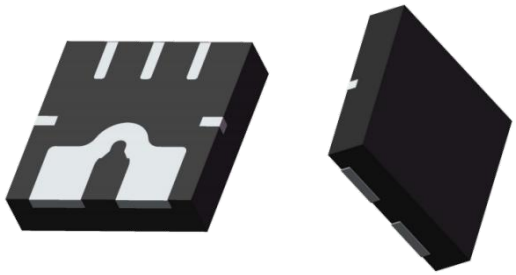
The MCS382K is a high-precision integrated chip for current sensors that accurately detect AC and DC currents.Its detection section consists of two differential Hall elements that reduce stray magnetic fields and eliminate common-mode interference effects.A thick copper strip with a typical resistance of only 200μΩ is used to direct the primary flow near the detection area. This reduces losses and reduces heat to a minimum, thereby increasing current conduction.The chip adopts the unique compensation programming technology to realize the low zero and low temperature bleaching in the whole measurement temperature zone.

Features and Benefits

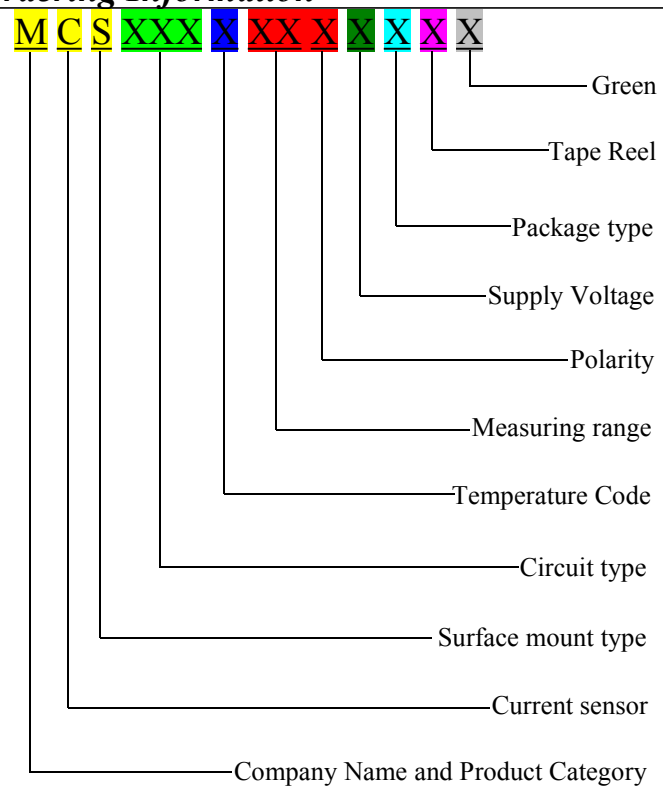
- Differential Hall detection technology inhibits common mode stray magnetic fields
- Primary side resistance 200μΩ , low heating loss, strong overcurrent capacity
- Through special filtering technology, low noise
- Bandwidth 350Khz, response time 1us
- Rich selection of detection current gear
- Excellent reliability against high voltage
- Integrated digital temperature compensation patent technology, low temperature drift
- Package form: QFN
- Compliant with AEC-Q100

Application

- Motor control
- Inverters and other switching power supplies
- Other current sensor occasions
- Load Detection
- Overcurrent protection detection



Ordering Information



Company Name and Product Category
M:MST

Current sensor
C:Current sensor

Surface mount type
S:Surface mount type

Circuit type
382K30,382K40,382K50,382K100,382K150

Temperature Code
E: 85 °C, I: 105 °C, K: 125 °C, L: 150 °C

Measuring range
±30A,±40A,±50A,±100A,±150A

Polarity
B:Bidirectional ;U:Unidirectional

Supply Voltage
3:3.3V;5:5.0V

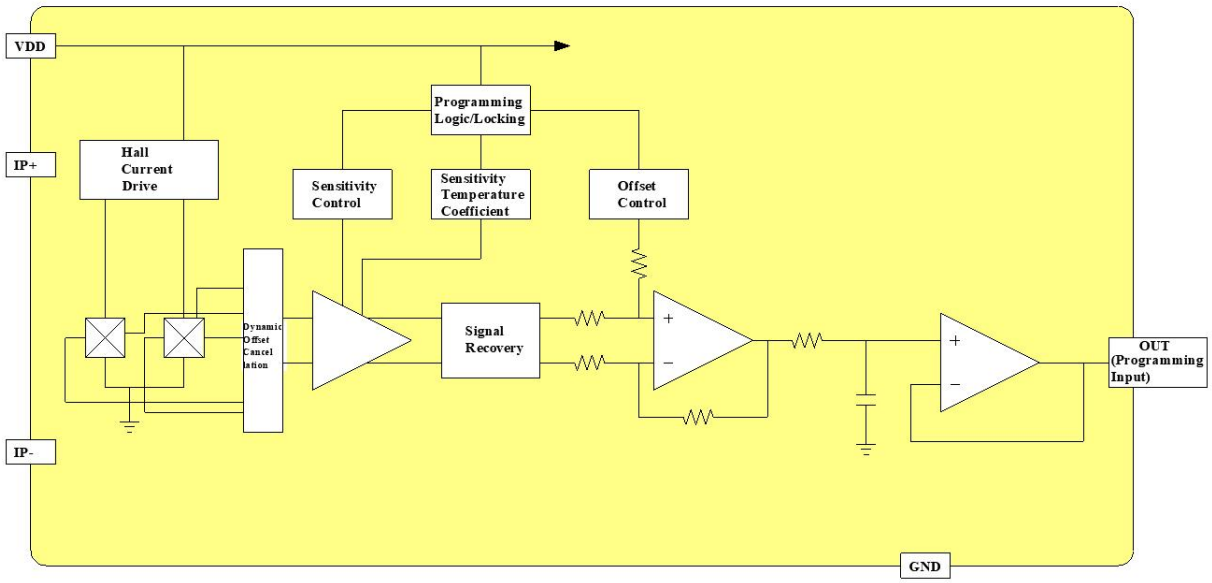
Package type
QF:QFN

Tape Reel
R:Tape Reel

Green
G:Pb-free&Halogen-free

Product No.	Package	Detect current range	Packaging form
MCS382K30B5QFRG	QFN	±30A	Braid
MCS382K40B5QFRG	QFN	±40A	Braid
MCS382K50B5QFRG	QFN	±50A	Braid
MCS382K100B5QFG	QFN	±100A	Braid
MCS382K150B5QFG	QFN	±150A	Braid
MCS382K30U5QFRG	QFN	+30A	Braid
MCS382K40U5QFRG	QFN	+40A	Braid
MCS382K50U5QFRG	QFN	+50A	Braid
MCS382K100U5QFG	QFN	+100A	Braid
MCS382K150U5QFG	QFN	+150A	Braid
MCS382K30B3QFRG	QFN	±30A	Braid
MCS382K40B3QFRG	QFN	±40A	Braid
MCS382K50B3QFRG	QFN	±50A	Braid
MCS382K100B3QFG	QFN	±100A	Braid
MCS382K150B3QFG	QFN	±150A	Braid
MCS382K30U3QFRG	QFN	+30A	Braid
MCS382K40U3QFRG	QFN	+40A	Braid
MCS382K50U3QFRG	QFN	+50A	Braid
MCS382K100U3QFG	QFN	+100A	Braid
MCS382K150U3QFG	QFN	+150A	Braid

Functional Diagram



Absolute Maximum Ratings

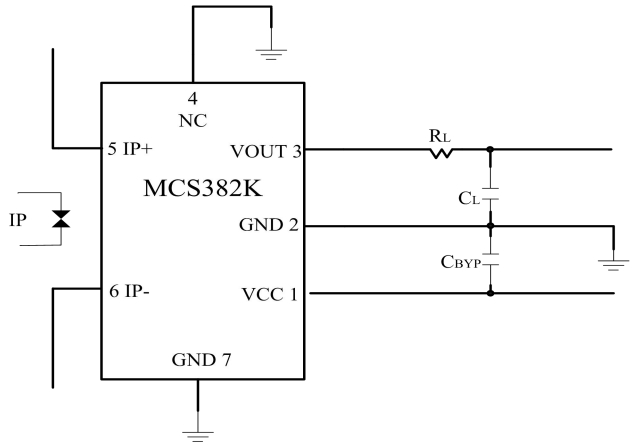
Characteristic	Symbol	Rating	Unit
Supply Voltage	V_{CC}	-0.3 to 6.5	V
Supply Current	I_{CC}	20	mA
Output Voltage	V_{OUT}	0.15 to VCC-0.15	V
Output Current	I_{OUT}	±40	mA
Operating Temperature	T_A	-40 to 125	°C
Max Junction Temperature	T_J	165	°C
Storage Temperature	T_S	-55 to 150	°C

Electronical Specifications

DC operating parameters at VCC = 5.0V，TA=25°C, unless other wise specified

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Supply Voltage	V_{CC}		3.14	3.3	3.47	V
			4.75	5	5.25	V
Supply Current	I_{CC}	V_{CC}= 5V, output open		16		mA
Output Load Capacitance	C_L	V_{OUT} TO GND	–	–	10	nF
Output Load Resistance	R_L	V_{OUT} TO GND	4.7			kΩ
Primary Side Conductor Resistance	R_{IP}	T_A = 25°C	–	200	–	μΩ
Response Time	$t_{RESPONSE}$	T_A=25°C, C_L=1nF	–	1	–	μs
Bandwidth	BW	Small signal –3dB; C_L=1nF	–	350	–	kHz
Linearity	E_{LIN}	Through full range of I_P	-1.5		+1.5	%
Power-on Time	t_{PO}	T_A=25°C		1		ms
Electro-Static Discharge	HBM		6			kV

Typical Application Circuit



**If the application circuit power supply (Vcc) may have a transient pulse spike greater than 6.5V, it is recommended to add TVS tube between Vcc and GND to absorb the spike energy.*

MCS382K30U5QFRG Performance Characteristics

DC operating parameters at VCC = 5.0V，TA=-40°C~125°C, unless other wise specified

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal parameters						
Current Measurement Range	I_{PR}		0	-	30	A
Sensitivity	Sens	$I_{PR}(min) < I_P < I_{PR}(max)$		133		mV/A
Zero Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P =0A	-	Vcc x 0.1	-	V
Accuracy Performance						
Total Output Error	E_{TOT}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$	-2	±1	2	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$		±3		%
Sensitivity Error	E_{Sens}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C	-1.5	±1	1.5	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C		±3		%
Electrical Offset Error	V_{OE}	I_P=0A, T_A=25°C	-10	±6	10	mV
		I_P=0A, T_A= -40°C to 125°C	-30	±15	30	mV

MCS382K30B5QFRG Performance Characteristics

DC operating parameters at VCC = 5.0V，TA=-40°C~125°C, unless other wise specified

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal parameters						
Current Measurement Range	I_{PR}		-30	-	30	A
Sensitivity	Sens	$I_{PR}(min) < I_P < I_{PR}(max)$		66		mV/A
Zero Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P =0A	-	Vcc x 0.5	-	V
Accuracy Performance						
Total Output Error	E_{TOT}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$	-2	±1	2	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$		±3		%
Sensitivity Error	E_{Sens}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C	-1.5	±1	1.5	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C		±3		%
Electrical Offset Error	V_{OE}	I_P=0A, T_A=25°C	-10	±6	10	mV
		I_P=0A, T_A= -40°C to 125°C	-30	±15	30	mV

MCS382K40U5QFRG Performance Characteristics

DC operating parameters at VCC = 5.0V，TA=-40°C~125°C, unless other wise specified

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal parameters						
Current Measurement Range	I_{PR}		0	-	40	A
Sensitivity	Sens	$I_{PR}(min) < I_P < I_{PR}(max)$		100		mV/A
Zero Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P =0A	-	Vcc x 0.1	-	V
Accuracy Performance						
Total Output Error	E_{TOT}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$	-2	±1	2	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$		±3		%
Sensitivity Error	E_{Sens}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C	-1.5	±1	1.5	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C		±3		%
Electrical Offset Error	V_{OE}	I_P=0A, T_A=25°C	-10	±6	10	mV
		I_P=0A, T_A= -40°C to 125°C	-30	±15	30	mV

MCS382K40B5QFRG Performance Characteristics

DC operating parameters at VCC = 5.0V，TA=-40°C~125°C, unless other wise specified

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal parameters						
Current Measurement Range	I_{PR}		-40	-	40	A
Sensitivity	Sens	$I_{PR}(min) < I_P < I_{PR}(max)$		50		mV/A
Zero Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P =0A	-	Vcc x 0.5	-	V
Accuracy Performance						
Total Output Error	E_{TOT}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$	-2	±1	2	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$		±3		%
Sensitivity Error	E_{Sens}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C	-1.5	±1	1.5	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C		±3		%
Electrical Offset Error	V_{OE}	I_P=0A, T_A=25°C	-10	±6	10	mV
		I_P=0A, T_A= -40°C to 125°C	-30	±15	30	mV

MCS382K50U5QFRG Performance Characteristics

DC operating parameters at VCC = 5.0V，TA=-40°C~125°C, unless other wise specified

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal parameters						
Current Measurement Range	I_{PR}		0	-	50	A
Sensitivity	Sens	$I_{PR}(min) < I_P < I_{PR}(max)$		80		mV/A
Zero Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P =0A	-	Vcc x 0.1	-	V
Accuracy Performance						
Total Output Error	E_{TOT}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$	-2	±1	2	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$		±3		%
Sensitivity Error	E_{Sens}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C	-1.5	±1	1.5	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C		±3		%
Electrical Offset Error	V_{OE}	I_P=0A, T_A=25°C	-10	±6	10	mV
		I_P=0A, T_A= -40°C to 125°C	-30	±15	30	mV

MCS382K50B5QFRG Performance Characteristics

DC operating parameters at VCC = 5.0V，TA=-40°C~125°C, unless other wise specified

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal parameters						
Current Measurement Range	I_{PR}		-50	-	50	A
Sensitivity	Sens	$I_{PR}(min) < I_P < I_{PR}(max)$		40		mV/A
Zero Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P =0A	-	Vcc x 0.5	-	V
Accuracy Performance						
Total Output Error	E_{TOT}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$	-2	±1	2	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$		±3		%
Sensitivity Error	E_{Sens}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C	-1.5	±1	1.5	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C		±3		%
Electrical Offset Error	V_{OE}	I_P=0A, T_A=25°C	-10	±6	10	mV
		I_P=0A, T_A= -40°C to 125°C	-30	±15	30	mV

MCS382K100U5QFRG Performance Characteristics

DC operating parameters at VCC = 5.0V，TA=-40°C ~125°C, unless other wise specified

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal parameters						
Current Measurement Range	I_{PR}		0	-	100	A
Sensitivity	Sens	$I_{PR}(min) < I_P < I_{PR}(max)$		40		mV/A
Zero Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P =0A	-	Vcc x 0.1	-	V
Accuracy Performance						
Total Output Error	E_{TOT}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$	-2	±1	2	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$		±3		%
Sensitivity Error	E_{Sens}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C	-1.5	±1	1.5	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C		±3		%
Electrical Offset Error	V_{OE}	I_P=0A, T_A=25°C	-10	±6	10	mV
		I_P=0A, T_A= -40°C to 125°C	-30	±15	30	mV

MCS382K100B5QFRG Performance Characteristics

DC operating parameters at VCC = 5.0V，TA=-40°C ~125°C, unless other wise specified

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal parameters						
Current Measurement Range	I_{PR}		-100	-	100	A
Sensitivity	Sens	$I_{PR}(min) < I_P < I_{PR}(max)$		20		mV/A
Zero Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P =0A	-	Vcc x 0.5	-	V
Accuracy Performance						
Total Output Error	E_{TOT}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$	-2	±1	2	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$		±3		%
Sensitivity Error	E_{Sens}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C	-1.5	±1	1.5	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C		±3		%
Electrical Offset Error	V_{OE}	I_P=0A, T_A=25°C	-10	±6	10	mV
		I_P=0A, T_A= -40°C to 125°C	-30	±15	30	mV

MCS382K150U5QFRG Performance Characteristics

DC operating parameters at VCC = 5.0V，TA=-40°C~125°C, unless other wise specified

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal parameters						
Current Measurement Range	I_{PR}	Instantaneous current	0	-	150	A
		Continuous current	0	-	100	A
Sensitivity	Sens	$I_{PR}(min) < I_P < I_{PR}(max)$		26.7		mV/A
Zero Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P =0A	-	Vcc x 0.1	-	V
Accuracy Performance						
Total Output Error	E_{TOT}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$	-2.5	±1	2.5	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$		±3		%
Sensitivity Error	E_{Sens}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C	-2	±1	2	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C		±3		%
Electrical Offset Error	V_{OE}	I_P=0A, T_A=25°C	-10	±6	10	mV
		I_P=0A, T_A= -40°C to 125°C	-30	±15	30	mV

MCS382K150B5QFRG Performance Characteristics

DC operating parameters at VCC = 5.0V，TA=-40°C~125°C, unless other wise specified

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal parameters						
Current Measurement Range	I_{PR}	Instantaneous current	-150	-	150	A
		Continuous current	-100	-	100	A
Sensitivity	Sens	$I_{PR}(min) < I_P < I_{PR}(max)$		13.3		mV/A
Zero Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P =0A	-	Vcc x 0.5	-	V
Accuracy Performance						
Total Output Error	E_{TOT}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$	-2.5	±1	2.5	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$		±3		%
Sensitivity Error	E_{Sens}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C	-2	±1	2	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C		±3		%
Electrical Offset Error	V_{OE}	I_P=0A, T_A=25°C	-10	±6	10	mV
		I_P=0A, T_A= -40°C to 125°C	-30	±15	30	mV

MCS382K30U3QFRG Performance Characteristics

DC operating parameters at VCC = 3.3V，TA=-40°C~125°C, unless other wise specified

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal parameters						
Current Measurement Range	I_{PR}		0	-	30	A
Sensitivity	Sens	$I_{PR}(min) < I_P < I_{PR}(max)$		88		mV/A
Zero Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P =0A	-	Vcc x 0.1	-	V
Accuracy Performance						
Total Output Error	E_{TOT}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$	-2	±1	2	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$		±3		%
Sensitivity Error	E_{Sens}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C	-1.5	±1	1.5	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C		±3		%
Electrical Offset Error	V_{OE}	I_P=0A, T_A=25°C	-10	±6	10	mV
		I_P=0A, T_A= -40°C to 125°C	-30	±15	30	mV

MCS382K30B3QFRG Performance Characteristics

DC operating parameters at VCC = 3.3V，TA=-40°C~125°C, unless other wise specified

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal parameters						
Current Measurement Range	I_{PR}		-30	-	30	A
Sensitivity	Sens	$I_{PR}(min) < I_P < I_{PR}(max)$		44		mV/A
Zero Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P =0A	-	Vcc x 0.5	-	V
Accuracy Performance						
Total Output Error	E_{TOT}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$	-2	±1	2	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$		±3		%
Sensitivity Error	E_{Sens}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C	-1.5	±1	1.5	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C		±3		%
Electrical Offset Error	V_{OE}	I_P=0A, T_A=25°C	-10	±6	10	mV
		I_P=0A, T_A= -40°C to 125°C	-30	±15	30	mV

MCS382K30B3QFRG Performance Characteristics

DC operating parameters at VCC = 3.3V，TA=-40°C~125°C, unless other wise specified

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal parameters						
Current Measurement Range	I_{PR}		0	-	40	A
Sensitivity	Sens	$I_{PR}(min) < I_P < I_{PR}(max)$		66		mV/A
Zero Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P =0A	-	Vcc x 0.1	-	V
Accuracy Performance						
Total Output Error	E_{TOT}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$	-2	±1	2	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$		±3		%
Sensitivity Error	E_{Sens}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C	-1.5	±1	1.5	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C		±3		%
Electrical Offset Error	V_{OE}	I_P=0A, T_A=25°C	-10	±6	10	mV
		I_P=0A, T_A= -40°C to 125°C	-30	±15	30	mV

MCS382K40B3QFRG Performance Characteristics

DC operating parameters at VCC = 3.3V，TA=-40°C~125°C, unless other wise specified

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal parameters						
Current Measurement Range	I_{PR}		-40	-	40	A
Sensitivity	Sens	$I_{PR}(min) < I_P < I_{PR}(max)$		33		mV/A
Zero Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P =0A	-	Vcc x 0.5	-	V
Accuracy Performance						
Total Output Error	E_{TOT}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$	-2	±1	2	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$		±3		%
Sensitivity Error	E_{Sens}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C	-1.5	±1	1.5	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C		±3		%
Electrical Offset Error	V_{OE}	I_P=0A, T_A=25°C	-10	±6	10	mV
		I_P=0A, T_A= -40°C to 125°C	-30	±15	30	mV

MCS382K50U3QFRG Performance Characteristics

DC operating parameters at VCC = 3.3V，TA=-40°C~125°C, unless other wise specified

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal parameters						
Current Measurement Range	I_{PR}		0	-	50	A
Sensitivity	Sens	$I_{PR}(min) < I_P < I_{PR}(max)$		52.8		mV/A
Zero Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P =0A	-	Vcc x 0.1	-	V
Accuracy Performance						
Total Output Error	E_{TOT}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$	-2	±1	2	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$		±3		%
Sensitivity Error	E_{Sens}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C	-1.5	±1	1.5	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C		±3		%
Electrical Offset Error	V_{OE}	I_P=0A, T_A=25°C	-10	±6	10	mV
		I_P=0A, T_A= -40°C to 125°C	-30	±15	30	mV

MCS382K50B3QFRG Performance Characteristics

DC operating parameters at VCC = 3.3V，TA=-40°C~125°C, unless other wise specified

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal parameters						
Current Measurement Range	I_{PR}		-50	-	50	A
Sensitivity	Sens	$I_{PR}(min) < I_P < I_{PR}(max)$		26.4		mV/A
Zero Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P =0A	-	Vcc x 0.5	-	V
Accuracy Performance						
Total Output Error	E_{TOT}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$	-2	±1	2	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$		±3		%
Sensitivity Error	E_{Sens}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C	-1.5	±1	1.5	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C		±3		%
Electrical Offset Error	V_{OE}	I_P=0A, T_A=25°C	-10	±6	10	mV
		I_P=0A, T_A= -40°C to 125°C	-30	±15	30	mV

MCS382K100U3QFRG Performance Characteristics

DC operating parameters at VCC = 3.3V，TA=-40°C~125°C, unless other wise specified

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal parameters						
Current Measurement Range	I_{PR}		0	-	100	A
Sensitivity	Sens	$I_{PR}(min) < I_P < I_{PR}(max)$		26.4		mV/A
Zero Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P =0A	-	Vcc x 0.1	-	V
Accuracy Performance						
Total Output Error	E_{TOT}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$	-2	±1	2	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$		±3		%
Sensitivity Error	E_{Sens}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C	-1.5	±1	1.5	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C		±3		%
Electrical Offset Error	V_{OE}	I_P=0A, T_A=25°C	-10	±6	10	mV
		I_P=0A, T_A= -40°C to 125°C	-30	±15	30	mV

MCS382K100B3QFRG Performance Characteristics

DC operating parameters at VCC = 3.3V，TA=-40°C~125°C, unless other wise specified

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal parameters						
Current Measurement Range	I_{PR}		-100	-	100	A
Sensitivity	Sens	$I_{PR}(min) < I_P < I_{PR}(max)$		13.2		mV/A
Zero Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P =0A	-	Vcc x 0.5	-	V
Accuracy Performance						
Total Output Error	E_{TOT}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$	-2	±1	2	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$		±3		%
Sensitivity Error	E_{Sens}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C	-1.5	±1	1.5	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C		±3		%
Electrical Offset Error	V_{OE}	I_P=0A, T_A=25°C	-10	±6	10	mV
		I_P=0A, T_A= -40°C to 125°C	-30	±15	30	mV

MCS382K150U3QFRG Performance Characteristics

DC operating parameters at VCC = 3.3V，TA=-40°C~125°C, unless other wise specified

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal parameters						
Current Measurement Range	I_{PR}	Instantaneous current	0	-	150	A
		Continuous current	0	-	100	A
Sensitivity	Sens	$I_{PR}(min) < I_P < I_{PR}(max)$		17.6		mV/A
Zero Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P =0A	-	Vcc x 0.1	-	V
Accuracy Performance						
Total Output Error	E_{TOT}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$	-2.5	±1	2.5	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$		±3		%
Sensitivity Error	E_{Sens}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C	-2	±1	2	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C		±3		%
Electrical Offset Error	V_{OE}	I_P=0A, T_A=25°C	-10	±6	10	mV
		I_P=0A, T_A= -40°C to 125°C	-30	±15	30	mV

MCS382K150B3QFRG Performance Characteristics

DC operating parameters at VCC = 3.3V，TA=-40°C~125°C, unless other wise specified

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Nominal parameters						
Current Measurement Range	I_{PR}	Instantaneous current	-150	-	150	A
		Continuous current	-100	-	100	A
Sensitivity	Sens	$I_{PR}(min) < I_P < I_{PR}(max)$		8.8		mV/A
Zero Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P =0A	-	Vcc x 0.5	-	V
Accuracy Performance						
Total Output Error	E_{TOT}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$	-2.5	±1	2.5	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$		±3		%
Sensitivity Error	E_{Sens}	$I_P = I_{PR}(max)$, T_A=25°C to 125°C	-2	±1	2	%
		$I_P = I_{PR}(max)$, T_A= -40°C to 25°C		±3		%
Electrical Offset Error	V_{OE}	I_P=0A, T_A=25°C	-10	±6	10	mV
		I_P=0A, T_A= -40°C to 125°C	-30	±15	30	mV

Performances Parameters Definitions

- **Sensitivity(Sens)**

  Unit: mV/A, the corresponding ratio of the output voltage to the primary current.

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

  V_{IOUT}=0.1V*Vcc , when input primary current Ipr=0 when using single side measurement model.

  V_{IOUT}=0.5V*Vcc, when input primary current Ipr=0 when using two-sided measurement model.

- **Bias Voltage(Voe)**

  The difference between $V_{OUT\ (Q)}$ output voltage and theoretical output voltage is caused due to magnetic retention and internal circuit operation imbalance.

- **Total Output Error (E_{TOT}):**

  Error between the device measurement current and Applied current (I_P), which is defined as the difference between the ideal output voltage and the actual output voltage divided by the ideal sensitivity:

$$E_{TOT(I_P)} = \frac{V_{I_{OUT(I_P)}} - V_{I_{OUT(ideal)(I_P)}}}{Sens_{(ideal)} \times I_P}$$

$$V_{I_{OUT(ideal)(I_P)}} = V_{I_{OUT(Q)}} + (Sens_{(ideal)} \times I_P)$$

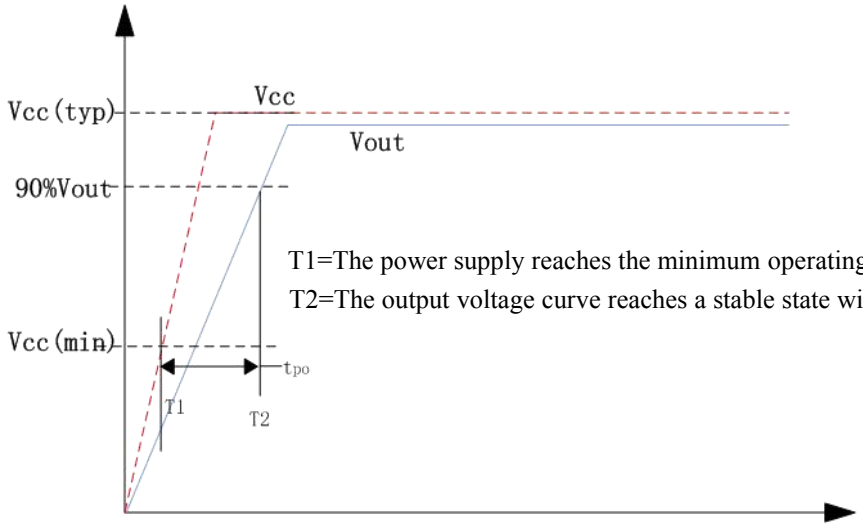
- **Linearity error (E_{LIN})**

  The nonlinear error in the full measurement range is calculated by the following formula:

  E_{LIN}=(1-((V_{IOUT}_($I_{PR\ (MAX)}$)-$V_{IOUT\ (Q)}$)/(2*V_{IOUT}_($I_{PR\ (MAX)}$ /2) -$V_{IOUT\ (Q)}$)) *100 (%)

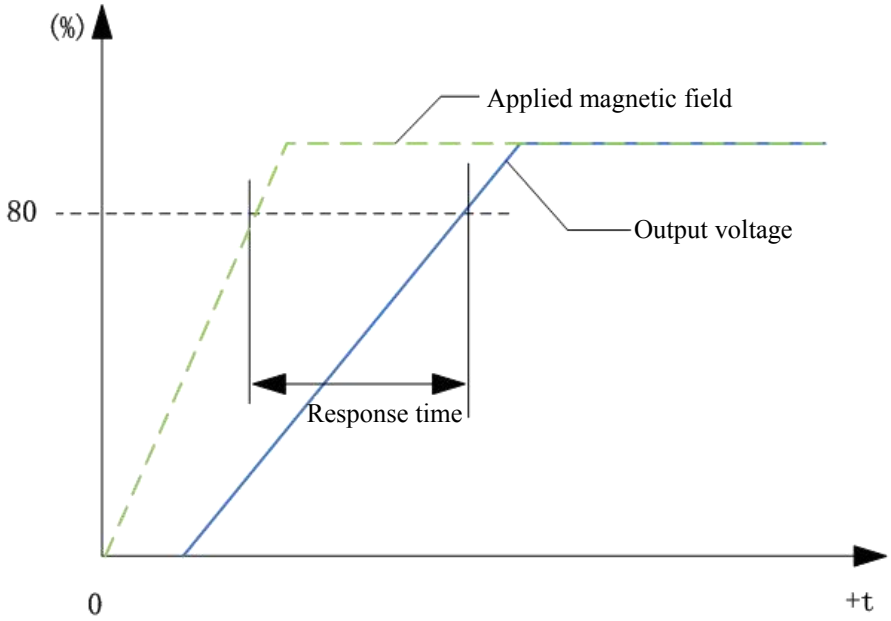
- **Power-on time (Tpo)**

  When the VCC power supply reaches its operating voltage, the internal IC needs a certain amount of time to respond to the external magnetic field. Tpo is defined as the time required for the output voltage waveform to reach a stable state within ±10% after the IC power supply reaches the minimum operating voltage under a certain external magnetic field. See the picture below:



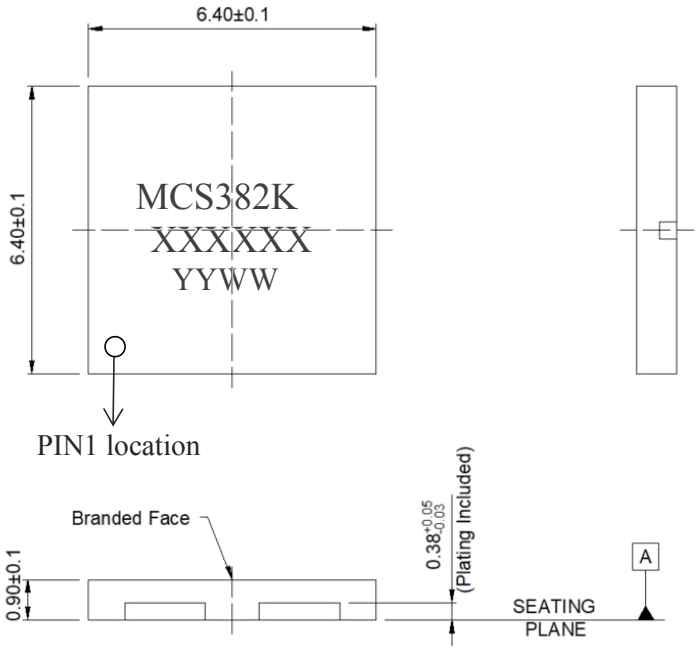
- **Response Time：**

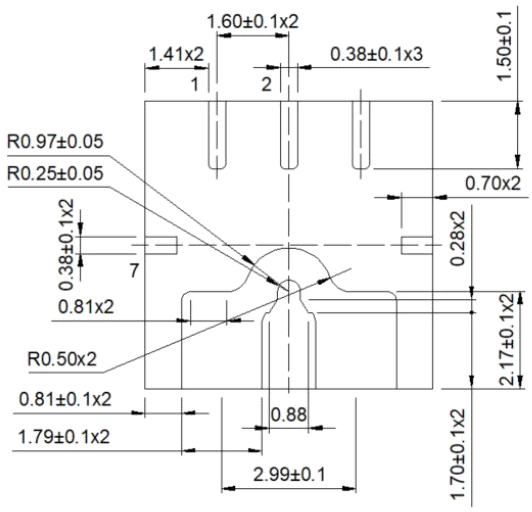
The time difference between 80% of the applied magnetic field and 80% of the output voltage. See below:



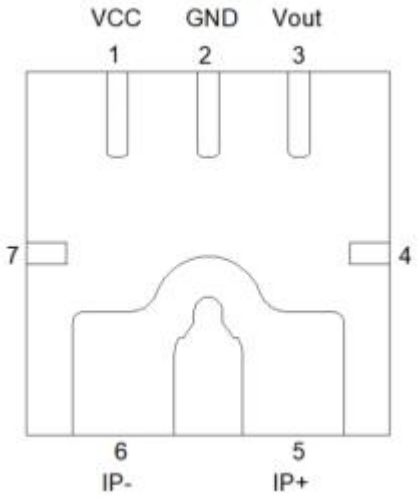
Package Dimension And Marking

(Top View)





(Bottom view)



NOTES:

1. Controlling dimension: mm
2. Leads must be free of flash and plating voids
3. Do not bend leads within 1 mm of lead to package interface.
4. Dot: PIN1 location identifier.
5. PINOUT

Pin number	Name	Description
1	VCC	Work input power
2	GND	Ground
3	VOUT	Signal output
4	NC	Grounding or hanging is recommended
5	IP+	Primary side detects current terminals
6	IP-	Primary side detects current terminals
7	GND	Grounding or hanging is recommended

6. MCS382K:Series
7. XXXXXX:Specific model
8. YYWW:1st and 2nd YY=Year;
   3rd and 4th WW=Week.

QFN Package Tape Direction