Ultra High Sensitivity Hall Effect Latch

1. Description

iA1188I Hall-effect sensor is a temperature stable, stress-resistant sensor. Superior high-temperature performance is made possible through a dynamic offset cancellation that utilizes chopper-stabilization. This method reduces the offset voltage normally caused by device over molding, temperature dependencies, and thermal stress.

iA1188I includes the following on a single silicon chip: voltage regulator, Hall voltage generator, small-signal amplifier, chopper stabilization, Schmitt trigger. Advanced DMOS wafer fabrication processing is used to take advantage of low-voltage requirements, component matching, very low input-offset errors, and small component geometries.

This device requires the presence of both south and north polarity magnetic fields for operation. In the presence of a south polarity field of sufficient strength, the device output sensor on, and only switches off when a north polarity field of sufficient strength is present.

2. Features

- DMOS Hall IC Technology.
- Reverse bias protection on power supply pin.
- Chopper stabilized amplifier stage.
- Optimized for BLDC motor applications.
- Reliable and low shifting on high Temp condition.
- Switching offset compensation at typically 69 kHz.
- Good ESD Protection.
- 100% tested at 150 ℃.

3. Applications

- High temperature Fan motor
- 3 phase BLDC motor application
- Speed sensing
- Position sensing
- Current sensing
- Revolution counting
- Solid-State Switch
- Linear Position Detection
- Angular Position Detection
- Proximity Detection
- High ESD Capability

4. Pin Assignments

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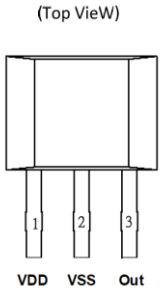


SIP-3

100% tested at 150 ℃

5. Marking Information

Product Name	Package	Marking
iA1188I	SIP-3	188 XXX X: Date Code

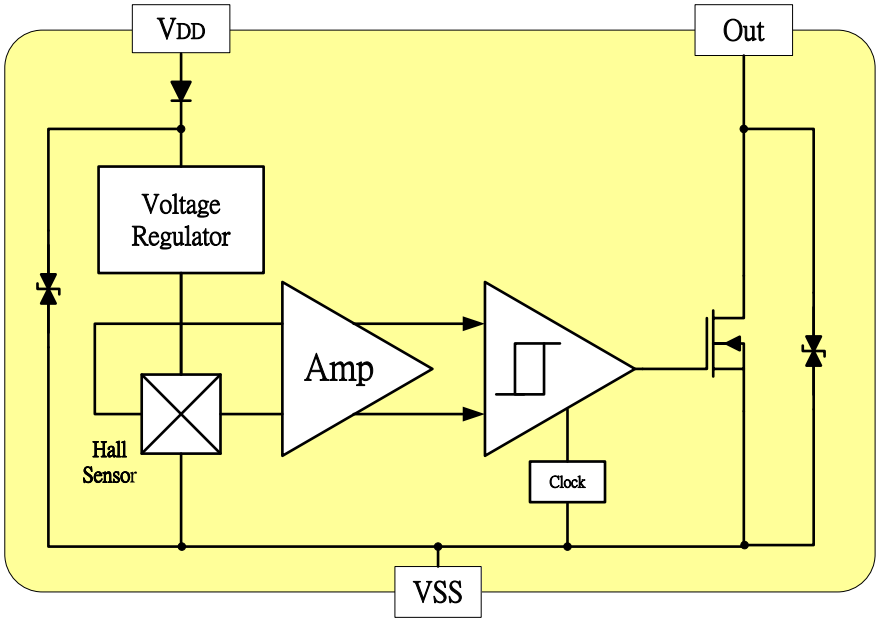
6. Ordering Code

iA1188I

7. Pin Definitions

Name	Pin (iA1188I)	Description
V_{DD}	1	Power Supply
V_{SS}	2	Ground
V_{OUT}	3	Output

8. Block Diagram



9. Absolute Maximum Ratings

(T_A = 25 ºC)

Characteristics		Values	Unit
Supply Voltage (***VDD***)		28	V
Output Voltage (***Vout***)		28	V
Reverse Voltage, (***VDD / Vout***)		-28/-0.3	V
Output current, (***ISINK***)		50	mA
Operating Temperature Range, (***TA***)		-40 ~ +150	℃
Storage temperature Range, (***Ts***)		-65 ~ +150	℃
Maximum Junction Temperature (***TJ***)		150	℃
Thermal Resistance for iA1188I	(θ_{JA})	206	℃/w
	(θ_{JC})	148	℃/w
Package Power Dissipation for iA1188I, (P_D)		606	mW

10. Electrical Characteristics

(DC Operating Parameters ： T_A =+25℃, V_{DD}=12V)

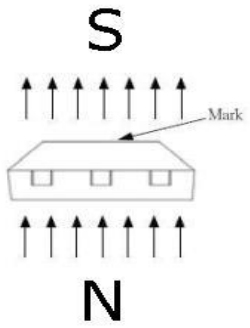
Parameters	Test Conditions	Min	Typ	Max	Units
Supply Voltage (V_{DD})	Operating	2.5		24.0	V
Supply Current (I_{DD})	B<BOP			5.0	mA
Output Saturation Voltage (V_{DSON})	Iout=20mA, B>BOP			400.0	mV
Output Leakage Current (*Ioff*)	IOFF B<BRP, VOUT = 12V			10.0	uA
Internal Oscillator Chopper Frequency (f_{OSC})			69		kHz

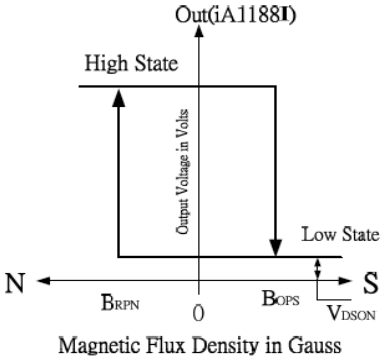
Parameters	Test Conditions	Min	Typ	Max	Units
Output Rise Time, (T_R)	RL=1.1KΩ, CL =20pF		0.04	0.45	uS
Output Fall Time, (T_F)	RL=820Ω; CL =20pF		0.18	0.45	uS
Electro-Static Discharge	HBM	4			KV
Operate Point, (B_{OP})	iA1188I	5(-25)		25(-5)	Gauss
Release Point, (B_{RP})	iA1188I	-25(5)		-5(25)	Gauss
Hysteresis,(B_{HYS})	|BOP - BRP|		30		Gauss

11. Output Behavior versus Magnetic Polar

(*DC Operating Parameters T_A = -40 to 150℃, V_{DD} =2.5 to 24 V*)

Parameter	*Test condition*	*OUT*
South pole	B>B_{OP}	Low (V_{DSON})
North pole	B<B_{RP}	Open (Pull-up Voltage)





12. Typical Characteristics

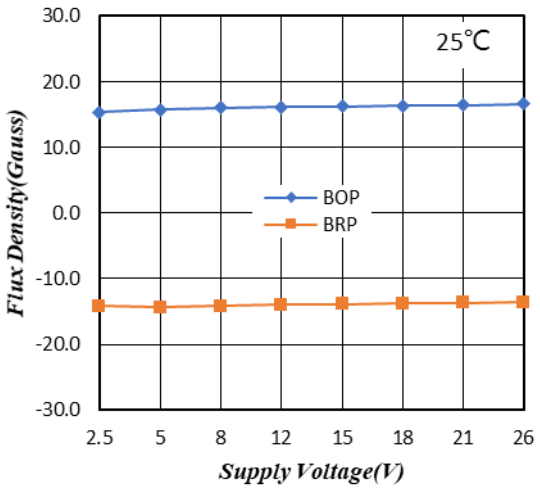


Fig1. Typical Supply Voltage (V_{DD}) Vs. Flux Density

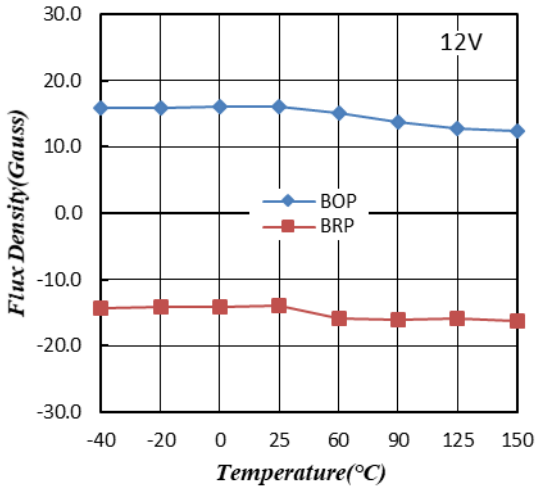


Fig2. Typical Temperature (T_A) Vs. Flux Density

12. Typical Characteristics(cont.)

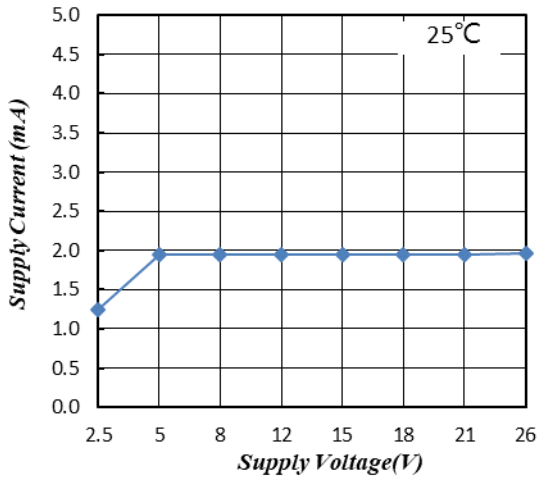


Fig3. Typical Supply Voltage (V_{DD}) Vs. Supply Current (I_{DD})

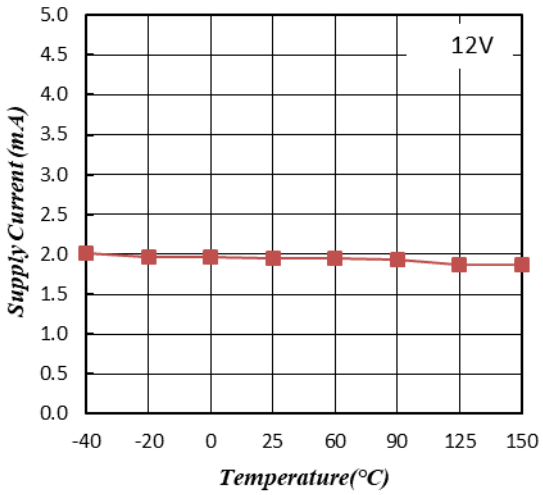


Fig4. Typical Temperature (T_A) Vs. Supply Current (I_{DD})

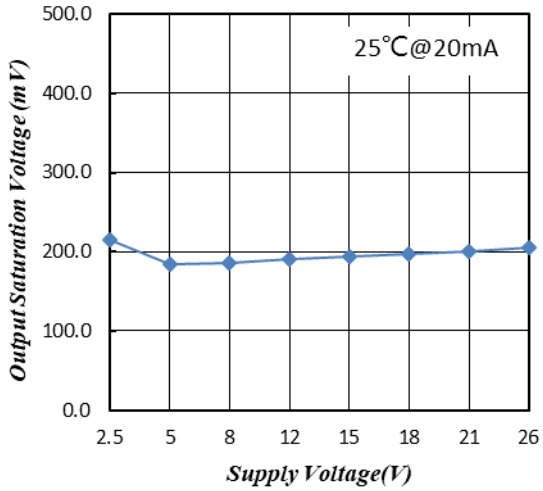


Fig5. Typical Supply Voltage (V_{DD}) Vs. Output Voltage (V_{DSON})

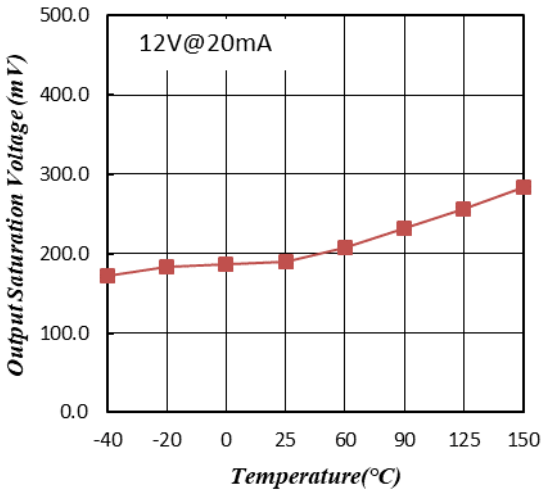


Fig6. Typical Temperature (T_A) Vs. Output Voltage (V_{DSON})

12. Typical Characteristics(cont.)

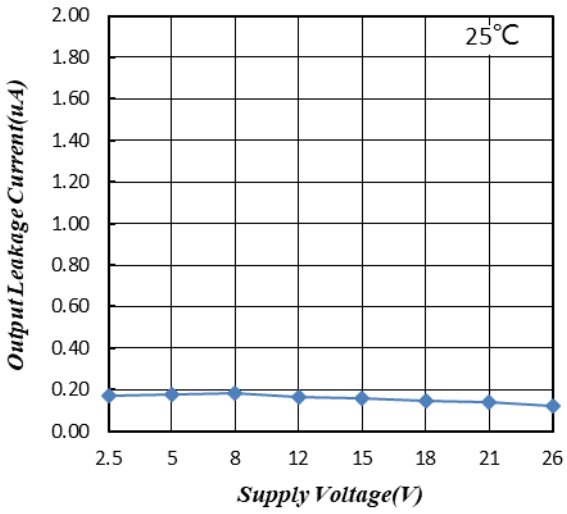


Fig7. Typical Supply Voltage (V_{DD}) Vs. Leakage Current (I_{OFF})

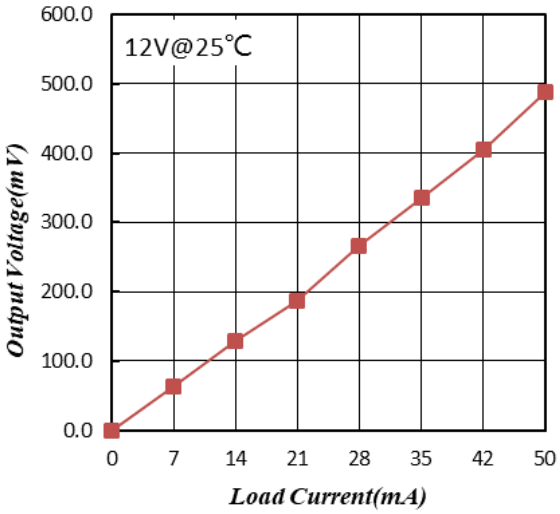
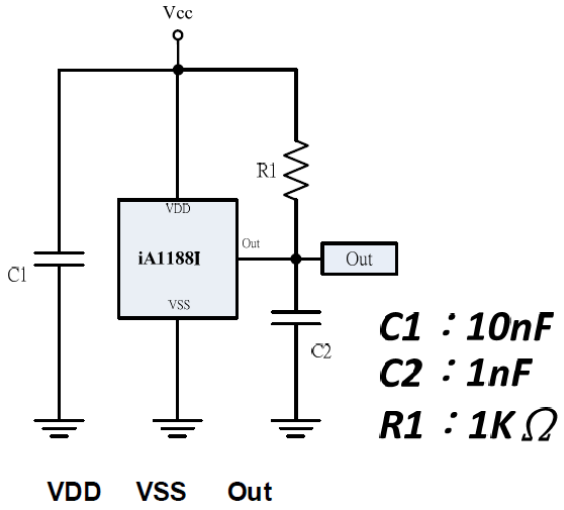
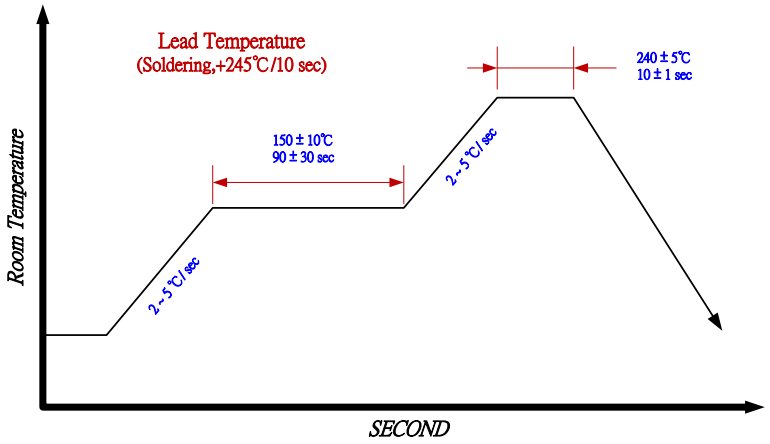


Fig8. Typical Load Current (I_L) Vs. Output Voltage (V_{OUT})

13. Typical Application circuit



14. IR reflow curve

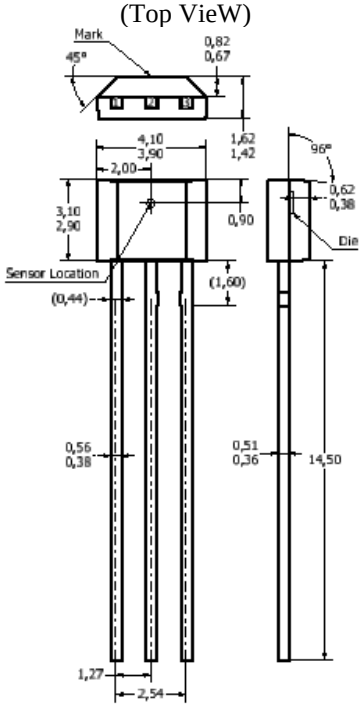


iA1188I Soldering Condition

15. Package Dimensions

SIP-3 Package

(Top VieW)



NOTES:

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

Pin No.	Pin Name	Function
1	V_{DD}	Power Supply
2	V_{SS}	Ground
3	V_{OUT}	Output