Differential output , High Accuracy, Current Sensor IC

General Description

The SENK SEMI's SC810 provides economical and precise solution for differential output mode in industrial, commercial, and communications systems. The superior features of high-sensitivity and wide-dynamic-range bring extra-experience to our customers. Fully integrated SOP-8 package is ideal for space-constrained applications as motor control, load detection and power supplies.

SC810 consists of a precise, low-offset, linear Hall sensor circuit with a copper conduction path located near the surface of the die. Applied current flowing through this copper conduction path generates a magnetic field which is sensed by the Hall IC and converted into a proportional voltage. A precise, proportional voltage is provided by the low-offset, chopper-stabilized Linear Hall IC, which is programmed for accuracy after packaging.

The terminals of the conductive path (from pin1 and 2 to pin 3 and 4) are electrically isolated from the signal leads (pins 5 through 8). This allows the SC810 to be used in applications requiring electrical isolation without the use of opto-isolators or other costly isolation techniques.

Features

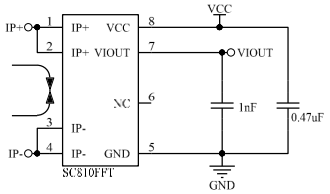
- 3kV RMS minimum isolation voltage
- Output voltage proportional to AC or DC currents
- Lowest current conductor impedance： 0.8mΩ
- Ultra wide current detection range, suitable for detecting ampere level current.
- Support differential output mode
- Internal fixed reference
- Selected Reference voltage mode: fixed 2.5V， 0.5*VCC， 0.1*VCC， Ref input
- Nearly zero magnetic hysteresis
- 2μs output rise time in response to step input current
- Wide operation temp. range： -40℃~125℃
- Total output error 1% @T_A =25℃, <3% for full temperature range.
- High driving capacity: suit for >2.2KΩ resistor load.
- Extremely simple peripheral circuit
- Support wave soldering full-automatic patch and tape packaging
- It is not interfered by wire magnetic field, external magnetic field and geomagnetic field
- High PSRR
- Independent copyright of SENK SEMI.
- Certificate Number: E514605-A6002-UL

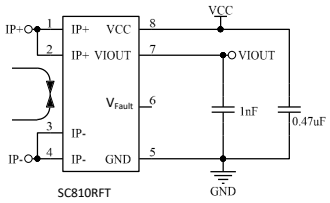
Package: 8-Lead SOP-SC

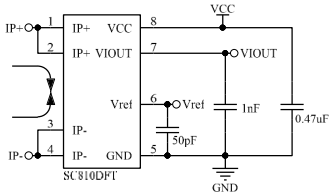
Top View:

Current Path view:

Typical Application







Order information

Part Number[1]	Special Code	Temp Range	Packaging	IP(A)	Vout @IP=0A	Sens @ VCC=5V (mV/A)
SC810DFT-2P5F5	D (Differential mode)	F(-40~125℃)	T (3000pcs/reel)	±2.5	F(2.5V)	800
SC810DFT-05F5				±5		400
SC810DFT-10F5				±10		200
SC810DFT-20F5				±20		100
SC810DFT-25F5				±25		80
SC810DFT-30F5				±30		66
SC810DFT-40F5				±40		50
SC810DFT-50F5				±50		40
SC810DFT-60F5				±60		33.33
SC810DFT-25I5				±25	I[3] (=Vref input voltage)	80
SC810DFT-30I5				±30		66
SC810DFT-30I5-100				+30	I=1V	66
SC810DFT-50I5-050				+50	I=0.5V	40
SC810DFT-30I5-075				+30	I=0.75V	66
SC810RFT-10U5	R			+10	U(0.1Vcc)	264
SC810FFT-10B5	F (Servo mode)			±10	B(0.5Vcc)	200
SC810FFT-20B5				±20		100
SC810FFT-25B5				±25		80
SC810FFT-30B5				±30		66
SC810FFT-40B5				±40		50
SC810FFT-50B5				±50		40
SC810FFT-05U5				+5	U(0.1Vcc)	800
SC810FFT-10U5				+10		400
SC810FFT-20U5				+20		200
SC810FFT-20U5-185				+20		185
SC810FFT-30U5				+30		133
SC810FFT-40U5				+40		100
SC810FFT-50U5				+50		80
SC810FFT-10U5-012				+10	U（0.12Vcc）	390

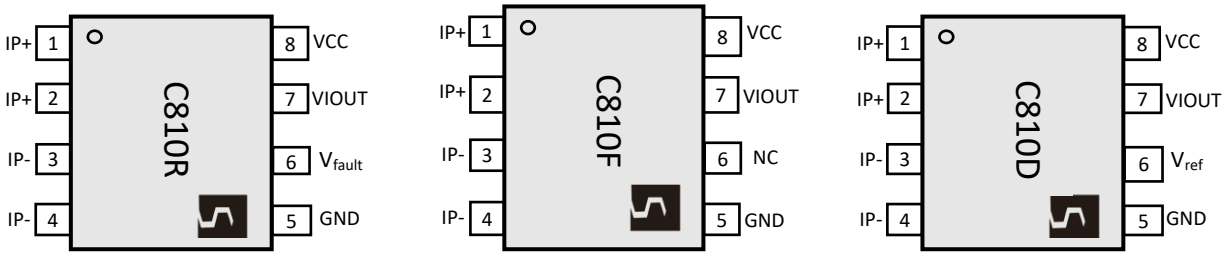
Note1:F,B,I and U types are different in the reference output when IP=0A, and F is recommended by default.

F	when IP=0A,VIOUT@0A=VREF=2.5V,suitable for bidirectional current detection，Zero Current Output and sensitivity do not change with VCC ratio.
B	when IP=0A,VIOUT@0A=VREF=0.5*VCC,suitable for bidirectional current detection，Zero Current Output and sensitivity vary with VCC ratio.
I	when IP=0A,VIOUT@0A=Vref input voltage(0.5V- 2.5V)，Zero Current Output and sensitivity do not change with VCC ratio.
U*2	when IP=0A,VIOUT@0A=0.1*VCC/0.12*VCC,suitable for unidirectional current detection，Zero Current Output and sensitivity vary with VCC ratio.

Note2: Model U, Dynamic range x2, sensitivity x2; If there are any different sensitivity requirements, you can contact our FAE or Agent.

Note3: Model I,must contact FAE for confirmation,the input voltage value must be informed with the model to obtain the best precision parameter. E.g. SC810DFT-25I5, I=0.5V.

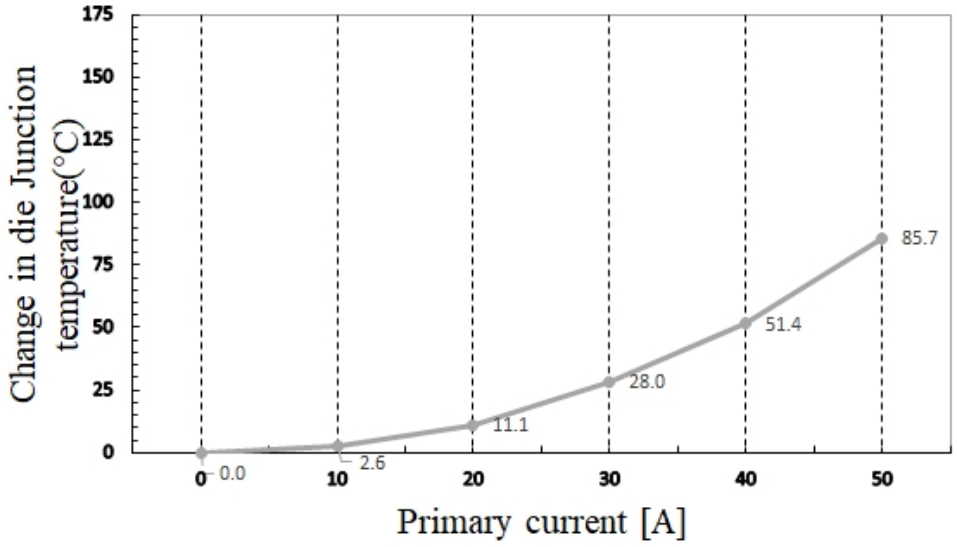
Pin Configuration



Number	Name	Description
1 and 2	IP+	The positive end of the primary current output supports 1/2 connection
3 and 4	IP-	The negative side of the primary current output supports 3/4 connection
5	GND	Signal Ground terminal
6	NC(SC810FFT)	NC, support GND connection
	Vref (SC810DFT)	Reference terminal, supporting input and output. Specifically define Note 1 of the above ordering information VIOUT= Vref (IP=0A)
	Vfault（SC810RFT）	Built-in 1.3x IP over-current protection output, open-drain output
7	VIOUT	Analog output signal, VIOUT=IP*Sens+Vref
8	VCC	Device power supply terminal

Thermal Rise vs. Primary Current

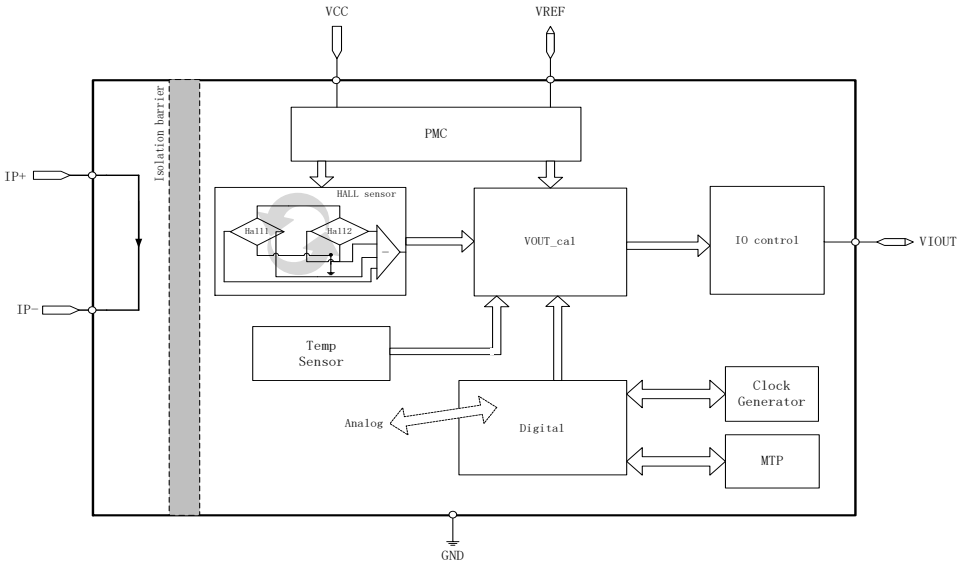
Remark: The relationship between temperature rise (DeltaT) and primary side current is obtained in the whole series of SC810 under the condition of DEMO board of our company at 26℃.



Demo Board information

PCB Name	A10-V2
Layer Number	2
Total Copper size connected to Primary pins (Including all layers)	1224 mm^2
Copper layer thickness	2oz / 70um
Board Thickness	1mm

Functional Block Diagram



Absolute Maximum Ratings

Absolute maximum ratings are limiting values to be applied individually, and beyond which the serviceability of the circuit may be impaired. Functional operability is not necessarily implied. Exposure to absolute maximum rating conditions for an extended period of time may affect device reliability.

Characteristic	Symbol	Notes	Rating	Unit
Supply voltage	V_{CC}		6.0	V
Reverse Supply Voltage	V_{RCC}		-0.1	V
Output voltage	V_{IOUT}		6.0	V
Reverse Output Voltage	V_{RIOUT}		-0.1	V
Nominal Operating Ambient Temperature	T_A	Range F	-40~125	℃
Maximum Junction Temperature	$T_{J\ (max)}$		165	℃
Storage Temperature	T_{stg}		–65~170	℃
Output Current Source	$I_{OUT(Source)}$	Shorted Output-to-Ground Current	3.43	mA
Output Current Sink	$I_{OUT(Sink)}$	Shorted Output-to-VCC Current	40	mA
REF Current Source	$I_{REF(Source)}$	Shorted REF-to-Ground Current	3.47	mA
REF Current Sink	$I_{REF(Sink)}$	Shorted REF-to-VCC Current	40	mA
Maximum IP value of sustainable loading at ambient temperature	IP_{max}	It is directly related to the heat dissipation capacity of PCB, and this data depends on the demo test board of SENK	50	A
Transient overload IP value of sustainable loading at ambient temperature	**IPover**	It is directly related to the heat dissipation capacity of PCB, and this data depends on the demo test board of SENK. 1pulse,100ms,1% duty cycle	100	A
HBM mode	**ESD**		4	kV

Isolation Characteristics

Parameter	Symbol	Value	Unit	Comment
RMS voltage for AC insulation test，50Hz，1min	V_{ISO}	3000	V_{rms}	Agency type-tested for 60 seconds per UL60950-1
Working Voltage for Basic Isolation	V_{WVBI}	420	V_{Peak}	Maximum working voltage according to UL60950-1
Clearance	D_{cl}	4	mm	Minimum distance through air from IP leads to signal leads
Creepage distance	D_{cr}	4	mm	Minimum distance along package body from IP leads to signal leads
Leakage mark index	CT1	600	V	The electrical breakdown (tracking) properties of an insulating material
1.2/50μs Impulse voltage	Impulse voltage	7	kV	
8/20μs impulse current	Impact of current	/	kA	

Reference application Specification

Symbol	Description	Min	Typ	Max	Unit
C_{VCC}	The filter capacitor of power supply is connected between Vcc and gnd	0.1	0.47		uF
C_{VIOUT}	The filter capacitor of Output is connected between Viout and gnd	0	1	1.5	nF
C_{VREF}	The filter capacitor of REF is connected between Vref and gnd	0	50	100	pF

Common Electrical Characteristics

Note: Over full range of T_A=25°C, C_{Bypass}=0.47uF, C_{Load}=1.0nF, V_{CC}=5V,unless otherwise specified.

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Voltage	V_{CC}	Operating	4.5	5	5.5	V
Supply Current	I_{CC}	V_{CC} = 4.5~5.5 V, output open		20		mA
Output Capacitance Load	C_L	V_{IOUT} to GND		1	1.5	nF
Output Resistive Load	R_L	V_{IOUT} to GND	2.2			kΩ
REF Capacitance Load	C_{LREF}	V_{REF} to GND		50	100	pF
REF Resistive Load	R_{LREF}	V_{REF} to GND	2.2			kΩ
Hall coupling factor	CF	T_A = 25°C		5.2		G/A
Anti-external magnetic interference	CMFR			-45.5		dB
Primary Conductor Resistance	$R_{PRIMARY}$	T_A = 25°C		0.8		mΩ
Temperature Coefficient of Primary Conductor Resistance	TC_R	T_A=-40~125°C		3365		ppm/°C
Hysteresis	V_{hys}	Viout(Load +20A, return to 0A)- Viout(Load -20A, return to 0A)		1		mV
Rise time	t_r	IP=20A（50A/us）		1.9		uS
Propagation Delay	t_{pd}	IP=20A（50A/us）		1.28		uS
Response Time	$t_{response}$	IP=20A（50A/us）		1.72		uS
Bandwidth	f	–3 dB		170		kHz
Noise Density	I_{ND}	T_A = 25°C ,C_L=1nF		1545		μA(rms)/√Hz
Noise	I_N			0.46		mA(rms)
	I_N	BW=10KHz		0.12		mA(rms)
	I_N	BW=1KHz		0.05		mA(rms)
Nonlinearity	E_{LIN}	-20A<IP<20A			1	%
Proportional coefficient of follow-up sensitivity (applicable to B5 suffix production Product)	S_{coef}	VCC=4.5~5.5V, S_{coef}=Sens(VCC)/Sens(5V)		VCC/5		
Sensitivity under fixed Zero Current Output (applicable to F5 suffix production Product)		VCC=4.5~5.5V, Type selection is xxF5		2000/I_{PR}		mV/A
Zero Current Output under fixed Zero Current Output (applicable to F5 suffix production Product)		VCC=4.5~5.5V, Type selection is xxF5		2.5		V
Peripheral input Zero Current Output range		VCC=4.5~5.5V, Type selection is xxI5	0.5		2.5	V
Linear rail-to-rail output range	Vrail-rail	R_L=4.7kΩ	10		90	%VCC
Power-On Time	t_{PO}	Output reaches steady state level, T_J = 25°C		100	200	μS
Zero Current Output of Power supply rejection ratio (applicable to F5 suffix production Product)	$PSRR_Q$			43		dB
Sensitivity of Power supply rejection ratio (applicable to F5 suffix production Product)	$PSRR_S$			25		dB

SC810DFT-2P5F5 Individual Performance Characteristics

Note: Over full range of TA=-40~125°C, C_{Bypass}=0.47uF, C_{Load}=1nF, V_{CC}=5V, unless otherwise specified.

Characteristic	Symbol	Test Conditions	Min	Typ[1]	Max	Unit
NOMINAL PERFORMANCE						
Current-Sensing Range	I_{PR}		-2.5		2.5	A
Zero-Current Output Voltage	Voq	IP=0A, T_A=25°C		2.5		V
VREF output Voltage	V_{REF}	no correlation with IP input		2.5		V
Difference zero deviation	Voq -V_{REF}	IP=0A		±5		mV
Sensitivity	Sens	-2.5A<IP<2.5A		800		mV/A
ACCURACY PERFORMANCE						
Sensitivity Error	E_{SENS}	I_P = ±2.5 A, T_A = 25°C		±1		%
		I_P = ±2.5 A, T_A = -40~85°C		±2		%
		I_P = ±2.5 A, T_A = 85~125°C		±3		%
Single end output zero error	V_{OE}	I_P=0A, T_A = 25°C		±15		mV
		I_P=0A, T_A = -40~85°C		±65		mV
		I_P=0A, T_A = 85~125°C		±81		mV
Differential Output Error	E (Voq -VREF)	I_P=0A, T_A = 25°C		±5		mV
		I_P=0A, T_A = -40~85°C		±65		mV
		I_P=0A, T_A = 85~125°C		±81		mV
Zero Current Output Ripple	Voq_pp	IP=0A,T_A= 25°C,Output Peak to Peak		350		mV
TOTAL OUTPUT ERROR COMPONENTS: E_{TOT} = E_{SENS} + V_{OE} /(Sens × I_P)						
Total Output Error[2]	E_{TOT}	I_P = ±2.5 A, T_A=25°C		±1		%
		I_P = ±2.5 A, T_A=-40°C~85°C		±2		%
		I_P = ±2.5 A, T_A= 85°C ~ 125°C		±3		%

[1] Typical values with +/- are 3 sigma values
[2] Percentage of IP , with IP = $I_{PR(max)}$.

SC810DFT-05F5 Individual Performance Characteristics

Note: Over full range of TA=-40~125°C, C_{Bypass}=0.47uF, C_{Load}=1nF, V_{CC}=5V, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ[1]	Max	Unit
NOMINAL PERFORMANCE						
Current-Sensing Range	I_{PR}		-5		5	A
Zero-Current Output Voltage	Voq	IP=0A, T_A=25°C		2.5		V
VREF output Voltage	V_{REF}	no correlation with IP input		2.5		V
Difference zero deviation	Voq -V_{REF}	IP=0A		0		mV
Sensitivity	Sens	-5A<IP<5A		400		mV/A
ACCURACY PERFORMANCE						
Sensitivity Error	E_{SENS}	I_P = ±5 A, T_A = 25°C		±1		%
		I_P = ±5 A, T_A = -40~85°C		±1.5		%
		I_P = ±5 A, T_A = 85~125°C		±3		%
Single end output zero error	V_{OE}	I_P=0A, T_A = 25°C		±5		mV
		I_P=0A, T_A = -40~85°C		±20		mV
		I_P=0A, T_A =85~125°C		±35		mV
Differential Output Error	E (Voq -VREF)	I_P=0A, T_A = 25°C		±5		mV
		I_P=0A, T_A = -40~85°C		±22		mV
		I_P=0A, T_A = 85~125°C		±35		mV
Zero Current Output Ripple	Voq_pp	IP=0A,T_A= 25°C,Output Peak to Peak		230		mV
TOTAL OUTPUT ERROR COMPONENTS: E_{TOT} = E_{SENS} + V_{OE} /(Sens × I_P)						
Total Output Error[2]	E_{TOT}	I_P = ±5 A, T_A=25°C		±1		%
		I_P = ±5 A, T_A= -40~85°C		±2		%
		I_P = ±5 A, T_A= 85~125°C		±3		%

[1] Typical values with +/- are 3 sigma values
[2] Percentage of IP , with IP = $I_{PR(max)}$.

SC810DFT-10F5 Individual Performance Characteristics

Note: Over full range of TA=-40~125°C, C_{Bypass}=0.47uF, C_{Load}=1nF, V_{CC}=5V, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ[1]	Max	Unit
NOMINAL PERFORMANCE						
Current-Sensing Range	I_{PR}		-10		10	A
Zero-Current Output Voltage	Voq	IP=0A, T_A=25°C		2.5		V
VREF output Voltage	V_{REF}	no correlation with IP input		2.5		V
Difference zero deviation	Voq -V_{REF}	IP=0A		0		mV
Sensitivity	Sens	-10A<IP<10A		200		mV/A
ACCURACY PERFORMANCE						
Sensitivity Error	E_{SENS}	I_P = ±10 A, T_A = 25°C		±1		%
		I_P = ±10 A, T_A = -40~85°C		±1.5		%
		I_P = ±10 A, T_A = 85~125°C		±3		%
Single end output zero error	V_{OE}	I_P=0A, T_A = 25°C		±5		mV
		I_P=0A, T_A = -40~85°C		±15		mV
		I_P=0A, T_A = 85~125°C		±20		mV
Differential Output Error	E (Voq -VREF)	I_P=0A, T_A = 25°C		±5		mV
		I_P=0A, T_A = -40~85°C		±15		mV
		I_P=0A, T_A = 85~125°C		±20		mV
Zero Current Output Ripple	Voq_pp	IP=0A,T_A= 25°C,Output Peak to Peak		150		mV
TOTAL OUTPUT ERROR COMPONENTS: E_{TOT} = E_{SENS} + V_{OE} /(Sens × I_P)						
Total Output Error[2]	E_{TOT}	I_P = ±10 A, T_A=25°C		±1		%
		I_P = ±10 A, T_A= -40~85°C		±2		%
		I_P = ±10 A, T_A= 85~125°C		±3		%

[1] Typical values with +/- are 3 sigma values
[2] Percentage of IP , with IP = $I_{PR(max)}$.

SC810DFT-20F5 Individual Performance Characteristics

Note: Over full range of TA=-40~125°C, C_{Bypass}=0.47uF, C_{Load}=1nF, V_{CC}=5V, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ[1]	Max	Unit
NOMINAL PERFORMANCE						
Current-Sensing Range	I_{PR}		-20		20	A
Zero-Current Output Voltage	Voq	IP=0A, T_A=25°C		2.5		V
VREF output Voltage	V_{REF}	no correlation with IP input		2.5		V
Difference zero deviation	Voq -V_{REF}	IP=0A		0		mV
Sensitivity	Sens	-20A<IP<20A		100		mV/A
ACCURACY PERFORMANCE						
Sensitivity Error	E_{SENS}	I_P = ±20 A, T_A = 25°C		±1		%
		I_P = ±20 A, T_A = -40~85°C		±1.5		%
		I_P = ±20 A, T_A = 85~125°C		±3		%
Single end output zero error	V_{OE}	I_P=0A, T_A = 25°C		±5		mV
		I_P=0A, T_A = -40~85°C		±10		mV
		I_P=0A, T_A = 85~125°C		±15		mV
Differential Output Error	E (Voq -VREF)	I_P=0A, T_A = 25°C		±5		mV
		I_P=0A, T_A = -40~85°C		±10		mV
		I_P=0A, T_A = 85~125°C		±15		mV
Zero Current Output Ripple	Voq_pp	IP=0A,T_A= 25°C,Output Peak to Peak		100		mV
TOTAL OUTPUT ERROR COMPONENTS: E_{TOT} = E_{SENS} + V_{OE} /(Sens × I_P)						
Total Output Error[2]	E_{TOT}	I_P = ±20 A, T_A=25°C		±1		%
		I_P = ±20 A, T_A= -40~85°C		±2		%
		I_P = ±20 A, T_A= 85~125°C		±3		%

[1] Typical values with +/- are 3 sigma values
[2] Percentage of IP , with IP = $I_{PR(max)}$

SC810DFT-25F5 Individual Performance Characteristics

Note: Over full range of TA=-40~125°C, C_{Bypass}=0.47uF, C_{Load}=1nF, V_{CC}=5V, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ[1]	Max	Unit
NOMINAL PERFORMANCE						
Current-Sensing Range	I_{PR}		-25		25	A
Zero-Current Output Voltage	Voq	IP=0A, T_A=25°C		2.5		V
VREF output Voltage	V_{REF}	no correlation with IP input		2.5		V
Difference zero deviation	Voq -V_{REF}	IP=0A		0		mV
Sensitivity	Sens	-25A<IP<25A		80		mV/A
ACCURACY PERFORMANCE						
Sensitivity Error	E_{SENS}	I_P = ±25 A, T_A = 25°C		±1		%
		I_P = ±25 A, T_A = -40~85°C		±1.5		%
		I_P = ±25 A, T_A = 85~125°C		±3		%
Single end output zero error	V_{OE}	I_P=0A, T_A = 25°C		±5		mV
		I_P=0A, T_A = -40~85°C		±10		mV
		I_P=0A, T_A = 85~125°C		±15		mV
Differential Output Error	E (Voq -VREF)	I_P=0A, T_A = 25°C		±5		mV
		I_P=0A, T_A = -40~85°C		±10		mV
		I_P=0A, T_A = 85~125°C		±15		mV
Zero Current Output Ripple	Voq_pp	IP=0A,T_A= 25°C,Output Peak to Peak		85		mV
TOTAL OUTPUT ERROR COMPONENTS: E_{TOT} = E_{SENS} + V_{OE} /(Sens × I_P)						
Total Output Error[2]	E_{TOT}	I_P = ±25 A, T_A=25°C		±1		%
		I_P = ±25 A, T_A= -40~85°C		±2		%
		I_P = ±25 A, T_A= 85~125°C		±3		%

[1] Typical values with +/- are 3 sigma values
[2] Percentage of IP , with IP = $I_{PR(max)}$.

SC810DFT-30F5 Individual Performance Characteristics

Note: Over full range of TA=-40~125°C, C_{Bypass}=0.47uF, C_{Load}=1nF, V_{CC}=5V, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ[1]	Max	Unit
NOMINAL PERFORMANCE						
Current-Sensing Range	I_{PR}		-30		30	A
Zero-Current Output Voltage	Voq	IP=0A, T_A=25°C		2.5		V
VREF output Voltage	V_{REF}	no correlation with IP input		2.5		V
Difference zero deviation	Voq -V_{REF}	IP=0A		0		mV
Sensitivity	Sens	-30A<IP<30A		66		mV/A
ACCURACY PERFORMANCE						
Sensitivity Error	E_{SENS}	I_P = ±30 A, T_A = 25°C		±1		%
		I_P = ±30 A, T_A = -40~85°C		±1.5		%
		I_P = ±30 A, T_A = 85~125°C		±3		%
Single end output zero error	V_{OE}	I_P=0A, T_A = 25°C		±5		mV
		I_P=0A, T_A = -40~85°C		±10		mV
		I_P=0A, T_A = 85~125°C		±15		mV
Differential Output Error	E (Voq -VREF)	I_P=0A, T_A = 25°C		±5		mV
		I_P=0A, T_A = -40~85°C		±10		mV
		I_P=0A, T_A = 85~125°C		±15		mV
Zero Current Output Ripple	Voq_pp	IP=0A,T_A= 25°C,Output Peak to Peak		80		mV
TOTAL OUTPUT ERROR COMPONENTS: E_{TOT} = E_{SENS} + V_{OE} /(Sens × I_P)						
Total Output Error[2]	E_{TOT}	I_P = ±30 A, T_A=25°C		±1		%
		I_P = ±30 A, T_A= -40~85°C		±2		%
		I_P = ±30 A, T_A= 85~125°C		±3		%

[1] Typical values with +/- are 3 sigma values
[2] Percentage of IP , with IP = $I_{PR(max)}$.

SC810DFT-40F5 Individual Performance Characteristics

Note: Over full range of TA=-40~125°C, C_{Bypass}=0.47uF, C_{Load}=1nF, V_{CC}=5V, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ[1]	Max	Unit
NOMINAL PERFORMANCE						
Current-Sensing Range	I_{PR}		-40		40	A
Zero-Current Output Voltage	Voq	IP=0A, T_A=25°C		2.5		V
VREF output Voltage	V_{REF}	no correlation with IP input		2.5		V
Difference zero deviation	Voq -V_{REF}	IP=0A		0		mV
Sensitivity	Sens	-40A<IP<40A		50		mV/A
ACCURACY PERFORMANCE						
Sensitivity Error	E_{SENS}	I_P = ±40 A, T_A = 25°C		±1		%
		I_P = ±40 A, T_A = -40~85°C		±1.5		%
		I_P = ±40 A, T_A = 85~125°C		±3		%
Single end output zero error	V_{OE}	I_P=0A, T_A = 25°C		±5		mV
		I_P=0A, T_A = -40~85°C		±10		mV
		I_P=0A, T_A = 85~125°C		±15		mV
Differential Output Error	E (Voq -VREF)	I_P=0A, T_A = 25°C		±5		mV
		I_P=0A, T_A = -40~85°C		±10		mV
		I_P=0A, T_A = 85~125°C		±15		mV
Zero Current Output Ripple	Voq_pp	IP=0A,T_A= 25°C,Output Peak to Peak		60		mV
TOTAL OUTPUT ERROR COMPONENTS: E_{TOT} = E_{SENS} + V_{OE} /(Sens × I_P)						
Total Output Error[2]	E_{TOT}	I_P = ±40 A, T_A=25°C		±1		%
		I_P = ±40 A, T_A= -40~85°C		±2		%
		I_P = ±40 A, T_A= 85~125°C		±3		%

[1] Typical values with +/- are 3 sigma values
[2] Percentage of IP , with IP = $I_{PR(max)}$.

SC810DFT-50F5 Individual Performance Characteristics

Note: Over full range of TA=-40~125°C, C_{Bypass}=0.47uF, C_{Load}=1nF, V_{CC}=5V, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ[1]	Max	Unit
NOMINAL PERFORMANCE						
Current-Sensing Range	I_{PR}		-50		50	A
Zero-Current Output Voltage	Voq	IP=0A, T_A=25°C		2.5		V
VREF output Voltage	V_{REF}	no correlation with IP input		2.5		V
Difference zero deviation	Voq -V_{REF}	IP=0A		0		mV
Sensitivity	Sens	-50A<IP<50A		40		mV/A
ACCURACY PERFORMANCE						
Sensitivity Error	E_{SENS}	I_P = ±50 A, T_A = 25°C		±1		%
		I_P = ±50 A, T_A = -40~85°C		±1.5		%
		I_P = ±50 A, T_A = 85~125°C		±3		%
Single end output zero error	V_{OE}	I_P=0A, T_A = 25°C		±5		mV
		I_P=0A, T_A = -40~85°C		±10		mV
		I_P=0A, T_A = 85~125°C		±15		mV
Differential Output Error	E (Voq -VREF)	I_P=0A, T_A = 25°C		±5		mV
		I_P=0A, T_A = -40~85°C		±10		mV
		I_P=0A, T_A = 85~125°C		±15		mV
Zero Current Output Ripple	Voq_pp	IP=0A,T_A= 25°C,Output Peak to Peak		60		mV
TOTAL OUTPUT ERROR COMPONENTS: E_{TOT} = E_{SENS} + V_{OE} /(Sens × I_P)						
Total Output Error[2]	E_{TOT}	I_P = ±50 A, T_A=25°C		±1		%
		I_P = ±50 A, T_A= -40~85°C		±1.5		%
		I_P = ±50 A, T_A= 85~125°C		±3		%

[1] Typical values with +/- are 3 sigma values
[2] Percentage of IP , with IP = $I_{PR(max)}$.

SC810DFT-25I5 Individual Performance Characteristics

Note: Over full range of TA=-40~125°C, C_{Bypass}=0.47uF, C_{Load}=1nF, V_{CC}=5V, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ[1]	Max	Unit
NOMINAL PERFORMANCE						
Current-Sensing Range[3]	I_{PR}	Default one-way detection, Calculation formula of negative current range: MinIPR=$(0.5 - VREF\_IN)/Sens$			25	A
Zero-Current Output Voltage	Voq	IP=0A, T_A=25°C		=Vref		V
VREF output Voltage	V_{REF}	no correlation with IP input		Pace with input		V
Difference zero deviation	Voq -V_{REF}	IP=0A		0		mV
Sensitivity	Sens	0A<IP<25A		80		mV/A
ACCURACY PERFORMANCE						
Sensitivity Error	E_{SENS}	I_P = 25 A, T_A = 25°C		±1		%
		I_P = 25 A, T_A = -40~85°C		±1		%
		I_P = 25 A, T_A = 85~125°C		±0.5		%
Single end output zero error	V_{OE}	I_P=0A, T_A = 25°C	-10	0	10	mV
		I_P=0A, T_A = -40~85°C		4		mV
		I_P=0A, T_A = 85~125°C		4		mV
Zero Current Output Ripple	Voq_pp	IP=0A,T_A= 25°C,Output Peak to Peak		85		mV
TOTAL OUTPUT ERROR COMPONENTS: E_{TOT} = E_{SENS} + V_{OE} /(Sens × I_P)						
Total Output Error[2]	E_{TOT}	I_P = 25 A, T_A=25°C		±1		%
		I_P = 25 A, T_A= -40~85°C		±2		%
		I_P = 25 A, T_A= 85~125°C		±3		%

[1] Typical values with +/- are 3 sigma values
[2] Percentage of IP , with IP = $I_{PR(max)}$.
[3]Current measurement range: the minimum viout linear output voltage is 0.5V, that is, the negative current detection range is judged according to the external VREF input voltage.

SC810DFT-30I5-100 Individual Performance Characteristics

Note: Over full range of TA=-40~125°C, C_{Bypass}=0.47uF, C_{Load}=1nF, V_{CC}=5V, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ[1]	Max	Unit
NOMINAL PERFORMANCE						
Current-Sensing Range[3]	I_{PR}	Default one-way detection, Calculation formula of negative current range: MinIPR=$(0.5 - VREF\_IN)/Sens$			30	A
Zero-Current Output Voltage	Voq	IP=0A, T_A=25°C		=Vref		V
VREF output Voltage	V_{REF}	no correlation with IP input		1		V
Difference zero deviation	Voq -V_{REF}	IP=0A		0		mV
Sensitivity	Sens	0A<IP<30A		66		mV/A
ACCURACY PERFORMANCE						
Sensitivity Error	E_{SENS}	I_P = 30 A, T_A = 25°C	-1	±0.5	1	%
		I_P = 30 A, T_A = -40~85°C	-2.26	±0.6	2.26	%
		I_P = 30 A, T_A = 85~125°C	-2.42	±0.7	2.42	%
Single end output zero error	V_{OE}	I_P=0A, T_A = 25°C	-17	±5	17	mV
		I_P=0A, T_A = -40~85°C	-41	±10	41	mV
		I_P=0A, T_A = 85~125°C	-23	±15	23	mV
Zero Current Output Ripple	Voq_pp	IP=0A,T_A= 25°C,Output Peak to Peak		85		mV
TOTAL OUTPUT ERROR COMPONENTS: E_{TOT} = E_{SENS} + V_{OE} /(Sens × I_P)						
Total Output Error[2]	E_{TOT}	I_P = 30 A, T_A=25°C	-1.5	±1	1.5	%
		I_P = 30 A, T_A= -40~85°C	-3.5	±1.5	3.5	%
		I_P = 30 A, T_A= 85~125°C	-3.1	±1.5	3.1	%

[1] Typical values with +/- are 3 sigma values
[2] Percentage of IP , with IP = $I_{PR(max)}$.
[3] Current measurement range: the minimum viout linear output voltage is 0.5V, that is, the negative current detection range is judged according to the external VREF input voltage.

SC810DFT-30I5 Individual Performance Characteristics

Note: Over full range of T_A=-40~125°C, C_{Bypass}=0.47uF, C_{Load}=1nF, V_{CC}=5V, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ[1]	Max	Unit
NOMINAL PERFORMANCE						
Current-Sensing Range[3]	I_{PR}	Default one-way detection, Calculation formula of negative current range: MinIPR=$(0.5 - VREF\_IN)/Sens$			30	A
Zero-Current Output Voltage	Voq	IP=0A		=Vref		V
VREF output Voltage	V_{REF}	no correlation with IP input		0.5		V
Sensitivity	Sens	0A<IP<30A		66		mV/A
ACCURACY PERFORMANCE						
Sensitivity Error	E_{SENS}	I_P = 30 A, T_A = 25°C	-1	±0.5	1	%
		I_P = 30 A, TA = -40~85°C	-3.3	±0.6	3.3	%
		I_P = 30 A, TA = 85~125°C	-2.8	±0.7	2.8	%
Single end output zero error	V_{OE}	I_P=0A, T_A = 25°C	-10	±5	10	mV
		I_P=0A, TA = -40~85°C	-26	±10	26	mV
		I_P=0A, TA = 85~125°C	-40	±15	40	mV
Zero Current Output Ripple	Voq_pp	IP=0A, T_A = 25°C, Output Peak to Peak		170		mV
TOTAL OUTPUT ERROR COMPONENTS: E_{TOT} = E_{SENS} + V_{OE} /(Sens × I_P)						
Total Output Error[2]	E_{TOT}	I_P = 30 A, T_A=25°C	-1.5	±0.8	1.5	%
		I_P = 30 A, TA = -40~85°C	-3.3	±1	3.3	%
		I_P = 30 A, TA = 85~125°C	-3.1	±1.5	3.1	%

[1] Typical values with +/- are 3 sigma values
[2] Percentage of IP , with IP = $I_{PR(max)}$.
[3] Current measurement range: the minimum viout linear output voltage is 0.5V, that is, the negative current detection range is judged according to the external VREF input voltage.

SC810RFT-10U5 Individual Performance Characteristics

Note: Over full range of TA=-40~125°C, C_{Bypass}=0.47uF, C_{Load}=1nF, V_{CC}=5V, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ[1]	Max	Unit
NOMINAL PERFORMANCE						
Current-Sensing Range	I_{PR}		0		10	A
Zero-Current Output Voltage	Voq	IP=0A, T_A=25°C		0.1Vcc		V
Sensitivity	Sens	0A<IP<10A		264*S_{coef}		mV/A
ACCURACY PERFORMANCE						
Sensitivity Error	E_{SENS}	I_P = 10 A, T_A = 25°C		±1		%
		I_P = 10 A, T_A = -40~85°C		±1.5		%
		I_P = 10 A, T_A = 85~125°C		±3		%
Single end output zero error	V_{OE}	I_P=0A, T_A = 25°C		0		mV
		I_P=0A, T_A = -40~85°C		64		mV
		I_P=0A, T_A = 85~125°C		5		mV
Zero Current Output Ripple	Voq_pp	IP=0A,T_A= 25°C,Output Peak to Peak		230		mV
TOTAL OUTPUT ERROR COMPONENTS: E_{TOT} = E_{SENS} + V_{OE} /(Sens × I_P)						
Total Output Error[2]	E_{TOT}	I_P = 10 A, T_A=25°C		±1		%
		I_P = 10 A, T_A= -40~85°C		±1.5		%
		I_P = 10 A, T_A= 85~125°C		±3		%

[1] Typical values with +/- are 3 sigma values
[2] Percentage of IP , with IP = $I_{PR(max)}$.

SC810FFT-10B5 Individual Performance Characteristics

Note: Over full range of TA=-40~125°C, C_{Bypass}=0.47uF, C_{Load}=1nF, V_{CC}=5V, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ[1]	Max	Unit
NOMINAL PERFORMANCE						
Current-Sensing Range	I_{PR}		-10		10	A
Zero-Current Output Voltage	Voq	IP=0A, T_A=25°C		0.5Vcc		V
Sensitivity	Sens	-10A<IP<10A		200*S_{coef}		mV/A
ACCURACY PERFORMANCE						
Sensitivity Error	E_{SENS}	I_P = ±10 A, T_A = 25°C		±1		%
		I_P = ±10 A, T_A = -40~85°C		±1.5		%
		I_P = ±10 A, T_A = 85~125°C		±3		%
Single end output zero error	V_{OE}	I_P=0A, T_A = 25°C		±3		mV
		I_P=0A, T_A = -40~85°C		±5		mV
		I_P=0A, T_A = 85~125°C		±15		mV
Zero Current Output Ripple	Voq_pp	IP=0A,T_A= 25°C,Output Peak to Peak		150		mV
TOTAL OUTPUT ERROR COMPONENTS: E_{TOT} = E_{SENS} + V_{OE} /(Sens × I_P)						
Total Output Error[2]	E_{TOT}	I_P = ±10 A, T_A=25°C		±1		%
		I_P = ±10 A, T_A= -40~85°C		±1.5		%
		I_P = ±10 A, T_A= 85~125°C		±3		%

[1] Typical values with +/- are 3 sigma values
[2] Percentage of IP , with IP = $I_{PR(max)}$.

SC810FFT-10U5 Individual Performance Characteristics

Note: Over full range of TA=-40~125°C, C_{Bypass}=0.47uF, C_{Load}=1nF, V_{CC}=5V, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ[1]	Max	Unit
NOMINAL PERFORMANCE						
Current-Sensing Range	I_{PR}		0		10	A
Zero-Current Output Voltage	Voq	IP=0A, T_A=25°C		0.1Vcc		V
Sensitivity	Sens	0A<IP<10A		400*S_{coef}		mV/A
ACCURACY PERFORMANCE						
Sensitivity Error	E_{SENS}	I_P = 10 A, T_A = 25°C	-1.06		1.06	%
		I_P = 10 A, T_A = -40~85°C	-2.04		2.04	%
		I_P = 10 A, T_A = 85~125°C	-3.75		3.75	%
Single end output zero error	V_{OE}	I_P=0A, T_A = 25°C	-12		12	mV
		I_P=0A, T_A = -40~85°C	-37		37	mV
		I_P=0A, T_A = 85~125°C	-59		59	mV
Zero Current Output Ripple	Voq_pp	IP=0A,T_A= 25°C,Output Peak to Peak		150		mV
TOTAL OUTPUT ERROR COMPONENTS: E_{TOT} = E_{SENS} + V_{OE} /(Sens × I_P)						
Total Output Error[2]	E_{TOT}	I_P = 10 A, T_A=25°C	-1.13		1.13	%
		I_P = 10 A, T_A= -40~85°C	-2.63		2.63	%
		I_P = 10 A, T_A= 85~125°C	-4.97		4.97	%

[1] Typical values with +/- are 3 sigma values
[2] Percentage of IP , with IP = $I_{PR(max)}$.

SC810FFT-25B5 Individual Performance Characteristics

Note: Over full range of TA=-40~125°C, C_{Bypass}=0.47uF, C_{Load}=1nF, V_{CC}=5V, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ[1]	Max	Unit
NOMINAL PERFORMANCE						
Current-Sensing Range	I_{PR}		-25		25	A
Zero-Current Output Voltage	Voq	IP=0A, T_A=25°C		0.5Vcc		V
Sensitivity	Sens	-25A<IP<25A		80*S_{coef}		mV/A
ACCURACY PERFORMANCE						
Sensitivity Error	E_{SENS}	I_P = ±25 A, T_A = 25°C		±1		%
		I_P = ±25 A, T_A = -40~85°C		±1.5		%
		I_P = ±25 A, T_A = 85~125°C		±3		%
Single end output zero error	V_{OE}	I_P=0A, T_A = 25°C		±5		mV
		I_P=0A, T_A = -40~85°C		±10		mV
		I_P=0A, T_A = 85~125°C		±15		mV
Zero Current Output Ripple	Voq_pp	IP=0A,T_A= 25°C,Output Peak to Peak		85		mV
TOTAL OUTPUT ERROR COMPONENTS: E_{TOT} = E_{SENS} + V_{OE} /(Sens × I_P)						
Total Output Error[2]	E_{TOT}	I_P = ±25 A, T_A=25°C		±1		%
		I_P = ±25 A, T_A= -40~85°C		±1.5		%
		I_P = ±25 A, T_A= 85~125°C		±3		%

[1] Typical values with +/- are 3 sigma values
[2] Percentage of IP , with IP = $I_{PR(max)}$.

SC810FFT-50B5 Individual Performance Characteristics

Note: Over full range of TA=-40~125°C, C_{Bypass}=0.47uF, C_{Load}=1nF, V_{CC}=5V, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ[1]	Max	Unit
NOMINAL PERFORMANCE						
Current-Sensing Range	I_{PR}		-50		50	A
Zero-Current Output Voltage	Voq	IP=0A, T_A=25°C		0.5Vcc		V
Sensitivity	Sens	-50A<IP<50A		40*S_{coef}		mV/A
ACCURACY PERFORMANCE						
Sensitivity Error	E_{SENS}	I_P = ±50 A, T_A = 25°C		±1		%
		I_P = ±50 A, T_A = -40~85°C		±1.5		%
		I_P = ±50 A, T_A = 85~125°C		±3		%
Single end output zero error	V_{OE}	I_P=0A, T_A = 25°C		±5		mV
		I_P=0A, T_A = -40~85°C		±10		mV
		I_P=0A, T_A = 85~125°C		±15		mV
Zero Current Output Ripple	Voq_pp	IP=0A,T_A= 25°C,Output Peak to Peak		60		mV
TOTAL OUTPUT ERROR COMPONENTS: E_{TOT} = E_{SENS} + V_{OE} /(Sens × I_P)						
Total Output Error[2]	E_{TOT}	I_P = ±50 A, T_A=25°C		±1		%
		I_P = ±50 A, T_A=-40~85°C		±1.5		%
		I_P = ±50 A, T_A= 85~125°C		±3		%

[1] Typical values with +/- are 3 sigma values
[2] Percentage of IP , with IP = $I_{PR(max)}$.

Accuracy characteristic curve （SC810DFT-20F5）

Fig1：Vref output Error vs.Temp.

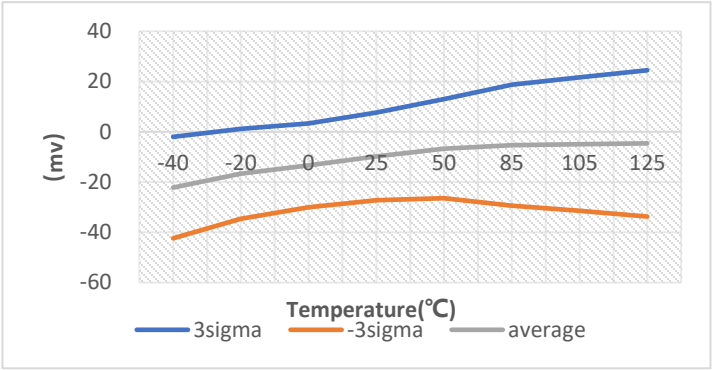


Fig2：Offset Voltage vs. Temp.

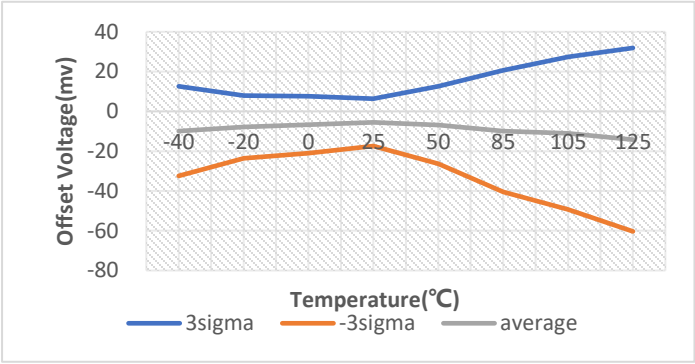


Fig3：Voq vs. Temp.

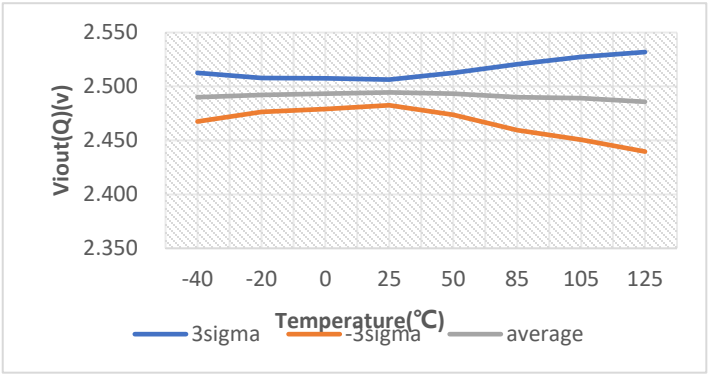


Fig4：Sensitivity Error vs.Temp.

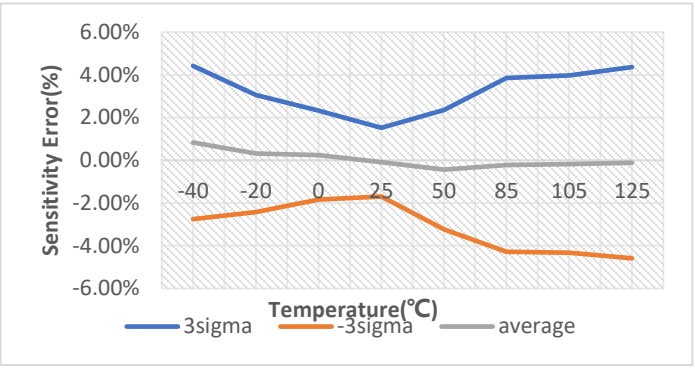


Fig5：Sensitivity Error@XXX-20F5 vs. Temp.

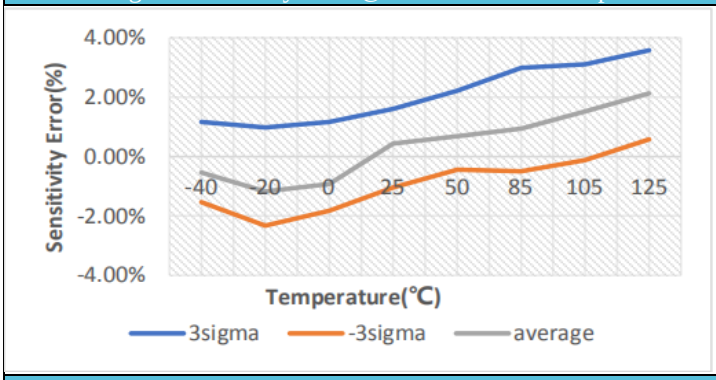


Fig6：Non-linearility vs. Temp.

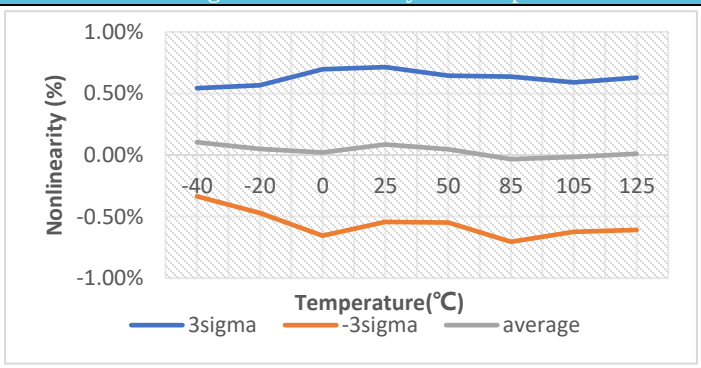


Fig7：Toltal output Error vs. Temp.

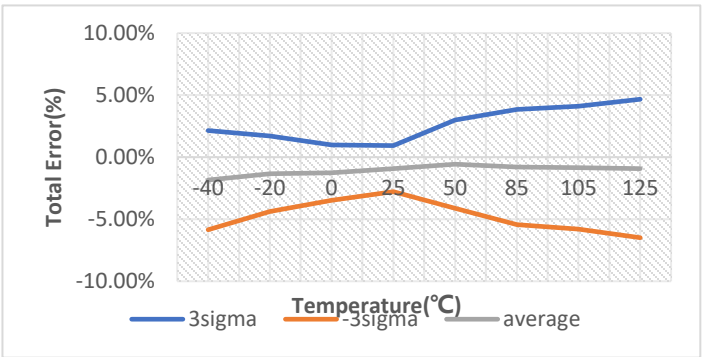
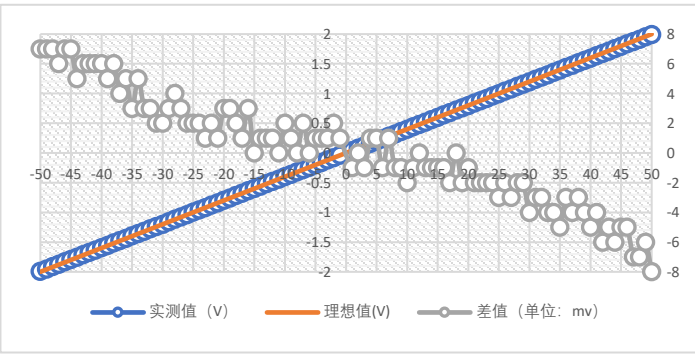


Fig8：Non-linearility vs. Temp.



AC & Dynamic Characteristic Curve

Fig1：Trans. Rising time

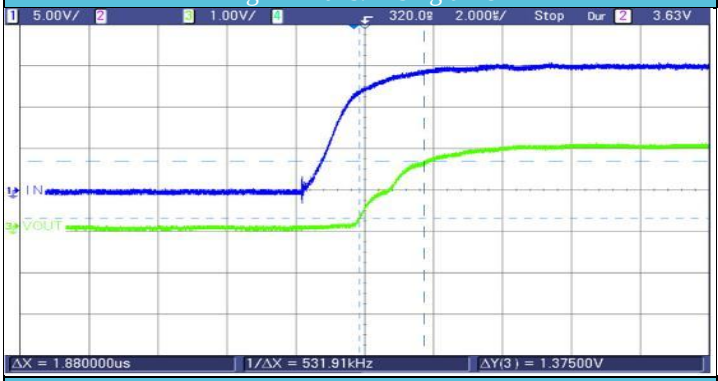


Fig2：Response Time

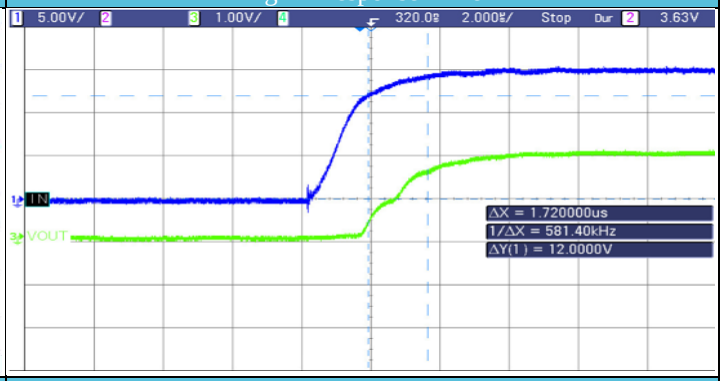


Fig3：Response delay time

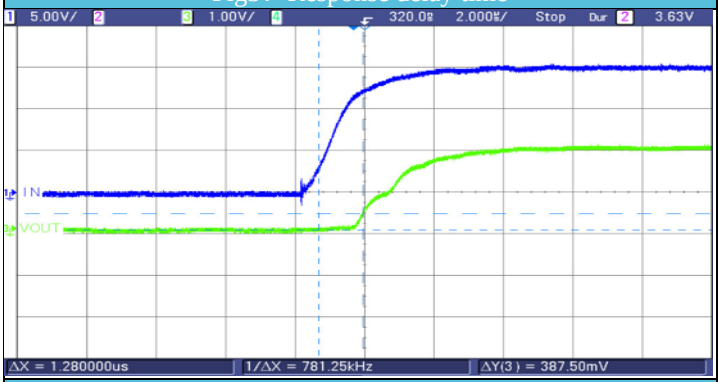


Fig4：Noise FFT

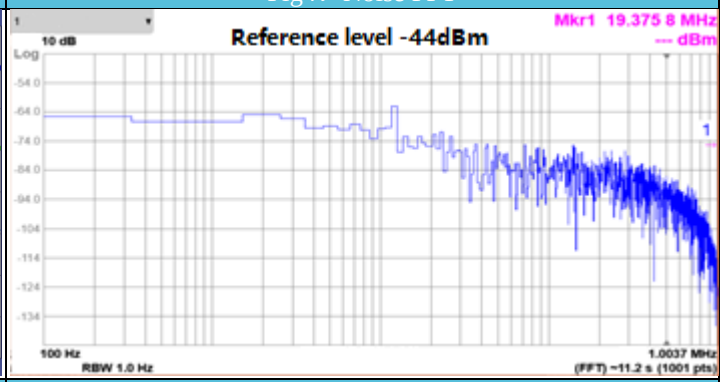


Fig5：Sinwave deltect

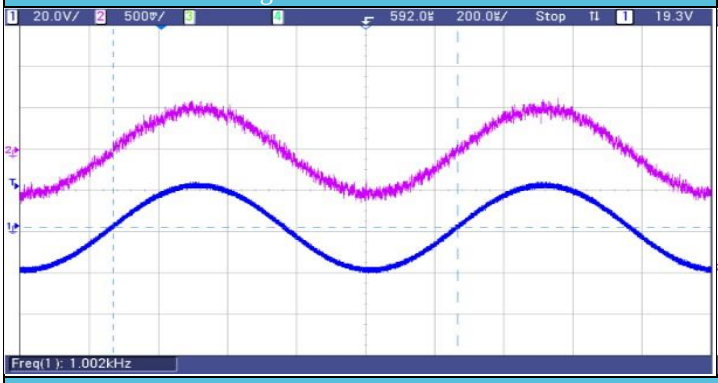


Fig6：Pluse deltect

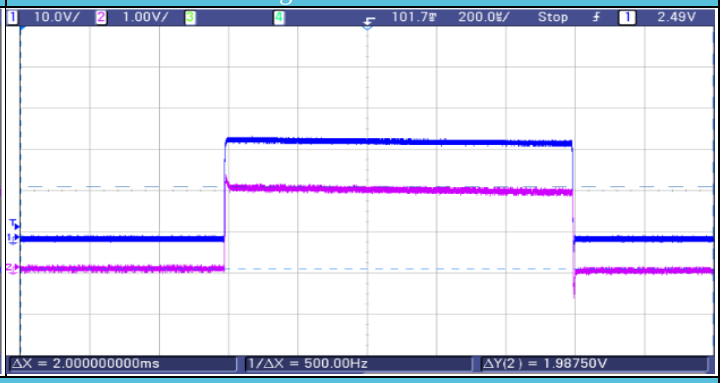
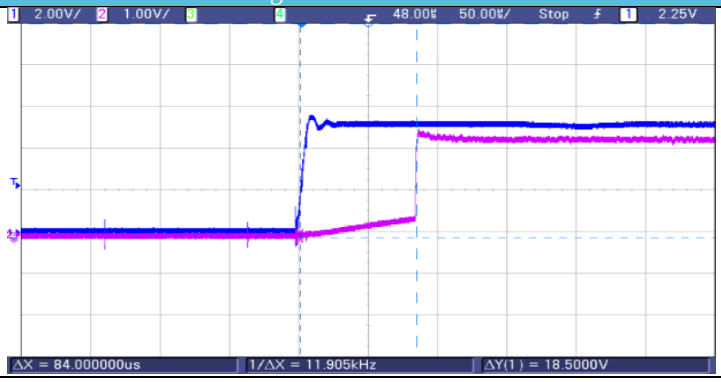


Fig7：Power on time



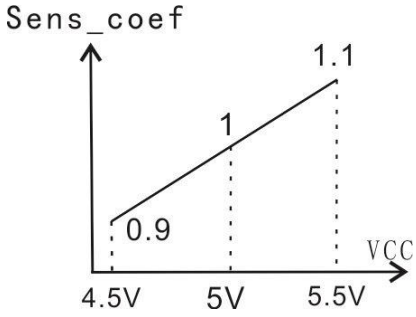
Functional Description

◆ Internal Reference Voltage

Vref is always equal to the static bias output value of VIOUT, that is, VIOUT value when IP=0A.
The relationship between VIOUT and Vref obey that following formula:
VIOUT=IP*SENS+Vref,in which IP is the primary current.
When SC810DFT**F5 is used, the constant output of VREF is fixed at 2.5V, and the driving capability is greater than 3mA.
When SC810DFT**B5 is used, VREF constantly outputs 0.5VCC, and has a driving capability of more than 3mA.
When SC810DFT**U5 is used, VREF constantly outputs 0.1VCC, and has a driving capability of more than 3mA.
When SC810DFT**I5 is used, VREF is input mode, and its voltage can be modified to 0.5V-2.5V by using external input voltage.However, it is necessary to contact FAE for confirmation and inform the input voltage value along with the model to obtain the best accuracy parameters.

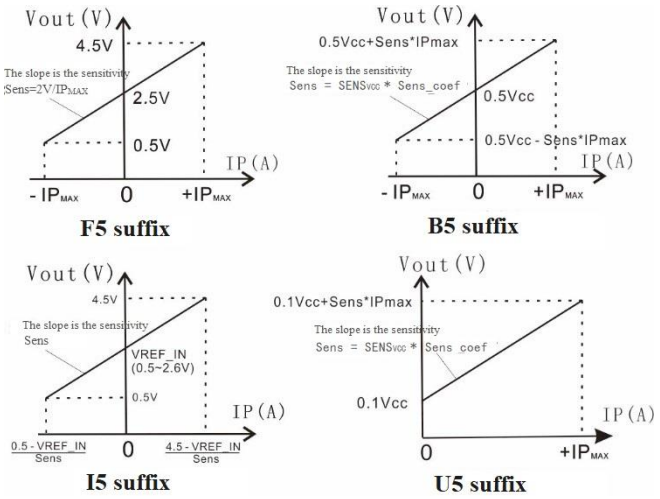
◆ Proportional Coefficient Of Sensitivity(suitable for products with suffix B or U)

Sensitivity ratio coefficient (sens_coef), which defines the coefficient proportional to the sensitivity and VCC. The ideal coefficient is 1. If the VCC increases by 10%, the sensitivity will increase by 10%. At this time, the coefficient is 1.1, which means that the sensitivity increases by 10% compared with the ideal proportion. The relationship between the scale coefficient is described by the following equation:
Scoef=Sens_coef=$SENS_{VCC}$/$SENS_{VCCN}$
It is the ratio of the sensitivity $SENS_{VCC}$ under the supply voltage Vcc to the sensitivity $SENS_{VCCN}$ under the rated supply voltage VCCN. Through this value, we can get the sensitivity under any supply voltage.
In ideal situation:



◆ Proportional Relationship

Zero-current voltage is fixed at 2.5V and sensitivity is fixed at 2V/IPMAX when VCC change if using SC810**F5. IPMAX is the Maximum current.
Zero-current voltage is fixed at VCC/2 and sensitivity is fixed at SENSVCC ×Sens_coef when VCC change if using SC810**B5.
Zero-current voltage is fixed at VCC/10 and sensitivity is fixed at SENSVCC ×Sens_coef when VCC change if using SC810**U5.
Zero-current voltage is fixed at the VREF input voltage and sensitivity is fixed at 2V/IP,when VCC change if using SC810DFT**I5.IP is
the current value in the model.The measurable current range is $[(0.5-\mathrm{VREF\_IN})/\mathrm{Sens},(4.5-\mathrm{VREF\_IN})/\mathrm{Sens}]$.
E.g. SC810DFT-20I5, when the external input voltage VREF_IN=1.65V, the sensitivity is Sens=2*1000/20=100mv/A, and the measurable current range is [-11.5A,28.5A].



◆ Impact of External Magnetic Fields

CMFR is used to express the ability of sensor resisting impact of external magnetic fields.The larger the absolute value of CMFR,the stronger the ability to resist external magnetic interference is.CMFR is defined as The absolute value of the ratio of the voltage change ACM (in mv/G) caused by external magnetic interference to the sensor itself is 20 times of the common logarithm, and the unit is decibel (dB).

$$CMFR = 20\lg\left|\frac{A_{CM}}{Sens/CF}\right|$$

CF is the coupling factor in G/A,multiplying by the sensitivity of the part(Sens)gives the error in mV.

For example:CMFR= -40dB， Sens = 40mv/A， CF = 10G/A, then A_{CM} is 0.04mv/G.That is, the output changes by 40uv for every 1Guass increase of external magnetic field.

◆ Power Supply Rejection Ratio(suitable for products with suffix F)

Sensitivity power supply rejection ratio(PSRRs) It refers to the sensitivity change rate ($SENS_{VCC}$-$SENS_{VCCN}$)/$SENS_{VCCN}$ caused by the power supply change rate(VCC-VCC_N)/VCC_N. The absolute value of the ratio is 20 times of the common logarithm, the unit is dB.

$$PSRR_S = 20\lg\left|\frac{(VCC-VCC_N)/VCC_N}{(SENS_{VCC}-SENS_{VCCN})/SENS_{VCCN}}\right|$$

Zero current power supply rejection ratio($PSRR_Q$) It refers to the zero point change VOE - VOE_N caused by the change of voltage VCC - VCC_N. The absolute value of the ratio is 20 times of the common logarithm, the unit is dB.

$$PSRR_Q = 20\lg\left|\frac{VCC-VCC_N}{VOE-VOE_N}\right|$$

◆ Delay time t_{pd} and Response time $t_{response}$

Both delay time and response time are used to characterize the time difference between primary side and secondary side;

The propagation Delay time is the time difference when the secondary output reaches 20% of the steady-state output value and the primary output reaches 20% of the steady-state current;

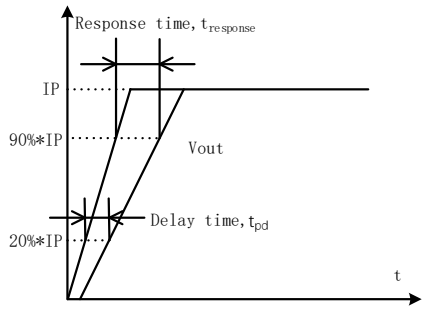
The response time is the time difference when the secondary output reaches 90% of the steady-state output value and the primary output reaches 90% of the steady-state current.

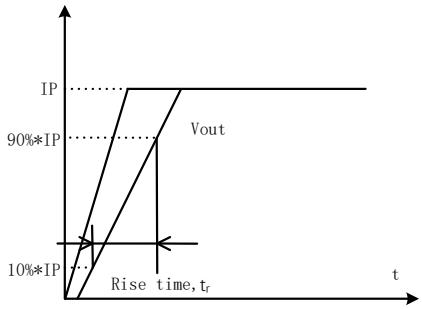
Rise Time T_r

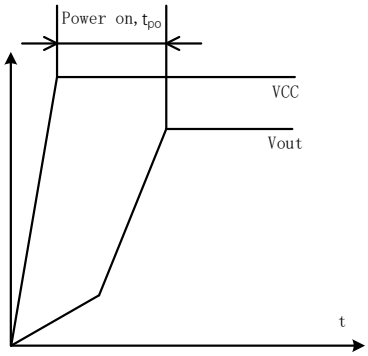
Rise time is used to characterize the time difference of the secondary side itself, that is, the time difference between when the secondary side output reaches 90% of the steady-state output value and when it reaches 10% of the steady-state output value.

Power-On Time t_{po}

The power-on time is used to characterize the time difference between the secondary side and the power supply VCC, that is, the time difference between the secondary side output reaching the steady-state output value and the VCC reaching the steady-state output value.







◆ Thermal resistance $R_{\theta JA}$

Based on a demo board, the thermal resistance is calculated by measuring the chip top temperature and power value. According to the thermal resistance, the junction temperature can be calculated as a reference. The actual surface temperature measurement value is shown in the relationship between the package temperature and the measured current.

$$T_J = T_A + (R_{\theta JA} * POWER) = T_A + (R_{\theta JA} * IP^2 * R_{PRIMARY});$$

Where T_J is junction temperature and T_A is ambient temperature.

◆ Refer to application information

1.Selection of SC810DFT/FFT/RFT suffix

DFT:With reference pin (not grounded),support input system synchronization reference,or differential output application mode.
If system synchronization reference or post-differential sampling and amplification is required, DFT is selected.
FFT:There is no reference mode,convenient pin6 grounding application for customers.Make a choice for compatibility.
RFT: Built-in 1.3x IP over-current protection output, open-drain output

2.Selection of SC810xxF5/xxB5/xxU5/xxI5 suffix

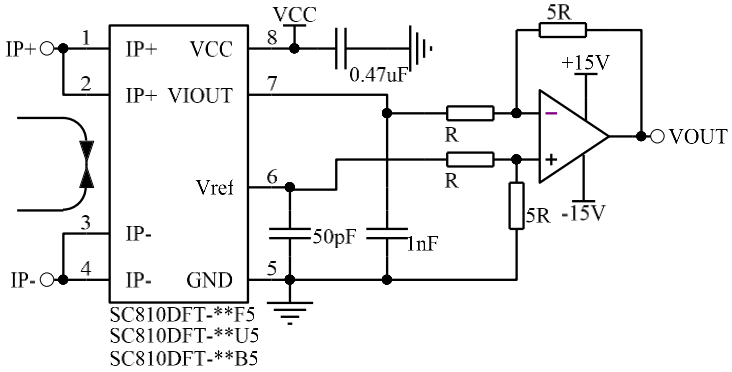
F,B,I and U types are different in the reference output when IP=0A, and F is recommended by default(2.5V fixed zero voltage).

F	Output is not affected by power supply voltage, and has high power supply suppression ability, low output noise and strong anti-interference ability. Especially in the case of high noise of system power supply, to ensure excellent output characteristics. However, it is required that the post-processing is not based on VCC, or when VCC fluctuates very little, so as to obtain high suppression ratio capability.
B	Output varies with VCC ratio, which basically has no ability to suppress high frequency noise of power supply. It is applicable to the system where the power supply voltage fluctuates greatly, and the subsequent MCU or DSP processing adopts 0.5VCC as the reference conversion and sensitivity as the VCC ratio calculation. And the VCC fluctuation error is offset by synchronous calculation.
I	Same as F mode, But the zero point is applied synchronously by external input,So as to offset the error of unsynchronized reference voltages.
U	Same as B mode, but suitable for unidirectional current detection.

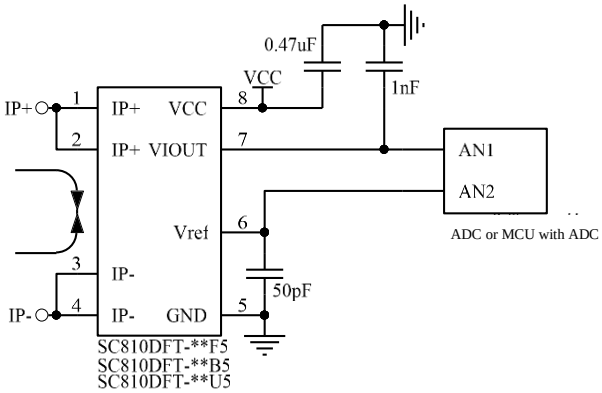
3.Differential output/input application description

1)Schematic diagram of differential amplification mode:

VOUT = IP * Sensitivity * (-5R / R), R>1.3K

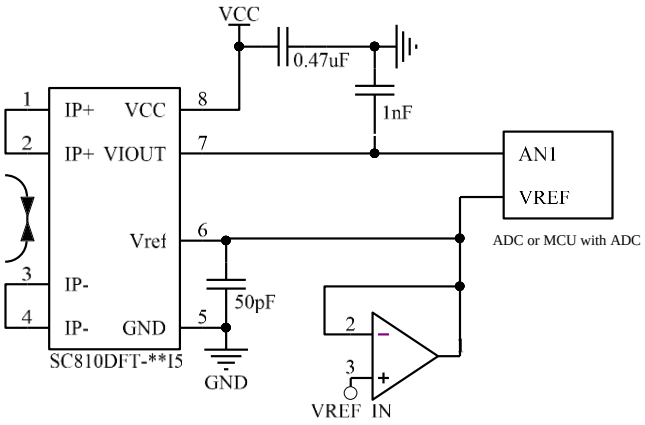


2)Schematic diagram of connection between differential output and ADC:

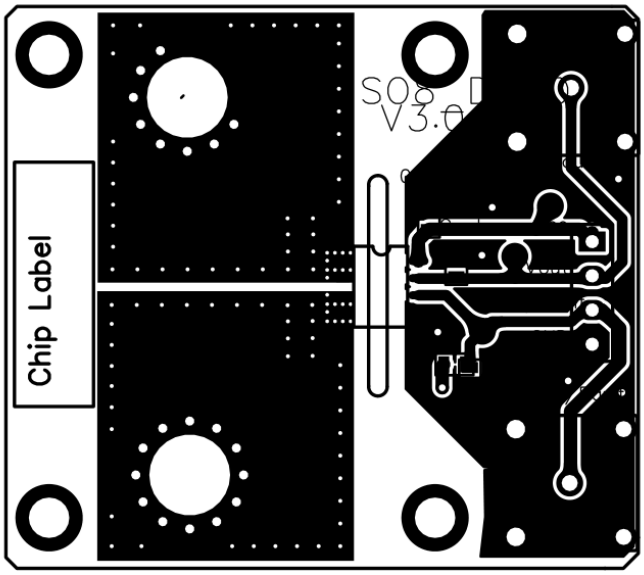


3)Schematic diagram of VREF input synchronization application

With SC810DFT**I5, VREF is the input mode.The external input voltage can be used to modify its voltage to 0.5v ~2.5v, VIOUT= VREF_IN + Sensitivity * IP,In which VREF_IN should be 0.5v ~2.5v.



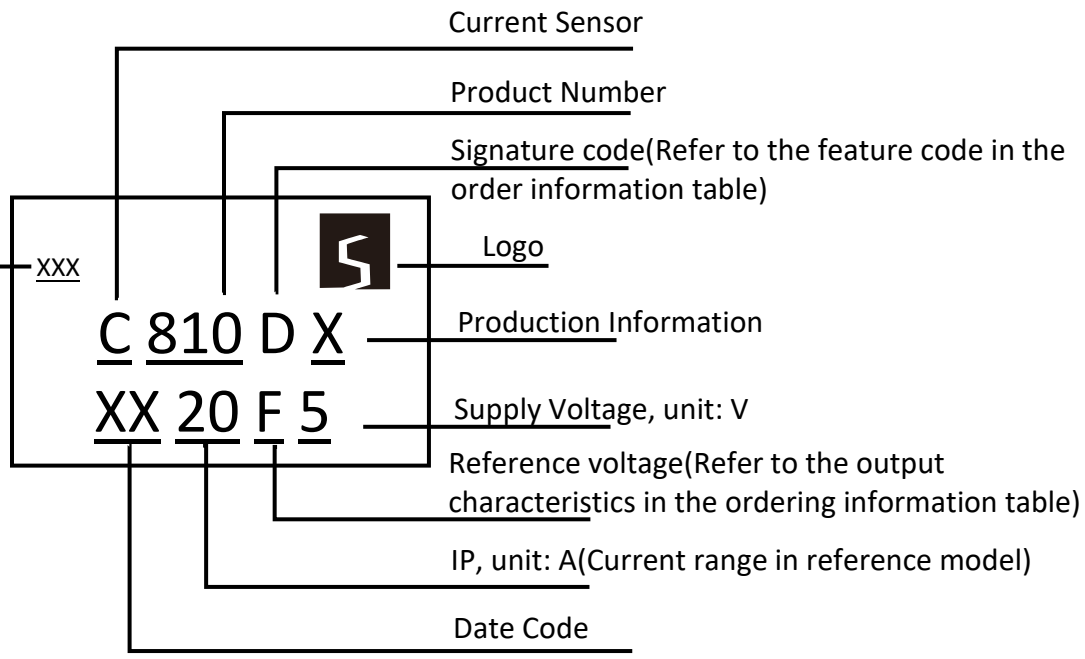
Demo Board Layout



Mark Description

Input voltage of model I, Blank: 0.5V, 075:0.75V Corresponding to this. Other models can be left blank.

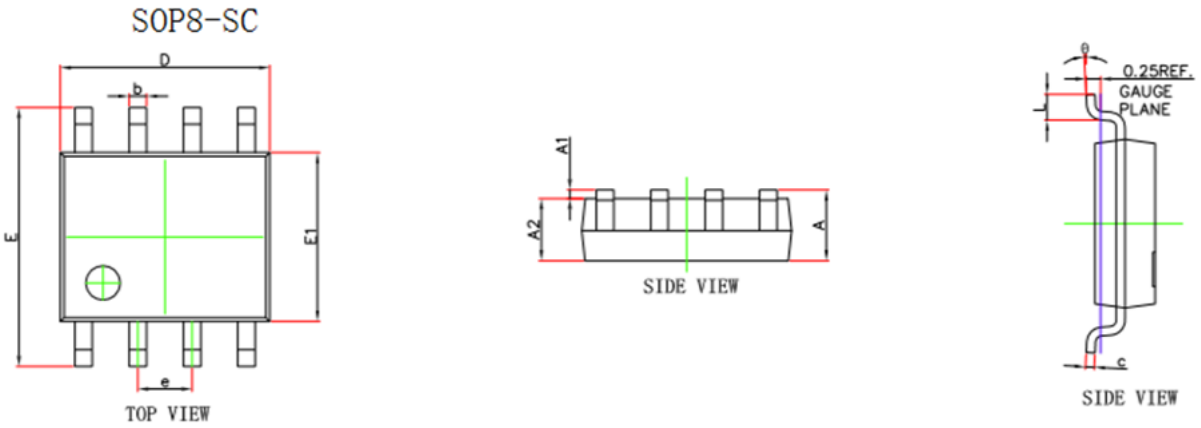
The U model is only defined for SC810FFT-20U5-185, and 185 represents the sensitivity



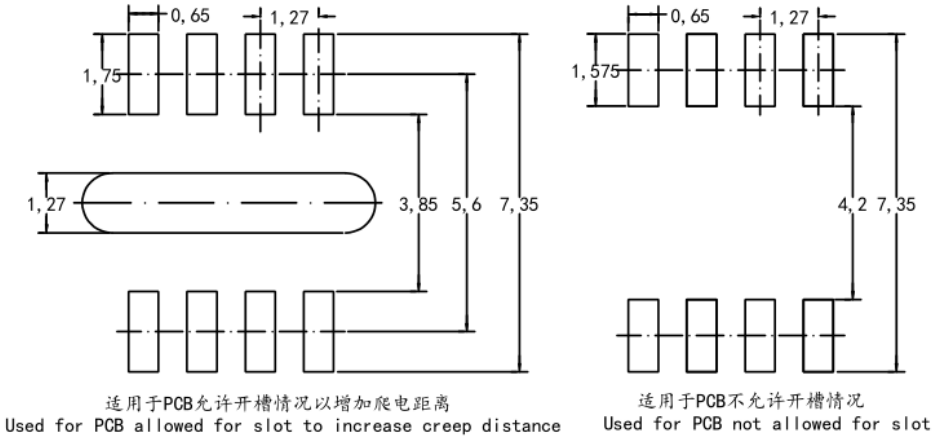
Note:X is non fixed character, defined by SENK SEMI naming rules

Package Information

Note: Package is SOP8-SC, all dimensions are in millimeters.



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
D	4.700	5.100	0.185	0.201
E1	3.800	4.000	0.150	0.157
E	5.800	6.200	0.228	0.244
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



PCB Layout Reference View
PCB Layout 参考图

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Revision Table

Revision	Change	Page	Author	Date
1.0	Initial draft for XG601 version Tom 2020.1		Tom	2020.1
2.0	Revise to new format ; Release to customer for sample and check EC Table; Increase the code of non-mass-supplied products; According to customer requirements, add 25I5 models; According to customer requirements, add 2P5B5 model; Add RFT-10U5; Released version; According to customer requirements, add 40F5 models; Fill in the frequency bandwidth and modify the description of I series;		Emma	2021.01
3.0	Update the function block diagram; Replace Exterior View; Add SC810DFT-30I5; Add UL and environmental protection logo; Add SC810FFT-20U5; Add SC810FFT-10U5; Add SC810DFT-30I5-100, and modify the silk screen printing instructions; Add SC810DFT-30I5-100 performance index parameters; Add SC810FFT-10U5 performance index parameters; Update the precision parameters of SC810DFT-30I5-100;		Emma	2021.12
4.0	Modify part of the data and description; Add SC810DFT-50I5-050;1. Add SC810FFT-30U5; 2. Add SC810DFT-30I5 performance index parameters; Add SC810FFT-50U5; Add SC810DFT-60F5; Add SC810FFT-40U5; Add SC810DFT-30I5-075; Add SC810FFT-20U5-185 model and define the special marking; Add SC810FFT-20B5; Add SC810FFT-05U5; Modify the pin definition description； Add SC810FFT-10U5-012; Modify the SC810RFT pin definition, change Pin6 to Vfault, and add a pin definition description;		MWJ	2024.05.15