Features

- *High Accuracy、Large Current*
  - *0~200A Current Sensor*
  - *Offset temperature drift: ±5mV*
  - *Sensitivity total output error:±1%*
  - *Typical sensitivity temperature drift: ±0.2%*
  - *Typical linearity error: ±0.2%High*
- *Bandwidth 、Fast Response*
  - *Typical Bandwidth: 250kHz*
  - *Typical response time: 1.5μs*
- *High Anti-interference、High Isolation*
  - *The integrated magnetic core resists stray magnetic field interference.*
  - *High Isolated Voltage : 5kVrms.*

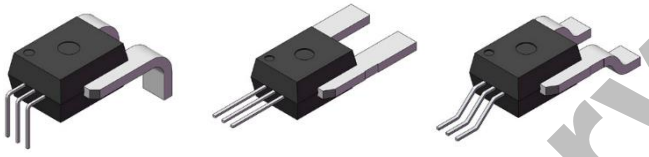
Description

The PIC1100 series is an open-loop Hall current sensing chip that combines high accuracy, high bandwidth, high response, high linearity, and low temperature drift. PIC1100 provides 0~200A large current measurement range. PIC1100 can also do -40 ℃ ~ 125 ℃ full temperature range of typical sensitivity temperature drift ± 0.2% of the performance indicators. It provides a new solution for the high accuracy and high performance current sensor area. PIC1100 adapts to strong electromagnetic and high isolation current detection environment. In addition, PIC1100 series products have passed CE, TUV and other certifications.

Applications

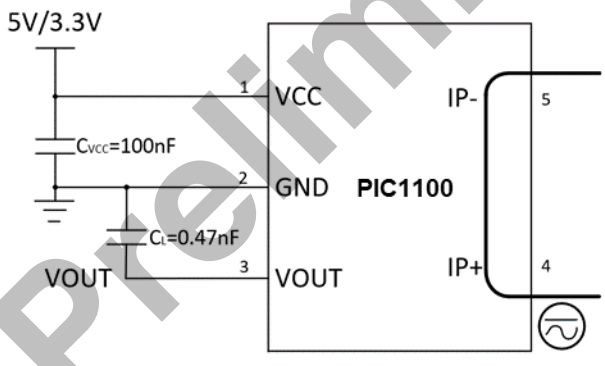
- *Photovoltaic Inverter*
- *Industrial Inverter*
- *Commercial Air Conditioning*
- *Charging Station*
- *Welding Machine*
- *Balancing Car*
- *UPS*

Package



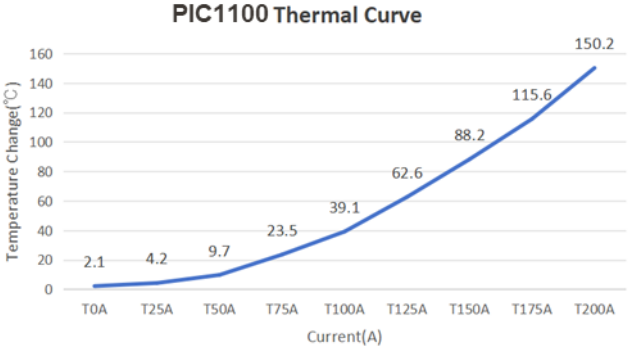
PFF **PSS** **SMT**

Application Circuits



Typical Application Circuit Diagram

Thermal Curve



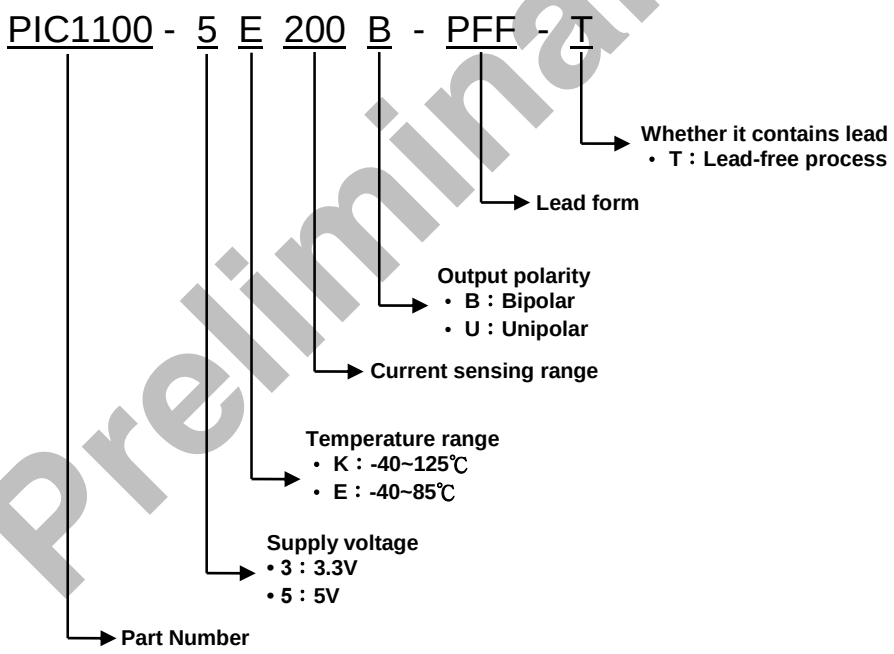
Thermal Curve is measured with the room temperature and no wind. The thermal response is highly depends on PCB layout, cooling techniques, copper thickness.

Selection Guide

Part Number	Output Mode	IPR(A)	Sensitivity(mV/A)		Lead Form	Operating Temperature	Packing
			*=3	*=5			
PIC1100-*K050U-PFF-T	Ratiometric Output Mode	50	52.8	80	PFF	-40℃ ~ 125℃	40 pieces per tube
PIC1100-*K050U-PSS-T					PSS		
PIC1100-*K050U-SMT-T					SMT		
PIC1100-*K050B-PFF-T		±50	26.4	40	PFF		
PIC1100-*K050B-PSS-T					PSS		
PIC1100-*K050B-SMT-T					SMT		
PIC1100-*K100U-PFF-T		100	26.4	40	PFF		
PIC1100-*K100U-PSS-T					PSS		
PIC1100-*K100U-SMT-T					SMT		
PIC1100-*K100B-PFF-T		±100	13.2	20	PFF		
PIC1100-*K100B-PSS-T					PSS		
PIC1100-*K100B-SMT-T					SMT		
PIC1100-*K150U-PFF-T		150	17.6	26.66	PFF		
PIC1100-*K150U-PSS-T					PSS		
PIC1100-*K150U-SMT-T					SMT		
PIC1100-*K150B-PFF-T		±150	8.8	13.33	PFF		
PIC1100-*K150B-PSS-T					PSS		
PIC1100-*K150B-SMT-T					SMT		
PIC1100-*E200U-PFF-T		200	13.2	20	PFF	-40℃ ~ 85℃	
PIC1100-*E200U-PSS-T					PSS		
PIC1100-*E200U-SMT-T					SMT		
PIC1100-*E200B-PFF-T		±200	6.6	10	PFF		
PIC1100-*E200B-PSS-T					PSS		
PIC1100-*E200B-SMT-T					SMT		

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

Part Number Specification



Absolute Maximum Rating

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ.	Max.
Supply Voltage	V_{CC}	V	T_A=25°C	-0.3	---	6.5
Output Current	I_{OUTmax}	mA	T_A=25°C	-45	---	45
Proportional output	V_{OUTmax}	V	T_A=25°C	0.1	---	V_{CC} - 0.1
Storage temperature	T_S	℃	---	-55	---	150
Operating Ambient Temperature	T_A	℃	---	-40	---	125
Maximum Junction Temperature	T_{Jmax}	℃	---	---	---	165

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

ESD Characteristics

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

Isolation Characteristics

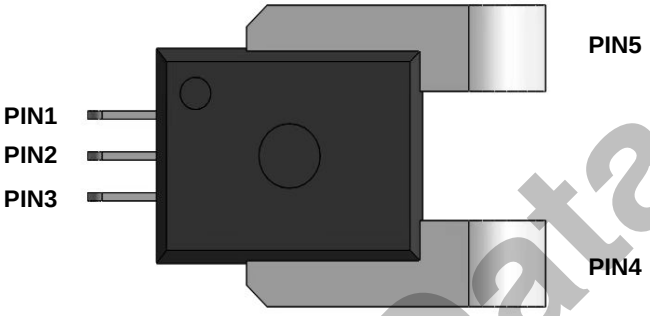
Characteristic	Symbol	Unit	Test Conditions	Value
Dielectric Surge Voltage	V_{SURGE}	V	Test method refers to IEC61000-4-5, 1.2μs/50μs waveform.	8000
Dielectric Strength Test Voltage	V_{ISO}	V_{RMS}	60s, 50Hz isolation withstand voltage parameters, according to UL62368-1, test 6kV/1s before delivery to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

Typical Overcurrent Capability

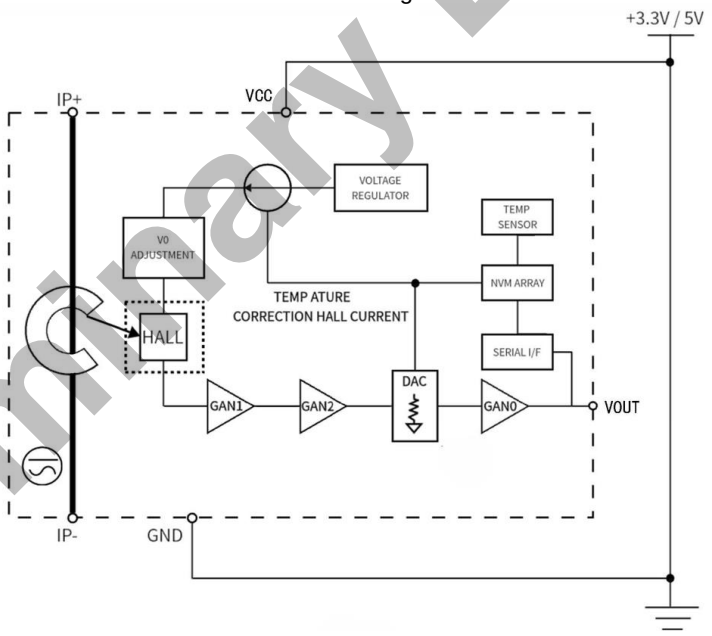
Characteristic	Symbol	Unit	Test Conditions	Value
Maximum Current Test	I_{POC}	A	T_A=25°C, Current On 1s, off 99s, Apply 100 pulses	1200
			T_A=85°C, Current On 1s, off 99s, Apply 100 pulses	900
			T_A=125°C, Current On 1s, off 99s, Apply 100 pulses	600

Terminal list & Functional Block

Number	Name	Description
1	VCC	Device power supply terminal
2	GND	ground terminal
3	VOUT	Analog output signal
4	IP+	Current flows into the chip, positive direction
5	IP-	Current flows out of the chip, negative direction



Terminal Diagram



Functional Block Diagram

Electrical Characteristics

Unless otherwise specified, refers to general test conditions: T_A=25℃ · V_{CC}=5V/3.3V · C_L=0.47nF · C_{Vcc}=100nF

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ.	Max.
Rated Current	I_{PN}	A	PIC1100-*K050U-XXX-T	0	---	50
			PIC1100-*K050B-XXX-T	-50	---	50
			PIC1100-*K100U-XXX-T	0	---	100
			PIC1100-*K100B-XXX-T	-100	---	100
			PIC1100-*K150U-XXX-T	0	---	150
			PIC1100-*K150B-XXX-T	-150	---	150
			PIC1100-*E200U-XXX-T	0	---	200
			PIC1100-*E200B-XXX-T	-200	---	200
Supply Voltage	V_{CC}	V	*=3	3	3.3	3.6
			*=5	4.5	5	5.5
Supply Current[Note1]	I_{CC}	mA	*=3	6	6.5	12
			*=5	6	7.5	12
Primary Conductor Resistance[Note1]	R_P	mΩ		---	0.1	---
Power-On Time[Note2]	T_{PO}	ms	Chip power-on (V_{CC}>3.0V) , V_{OUT} stable time	---	1	---
Rise time	T_R	μs		---	1	---
Propagation Delay	T_{PROP}	μs		---	0.5	---
Response Time	$T_{RESPONSE}$	μs		---	1.5	---
Output Capacitive Load[Note2]	C_L	nF	V_{OUT} -V_{GND}	---	0.47	10
Output Resistive Load[Note2]	R_L	kΩ		4.7	---	---
DC Output Resistance[Note2]	R_{OUT}	Ω		---	1	---
Undervoltage-Lockout[Note1]	V_{UVLOD}	V	Undervoltage protection rising threshold	---	2.3	---
	V_{UVLOE}	V	Undervoltage protection drop threshold	---	2.1	---
Undervoltage-Lockout[Note1]	T_{UVLOD}	μs	Undervoltage protection rise time	---	500	---
	T_{UVLOE}	μs	Undervoltage protection drop time	---	50	---
Output Current Capability	I_{SINK}	mA	Sink current of output Pin	---	50	---
	I_{SOURCE}	mA	Source current of output Pin	---	55	---
Output Voltage Range	V_S	V	RL=10kΩ to V_{CC} or GND	0.1	---	V_{CC}-0.1
Internal Bandwidth	BW_I	kHz	200A range, small signal measurement	---	250	---
Sensitivity Symmetry Error	E_{SYM}	%		-0.1	±0.01	0.1
Ratiometric Output Sensitivity Error[Note1]	S_{ERR}	%	V_{CC}=3.15~3.45V	-0.5	0	0.5
			V_{CC}=4.75~5.25V	-0.5	0	0.5
Nonlinearity[Note1]	E_{LIN}	%	<=100A	-0.1	0.03	0.1
			<=200A	-0.2	0.05	0.2
Sensitivity Temperature Drift [Note1]	dS_{ERR}	%	T_A=85℃ ~ 125℃	-1.0	±0.2	1.0
			T_A=25℃ ~ 85℃	-0.8	±0.2	0.8
			T_A=-40℃ ~ 25℃	-1.0	±0.2	1.0
Offset Temperature Drift[Note1]	$V_{IOUT(Q)TC}$	mV	T_A=25℃ ~ 125℃	-5	---	5
			T_A=-40℃ ~ 25℃	-5	---	5

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

Note2: These parameters are guaranted by design.

PIC1100-*K050U-XXX-T/PIC1100-*K050B-XXX-T Performance Characteristic

Unless otherwise specified, refers to general test conditions: T_A=25℃ · V_{CC}=5V/3.3V · C_L=0.47nF · C_{Vcc}=100nF

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ.	Max.
Nominal Performance						
Sensitivity(V_{CC}=3.3V)	Sens	mV/A	I_{PRmin} < I_{PR} < I_{Prmax} PIC1100-3K050U-XXX-T	---	V_{CC}*52.8 /3.3	---
			I_{PRmin} < I_{PR} < I_{Prmax} PIC1100-3K050B-XXX-T	---	V_{CC}*26.4 /3.3	---
Sensitivity(V_{CC}=5V)	Sens	mV/A	I_{PRmin} < I_{PR} < I_{Prmax} PIC1100-5K050U-XXX-T	---	V_{CC}*80/5	---
			I_{PRmin} < I_{PR} < I_{Prmax} PIC1100-5K050B-XXX-T	---	V_{CC}*40/5	---
Zero Current Output Voltage	$V_{IOUT(Q)}$	V	Unipolar, I_{PR}=0A	---	V_{CC}*0.1	---
			Bipolar, I_{PR}=0A	---	V_{CC}*0.5	---
Accuracy Performance						
Noise	V_N	mVrms		---	7	---
Magnetic Offset Error	I_{ERROM}	mV	I_P=0A · I_{PRmax}	---	0.4	---
		mA	I_P=0A · I_{PRmax}	---	10	---
Total Output Error	E_{TOT}	%	I_P=I_{PRmax} · T_A=-40℃ ~ 125℃	-1	±0.2	1
Total Output Error Components: E_{TOT} = (V_{IOUT} -$V_{IOUTideal}$) /（$Sens_{ideal}$ × I_P）×100%						
Sensitivity Error	E_{SENS}	%	I_P=I_{PRmax} · T_A=25℃ ~ 125℃	-0.5	±0.2	0.5
Voltage Offset Error	V_{OE}	mV	I_P=0A · T_A=25℃ ~ 125℃	-10	±0.2	10
			I_P=0A · T_A=25℃	-5	±0.2	5
			I_P=0A · T_A=-40℃ ~ 125℃	-10	±0.2	10
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{SENS_drift}	%	After reliability test · T_A=25°C	---	±0.5	---
Total Output Error Lifetime Drift	E_{TOT_drift}	%	After reliability test · T_A=25°C	---	±0.5	---

Note : The data is obtained from laboratory testing with 3 σ data

PIC1100-*K100U-XXX-T/PIC1100-*K100B-XXX-T Performance Characteristic

Unless otherwise specified, refers to general test conditions: T_A=25℃ · V_{CC}=5V/3.3V · C_L=0.47nF · C_{Vcc}=100nF

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ.	Max.
Nominal Performance						
Sensitivity(V_{CC}=3.3V)	Sens	mV/A	I_{PRmin} < I_{PR} < I_{Prmax} PIC1100-3K100U-XXX-T	---	V_{CC}*26.4 /3.3	---
			I_{PRmin} < I_{PR} < I_{Prmax} PIC1100-3K100B-XXX-T	---	V_{CC}*13.2 /3.3	---
Sensitivity(V_{CC}=5V)	Sens	mV/A	I_{PRmin} < I_{PR} < I_{Prmax} PIC1100-5K100U-XXX-T	---	V_{CC}*40/5	---
			I_{PRmin} < I_{PR} < I_{Prmax} PIC1100-5K100B-XXX-T	---	V_{CC}*20/5	---
Zero Current Output Voltage	$V_{IOUT(Q)}$	V	Unipolar, I_{PR}=0A	---	V_{CC}*0.1	---
			Bipolar, I_{PR}=0A	---	V_{CC}*0.5	---
Accuracy Performance						
Noise	V_N	mVrms		---	5	---
Magnetic Offset Error	I_{ERROM}	mV	I_P=0A · I_{PRmax}	---	0.6	---
		mA	I_P=0A · I_{PRmax}	---	30	---
Total Output Error	E_{TOT}	%	I_P=I_{PRmax} · T_A=-40℃ ~ 125℃	-1	±0.2	1
Total Output Error Components: E_{TOT} = (V_{IOUT} -$V_{IOUTideal}$) /（$Sens_{ideal}$ × I_P）×100%						
Sensitivity Error	E_{SENS}	%	I_P=I_{PRmax} · T_A=25℃ ~ 125℃	-0.5	±0.2	0.5
Voltage Offset Error	V_{OE}	mV	I_P=0A · T_A=25℃ ~ 125℃	-10	±0.2	10
			I_P=0A · T_A=25℃	-5	±0.2	5
			I_P=0A · T_A=-40℃ ~ 125℃	-10	±0.2	10
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{SENS_drift}	%	After reliability test · T_A=25°C	---	±0.5	---
Total Output Error Lifetime Drift	E_{TOT_drift}	%	After reliability test · T_A=25°C	---	±0.5	---

Note : The data is obtained from laboratory testing with 3 σ data

PIC1100-*K150U-XXX-T/PIC1100-*K150B-XXX-T Performance Characteristic

Unless otherwise specified, refers to general test conditions: T_A=25℃ · V_{CC}=5V/3.3V · C_L=0.47nF · C_{Vcc}=100nF

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ.	Max.
Nominal Performance						
Sensitivity(V_{CC}=3.3V)	Sens	mV/A	I_{PRmin} < I_{PR} < I_{Prmax} PIC1100-3K150U-XXX-T	---	V_{CC}*17.6 /5	---
			I_{PRmin} < I_{PR} < I_{Prmax} PIC1100-3K150B-XXX-T	---	V_{CC}*8.8 /5	---
Sensitivity(V_{CC}=5V)	Sens	mV/A	I_{PRmin} < I_{PR} < I_{Prmax} PIC1100-5K150U-XXX-T	---	V_{CC}*26.66 /5	---
			I_{PRmin} < I_{PR} < I_{Prmax} PIC1100-5K150B-XXX-T	---	V_{CC}*13.33 /5	---
Zero Current Output Voltage	$V_{IOUT(Q)}$	V	Unipolar, I_{PR}=0A	---	V_{CC}*0.1	---
			Bipolar, I_{PR}=0A	---	V_{CC}*0.5	---
Accuracy Performance						
Noise	V_N	mVrms		---	4	---
Magnetic Offset Error	I_{ERROM}	mV	I_P=0A · I_{PRmax}	---	0.8	---
		mA	I_P=0A · I_{PRmax}	---	60	---
Total Output Error	E_{TOT}	%	I_P=I_{PRmax} · T_A=-40℃ ~ 125℃	-1	±0.2	1
Total Output Error Components: E_{TOT} = (V_{IOUT} -$V_{IOUTideal}$) /（$Sens_{ideal}$ × I_P）× 100%						
Sensitivity Error	E_{SENS}	%	I_P=I_{PRmax} · T_A=25℃ ~ 125℃	-0.5	±0.2	0.5
Voltage Offset Error	V_{OE}	mV	I_P=0A · T_A=25℃ ~ 125℃	-10	±0.2	10
			I_P=0A · T_A=25℃	-5	±0.2	5
			I_P=0A · T_A=-40℃ ~ 125℃	-10	±0.2	10
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{SENS_drift}	%	After reliability test · T_A=25°C	---	±0.5	---
Total Output Error Lifetime Drift	E_{TOT_drift}	%	After reliability test · T_A=25°C	---	±0.5	---

Note : The data is obtained from laboratory testing with 3 σ data

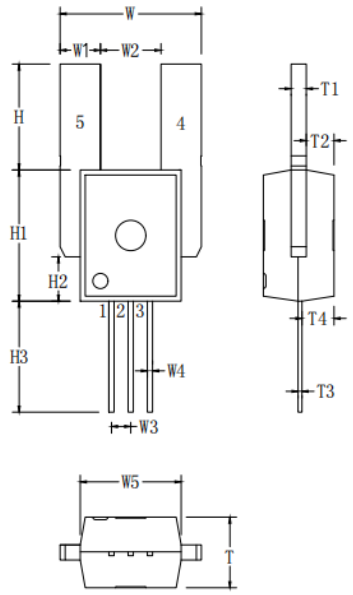
PIC1100-*E200U-XXX-T/PIC1100-*E200B-XXX-T Performance Characteristic

Unless otherwise specified, refers to general test conditions: T_A=25℃ · V_{CC}=5V/3.3V · C_L=0.47nF · C_{Vcc}=100nF

Characteristic	Symbol	Unit	Test Conditions	Min.	Typ.	Max.
Nominal Performance						
Sensitivity(V_{CC}=3.3V)	Sens	mV/A	I_{PRmin} < I_{PR} < I_{Prmax} PIC1100-3E200U-XXX-T	---	V_{CC}*13.2 /3.3	---
			I_{PRmin} < I_{PR} < I_{Prmax} PIC1100-3E200B-XXX-T	---	V_{CC}*6.6 /3.3	---
Sensitivity(V_{CC}=5V)	Sens	mV/A	I_{PRmin} < I_{PR} < I_{Prmax} PIC1100-5E200U-XXX-T	---	V_{CC}*20/5	---
			I_{PRmin} < I_{PR} < I_{Prmax} PIC1100-5E200B-XXX-T	---	V_{CC}*10/5	---
Zero Current Output Voltage	$V_{IOUT(Q)}$	V	Unipolar, I_{PR}=0A	---	V_{CC}*0.1	---
			Bipolar, I_{PR}=0A	---	V_{CC}*0.5	---
Accuracy Performance						
Noise	V_N	mVrms		---	3	---
Magnetic Offset Error	I_{ERROM}	mV	I_P=0A · I_{PRmax}	---	1	---
		mA	I_P=0A · I_{PRmax}	---	100	---
Total Output Error	E_{TOT}	%	I_P=I_{PRmax} · T_A=-40℃ ~ 125℃	-1	±0.2	1
Total Output Error Components: E_{TOT} = (V_{IOUT} -$V_{IOUTideal}$) / ($Sens_{ideal}$ × I_P) × 100%						
Sensitivity Error	E_{SENS}	%	I_P=I_{PRmax} · T_A=25℃ ~ 125℃	-0.5	±0.2	0.5
Voltage Offset Error	V_{OE}	mV	I_P=0A · T_A=25℃ ~ 125℃	-10	±0.2	10
			I_P=0A · T_A=25℃	-5	±0.2	5
			I_P=0A · T_A=-40℃ ~ 125℃	-10	±0.2	10
Lifetime Drift Characteristics						
Sensitivity Error Lifetime Drift	E_{SENS_drift}	%	After reliability test · T_A=25°C	---	±0.5	---
Total Output Error Lifetime Drift	E_{TOT_drift}	%	After reliability test · T_A=25°C	---	±0.5	---

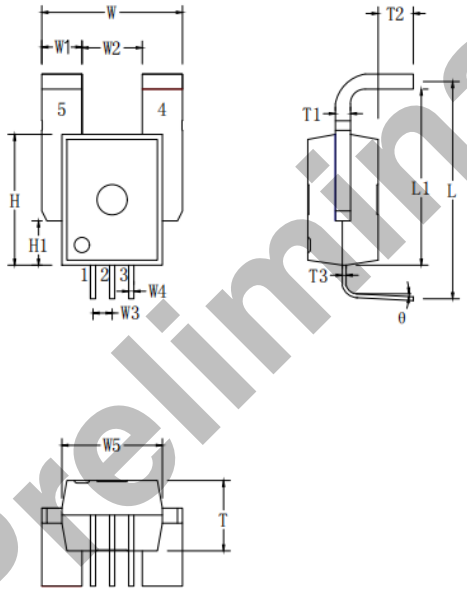
Note : The data is obtained from laboratory testing with 3 σ data

PACKAGE INFORMATION



5PIN-PSS Package

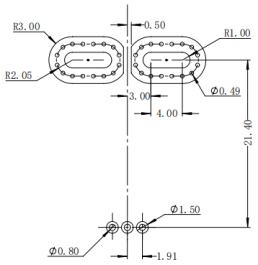
NUM	SIZE (mm)			NOTE
	MIN	NOM	MAX	
W	13.80	14.00	14.20	
W1	3.80	4.00	4.20	
W2	5.80	6.00	6.20	
W3	1.70	1.90	2.10	
W4	0.41	0.51	0.61	
W5	9.90	10.00	10.10	
H	10.00	10.50	11.00	
H1	12.90	13.00	13.10	
H2	4.30	4.40	4.50	
H3	10.50	11.00	11.50	
T	6.90	7.00	7.10	
T1	1.40	1.50	1.60	
T2	2.65	2.75	2.85	
T3	0.33	0.38	0.43	
T4	3.08	3.18	3.28	



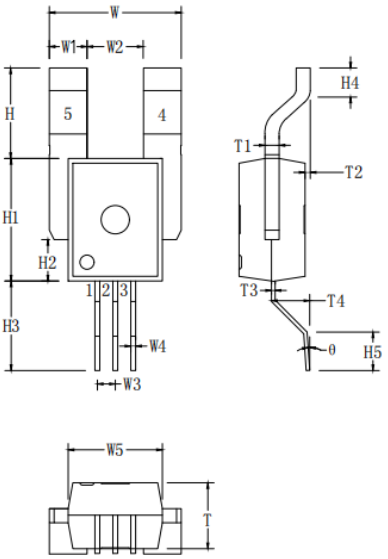
5PIN-PFF Package

NUM	SIZE (mm)			NOTE
	MIN	NOM	MAX	
W	13.80	14.00	14.20	
W1	3.80	4.00	4.20	
W2	5.80	6.00	6.20	
W3	1.70	1.90	2.10	
W4	0.41	0.51	0.61	
W5	9.90	10.00	10.10	
T	6.90	7.00	7.10	
H	12.90	13.00	13.10	
H1	4.30	4.40	4.50	
T1	1.40	1.50	1.60	
T2	3.30	3.50	3.70	
T3	0.33	0.38	0.43	
L	20.40	21.40	22.40	
L1	17.30	17.50	17.70	
θ 1	0°	5°	10°	
θ 2	-1°	1°	3°	

Recommend pad size :



General linear tolerance: ±0.2mm

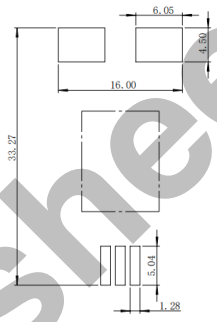


5PIN-SMT Package

NUM	SIZE (mm)			NOTE
	MIN	NOM	MAX	
W	13.80	14.00	14.20	
W1	3.80	4.00	4.20	
W2	5.80	6.00	6.20	
W3	1.70	1.90	2.10	
W4	0.41	0.51	0.61	
W5	9.90	10.00	10.10	
H	9.10	9.60	10.10	
H1	12.90	13.00	13.10	
H2	4.30	4.40	4.50	
H3	9.00	9.50	10.00	
H4	1.90	2.40	2.90	
H5	3.30	3.80	4.30	
θ	0°	4°	8°	

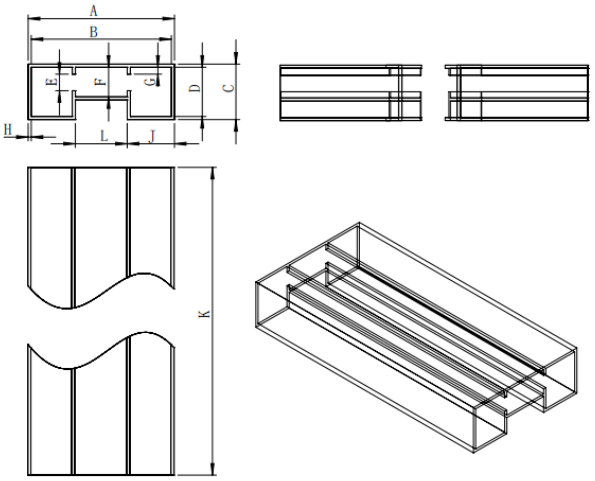
NUM	SIZE (mm)			NOTE
	MIN	NOM	MAX	
T	6.90	7.00	7.10	
T1	1.40	1.50	1.60	
T2	0.00	0.50	1.00	
T3	0.33	0.38	0.43	
T4	3.20	3.70	4.20	

Recommend pad size :



General linear tolerance: ±0.2mm

PACKING INFORMATION



NUM	SIZE (mm)		
	MIN	NOM	MAX
A	37.80	38.00	38.20
B	36.20	36.40	36.60
C	13.80	14.00	14.20
D	12.20	12.40	12.60
E	4.10	4.30	4.50
F	7.50	7.70	7.90
G	1.60	1.80	2.00
H	0.60	0.80	1.00
L	13.50	13.70	13.90
J	11.95	12.15	12.35
K	589.00	590.00	591.00

*40 pieces per tube