

AN8212K

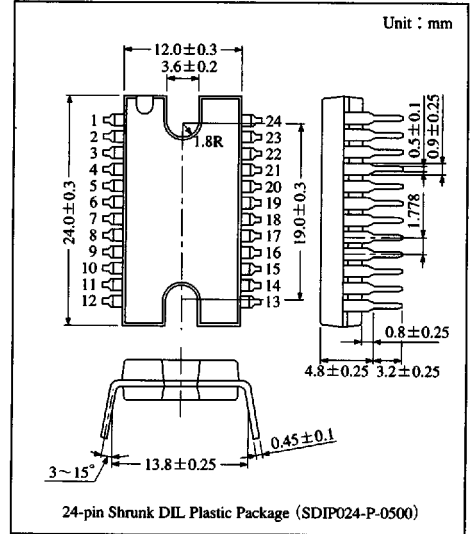
FDD Spindle Motor Controller

Overview

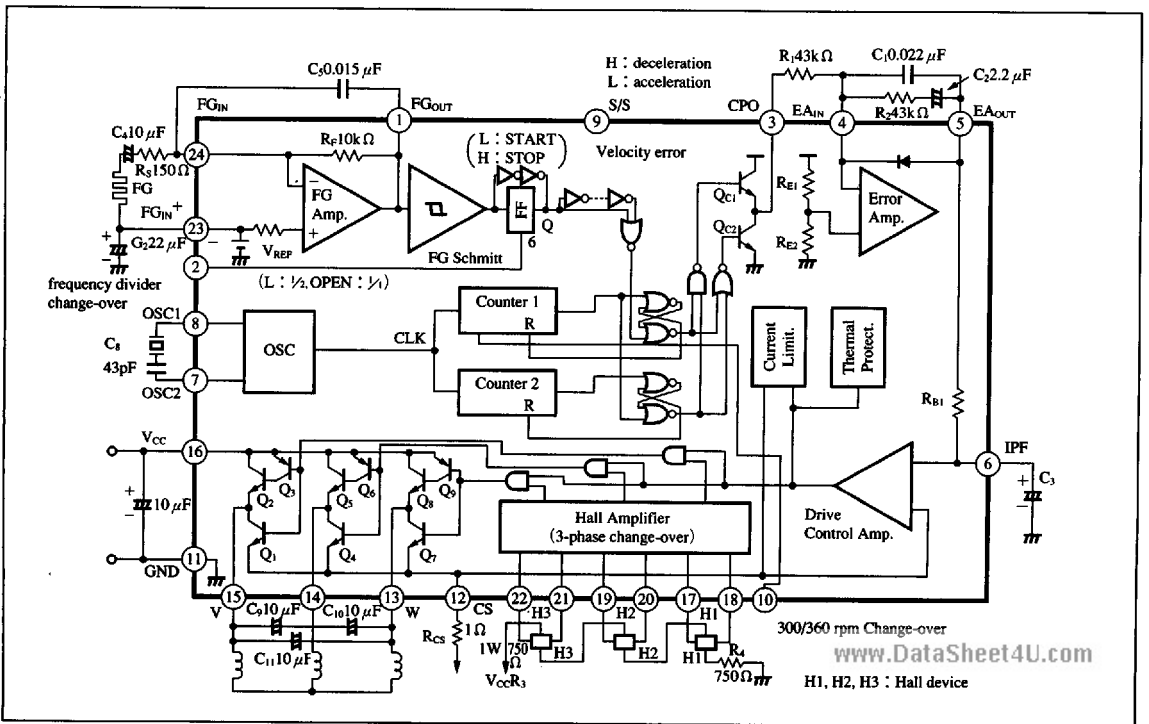
The AN8212K is an integrated circuit in which 300/360 rpm speed change-over function is added to the AN8210NK for FDD spindle motor.

Features

- Speed change-over built-in (300/360rpm)
- FG divider change-over built-in (1/1/2)
- Speed control by digital velocity detector
- 3-phase full-wave current drive
- Motor current limit built-in
- Thermal protection built-in
- Start/stop switch



Block Diagram and Application Circuit



Pin Descriptions

Pin No.	Pin name	Pin No.	Pin name
1	FG amp. output	13	Motor drive output W
2	FG divider	14	Motor drive output U
3	Velocity error output	15	Motor drive output V
4	Error amp. inversion input	16	V _{CC}
5	Error amp. output	17	Hall amp. 1 +input
6	Low-pass filter	18	Hall amp. 1 -input
7	Oscillation circuit 2	19	Hall amp. 2 +input
8	Oscillation circuit 1	20	Hall amp. 2 -input
9	Start/stop switching	21	Hall amp. 3 -input
10	300/360 rpm switching	22	Hall amp. 3 +input
11	GND	23	FG amp. +input
12	Current sensing	24	FG amp. +input

Absolute Maximum Ratings (T_a=25°C)

Parameter	Symbol	Rating	Unit
Supply voltage	V _{CC}	20	V
Motor drive pin voltage	V ₁₃ , V ₁₄ , V ₁₅	20	V
Pin applied voltage 1	V ₁ ~V ₉ , V ₂₄	-0.3 to +5.5	V
Pin applied voltage 2	V ₁₇ ~V ₂₂	0 to V _{CC}	V
Supply current	I _{CC}	900	mA
Pin current 1	I ₁₂	-900 to 0	mA
Motor drive pin current	I ₁₃ , I ₁₄ , I ₁₅	-900 to +900	mA
Pin current 2	I ₂₃	-20 to +1	mA
Power dissipation	P _D	2.5	W
Operating ambient temperature	T _{opr}	-20 to +75	°C
Storage temperature	T _{stg}	-55 to +150	°C

Electrical Characteristics (V_{CC}=12V, T_a=25°C)

Parameter	Symbol	Condition	min	typ	max	Unit
Standby quiescent current	I _{QS}	V _{S/S} =2V	—	0.3	0.5	mA
No-load quiescent current	I _{QN}	V _{S/S} =0V	—	18	25	mA

Reference Voltage Part

Reference voltage	V _{OR}	I _{OR} =0mA	2.3	—	2.8	V
Output sink current	I _{OR} ⁺		0.5	—	—	mA
Output source current	I _{OR} ⁻		—	-15	-10	mA
Output impedance	Z _{OR}	I _{OR} =0 to -10mA	—	5	10	Ω

FG Amp./Schmitt Part

Offset voltage	V _{OSF}		-15	—	15	mV
Feedback resistance	R _{FF}		—	—	—	kΩ
Output sink current	I _{OF} ⁺	V _S =0V, V _R =3V	3	—	—	mA
Output source current	I _{OF} ⁻	V _S =0V, V _R =2V	—	—	-3	mA

Electrical Characteristics (Cont.) ($V_{CC}=12V$, $T_a=25^\circ C$)

Parameter	Symbol	Condition	min	typ	max	Unit
Speed Error Detect Part (Logic)						
Count switch-over voltage	V_{FG}		1.0	1.8	2.5	V
Count No. 1	N_{CT1}	300rpm mode	—	1006	—	Time
Count No. 2	N_{CT2}	300rpm mode	—	838	—	Time
Speed Error Output Part						
Output low voltage	V_{OLC}		—	0.1	0.3	V
Output high voltage	V_{OHC}		2.4	—	5.5	V
Output sink current	I_{OC}^+		300	—	—	μA
Output source current	I_{OC}^-		—	—	150	μA
Error Amp. Part						
Output sink current	I_{OE}^+		2	—	—	mA
Output source current	I_{OE}^-		—	—	-2	mA
Gain bandwidth product	f_{GBE}		—	800	—	kHz
FG divider change-over	—	$V_{FG}=0V$	—	600/720	—	rpm
300/360 rpm change-over	—	$V_{FG}=2.5V$	—	300/360	—	rpm
Drive Control Amp. Part						
Threshold voltage	V_{THD}		2.3	2.55	2.8	V
Drive gain	A_{GD}		1.6	1.8	2.0	Time
Limiter voltage	V_{LD}		0.59	0.66	0.72	V
Open loop drive gain	A_{OD}		—	30	—	dB
Hall Amp. Part						
Phase input voltage range	V_{ICH}		2	—	$V_{CC}-2$	V
Error input voltage range	V_{IDH}		—	—	400	mV
Hall input sensitivity	V_{ISH}		—	10	—	mV
Hall offset voltage	V_{OSH}		—	—	20	mV
Input bias current	I_{BH}		—	1.0	5.0	μA
Drive Output Part						
Saturation voltage (on V_{CC})	V_{SU}		—	—	1.4	V
Saturation voltage (on ground)	V_{SL}		—	—	1.1	V
OFF leak current	I_{LO}		-20	—	20	μA
Start/Stop Control Part						
Input low voltage	V_{IL}		—	—	0.7	V
Input high voltage	V_{IH}		2	—	—	V
Input low current	I_{IL}	$V_{SS}=0V$	-100	-50	—	μA
Input high current	I_{IH}	$V_{SS}=2V$	—	10	100	μA
Speed Error Output Part						
Output leak current	I_{LC}^*		—	—	0.1	μA
Input bias current	I_{BE}^*		—	—	0.1	μA
Quiescent breakdown level	V_S^*	Applied between GND and each pin (C=100pF, No R)	300	—	—	V

 Note) Operating Supply Voltage Range : $V_{CC(oper)}=9$ to 16V

* These values are of reference values but not guaranteed values.

■ Characteristics Curve

