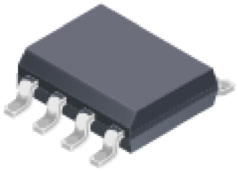
CH701

AEC-Q100 Qualified, 3000V$_{RMS}$ Isolation, Hall Current Sensor IC in SOIC-8 Package

Features

- Reinforced isolation: **3000V$_{RMS}$**
- Total output error: **±1% typical**
- AEC-Q100 qualified
- Primary conductor resistance: **0.8 mΩ**
- Single supply: **3.3V or 5V**
- Output voltage proportional to AC or DC current: **±5A, ±10A, ±20A, ±30A, ±40A, ±50A**
- Bandwidth: **120 kHz**
- Response time: **4 us**
- Ratio-metric output from supply voltage
- Adjustable bandwidth and resolution with a filter pin
- Small-footprint SOIC-8 package suitable for replacing bulky transformers or shunt current sensing solutions
- Integrated shield virtually eliminates capacitive coupling from current conductor to die, greatly suppressing output noise due to high dv/dt transients
- Factory-trimmed sensitivity and quiescent output voltage for improved accuracy
- Chopper stabilization results in extremely stable quiescent output voltage

Package

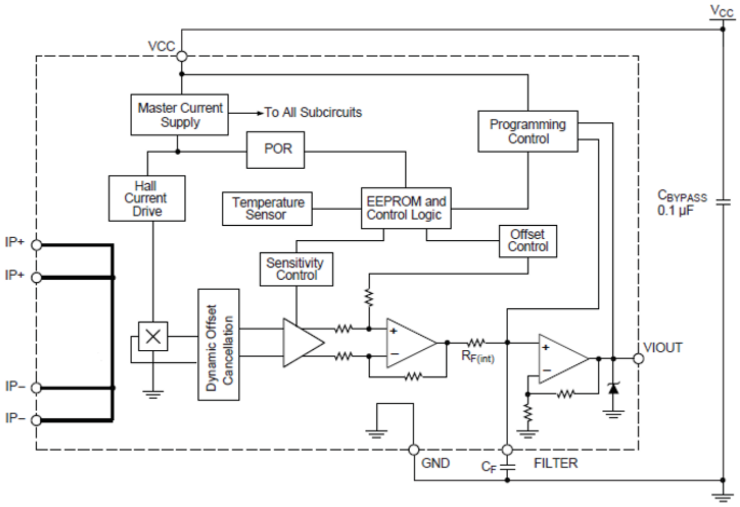


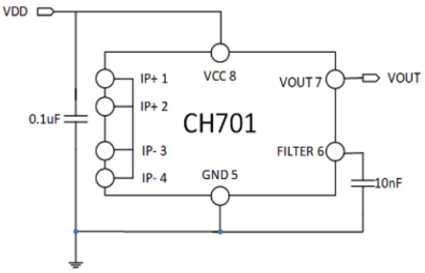
SO-8

Application

- Variable-frequency inverters
- Motor control
- Over-current fault protection
- Load detection and management

Functional Block Diagram


VCC
Vcc
Master Current Supply
To All Subcircuits
Programming Control
POR
Hall Current Drive
Temperature Sensor
EEPROM and Control Logic
Offset Control
Sensitivity Control
Dynamic Offset Cancellation
CBYPASS 0.1 µF
IP+
IP+
IP−
IP−
RF(int)
VIOUT
GND
CF
FILTER


VDD
0.1uF
IP+ 1
IP+ 2
IP- 3
IP- 4
VCC 8
CH701
GND 5
VOUT 7
VOUT
FILTER 6
10nF

Description

The CH701 current sensor IC is an economical and precise solution for AC or DC current sensing in industrial, automotive, commercial, and communications 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. A precise, proportional voltage is provided by the low-offset, chopper-stabilized BCD Hall IC, which is programmed for accuracy after packaging. The output of the device has a positive slope when an increasing current flows through the primary copper conduction path (from pins 1 and 2, to pins 3 and 4), which is the path used for current sensing. The internal resistance of this conductive path is 0.8 mΩ typical, providing low power loss.

The terminals of the conductive path are electrically isolated from the sensor leads (pins 5 through 8). This allows the CH701 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.

The CH701 is provided in a small, low-profile surface-mount SOIC8 package. The leadframe is plated with 100% matte tin, which is compatible with standard lead (Pb) free printed circuit board assembly processes. Internally, the device is Pb-free, except for flip-chip high-temperature Pb-based solder balls, currently exempt from RoHS. The device is fully calibrated prior to shipment from the factory.

Similar Products

All products can be operated with 3.3V or 5V supply, and can measure AC and DC.

Product Family	Package	R_{IP}	Bandwidth	Current Range	AEC-Q100	V_{ISO}	Status
CH703	SOIC-8	1.2mΩ	120kHz	±5A, ±10A, ±20A, ±30A, ±40A, ±50A	NO	2100V_{RMS}	Released
CH701	SOIC-8	1.2mΩ	120kHz	±5A, ±10A, ±20A, ±30A, ±40A, ±50A	NO	3000V_{RMS}	Released
CH701W	SOIC-16	0.8mΩ	120kHz	±5A, ±10A, ±20A, ±30A, ±40A, ±50A, ±60A, ±70A	YES	4800V_{RMS}	Released
CHI706	SOIC-8	1.2mΩ	450kHz	±5A, ±10A, ±20A, ±30A, ±40A, ±50A	NO	3000V_{RMS}	Preliminary
CHI706W	SOIC-16	0.8mΩ	450kHz	±5A, ±10A, ±20A, ±30A, ±40A, ±50A, ±60A, ±70A	NO	4800V_{RMS}	Preliminary
CHA707W	SOIC-16	0.8mΩ	450kHz	±5A, ±10A, ±20A, ±30A, ±40A, ±50A, ±60A, ±70A	YES	4800V_{RMS}	Preliminary
*CHI704	PFF-5	0.1mΩ	120kHz	±50A, ±100A, ±150A, ±200A	NO	4800V_{RMS}	Preliminary
*CHA704	PFF-5	0.1mΩ	120kHz	±50A, ±100A, ±150A, ±200A	YES	4800V_{RMS}	Preliminary

*CHI704 and CHA704 supply voltage 4.5-5.5V.

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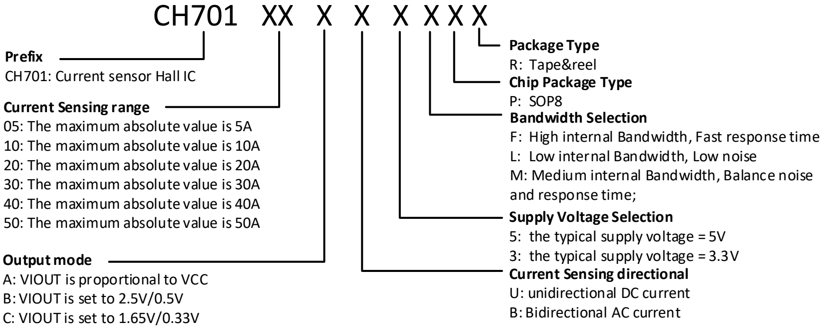
1 Product Family Members

CH701x is available in a variety of delivery forms. They are distinguished by a specific nomenclature code:



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Prefix
CH701: Current sensor Hall IC

Current Sensing range
05: The maximum absolute value is 5A
10: The maximum absolute value is 10A
20: The maximum absolute value is 20A
30: The maximum absolute value is 30A
40: The maximum absolute value is 40A
50: The maximum absolute value is 50A

Output mode
A: VIOUT is proportional to VCC
B: VIOUT is set to 2.5V/0.5V
C: VIOUT is set to 1.65V/0.33V

Package Type
R: Tape&reel

Chip Package Type
P: SOP8

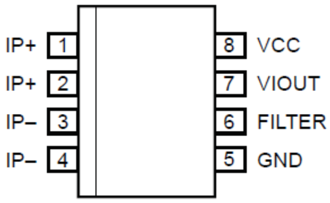
Bandwidth Selection
F: High internal Bandwidth, Fast response time
L: Low internal Bandwidth, Low noise
M: Medium internal Bandwidth, Balance noise and response time;

Supply Voltage Selection
5: the typical supply voltage = 5V
3: the typical supply voltage = 3.3V

Current Sensing directional
U: unidirectional DC current
B: Bidirectional AC current

Part Number	VCC (V)	I_{PR} (A)	Sens (mV/A)	T_j (°C)	Packing
CH70105AU5*	5±0.5	5	800	-40 to 150	Tape and Reel, 3000 pieces per reel
CH70105AU3*	3.3±0.3	5	528		
CH70105AB5*	5±0.5	±5	400		
CH70105AB3*	3.3±0.3	±5	264		
CH70105BU5*	5±0.5	5	800		
CH70105BB5*	5±0.5	±5	400		
CH70105CU3*	3.3±0.3	5	528		
CH70105CB3*	3.3±0.3	±5	264		
CH70110AU5*	5±0.5	10	400		
CH70110AU3*	3.3±0.3	10	264		
CH70110AB5*	5±0.5	±10	200		
CH70110AB3*	3.3±0.3	±10	132		
CH70110BU5*	5±0.5	10	400		
CH70110BB5*	5±0.5	±10	200		
CH70110CU3*	3.3±0.3	10	264		
CH70110CB3*	3.3±0.3	±10	132		
CH70120AU5*	5±0.5	20	200		
CH70120AU3*	3.3±0.3	20	132		
CH70120AB5*	5±0.5	±20	100		
CH70120AB3*	3.3±0.3	±20	66		
CH70120BU5*	5±0.5	20	200		
CH70120BB5*	5±0.5	±20	100		
CH70120CU3*	3.3±0.3	20	132		
CH70120CB3*	3.3±0.3	±20	66		
CH70130AU5*	5±0.5	30	133		
CH70130AU3*	3.3±0.3	30	88		
CH70130AB5*	5±0.5	±30	66		
CH70130AB3*	3.3±0.3	±30	44		
CH70130BU5*	5±0.5	30	133		
CH70130BB5*	5±0.5	±30	66		
CH70130CU3*	3.3±0.3	30	88		
CH70130CB3*	3.3±0.3	±30	44		
CH70140AU5*	5±0.5	40	100		
CH70140AU3*	3.3±0.3	40	66		
CH70140AB5*	5±0.5	±40	50		
CH70140AB3*	3.3±0.3	±40	33		
CH70140BU5*	5±0.5	40	100		
CH70140BB5*	5±0.5	±40	50		
CH70140CU3*	3.3±0.3	40	66		
CH70140CB3*	3.3±0.3	±40	33		
CH70150AU5*	5±0.5	50	80		
CH70150AU3*	3.3±0.3	50	52		
CH70150AB5*	5±0.5	±50	40		
CH70150AB3*	3.3±0.3	±50	26		
CH70150BU5*	5±0.5	50	80		
CH70150BB5*	5±0.5	±50	40		
CH70150CU3*	3.3±0.3	50	52		
CH70150CB3*	3.3±0.3	±50	26		

2 Pin Definitions and Descriptions



Package LC, 8-Pin SOICN
Pin-Out Diagram

Number	Name	Function
1,2	IP+	Terminals for current being sensed, fused internally
3,4	IP–	Terminals for current being sensed, fused internally
5	GND	Signal ground terminal
6	FILTER	Terminal for external capacitor that sets bandwidth
7	VIOUT	Analog output signal
8	VCC	Device power supply terminal

3 Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Units
Supply Voltage	V_{CC}	-	6	V
Reverse Supply Voltage	V_{RCC}	-0.1	-	V
Output Voltage	V_{IOUT}	-	V_{CC} +0.5	V
Reverse Output Voltage	V_{RIOUT}	-0.1	-	V
Operating Ambient Temperature	T_A	-40	150	°C
Storage Temperature	T_S	-65	165	°C
Junction temperature	$T_{J(max)}$		165	°C

Note 1: Exceeding the absolute maximum ratings may cause permanent damage. Exposure to absolute-maximum- rated conditions for extended periods may affect device reliability.

Isolation Characteristics

Characteristic	Symbol	Notes	Rating	Unit
Dielectric Strength Test Voltage	V_{ISO}	Agency type-tested for 60 seconds per UL 62368-1 (edition 3); production-tested at V_ISO for 1 second, in accordance with UL 62368-1 (edition 3). UL62368-1 (edition 3) replaces UL60950-1.	3000	V_{RMS}
Working Voltage for Basic Isolation	V_{WVBI}	Maximum approved working voltage for basic (single) isolation according to UL 62368-1 (edition 3). UL62368-1 (edition 3) replaces UL60950-1.	725	V_{pk} or VDC
			513	V_{rms}

Thermal Characteristics

Characteristic	Symbol	Test Conditions*	Value	Units
Package Thermal Resistance (Junction to Ambient)	$R_{\theta JA}$		23	ºC/W
Package Thermal Resistance (Junction to Lead)	$R_{\theta JL}$		5	ºC/W

4 ESD Protections

Parameter	Value	Unit
All pins $^{1)}$	±8000	V
All pins $^{2)}$	±400	V
All pins $^{3)}$	±1500	V

1) HBM (human body mode, 100pF, 1.5 kΩ) according to MIL-STD-883H Method 3015.8
2) MM (Machine Mode C=200pF, R=0Ω) according to JEDEC EIA/JESD22-A115
3) CDM (charged device mode) according to JEDEC EIA/JESD22-C101F

5 Electrical Characteristics:

Valid through the full range of T_A , V_{CC} = 5 V, C_F = 0, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Supply Current	I_{CC}	V_{CC} = 5 V, output open	–	10	14	mA
Output Capacitance Load	C_L	VIOUT to GND	–	–	10	nF
Output Resistive Load	R_L	VIOUT to GND	4.7	–	–	kΩ
Primary Conductor Resistance	R_{IP}	T_A = 25°C	–	0.8	–	mΩ
Internal Filter Resistance[2]	$R_{F(int)}$		–	1.7	–	kΩ
Rise Time	t_r	$I_P = I_P$(max), T_A = 25°C, C_L = 1 nF	–	3	–	μs
Propagation Delay	t_{pd}	$I_P = I_P$(max), T_A = 25°C, C_L = 1 nF	–	2	–	μs
Response Time	$t_{RESPONSE}$	$I_P = I_P$(max), T_A = 25°C, C_L = 1 nF	–	4	–	μs
Bandwidth	BW	Small signal –3 dB; C_L = 1 nF	–	120	–	kHz
Noise Density	I_{ND}	Input-referenced noise density; T_A = 25°C, C_L = 1 nF	–	150	–	$\mu A_{(rms)}/\sqrt{Hz}$
Noise	I_N	Input-referenced noise: C_F = 4.7 nF, C_L = 1 nF, BW = 18 kHz, T_A = 25°C	–	25	–	$mA_{(rms)}$
Nonlinearity	E_{LIN}	Through full range of I_P		±1		%
Sensitivity Ratiometry Coefficient	SENS_RAT_COEF	V_{CC} = 4.5 to 5.5 V, T_A = 25ºC	–	1.3	–	–
Zero-Current Output Ratiometry Coefficient	QVO_RAT_COEF	V_{CC} = 4.5 to 5.5 V, T_A = 25ºC	–	1	–	–
Saturation Voltage[3]	V_{OH}	R_L = 4.7 kΩ, TA = 25°C	VCC – 0.2		–	V
	V_{OL}	R_L = 4.7 kΩ, TA = 25°C	–		0.2	V
Power-On Time	t_{PO}	Output reaches 90% of steady-state level, T_A = 25°C, I_P = I_{PR}(max) applied	–	62	–	μs
Shorted Output-to-Ground Current	$I_{SC(GND)}$	T_A = 25ºC	–	3.3	–	mA
Shorted Output-to-V_{CC} Current	$I_{SC(VCC)}$	T_A = 25ºC	–	45	–	mA

[1] Device may be operated at higher primary current levels, I_P, ambient temperatures, T_A, and internal leadframe temperatures, provided the Maximum Junction Temperature, T_J(max), is not exceeded.

[2] $R_{F(int)}$ forms an RC circuit via the FILTER pin.

[3] The sensor IC will continue to respond to current beyond the range of I_P until the high or low saturation voltage; however, the nonlinearity in this region will be worse than through the rest of the measurement range.

CH70105AU3* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing Range	I_{PR}		0	–	5	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$, VCC = 3.3V	–	480	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P = 0 A, VCC = 3.3V	–	0.45	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j =-40°C to 150ºC	–2.5	±1.5	2.5	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–2	±1	2	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j =-40°C to 150ºC	–15	±7	15	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70105AB5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		-5	–	5	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$, VCC = 5V	–	400	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A, VCC = 5V	–	V_{CC} × 0.5	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±1	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±1	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70105AB3* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing Range	I_{PR}		-5	–	5	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$, VCC = 3.3V	–	264	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A, VCC = 3.3V	–	V_{CC} × 0.5	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±1	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±1	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70105BU5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		0	–	5	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	740	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P = 0 A	–	0.65	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2.5	±1.5	2.5	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–2	±1	2	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–15	±7	15	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70105BB5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		-5	–	5	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	400	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A	–	2.5	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±1	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±1	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70105CU5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		0	–	5	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	480	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P = 0 A	–	0.45	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2.5	±1.5	2.5	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–2	±1	2	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–15	±7	15	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70105CU3* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing Range	I_{PR}		0	–	5	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	480	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P = 0 A	–	0.45	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2.5	±1.5	2.5	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–2	±1	2	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–15	±7	15	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70105CB3* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing Range	I_{PR}		-5	–	5	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	264	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A	–	1.65	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±1	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±1	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70110AU5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		0	–	10	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$, VCC = 5V	–	370	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P = 0 A, VCC = 5V	–	0.65	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j =-40°C to 150ºC	–2.5	±1.5	2.5	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–2	±1	2	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j =-40°C to 150ºC	–15	±7	15	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70110AU3* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing Range	I_{PR}		0	–	10	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$, VCC = 3.3V	–	240	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P = 0 A, VCC = 3.3V	–	0.45	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j =-40°C to 150ºC	–2.5	±1.5	2.5	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–2	±1	2	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j =-40°C to 150ºC	–15	±7	15	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70110AB5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		-10	–	10	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$, VCC = 5V	–	200	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A, VCC = 5V	–	V_{CC} × 0.5	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±1	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±1	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70110AB3* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing Range	I_{PR}		-10	–	10	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$, VCC = 3.3V	–	132	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A, VCC = 3.3V	–	V_{CC} × 0.5	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±1	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(\text{Sens} \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±1	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70110BU5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		0	–	10	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	370	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P = 0 A	–	0.65	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2.5	±1.5	2.5	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(\text{Sens} \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–2	±1	2	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–15	±7	15	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70110BB5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		-10	–	10	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	200	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A	–	2.5	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±1	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±1	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70110CU3* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing Range	I_{PR}		0	–	10	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	240	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P = 0 A	–	0.45	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2.5	±1.5	2.5	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–2	±1	2	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–15	±7	15	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70110CB5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		-10	–	10	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	132	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A	–	1.65	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±1	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±1	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70110CB3* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing Range	I_{PR}		-10	–	10	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	132	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A	–	1.65	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±1	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±1	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values
[2] Percentage of I_P, with $I_P = I_{PR(max)}$.
[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70120AU5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		0	–	20	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$, VCC = 5V	–	200	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P = 0 A, VCC = 5V	–	V_{CC} × 0.1	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.7	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.7	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70120AU3* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing Range	I_{PR}		0	–	20	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$, VCC = 3.3V	–	132	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P = 0 A, VCC = 3.3V	–	0.45	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.7	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.7	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70120AB5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		-20	–	20	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$, VCC = 5V	–	100	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A, VCC = 5V	–	V_{CC} × 0.5	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.8	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.6	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±5	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70120AB3* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing Range	I_{PR}		-20	–	20	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$, VCC = 3.3V	–	66	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A, VCC = 3.3V	–	V_{CC} × 0.5	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.8	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.6	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±5	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70120BU5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		0	–	20	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	200	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P = 0 A	–	0.5	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.7	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.7	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70120BB5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		-20	–	20	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	100	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A	–	2.5	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.8	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.6	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±5	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70120CU5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		0	–	20	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	132	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P = 0 A	–	0.33	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.7	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.7	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70120CU3* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing Range	I_{PR}		0	–	20	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	132	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P = 0 A	–	0.33	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.7	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.7	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70120CB5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		-20	–	20	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	66	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A	–	1.65	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.8	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.6	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±5	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70120CB3* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing Range	I_{PR}		-20	–	20	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	66	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A	–	1.65	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.8	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.6	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±5	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70130AU5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		0	–	30	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$, VCC = 5V	–	133	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P = 0 A, VCC = 5V	–	V_{CC} × 0.1	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.7	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.7	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values
[2] Percentage of I_P, with $I_P = I_{PR(max)}$.
[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70130AU3* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing Range	I_{PR}		0	–	30	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$, VCC = 3.3V	–	88	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P = 0 A, VCC = 3.3V	–	0.45	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.7	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.7	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70130AB5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		-30	–	30	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$, VCC = 5V	–	66	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A, VCC = 5V	–	V_{CC} × 0.5	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.8	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.8	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70130AB3* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing Range	I_{PR}		-30	–	30	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$, VCC = 3.3V	–	44	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A, VCC = 3.3V	–	V_{CC} × 0.5	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.8	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.8	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70130BU5* Performance Characteristics: T_A Range L, valid at T_j = −40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing 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 = 0 A	–	0.5	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.7	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.7	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70130BB5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		-30	–	30	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	66	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A	–	2.5	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.8	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.6	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±5	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70130CU5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing 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 = 0 A	–	0.33	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.7	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.7	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70130CU3* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing 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 = 0 A	–	0.33	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.7	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.7	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70130CB5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		-30	–	30	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	44	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, $I_P = 0$ A	–	1.65	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.8	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.6	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±5	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70130CB3* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing Range	I_{PR}		-30	–	30	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	44	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A	–	1.65	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.8	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.6	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±5	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70140AU5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		0	–	40	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$, VCC = 5V	–	100	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P = 0 A, VCC = 5V	–	V_{CC} × 0.1	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.7	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.7	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70140AU3* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing Range	I_{PR}		0	–	40	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$, VCC = 3.3V	–	66	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P = 0 A, VCC = 3.3V	–	0.45	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.7	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.7	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values
[2] Percentage of I_P, with $I_P = I_{PR(max)}$.
[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70140AB5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		-40	–	40	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$, VCC = 5V	–	50	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A, VCC = 5V	–	V_{CC} × 0.5	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.8	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.6	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±5	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70140AB3* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing Range	I_{PR}		-40	–	40	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$, VCC = 3.3V	–	33	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A, VCC = 3.3V	–	V_{CC} × 0.5	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.8	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.6	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±5	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70140BU5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing 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 = 0 A	–	0.5	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.7	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.7	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70140BB5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		-40	–	40	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	50	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A	–	2.5	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.8	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.6	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j =-40°C to 150ºC	–10	±5	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70140CU5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing 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 = 0 A	–	0.33	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.7	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.7	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70140CU3* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing 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 = 0 A	–	0.33	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.7	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.7	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70140CB5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		-40	–	40	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	33	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A	–	1.65	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.8	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.6	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±5	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70140CB3* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing Range	I_{PR}		-40	–	40	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	33	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A	–	1.65	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.8	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.6	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±5	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70150AU5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		0	–	50	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$, VCC = 5V	–	80	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P = 0 A, VCC = 5V	–	V_{CC} × 0.1	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.7	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.7	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70150AU3* Performance Characteristics: T_A Range L, valid at $T_j = -40°C$ to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing Range	I_{PR}		0	–	50	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$, VCC = 3.3V	–	52	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P = 0 A, VCC = 3.3V	–	0.45	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.7	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.7	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values
[2] Percentage of I_P, with $I_P = I_{PR(max)}$.
[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70150AB5* Performance Characteristics: T_A Range L, valid at T_j = −40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		-50	–	50	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$, VCC = 5V	–	40	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A, VCC = 5V	–	V_{CC} × 0.5	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.8	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.6	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±5	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70150AB3* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing Range	I_{PR}		-50	–	50	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$, VCC = 3.3V	–	26	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A, VCC = 3.3V	–	V_{CC} × 0.5	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.8	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.6	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±5	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70150BU5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing 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 = 0 A	–	0.5	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.7	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.7	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70150BB5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		-50	–	50	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	40	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A	–	2.5	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.8	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.6	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±5	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70150CU5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		0	–	50	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	52	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P = 0 A	–	0.33	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.7	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.7	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70150CU3* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing Range	I_{PR}		0	–	50	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	52	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Unidirectional, I_P = 0 A	–	0.33	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.7	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.7	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±6	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70150CB5* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		4.5	–	5.5	V
Current-Sensing Range	I_{PR}		-50	–	50	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	26	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A	–	1.65	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.8	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.6	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±5	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

CH70150CB3* Performance Characteristics: T_A Range L, valid at T_j = –40°C to 150°C, unless otherwise specified

Characteristic	Symbol	Test Conditions	Min.	Typ.[1]	Max.	Unit
Nominal Performance						
Supply Voltage	V_{CC}		3	–	3.6	V
Current-Sensing Range	I_{PR}		-50	–	50	A
Sensitivity	Sens	$I_{PR(min)} < I_P < I_{PR(max)}$	–	26	–	mV/A
Zero-Current Output Voltage	$V_{IOUT(Q)}$	Bidirectional, I_P = 0 A	–	1.65	–	V
Accuracy Performance						
Total Output Error[2]	E_{TOT}	$I_P = I_{PR(max)}$, T_j = -40°C to 150ºC	–2	±0.8	2	%
Total Output Error Components[3] $E_{TOT} = E_{SENS} + 100 \times V_{OE}/(Sens \times I_P)$						
Sensitivity Error	E_{sens}	$I_P = I_{PR(max)}$, T_j = -40°C to 150°C	–1.5	±0.6	1.5	%
Offset Voltage	V_{OE}	I_P = 0 A, T_j = -40°C to 150ºC	–10	±5	10	mV
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{sens_drift}			±1		%
Total Output Error Lifetime Drift	E_{tot_drift}			±1		%

[1] Typical values with +/- are 3 sigma values

[2] Percentage of I_P, with $I_P = I_{PR(max)}$.

[3] A single part will not have both the maximum/minimum sensitivity error and maximum/minimum offset voltage, as that would violate the maximum/minimum total output error specification. Also, 3 sigma distribution values are combined by taking the square root of the sum of the squares. See Application Information section.

6 Application Information

6.1 Estimating Total Error vs. Sensed Current

The Performance Characteristics tables give distribution (±3sigma) values for Total Error at $I_{PR(max)}$; however, one often wants to know what error to expect at a particular current. This can be estimated by using the distribution data for the components of Total Error, Sensitivity Error, and Offset Voltage. The ±3 sigma value for Total Error (E_{TOT}) as a function of the sensed current (I_P) is estimated as:

$$E_{TOT}(I_P) = \sqrt{{E_{SENS}}^2 + \left(\frac{100 \times V_{OE}}{Sens \times I_P}\right)^2}$$

Here, E_{SENS} and V_{OE} are the ±3 sigma values for those error terms. If there is an average sensitivity error or average offset voltage, then the average Total Error is estimated as:

$$E_{TOT_{AVG}}(I_P) = E_{SENS_{AVG}} + \frac{100 \times V_{OE_{AVG}}}{Sens \times I_P}$$

The resulting total error will be a sum of E_{TOT} and E_{TOT_AVG}. Using these equations and the 3 sigma distributions for Sensitivity Error and Offset Voltage, the Total Error versus sensed current (I_P) is below for the CH70120AB. As expected, as one goes towards zero current, the error in percent goes towards infinity due to division by zero.

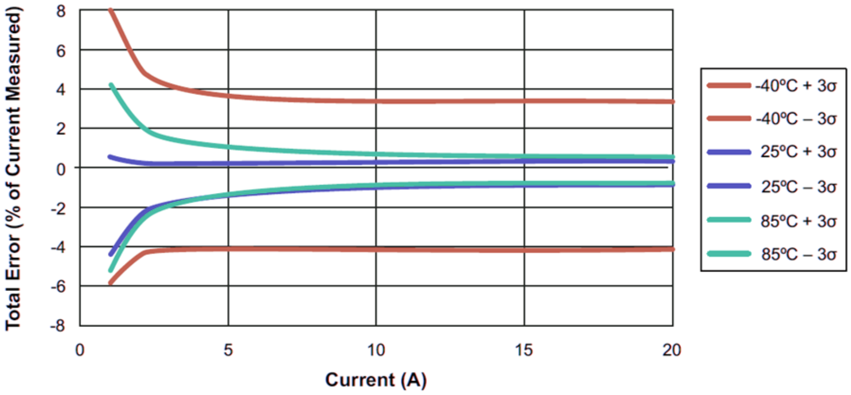


Figure 1: Predicted Total Error as a Function of the Sensed Current for the CH70120AB

6.2 Definitions of accuracy characteristics

Sensitivity (Sens). The change in sensor IC output in response to a 1 A change through the primary conductor. The sensitivity is the product of the magnetic circuit sensitivity (G/A) (1 G = 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.

Nonlinearity (E_{LIN}). The nonlinearity is a measure of how linear the output of the sensor IC is over the full current measurement range. The nonlinearity is calculated as:

$$E_{LIN} = \left\{1 - \left[\frac{V_{IOUT}\left(I_{PR(max)}\right) - V_{IOUT(Q)}}{2 \times \left(V_{IOUT}\left(\frac{I_{PR(max)}}{2}\right) - V_{IOUT(Q)}\right)}\right]\right\} \times 100(\%)$$

where $V_{IOUT}(I_{PR(max)})$ is the output of the sensor IC with the maximum measurement current flowing through it and $V_{IOUT}(I_{PR(max)}/2)$ is the output of the sensor IC with half of the maximum measurement current flowing through it.

Zero-Current Output Voltage ($V_{IOUT(Q)}$). The output of the sensor when the primary current is zero. For a unipolar supply voltage, it nominally remains at 0.5 × V_{CC} for a bidirectional device and 0.1 × V_{CC} for a unidirectional device. For example, in the case of a bidirectional output device, V_{CC} = 5 V translates into $V_{IOUT(Q)}$ = 2.5 V. 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}). The deviation of the device output from its ideal quiescent value of 0.5 × V_{CC} (bidirectional) or 0.1 × V_{CC} (unidirectional) due to nonmagnetic causes. To convert this voltage to amperes, divide by the device sensitivity, Sens.

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:

$$E_{TOT}(I_P) = \frac{V_{IOUT\_ideal}(I_P) - V_{IOUT}(I_P)}{Sens_{ideal}(I_P) \times I_P} \times 100(\%)$$

The Total Output Error incorporates all sources of error and is a function of I_P . At relatively high currents, E_{TOT} will be mostly due to sensitivity error, and at relatively low currents, E_{TOT} will be mostly due to Offset Voltage (V_{OE}). In fact, at $I_P = 0$, E_{TOT} approaches infinity due to the offset. This is illustrated in Figures 2 and 3. Figure 2 shows a distribution of output voltages versus I_P at 25°C and across temperature. Figure 3 shows the corresponding E_{TOT} versus I_P .

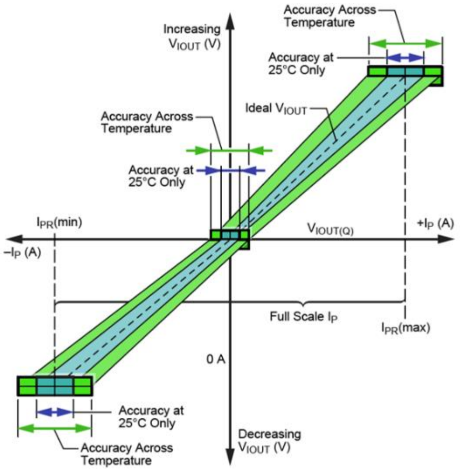


Figure 2: Output Voltage versus Sensed Current

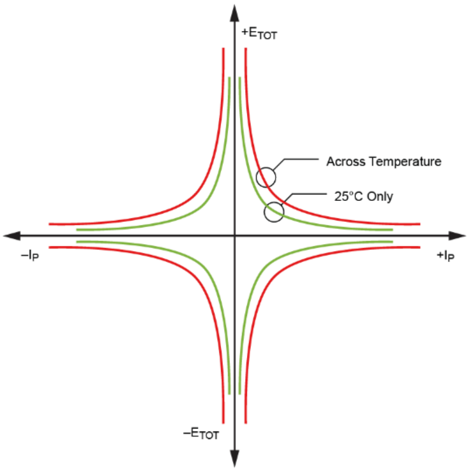


Figure3: Total Output Error versus Sensed Current

Sensitivity Ratiometry Coefficient (SENS_RAT_COEF). The coefficient defines how the sensitivity scales with V_{CC}. The ideal coefficient is 1, meaning the sensitivity scales proportionally with V_{CC}. A 10% increase in V_{CC} results in a 10% increase in sensitivity. A coefficient of 1.1 means that the sensitivity increases by 10% more than the ideal proportionality case. This means that a 10% increase in V_{CC} results in an 11% increase in sensitivity. This relationship is described by the following equation:

$$\mathrm{Sens}(V_{CC}) = Sens(5V)\left[1 + \frac{(V_{CC} - 5V) \times SENS\_RAT\_COEF}{5V}\right]$$

This can be rearranged to define the sensitivity ratiometry coefficient as:

$$SENS_{RAT_{COEF}} = \left[\frac{\mathrm{Sens}(V_{CC})}{Sens(5V)} - 1\right] \times \frac{5V}{V_{CC} - 5V}$$

Zero-Current Output Ratiometry Coefficient (QVO_RAT_ COEF). The coefficient defines how the zero-current output voltage scales with V_{CC}. The ideal coefficient is 1, meaning the output voltage scales proportionally with V_{CC}, always being equal to $V_{CC}/2$. A coefficient of 1.1 means that the zero-current output voltage increases by 10% more than the ideal proportionality case. This means that a 10% increase in V_{CC} results in an 11% increase in the zero-current output voltage. This relationship is described by the following equation:

$$\mathrm{VIOUTQ}(V_{CC}) = \mathrm{VIOUTQ}(5V)\left[1 + \frac{(V_{CC} - 5V) \times QVO\_RAT\_COEF}{5V}\right]$$

This can be rearranged to define the zero-current output ratiometry coefficient as:

$$QVO\_RAT\_COEF = \left[\frac{\mathrm{VIOUTQ}(V_{CC})}{\mathrm{VIOUTQ}(5V)} - 1\right] \times \frac{5V}{V_{CC} - 5V}$$

6.3 *Definitions of dynamic response characteristics*

Power-On Time (t_{PO}). When the supply is ramped to its operating voltage, the device requires a finite time to power its internal components before responding to an input magnetic field. Power-On Time, t_{PO} , is defined as the time it takes for the output voltage to settle within ±10% of its steady-state value under an applied magnetic field, after the power supply has reached its minimum specified operating voltage, $V_{CC(min)}$, as shown in the chart at right.

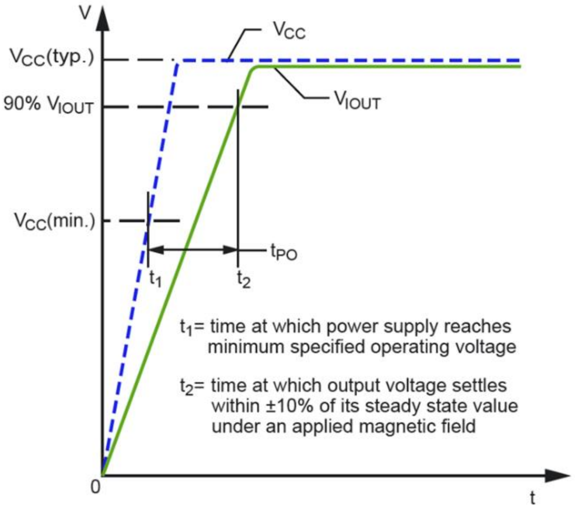

V
Vcc
Vcc(typ.)
90% VIOUT
VIOUT
Vcc(min.)
tPO
t1
t2
t1= time at which power supply reaches minimum specified operating voltage
t2= time at which output voltage settles within ±10% of its steady state value under an applied magnetic field
0
t

Figure 4: Power-On Time

Rise Time (t_r). The time interval between a) when the sensor IC reaches 10% of its full-scale value, and b) when it reaches 90% of its full-scale value. The rise time to a step response is used to derive the bandwidth of the current sensor IC, in which $f(-3\text{ dB}) = 0.35 / t_r$. Both t_r and $t_{RESPONSE}$ are detrimentally affected by eddy-current losses observed in the conductive IC ground plane.

Propagation Delay (t_{pd}). The propagation delay is measured as the time interval a) when the primary current signal reaches 20% of its final value, and b) when the device reaches 20% of its output corresponding to the applied current.

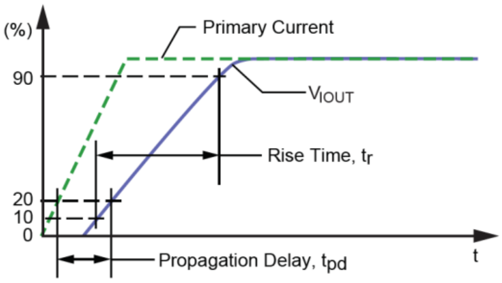

(%)
Primary Current
90
VIOUT
Rise Time, tr
20
10
0
Propagation Delay, tpd
t

Figure 5: Rise Time and Propagation Delay

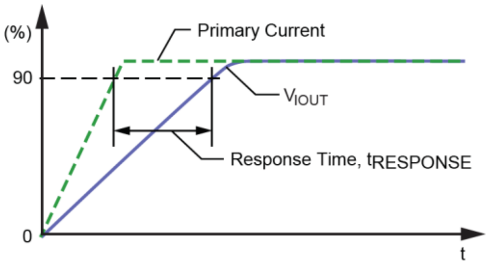
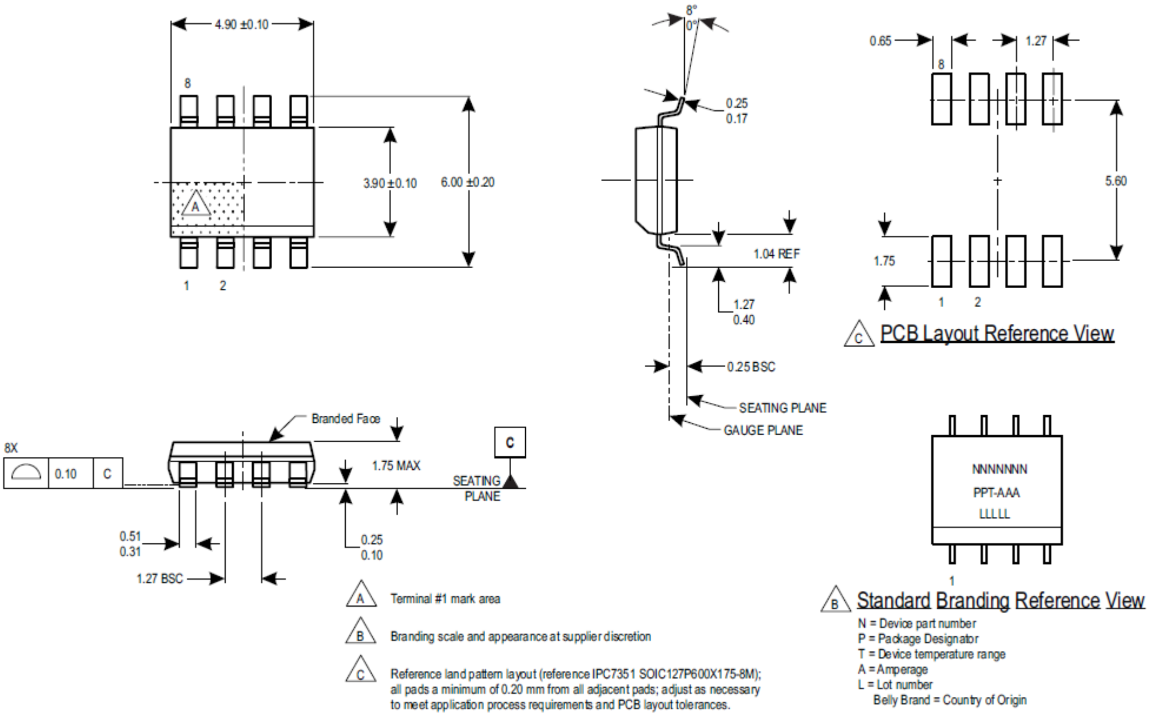

(%)
Primary Current
90
VIOUT
Response Time, tRESPONSE
0
t

Figure 6: Response Time

Response Time ($t_{RESPONSE}$). The time interval between a) when the primary current signal reaches 90% of its final value, and b) when the device reaches 90% of its output corresponding to the applied current.

7 Package Information:

For Reference Only – Not for Tooling Use
(Reference MS-012AA)
Dimensions in millimeters – NOT TO SCALE
Dimensions exclusive of mold flash, gate burrs, and dambar protrusions


4.90 ±0.10
8
1
2
A
3.90 ±0.10
6.00 ±0.20
8°
0°
0.25
0.17
1.04 REF
1.27
0.40
0.25 BSC
SEATING PLANE
GAUGE PLANE
0.65
1.27
8
5.60
1.75
1
2
C
PCB Layout Reference View
8X
0.10
C
Branded Face
1.75 MAX
C
SEATING PLANE
0.51
0.31
0.25
0.10
1.27 BSC
NNNNNNN
PPT-AAA
LLLLL
1
B
Standard Branding Reference View
A
B
C

A Terminal #1 mark area

B Branding scale and appearance at supplier discretion

C Reference land pattern layout (reference IPC7351 SOIC127P600X175-8M); all pads a minimum of 0.20 mm from all adjacent pads; adjust as necessary to meet application process requirements and PCB layout tolerances.

N = Device part number
P = Package Designator
T = Device temperature range
A = Amperage
L = Lot number
Belly Brand = Country of Origin

Figure 7: Package LC, 8-pin SOIC

8 Revision History

Date	Revision	Change
Nov 2019	1	First draft
May 2021	1.1	Updated format
July 2021	1.2	Added “Similar Products” section
July 2021	1.3	Correct AU serials zero voltage. Correct ELin formula.

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