Pin Configuration

Z4 Package
(TO-94)

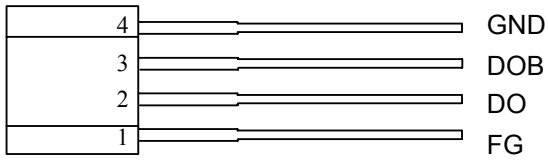


Figure 2. Pin Configuration of AH211 (Front View)

Pin Description

Pin Number	Pin Name	Function
1	FG	Frequency Generation
2	DO	Output 1
3	DOB	Output 2
4	GND	Ground

Functional Block Diagram

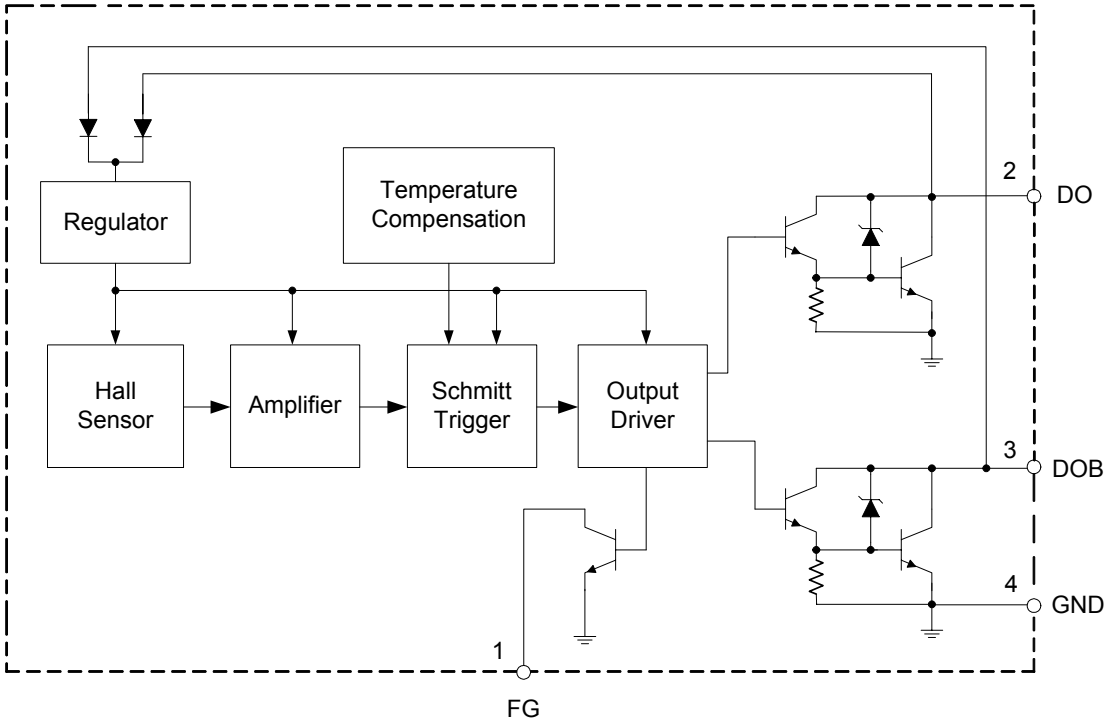
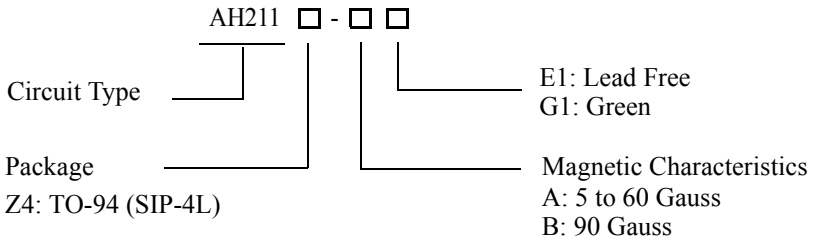


Figure 3. Functional Block Diagram of AH211

Ordering Information



Package	Temperature Range	Part Number		Marking ID		Packing Type
		Lead Free	Green	Lead Free	Green	
TO-94	-20 to 85 °C	AH211Z4-AE1	AH211Z4-AG1	AH211	AH211Z4-G1	Bulk
		AH211Z4-BE1	AH211Z4-BG1	AH211	AH211Z4-G1	Bulk

BCD Semiconductor's Pb-free products, as designated with "E1" suffix in the part number, are RoHS compliant. Products with "G1" suffix are available in green package.

Absolute Maximum Ratings (Note 1)

(T_A=25°C)

Parameter		Symbol	Value	Unit
Supply Voltage		V_{CC}	20	V
Magnetic Flux Density		B	Unlimited	Gauss
Output Current	Continuous	I_O	400	mA
	Hold		600	mA
	Peak (Start up)		800	mA
FG Voltage		V_{FG}	30	V
FG Current		I_{FG}	20	mA
Power Dissipation		P_D	550	mW
Thermal Resistance	Die to Atmosphere	θ_{JA}	227	°C/W
	Die to Package Case	θ_{JC}	49	°C/W
Storage Temperature		T_{STG}	-50 to 150	°C
ESD (Machine Model)			600	V
ESD (Human Body Model)			6000	V

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. "Absolute Maximum Ratings" for extended period may affect device reliability.

Recommended Operating Conditions

(T_A=25°C)

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V_{CC}	3.5	16	V
Ambient Temperature	T_A	-20	85	°C

Electrical Characteristics

(T_A=25°C, V_{CC}=14V, unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Output Saturation Voltage	V_{SAT}	B>150Gauss, V_{CC}=3.5V, V_{DOB}=V_{CC}, I_{DO}=100mA (or B<-150Gauss, V_{CC}=3.5V, V_{DO}=V_{CC}, I_{DOB}=100mA)		1.1		V
		B>150Gauss, V_{DOB}=V_{CC}, I_{DO}=400mA (or B<-150Gauss, V_{DO}=V_{CC}, I_{DOB}=400mA)		1.05	1.3	V
FG Saturation Voltage	V_{SATF}	B<-150Gauss, V_{DO}=V_{CC}, I_{FG}=20mA		0.35	0.6	V
FG Leakage Current	I_{OLF}	B>150Gauss, V_{DOB}=V_{CC}, V_{FG}=16V		0.1	10	μA
Supply Current	I_{CC}	B>150Gauss, V_{DOB}=V_{CC}, (or B<-150Gauss, V_{DO}=V_{CC})		4	8	mA
Output Rise Time	tr	R_L=1kΩ, C_L=10pF		3.0	10	μs
Output Fall Time	tf	R_L=1kΩ, C_L=10pF		0.3	1.0	μs
Switch Time Differential	Δt	R_L=1kΩ, C_L=10pF		3.0	10	μs
Output Zener Breakdown Voltage	V_Z			31		V

Magnetic Characteristics

(T_A=25°C)

Parameter	Symbol	Grade	Min	Typ	Max	Unit
Operating Point	B_{OP}	A	5	30	60	Gauss
		B			90	Gauss
Releasing Point	B_{RP}	A	-60	-30	-5	Gauss
		B	-90			Gauss
Hysteresis	B_{HYS}			60		Gauss

Magnetic Characteristics (Continued)

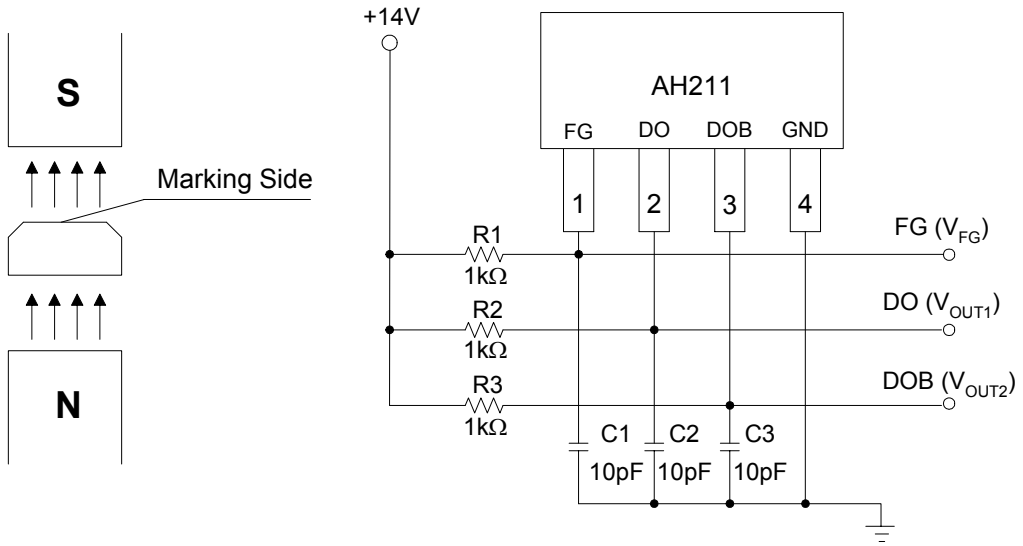


Figure 4. Basic Test Circuit

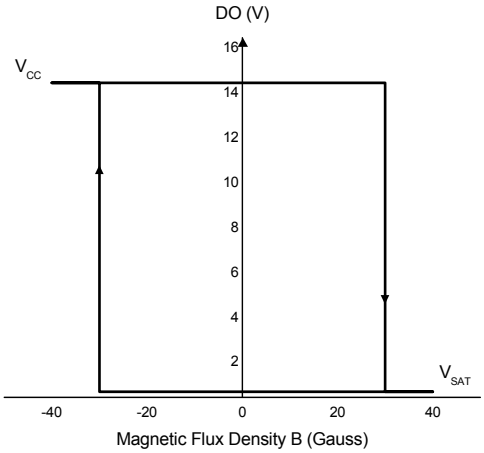


Figure 5. V_{DO} vs. Magnetic Flux Density

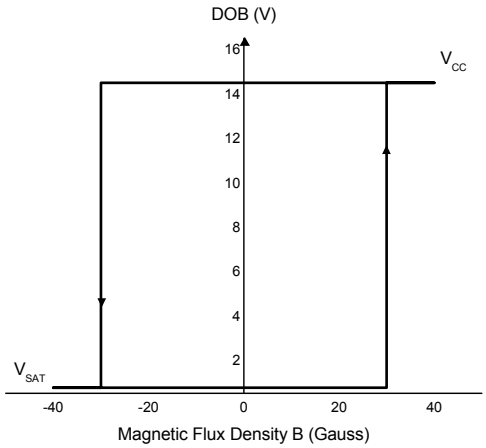


Figure 6. V_{DOB} vs. Magnetic Flux Density

Typical Performance Characteristics

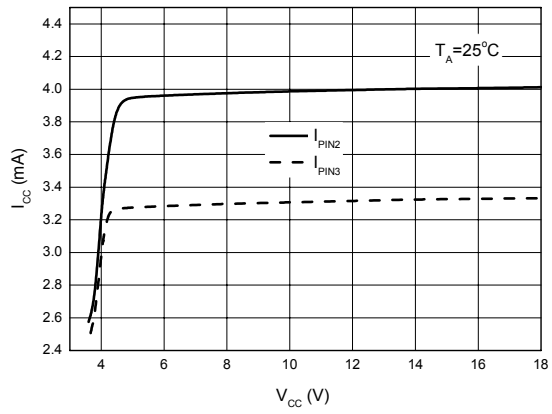


Figure 7. I_{CC} vs. V_{CC}

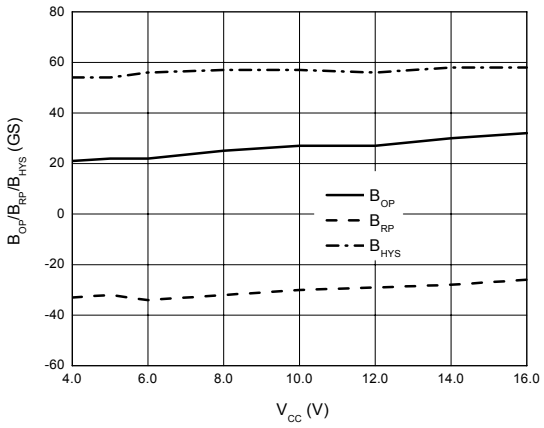


Figure 8. $B_{OP}/B_{RP}/B_{HYS}$ vs. V_{CC}

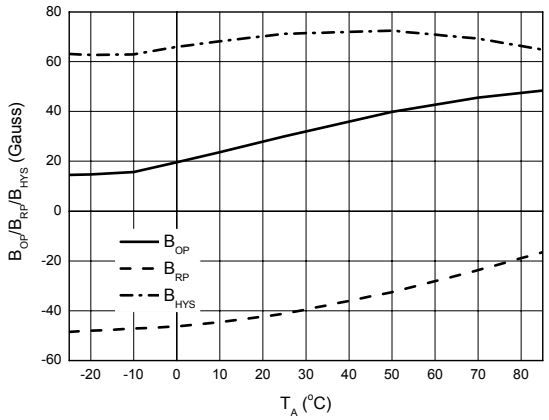


Figure 9. $B_{OP}/B_{RP}/B_{HYS}$ vs. Ambient Temperature

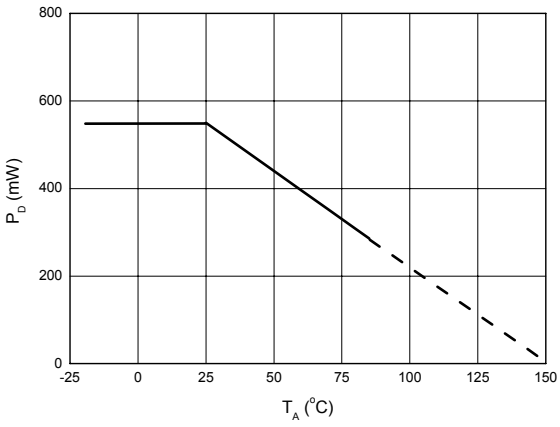


Figure 10. P_D vs. Ambient Temperature

Typical Performance Characteristics (Continued)

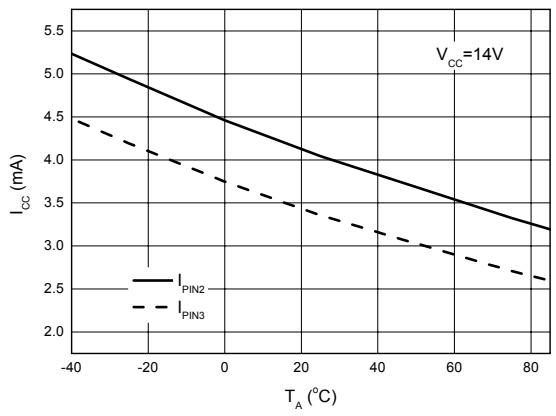


Figure 11. Supply Current vs. Ambient Temperature

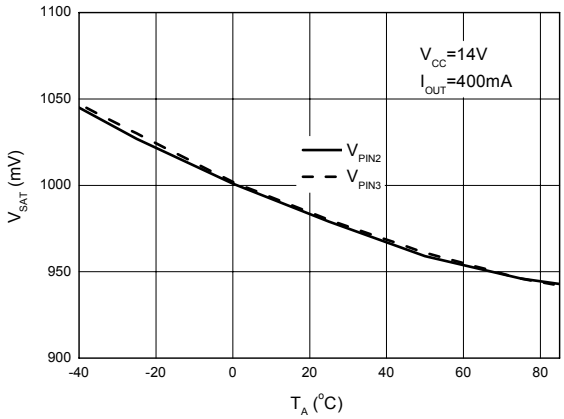


Figure 12. V_{SAT} vs. Ambient Temperature

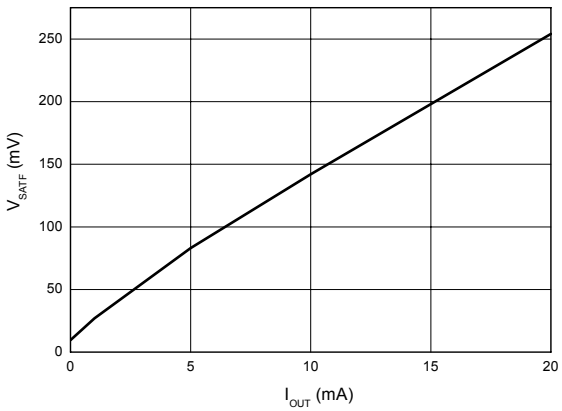


Figure 13. FG Saturation Voltage vs. Output Current

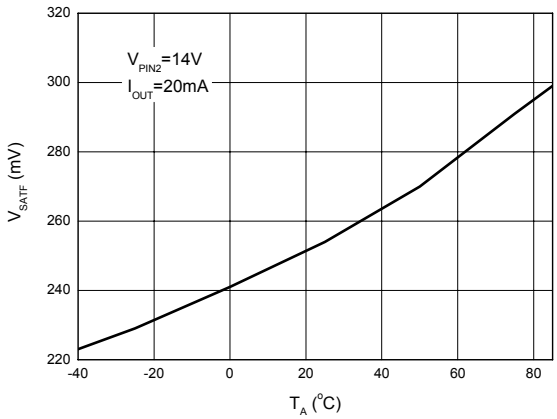


Figure 14. FG Saturation Voltage vs. Ambient Temperature

Application Information

Figure 15 is the typical application circuit for AH211. Usually, there are three wires for fan connection: the red is input of power supply; the yellow is the output of FG; the black is the ground. R1 is an external pull-up resister for the use of measuring FG signal from fan. The value of R1 could be decided by the transistor saturation voltage (V_{ON}), sink current (I_{FG}), and pull-up voltage (V_{DD}). The calculation formula is:

$R1=(V_{DD}-V_{ON}) / I_{FG}$

For example:
V_{DD}=5V for TTL level.
If saturation voltage is 0.6V (IC specification) I_{FG}=20mA (≤20mA) , then R1=220Ω ;

If saturation voltage is 0.1V, I_{FG}=1mA (=<20mA) , the value of R1=4.9kΩ

According AH211's specification, if V_{DD}=5V, R1 must be larger than 220Ω

D1 is the reverse protection diode. If the red and black wires reversely connected, the current will flow from the ground via IC and coils L1 and L2 to power supply. Under such circumstances, the IC and coils are easy to be burned out. Therefore, the reverse protection diode D1is necessary. However, D1 will also cause an extra voltage drop on the supply voltage.

C1 is a capacitor to reduce the ripple noise caused by the transient of the output stages. The amplitude of the ripple noise depends on the coil impedance and its characteristics.

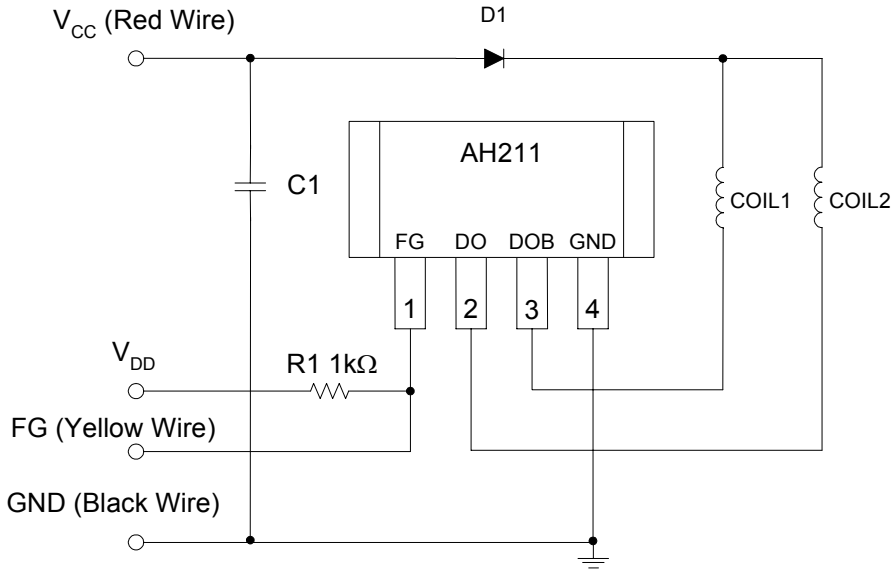
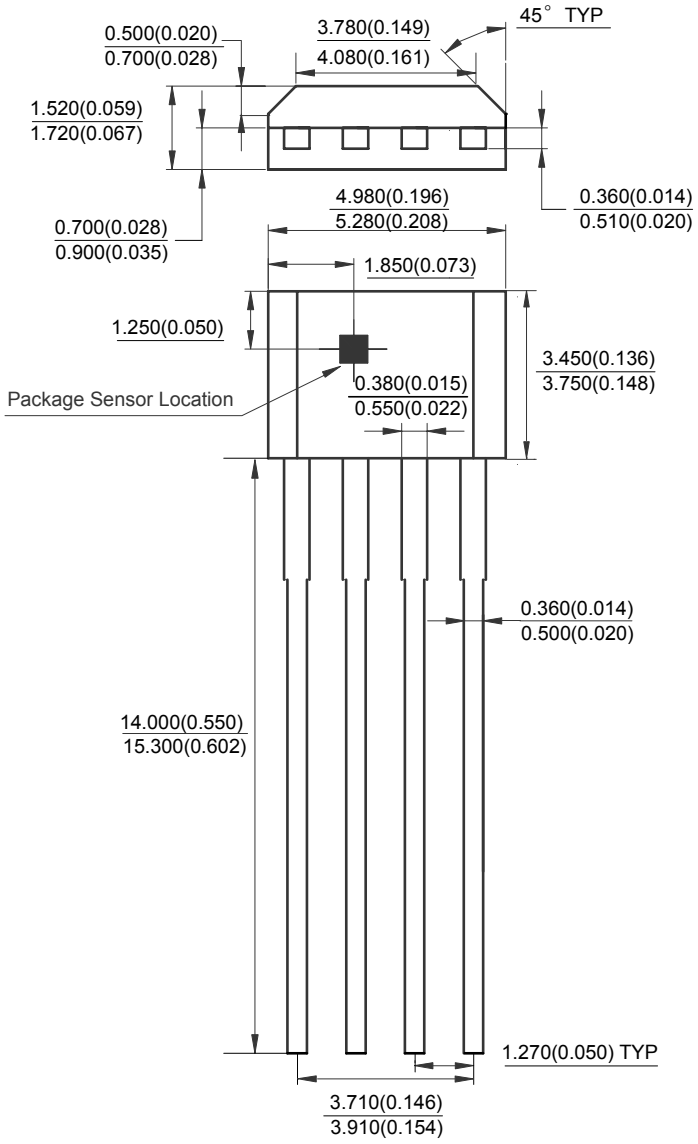


Figure 15. AH211 Typical Application Circuit

Mechanical Dimensions

TO-94 **Unit: mm(inch)**



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