

AN8231K, AN8231S

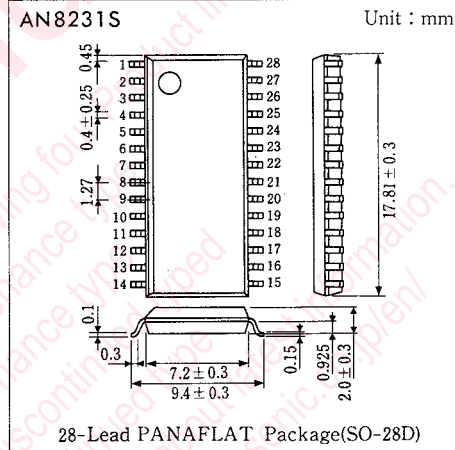
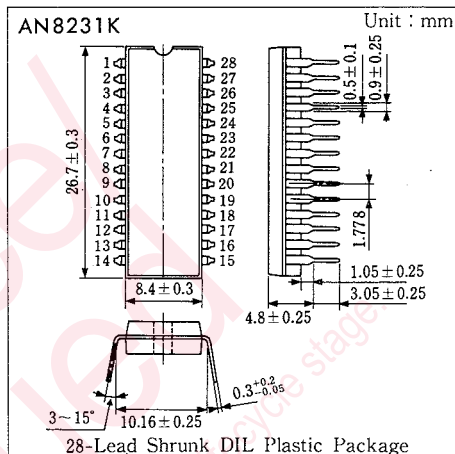
Low-voltage FDD Motor Drive Control Circuits

Outline

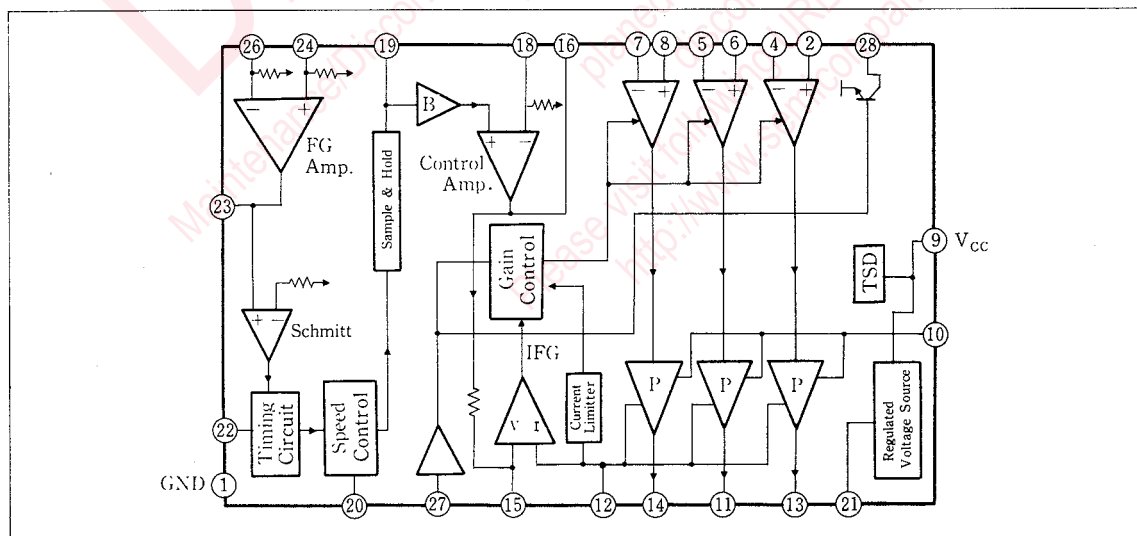
The AN8231K and the AN8231S are FDD motor drive control ICs, in which a frequency-controlled speed control circuit operated at 5V of supply voltage and a 3-phase full wave drive circuit are integrated on a single chip.

Features

- Low operating voltage : $V_{CC}=5V$
- Total current in stop mode : less than 0.3mA
- Current-limit circuit
- Thermal shut-down circuit
- Maximum output current : 500mA



Block Diagram



■ Pin

Pin No.	Pin Name	Pin No.	Pin Name
1	GND	15	V _{-I} Conv. Ripple Reduction
2	Hall Amp. Input(Ha ⁺)	16	Cont. Amp. Output
3	NC	17	NC
4	Hall Amp. Input(Ha ⁺)	18	Cont. Amp. Input
5	Hall Amp. Input(Hb ⁻)	19	Sample & Hold
6	Hall Amp. input(Hb ⁺)	20	Speed Control
7	Hall Amp. Input(Hc ⁻)	21	V _s
8	Hall Amp. Input(Hc ⁺)	22	Ref. O _{sc} .
9	V _{cc}	23	FG Amp. Output
10	V _M	24	FG Amp. Input(+)
11	Current Output	25	NC
12	GND(Power)	26	FG Amp. Input(-)
13	Current Output	27	Start/Stop
14	Current Output	28	Hall Element Bias

■ Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Rating	Unit
Supply Voltage	V _{cc}	10	V
Power Dissipation	AN8231K	1780	mW
	AN8231S	562	mW
Operating Ambient Temperature	T _{opr}	-20 ~ +70	°C
Storage Temperature	AN8231K	-55 ~ +150	°C
	AN8231S	-55 ~ +125	°C
Output Current	I _o	±500	mA
Hall Input Voltage Range	V _{HB}	1.4 ~ 3.8	V

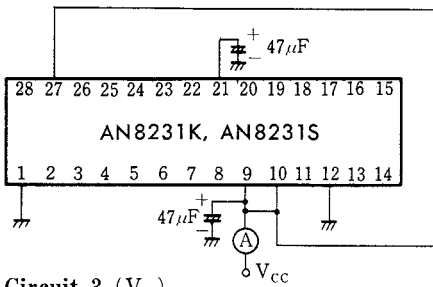
■ Electrical Characteristics (Ta=25°C)

Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Standby Supply Current	I _{cs}	1	V _{STOP} =5V, V _M =5V			0.3	mA
No-load Supply Current	I _{cm}	2	V _M =5V, V _{V1} =1.4V			15	mA
Stabilized Supply Voltage	V _s	3	V _{STOP} =0.8V	2.9	3.4	3.8	mA
Start/Stop Input Voltage "H"	V _{STH}	4	V _{cc} =4.5V	2			V
Start/Stop Input Voltage "L"	V _{STL}	5	V _{cc} =4.5V			0.8	V
Start/Stop Input Current "H"	I _{STH}	4	V _{STOP} =2V			100	nA
Start/Stop Input Current "L"	I _{STL}	5	V _{STOP} =0.8V	-50			μA
Hall Bias Current (for pins)	I _{HB}	6	V _{V1} =2.7V, V _{HL} =2V, V _{HH} =2.7V			3	μA
FG Amp. Input Bias Voltage "+"	V _{FG+}	7	V _{V1} =1.4V, V _{STOP} =0.8V	1.45	1.7	1.9	V
FG Amp. Input Bias Voltage "-"	V _{FG-}	7	V _{V1} =1.4V, V _{STOP} =0.8V	1.45	1.7	1.9	V
Schmitt Amp. Input Bias Voltage "H"	V _{SH}	8	V _{STOP} =0.8V, I _{FG-} =-50μA			3	V
Schmitt Amp. Input Bias Voltage "L"	V _{SL}	8	V _{STOP} =0.8V, I _{FG} =-50μA	0.4			V
Speed Control Input Bias Current	I _{SP}	9	V _{SP} =1.8V, V _{cc} =9V, V _{osc} =0V, V _{STOP} =0.8V			100	nA
S/H Input Bias Current	I _{SHB}	10	V _{S/H} =1.8V, V _{cc} =9V, V _{osc} =0V, V _{STOP} =0.8V			100	nA
Output Voltage "L"	V _{OL}	11	I _{OL} =300mA, V _{V1} =2.7V, V _{cc} =V _M =4.5V			1	V
Current Limit Reference Voltage	V _{LM}	12	V _M =5V, V _{V1} =2.7V		0.5	0.55	V

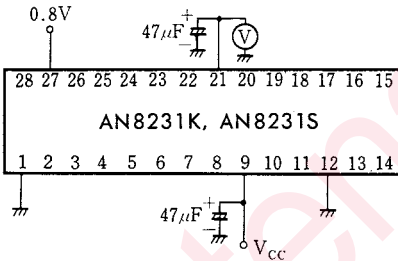
Note 1) V_{cc}=5V, V_{STOP}=0V, V_{PG}=0V in case of no specific conditions.

Note 2) Supply power to V_{cc} and V_M simultaneously, or V_M first.

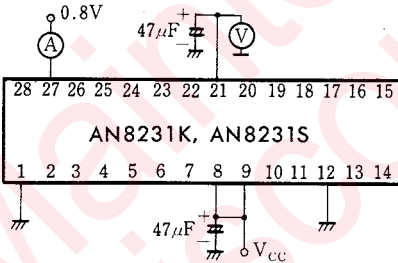
Test Circuit 1 (I_{CS})



Test Circuit 3 (V_S)

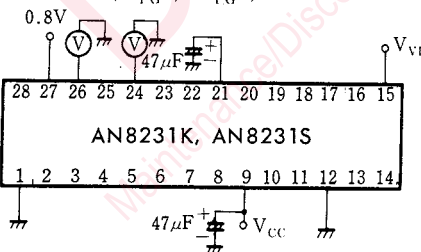


Test Circuit 5 (V_{STL} , I_{STL})

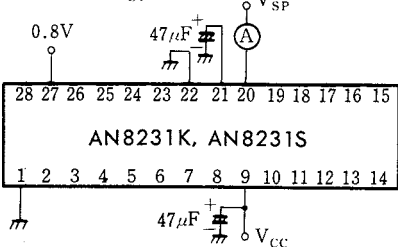


- When 0.8V is applied to Pin ②, measure Pin ② voltage to check that the stabilized power circuit is turned ON.
- Measure the current value when 0.8V is applied to Pin ②.

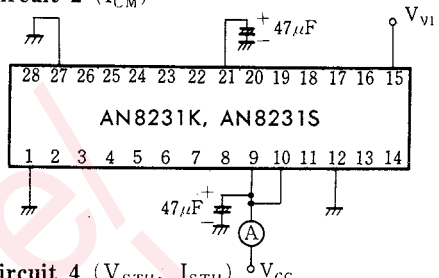
Test Circuit 7 (V_{FG}^+ , V_{FG}^-)



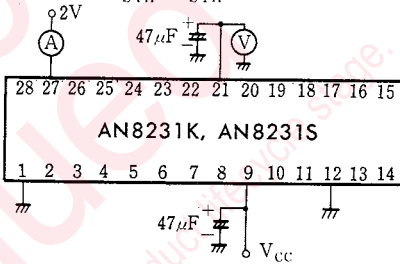
Test Circuit 9 (I_{SP})



Test Circuit 2 (I_{CM})

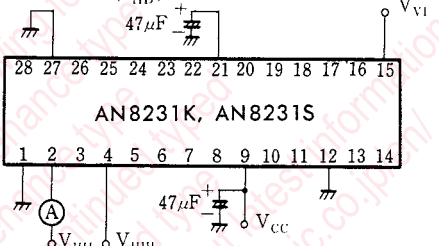


Test Circuit 4 (V_{STH} , I_{STH})



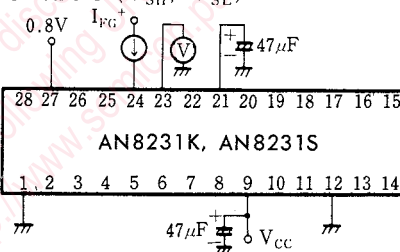
- When 2V is applied to Pin ②, measure Pin ② voltage to check that the stabilized power circuit is turned ON.
- Measure the current value when 2V is applied to Pin ②.

Test Circuit 6 (I_{HB})

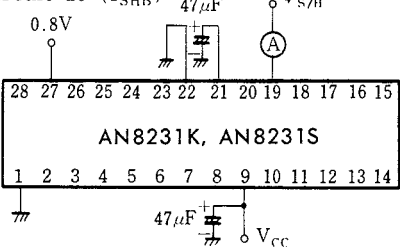


- Apply V_{HIH} to the measuring pin to measure I_{HB} . Similar procedure is made for Pins ④ to ⑧.

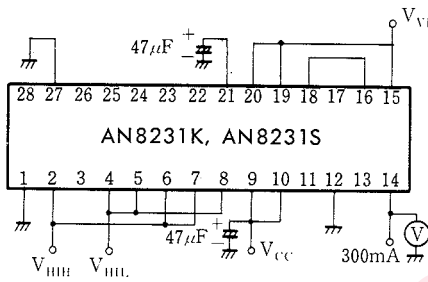
Test Circuit 8 (V_{SH} , V_{SL})



Test Circuit 10 (I_{SHB})

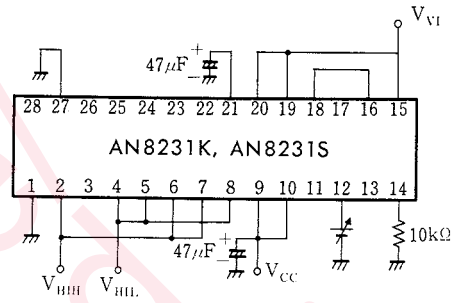


Test Circuit 11 (V_{OL})



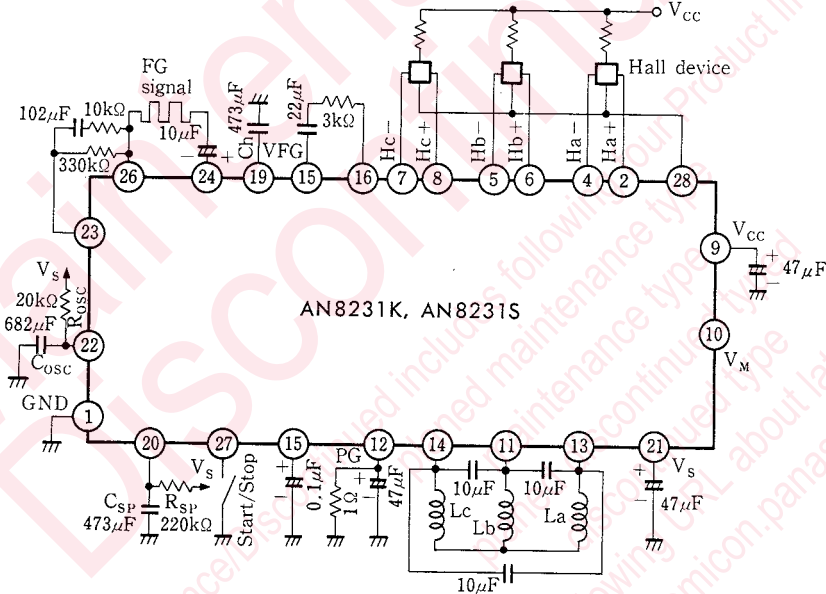
● Measure Pin ⑭ voltage when 300mA is applied to it.

Test Circuit 12 (V_{LM})



● Change the voltage to be applied to Pin ⑫ and measure the voltage when Pin ⑭ becomes from "H" to "L".

■ Application Circuit



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