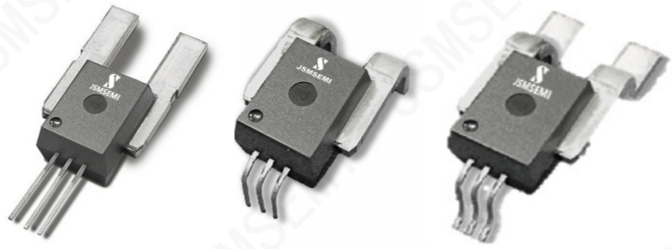
DESCRIPTION

The ACS77x series is an open-loop current sensor module based on the Hall effect principle, providing a more economical and accurate solution for AC or DC detection. It is widely used in industrial , commercial, and communication systems for AC or DC current detection. This product can be used for motor control, load detection and management, power and DC-DC converters, photovoltaic inverters UPS、Applications such as overcurrent protection and current detection in low to medium power frequency converters. While maintaining a high current range of 0-400A, ACS77x can also achieve a typical sensitivity temperature drift of ±0.1 % within the full temperature range of -40 to 125 . Provided a new solution for the high-precision and high-performance current detection market.

The ACS77x series chip integrates magnetic core packaging internally, and the isolation performance between the primary conductor and the sensing circuit is as high as 5000VAC, making it suitable for strong electromagnetic and highly isolated current detection environments.ACS772 series products have passed ROHS and other certifcations.



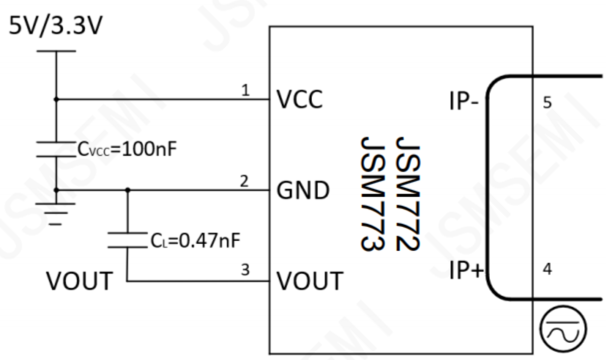
PSS PFF SMT

TYPICALAPPLICATIONS

- Photovoltaic Inverter
- Industrial Inverter
- CommercialAir Conditioning
- Charging Station
- Welding Machine
- Balancing Car
- UAV
- UPS

FEATURES

- HighAccuracy, Large Current
- 0~400ACurrent sensor
- Ofset temperature drift: ±1mV
- Sensitivity total output error: ±0.5%
- Typical sensitivity temperature drift: ±0.5%
- Typical linearity error: ±0.1%
- High Bandwidth, Fast Response
- Typical bandwidth:250kHz
- Typical response time: 1.2μs
- HighAnti-interference, High Isolation
- The integrated magnetic core resists stray magnetic field interference.
- Isolated voltage: 5000Vrms



TypicalApplication Circuit Diagram

SELECTION GUIDE

Part Number	Output Mode	I_{PR}(A)	Sensitivity (mV/A) ACS773=3.3	Sensitivity (mV/A) ACS772=5.0	Lead Form	Operating Temperature	Packing
ACS77xLCB-050U-PFF-T-JSM	Ratiometric Output Mode	50	52.8	80	PFF	–40℃~125℃	40 pieces per tube
ACS77xLCB-050U-PSS-T-JSM					PSS		
ACS77xLCB-050U-SMT-T-JSM					SMT		
ACS77xLCB-050B-PFF-T-JSM		±50	26.4	40	PFF		
ACS77xLCB-050B-PSS-T-JSM					PSS		
ACS77xLCB-050B-SMT-T-JSM					SMT		
ACS77xLCB-100U-PFF-T-JSM		100	26.4	40	PFF		
ACS77xLCB-100U-PSS-T-JSM					PSS		
ACS77xLCB-100U-SMT-T-JSM					SMT		
ACS77xLCB-100B-PFF-T-JSM		±100	13.2	20	PFF		
ACS77xLCB-100B-PSS-T-JSM					PSS		
ACS77xLCB-100B-SMT-T-JSM					SMT		
ACS77xKCB-150U-PFF-T-JSM		150	17.6	26.66	PFF		
ACS77xKCB-150U-PSS-T-JSM					PSS		
ACS77xKCB-150U-SMT-T-JSM					SMT		
ACS77xKCB-150B-PFF-T-JSM		±150	8.8	13.33	PFF		
ACS77xKCB-150B-PSS-T-JSM					PSS		
ACS77xKCB-150B-SMT-T-JSM					SMT		
ACS77xECB-200U-PFF-T-JSM		200	13.2	20	PFF		
ACS77xECB-200U-PSS-T-JSM					PSS		
ACS77xECB-200U-SMT-T-JSM					SMT		
ACS77xECB-200B-PFF-T-JSM		±200	6.6	10	PFF		
ACS77xECB-200B-PSS-T-JSM					PSS		
ACS77xECB-200B-SMT-T-JSM					SMT		
ACS77xECB-250U-PFF-T-JSM		250	10.56	16	PFF		
ACS77xECB-250U-PSS-T-JSM					PSS		
ACS77xECB-250U-SMT-T-JSM					SMT		
ACS77xECB-250B-PFF-T-JSM		±250	5.28	8	PFF		
ACS77xECB-250B-PSS-T-JSM					PSS		
ACS77xECB-250B-SMT-T-JSM					SMT		
ACS77xECB-300U-PFF-T-JSM		300	8.8	13.33	PFF		
ACS77xECB-300U-PSS-T-JSM					PSS		
ACS77xECB-300U-SMT-T-JSM					SMT		
ACS77xECB-300B-PFF-T-JSM		±300	4.4	6.67	PFF		
ACS77xECB-300B-PSS-T-JSM					PSS		
ACS77xECB-300B-SMT-T-JSM					SMT		
ACS77xECB-400U-PFF-T-JSM		400	6.6	10	PFF		
ACS77xECB-400U-PSS-T-JSM					PSS		
ACS77xECB-400U-SMT-T-JSM					SMT		
ACS77xECB-400B-PFF-T-JSM		±400	3.3	5	PFF		
ACS77xECB-400B-PSS-T-JSM					PSS		
ACS77xECB-400B-SMT-T-JSM					SMT		

Note: Changes in ambient temperature may affect the maximum operating current of the product. For specific information, please refer to the derating curve. If you have other range requirements, please contact our sales. New range will be added without notice.

PART NUMBER SPECIFICATION

ACS77x E CB - 400 B - PFF - T

Whether it contains lead
T：Lead-free process

Lead form
- PFF:PFF
- PSS:PSS
- SMT:SMT

Output polarity
- B: Bipolar
- U: Unipolar

Current sensing range

Packing requirement:tube

Temperature range
- L/K： －40~125℃
- E: -40~85℃

Product model
- ACS772：5.0V
- ACS773：3. 3V

1. ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Unit	Min.	Typ.	Max.
Supply Voltage	V_{CC}	V	-0.3	/	6.5
Maximun Output Current	I_{OUTmax}	mA	-45	/	45
Maximun Output Voltage	V_{OUTmax}	V	0.1	/	V_{CC}-0.1
Storage Temperature	T_S	℃	-55	/	150
Operating Ambient Temperature	T_A	℃	-40	/	125
Maximum Junction Temperature	T_{Jmax}	℃	/	/	165

Note: Operation outside the absolute maximum ratings may cause permanent device damage. Absolute maximum ratings do not imply functional operation of the device at these or any other conditions beyond those listed under recommended operating conditions. If used outside the recommended operating conditions but within the absolute maximum ratings, the device may not be fully functional, and this may affect device reliability, functionality, performance, and shorten the device lifetime.

2. ESD RATINGS

Characteristic	Symbol	Unit	Notes	Value
Human Body Model	V_{HBM}	kV	ESD between any two pins	±6
Charged Device Model	V_{CDM}	kV		±1

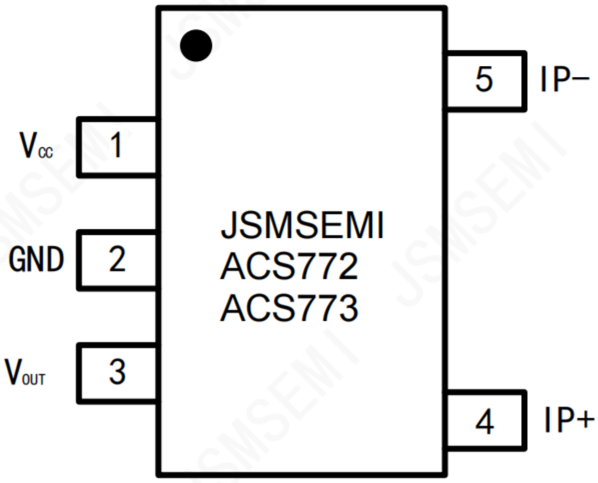
3. ISOLATION CHARACTERISTICS

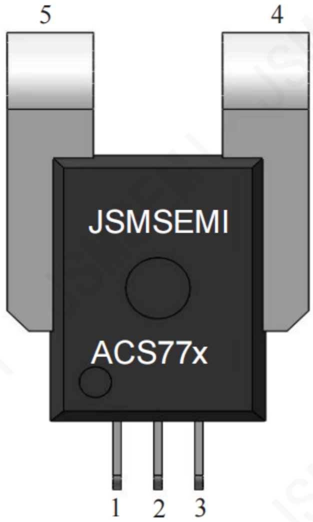
Characteristic	Symbol	Unit	Notes	Value
Dielectric Surge Voltage	V_{SURGE}	V	Test method refers to IEC61000-4-5, 1.2μs/50μs waveform.	8000
Dielectric Strength Test Voltage	V_{ISO}	V_{RMS}	60s, 50Hz isolation withstand voltage parameters, according to UL62368-1, test 6kV/1s before delivery to verify the insulation performance, and verify the partial discharge is less than 5pc.	5000
Working Voltage for Basic Isolation	V_{WVBI}	V_{PK} or V_{CC}	Maximum approved working voltage for basic (single) isolation according to UL 60950-1 (edition 2).	1800
		V_{RMS}		1272
Working Voltage for Reinforced Isolation	V_{WVRI}	V_{PK} or V_{CC}	Maximum approved working voltage for reinforced isolation according to UL 60950-1 (edition 2).	900
		V_{RMS}		636

4. TYPICAL OVERCURRENT CAPABILITY

Characteristic	Symbol	Unit	Notes	Value
Maximum Current Test	I_{POC}	A	T_A=25°C, Current On 1s, off 99s, Apply 100 pulses	1200
			T_A=85°C, Current On 1s, off 99s, Apply 100 pulses	900
			T_A=125°C, Current On 1s, off 99s, Apply 100 pulses	600

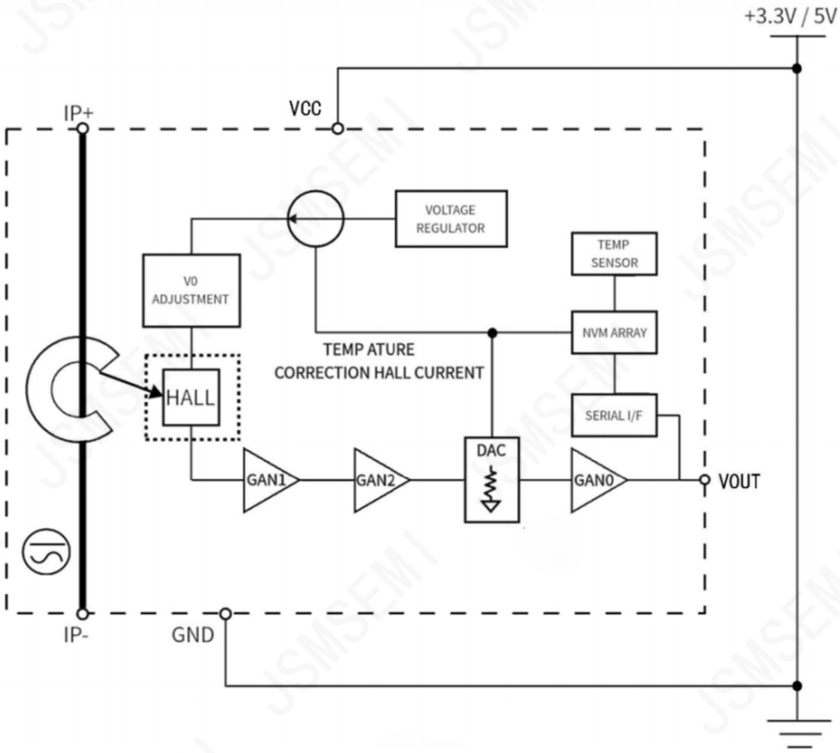
5. PINOUT DIAGRAM & FUNCTIONAL BLOCK DIAGRAM





Number	Name	Description
PIN1	VCC	Device power supply terminal pin
PIN2	GND	Device ground terminal pin
PIN3	VOUT	Analog output signal pin
PIN4	IP+	Current flows into the chip, positive direction
PIN5	IP-	Current flows out of the chip, negative direction

Pinout Diagram



Functional Block Diagram

6. ELECTRICAL CHARACTERISTICS

T_A=25°C, V_{CC}=5V/3.3V, C_L=0.47nF, C_{VCC}=100nF(Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ.	Max.
Rated Current	I_{PN}	A	ACS772XCB-050U-XXX-T	0	/	50
			ACS772XCB-050B-XXX-T	-50	/	50
			ACS77xXCB-100U-XXX-T	0	/	100
			ACS77xXCB-100B-XXX-T	-100	/	100
			ACS77xXCB-150U-XXX-T	0	/	150
			ACS77xXCB-150B-XXX-T	-150	/	150
			ACS77xECB-200U-XXX-T	0	/	200
			ACS77xECB-200B-XXX-T	-200	/	200
			ACS77xECB-250U-XXX-T	0	/	250
			ACS77xECB-250B-XXX-T	-250	/	250
			ACS77xECB-300U-XXX-T	0	/	300
			ACS77xECB-300B-XXX-T	-300	/	300
			ACS77xECB-400U-XXX-T	0	/	400
			ACS77xECB-400B-XXX-T	-400	/	400
Supply Voltage	V_{CC}	V	ACS773=3.3	3	3.3	3.6
			ACS772=5.0	4.5	5	5.5
Supply Current[Note1]	I_{CC}	mA	ACS773=3.3	6	6.5	12
			ACS772=5.0	6	7.5	12
Primary Conductor Resistance[Note1]	R_P	mΩ	/	/	0.1	/
Power-On Time[Note2]	T_{PO}	ms	Chip power-on（V_{CC}>3.0V）, V_{OUT} stable time	/	0.8	/
Rise time	T_R	μs	/	/	0.4	/
Propagation Delay	T_{PROP}	μs	/	/	0.5	/
Response Time	$T_{RESPONSE}$	μs	/	/	1.5	/
Output Capacitive Load[Note2]	C_L	nF	V_{OUT} -V_{GND}	/	0.47	10
Output Resistive Load[Note2]	R_L	kΩ	/	4.7	/	/
DC Output Resistance[Note2]	R_{OUT}	Ω	/	/	1	/
Undervoltage-Lockout[Note1]	UVLOD	V	Undervoltage protection rising threshold	/	2.3	/
	UVLOE	V	Undervoltage protection drop threshold	/	2.1	/
Undervoltage-Lockout[Note1]	T_{UVLOD}	μs	Undervoltage protection rise time	/	500	/
	T_{UVLOE}	μs	Undervoltage protection drop time	/	50	/
Output Voltage Range	V_S	V	R_L=10kΩ to V_{CC} or GND	0.1	/	V_{CC}-0.1
Internal Bandwidth	BW	kHz	200A range, -3dB small signal measurement	/	250	/
Sensitivity Symmetry Error	E_{SYM}	%	/	-0.1	±0.01	0.1
Ratiometric Output Sensitivity Error[Note1]	S_{ERR}	%	V_{CC}=3.15~3.45V	-0.5	0	0.5
			V_{CC}=4.75~5.25V	-0.5	0	0.5
Nonlinearity[Note1]	E_{LIN}	%	0~200A	-0.1	0.02	0.1
Sensitivity Temperature Drift [Note1]	dS_{ERR}	%	T_A=-40°C ~ 125°C	-1.0	±0.2	1.0
Offset Temperature Drift[Note1]	$V_{IOUT(Q)TC}$	mV	T_A=-40°C ~ 125°C	-5	1	5

Note1: These parameters are obtained from laboratory testing with 3σ data.
Note2: These parameters are guaranted by design.

ACS77xXCB-050U-XXX-T/ACS77xXCB-050B-XXX-T PERFORMANCE CHARACTERISTICS

T_A=25°C, V_{CC}=5V/3.3V, C_L=0.47nF, C_{VCC}=100nF(Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ.[Note1]	Max.
NOMINAL PERFORMANCE						
Sensitivity (V_{CC}=3.3V)	Sens	mV/A	$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS773xCB-050U-XXX-T	/	V_{CC}*52.8 /3.3	/
			$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS773xCB-050B-XXX-T	/	V_{CC}*26.4 /3.3	/
Sensitivity (V_{CC}=5V)	Sens	mV/A	$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS772xCB-050U-XXX-T	/	V_{CC}*80/5	/
			$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS772xCB-050B-XXX-T	/	V_{CC}*40/5	/
Zero Current Output Voltage	$V_{IOUT(Q)}$	V	Unipolar, I_{PR}=0A	/	V_{CC}*0.1	/
			Bipolar, I_{PR}=0A	/	V_{CC}*0.5	/
ACCURACY PERFORMANCE						
Noise	V_N	mVrms	/	/	7	/
Magnetic Offset Error	I_{ERROM}	mV	I_P=0A， After I_{PRmax}	/	0.4	/
		mA	I_P=0A， After I_{PRmax}	/	10	/
Total Output Error	E_{TOT}	%	I_P=I_{PRmax}	-1	±0.2	1
TOTAL OUTPUT ERROR COMPONENTS: $E_{TOT} = (V_{IOUT}-V_{IOUT\,Ideal})/(Sens_{Ideal} \times I_P) \times 100\%$						
Sensitivity Error	E_{SENS}	%	I_P=I_{PRmax}, T_A=-40°C ~ 125°C	-1.0	±0.5	1.0
Offset Error	V_{OE}	mV	I_P= 0 A， T_A=-40°C ~ 125°C	-5	±1	5
			I_P= 0 A， T_A=25°C	-3	±1	3
LIFETIME DRIFT CHARACTERISTICS						
Sensitivity Error Lifetime Drift	E_{SENS_drift}	%	After reliability test, T_A=25°C	/	±1.4	/
Total Output Error Lifetime Drift	E_{TOT_drift}	%	After reliability test, T_A=25°C	/	±1.4	/

Note: These parameters are obtained from laboratory testing with 3σ data.

ACS77xXCB-100U-XXX-T/ACS77xXCB-100B-XXX-TPERFORMANCE CHARACTERISTIC

T_A=25°C, V_{CC}=5V/3.3V, C_L=0.47nF, C_{VCC}=100nF(Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ.[Note1]	Max.
NOMINAL PERFORMANCE						
Sensitivity (V_{CC}=3.3V)	Sens	mV/A	$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS773XCB-100U-XXX-T	/	V_{CC}*26.4 /3.3	/
			$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS773XCB-100B-XXX-T	/	V_{CC}*13.2 /3.3	/
Sensitivity (V_{CC}=5V)	Sens	mV/A	$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS772XCB-100U-XXX-T	/	V_{CC}*40/5	/
			$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS772XCB-100B-XXX-T	/	V_{CC}*20/5	/
Zero Current Output Voltage	$V_{IOUT(Q)}$	V	Unipolar, I_{PR}=0A	/	V_{CC}*0.1	/
			Bipolar, I_{PR}=0A	/	V_{CC}*0.5	/
ACCURACY PERFORMANCE						
Noise	V_N	mVrms	/	/	5	/
Magnetic Offset Error	I_{ERROM}	mV	I_P=0A， After I_{PRmax}	/	0.6	/
		mA	I_P=0A， After I_{PRmax}	/	30	/
Total Output Error	E_{TOT}	%	I_P=I_{PRmax}	-1.4	±0.5	1.4
TOTAL OUTPUT ERROR COMPONENTS: $E_{TOT} = (V_{IOUT}-V_{IOUT\ Ideal})/(Sens_{Ideal}\times I_P)\times 100\%$						
Sensitivity Error	E_{SENS}	%	I_P=I_{PRmax}, T_A=25°C ~ 125°C	-1.2	±0.5	1.2
Offset Error	V_{OE}	mV	I_P=0A, T_A=25°C ~ 125°C	-5	±1	5
			I_P=0A, T_A=25°C	-3	±1	3
			I_P=0 A, T_A=-40°C ~ 125°C	-10	±0.2	10
LIFETIME DRIFT CHARACTERISTICS						
Sensitivity Error Lifetime Drift	E_{SENS_drift}	%	After reliability test, T_A=25°C	/	±1.4	/
Total Output Error Lifetime Drift	E_{TOT_drift}	%	After reliability test, T_A=25°C	/	±1.4	/

Note: These parameters are obtained from laboratory testing with 3σ data.

ACS77xXCB-150U-XXX-T/ACS77xXCB-150B-XXX-T PERFORMANCE CHARACTERISTIC

T_A=25°C, V_{CC}=5V/3.3V, C_L=0.47nF, C_{VCC}=100nF(Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ.[Note1]	Max.
NOMINAL PERFORMANCE						
Sensitivity (V_{CC}=3.3V)	Sens	mV/A	$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS773XCB-150U-XXX-T	/	V_{CC}*17.6 /5	/
			$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS773XCB-150B-XXX-T	/	V_{CC}*8.8 /5	/
Sensitivity (V_{CC}=5V)	Sens	mV/A	$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS772XCB-150U-XXX-T	/	V_{CC}*26.66 /5	/
			$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS772XCB-150B-XXX-T	/	V_{CC}*13.33 /5	/
Zero Current Output Voltage	$V_{IOUT(Q)}$	V	Unipolar, I_{PR}=0A	/	V_{CC}*0.1	/
			Bipolar, I_{PR}=0A	/	V_{CC}*0.5	/
ACCURACY PERFORMANCE						
Noise	V_N	mVrms	/	/	5	/
Magnetic Offset Error	I_{ERROM}	mV	I_P=0A， After I_{PRmax}	/	0.8	/
		mA	I_P=0A， After I_{PRmax}	/	60	/
Total Output Error	E_{TOT}	%	I_P=I_{PRmax}	-1.5	±0.5	1.5
TOTAL OUTPUT ERROR COMPONENTS: $E_{TOT} = (V_{IOUT}-V_{IOUT\,Ideal})/(Sens_{Ideal}\times I_P)\times 100\%$						
Sensitivity Error	E_{SENS}	%	I_P=I_{PRmax}, T_A=-40°C ~ 125°C	-1.2	±0.5	1.2
Offset Error	V_{OE}	mV	I_P= 0 A， T_A=-40°C ~ 125°C	-5	±1	5
			I_P= 0 A， T_A=25°C	-3	±1	3
LIFETIME DRIFT CHARACTERISTICS						
Sensitivity Error Lifetime Drift	E_{SENS_drift}	%	After reliability test, T_A=25°C	/	±1.4	/
Total Output Error Lifetime Drift	E_{TOT_drift}	%	After reliability test, T_A=25°C	/	±1.4	/

Note: These parameters are obtained from laboratory testing with 3σ data.

ACS77xECB-200U-XXX-T/ACS77xECB-200B-XXX-T PERFORMANCE CHARACTERISTIC

T_A=25℃, V_{CC}=5V/3.3V, C_L=0.47nF, C_{VCC}=100nF(Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ.[Note1]	Max.
NOMINAL PERFORMANCE						
Sensitivity (V_{CC}=3.3V)	Sens	mV/A	$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS773LCB-200U-XXX-T	/	V_{CC}*13.2 /3.3	/
			$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS773LCB-200B-XXX-T	/	V_{CC}*6.6 /3.3	/
Sensitivity (V_{CC}=5V)	Sens	mV/A	$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS772LCB-200U-XXX-T	/	V_{CC}*20/5	/
			$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS772LCB-200B-XXX-T	/	V_{CC}*10/5	/
Zero Current Output Voltage	$V_{IOUT(Q)}$	V	Unipolar, I_{PR}=0A	/	V_{CC}*0.1	/
			Bipolar, I_{PR}=0A	/	V_{CC}*0.5	/
ACCURACY PERFORMANCE						
Noise	V_N	mVrms	/	/	5	/
Magnetic Offset Error	I_{ERROM}	mV	I_P=0A， After I_{PRmax}	/	1.2	/
		mA	I_P=0A， After I_{PRmax}	/	120	/
Total Output Error	E_{TOT}	%	I_P=I_{PRmax}	-1.5	±0.5	1.5
TOTAL OUTPUT ERROR COMPONENTS: $E_{TOT} = (V_{IOUT}-V_{IOUT\ Ideal})/(Sens_{Ideal}\times I_P)\times 100\%$						
Sensitivity Error	E_{SENS}	%	I_P=I_{PRmax}, T_A=-40℃ ~ 125℃	-1.3	±0.5	1.3
Offset Error	V_{OE}	mV	I_P= 0 A， T_A=-40℃ ~ 125℃	-5	±1	5
			I_P= 0 A， T_A=25℃	-3	±1	3
LIFETIME DRIFT CHARACTERISTICS						
Sensitivity Error Lifetime Drift	E_{SENS_drift}	%	After reliability test, T_A=25℃	/	±1.4	/
Total Output Error Lifetime Drift	E_{TOT_drift}	%	After reliability test, T_A=25℃	/	±1.4	/

Note: These parameters are obtained from laboratory testing with 3σ data.

ACS77xECB-250U-XXX-T/ACS77xECB-250B-XXX-T PERFORMANCE CHARACTERISTIC

T_A=25°C, V_{CC}=5V/3.3V, C_L=0.47nF, C_{VCC}=100nF(Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ.[Note1]	Max.
NOMINAL PERFORMANCE						
Sensitivity (V_{CC}=3.3V)	Sens	mV/A	I_{PRmin} < I_{PR} < I_{PRmax} ACS773ECB-200U-XXX-T	/	V_{CC}*13.2 /3.3	/
			I_{PRmin} < I_{PR} < I_{PRmax} ACS773ECB-200B-XXX-T	/	V_{CC}*6.6 /3.3	/
Sensitivity (V_{CC}=5V)	Sens	mV/A	I_{PRmin} < I_{PR} < I_{PRmax} ACS772ECB-200U-XXX-T	/	V_{CC}*20/5	/
			I_{PRmin} < I_{PR} < I_{PRmax} ACS772ECB-200B-XXX-T	/	V_{CC}*10/5	/
Zero Current Output Voltage	$V_{IOUT(Q)}$	V	Unipolar, I_{PR}=0A	/	V_{CC}*0.1	/
			Bipolar, I_{PR}=0A	/	V_{CC}*0.5	/
ACCURACY PERFORMANCE						
Noise	V_N	mVrms	/	/	5	/
Magnetic Offset Error	I_{ERROM}	mV	I_P=0A， After I_{PRmax}	/	1.2	/
		mA	I_P=0A， After I_{PRmax}	/	120	/
Total Output Error	E_{TOT}	%	I_P=I_{PRmax}	-1.5	±0.5	1.5
TOTAL OUTPUT ERROR COMPONENTS: $E_{TOT} = (V_{IOUT}-V_{IOUT\,Ideal})/(Sens_{Ideal} \times I_P) \times 100\%$						
Sensitivity Error	E_{SENS}	%	I_P=I_{PRmax}, T_A=-40°C ~ 125°C	-1.3	±0.5	1.3
Offset Error	V_{OE}	mV	I_P= 0 A， T_A=-40°C ~ 125°C	-5	±1	5
			I_P= 0 A， T_A=25°C	-3	±1	3
LIFETIME DRIFT CHARACTERISTICS						
Sensitivity Error Lifetime Drift	E_{SENS_drift}	%	After reliability test, T_A=25°C	/	±1.4	/
Total Output Error Lifetime Drift	E_{TOT_drift}	%	After reliability test, T_A=25°C	/	±1.4	/

Note: These parameters are obtained from laboratory testing with 3σ data.

ACS77xECB300U-XXX-T/ACS77xECB-300B-XXX-T PERFORMANCE CHARACTERISTIC

T_A=25°C, V_{CC}=5V/3.3V, C_L=0.47nF, C_{VCC}=100nF(Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ.[Note1]	Max.
NOMINAL PERFORMANCE						
Sensitivity (V_{CC}=3.3V)	Sens	mV/A	$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS77xECB-300U-XXX-T	/	V_{CC}*8.8 /5	/
			$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS77xECB-300B-XXX-T	/	V_{CC}*4.4 /5	/
Sensitivity (V_{CC}=5V)	Sens	mV/A	$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS77xECB-300U-XXX-T	/	V_{CC}*13.33 /5	/
			$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS77xECB-300B-XXX-T	/	V_{CC}*6.67 /5	/
Zero Current Output Voltage	$V_{IOUT(Q)}$	V	Unipolar, I_{PR}=0A	/	V_{CC}*0.1	/
			Bipolar, I_{PR}=0A	/	V_{CC}*0.5	/
ACCURACY PERFORMANCE						
Noise	V_N	mVrms	/	/	5	/
Magnetic Offset Error	I_{ERROM}	mV	I_P=0A， After I_{PRmax}	/	1.6	/
		mA	I_P=0A， After I_{PRmax}	/	160	/
Total Output Error	E_{TOT}	%	I_P=I_{PRmax}	-1.8	±0.5	1.8
TOTAL OUTPUT ERROR COMPONENTS: $E_{TOT} = (V_{IOUT}-V_{IOUT\,Ideal})/(Sens_{Ideal} \times I_P) \times 100\%$						
Sensitivity Error	E_{SENS}	%	I_P=I_{PRmax}, T_A=-40°C ~ 125°C	-1.4	±0.5	1.4
Offset Error	V_{OE}	mV	I_P= 0 A， T_A=-40°C ~ 125°C	-5	±1	5
			I_P= 0 A， T_A=25°C	-5	±1	5
LIFETIME DRIFT CHARACTERISTICS						
Sensitivity Error Lifetime Drift	E_{SENS_drift}	%	After reliability test, T_A=25°C	/	±1.4	/
Total Output Error Lifetime Drift	E_{TOT_drift}	%	After reliability test, T_A=25°C	/	±1.4	/

Note: These parameters are obtained from laboratory testing with 3σ data.

ACS77xECB-400U-XXX-T/ACS77xECB-400B-XXX-T PERFORMANCE CHARACTERISTIC

T_A=25°C, V_{CC}=5V/3.3V, C_L=0.47nF, C_{VCC}=100nF(Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ.[Note1]	Max.
NOMINAL PERFORMANCE						
Sensitivity (V_{CC}=3.3V)	Sens	mV/A	$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS773ECB-400U-XXX-T	/	V_{CC}*6.6 /3.3	/
			$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS773ECB-400B-XXX-T	/	V_{CC}*3.3 /3.3	/
Sensitivity (V_{CC}=5V)	Sens	mV/A	$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS772ECB-400U-XXX-T	/	V_{CC}*10/5	/
			$I_{PRmin} < I_{PR} < I_{PRmax}$ ACS772ECB-400B-XXX-T	/	V_{CC}*5/5	/
Zero Current Output Voltage	$V_{IOUT(Q)}$	V	Unipolar, I_{PR}=0A	/	V_{CC}*0.1	/
			Bipolar, I_{PR}=0A	/	V_{CC}*0.5	/
ACCURACY PERFORMANCE						
Noise	V_N	mVrms	/	/	5	/
Magnetic Offset Error	I_{ERROM}	mV	I_P=0A， After I_{PRmax}	/	2	/
		mA	I_P=0A， After I_{PRmax}	/	200	/
Total Output Error	E_{TOT}	%	$I_P=I_{PRmax}$	-2.2	±0.5	2.2
TOTAL OUTPUT ERROR COMPONENTS: $E_{TOT} = (V_{IOUT}-V_{IOUT Ideal})/(Sens_{Ideal}\times I_P)\times 100\%$						
Sensitivity Error	E_{SENS}	%	$I_P=I_{PRmax}$, T_A=-40°C ~ 125°C	-1.5	±0.5	1.5
Offset Error	V_{OE}	mV	I_P= 0 A， T_A=-40°C ~ 125°C	-5	±1	5
			I_P= 0 A， T_A=25°C	-5	±1	5
LIFETIME DRIFT CHARACTERISTICS						
Sensitivity Error Lifetime Drift	E_{SENS_drift}	%	After reliability test, T_A=25°C	/	±1.4	/
Total Output Error Lifetime Drift	E_{TOT_drift}	%	After reliability test, T_A=25°C	/	±1.4	/

Note: These parameters are obtained from laboratory testing with 3σ data.

7. PARAMETERS DESCRIPTION

7.1 Sensitivity Sens

The change in sensor IC output in response to a 1A change through the primary conductor. The sensitivity is the product of the magnetic circuit sensitivity (G/A) (1G = 0.1 mT) and the linear IC amplifier gain (mV/G). The linear IC amplifier gain is programmed at the factory to optimize the sensitivity (mV/A) for the full-scale current of the device.

7.2 Sensitivity error E_{SENS}

Sensitivity error E_{SENS} refers to the percentage deviation between the actual measured sensitivity and the ideal sensitivity.

For example, when Vcc = 5V,

E_{SENS}=（$Sens_{Meas（5V）}$ -$Sens_{Ideal（5V）}$） /$Sens_{Ideal（5V）}$ ×100%

7.3 The sensitivity temperature drift of dS_{ERR}

Over the entire operating temperature range is defined as:

$dS_{ERR}=(Sens_{(TA)}-Sens_{(25°C)})/Sens_{(25°C)}\times100\%$

7.4 Saturation output voltage $V_{OUT\text{-}SAT(H/L)}$

$V_{OUT\text{-}SAT(H)}$ is the maximum output of the chip under the positive current.

$V_{OUT\text{-}SAT(L)}$ is the maximum output of the chip under negative current.

7.5 Zero current output voltage $V_{IOUT(Q)}$

I_p=0, Output voltage of the sensor $V_{IOUT(Q)}$.

For bipolar devices, the output voltage $V_{IOUT(Q)}=V_{CC}\times0.5$

, For unipolar devices, the output voltage $V_{IOUT(Q)}=V_{CC}\times0.1$

Variation in $V_{IOUT(Q)}$ can be attributed to the resolution of the linear IC quiescent voltage trim and thermal drift.

7.6 Offset voltage V_{OE}

Used to measure the influence of external non-magnetic factors. Under zero-current conditions, in ratiometric output mode, it is the difference between the actual output voltage and the theoretical output voltage.

7.7 Offset temperature drift $V_{IOUT(Q)TC}$

Due to internal circuit tolerance and heat dissipation, static output voltage due to internal circuit tolerance and heat dissipation $V_{OUT(Q)}$ differential static output voltage V_{OE}. May shift with operating temperature $V_{OUT(Q)TC}$.

$V_{IOUT(Q)TC}=V_{OUT(Q)(TA)}-V_{OUT(25°C)}$

7.8 Noise V_N

Noise is the macroscopic sum of thermal noise and shot noise inside the current sensor.

Dividing the noise (mV) by the sensitivity (mV/A) gives the smallest current that the device can resolve.

7.9 Symmetry E_{SYM}

Definition: The relationship between the actual output voltage $V_{IOUT(Q)}$ and the forward half-range $V_{IOUT\text{-}POSHALF}$ and reverse half-range $V_{IOUT\text{-}NEGHALF}$ outputs.

The formula is defined as follows:

$E_{SYM}=(1-(V_{IOUT\text{-}POSHALF}-V_{IOUT(Q)})/(V_{IOUT(Q)}-V_{IOUT\text{-}NEGHALF}))\times100\%$

7.10 Nonlinearity E_{LIN}

The design output of the device varies linearly with the measured current.

Ideally, under the same supply voltage and ambient temperature conditions, the output sensitivity of the device is the same for two different current sizes I1(half scale current) and I2(full scale current). In practical application, there is a difference in sensitivity for the measurement of two different current sizes I1 and I2, and nonlinear sensitivity error E_{LIN} describes the difference digitally.

In the chip, positive current nonlinearity E_{LINPOS} and negative current nonlinearity E_{LINNEG} are defined as follows:

I_{POSx}、I_{NEGx} is positive current and negative current

$I_{POS2}=2\times I_{POS1}$

$I_{NEG2}=2\times I_{NEG1}$

$Sens_{Ix}=(V_{IOUT(Ix)}-V_{IOUT(Q)})/Ix$

$E_{LINPOS}=(1-(Sens_{IPOS2}/Sens_{IPOS1}))\times100\%$

$E_{LINNEG}=(1-(Sens_{INEG2}/Sens_{INEG1}))\times100\%$

Due to the hysteresis effect of the internal magnetic core, magnetic saturation exists at high currents. Therefore, the nonlinear error increases when the measured current exceeds 200A. [Specific reference to the sensitivity error E_{SENS}]

7. PARAMETER DESCRIPTION (CONTINUED)

7.11 Proportional output sensitivity error S_{ERR}

The proportional output sensitivity error S_{ERR} is defined based on the supply voltage Vcc:

$$S_{ERR} = (1-((Sens_{Vcc}/Sens_{5V})/(Vcc/5V)))\times 100\%$$

$$S_{ERR} = (1-((Sens_{Vcc}/Sens_{5V})/(Vcc/3.3V)))\times 100\%$$

Proportional output error of static voltage

Error between the ratio of V_{out1} and V_{out0} value at V_{CC}=5V and the theoretical ratio when Vcc varies from 4.5V to 5.5V, or at V_{CC}=3.3V and the theoretical ratio when V_{CC} varies from 3.0V to 3.6V

$$V_{0zero} = (1-((Vout1/Vout0)/(Vcc/5V)))\times 100\%$$

$$V_{0zero} = (1-((Vout1/Vout0)/(Vcc/3.3V)))\times 100\%$$

7.12 Total output error E_{TOT}

The difference between the current measurement from the sensor IC and the actual current (I_P), relative to the actual current. This is equivalent to the difference between the ideal output voltage and the actual output voltage,divided by the ideal sensitivity, relative to the current flowing through the primary conduction path:

$$E_{TOT} = (V_{IOUT} - V_{IOUTIdeal})/(Sens_{Ideal}\times I_P)\times 100\%$$

At relatively large current, E_{TOT} is mainly sensitivity error, while at relatively small current, E_{TOT} is mainly zero current sensitivity error voltage V_{OE}. As I_P approaches zero, E_{TOT} approaches infinity due to the bias voltage.

$$V_{IOUTIdeal} = V_{IOUT(Q)} + (Sens_{Ideal}\times I_P)$$

7.13 Dynamic response characteristic

7.13.1 Power-on time T_{PO}

When the supply is ramped to its operating voltage, the device requires a finite amount of time to power its internal components before responding to an input magnetic field. Power-On Time (T_{PO}) is defined as the time interval between the power supply has reached its minimum specified operating voltage (V_{UVLOD}) and the sensor output has settled within ±10% of its steady-state value under an applied magnetic field.

7.13.2 Rise time T_r

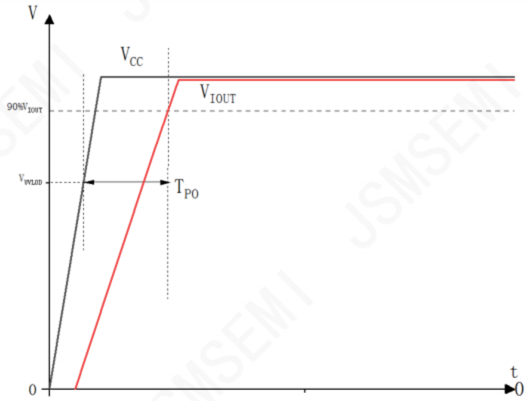
The time interval between the sensor output voltage reaches 10% of its full-scale value and it reaches 90% of its full-scale value.

7.13.3 Propagation delay T_{PROP}

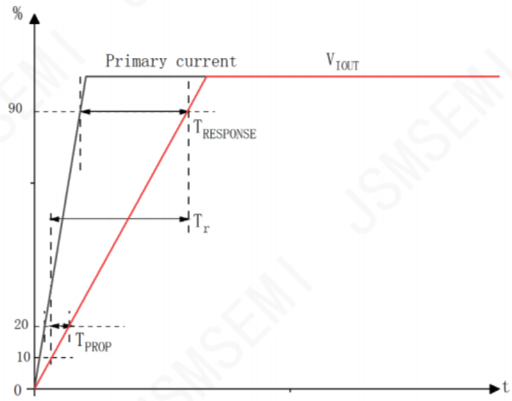
The time interval between the sensed primary current reaches 20% of its final value and the sensor output voltage reaches 20% of its full-scale value.

7.13.4 Response Time $T_{RESPONSE}$

The time interval between the sensed primary current reaches 90% of its final value and the sensor output voltage reaches 90% of its full-scale value.



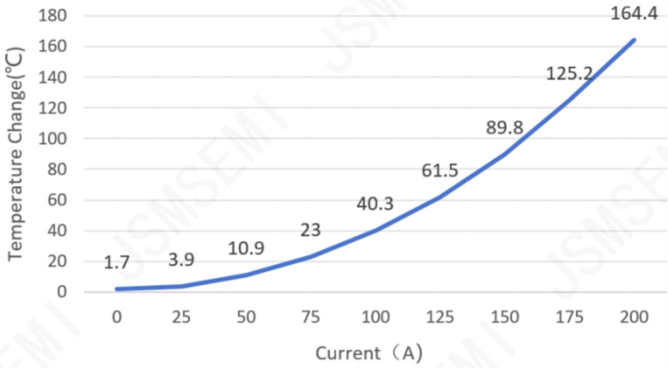
Power-on Time T_{PO}



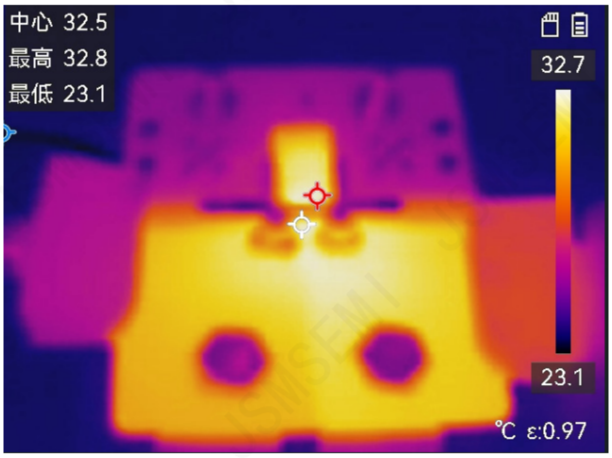
Dynamic Response Time Parameters

8. THERMAL EVALUATION

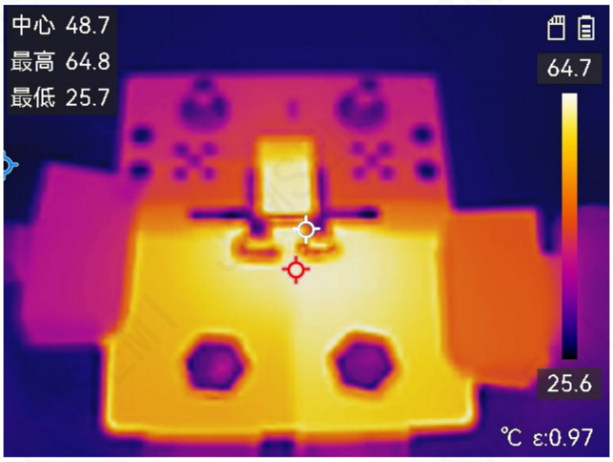
The product will naturally heat up during useing, and the thermal curve performance of this device was measured in a windless environment at 25±3°C in application laboratory using.



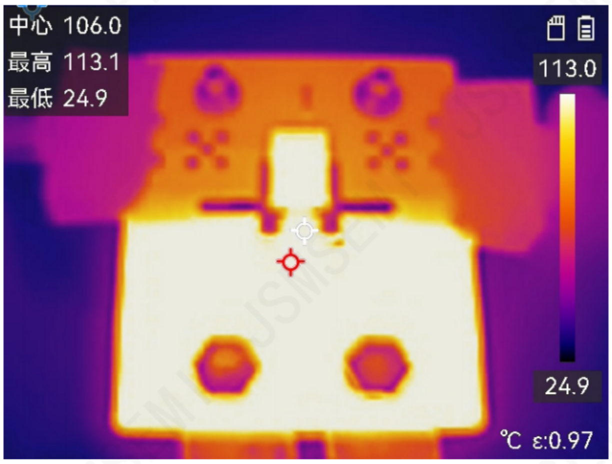
Thermal curve



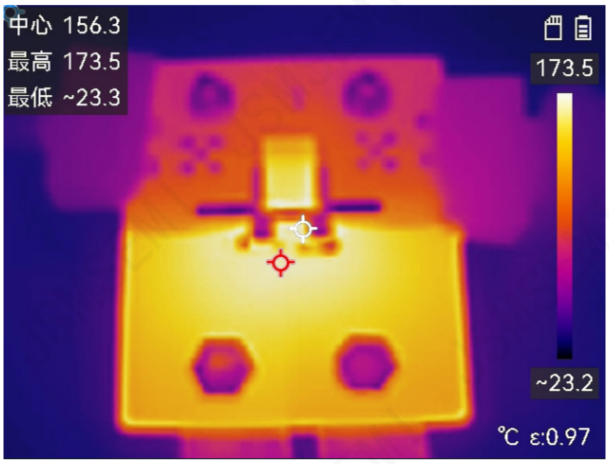
Thermal performance of 50A



Thermal performance of 100A



Thermal performance of 150A

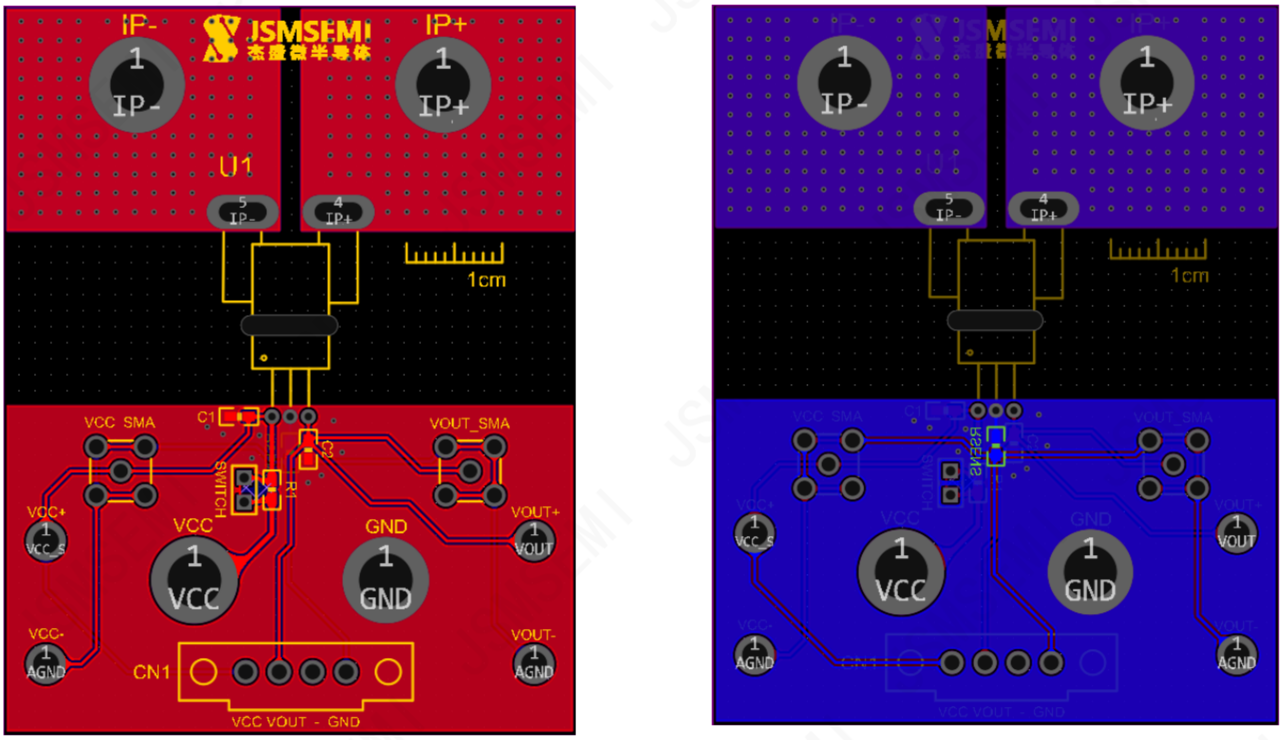


Thermal performance of 200A

9. LAYOUT GUIDELINES

Test information of the demo board

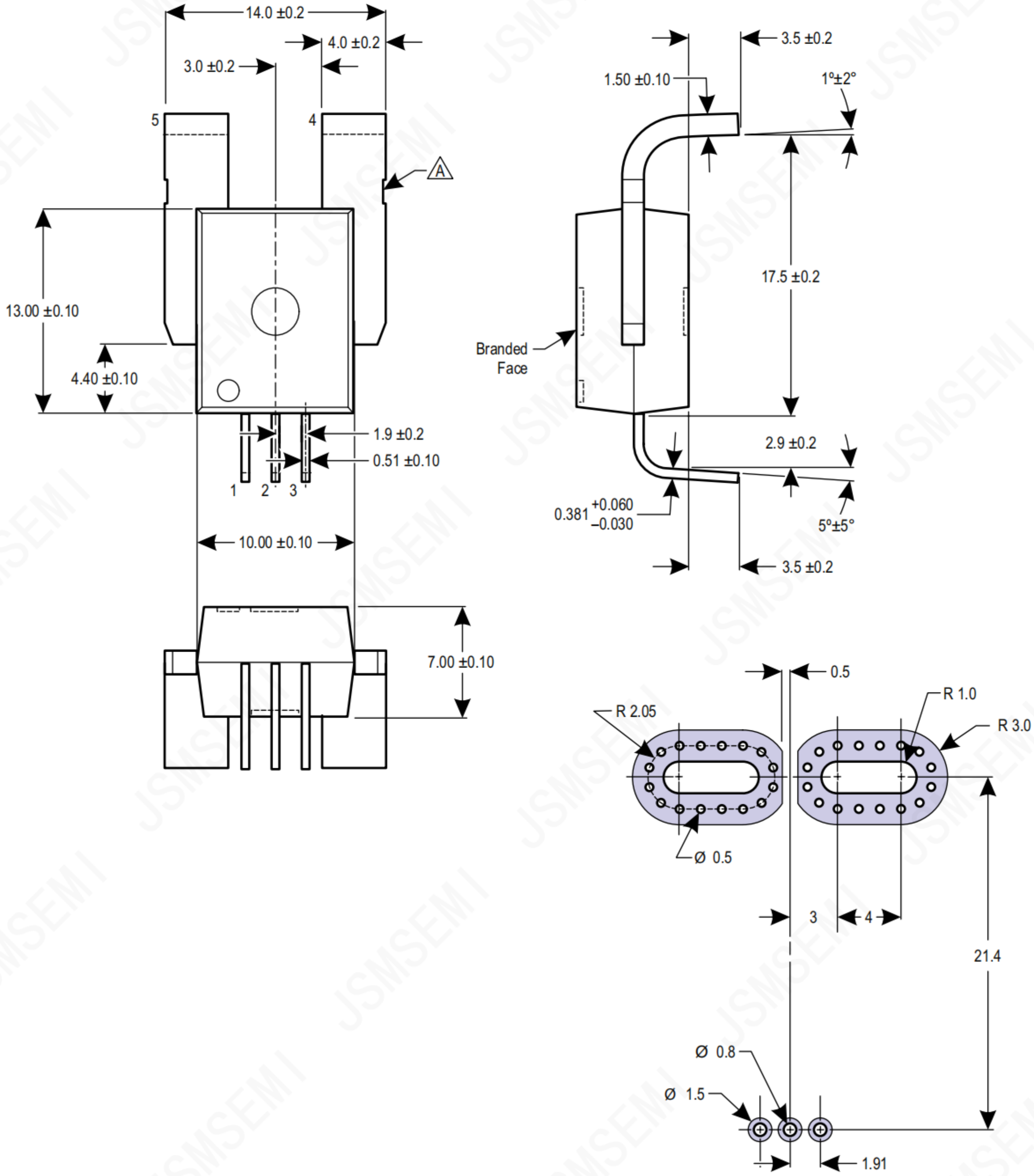
The IP heat dissipation copper thickness of the demo board is 4oz,the heat dissipation area is 2×986 (mm^2),the test wiring uses Kelvin sense to avoid the voltage drop caused by GND impedance, and capacitors should set to the chip pins as close as possible.C_L=0.47nF, C_{VCC}=100nF



FigDemo board

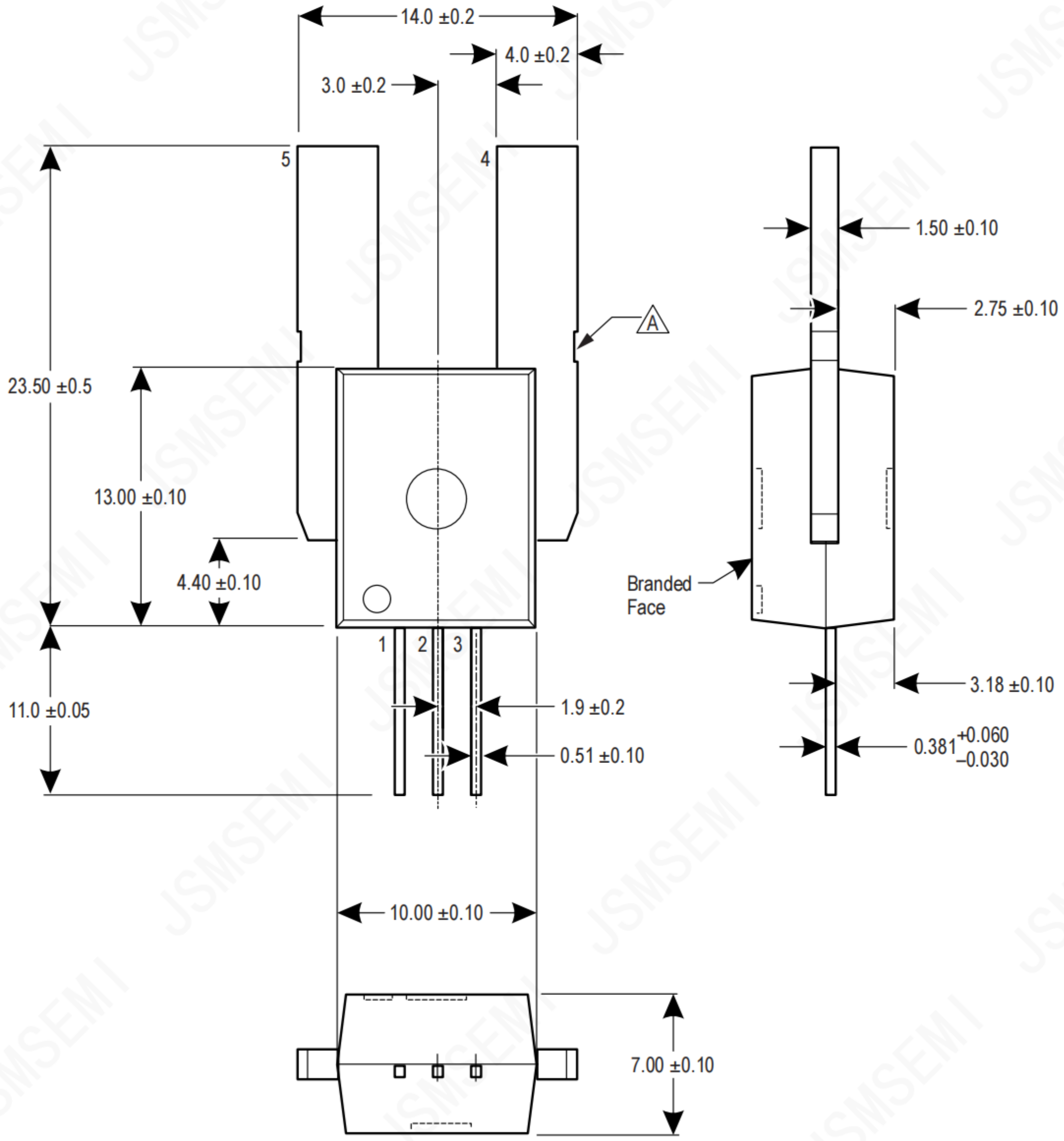
10. PACKAGE OUTLINE(CONTINUED)

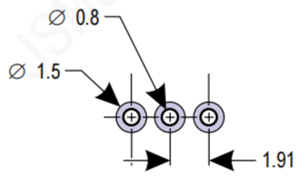
PFF



PCB Layout Reference View

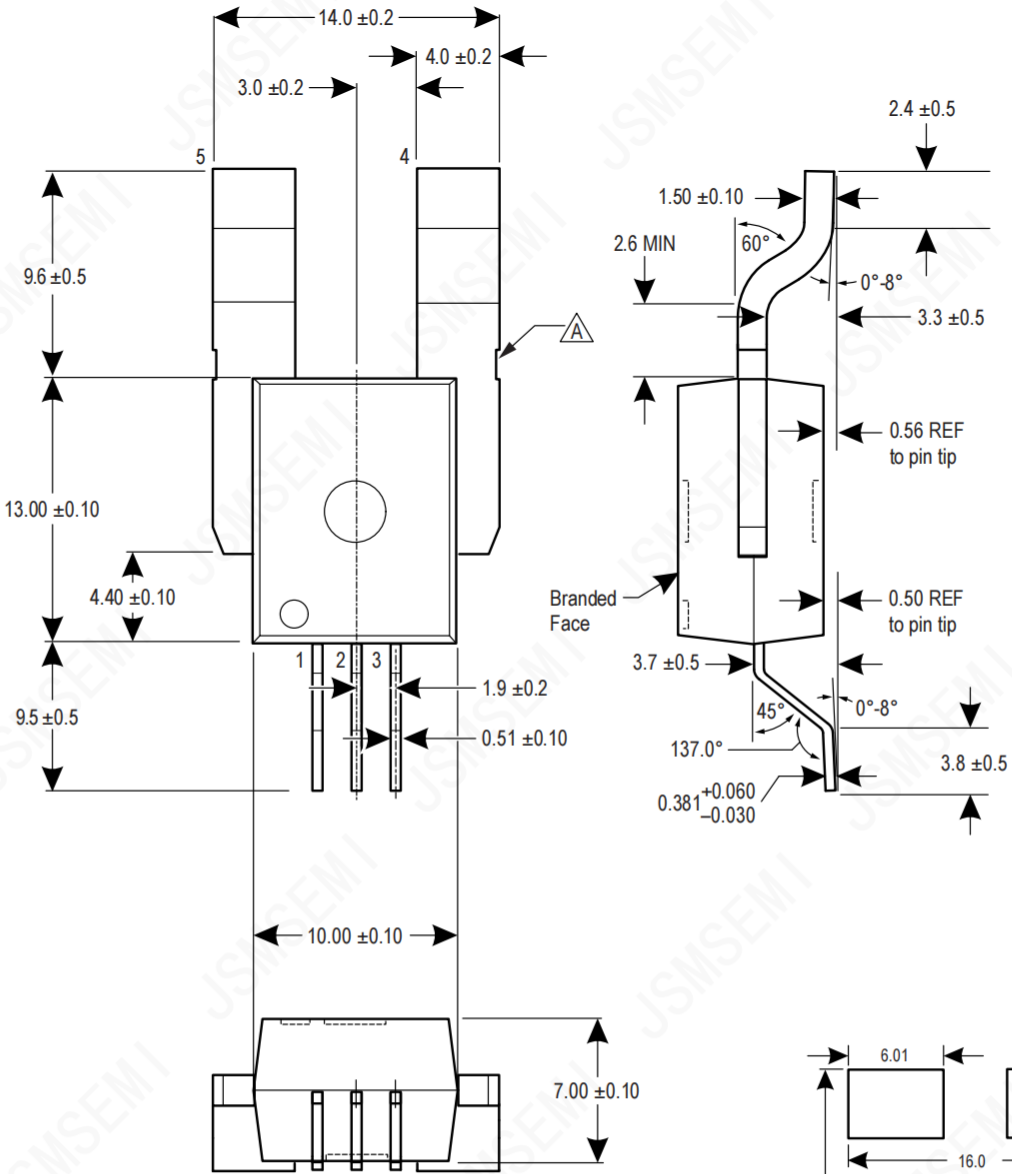
PSS

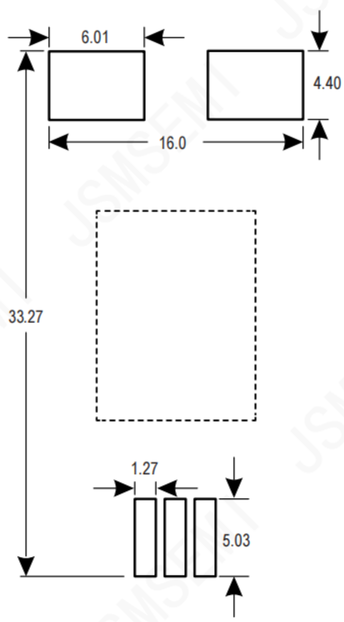




PCB Layout Reference View

SMT





PCB Layout Reference View