q1

Reinforced Isolation Voltage Resistance, 25kA Surge Current, High-performance Hall-effect Current Sensor

FEATURES

- Comply with AEC-Q100 grade 1
- The reference has two modes: Built-in VREF Output，External VREF Input:
  - Built-in VREF Output: V_{OE} is programmable to < 5mV
  - External VREF Input: V_{OUT} quiescent output voltage is consistent with it
- The overcurrent point V_{OC} is user-set, with a low latency error alarm output xFAULT
- Low noise，Single-end analog output
- High isolation and withstand voltage (5000V_{RMS} isolation voltage between pins 1-8 and 9-16)
- V_{WVBI}=1500V_{RMS}; V_{WVRI}=750V_{RMS}
- Less power loss, internal conductor's resistance is 0.3mΩ
- High bandwidth, up to 250kHz, 1.2us output rise time in response to step input current
- Room temperature error ±1%, sensitivity temperature drift up to ±2.5%.
- Good temperature stability, using Hall signal amplification circuit and temperature compensation circuit
- Differential Hall structure, strong resistance to external magnetic interference
- Strong resistance to mechanical stress, magnetic parameters will not be offset by external pressure
- ESD (HBM) 4kV，ESD(CDM) 2kV，LU 500mA
- Available in SOP16W package.

APPLCATIONS

- Motor controller
- Load monitoring system
- Switch-mode power supplies
- Overcurrent fault protection
- OBC
- PV inverter

GENERAL DESCRIPTION

The CC6922-Q1 device is a high-performance Hall-effect current sensor that can measure DC or AC current more efficiently, and has the advantages of high accuracy, excellent linearity and temperature stability in industrial, consumer, and communication equipment.

The CC6922-Q1 device consists of a high-precision, low-noise linear Hall integrated circuit and a low-resistance main current conductor. Internal copper conductor's resistance is typical 0.3mΩ, which provides much less power loss than the universal resistor sampling method. Otherwise, its internal inherent insulation provides 5000V_{RMS} (AC) insulation withstand voltage between the input current path and the secondary circuit. The sensor adopts linear Hall sensor temperature compensation technology, which has high temperature stability characteristics.

The differential common-mode suppression circuit integrated in CC6922-Q1 can make the chip output unaffected by external interference magnetic signals. The integrated dynamic offset elimination circuit makes the sensitivity of the chip independent of external stress and chip packaging stress.

Another advantage of the CC6922-Q1 is the fast fault monitoring function of the open-drain output, which is ideal for overcurrent fault detection. This feature is flexible in fault detection and greatly simplifies board application layout. The reference voltage (VREF) allows differential measurements and is allowed to be used as a reference voltage (VOC) of setting the overcurrent fault threshold

CC6922-Q1 is available in SOP16W package. It's operating ambient temperature range is -40~125°C. Comply with RoHS requirements.

DEVICE INFORMATION

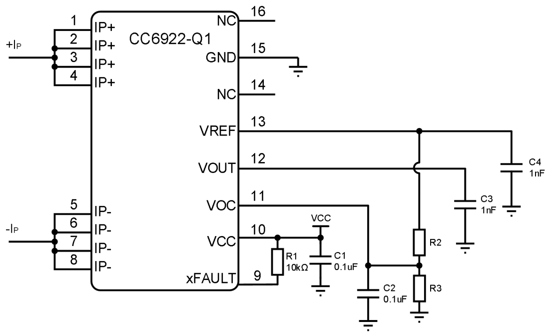
Part Number	Package	Body Size（TYP.）
CC6922-Q1	SOP16W	10.30mm×7.50mm

Certificate Number:
TUV MARK: R50590288

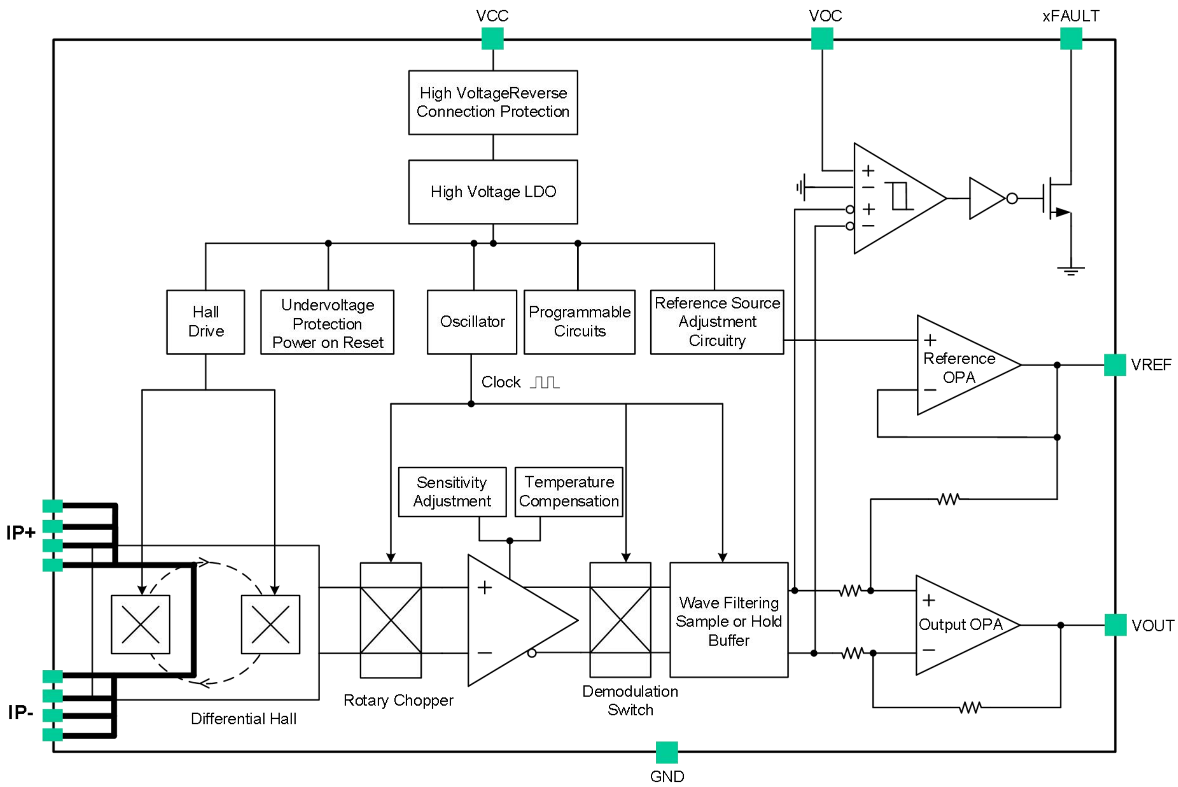
Certificate Number:
E526186-A6002-UL

PRODUCT PACKAGE DRAWING

TYPICAL APPLICATION



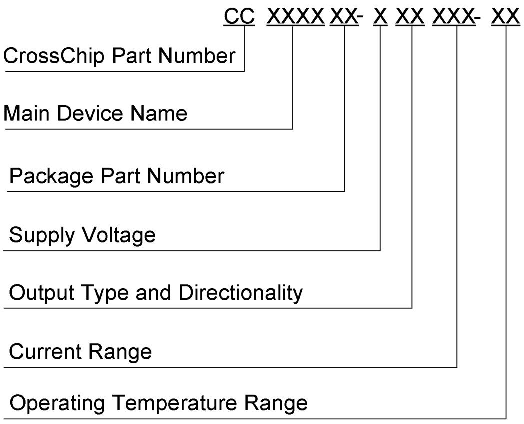
FUNCTION BLOCK DIAGRAM



ORDERING INFORMATION

Part No.	SENS. (mV/A)	Package	Packing Form
CC6922SG-5FB065-Q1	30.77	SOP16W	tape reel, 1000 pcs/reel
CC6922SG-5FB100-Q1	20	SOP16W	tape reel, 1000 pcs/reel

PRODUCTION NAME DEFINITION



CrossChip Part Number： Fixed to CC

Main Device Name： Main material number name

Package Part Number： Package code

Supply Voltage： Fixed operational voltage, 5 - VCC=5V

Output Type and Directionality： Output type and directionality

Output type：F：Fixed output

Output directionality：B：Bidirectional

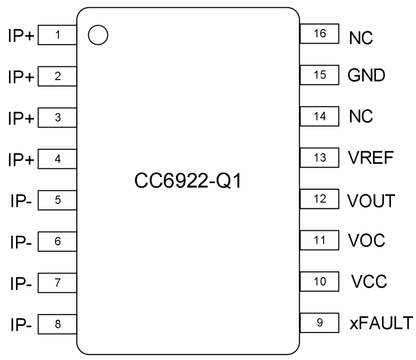
Current Range : Measuring current range

Operating Temperature Range : Temperature ratings for automotive applications

Q0 :-40°C to +150°C　　Q1 :-40°C to +125°C

Q2 :-40°C to +105°C　　Q3 :-40°C to +85°C

PINOUT DIAGRAM



SOP16W Package

Name	Number	Description	Name	Number	Description
IP+	1	Current Sampled +	xFAULT	9	Overcurrent sign pin，Open-drain output(low active)connect a 10kΩ pull-up resistor to the power supply; Ground is recommended when this function is not used
IP+	2	Current Sampled +	VCC	10	Supply Voltage
IP+	3	Current Sampled +	VOC	11	Define the overcurrent fault threshold; Ground is recommended when this function is not used
IP+	4	Current Sampled +	VOUT	12	Analog Voltage Output
IP-	5	Current Sampled -	VREF	13	Reference input and outputt
IP-	6	Current Sampled -	NC	14	Hang in the air，no internal connection
IP-	7	Current Sampled -	GND	15	Ground
IP-	8	Current Sampled -	NC	16	Hang in the air，no internal connection

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Power Supply	V_{CC}	-20 ~ 20	V
Output Voltage	V_{OUT}，V_{REF}，xFAULT	-0.3 ~ 6.0	V
Input Voltage	V_{OC}	-0.3 ~ 6.0	V
Input Current Peak Current (3 s)	I_{PEAK}	200	A
Input Current Continuous Current	I_{CON}	72	A
Operating Ambient Temperature	T_A	-40~125	°C
Junction Temperature	T_J	165	°C
Storage Temperature	T_S	-55~150	°C
Moisture Sensitivity Level	MSL	3	
Electrostatic Discharge Voltage	HBM	4	kV
	CDM	2	kV
Latch Up	LU	500	mA

Note: Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

ISOLATION CHARACTERISTICS

Parameter	Symbol	Test Conditions	Value	Unit
Distance Through Insulation	DTI	Minimum internal distance through insulation	127	um
Dielectric strength test voltage	V_{ISO}	50/60Hz，1min	5000	V_{RMS}
		t = 1s	6000	
Working Voltage for Basic Isolation	V_{WVBI}	Basic insulation TUV mark: EN IEC 62368-1:2020+A11:2020 UL 62368-1, 3rd Ed, 2021-10-22 CB Scheme：IEC 62368-1: 2018	2121	V_{PK} or V_{DC}
			1500	V_{RMS}
Working Voltage for Reinforced Isolation	V_{WVRI}	Reinforced insulation TUV mark: EN IEC 62368-1:2020+A11:2020 UL 62368-1, 3rd Ed, 2021-10-22 CB Scheme：IEC 62368-1: 2018	1060	V_{PK} or V_{DC}
			750	V_{RMS}
Clearance	D_{cl}	Minimum distance through air from IP leads to signal leads	8.3	mm
Creepage	D_{cr}	Minimum distance along package body from IP leads to signal leads	8.3	mm
Maximum Surge Isolation Voltage	V_{IOSM}	IEC 61000-4-5 Tested in air, ± 5 pulses, 2 times/min 1.2us (rise) / 50us (width)	11	kV
Surge Current	I_{SURGE}	IEC 61000-4-5 Tested in air, ± 5 pulses, 1 times/min 8μs (rise) / 20μs (width)	25	kA

THERMAL RESISTANCE INFORMATION

Parameter	Symbol，Conditions	value	Unit
Junction-to-ambient	θ_{JA}（SOP16W）	78	°C/W
Junction-to-case	θ_{JC}（SOP16W）	24	°C/W

ELECTRICAL PARAMETERS (V_{CC}=5V/3.3V，C_{OUT}=1nF，C_{REF}=1nF，T_A=25°C, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply Section，VCC=5V						
Supply Voltage	V_{CC}		4.5	5	5.5	V
Undervoltage Protection Release Threshold	UV	V_{CC}> UV，Undervoltage protection release		4.15		V
Undervoltage Protection Hysteresis Voltage	UV_{HYS}	V_{CC} < UV - UV_{HYS}，Lock the chip		0.2		V
Supply Current	I_{CC}		18	22	28	mA
Power-on Reset Time	T_{POR}	V_{CC}>UV to V_{REF} start		22		us
Supply Section，VCC=3.3V						
Supply Voltage	V_{CC}		3	3.3	3.6	V
Undervoltage Protection Release Threshold	UV	V_{CC}> UV，Undervoltage protection release		2.85		V
Undervoltage Protection Hysteresis Voltage	UV_{HYS}	V_{CC} < UV - UV_{HYS}，Lock the chip		0.2		V
Supply Current	I_{CC}		16	19	25	mA
Power-on Reset Time	T_{POR}	V_{CC}>UV to V_{REF} start		22		us
Output Section，VOUT						
VOUT Filter Capacitors	C_{OUT}	VOUT to GND		1	2.2	nF
VOUT Load Resistance	R_{L_OUT}	VOUT to GND	4.7			kΩ
VOUT High Saturation Voltage	V_{SATH}	V_{SATH}= V_{CC} – V_{OUT}，R_L=10kΩ to GND		0.1	0.2	V
VOUT Low Saturation Voltage	V_{SATL}	V_{SATL}= V_{OUT}，R_L=10kΩ to VCC		0.1	0.2	V
VOUT Output Source Current	I_{OUT_SOURCE}	VOUT to GND short-circuit current		8		mA
VOUT Output Sink Current	I_{OUT_SINK}	VOUT to VCC short-circuit current		28		mA
Signal Chain -3dB Bandwidth	f_{-3dB}	Small signal -3dB bandwidth		250		kHz
Signal Response Time	t_{RES}	Input current up to 90% to VOUT 90%		1.2	2	us
Reference Section，VREF						
VREF Filter Capacitors	C_{REF}	VREF to GND		1	2.2	nF
VREF Load Resistance	R_{L_REF}	VREF to GND	4.7			kΩ
VREF Output Voltage	V_{REF}	5V nominal supply voltage series	2.49	2.5	2.51	V
		3.3V nominal supply voltage series	1.64	1.65	1.66	V
VREF Input Voltage	$VREF_{IN}$	VREF Input voltage range	0.1×V_{CC}		0.9×V_{CC}	V
VREF Output Source Current	I_{REF_SOURCE}	VREF to GND short-circuit current		2.8		mA
VREF Output Sink Current	I_{REF_SINK}	VREF to VCC short-circuit current		6		mA

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Alarm section，VOC，xFAULT						
VOC Input Range	V_{VOC}	VOC Input voltage range	0.2×V_{VREF}		0.8×V_{VREF}	V
VOC Input Leakage Current	I_{LKVOC}	VOC pin input leakage current	-50		50	nA
Overcurrent Alarm Gain	A_{VOC}	$I_{VOC}=I_{MAX}×(V_{OC}/V_{REF})×A_{VOC}$， I_{VOC} is the set alarm current value， I_{MAX} is the current value corresponding to V_{OUT}(rail-to-rail)		2.5		-
Overcurrent Alarm Hysteresis	I_{VOCHYS}	After $I_P < I_{VOC} – I_{VOCHYS}$， xFAULT changes from pull-low to high-impedance		0.2×I_{MAX}		A
VOC Alarm Error	E_{xFAULT}	V_{OC}=0.4V_{REF} Output error relative to ideal value		±5		%
xFAULT Output Low	V_{xFAULT}	In the case of overcurrent, xFAULT outputs low, the xFAULT pin is connected to a 10kΩ pull-up resistor to V_{CC}			0.3	V
xFAULT Response Time	t_{VOC}	The delay time of the input current transitions from 0A step to 1.2×I_{VOC}, and the xFAULT pin pulls down from high to V_{xFAULT}		1.6		us
xFAULT Hold Time	t_{HOLD}	The delay time of the input current transitions from 1.2×I_{VOC} step to 0A, and the xFAULT pin pulls up from low to V_{xFAULT}		6.8		us
On-resistance						
Primary on-resistance	R_P	T_A=25°C, I_P=10A		0.3		mΩ
Time drift parameter part						
Sens lifetime drift	Sens_drift	After the reliability test， test @ T_A=25°C	-1.5		1.5	%
V_{REF} lifetime drift	V_{REF}_drift	After the reliability test， test @ T_A=25°C	-12		12	mV
$V_{OUT(Q)}$ lifetime drift	$V_{OUT(Q)}$_drift	After the reliability test， test @ T_A=25°C	-15		15	mV
V_{OE} lifetime drift	V_{VOE}_drift	After the reliability test， test @ T_A=25°C	-8		8	mV

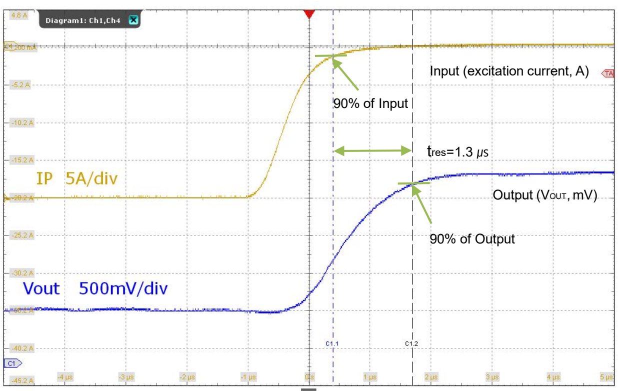
CC6922SG-5FB065-Q1 (V_{CC}=5V，C_{OUT}=1nF，C_{REF}=1nF，T_A=25°C, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Current Accuracy Range	I_P	-	-65		65	A
Sensitivity	Sens	full range of I_P		30.77		mV/A
Zero Current Differential Output Error	V_{OE}	V_{OE}=V_{OUT}-VREF，I_P=0A	-5		5	mV
Noise	$V_{N(RMS)}$	I_P=0A		4.75		mV
Zero Current Output Offset Temperature Drift	ΔV_{OE}	T_A=-40°C ~125°C V_{OE} offset voltage drift=V_{OE_TA} - $V_{OE\_25℃}$	-20		20	mV
Zero Current Quiescent Output Voltage Temperature Drift	$\Delta V_{OUT(Q)}$	T_A=-40°C ~125°C $V_{OUT(Q)}$ voltage drift=$V_{OUT(Q)\_TA}$ -$V_{OUT(Q)\_25℃}$	-25		25	mV
Sensitivity Drift	Δ_{SENS}	T_A=-40°C ~125°C	-2.5		2.5	%
Total Output Error	E_{TOT}	T_A=-40°C ~125°C，I_P=I_{P_MAX}	-3.0		3.0	%
Linearity Error	LIN_{ERR}	T_A=-40°C ~125°C		0.2	0.4	%

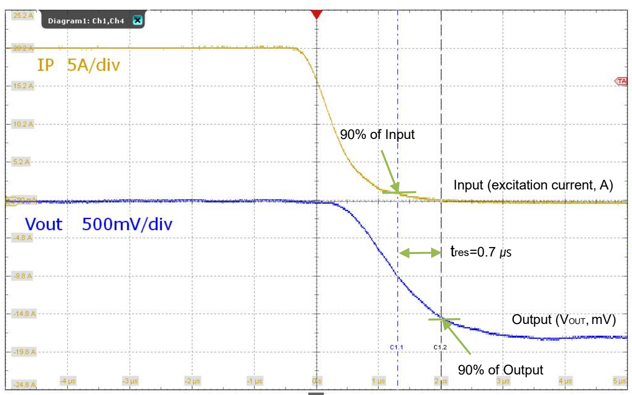
CC6922SG-5FB100-Q1 (V_{CC}=5V，C_{OUT}=1nF，C_{REF}=1nF，T_A=25°C, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Current Accuracy Range	I_P	-	-100		100	A
Sensitivity	Sens	full range of I_P		20		mV/A
Zero Current Differential Output Error	V_{OE}	V_{OE}=V_{OUT}-VREF，I_P=0A	-5		5	mV
Noise	$V_{N(RMS)}$	I_P=0A		3		mV
Zero Current Output Offset Temperature Drift	ΔV_{OE}	T_A=-40°C ~125°C V_{OE} offset voltage drift=V_{OE_TA} - $V_{OE\_25℃}$	-20		20	mV
Zero Current Quiescent Output Voltage Temperature Drift	$\Delta V_{OUT(Q)}$	T_A=-40°C ~125°C $V_{OUT(Q)}$ voltage drift=$V_{OUT(Q)\_TA}$ -$V_{OUT(Q)\_25℃}$	-25		25	mV
Sensitivity Drift	Δ_{SENS}	T_A=-40°C ~125°C	-2.5		2.5	%
Total Output Error	E_{TOT}	T_A=-40°C ~125°C，I_P=I_{P_MAX}	-3.0		3.0	%
Linearity Error	LIN_{ERR}	T_A=-40°C ~125°C		0.2	0.4	%

CURVE & WAVEFORM

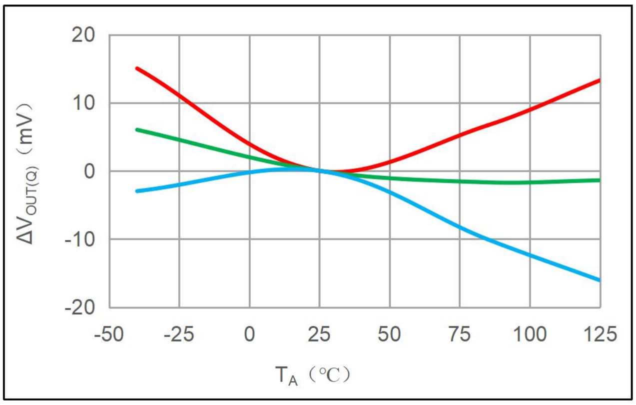


V_{OUT} positive step response waveform

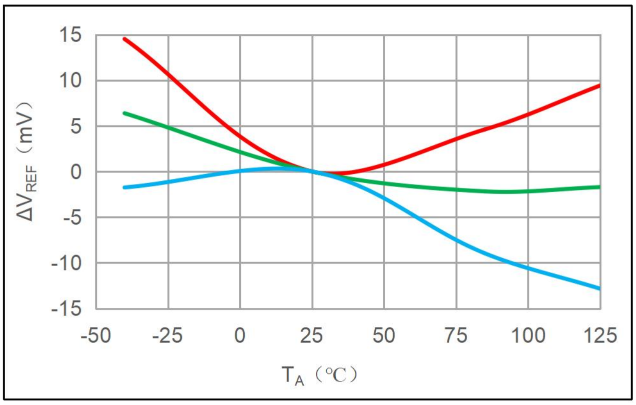


V_{OUT} negative step response waveform

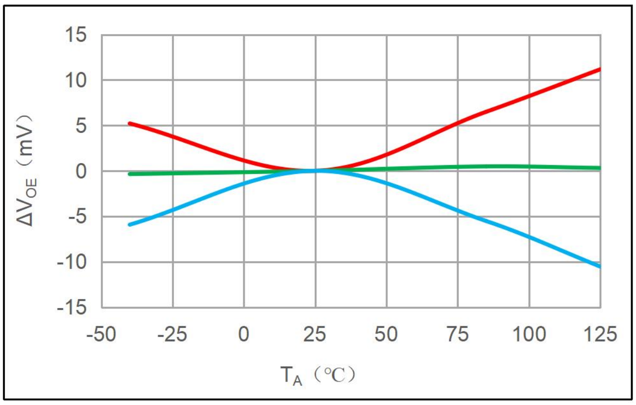
CC6922SG-5FB065-Q1[1]



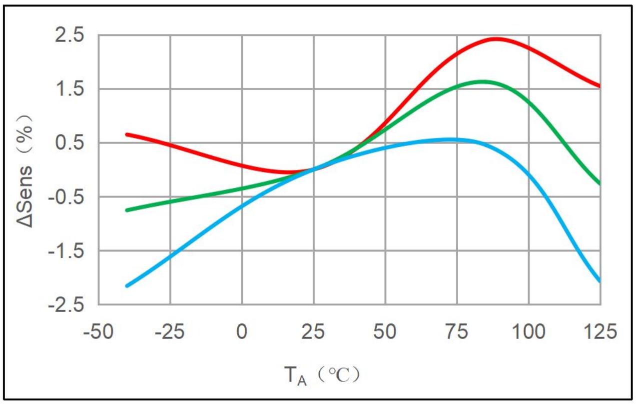
Δ $V_{OUT(Q)}$ vs. T_A



Δ V_{REF} vs. T_A



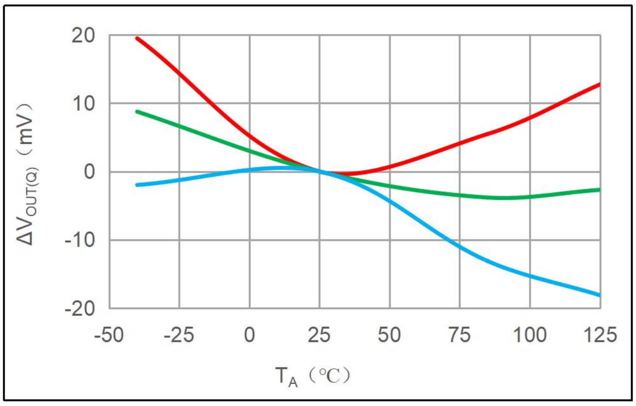
Δ V_{OE} vs. T_A



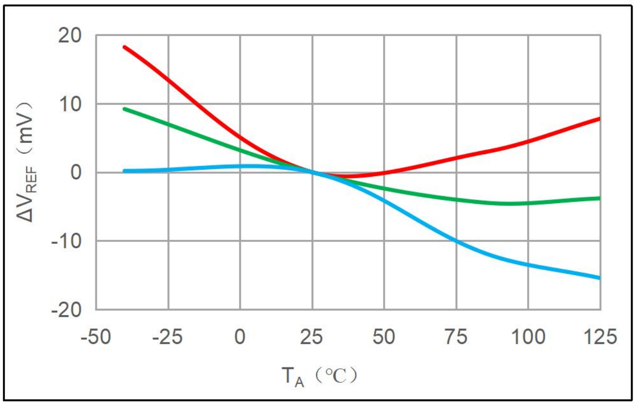
Δ Sens vs. T_A

[1] Green represents the average，Red represents the average+3Sigma，Blue represents the average-3Sigma(-40°C，25°C，85°C，125°C)

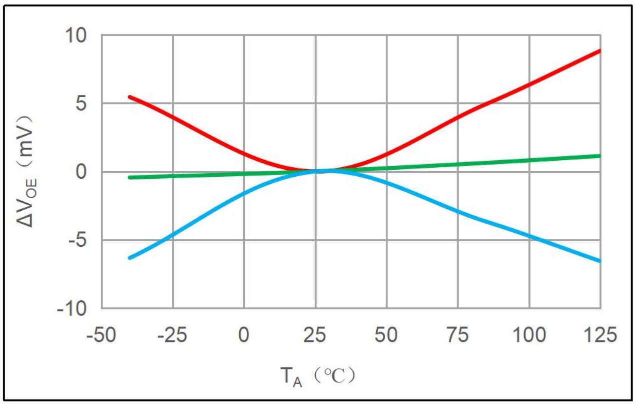
CC6922SG-5FB100-Q1[1]



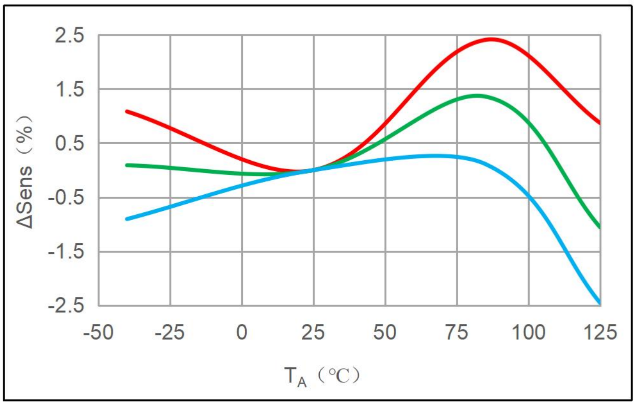
Δ $V_{OUT(Q)}$ vs. T_A



Δ V_{REF} vs. T_A



Δ V_{OE} vs. T_A



Δ Sens vs. T_A

[1] Green represents the average，Red represents the average+3Sigma，Blue represents the average-3Sigma(-40°C，25°C，85°C，125°C)

FUNCTION DESCRIPTION

The CC6922-Q1 device is a precision current sensor based on Hall sensor.It has less than 3% full scale error and zero current reference signal output in the whole temperature range, which can realize bidirectional current detection. The input current flows through a wire between isolated input current pins, which has a resistance of 0.3mΩ at room temperature to reduce insertion loss.The magnetic field generated by the input current is sensed by Hall sensor and amplified by precise signal chain. It can be used for AC and DC current measurement with a bandwidth of 250kHz.The measuring current is 65A and 100A. There are 2 kinds of Current sensing range to choose. CC6922-Q1 is optimized for high accuracy and temperature stability, compensating for misalignment and sensitivity over the entire range.

The input current of CC6922-Q1 flows through the primary side of the package through IP+ and IP- pins, the current flowing through the chip generates a magnetic field proportional to the input current and is measured by an isolated precision Hall sensor IC. Compared with other current measurement methods, the low impedance lead frame path reduces power consumption and does not require any external devices on the primary side. In addition, the internal integrated differential common mode suppression circuit can make the chip output not affected by external interference magnetic signal, and only measure the magnetic field generated by the input current, so as to suppress the interference of external magnetic field.

The typical resistance of the primary current input conductor at 25°C is 0.3mΩ. The lead frame is made of copper. The temperature coefficient of the input wire is positive, and the wire resistance increases with the increase of temperature. The typical temperature coefficient is 3900 ppm/°C. For every 100°C increase in temperature, the primary side resistance will increase by 39%.

CC6922-Q1 has an on-chip overcurrent reminder function, when the primary side current exceeds the set overcurrent threshold, the internal comparator is reversed, driving the OD output to work, and the pin is pulled down. The overcurrent threshold can be set by an external resistor on the VOC pin, which can be derived from V_{REF} or another external voltage input. When using the xFAULT function, VREF can only use the reference output mode. The effective input voltage of V_{OC} is between $0.2\times V_{VREF}$ and $0.8\times V_{VREF}$, and the correspondence of the overcurrent threshold and the V_{OC} voltage is as follows:

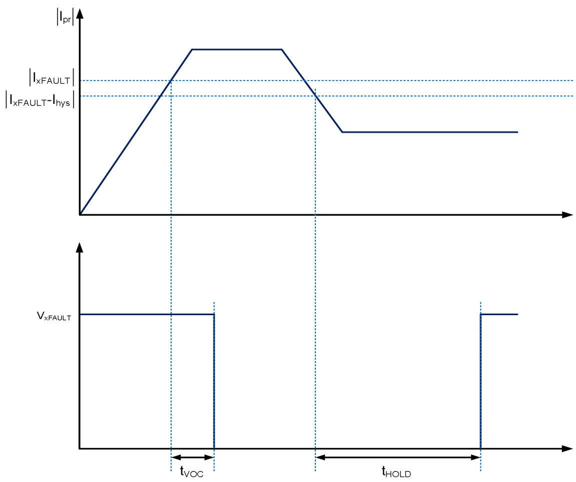
$$I_{xFAULT} = \frac{V_{OC}}{V_{REF}} \times 2.5 \times I_{pr}$$

e.g.: CC6922SG-5FB100-Q1，it's overcurrent protection point threshold range that can be set is 50A ~ 200A.

When $V_{OC}=0.2\times V_{VREF}=0.5V$, the threshold = 50A, the current is above 50A or the reverse is less than -50A, xFAULT pin pull down;

When $V_{OC}=0.8\times V_{VREF}=2.0V$, the threshold = 200A, the current is above 200A or the reverse is less than -200A, xFAULT pin pull down.

When the primary current (positive and negative currents) exceeds the overcurrent threshold set above, an overcurrent alarm is triggered. xFAULT is cleared when the absolute value of the primary current is less than the set current threshold minus the current hysteresis. t_{VOC} is the overcurrent response time, which is the time when the primary current reaches the overcurrent point to the xFAULT pin pulls down. t_{HOLD} is the overcurrent duration time, which is the time the original edge current is less than the set threshold | $I_{xFAULT}-I_{hys}$ | to the xFAULT pin pulls up. The overcurrent protection timing is as follows:



INPUT CURRENT

In use, the primary side of the chip (package pins 1-8) is connected in series at any position in the whole circuit. The input current flowing from IP+ (package pins 1-4) to IP- (package pins 5-8) is positive, otherwise it is negative. Do not shunt resistors between IP+ and IP-, unless there are very special reasons — such as minimizing insertion loss — which will reduce the current flowing through the chip, and the wire resistance will also be affected by temperature drift, which requires external temperature and precision correction of the whole system.

VREF INPUT/OUTPUT CHARACTERISTIC

The quiescent output voltage V_{OQ} of V_{OUT} is V_{REF} as a reference， VREF has two modes: input / output, which can be used as an internal reference to an external circuit or to adjust the V_{OQ}.

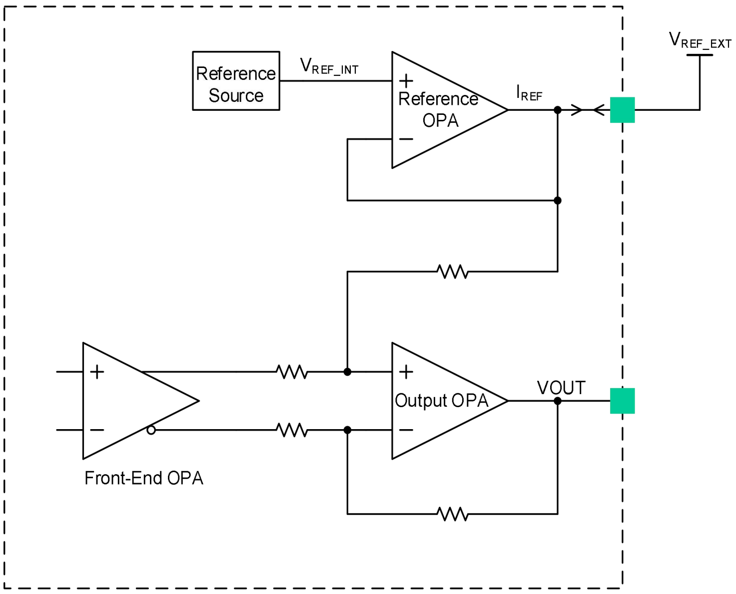
1. When using the VREF output mode：

Rated working voltage V_{CC} = 5V series products,V_{REF} can reach 2.500V, after factory programming, the nominal value error ≤ 5mV;

The typical value of I_{VREF_SOURCE} = 2.8mA, and the typical value of I_{VREF_SINK} = 6mA. Upon application, the recommended current value of V_{REF} ≤ 2mV.

2. When using the VREF input mode：

When the drive capability of the external reference exceeds the output of the Reference Op Amp, the external reference forces VOQ to use the external reference as a reference.When the input voltage is lower than the nominal value of V_{REF}, the drive capability of the input source needs to be higher than I_{VREF_SOURCE}; When the input voltage is higher than the nominal value of V_{REF}, the drive capability of the input source needs to be higher than I_{VREF_SINK}. It is recommended that customers use an external reference source that ±10mA drive capability for input. Limited by the rail-to-rail output range of the output op amp, the voltage range of the external input of V_{REF} is 0.1×V_{CC} ~ 0.9×V_{CC}, V_{OQ} changes with V_{REF}, and the sensitivity of CC6922-Q1 remains unchanged.



VOUT OUTPUT CHARACTERISTIC

The quiescent output point of the CC6922-Q1 (IP = 0A, with VREF in output mode) is 2.5V.

When the current increases, the V_{OUT} increases until the saturation voltage of the output operational amplifier (VCC – rail voltage); when the current decreases, the V_{OUT} decreases until the saturation voltage (GND + rail voltage) of the Output Op Amp. Crosschip ensures the accuracy and linearity of V_{OUT} in the range of 0.5~4.5V. In order to ensure the consistency of mass manufacturing, there is a certain margin in this range, but it is not recommended for customers to use this margin.

When the input current exceeds the range, the output of V_{OUT} is close to the rail voltage of the power supply. When the input current does not exceed the tolerance limit of the chip, the voltage will always be maintained. After the input current returns to the range, the output of V_{OUT} will return to normal without any damage to the chip.

When using the VREF output mode:

Product Name	Input Current	Nominal Supply Voltage(V)	Sensitivity (mV/A)	Calculation Formula (Note 1)
CC6922SG-5FB065-Q1	-65A ~ +65A	5	30.77	V_{OUT} = 2500 + I_P(A) × 30.77……....(mV)
CC6922SG-5FB100-Q1	-100A ~ +100A	5	20	V_{OUT} =2500 + I_P(A) × 20 …...........(mV)

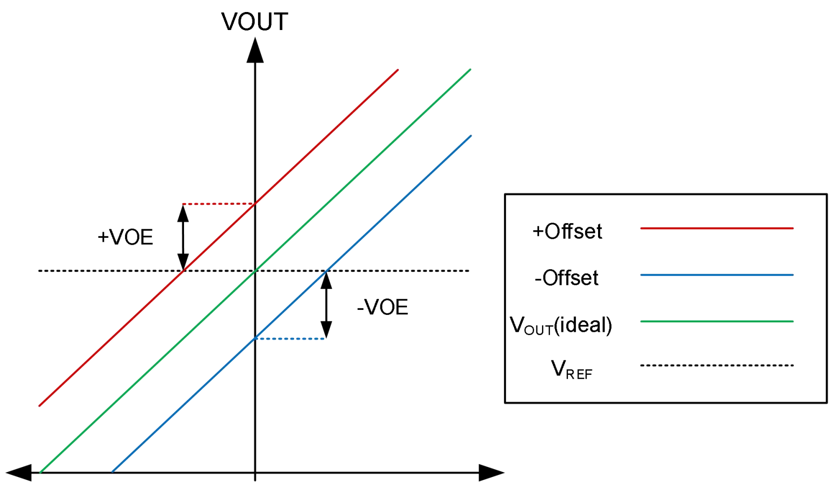
When using the VREF input mode: （$0.1 \times V_{CC} \le V_{REF} \le 0.9 \times V_{CC}$）

Product Name	Input Current	Nominal Supply Voltage(V)	Sensitivity (mV/A)	Calculation Formula (Note 1)
CC6922SG-5FB065-Q1	-65A ~ +65A	5	30.77	V_{OUT} = V_{REF} + I_P(A) × 30.77…........(mV)
CC6922SG-5FB100-Q1	-100A ~ +100A	5	20	V_{OUT} = V_{REF} + I_P(A) × 20…..............(mV)

Note1: This formula is only applicable to DC current calculations, when AC current applications, one should pay attention to I_{PEAK}=1.414 × I_{RMS} and pay attention to the positive and negative current direction.

OFFSET VOLTAGE

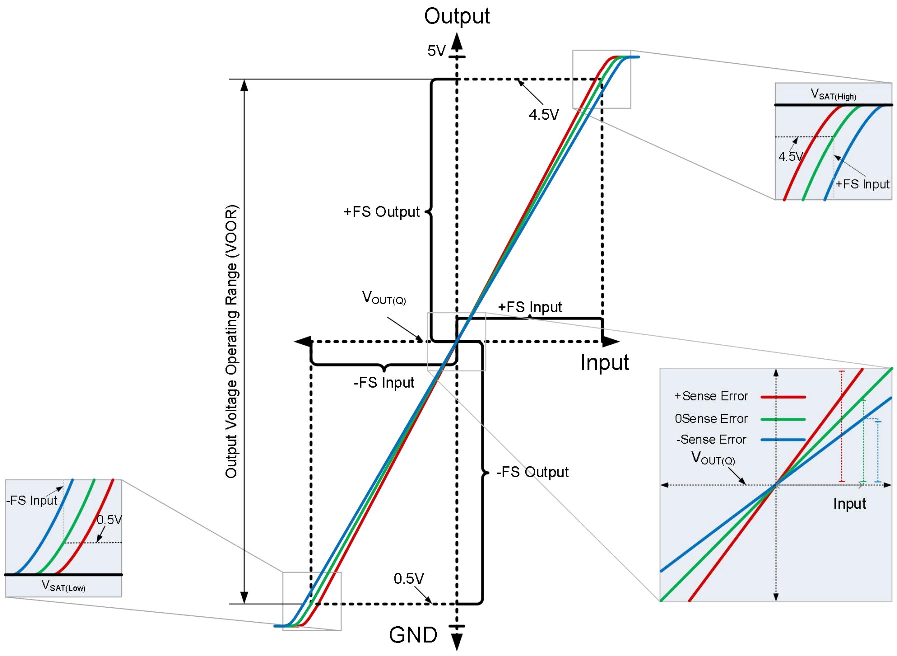
Offset Voltage (V_{OE}) is defined as the difference between $V_{OUT(Q)}$ and V_{REF} (as shown in the figure below). V_{OE} includes the drift of $V_{OUT(Q)}$ minus V_{REF} from room to hot or room to cold (25°C to 125°C or 25°C to –40°C respectively).



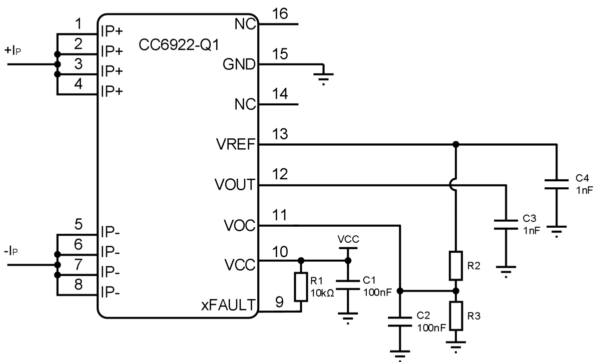
OUTPUT VOLTAGE OPERATING RANGE

As shown in the figure, the output voltage operating range V_{OOR} is the swing range of the linear output of V_{OUT}. V_{OUT} beyond V_{OOR} could still work until V_{SAT}, but performance deteriorated in this range.

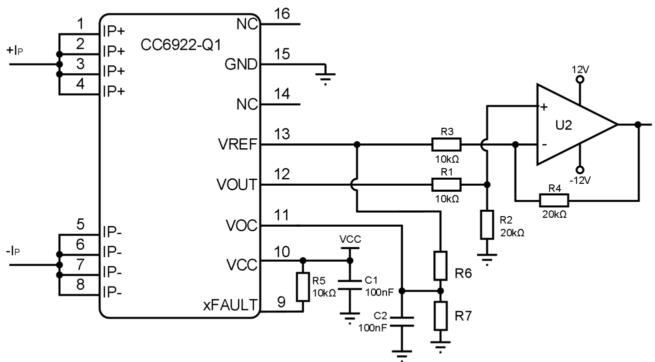
Voltage Output Operating Range for V_{CC} and Output Modes	
V_{CC}	Bidirectional
5V	±2



TYPICAL APPLICATION CIRCUITS



Recommended Application



Zero Migration Application (VREF Output Mode)

TEMPERATURE RISE vs. INPUT CURRENT

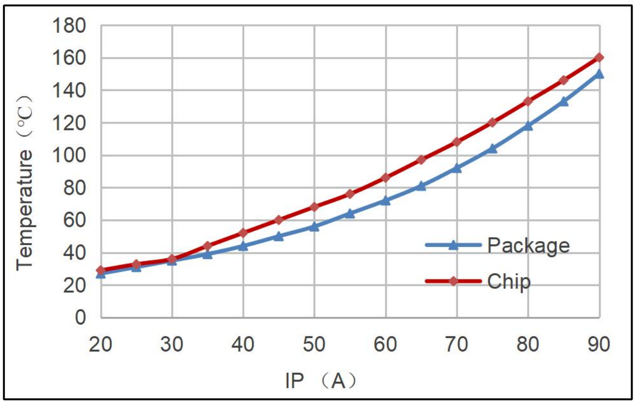
When designing any current sensing system, self-heating due to a single current measurement should be considered. As current flows through the system, the sensor, printed circuit board (PCB), and contact resistance all generate heat. Temperature rise is highly dependent on PCB layout, copper foil thickness, cooling method, and input current method. The primary current includes peak current,the conducting time of current and duty cycle. The data presented in this section is a DC test that can be used to approximate the temperature rise of AC and pulse currents.

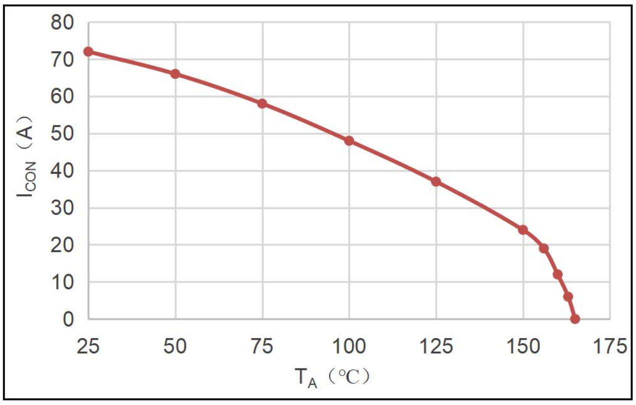
The test environment of this experiment is: room temperature, open environment, no wind; The temperature rise test method is: the chip surface is attached to our Demo Board, and the temperature data is collected after the chip temperature is stable. The following chart shows the CC6922-Q1 package body surface temperature vs. the continuous current flowing through the primary side.

The heat capacity of the CC6922-Q1 should be verified by final customer under the specific conditions of the application. The maximum junction temperature $T_{J(MAX)}$ (165°C) should not be exceeded.

For further information on testing this application, please refer to Crosschip《Crosschip Current Sensor Layout Application Guide》.

Relationship between Package Temperature & Input Current



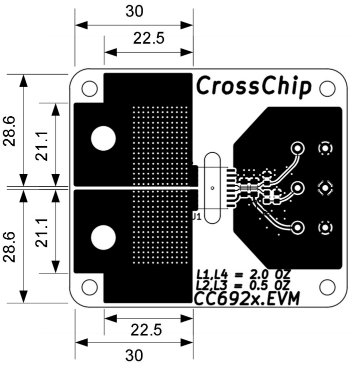


Input Current (IP) vs. Package Temperature

I_{CON} vs T_A

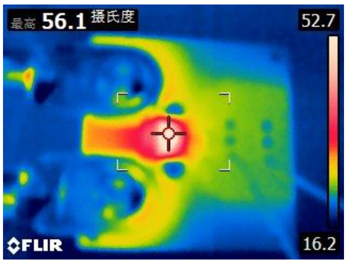
Note：Based on the demo board test, for specific applications, it is necessary to strengthen heat dissipation or choose Tg high plates according to actual application scenarios.

Continuous power supply at 150A current, if the wind speed of the auxiliary cooling fan is 14.5 m/s, the temperature rise can be controlled within the 5°C range.



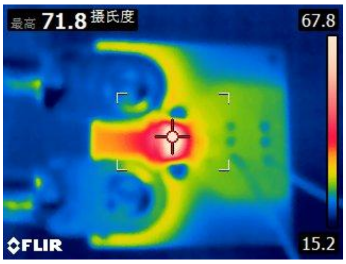
Thickness 1.6mm, FR-4 double panel, top 2 oz and inner 0.5 oz copper foil, total 800mm², Connected with the IP pin, and each layer of copper foil connected with holes

Test environment: open environment, quiescent air



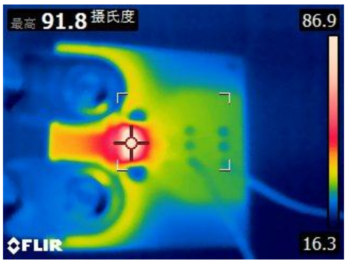
Package Thermography

(Input Current 50A)



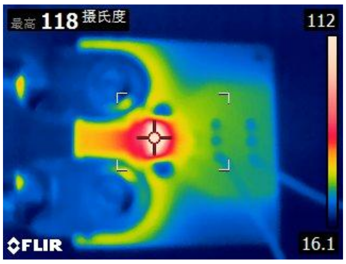
Package Thermography

(Input Current 60A)



Package Thermography

(Input Current 70A)

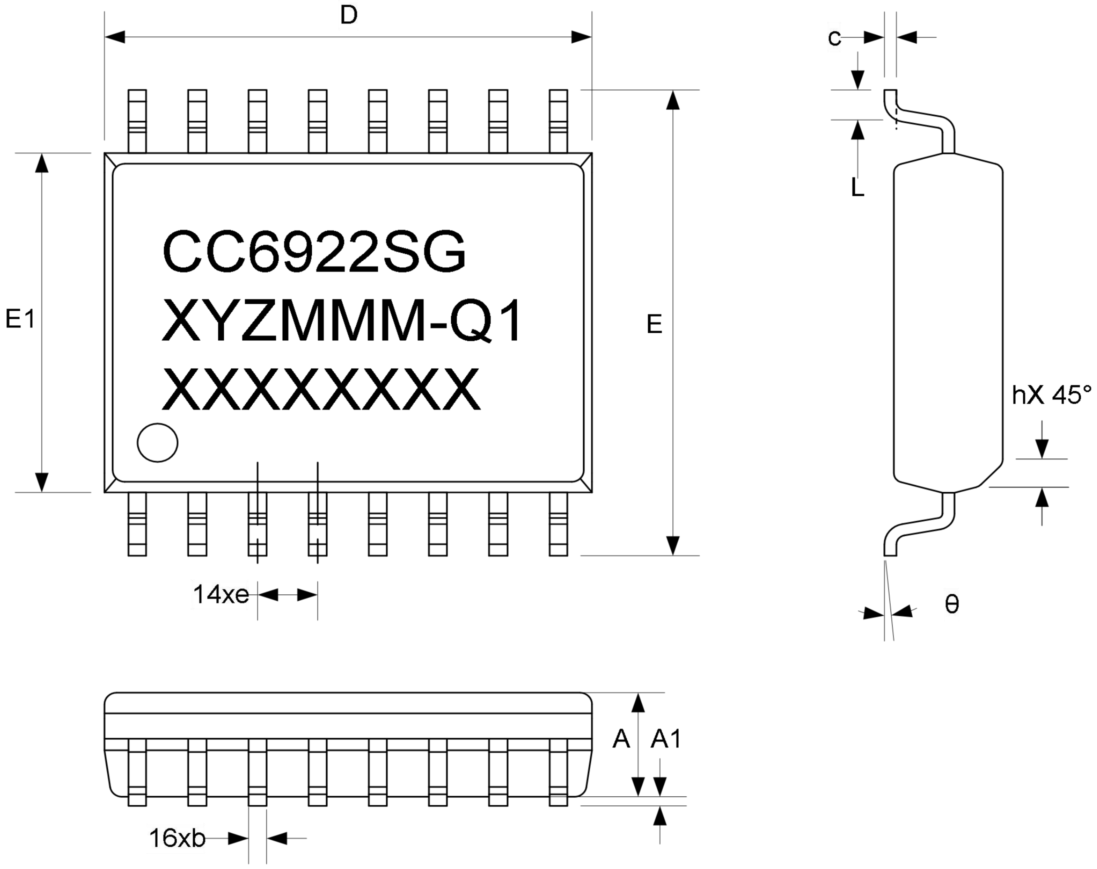


Package Thermography

(Input Current 80A)

PACKAGE INFORMATION

SOP16W Package



Size	Millimeters		
	Min.	Typ.	Max.
A	2.35	-	2.65
A1	0.10	-	0.30
b	0.33	-	0.51
c	0.23	-	0.32
D	10.10	-	10.50
E1	7.40	-	7.60
E	10.00	-	10.63
e	1.27 BSC		
L	0.40	-	1.27
h	0.25	-	0.75
θ	0°	-	8°

Marking:

1st Line: CC6922SG – Device Name

2nd Line: XYZMMM-Q1

- X – Rated operating voltage
- Y – Output type
- Z – Output polarity
- MMM – The current range

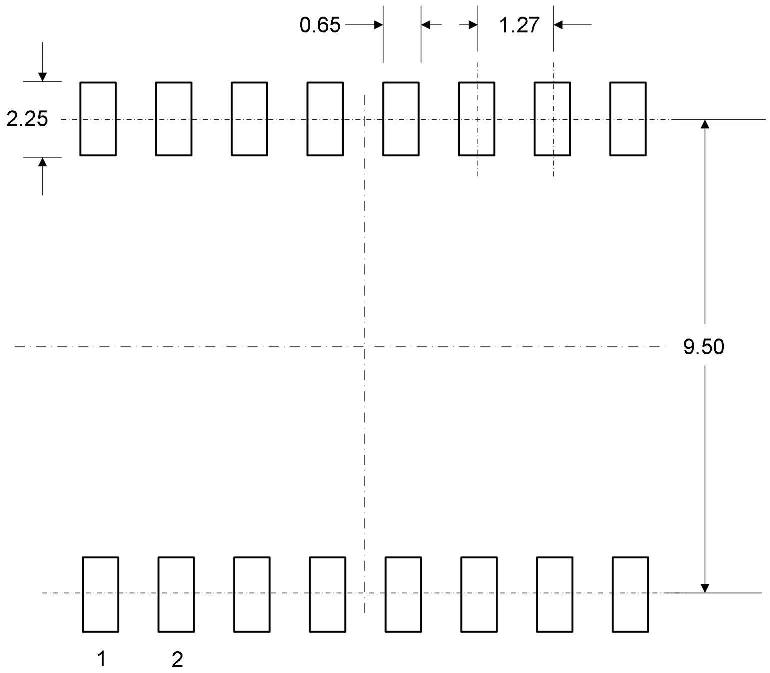
3rd Line: XXXXXXXX

- XXXXXXXX – Production serial number

Note:

1. All dimensions are in millimeters.
2. For details: refer to Product Name Definition

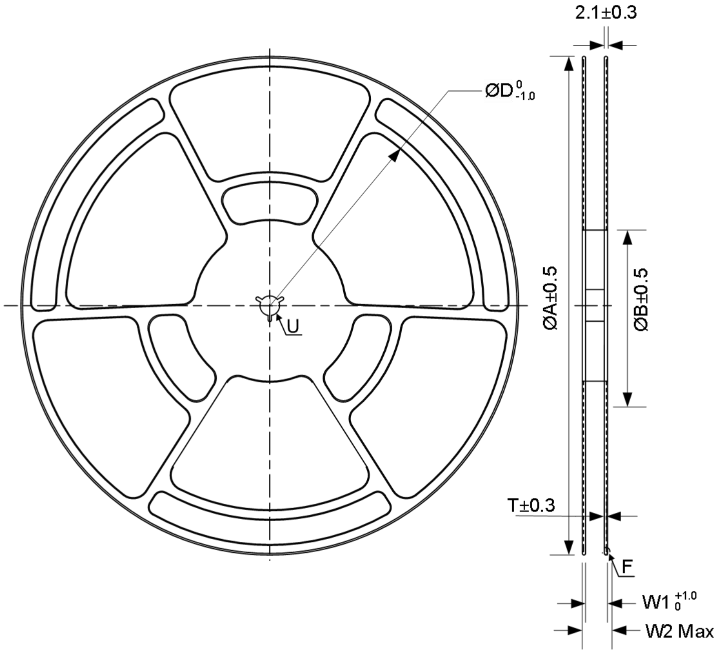
Package Reference

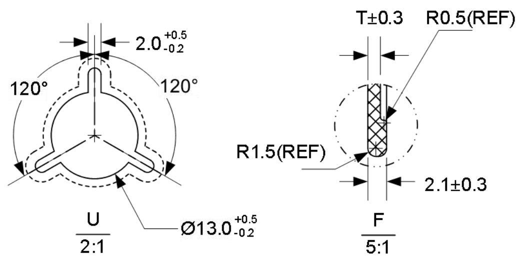


shorten pad length and increase creepage distance

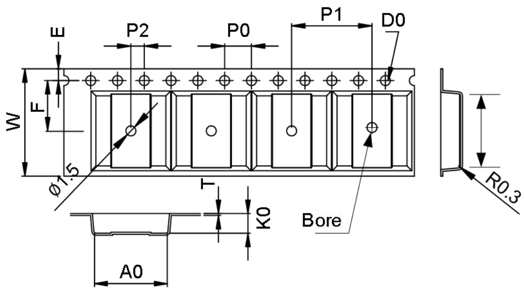
TAPE AND REEL INFORMATION

Reel Dimensions

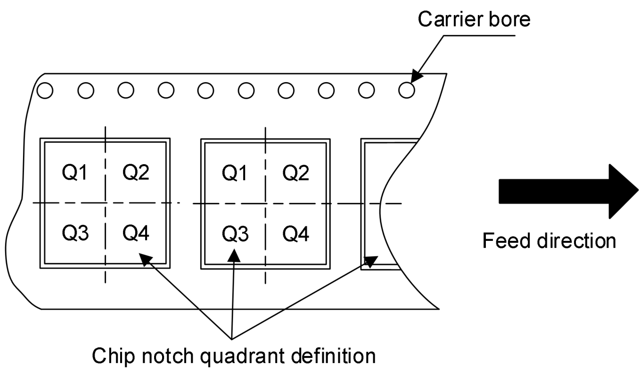




Tape Dimensions



QUADRANT ASSIGNMENTS FOR PIN1 ORIENTATION IN TAPE



Note:

The silkscreen side is facing up, and PIN1 is positioned in Q1

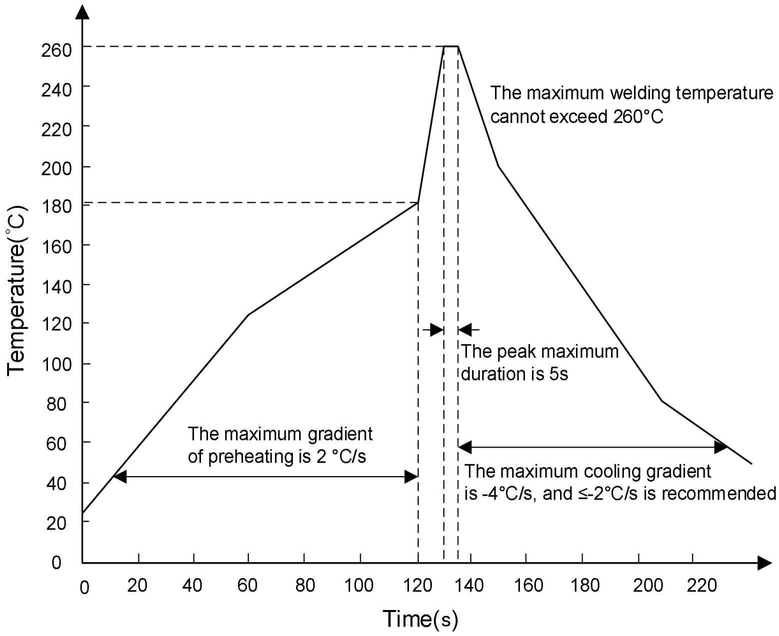
Each carrier tape has a front space of 30±5 squares and a back space of 50±5 squares.

Reel Basic Size(mm)					
A	B	W1	W2 Max	T	D
330	100	16.4	22.4	1.5	270
Carrier Tape Basic Size(mm)					
W	A0	B0	K0	P0	P1
16±0.30	10.7±0.1	10.7±0.1	3.00±0.1	4.0±0.1	12.00±0.1
P2	F	S	E	D0	T
2.0±0.1	7.5±0.1	0.0±0.1	1.75±0.1	$1.5^{+0.1}_{-0.0}$	0.3±0.05

Note: Tolerance ± 0.2mm is not specified.

THE WELDING PROCESS OF THE CHIP

Welding Process Requirements：



REVISION HISTORY

Revision Date	Description of Revision	Revision
2024.04.07	Newly issued.	rev1.0
2024.04.08	*ESD (CDM)* parameter indicator updated from "1kV" to "2kV"; VCC limit withstand voltage updated to "-20 ~ 20V"; VOC、VOUT、VREF、xFAULT limit withstand voltage updated to "-0.3 ~ 6.0V"; Functional Block Diagram updates.	rev1.1
2024.04.12	Supplemental 100A range related information.	rev1.2

CrossChip

CrossChip Microsystems Inc. was founded in 2013, is a national high-tech enterprise, engaged in integrated circuit design and sales. The company has strong technical strength, has more than 60 kinds of patents, mainly used in Hall sensor signal processing, with the following product lines:

- ✓ High precision linear Hall sensor
- ✓ All kinds of Hall switches
- ✓ Single phase motor drive
- ✓ Single chip current sensor
- ✓ AMR Magnetoresistance sensor
- ✓ Isolation drive class chip

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