KA2820D

Stepping Motor Driver

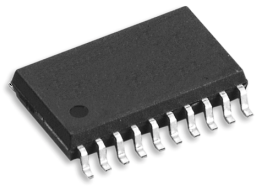
Features

- Built-in power save function
- Low saturation voltage
- Low power dissipation
- Input level: TTL, LSTTL, 5V CMOS compatible
- Standard MPU direct interface
- Built-in Thermal Shutdown(TSD) circuit

Description

The KA2820D is a monolithic integrated circuit, and suitable as a the two-phase stepping motor driver of a 5.25-inch FDD system.

20-SOP-375



Typical Application

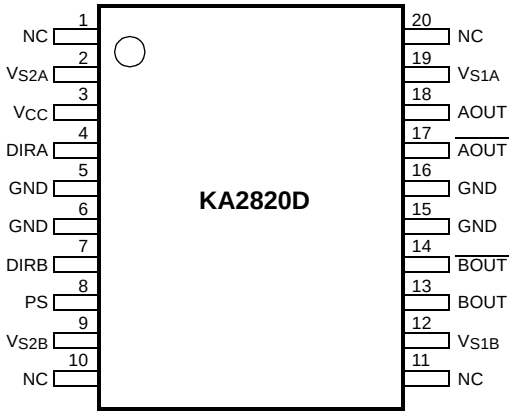
- Floppy disk drive (FDD)
- General stepping motor

Ordering Information

Device	Package	Operating Temp.
KA2820D2	20-SOP-375	–20 ~ +75°C

Rev. 1.0.2
May. 2000.

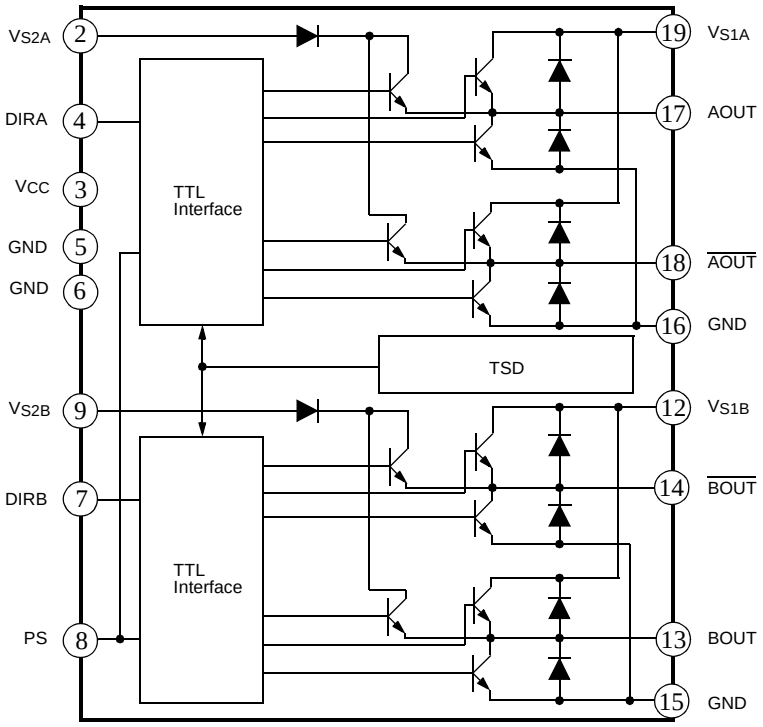
Pin Assignments



Pin Definitions

Pin Number	Pin Name	I/O	Pin Function Description	Channel
1	NC	-	No connection	-
2	V_{S2A}	-	A-channel holding supply voltage	A
3	V_{CC}	-	Logic part supply voltage	A, B
4	DIRA	I	A-channel direction input	A
5	GND	-	Signal ground	A, B
6	GND	-	Signal ground	A, B
7	DIRB	I	B-channel direction input	B
8	PS	I	Power save input	A, B
9	V_{S2B}	-	B-channel holding supply voltage	B
10	NC	-	No connection	-
11	NC	-	No connection	-
12	V_{S1B}	-	B-channel seeking supply voltage	B
13	BOUT	O	B-channel output	B
14	$\overline{BOUT}$	O	B-channel inverting output	B
15	GND	-	Power ground	A, B
16	GND	-	Power ground	A, B
17	$\overline{AOUT}$	O	A-channel inverting output	A
18	AOUT	O	A-channel output	A
19	V_{S1A}	-	A-channel seeking supply voltage	A
20	NC	-	No connection	-

Internal Block Diagram



Absolute Maximum Ratings (Ta = 25°C)

Parameter	Symbol	Value	Unit
Logic part supply voltage	V_{CC}	7.0	V
Seeking supply voltage	V_{S1}	15.0	V
Holding supply voltage	V_{S2}	7.0	V
Input voltage	V_{IN}	V_{CC}	V
Seeking output current (Continuouts)	I_{OS}	330	mA
Seeking output current (Peak)	I_{OSPEAK}	500	mA
Holding output current	I_{OH}	200	mA
Package power dissipation	P_D	1.0	W
Operating temperature range	T_{OPR}	–20 ~ 75	°C
Storage temperature	T_{STG}	–40 ~ 125	°C

Recommended Operating Conditions (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max	Unit
Logic part supply voltage	V_{CC}	4.5	5.0	5.5	V
Seeking supply voltage	V_{S1}	10.2	12.0	13.8	V
Holding supply voltage	V_{S2}	4.5	5.0	5.5	V

Electrical Characteristics

(Ta=25°C, V_{CC}=5V, V_{S1}=12V, V_{S2}=5V, unless specified otherwise)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Digital input “L” voltage	V_{IL}	-	-	-	0.8	V
Digital input “H” voltage	V_{IH}	-	2.0	-	-	V
Digital input “L” current	I_{IL}	V_{IN}=0.8V	-	0	10	µA
Digital input “H” current	I_{IH1}	V_{IN}=2.0V	-	1	10	µA
	I_{IH2}	V_{IN}=5V	-	0.3	1.0	mA
Supply current	IV_{CCL}	PS=0.8V	-	25	33	mA
	IV_{S1L}	PS=0.8V	-	6	10	mA
	IV_{S2L}	PS=0.8V	-	-	0.1	mA
	IV_{CCH}	PS=2.0V	-	25	33	mA
	IV_{S1H}	PS=2.0V	-	1	2	mA
	V_{S2H}	PS=2.0V	-	2.5	4	mA
Output sustain voltage	V_{SUS}	I_O=130mA, PS=0.8V	18	-	-	V
VS1 output saturation voltage	V_{SAT1}	I_O=130mA, PS=2.0V	-	1.5	2.0	V
VS2 output saturation voltage	V_{SAT2}	I_O=130mA	-	1.5	2.0	V
Output clamp voltage	V_{FU}	I_O=330mA (Upper)	-	3.0	5.0	V
	V_{FL}	I_O=330mA (Lower)	-	1.5	2.0	V
Output delay time	T_{PLH}	Input pulse (2kHz)	-	1.0	5.0	µs
	T_{PHL}	Input pulse (2kHz)	-	1.0	5.0	µs
TSD operating temperature	TSD	-	125	150	-	°C
TSD hysterisis	ΔTSD	-	-	25	-	°C

Application Information

1. MOTOR CONTROL LOGIC

Mode selection-truth table

Input		Output			Operating Mode
PS	DIRX	XOUT	XOUT		
L	L	L	H+	Seeking Mode	H+: Operating by V_{S1} (V_{S1}=12V)
L	H	H+	L		
H	L	L	H–	Open Mode	H–: Operating by V_{S2} (V_{S2}=5V)
H	H	H–	L		

Notes:
DIRX: DIRA or DIRB (Direction input)
XOUT: AOUT or BOUT (Non-inverting output)
XOUT: AOUT or BOUT (Inverting output)
X: Indicate each channel (A and B)

2. HOLDING AND SEEKING MODE

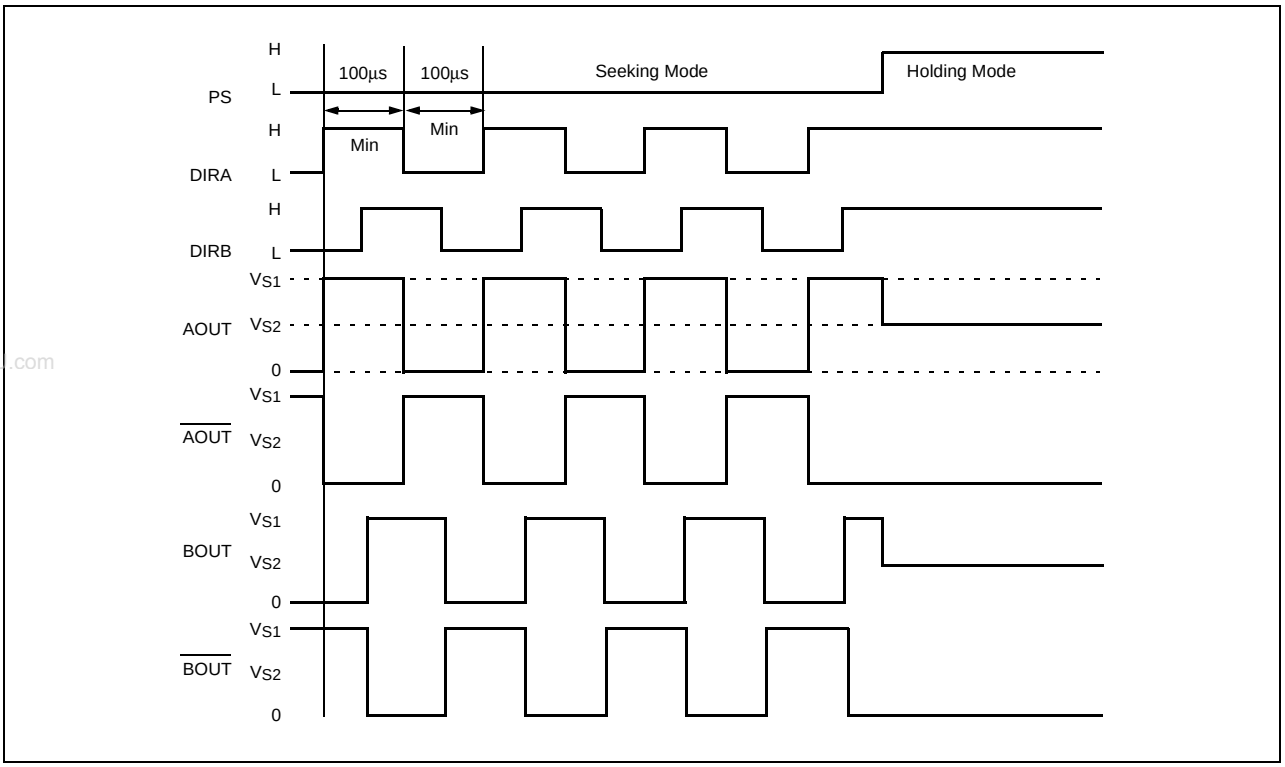
In rotating high speed (Seeking Mode), stepping motor is operated by high voltage (V_{S1}: Seeking power supply voltage “12”).

In holding mode, stepping motor is operated by low voltage (V_{S2}: Holding power supply voltage “5”).
When the PS input signal is high, it will be minimized power consumptio in this device.

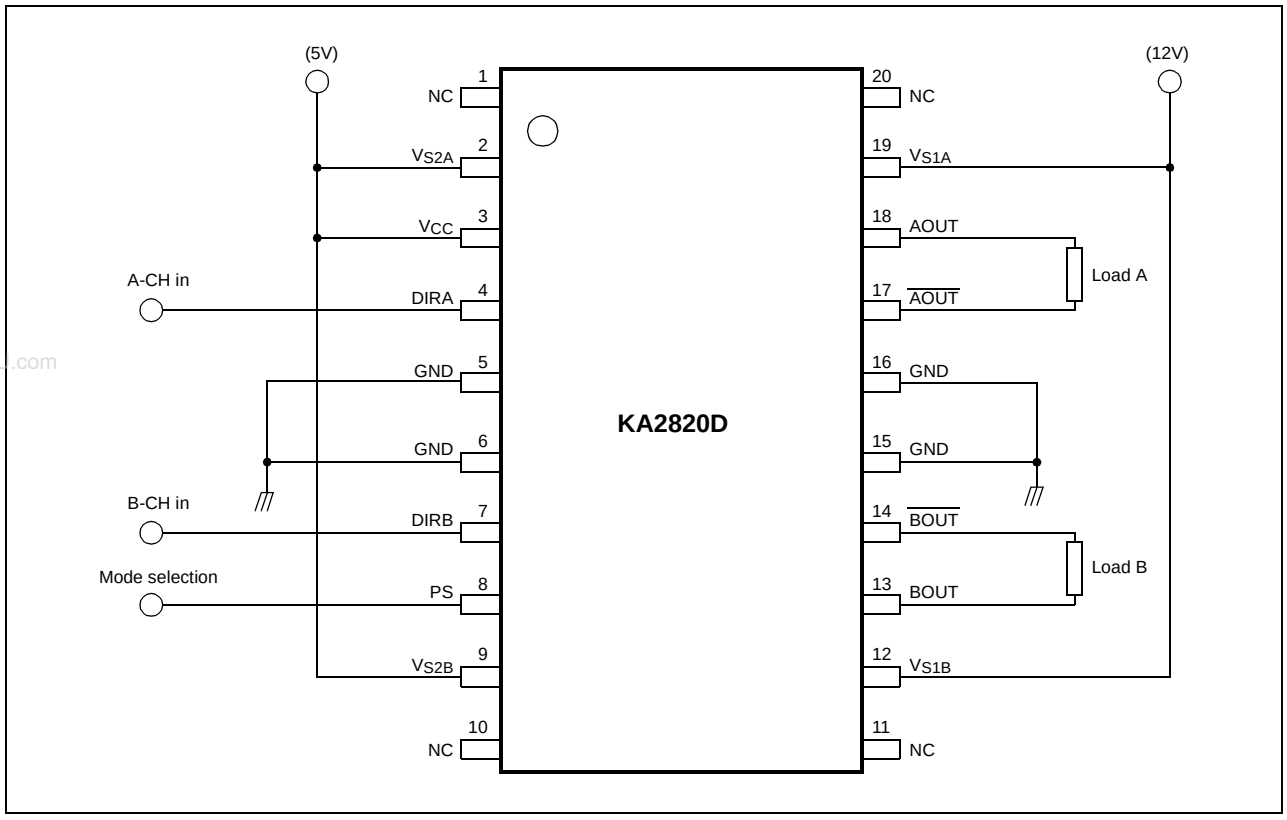
3. MAXIMUM DRIVE CURRENT CAPACITY

- Peak seeking output current: 0.5A
- Continued seeking output current: 0.33A
- Holding output current: 0.2A

Timing Chart



Typical Application Circuits



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