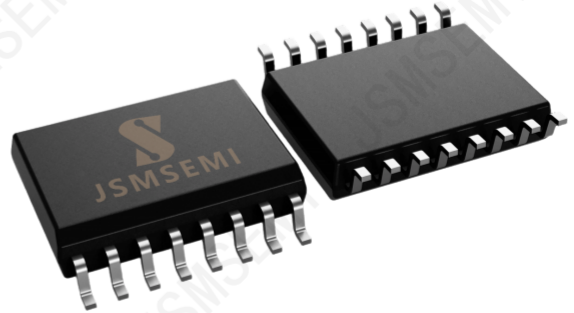


DESCRIPTION

The ACS72x current sensor IC is an economical and precise solution for AC or DC current sensing in industrial, commercial, and communication systems. The small package is ideal for space-constrained applications while also saving costs due to reduced board area. Typical applications include motor control, load detection and management, switched-mode power supplies, and overcurrent fault protection.

The device 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 integrated Hall IC and converted into a proportional voltage. The current is sensed differentially in order to reject common-mode fields, improving accuracy in magnetically noisy environments. The inherent device accuracy is optimized through the close proximity of the magnetic field to the Hall transducer. A precise, proportional voltage is provided by the low-offset, chopper-stabilized Hall IC, which includes digital temperature compensation, resulting in extremely accurate performance over temperature. The output of the device has a positive slope when an increasing current flows through the primary copper conduction path (from pins 1 through 4, to pins 5 through 8), which is the path used for current sensing. The internal resistance of this conductive path is 0.5 mΩ typical, providing low power loss.

The terminals of the conductive path are electrically isolated from the sensor leads (pins 9 through 16). This allows the ACS72x current sensor IC to be used in high-side current sense applications without the use of high-side differential amplifiers or other costly isolation techniques. In addition, ACS72x series products have passed ROHS and other certifications.



High Anti-interference, High Insulation

- Differential hall effectively resists external magnetic field interference
- Isolated voltage: 5000Vrms
- Compatible with 3.3V/5V power supply
- Ratiometric/fixed output

TYPICAL APPLICATIONS

- White Goods
- Solar Energy
- Power supplies
- Motor Control
- EV charging
- Industrial AC/DC

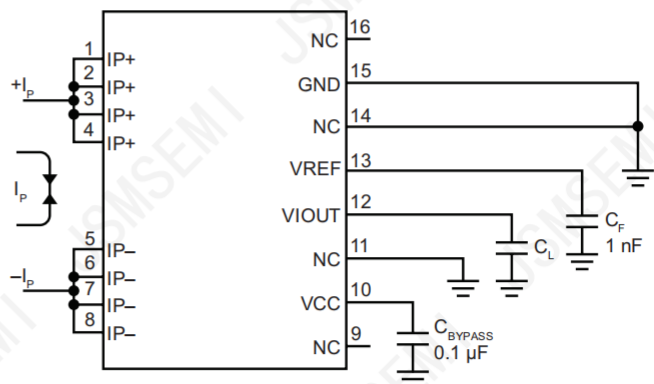
FEATURES

High Accuracy、Large Current

- 0~100A Current sensor
- Low primary conductor resistance: 0.5mΩ
- Typical V_{OE} temperature drift: $\pm 5\text{mV}$
- Typical sensitivity temperature drift: $\pm 0.5\%$
- Typical linearity error: $\pm 0.1\%$

High Bandwidth, Fast Response

- Typical bandwidth: 250kHz
- Typical response time: 1.6μs



Typical Application

SELECTION GUIDE

Part Number	Output Mode	I _{PR} (A)	Sensitivity (mV/A)		Rating MSL	Temperature Operating	Packing
			V _{CC} =3.3V(725)	V _{CC} =5V(724)			
ACS72xLMATR-10AB-T	Ratiometric Output Mode	±10	132	200	3	-40°C to 150°C	Tape and reel, 1000/2000 pieces per reel
ACS72xLMATR-20AB-T		±20	66	100			
ACS72xLMATR-30AB-T		±30	44	66.7			
ACS72xLMATR-40AB-T		±40	33	50			
ACS72xLMATR-50AB-T		±50	26.4	40			
ACS72xLMATR-65AB-T		±65	20.3	30.8			
ACS72xLMATR-75AB-T		±80	16.5	25			
ACS72xLMATR-100AB-T		±100	13.2	20			
ACS72xLMATR-10AU-T		10	264	400			
ACS72xLMATR-20AU-T		20	132	200			
ACS72xLMATR-30AU-T		30	88	133.3			
ACS72xLMATR-40AU-T		40	66	100			
ACS72xLMATR-50AU-T		50	50.8	80			
ACS72xLMATR-65AU-T		65	10	15.4			

Note: Continuous testing at 25°C supports 50A, if the test range increases or the ambient temperature rises, please refer to the derating curve in application manuals to take heat dissipation measures. Take 30A bipolar as an example, 20A and above have unipolar output mode with 5V supply, new range will be added without notice.

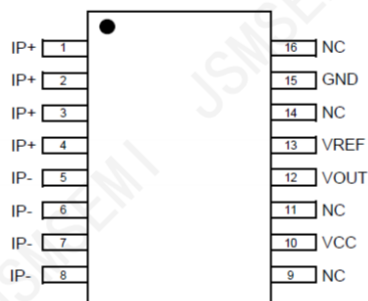
Order Information

Order number	Package	Marking	Operation Temperature Range	MSL Grade	Ship, Quantity	Green
ACS724LMATR-10AB-T-JSM	SOP-16W	JSM724-10A	-40 to 150°C	3	TR&1000/2000	Rohs
ACS724LMATR-20AB-T-JSM	SOP-16W	JSM724-20A	-40 to 150°C	3	TR&1000/2000	Rohs
ACS724LMATR-30AB-T-JSM	SOP-16W	JSM724-30A	-40 to 150°C	3	TR&1000/2000	Rohs
ACS724LMATR-40AB-T-JSM	SOP-16W	JSM724-40A	-40 to 150°C	3	TR&1000/2000	Rohs
ACS724LMATR-50AB-T-JSM	SOP-16W	JSM724-50A	-40 to 150°C	3	TR&1000/2000	Rohs
ACS724LMATR-65AB-T-JSM	SOP-16W	JSM724-65A	-40 to 150°C	3	TR&1000/2000	Rohs
ACS724LMATR-80AB-T-JSM	SOP-16W	JSM724-80A	-40 to 150°C	3	TR&1000/2000	Rohs
ACS724LMATR-100AB-T-JSM	SOP-16W	JSM724-100A	-40 to 150°C	3	TR&1000/2000	Rohs
ACS724LMATR-10AU-T-JSM	SOP-16W	JSM724-10U	-40 to 150°C	3	TR&1000/2000	Rohs
ACS724LMATR-20AU-T-JSM	SOP-16W	JSM724-20U	-40 to 150°C	3	TR&1000/2000	Rohs
ACS724LMATR-30AU-T-JSM	SOP-16W	JSM724-30U	-40 to 150°C	3	TR&1000/2000	Rohs
ACS724LMATR-40AU-T-JSM	SOP-16W	JSM724-40U	-40 to 150°C	3	TR&1000/2000	Rohs
ACS724LMATR-50AU-T-JSM	SOP-16W	JSM724-50U	-40 to 150°C	3	TR&1000/2000	Rohs
ACS724LMATR-65AU-T-JSM	SOP-16W	JSM724-65U	-40 to 150°C	3	TR&1000/2000	Rohs
ACS725LMATR-10AB-T-JSM	SOP-16W	JSM725-10B	-40 to 150°C	3	TR&1000/2000	Rohs
ACS725LMATR-20AB-T-JSM	SOP-16W	JSM725-20B	-40 to 150°C	3	TR&1000/2000	Rohs
ACS725LMATR-30AB-T-JSM	SOP-16W	JSM725-30B	-40 to 150°C	3	TR&1000/2000	Rohs
ACS725LMATR-40AB-T-JSM	SOP-16W	JSM725-40B	-40 to 150°C	3	TR&1000/2000	Rohs
ACS725LMATR-50AB-T-JSM	SOP-16W	JSM725-50B	-40 to 150°C	3	TR&1000/2000	Rohs
ACS725LMATR-65AB-T-JSM	SOP-16W	JSM725-65B	-40 to 150°C	3	TR&1000/2000	Rohs
ACS725LMATR-80AB-T-JSM	SOP-16W	JSM725-80B	-40 to 150°C	3	TR&1000/2000	Rohs
ACS725LMATR-100AB-T-JSM	SOP-16W	JSM725-100B	-40 to 150°C	3	TR&1000/2000	Rohs

Order Information

Order number	Package	Marking	Operation Temperature Range	MSL Grade	Ship, Quantity	Green
ACS725LMATR-10AU-T-JSM	SOP-16W	JSM725-10U	-40 to 150°C	3	TR&1000/2000	Rohs
ACS725LMATR-20AU-T-JSM	SOP-16W	JSM725-20U	-40 to 150°C	3	TR&1000/2000	Rohs
ACS725LMATR-30AU-T-JSM	SOP-16W	JSM725-30U	-40 to 150°C	3	TR&1000/2000	Rohs
ACS725LMATR-40AU-T-JSM	SOP-16W	JSM725-40U	-40 to 150°C	3	TR&1000/2000	Rohs
ACS725LMATR-50AU-T-JSM	SOP-16W	JSM725-50U	-40 to 150°C	3	TR&1000/2000	Rohs
ACS725LMATR-65AU-T-JSM	SOP-16W	JSM725-65U	-40 to 150°C	3	TR&1000/2000	Rohs

1 PINOUT DIAGRAM & FUNCTIONAL BLOCK DIAGRAM



Number	Name	Description
1,2,3,4	IP+	Current flows into the chip, positive direction
5,6,7,8	IP-	Current flows out of the chip, negative direction
9,11,14,16	NC	No connect
10	VCC	Device power supply terminal pin
12	VOUT	Analog output signal pin
13	VREF	Zero current reference voltage pin
15	GND	Signal ground terminal

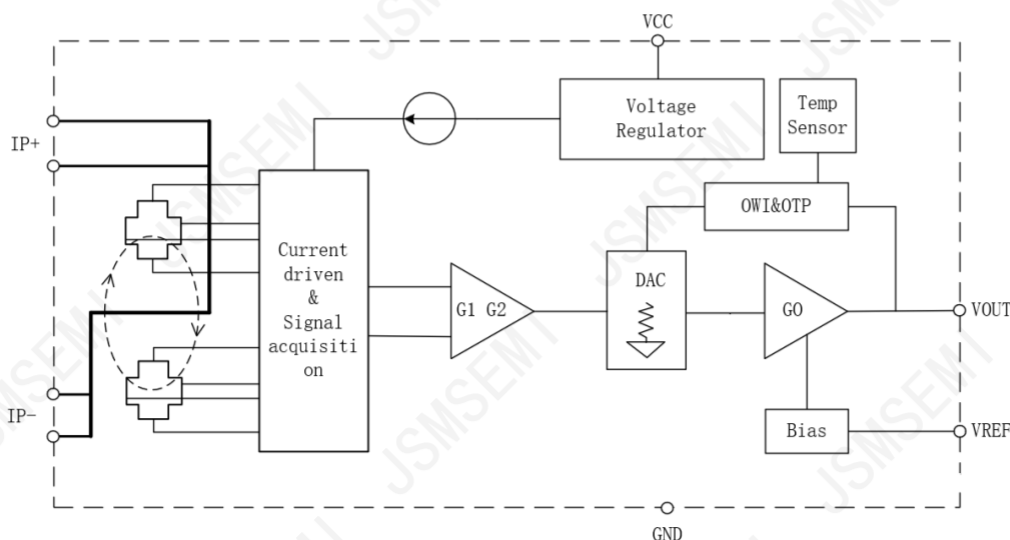


Figure 1. Functional Block Diagram

2 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	°C	-55	/	150
OperatingAmbient Temperature	T_A	°C	-40	/	150
Maximum Junction Temperature	T_{Jmax}	°C	/	/	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.

3 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

4 ISOLATION CHARACTERISTICS

Characteristic	Symbol	Unit	Notes	Value
Dielectric Surge Voltage	V_{SURGE}	V	Test method refers to IEC61000-4-5, 1.2μs/50μs waveform.	10
Dielectric Strength Test Voltage	V_{ISO}	V_{RMS}	60s, 50Hz isolation withstand voltage parameters, according to UL62368-1, test 1.2 V_{ISO} /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 UL60950-1.	2262
		V_{RMS}		1600
Creepage	D_{CR}	mm	Minimum distance along package body from IP leads to signal leads.	8.0
Comparative Tracking Index	CTI	V	Material Group II	600

5 ELECTRICAL CHARACTERISTICS

$T_A=25^{\circ}\text{C}$, $V_{CC}=5\text{V}/3.3\text{V}$, $C_{REF}=1\text{nF}$, $C_L=1\text{nF}$, $C_{VCC}=100\text{nF}$ (Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ.	Max.
Supply Voltage	V_{CC}	V	3.3V	3	3.3	3.6
			5.0V	4.5	5	5.5
Supply Current ^{Note1}	I_{CC}	mA	no-load, $V_{CC}=3.3\text{V}$	/	7.5	15
			no-load, $V_{CC}=5\text{V}$	/	10	15
Primary Conductor Resistance ^{Note1}	R_P	m Ω	/	/	0.5	/
Power-On Time ^{Note2}	T_{PO}	ms	Chip power-on ($V_{CC}>3.0\text{V}$), V_{OUT} and V_{REF} stable time Chip power-on ($V_{CC}>4.5\text{V}$), V_{OUT} and V_{REF} stable time	/	1	/
Output Capacitive Load ^{Note2}	C_L	nF	/	/	1	10
Output Resistive Load ^{Note2}	R_L	k Ω	/	4.7	/	/
Reference Resistive Load ^{Note2}	R_{LREF}	k Ω	/	10	/	/
Output Voltage Range ^{Note2}	V_S	V	$R_L=10\text{k}\Omega$ to V_{CC} or V_{GND}	0.1	/	$V_{CC}-0.1$
Common Mode Field Rejection ^{Note2}	CMFR	dB	/	/	40	/
Rise Time	T_r	μs	ACS72xLMATR-30AB-T	/	1.2	/
Response Time	$T_{RESPONSE}$	μs	ACS72xLMATR-30AB-T	/	1.6	/
Internal Bandwidth	BW	kHz	ACS72xLMATR-30AB-T, 基于小信号测量	/	250	/
Output Noise	V_N	mVrms	ACS72xLMATR-30AB-T	/	8	/
Nonlinearity ^{Note1}	E_{LIN}	%	/	/	± 0.1	± 0.3
Reference Voltage ^{Note1}	V_{REF}	V	Fixed output, Bipolar, $V_{CC}=5\text{V}$	2.49	2.5	2.51
			Fixed output, Bipolar, $V_{CC}=3.3\text{V}$	1.64	1.65	1.66
			Fixed output, Unipolar, $V_{CC}=5\text{V}$	0.49	0.5	0.51
			Ratiometric output, Bipolar	/	$V_{CC}\times 0.5$	/
			Ratiometric output, Unipolar	/	$V_{CC}\times 0.1$	/
Ratiometric Output Sensitivity Error ^{Note1}	S_{ERR}	%	$V_{CC}=3.15\sim 3.45\text{V}$ or $V_{CC}=4.75\sim 5.25\text{V}$	/	0.6	/
Sensitivity Temperature Drift ^{Note1}	dS_{ERR}	%	$I_P=I_{PRmax}$, $T_A=-40^{\circ}\text{C}\sim 125^{\circ}\text{C}$	-1.5	± 0.5	1.5
Offset Temperature Drift ^{Note1}	$V_{IOUT(Q)/TC}$	mV	$I_P=0\text{A}$, $T_A=-40^{\circ}\text{C}\sim 125^{\circ}\text{C}$	-10	± 5	10

Note1: These parameters are obtained from laboratory testing with 3 σ data.

Note2: These parameters are guaranteed by design.

ACS72xLMATR-10AB-T DEVICE PERFORMANCE CHARACTERISTICS

$T_A=25^{\circ}\text{C}$, $V_{CC}=5\text{V}/3.3\text{V}$, $C_{REF}=1\text{nF}$, $C_L=1\text{nF}$, $C_{VCC}=100\text{nF}$ (Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ. ^{Note1}	Max.
NOMINAL PERFORMANCE						
Current Sensing Range	I _{PR}	A	/	-10	/	10
Sensitivity(ACS725)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	132	/
Sensitivity(ACS724)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	200	/
Zero Current Output Voltage	V _{IOUT(Q)}	V	Bipolar, I _{PR} =0A, V _{CC} =3.3V, Fixed output	1.64	1.65	1.66
			Bipolar, I _{PR} =0A, V _{CC} =5V, Fixed output	2.49	2.5	2.51
			Bipolar, I _{PR} =0A, Ratiometric output	/	V _{CC} *0.5	/
ACCURACY PERFORMANCE						
Total Output Error	E _{TOT}	%	I _P =I _{PRmax} , T _A =-40°C ~ 125°C	-1.6	±0.5	1.6
TOTAL OUTPUT ERROR COMPONENTS: E _{TOT} = (V _{IOUT} -V _{IOUT Ideal})/(Sens _{Ideal} ×I _P)×100%, E _{TOT} = ((V _{IOUT Meas} -V _{REF Meas})-(V _{IOUT Ideal} -V _{REF Ideal}))/(Sens _{Ideal} ×I _P)×100%						
Sensitivity Error	E _{SENS}	%	I _P =I _{PRmax} , T _A =25°C ~ 125°C	-1.4	±0.5	1.4
			I _P =I _{PRmax} , T _A =-40°C ~ 25°C	-1.0	±0.5	1.0
Offset Error ^{Note2}	V _{OE}	mV	I _P =0A, T _A =25°C ~ 125°C	-10	±5	10
			I _P =0A, T _A =25°C	-5	±2	5
			I _P =0A, T _A =-40°C ~ 125°C	-10	±5	10
LIFETIME DRIFT CHARACTERISTICS						
Sensitivity Error Lifetime Drift	E _{SENS_drift}	%	After reliability test, T _A =25°C	/	±0.5	/
Total Output Error Lifetime Drift	E _{TOT_drift}	%	After reliability test, T _A =25°C	/	±0.5	/

ACS72xLMATR-10AU-T DEVICE PERFORMANCE CHARACTERISTICS

$T_A=25^{\circ}\text{C}$, $V_{CC}=5\text{V}/3.3\text{V}$, $C_{REF}=1\text{nF}$, $C_L=1\text{nF}$, $C_{VCC}=100\text{nF}$ (Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ. ^{Note1}	Max.
NOMINAL PERFORMANCE						
Current Sensing Range	I _{PR}	A	/	0	/	10
Sensitivity(ACS725)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	264	/
Sensitivity(ACS724)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	400	/
Zero Current Output Voltage	V _{IOUT(Q)}	V	Unipolar, I _{PR} =0A, V _{CC} =3.3V, Fixed output	0.32	0.33	0.34
			Unipolar, I _{PR} =0A, V _{CC} =5V, Fixed output	0.49	0.5	0.51
			Unipolar, I _{PR} =0A, Ratiometric output	/	V _{CC} *0.1	/
ACCURACY PERFORMANCE						
Total Output Error	E _{TOT}	%	I _P =I _{PRmax} , T _A =-40°C ~ 125°C	-1.6	±0.5	1.6
TOTAL OUTPUT ERROR COMPONENTS: E _{TOT} = (V _{IOUT} -V _{IOUT Ideal})/(Sens _{Ideal} ×I _P)×100%, E _{TOT} = ((V _{IOUT Meas} -V _{REF Meas})-(V _{IOUT Ideal} -V _{REF Ideal}))/(Sens _{Ideal} ×I _P)×100%						
Sensitivity Error	E _{SENS}	%	I _P =I _{PRmax} , T _A =25°C ~ 125°C	-1.5	±0.5	1.5
			I _P =I _{PRmax} , T _A =-40°C ~ 25°C	-1.0	±0.5	1.0
Offset Error ^{Note2}	V _{OE}	mV	I _P =0A, T _A =25°C ~ 125°C	-10	±5	12
			I _P =0A, T _A =25°C	-5	±2	5
			I _P =0 A, T _A =-40°C ~ 125°C	-10	±5	12
LIFETIME DRIFT CHARACTERISTICS						
Sensitivity Error Lifetime Drift	E _{SENS_drift}	%	After reliability test, T _A =25°C	/	±0.5	/
Total Output Error Lifetime Drift	E _{TOT_drift}	%	After reliability test, T _A =25°C	/	±0.5	/

Note1: These parameters are obtained from laboratory testing with 3 σ data.

Note2: Offset error refers to ratiometric output mode of unipolar output or fixed output mode of differential output.

ACS72xLMATR-20AB-T DEVICE PERFORMANCE CHARACTERISTICS

$T_A=25^{\circ}\text{C}$, $V_{CC}=5\text{V}/3.3\text{V}$, $C_{REF}=1\text{nF}$, $C_L=1\text{nF}$, $C_{VCC}=100\text{nF}$ (Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ. ^{Note1}	Max.
NOMINAL PERFORMANCE						
Current Sensing Range	I _{PR}	A	/	-20	/	20
Sensitivity(ACS725)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	66	/
Sensitivity(ACS724)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	100	/
Zero Current Output Voltage	V _{IOUT(Q)}	V	Bipolar, I _{PR} =0A, V _{CC} =3.3V, Fixed output	1.64	1.65	1.66
			Bipolar, I _{PR} =0A, V _{CC} =5V, Fixed output	2.49	2.5	2.51
			Bipolar, I _{PR} =0A, Ratiometric output	/	V _{CC} *0.5	/
ACCURACY PERFORMANCE						
Total Output Error	E _{TOT}	%	I _P =I _{PRmax} , T _A =-40°C ~ 125°C	-1.6	±0.5	1.6
TOTAL OUTPUT ERROR COMPONENTS: E _{TOT} = (V _{IOUT} -V _{IOUT Ideal})/(Sens _{Ideal} ×I _P)×100%, E _{TOT} = ((V _{IOUT Meas} -V _{REF Meas})-(V _{IOUT Ideal} -V _{REF Ideal}))/(Sens _{Ideal} ×I _P)×100%						
Sensitivity Error	E _{SENS}	%	I _P =I _{PRmax} , T _A =25°C ~ 125°C	-1.5	±0.5	1.5
			I _P =I _{PRmax} , T _A =-40°C ~ 25°C	-1.5	±0.5	1.5
Offset Error ^{Note2}	V _{OE}	mV	I _P =0A, T _A =25°C ~ 125°C	-15	±5	15
			I _P =0A, T _A =25°C	-5	±2	5
			I _P =0 A, T _A =-40°C ~ 125°C	-15	±5	15
LIFETIME DRIFT CHARACTERISTICS						
Sensitivity Error Lifetime Drift	E _{SENS_drift}	%	After reliability test, T _A =25°C	/	±0.5	/
Total Output Error Lifetime Drift	E _{TOT_drift}	%	After reliability test, T _A =25°C	/	±0.5	/

ACS72xLMATR-20AU-T DEVICE PERFORMANCE CHARACTERISTICS

$T_A=25^{\circ}\text{C}$, $V_{CC}=5\text{V}/3.3\text{V}$, $C_{REF}=1\text{nF}$, $C_L=1\text{nF}$, $C_{VCC}=100\text{nF}$ (Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ. ^{Note1}	Max.
NOMINAL PERFORMANCE						
Current Sensing Range	I _{PR}	A	/	0	/	20
Sensitivity(ACS725)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	132	/
Sensitivity(ACS724)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	200	/
Zero Current Output Voltage	V _{IOUT(Q)}	V	Unipolar, I _{PR} =0A, V _{CC} =3.3V, Fixed output	0.32	0.33	0.34
			Unipolar, I _{PR} =0A, V _{CC} =5V, Fixed output	0.49	0.5	0.51
			Unipolar, I _{PR} =0A, Ratiometric output	/	V _{CC} *0.1	/
ACCURACY PERFORMANCE						
Total Output Error	E _{TOT}	%	I _P =I _{PRmax} , T _A =-40°C ~ 125°C	-1.6	±0.5	1.6
TOTAL OUTPUT ERROR COMPONENTS: E _{TOT} = (V _{IOUT} -V _{IOUT Ideal})/(Sens _{Ideal} ×I _P)×100%, E _{TOT} = ((V _{IOUT Meas} -V _{REF Meas})-(V _{IOUT Ideal} -V _{REF Ideal}))/(Sens _{Ideal} ×I _P)×100%						
Sensitivity Error	E _{SENS}	%	I _P =I _{PRmax} , T _A =25°C ~ 125°C	-1.5	±0.5	1.5
			I _P =I _{PRmax} , T _A =-40°C ~ 25°C	-1.0	±0.5	1.0
Offset Error ^{Note2}	V _{OE}	mV	I _P =0A, T _A =25°C ~ 125°C	-15	±5	15
			I _P =0A, T _A =25°C	-5	±2	5
			I _P =0A, T _A =-40°C ~ 125°C	-15	±5	15
LIFETIME DRIFT CHARACTERISTICS						
Sensitivity Error Lifetime Drift	E _{SENS_drift}	%	After reliability test, T _A =25°C	/	±0.5	/
Total Output Error Lifetime Drift	E _{TOT_drift}	%	After reliability test, T _A =25°C	/	±0.5	/

Note1: These parameters are obtained from laboratory testing with 3 σ data.

Note2: Offset error refers to ratiometric output mode of unipolar output or fixed output mode of differential output.

ACS72xLMATR-30AB-T DEVICE PERFORMANCE CHARACTERISTICS

$T_A = 25^\circ\text{C}$, $V_{CC} = 5\text{V}/3.3\text{V}$, $C_{REF} = 1\text{nF}$, $G = 1\text{nF}$, $G_{CC} = 100\text{nF}$ (Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ. ^{Note1}	Max.
NOMINAL PERFORMANCE						
Current Sensing Range	I _{PR}	A	/	-30	/	30
Sensitivity(ACS725)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	44	/
Sensitivity(ACS724)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	66.7	/
Zero Current Output Voltage	V _{IOUT(Q)}	V	Bipolar, I _{PR} =0A, V _{CC} =3.3V, Fixed output	1.64	1.65	1.66
			Bipolar, I _{PR} =0A, V _{CC} =5V, Fixed output	2.49	2.5	2.51
			Bipolar, I _{PR} =0A, Ratiometric output	/	V _{CC} *0.5	/
ACCURACY PERFORMANCE						
Total Output Error	E _{TOT}	%	I _P =I _{PRmax} , T _A =-40°C ~ 125°C	-1.6	±0.5	1.6
TOTAL OUTPUT ERROR COMPONENTS: E _{TOT} = (V _{IOUT} -V _{IOUT Ideal})/(Sens _{Ideal} ×I _P)×100%, E _{TOT} = ((V _{IOUT Meas} -V _{REF Meas})-(V _{IOUT Ideal} -V _{REF Ideal}))/(Sens _{Ideal} ×I _P)×100%						
Sensitivity Error	E _{SENS}	%	I _P =I _{PRmax} , T _A =25°C ~ 125°C	-1.5	±0.5	1.5
			I _P =I _{PRmax} , T _A =-40°C ~ 25°C	-1.0	±0.5	1.0
Offset Error ^{Note2}	V _{OE}	mV	I _P =0A, T _A =25°C ~ 125°C	-12	±5	12
			I _P =0A, T _A =25°C	-5	±2	5
			I _P =0A, T _A =-40°C ~ 125°C	-12	±5	12
LIFETIME DRIFT CHARACTERISTICS						
Sensitivity Error Lifetime Drift	E _{SENS_drift}	%	After reliability test, T _A =25°C	/	±0.5	/
Total Output Error Lifetime Drift	E _{TOT_drift}	%	After reliability test, T _A =25°C	/	±0.5	/

ACS72xLMATR-30AU-T DEVICE PERFORMANCE CHARACTERISTICS

$T_A = 25^\circ\text{C}$, $V_{CC} = 5\text{V}/3.3\text{V}$, $C_{REF} = 1\text{nF}$, $C_L = 1\text{nF}$, $C_{VCC} = 100\text{nF}$ (Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ. ^{Note1}	Max.
NOMINAL PERFORMANCE						
Current Sensing Range	I _{PR}	A	/	0	/	30
Sensitivity(ACS725)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	88	/
Sensitivity(ACS724)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	133.3	/
Zero Current Output Voltage	V _{IOUT(Q)}	V	Unipolar, I _{PR} =0A, V _{CC} =3.3V, Fixed output	0.32	0.33	0.34
			Unipolar, I _{PR} =0A, V _{CC} =5V, Fixed output	0.49	0.5	0.51
			Unipolar, I _{PR} =0A, Ratiometric output	/	V _{CC} *0.1	/
ACCURACY PERFORMANCE						
Total Output Error	E _{TOT}	%	I _P =I _{PRmax} , T _A =-40°C ~ 125°C	-1.6	±0.5	1.6
TOTAL OUTPUT ERROR COMPONENTS: E _{TOT} = (V _{IOUT} -V _{IOUT Ideal})/(Sens _{Ideal} ×I _P)×100%, E _{TOT} = ((V _{IOUT Meas} -V _{REF Meas})-(V _{IOUT Ideal} -V _{REF Ideal}))/(Sens _{Ideal} ×I _P)×100%						
Sensitivity Error	E _{SENS}	%	I _P =I _{PRmax} , T _A =25°C ~ 125°C	-1.5	±0.5	1.5
			I _P =I _{PRmax} , T _A =-40°C ~ 25°C	-1.0	±0.5	1.0
Offset Error ^{Note2}	V _{OE}	mV	I _P =0A, T _A =25°C ~ 125°C	-12	±5	12
			I _P =0A, T _A =25°C	-5	±2	5
			I _P =0A, T _A =-40°C ~ 125°C	-12	±5	12
LIFETIME DRIFT CHARACTERISTICS						
Sensitivity Error Lifetime Drift	E _{SENS_drift}	%	After reliability test, T _A =25°C	/	±0.5	/
Total Output Error Lifetime Drift	E _{TOT_drift}	%	After reliability test, T _A =25°C	/	±0.5	/

Note1: These parameters are obtained from laboratory testing with 3 σ data.

Note2: Offset error refers to ratiometric output mode of unipolar output or fixed output mode of differential output.

ACS72xLMATR-40AB-T DEVICE PERFORMANCE CHARACTERISTICS

$T_A=25^{\circ}\text{C}$, $V_{CC}=5\text{V}/3.3\text{V}$, $C_{REF}=1\text{nF}$, $C_L=1\text{nF}$, $C_{VCC}=100\text{nF}$ (Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ. ^{Note1}	Max.
NOMINAL PERFORMANCE						
Current Sensing Range	I _{PR}	A	/	-40	/	40
Sensitivity(ACS725)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	33	/
Sensitivity(ACS724)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	50	/
Zero Current Output Voltage	V _{IOUT(Q)}	V	Bipolar, I _{PR} =0A, V _{CC} =3.3V, Fixed output	1.64	1.65	1.66
			Bipolar, I _{PR} =0A, V _{CC} =5V, Fixed output	2.49	2.5	2.51
			Bipolar, I _{PR} =0A, Ratiometric output	/	V _{CC} *0.5	/
ACCURACY PERFORMANCE						
Total Output Error	E _{TOT}	%	I _P =I _{PRmax} , T _A =-40°C ~125°C	-1.6	±0.5	1.6
TOTAL OUTPUT ERROR COMPONENTS: E _{TOT} = (V _{IOUT} -V _{IOUT Ideal})/(Sens _{Ideal} ×I _P)×100%, E _{TOT} = ((V _{IOUT Meas} -V _{REF Meas})-(V _{IOUT Ideal} -V _{REF Ideal}))/(Sens _{Ideal} ×I _P)×100%						
Sensitivity Error	E _{SENS}	%	I _P =I _{PRmax} , T _A =25°C ~ 125°C	-1.5	±0.5	1.5
			I _P =I _{PRmax} , T _A =-40°C ~ 25°C	-1.5	±0.5	1.5
Offset Error ^{Note2}	V _{OE}	mV	I _P =0A, T _A =25°C ~ 125°C	-10	±5	10
			I _P =0A, T _A =25°C	-5	±2	5
			I _P =0 A, T _A =-40°C ~ 125°C	-10	±5	10
LIFETIME DRIFT CHARACTERISTICS						
Sensitivity Error Lifetime Drift	E _{SENS_drift}	%	After reliability test, T _A =25°C	/	±0.5	/
Total Output Error Lifetime Drift	E _{TOT_drift}	%	After reliability test, T _A =25°C	/	±0.5	/

ACS72xLMATR-40AU-T DEVICE PERFORMANCE CHARACTERISTICS

$T_A=25^{\circ}\text{C}$, $V_{CC}=5\text{V}/3.3\text{V}$, $C_{REF}=1\text{nF}$, $C_L=1\text{nF}$, $C_{VCC}=100\text{nF}$ (Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ. ^{Note1}	Max.
NOMINAL PERFORMANCE						
Current Sensing Range	I _{PR}	A	/	0	/	40
Sensitivity(ACS725)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	66	/
Sensitivity(ACS724)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	100	/
Zero Current Output Voltage	V _{IOUT(Q)}	V	Unipolar, I _{PR} =0A, V _{CC} =3.3V, Fixed output	0.32	0.33	0.34
			Unipolar, I _{PR} =0A, V _{CC} =5V, Fixed output	0.49	0.5	0.51
			Unipolar, I _{PR} =0A, Ratiometric output	/	V _{CC} *0.1	/
ACCURACY PERFORMANCE						
Total Output Error	E _{TOT}	%	I _P =I _{PRmax} , T _A =-40°C ~ 125°C	-1.6	±0.5	1.6
TOTAL OUTPUT ERROR COMPONENTS: E _{TOT} = (V _{IOUT} -V _{IOUT Ideal})/(Sens _{Ideal} ×I _P)×100%, E _{TOT} = ((V _{IOUT Meas} -V _{REF Meas})-(V _{IOUT Ideal} -V _{REF Ideal}))/(Sens _{Ideal} ×I _P)×100%						
Sensitivity Error	E _{SENS}	%	I _P =I _{PRmax} , T _A =25°C ~ 125°C	-1.5	±0.5	1.5
			I _P =I _{PRmax} , T _A =-40°C ~ 25°C	-1.0	±0.5	1.0
Offset Error ^{Note2}	V _{OE}	mV	I _P =0A, T _A =25°C ~ 125°C	-10	±5	10
			I _P =0A, T _A =25°C	-5	±2	5
			I _P =0 A, T _A =-40°C ~ 125°C	-10	±5	10
LIFETIME DRIFT CHARACTERISTICS						
Sensitivity Error Lifetime Drift	E _{SENS_drift}	%	After reliability test, T _A =25°C	/	±0.5	/
Total Output Error Lifetime Drift	E _{TOT_drift}	%	After reliability test, T _A =25°C	/	±0.5	/

Note1: These parameters are obtained from laboratory testing with 3 σ data.

Note2: Offset error refers to ratiometric output mode of unipolar output or fixed output mode of differential output.

ACS72xLMATR-50AB-T DEVICE PERFORMANCE CHARACTERISTICS

$T_A=25^{\circ}\text{C}$, $V_{CC}=5\text{V}/3.3\text{V}$, $C_{REF}=1\text{nF}$, $C_L=1\text{nF}$, $C_{VCC}=100\text{nF}$ (Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ. ^{Note1}	Max.
NOMINAL PERFORMANCE						
Current Sensing Range	I _{PR}	A	/	-50	/	50
Sensitivity(ACS725)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	26.4	/
Sensitivity(ACS724)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	40	/
Zero Current Output Voltage	V _{IOUT(Q)}	V	Bipolar, I _{PR} =0A, V _{CC} =3.3V, Fixed output	1.64	1.65	1.66
			Bipolar, I _{PR} =0A, V _{CC} =5V, Fixed output	2.49	2.5	2.51
			Bipolar, I _{PR} =0A, Ratiometric output	/	V _{CC} *0.5	/
ACCURACY PERFORMANCE						
Total Output Error	E _{TOT}	%	I _P =I _{PRmax} , T _A =-40°C ~ 125°C	-1.6	±0.6	1.6
TOTAL OUTPUT ERROR COMPONENTS: E _{TOT} = (V _{IOUT} -V _{IOUT Ideal})/(Sens _{ideal} ×I _P)×100%, E _{TOT} = ((V _{IOUT Meas} -V _{REF Meas})-(V _{IOUT Ideal} -V _{REF Ideal}))/(Sens _{ideal} ×I _P)×100%						
Sensitivity Error	E _{SENS}	%	I _P =I _{PRmax} , T _A =25°C ~ 125°C	-1.5	±0.5	1.5
			I _P =I _{PRmax} , T _A =-40°C ~ 25°C	-1.0	±0.5	1.0
Offset Error ^{Note2}	V _{OE}	mV	I _P =0 A, T _A =25°C ~ 125°C	-10	±5	10
			I _P =0 A, T _A =25°C	-5	±2	5
			I _P =0 A, T _A =-40°C ~ 25°C	-10	±5	10
LIFETIME DRIFT CHARACTERISTICS						
Sensitivity Error Lifetime Drift	E _{SENS_drift}	%	After reliability test, T _A =25°C	/	±0.5	/
Total Output Error Lifetime Drift	E _{TOT_drift}	%	After reliability test, T _A =25°C	/	±0.5	/

ACS72xLMATR-50AU-T DEVICE PERFORMANCE CHARACTERISTICS

$T_A=25^{\circ}\text{C}$, $V_{CC}=5\text{V}/3.3\text{V}$, $C_{REF}=1\text{nF}$, $C_L=1\text{nF}$, $C_{VCC}=100\text{nF}$ (Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ. ^{Note1}	Max.
NOMINAL PERFORMANCE						
Current Sensing Range	I _{PR}	A	/	0	/	50
Sensitivity(ACS725)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	50.8	/
Sensitivity(ACS724)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	80	/
Zero Current Output Voltage	V _{IOUT(Q)}	V	Unipolar, I _{PR} =0A, V _{CC} =3.3V, Fixed output	0.32	0.33	0.34
			Unipolar, I _{PR} =0A, V _{CC} =5V, Fixed output	0.49	0.5	0.51
			Unipolar, I _{PR} =0A, Ratiometric output	/	V _{CC} *0.1	/
ACCURACY PERFORMANCE						
Total Output Error	E _{TOT}	%	I _P =I _{PRmax} , T _A =-40°C ~ 125°C	-1.6	±0.6	1.6
TOTAL OUTPUT ERROR COMPONENTS: E _{TOT} = (V _{IOUT} -V _{IOUT Ideal})/(Sens _{Ideal} ×I _P)×100%, E _{TOT} = ((V _{IOUT Meas} -V _{REF Meas})-(V _{IOUT Ideal} -V _{REF Ideal}))/(Sens _{Ideal} ×I _P)×100%						
Sensitivity Error	E _{SENS}	%	I _P =I _{PRmax} , T _A =25°C ~ 125°C	-1.5	±0.5	1.5
			I _P =I _{PRmax} , T _A =-40°C ~ 25°C	-1.0	±0.5	1.0
Offset Error ^{Note2}	V _{OE}	mV	I _P =0A, T _A =25°C ~ 125°C	-10	±5	10
			I _P =0A, T _A =25°C	-5	±2	5
			I _P =0 A, T _A =-40°C ~ 125°C	-10	±5	10
LIFETIME DRIFT CHARACTERISTICS						
Sensitivity Error Lifetime Drift	E _{SENS_drift}	%	After reliability test, T _A =25°C	/	±0.5	/
Total Output Error Lifetime Drift	E _{TOT_drift}	%	After reliability test, T _A =25°C	/	±0.5	/

Note1: These parameters are obtained from laboratory testing with 3 σ data.

Note2: Offset error refers to ratiometric output mode of unipolar output or fixed output mode of differential output.

ACS72xLMATR-65AB-T DEVICE PERFORMANCE CHARACTERISTICS

$T_A=25^{\circ}\text{C}$, $V_{CC}=5\text{V}/3.3\text{V}$, $C_{REF}=1\text{nF}$, $C_L=1\text{nF}$, $C_{VCC}=100\text{nF}$ (Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ. ^{Note1}	Max.
NOMINAL PERFORMANCE						
Current Sensing Range	I _{PR}	A	/	-65	/	65
Sensitivity(ACS725)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	20.3	/
Sensitivity(ACS724)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	30.8	/
Zero Current Output Voltage	V _{IOUT(Q)}	V	Bipolar, I _{PR} =0A, V _{CC} =3.3V, Fixed output	1.64	1.65	1.66
			Bipolar, I _{PR} =0A, V _{CC} =5V, Fixed output	2.49	2.5	2.51
			Bipolar, I _{PR} =0A, Ratiometric output	/	V _{CC} *0.5	/
ACCURACY PERFORMANCE						
Total Output Error	E _{TOT}	%	I _P =I _{PRmax} , T _A =-40°C ~ 125°C	-1.8	±0.6	1.8
TOTAL OUTPUT ERROR COMPONENTS: E _{TOT} = (V _{IOUT} -V _{IOUT Ideal})/(Sens _{Ideal} ×I _P)×100%, E _{TOT} = ((V _{IOUT Meas} -V _{REF Meas})-(V _{IOUT Ideal} -V _{REF Ideal}))/(Sens _{Ideal} ×I _P)×100%						
Sensitivity Error	E _{SENS}	%	I _P =I _{PRmax} , T _A =25°C ~ 125°C	-1.6	±0.5	1.6
			I _P =I _{PRmax} , T _A =-40°C ~ 25°C	-1.2	±0.5	1.2
Offset Error ^{Note2}	V _{OE}	mV	I _P =0 A, T _A =25°C ~ 125°C	-10	±5	10
			I _P =0 A, T _A =25°C	-5	±2	5
			I _P =0 A, T _A =-40°C ~ 25°C	-10	±5	10
LIFETIME DRIFT CHARACTERISTICS						
Sensitivity Error Lifetime Drift	E _{SENS_drift}	%	After reliability test, T _A =25°C	/	±0.5	/
Total Output Error Lifetime Drift	E _{TOT_drift}	%	After reliability test, T _A =25°C	/	±0.5	/

ACS72xLMATR-65AU-T DEVICE PERFORMANCE CHARACTERISTICS

$T_A=25^{\circ}\text{C}$, $V_{CC}=5\text{V}/3.3\text{V}$, $C_{REF}=1\text{nF}$, $C_L=1\text{nF}$, $C_{VCC}=100\text{nF}$ (Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ. ^{Note1}	Max.
NOMINAL PERFORMANCE						
Current Sensing Range	I _{PR}	A	/	0	/	65
Sensitivity(ACS725)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	40.6	/
Sensitivity(ACS724)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	60.5	/
Zero Current Output Voltage	V _{IOUT(Q)}	V	Unipolar, I _{PR} =0A, V _{CC} =3.3V, Fixed output	0.32	0.33	0.34
			Unipolar, I _{PR} =0A, V _{CC} =5V, Fixed output	0.49	0.5	0.51
			Unipolar, I _{PR} =0A, Ratiometric output	/	V _{CC} *0.1	/
ACCURACY PERFORMANCE						
Total Output Error	E _{TOT}	%	I _P =I _{PRmax} , T _A =-40°C ~ 125°C	-1.6	±0.6	1.6
TOTAL OUTPUT ERROR COMPONENTS: E _{TOT} = (V _{IOUT} -V _{IOUT Ideal})/(Sens _{Ideal} ×I _P)×100%, E _{TOT} = ((V _{IOUT Meas} -V _{REF Meas})-(V _{IOUT Ideal} -V _{REF Ideal}))/(Sens _{Ideal} ×I _P)×100%						
Sensitivity Error	E _{SENS}	%	I _P =I _{PRmax} , T _A =25°C ~ 125°C	-1.5	±0.5	1.5
			I _P =I _{PRmax} , T _A =-40°C ~ 25°C	-1.0	±0.5	1.0
Offset Error ^{Note2}	V _{OE}	mV	I _P =0A, T _A =25°C ~ 125°C	-12	±5	12
			I _P =0A, T _A =25°C	-5	±2	5
			I _P =0 A, T _A =-40°C ~ 125°C	-12	±5	12
LIFETIME DRIFT CHARACTERISTICS						
Sensitivity Error Lifetime Drift	E _{SENS_drift}	%	After reliability test, T _A =25°C	/	±0.5	/
Total Output Error Lifetime Drift	E _{TOT_drift}	%	After reliability test, T _A =25°C	/	±0.5	/

Note1: These parameters are obtained from laboratory testing with 3 σ data.

Note2: Offset error refers to ratiometric output mode of unipolar output or fixed output mode of differential output.

ACS72xLMATR-80AB-T DEVICE PERFORMANCE CHARACTERISTICS

$T_A=25^{\circ}\text{C}$, $V_{CC}=5\text{V}/3.3\text{V}$, $C_{REF}=1\text{nF}$, $C_L=1\text{nF}$, $C_{VCC}=100\text{nF}$ (Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ. ^{Note1}	Max.
NOMINAL PERFORMANCE						
Current Sensing Range	I _{PR}	A	/	-80	/	80
Sensitivity(ACS725)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	16.5	/
Sensitivity(ACS724)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	25	/
Zero Current Output Voltage	V _{IOUT(Q)}	V	Bipolar, I _{PR} =0A, V _{CC} =3.3V, Fixed output	1.64	1.65	1.66
			Bipolar, I _{PR} =0A, V _{CC} =5V, Fixed output	2.49	2.5	2.51
			Bipolar, I _{PR} =0A, Ratiometric output	/	V _{CC} *0.5	/
ACCURACY PERFORMANCE						
Total Output Error	E _{TOT}	%	I _P =I _{PRmax} , T _A =-40°C ~ 125°C	-1.8	±0.6	1.8
TOTAL OUTPUT ERROR COMPONENTS: E _{TOT} = (V _{IOUT} -V _{IOUT Ideal})/(Sens _{Ideal} ×I _P)×100%, E _{TOT} = ((V _{IOUT Meas} -V _{REF Meas})-(V _{IOUT Ideal} -V _{REF Ideal}))/(Sens _{Ideal} ×I _P)×100%						
Sensitivity Error	E _{SENS}	%	I _P =I _{PRmax} , T _A =25°C ~ 125°C	-1.6	±0.6	1.6
			I _P =I _{PRmax} , T _A =-40°C ~ 25°C	-1.2	±0.6	1.2
Offset Error ^{Note2}	V _{OE}	mV	I _P =0 A, T _A =25°C ~ 125°C	-10	±5	10
			I _P =0 A, T _A =25°C	-5	±2	5
			I _P =0 A, T _A =-40°C ~ 25°C	-10	±5	10
LIFETIME DRIFT CHARACTERISTICS						
Sensitivity Error Lifetime Drift	E _{SENS_drift}	%	After reliability test, T _A =25°C	/	±0.5	/
Total Output Error Lifetime Drift	E _{TOT_drift}	%	After reliability test, T _A =25°C	/	±0.5	/

ACS72xLMATR-80AU-T DEVICE PERFORMANCE CHARACTERISTICS

$T_A=25^{\circ}\text{C}$, $V_{CC}=5\text{V}/3.3\text{V}$, $C_{REF}=1\text{nF}$, $C_L=1\text{nF}$, $C_{VCC}=100\text{nF}$ (Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ. ^{Note1}	Max.
NOMINAL PERFORMANCE						
Current Sensing Range	I _{PR}	A	/	0	/	80
Sensitivity(ACS725)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	33	/
Sensitivity(ACS724)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	50	/
Zero Current Output Voltage	V _{IOUT(Q)}	V	Unipolar, I _{PR} =0A, V _{CC} =3.3V, Fixed output	0.32	0.33	0.34
			Unipolar, I _{PR} =0A, V _{CC} =5V, Fixed output	0.49	0.5	0.51
			Unipolar, I _{PR} =0A, Ratiometric output	/	V _{CC} *0.1	/
ACCURACY PERFORMANCE						
Total Output Error	E _{TOT}	%	I _P =I _{PRmax} , T _A =-40°C ~ 125°C	-1.6	±0.6	1.6
TOTAL OUTPUT ERROR COMPONENTS: E _{TOT} = (V _{IOUT} -V _{IOUT Ideal})/(Sens _{Ideal} ×I _P)×100%, E _{TOT} = ((V _{IOUT Meas} -V _{REF Meas})-(V _{IOUT Ideal} -V _{REF Ideal}))/(Sens _{Ideal} ×I _P)×100%						
Sensitivity Error	E _{SENS}	%	I _P =I _{PRmax} , T _A =25°C ~ 125°C	-1.5	±0.6	1.5
			I _P =I _{PRmax} , T _A =-40°C ~ 25°C	-1.0	±0.6	1.0
Offset Error ^{Note2}	V _{OE}	mV	I _P =0A, T _A =25°C ~ 125°C	-10	±5	10
			I _P =0A, T _A =25°C	-5	±2	5
			I _P =0 A, T _A =-40°C ~ 125°C	-10	±5	10
LIFETIME DRIFT CHARACTERISTICS						
Sensitivity Error Lifetime Drift	E _{SENS_drift}	%	After reliability test, T _A =25°C	/	±0.5	/
Total Output Error Lifetime Drift	E _{TOT_drift}	%	After reliability test, T _A =25°C	/	±0.5	/

Note1: These parameters are obtained from laboratory testing with 3 σ data.

Note2: Offset error refers to ratiometric output mode of unipolar output or fixed output mode of differential output.

ACS72xLMATR-100AB-T DEVICE PERFORMANCE CHARACTERISTICS

$T_A=25^{\circ}\text{C}$, $V_{CC}=5\text{V}/3.3\text{V}$, $C_{REF}=1\text{nF}$, $C_L=1\text{nF}$, $C_{VCC}=100\text{nF}$ (Unless otherwise noted)

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ. ^{Note1}	Max.
NOMINAL PERFORMANCE						
Current Sensing Range	I _{PR}	A	/	-100	/	100
Sensitivity(ACS725)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	13.2	/
Sensitivity(ACS724)	Sens	mV/A	I _{PRmin} < I _{PR} < I _{PRmax}	/	20	/
Zero Current Output Voltage	V _{IOUT(Q)}	V	Bipolar, I _{PR} =0A, V _{CC} =3.3V, Fixed output	1.64	1.65	1.66
			Bipolar, I _{PR} =0A, V _{CC} =5V, Fixed output	2.49	2.5	2.51
			Bipolar, I _{PR} =0A, Ratiometric output	/	V _{CC} *0.5	/
ACCURACY PERFORMANCE						
Total Output Error	E _{TOT}	%	I _P =I _{PRmax} , T _A =-40°C ~ 125°C	-1.6	±0.8	1.6
TOTAL OUTPUT ERROR COMPONENTS: E _{TOT} = (V _{IOUT} -V _{IOUT Ideal})/(Sens _{Ideal} ×I _P)×100%, E _{TOT} = ((V _{IOUT Meas} -V _{REF Meas})-(V _{IOUT Ideal} -V _{REF Ideal}))/(Sens _{Ideal} ×I _P)×100%						
Sensitivity Error	E _{SENS}	%	I _P =I _{PRmax} , T _A =25°C ~ 125°C	-1.5	±0.6	1.5
			I _P =I _{PRmax} , T _A =-40°C ~ 25°C	-1.5	±0.6	1.5
Offset Error ^{Note2}	V _{OE}	mV	I _P =0A, T _A =25°C ~ 125°C	-10	±5	10
			I _P =0A, T _A =25°C	-5	±2	5
			I _P =0 A, T _A =-40°C ~ 125°C	-10	±5	10
LIFETIME DRIFT CHARACTERISTICS						
Sensitivity Error Lifetime Drift	E _{SENS_drift}	%	After reliability test, T _A =25°C	/	±0.5	/
Total Output Error Lifetime Drift	E _{TOT_drift}	%	After reliability test, T _A =25°C	/	±0.5	/

Note1: These parameters are obtained from laboratory testing with 3 σ data.

Note2: Offset error refers to ratiometric output mode of unipolar output or fixed output mode of differential output.

6 PARAMETERS DESCRIPTION

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.

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 $V_{CC} = 5V$,

$$E_{SENS} = (\text{Sens}_{\text{Meas}(5V)} - \text{Sens}_{\text{Ideal}(5V)}) / \text{Sens}_{\text{Ideal}(5V)} \times 100\%$$

The sensitivity temperature drift of dS_{ERR}

Over the entire operating temperature range is defined as:

$$dS_{ERR} = (\text{Sens}_{(TA)} - \text{Sens}_{(25^\circ C)}) / \text{Sens}_{(25^\circ C)} \times 100\%$$

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

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

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

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

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

For bipolar devices, the output voltage $V_{IOUT(Q)} = V_{CC} \times 0.5$

, For unipolar devices, the output voltage $V_{IOUT(Q)} = V_{CC} \times 0.1$

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

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. In fixed output mode, it is the difference between the actual output voltage and the actual V_{REF} voltage.

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 $V_{OUT(Q)TC}$.

Defined in ratiometric output mode:

$$V_{IOUT(Q)TC} = V_{OUT(Q)(TA)} - V_{OUT(25^\circ C)}$$

Defined in fixed output mode:

$$V_{IOUT(Q)TC} = (V_{OUT(Q)(TA)} - V_{REF(TA)}) - (V_{OUT(Q)(25^\circ C)} - V_{REF(25^\circ C)})$$

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.

Symmetry E_{SYM}

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

The formula is defined as follows:

$$E_{SYM} = (1 - (V_{IOUT-POSHALF} - V_{IOUT(Q)}) / (V_{IOUT(Q)} - V_{IOUT-NEGHALF})) \times 100\%$$

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 I_1 (half scale current) and I_2 (full scale current).

In practical application, there is a difference in sensitivity for the measurement of two different current sizes I_1 and I_2 , 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

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

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

$$\text{Sens}_{Ix} = (V_{IOUT(Ix)} - V_{IOUT(Q)}) / I_x$$

$$E_{LINPOS} = (1 - (\text{Sens}_{IPOS2} / \text{Sens}_{IPOS1})) \times 100\%$$

$$E_{LINNEG} = (1 - (\text{Sens}_{INEG2} / \text{Sens}_{INEG1})) \times 100\%$$

6 PARAMETERS DESCRIPTION (CONTINUED)

Proportional output sensitivity error S_{ERR}

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

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

$$S_{ERR} = (1 - (Sens_{V_{CC}} / Sens_{3V}) / (V_{CC} / 3.3V)) \times 100\%$$

Proportional output error of static voltage V_{0zero}

Error between the ratio of V_{out1} and V_{out0} value at $V_{CC}=5V$ and the theoretical ratio when V_{CC} 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.

$$V_{0zero} = (1 - (V_{out1} / V_{out0}) / (V_{CC} / 5V)) \times 100\%$$

$$V_{0zero} = (1 - (V_{out1} / V_{out0}) / (V_{CC} / 3.3V)) \times 100\%$$

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:

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

Defined in fixed output mode:

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

Where: Total output error E_{TOT} contains all error sources and is a function of I_P .

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

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.

Dynamic response characteristic

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 $\pm 10\%$ of its steady-state value under an applied magnetic field.

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.

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.

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.

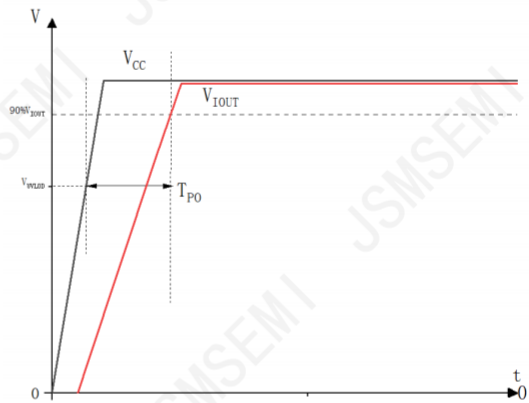


Figure 2. Power-On Time T_{PO}

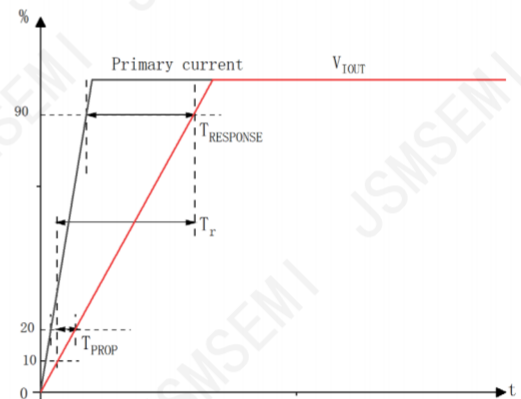


Figure 3. Dynamic Response Time Parameters

7 THERMAL EVALUATION

The product will naturally heat up during using, and the thermal curve performance of this device was measured in a windless environment at $25\pm 3^{\circ}\text{C}$ in application laboratory using a ACS72xREVA0 EVM.

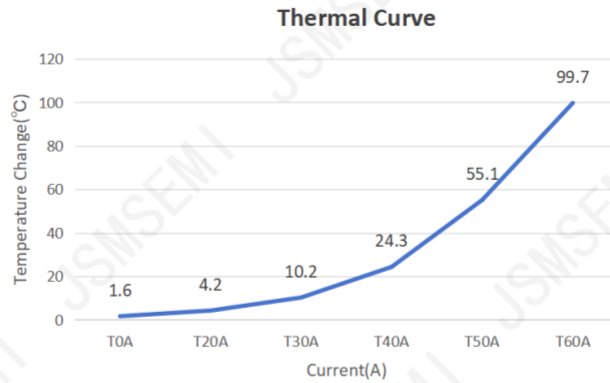


Figure 4. Thermal curve

8 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 $2\times 600\text{ (mm}^2\text{)}$, 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. $C_L=1\text{nF}$, $C_{REF}=1\text{nF}$, $C_{VCC}=100\text{nF}$

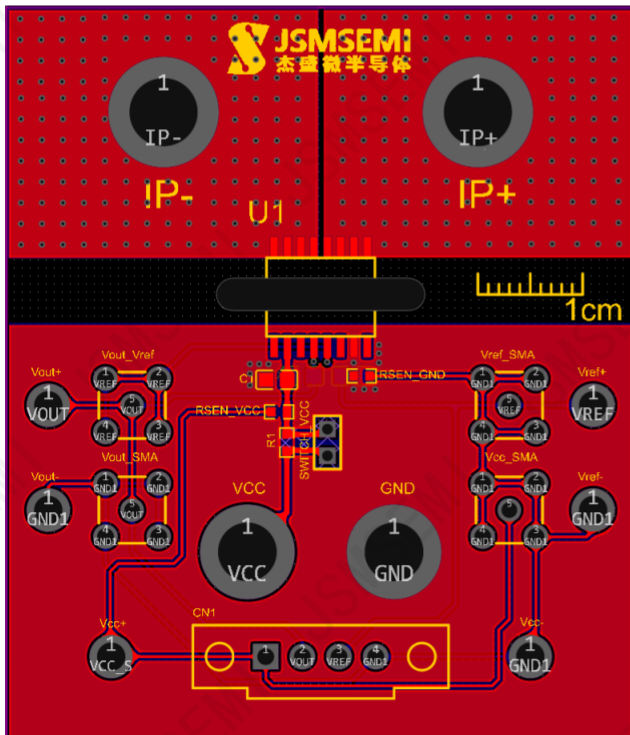


Figure 5. The front of the demo board

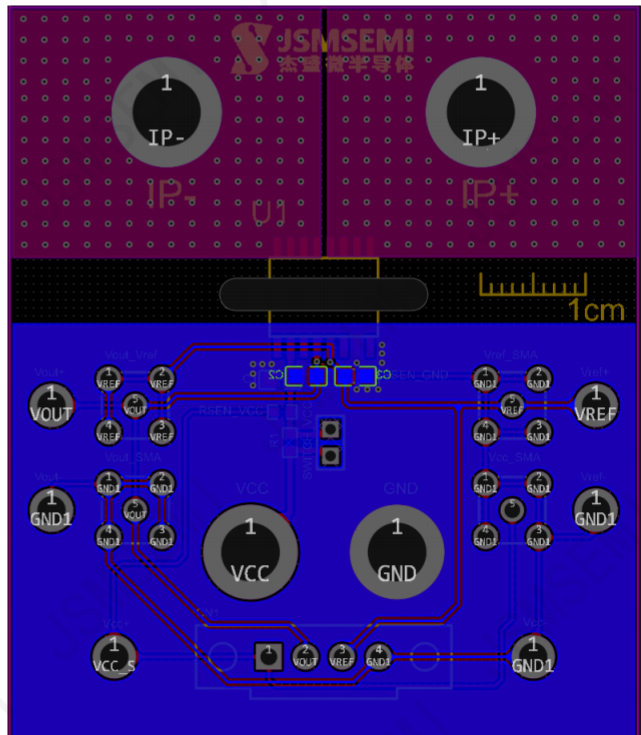
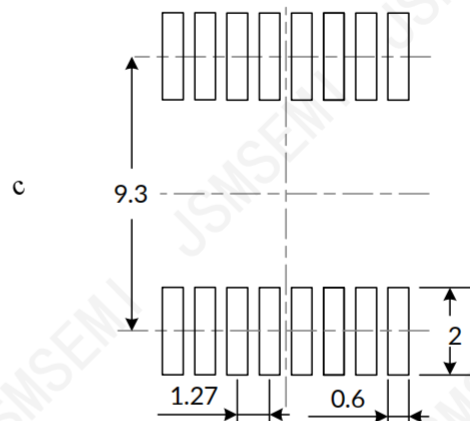
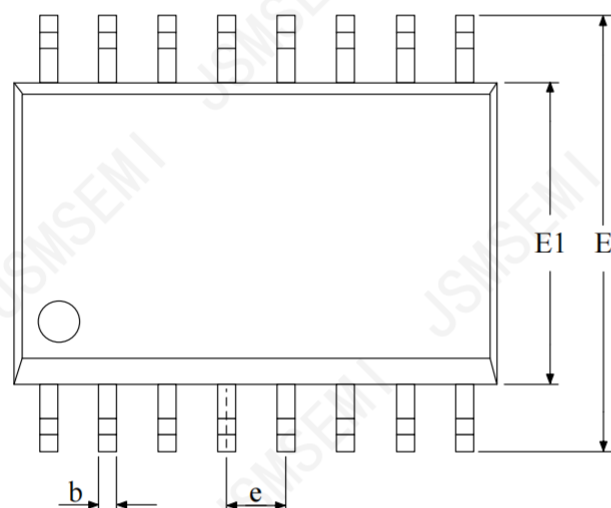
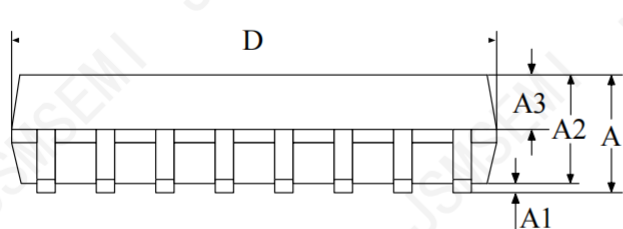


Figure 6. The back of the demo board

Package Information

SOIC-16-300mil



RECOMMENDED LAND PATTERN (Unit: mm)



Size Symbol	MIN(mm)	TYP(mm)	MAX(mm)	Size Symbol	MIN(mm)	TYP(mm)	MAX(mm)
A	2.35	-	2.65	D	10.2	-	10.4
A1	0.10	-	0.30	E	10.5	-	10.1
A2	2.25	-	2.35	E1	7.4	7.5	7.6
A3	0.97	-	1.10	e	1.27BSC		
b	0.35	-	0.43	L	0.55	-	0.85
θ	0	-	8°	L1	1.4BSC		

Revision History

Rev.	Change	Date
V1.0	Initial version	3/17/2021

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