CC6921

High Performance, Hall Effect-Based Current Sensor IC with a Low-Resistance Conductor 5A/10A/20A/30A/50A/65A/75A/100A

FEATURES

- Zero current output voltage is 50%VCC
- Current sensing range available: 5A/10A/20A/30A/50A/65A/75A/100A
- 1.2MHz chopper frequency, low noise, single ended analog output
- High isolation and withstand voltage (3200V(AC) isolation voltage between pins 1-8 and 9-16)
- Less power loss, internal conductor's resistance is 0.45mΩ
- High bandwidth, up to 250kHz, 1.2us output rise time in response to step input current
- Total output error 1% at T_a=25°C
- 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) 6kV

APPLICATIONS

- Motor controller
- Load detection and management
- Switch-mode power supplies
- Over-current fault protection

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E526186-A6001-UL

GENERAL DESCRIPTION

The CC6921 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 CC6921 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 0.14mΩ, which provides much less power loss than the universal resistor sampling method. Otherwise, its internal inherent insulation provides $1000V_{RMS}$ basic working isolation voltage and 3200V (AC) insulation withstand voltage between the input current path and the secondary circuit. The Hall circuit based on BiCOMS process integrates a high sensitivity Hall sensor assembly, Hall signal pre-amplifier, common mode magnetic field suppression circuit, temperature compensation unit, oscillator, dynamic offset cancellation circuit and amplifier output module. Zero current output voltage is 50%VCC.

When power supply voltage is 5V, the linear output voltage range is 0.2~4.8V, the linearity can reach 0.1%.

The differential common-mode suppression circuit integrated in CC6921 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.

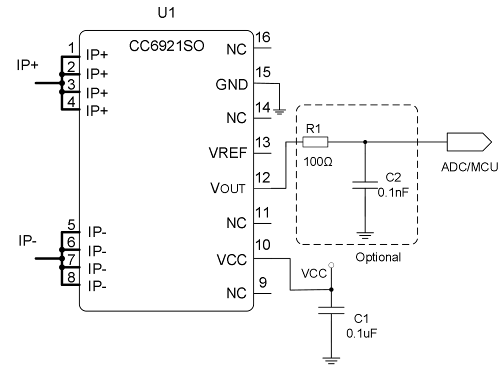
CC6921 is available in SOP16W package. It's operating ambient temperature range is -40~125°C. Comply with ROHS requirements.

DEVICE INFORMATION

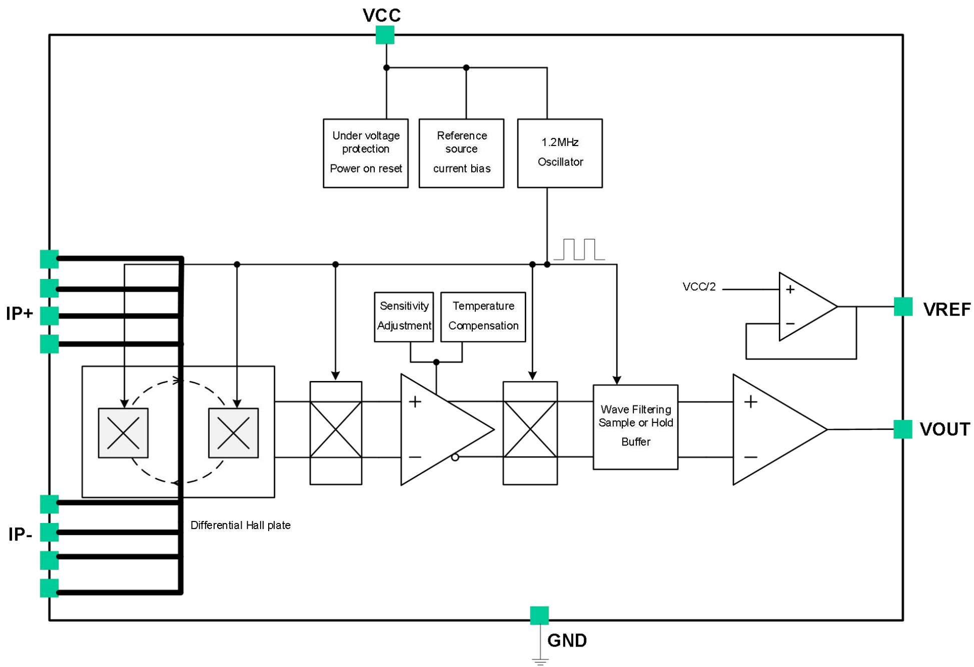
Part Number	Package	Body Size（TYP.）
CC6921	SOP16W	10.30mm×7.50mm

PRODUCT PACKAGE DRAWING

TYPICAL APPLICATION



FUNCTION BLOCK DIAGRAM



ORDERING INFORMATION

Part No.	SENS. (mV/A)	Package	Packing Form
CC6921SO-05A	400	SOP16W	tape reel, 1000 pcs/reel
CC6921SO-10A	200	SOP16W	tape reel, 1000 pcs/reel
CC6921SO-20A	100	SOP16W	tape reel, 1000 pcs/reel
CC6921SO-30A	66.7	SOP16W	tape reel, 1000 pcs/reel
CC6921SO-50A	40	SOP16W	tape reel, 1000 pcs/reel
CC6921SO-65A	30.8	SOP16W	tape reel, 1000 pcs/reel
CC6921SO-75A	26.7	SOP16W	tape reel, 1000 pcs/reel
CC6921SO-100A	20	SOP16W	tape reel, 1000 pcs/reel
CC6921SO-YYY (**Note1**)	-	SOP16W	tape reel, 1000 pcs/reel

Note1 : When YYY is within the range of 100A, customers can customize the range according to their needs

PRODUCTION NAME DEFINITION

CC 6921 SO - 50A

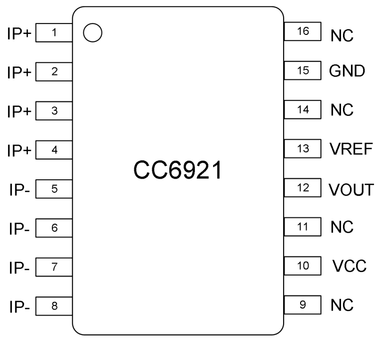
Current Range
100: 100A range

Package Part Number
SO: SOP16W

Main Device Name
6921

CrossChip Part Number
Fixed to CC

PINOUT DIAGRAM



SOP16W Package

Name	Number	Description	Name	Number	Description
IP+	1	Current Sampled +	NC	9	NC
IP+	2	Current Sampled +	VCC	10	Power Supply
IP+	3	Current Sampled +	NC	11	NC
IP+	4	Current Sampled +	VOUT	12	Analog Voltage Output
IP-	5	Current Sampled -	VREF	13	Zero Current Reference
IP-	6	Current Sampled -	NC	14	NC
IP-	7	Current Sampled -	GND	15	Ground
IP-	8	Current Sampled -	NC	16	NC

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Power Supply	V_{CC}	7	V
Output Voltage	V_{OUT}	-0.3~VCC+0.3	V
Output Source Current	$I_{OUT\,(SOURCE)}$	6	mA
Output Sink Current	$I_{OUT\,(SINK)}$	30	mA
Isolation Voltage	V_{ISO}	3200	V_{AC}
Input current peak current (3 s)	I_{PEAK}	100	A
Input current continuous current	I_{CON}	60	A
Operating Ambient Temperature	T_a	-40~125	°C
Junction Temperature	T_J	165	°C
Storage Temperature	T_S	-55~150	°C
Magnetic Flux Density	B	Not Limited	mT
Electrostatic Discharge Voltage (HBM)	ESD(HBM)	6	kV

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
Withstand isolation voltage	V_{ISO}	Test method: 50 / 60Hz, 1min	3200	V_{RMS}
	V_{TEST}	t = 1s (100% production)	3500	V_{RMS}
Working Voltage for Basic Insulation	V_{WVBI}	Basic insulation UL standard 62368-1:2014	1414	V_{PK} or VDC
			1000	V_{RMS}
Clearance	D_{cl}	minimum distance through air from IP leads to signal leads	7.8	mm
Maximum surge isolation voltage **(Note 1)**	V_{IOSM}	Tested 1.2us (rise) / 50us (width) One time	11	kV_{PK}
Surge Current **(Note 2)**	I_{SURGE}	Tested in compliance to IEC 61000-4-5 8μs (rise) / 20μs (width)	16	kA

Note1：Testing is carried out in air to determine the intrinsic surge immunity of the isolation barrier.

Note2: Certification pending.

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min.	Max.	Unit
Power Supply	V_{CC}	4.5	5.5	V
Operation Temperature	T_A	-40	125	°C

ELECTRICAL PARAMETERS (T_a=25°C and VCC=5V, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Power Supply	V_{CC}	-	4.5	5	5.5	V
Supply Current	I_{CC}	OUT pin floated	-	20	25	mA
Internal benchmark	V_{REF}		-	2.50	-	V
Zero Current Output Voltage	V_{OUTQ}	IP=0	2.49	2.50	2.51	V
Output Capacitance Load	C_L		-	-	1	nF
Output Resistive Load	R_L		1.5	-	-	kΩ
Resistance of Primary Conductor	R_P		-	0.45	-	mΩ
Propagation Time	t_D			1	2	us
Rise Time	tr		-	1.2	2.2	us
Common Mode Rejection Ratio	CMRR		-	43	-	dB
Bandwidth	BW	-3dB	-	250	-	kHz
Reference Output Source Current	$I_{REF(SOURCE)}$		2	-	4.5	uA
Reference Output Sink Current	$I_{REF(SINK)}$		4	-	8	uA
Nonlinearity	Lin_{ERR}		-	0.1	0.5	%
Symmetry	Sym_{ERR}		-	0.8	1.5	%
Power-on Time	t_{POR}	Output rising from 0 to 90% of steady-state	-	10	-	us

5A PERFORMANCE CHARACTERISTICS

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Current Accuracy Range	I_P	-	-5		5	A
Sensitivity	Sens	full range of I_P	388	400	412	mV/A
Zero Current Differential Output Error	V_{OE}	$V_{OE}=V_{OUT}-V_{REF}$，I_P=0A	-70		70	mV
Zero Current Output Offset Temperature Drift	ΔV_{OE}	T_A=-40°C ~125°C V_{OE} offset voltage drift=V_{OE_TA} - $V_{OE\_25℃}$	-80		80	mV
Noise	$V_{N(RMS)}$	I_P=0A		25		mV
Zero Current Quiescent Output Voltage Temperature Drift	$\Delta V_{OUT(Q)}$	T_A=-40°C ~125°C $V_{OUT(Q)}$ voltage drift=$V_{OUT(Q)\_TA}$ -$V_{OUT(Q)\_25℃}$	-80		80	mV
Sensitivity Drift	Δ_{SENS}	T_A=-40°C ~125°C	-2.0		2.0	%
Total Output Error	E_{TOT}	T_A=-40°C ~125°C，$I_P=I_{P\_MAX}$	-3.0		3.0	%

10A PERFORMANCE CHARACTERISTICS

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Current Accuracy Range	I_P	-	-10		10	A
Sensitivity	Sens	full range of I_P	194	200	206	mV/A
Zero Current Differential Output Error	V_{OE}	$V_{OE}=V_{OUT}-V_{REF}$，I_P=0A	-70		70	mV
Zero Current Output Offset Temperature Drift	ΔV_{OE}	T_A=-40°C ~125°C V_{OE} offset voltage drift=V_{OE_TA} - $V_{OE\_25℃}$	-50		50	mV
Noise	$V_{N(RMS)}$	I_P=0A		12.5		mV
Zero Current Quiescent Output Voltage Temperature Drift	$\Delta V_{OUT(Q)}$	T_A=-40°C ~125°C $V_{OUT(Q)}$ voltage drift=$V_{OUT(Q)\_TA}$ -$V_{OUT(Q)\_25℃}$	-50		50	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，$I_P=I_{P\_MAX}$	-3.5		3.5	%

20A PERFORMANCE CHARACTERISTICS

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Current Accuracy Range	I_P	-	-20		20	A
Sensitivity	Sens	full range of I_P	97	100	103	mV/A
Zero Current Differential Output Error	V_{OE}	$V_{OE}=V_{OUT}-V_{REF}$，I_P=0A	-45		45	mV
Zero Current Output Offset Temperature Drift	ΔV_{OE}	T_A=-40°C ~125°C V_{OE} offset voltage drift=V_{OE_TA} - $V_{OE\_25℃}$	-30		30	mV
Noise	$V_{N(RMS)}$	I_P=0A		16		mV
Zero Current Quiescent Output Voltage Temperature Drift	$\Delta V_{OUT(Q)}$	T_A=-40°C ~125°C $V_{OUT(Q)}$ voltage drift=$V_{OUT(Q)\_TA}$ -$V_{OUT(Q)\_25℃}$	-40		40	mV
Sensitivity Drift	Δ_{SENS}	T_A=-40°C ~125°C	-3.0		3.0	%
Total Output Error	E_{TOT}	T_A=-40°C ~125°C，$I_P=I_{P\_MAX}$	-4.0		4.0	%

30A PERFORMANCE CHARACTERISTICS

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Current Accuracy Range	I_P	-	-30		30	A
Sensitivity	Sens	full range of I_P	64.7	66.7	68.7	mV/A
Zero Current Differential Output Error	V_{OE}	$V_{OE}=V_{OUT}-V_{REF}$，I_P=0A	-45		45	mV
Zero Current Output Offset Temperature Drift	ΔV_{OE}	T_A=-40°C ~125°C V_{OE} offset voltage drift=V_{OE_TA} - $V_{OE\_25℃}$	-30		30	mV
Noise	$V_{N(RMS)}$	I_P=0A		11		mV
Zero Current Quiescent Output Voltage Temperature Drift	$\Delta V_{OUT(Q)}$	T_A=-40°C ~125°C $V_{OUT(Q)}$ voltage drift=$V_{OUT(Q)\_TA}$ -$V_{OUT(Q)\_25℃}$	-30		30	mV
Sensitivity Drift	Δ_{SENS}	T_A=-40°C ~125°C	-3.5		3.5	%
Total Output Error	E_{TOT}	T_A=-40°C ~125°C，$I_P=I_{P\_MAX}$	-4.5		4.5	%

50A PERFORMANCE CHARACTERISTICS

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Current Accuracy Range	I_P	-	-50		50	A
Sensitivity	Sens	full range of I_P	38.8	40	41.2	mV/A
Zero Current Differential Output Error	V_{OE}	$V_{OE}=V_{OUT}-V_{REF}$，I_P=0A	-40		40	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
Noise	$V_{N(RMS)}$	I_P=0A		10		mV
Zero Current Quiescent Output Voltage Temperature Drift	$\Delta V_{OUT(Q)}$	T_A=-40°C ~125°C $V_{OUT(Q)}$ voltage drift=$V_{OUT(Q)\_TA}$ -$V_{OUT(Q)\_25℃}$	-20		20	mV
Sensitivity Drift	Δ_{SENS}	T_A=-40°C ~125°C	-3.5		3.5	%
Total Output Error	E_{TOT}	T_A=-40°C ~125°C，$I_P=I_{P\_MAX}$	-4.5		4.5	%

65A PERFORMANCE CHARACTERISTICS

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Current Accuracy Range	I_P	-	-65		65	A
Sensitivity	Sens	full range of I_P	29.8	30.8	31.7	mV/A
Zero Current Differential Output Error	V_{OE}	$V_{OE}=V_{OUT}-V_{REF}$，I_P=0A	-25		25	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
Noise	$V_{N(RMS)}$	I_P=0A		10		mV
Zero Current Quiescent Output Voltage Temperature Drift	$\Delta V_{OUT(Q)}$	T_A=-40°C ~125°C $V_{OUT(Q)}$ voltage drift=$V_{OUT(Q)\_TA}$ -$V_{OUT(Q)\_25℃}$	-20		20	mV
Sensitivity Drift	Δ_{SENS}	T_A=-40°C ~125°C	-3.5		3.5	%
Total Output Error	E_{TOT}	T_A=-40°C ~125°C，$I_P=I_{P\_MAX}$	-4.5		4.5	%

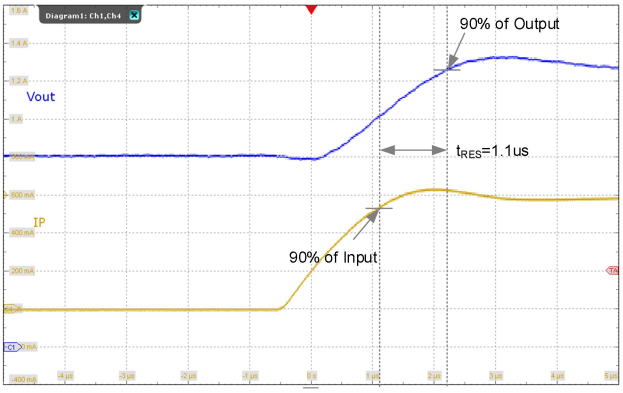
75A PERFORMANCE CHARACTERISTICS

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Current Accuracy Range	I_P	-	-75		75	A
Sensitivity	Sens	full range of I_P	25.9	26.7	27.5	mV/A
Zero Current Differential Output Error	V_{OE}	$V_{OE}=V_{OUT}-V_{REF}$，I_P=0A	-25		25	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
Noise	$V_{N(RMS)}$	I_P=0A		10		mV
Zero Current Quiescent Output Voltage Temperature Drift	$\Delta V_{OUT(Q)}$	T_A=-40°C ~125°C $V_{OUT(Q)}$ voltage drift=$V_{OUT(Q)\_TA}$ -$V_{OUT(Q)\_25℃}$	-20		20	mV
Sensitivity Drift	Δ_{SENS}	T_A=-40°C ~125°C	-3.5		3.5	%
Total Output Error	E_{TOT}	T_A=-40°C ~125°C，$I_P=I_{P\_MAX}$	-4.5		4.5	%

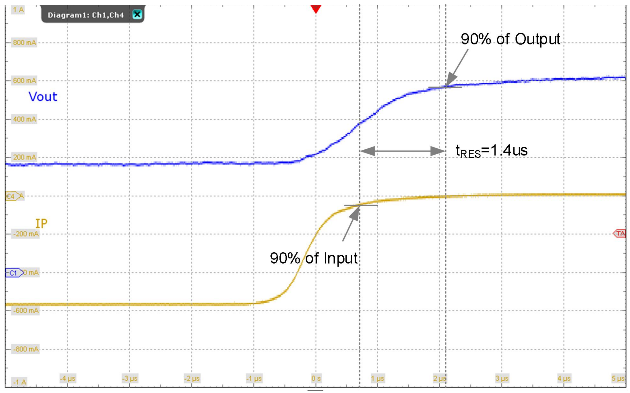
100A PERFORMANCE CHARACTERISTICS

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Current Accuracy Range	I_P	-	-100		100	A
Sensitivity	Sens	full range of I_P	19.4	20	20.6	mV/A
Zero Current Differential Output Error	V_{OE}	$V_{OE}=V_{OUT}-V_{REF}$，I_P=0A	-20		20	mV
Zero Current Output Offset Temperature Drift	ΔV_{OE}	T_A=-40°C ~125°C V_{OE} offset voltage drift=V_{OE_TA} - $V_{OE\_25℃}$	-10		10	mV
Noise	$V_{N(RMS)}$	I_P=0A		10		mV
Zero Current Quiescent Output Voltage Temperature Drift	$\Delta V_{OUT(Q)}$	T_A=-40°C ~125°C $V_{OUT(Q)}$ voltage drift=$V_{OUT(Q)\_TA}$ -$V_{OUT(Q)\_25℃}$	-20		20	mV
Sensitivity Drift	Δ_{SENS}	T_A=-40°C ~125°C	-3.5		3.5	%
Total Output Error	E_{TOT}	T_A=-40°C ~125°C，$I_P=I_{P\_MAX}$	-4.5		4.5	%

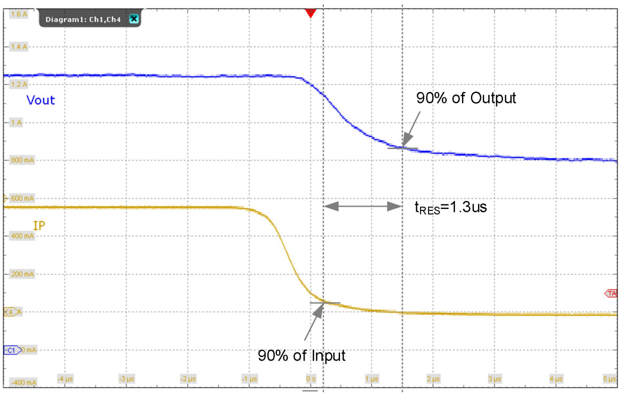
CURVE & WAVEFORM (V$_{CC}$=5V，T$_A$=25°C, unless otherwise specified)



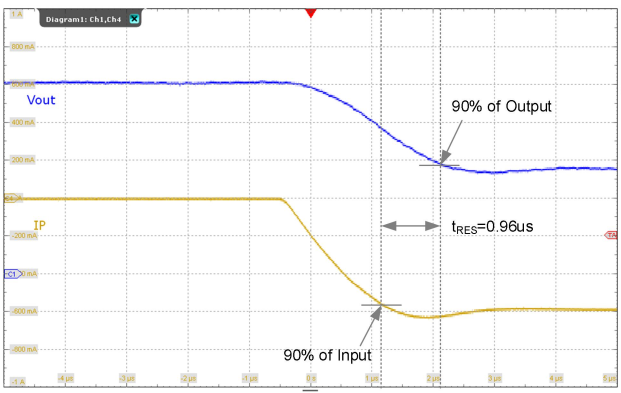
V$_{OUT}$ vs IP（Forward Current Rise Step Response）



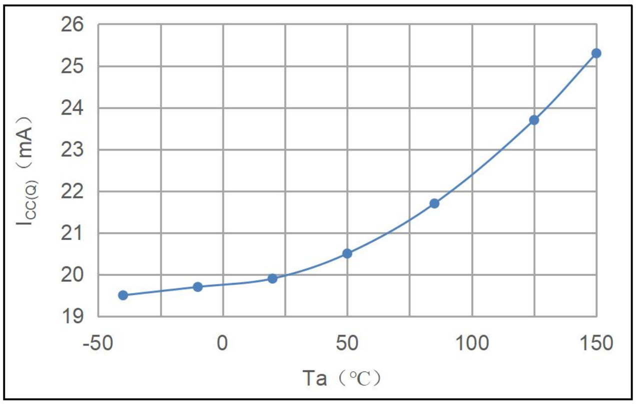
V$_{OUT}$ vs IP（Reverse Current Rise Step Response）



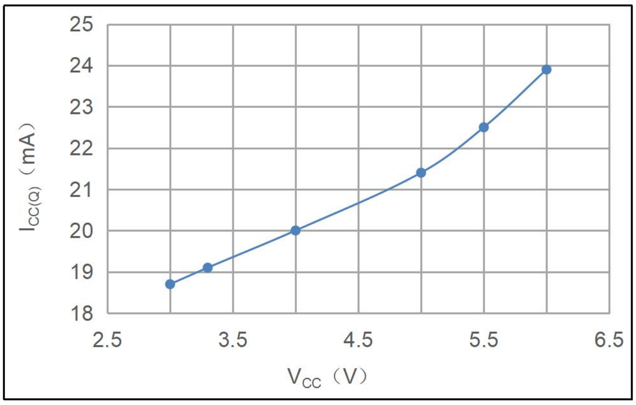
V$_{OUT}$ vs IP（Forward Current Fall Step Response）



V$_{OUT}$ vs IP（Reverse Current Fall Step Response）

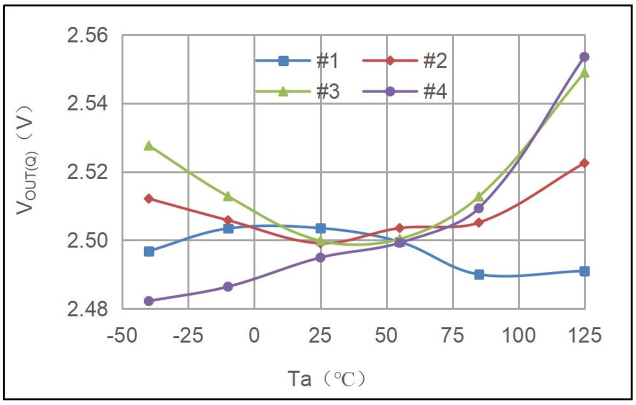


I_{CC} vs. Ta

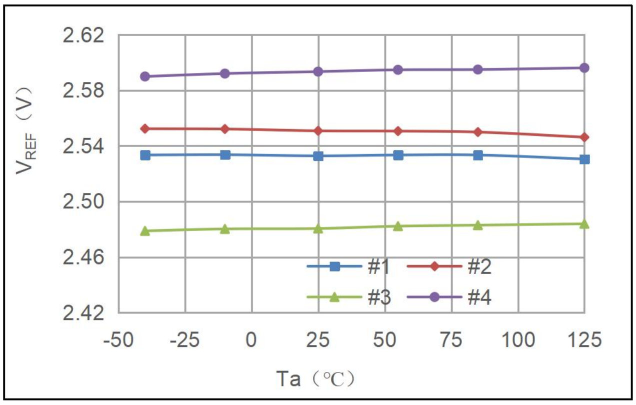


I_{CC} vs. V_{CC}

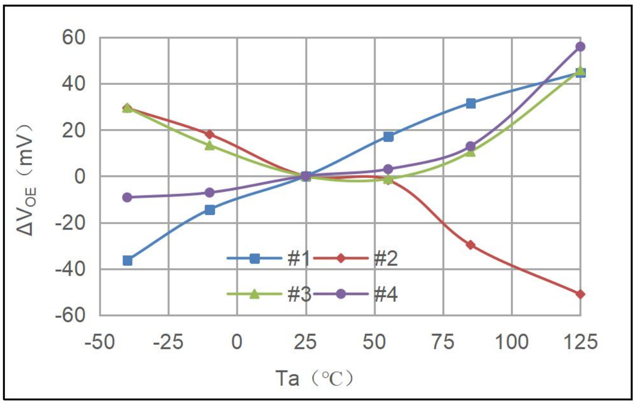
5A SERIES



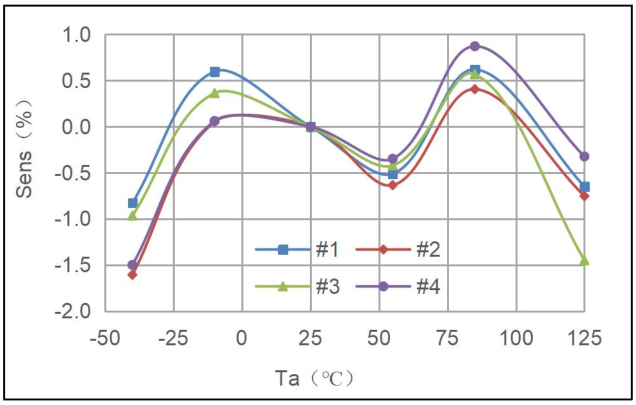
V_{OUTQ} vs. Ta



V_{REF} vs. Ta

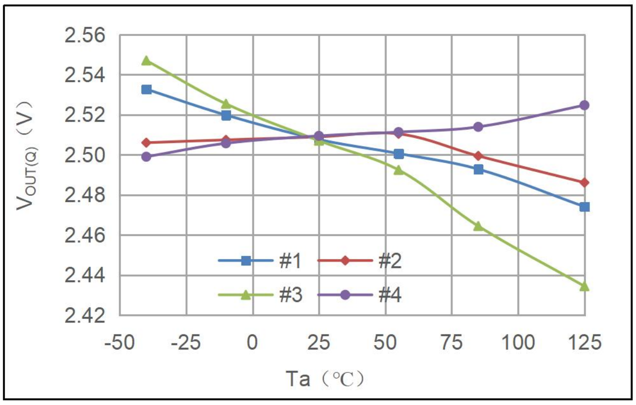


ΔV_{OE} vs. Ta

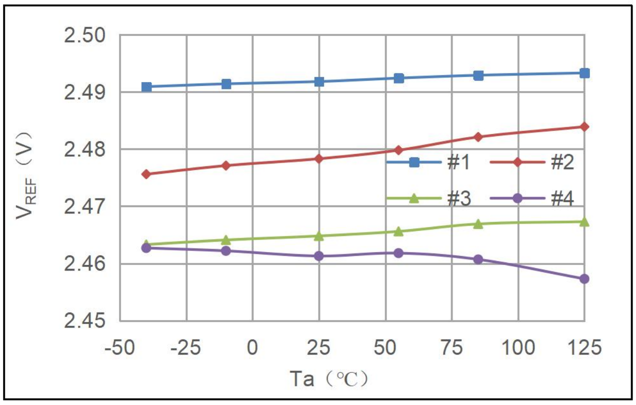


Sens vs. Ta

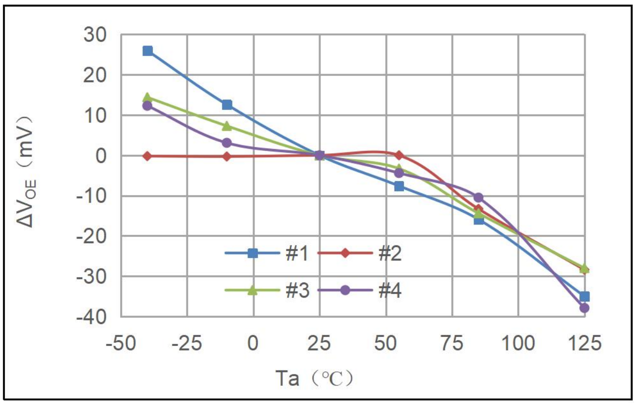
10A SERIES



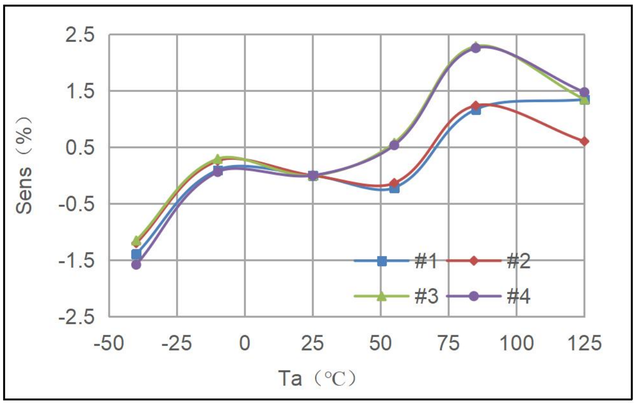
V_{OUTQ} vs. Ta



V_{REF} vs. Ta

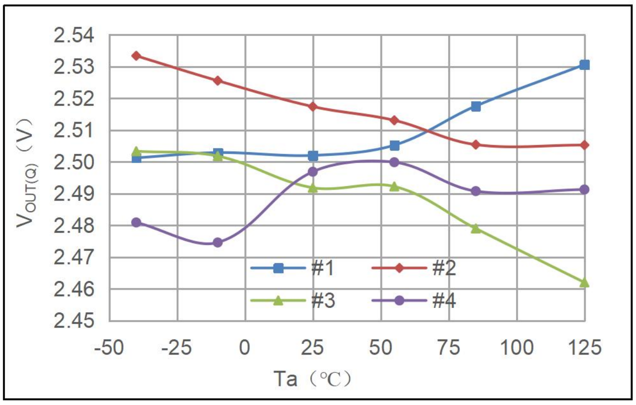


ΔV_{OE} vs. Ta

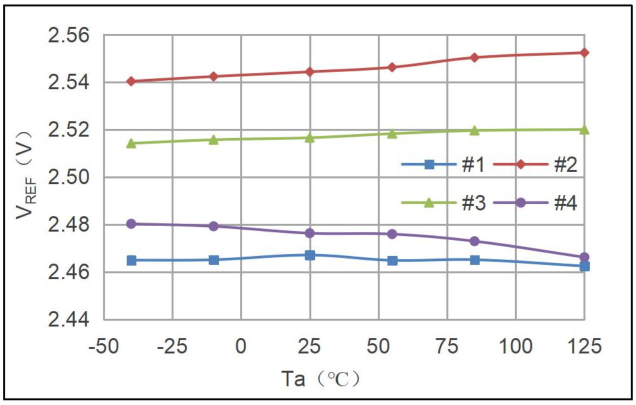


Sens vs. Ta

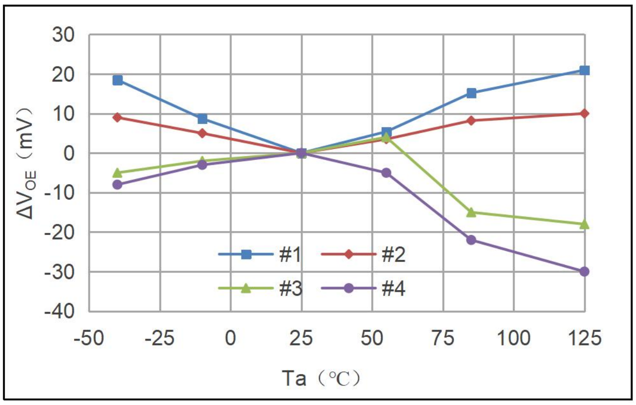
20A SERIES



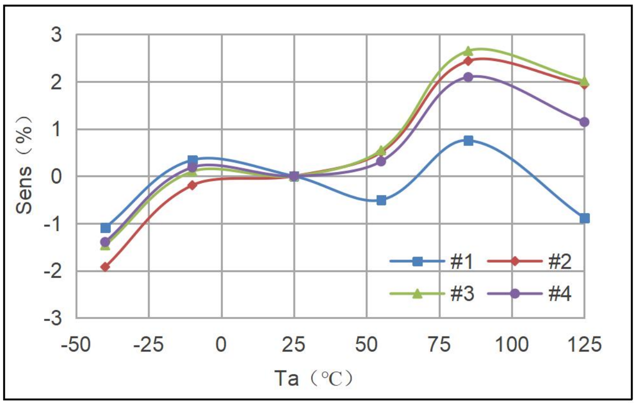
V_{OUTQ} vs. Ta



V_{REF} vs. Ta

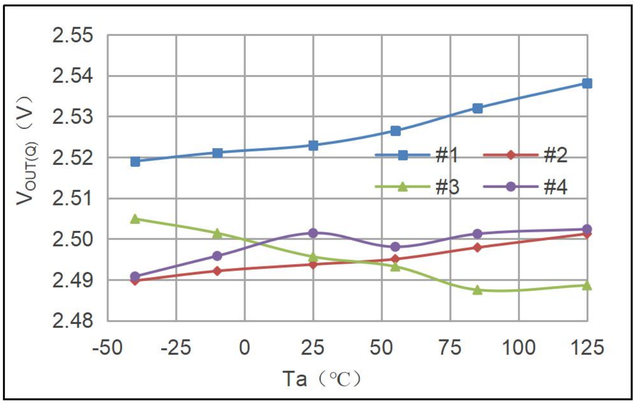


ΔV_{OE} vs. Ta

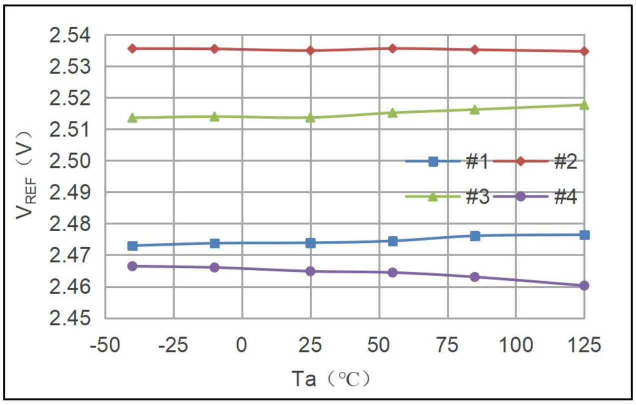


Sens vs. Ta

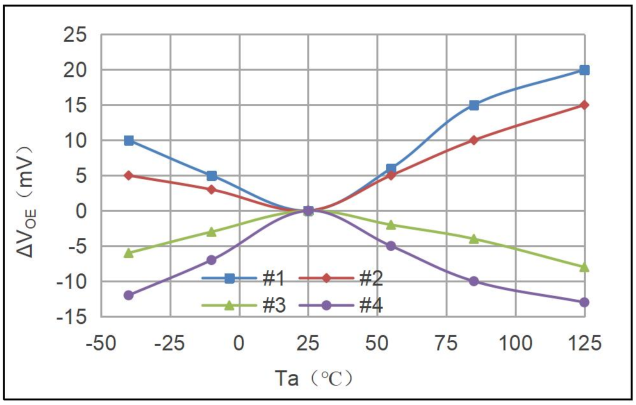
30A SERIES



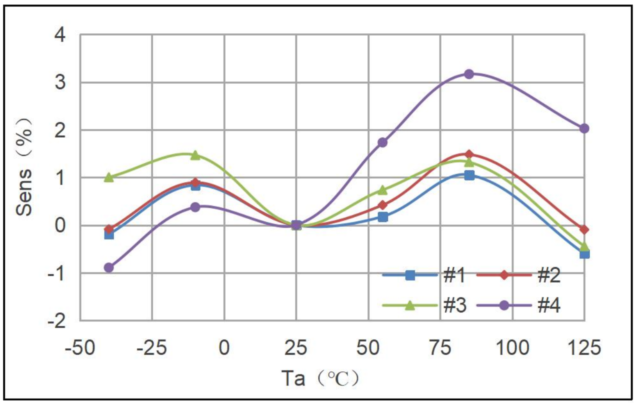
V_{OUTQ} vs. Ta



V_{REF} vs. Ta

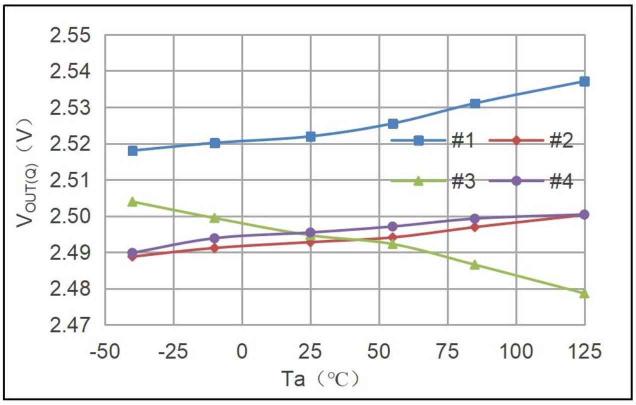


ΔV_{OE} vs. Ta

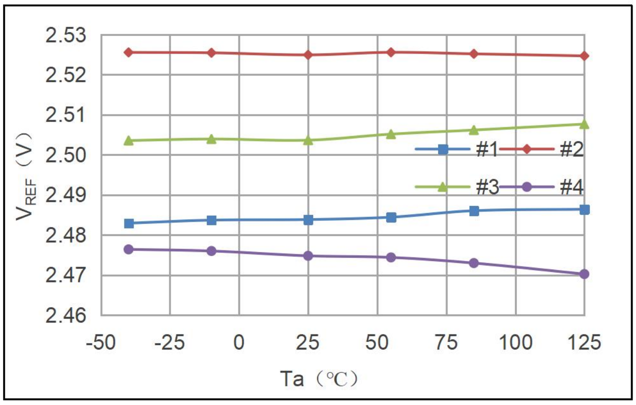


Sens vs. Ta

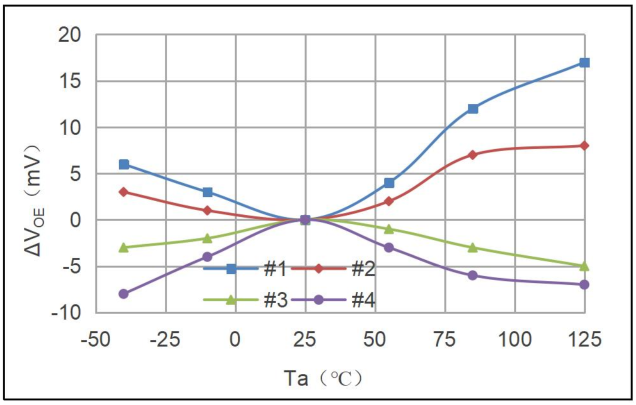
50A SERIES



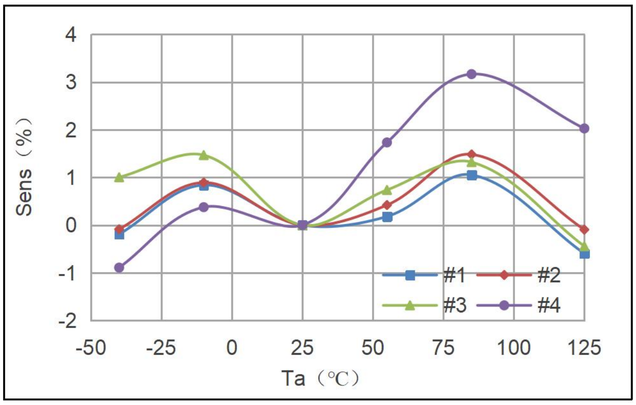
V_{OUTQ} vs. Ta



V_{REF} vs. Ta

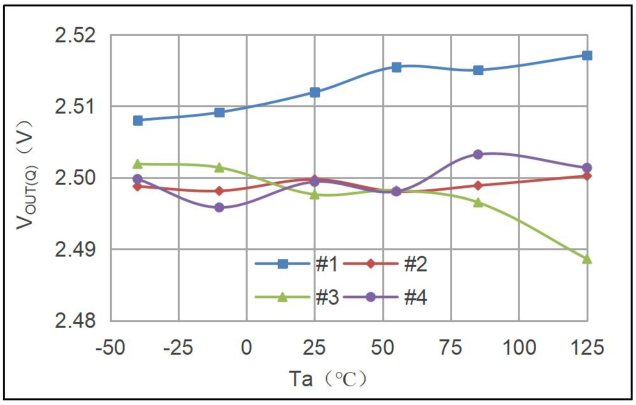


ΔV_{OE} vs. Ta

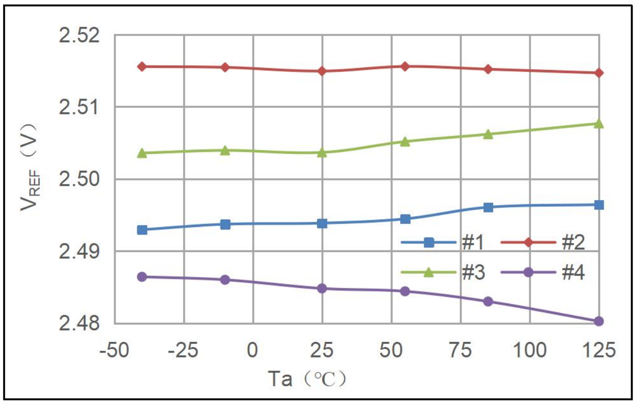


Sens vs. Ta

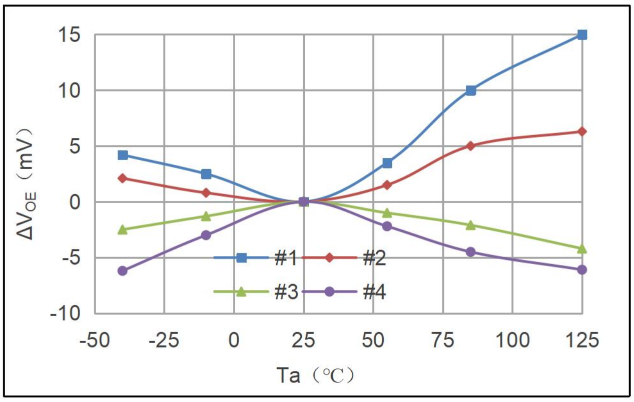
65A SERIES



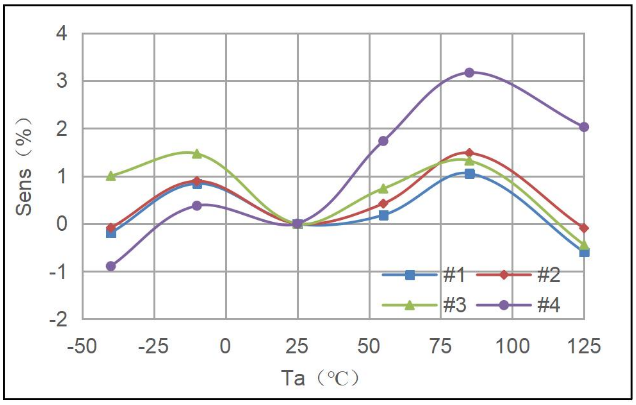
V_{OUTQ} vs. Ta



V_{REF} vs. Ta

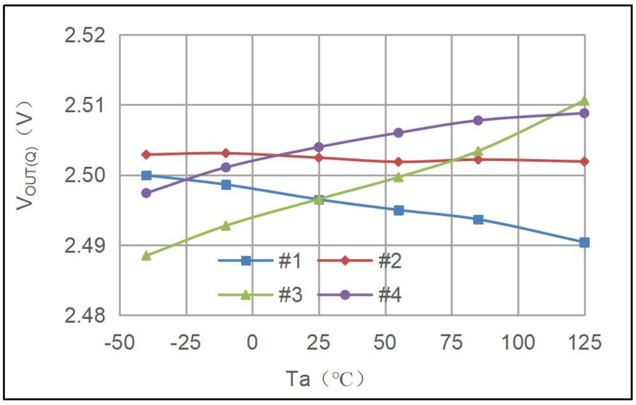


ΔV_{OE} vs. Ta

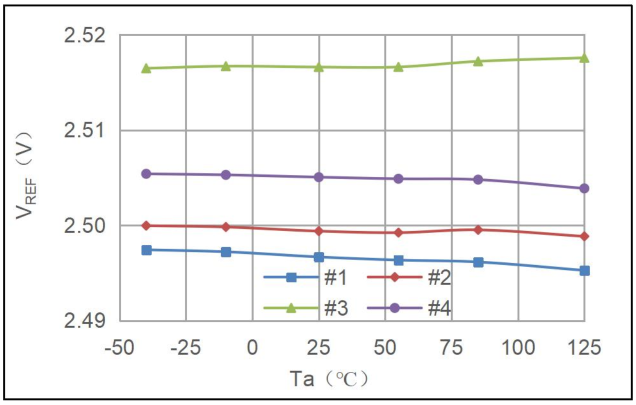


Sens vs. Ta

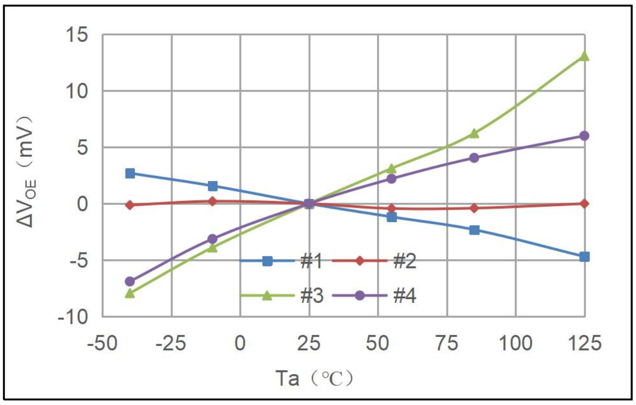
75A SERIES



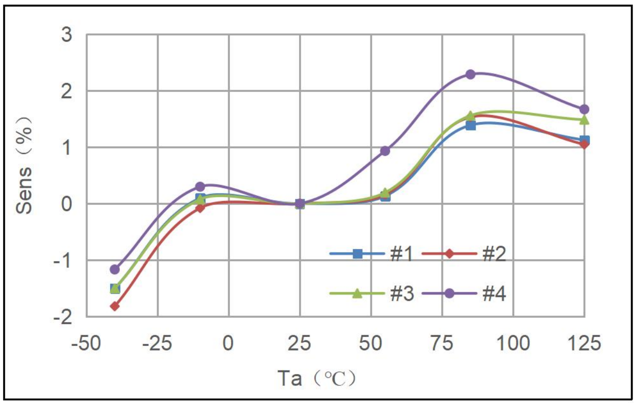
V_{OUTQ} vs. Ta



V_{REF} vs. Ta

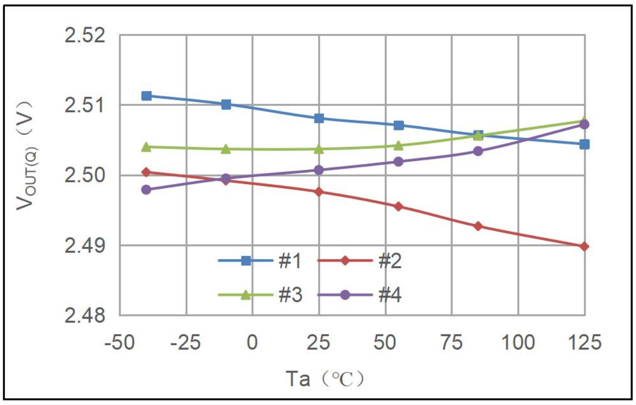


ΔV_{OE} vs. Ta

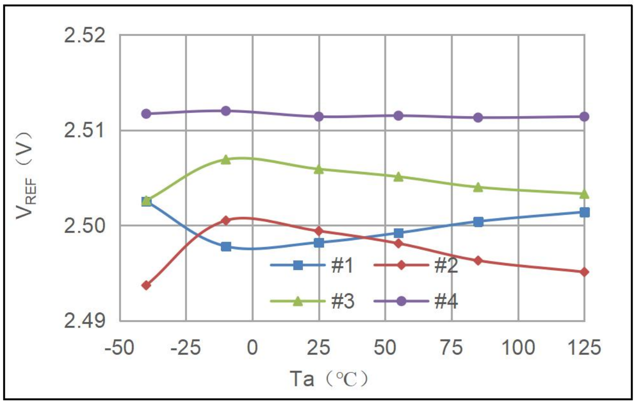


Sens vs. Ta

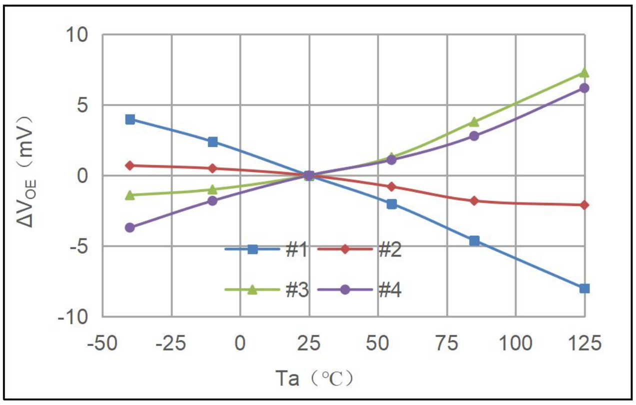
100A SERIES



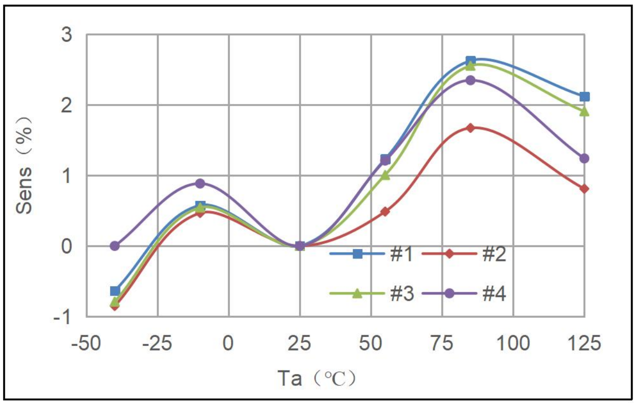
V_{OUTQ} vs. Ta



V_{REF} vs. Ta

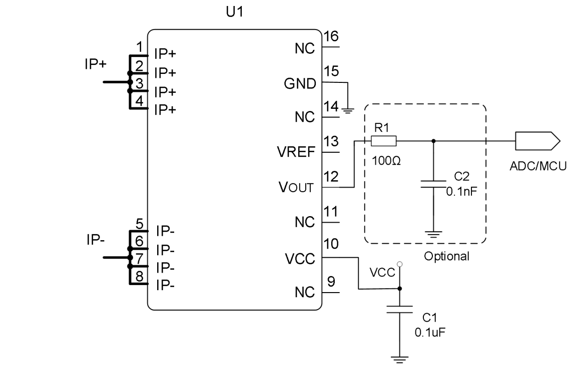


ΔV_{OE} vs. Ta

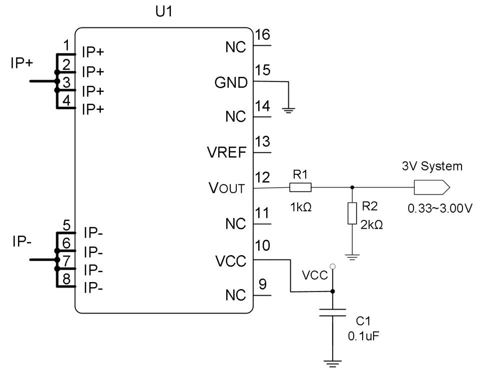


Sens vs. Ta

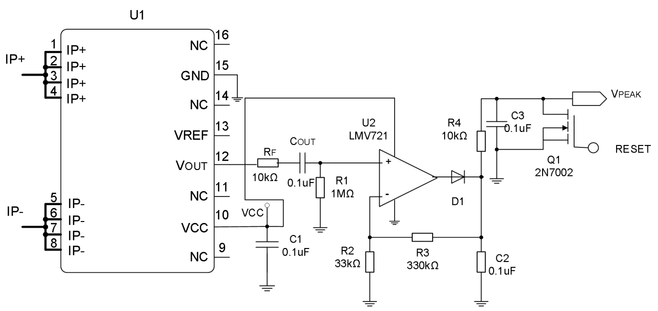
TYPICAL APPLICATION CIRCUITS



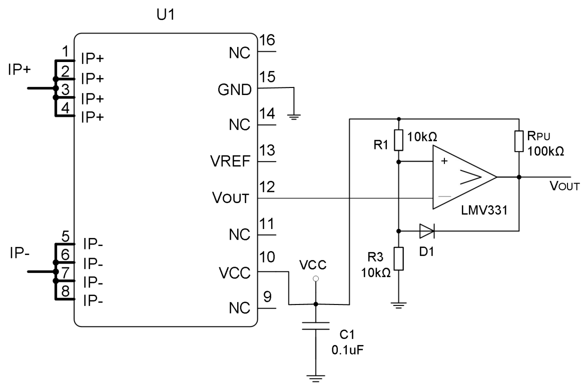
Typical Output Application



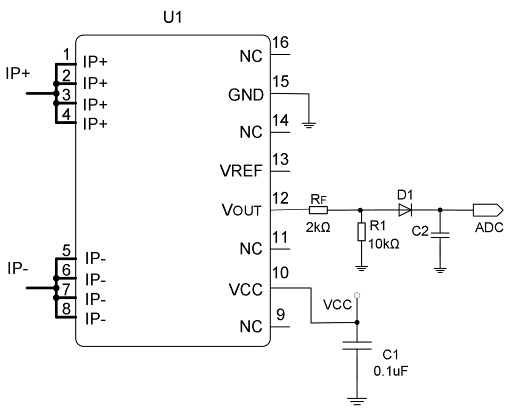
Signal Attenuation Circuit



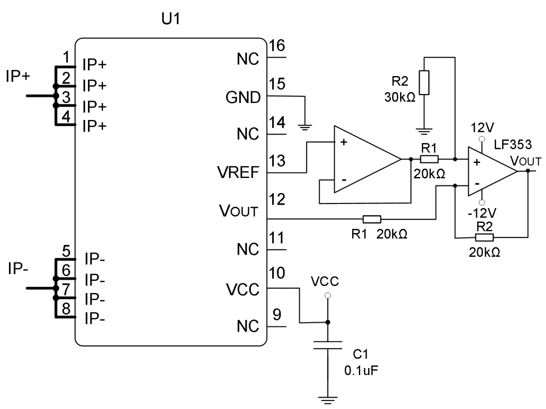
Peak Current Detection



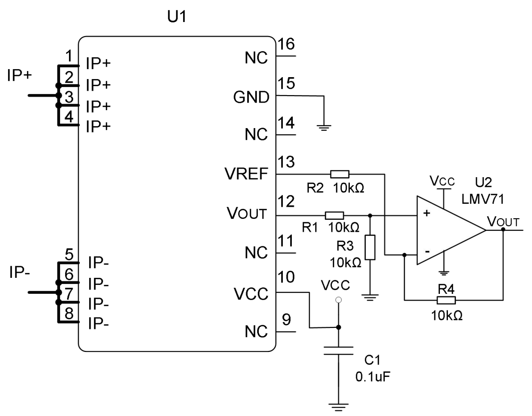
Over Current Fault Latch



Rectifier output, instead of current transformer application

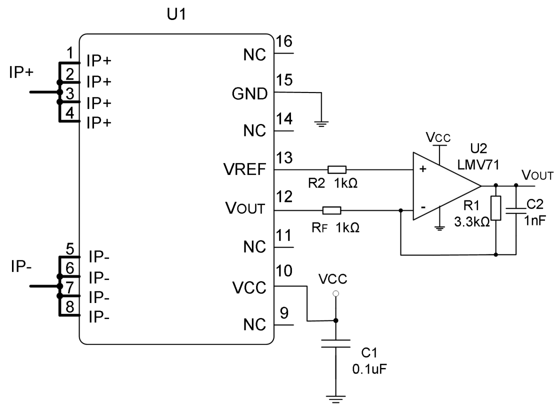


Zero Migration Application



Application of single source zero shift with unidirectional current

Note: the output current of I_{REF} is < 0.4mA. It is suggested that 0.3mA



Gain amplifier application

Note: output direction of V_{OUT}

Function Description

The CC6921 device is a precision current sensor based on Hall sensor. It has 1000V_{RMS} basic isolated working voltage, less than 3% full scale error and zero current reference signal output in the whole temperature range, which can realize unidirectional or bidirectional current detection. The input current flows through a wire between isolated input current pins, which has a resistance of 0.45 mΩ 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 5A~100A. There are 8 kinds of Current sensing range to choose. It can work under single power supply of 4.5V to 5.5V. CC6921 is optimized for high accuracy and temperature stability, compensating for misalignment and sensitivity over the entire range.

The input current of CC6921 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 0.45 mΩ. 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 3300 ppm/℃. For every 100 ° C increase in temperature, the primary side resistance will increase by 33%.

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.

Output Characteristic

The static output point (IP = 0A) of CC6921 is VCC / 2.

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.

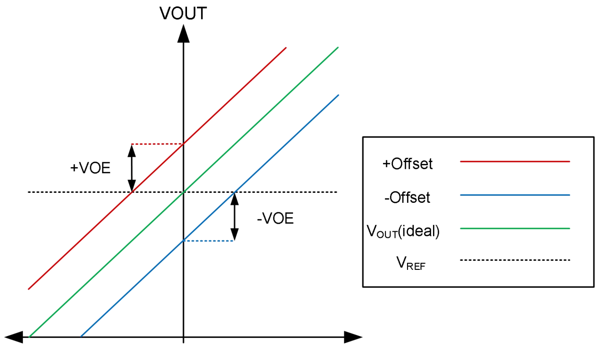
When the input current exceeds the range, the output of V_{OUT} is close to the rail voltage of the power supply. When the input current does not exceed the tolerance limit of the chip, the voltage will always be maintained. After the input current returns to the range, the output of V_{OUT} will return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

Product Name	Input Current	Sensitivity(mV/A)	Calculation Formula *(Note 1)*
CC6921SO-05A	-5A ~ +5A	400	$V_{OUT} = V_{CC} / 2 + 0.4 \times I_P(A)$.............(V)
CC6921SO-10A	-20A ~ +20A	200	$V_{OUT} = V_{CC} / 2 + 0.2 \times I_P(A)$.............(V)
CC6921SO-20A	-20A ~ +20A	100	$V_{OUT} = V_{CC} / 2 + 0.1 \times I_P(A)$.............(V)
CC6921SO-30A	-30A ~ +30A	66.7	$V_{OUT} = V_{CC} / 2 + 0.0667 \times I_P(A)$........(V)
CC6921SO-50A	-50A ~ +50A	40	$V_{OUT} = V_{CC} / 2 + 0.04 \times I_P(A)$...........(V)
CC6921SO-65A	-65A ~ +65A	30.8	$V_{OUT} = V_{CC} / 2 + 0.0308 \times I_P(A)$........(V)
CC6921SO-75A	-75A ~ +75A	26.7	$V_{OUT} = V_{CC} / 2 + 0.0267 \times I_P(A)$........(V)
CC6921SO-100A	-100A ~ +100A	20	$V_{OUT} = V_{CC} / 2 + 0.02 \times I_P(A)$...........(V)

Note : the formula is only applicable to DC current calculation. When AC current is applied, pay attention to $I_{PEAK} = 1.414 \times I_{RMS}$ and the positive & negative current direction.

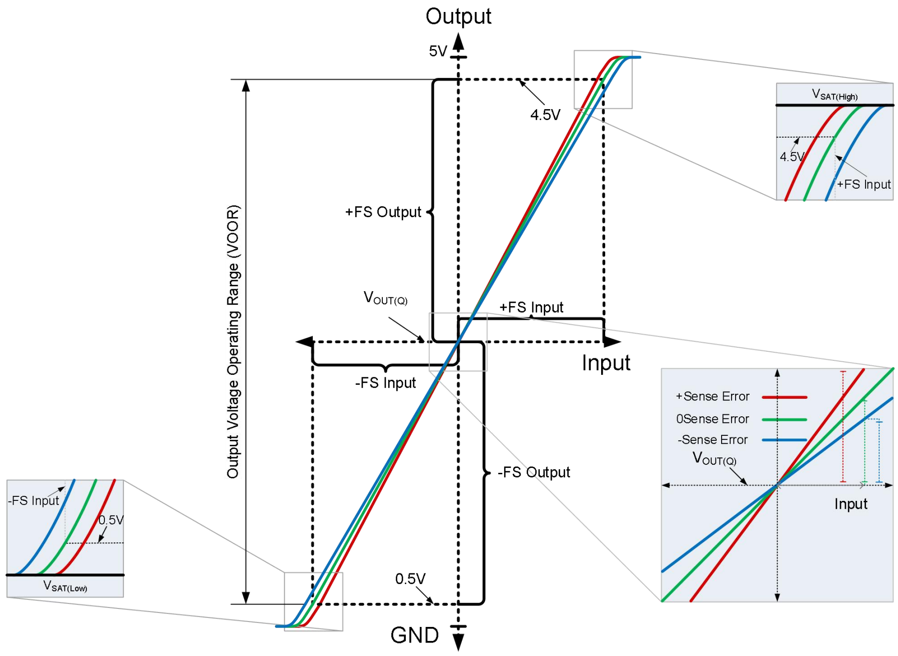
OFFSET VOLTAGE

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).



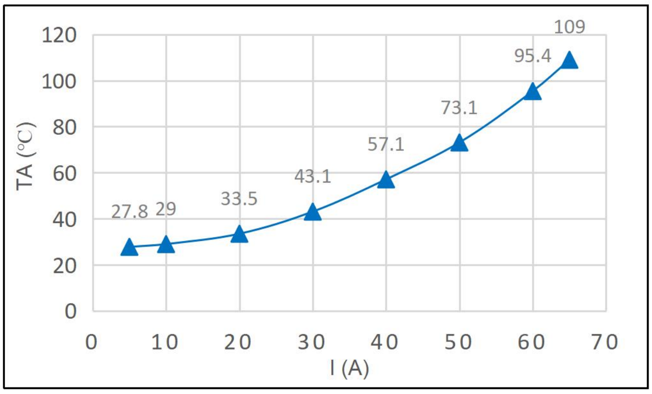
OUTPUT VOLTAGE OPERATING RANGE

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.

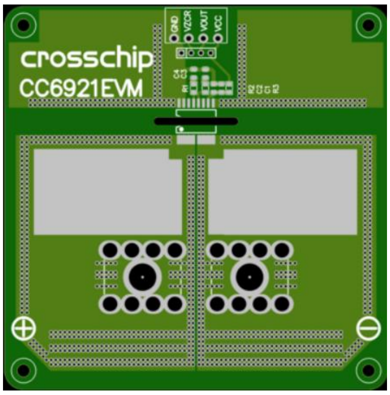


Voltage Output Operating Range for V_{CC} and Output Modes	
V_{CC}	Bidirectional
5V	±2

Relationship between Package Temperature & Input Current



Input Current (IP) vs. Package temperature



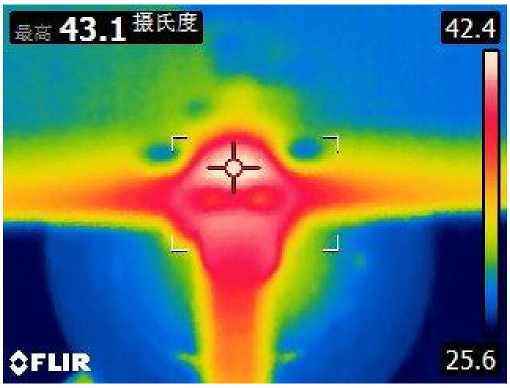
Thickness: 1.6mm, FR-4 double-sided plate, 4oz copper foil

total 10000m2

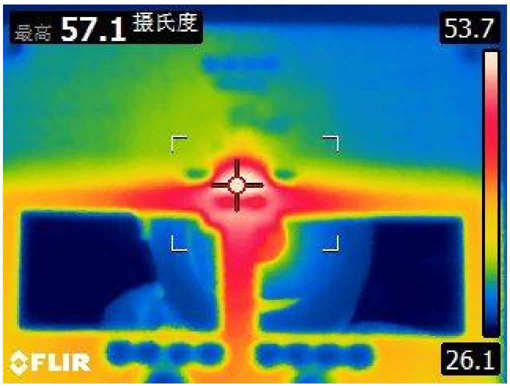
Test environment: open environment, stagnant air

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

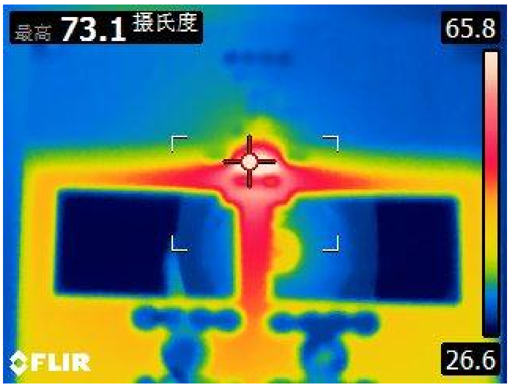
For example：Temperature tests shall be considered for the specific installation conditions in end system which needs a cooling system that can provide wind speeds of at least 13.8 m/s.



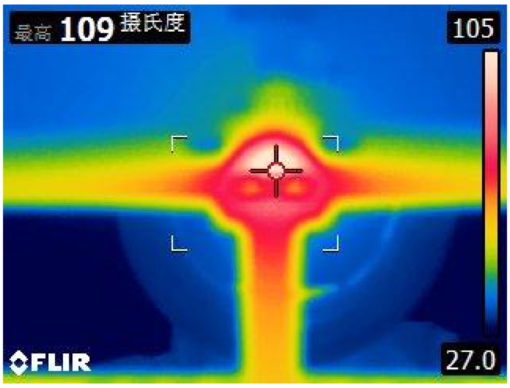
Package Thermography (Input Current 30A)



Package Thermography (Input Current 40A)



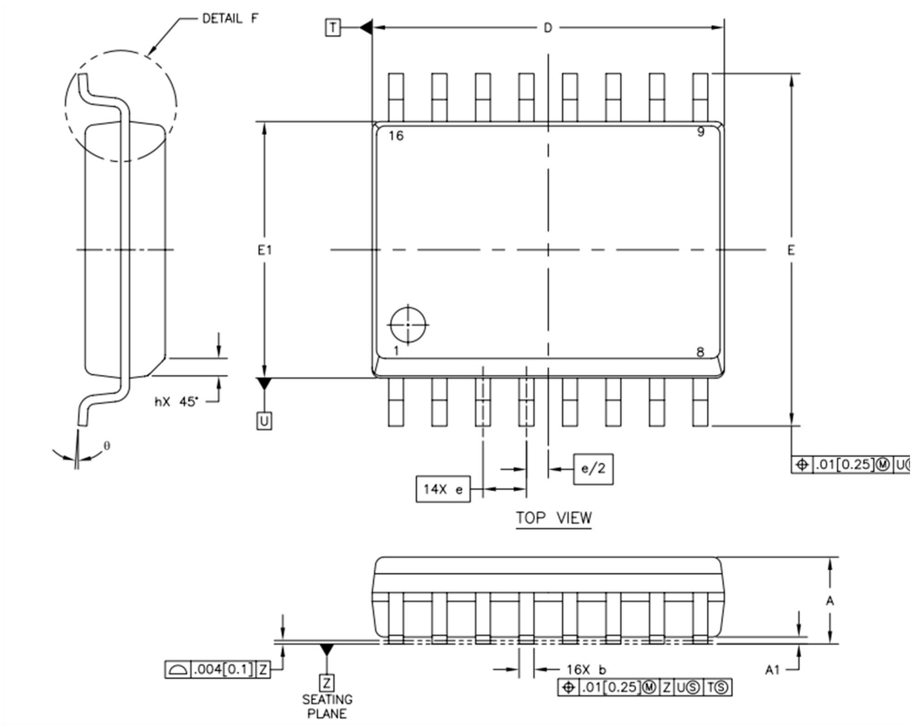
Package Thermography (Input Current 50A)



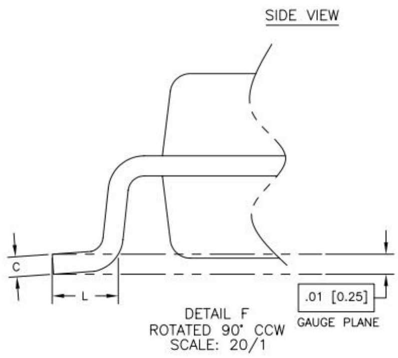
Package Thermography (Input Current 65A)

PACKAGE INFORMATION

SOP16W PACKAGE



Symbol	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°



Note:

1. All dimensions are in millimeters.

Marking:

1st Line: CC6921SO

2nd Line: ELC– XXA

XX—I_P Range

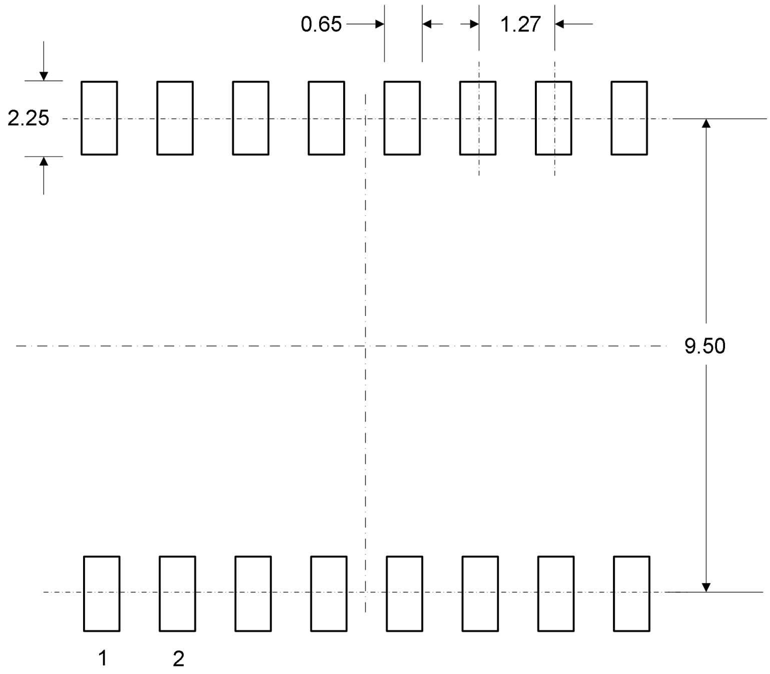
3rd Line: XXYYWW

XX –assembler code

YY – assembly year (last 2 digits)

WW – assembly week number

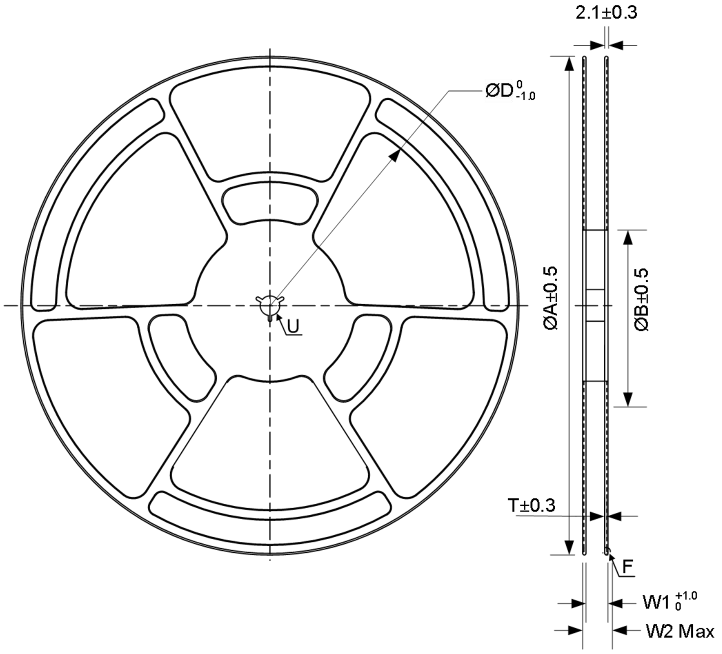
Package Reference

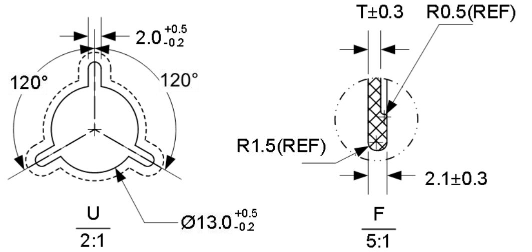


Reference: shorten pad length and increase creepage distance

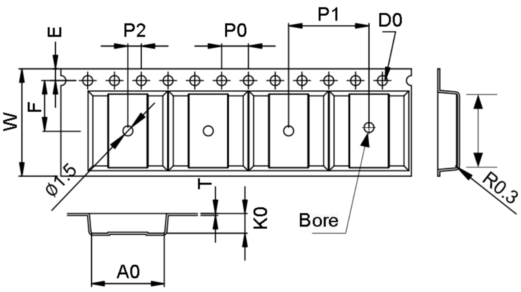
TAPE AND REEL INFORMATION

Reel Dimensions

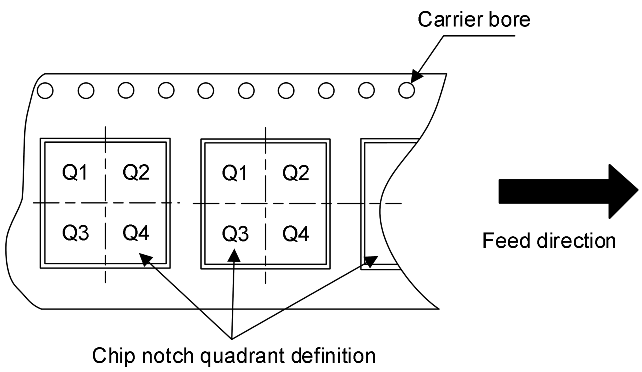




Tape Dimensions



QUADRANT ASSIGNMENTS FOR PIN1 ORIENTATION IN TAPE



Note:

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

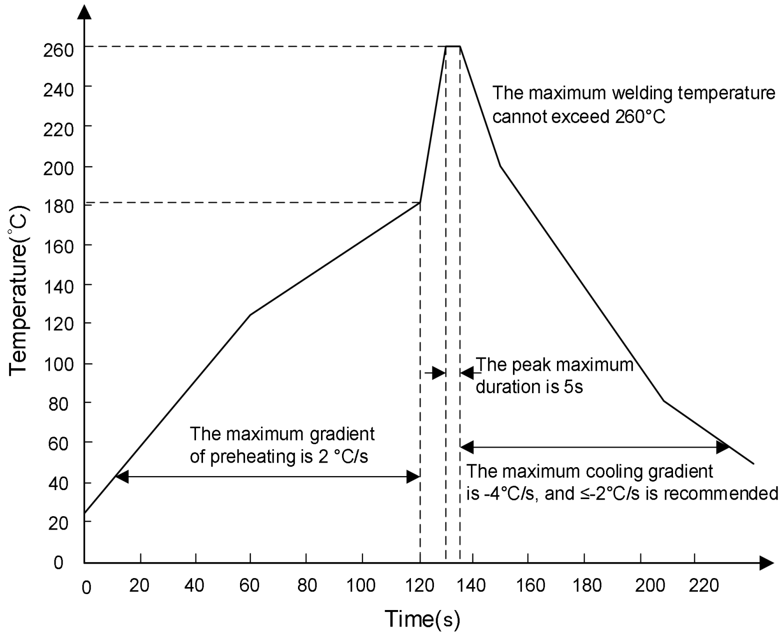
Each carrier tape has a front space of 30±5 squares and a back space of 50±5 squares.

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
2023.11.02	Initial release.	rev0.8
2023.11.06	1. Deletes the maximum and minimum value of the V_{REF} reference; 2. Refresh parameters: $I_{REF\_SOURCE/SINK}$; V_{OE} parameters for each range; Sens temperature drift and E_{TOT} temperature drift parameters for 20A range; CMRR； 3. Official Specification Release。	rev1.0
2024.02.23	Supplemental 5A and 10A current range related information	rev1.1
2024.02.26	Supplemental 75Acurrent range related information	rev1.2
2024.06.07	1. Supplemental 100A current range related information; 2. Supplemental 75A range temperature drift curve ; 3. Supplemental reel carrier tape size information and reflow profile.	rev1.3

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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