

### STEPPING MOTOR DRIVER

The KA2820D2 is a monolithic integrated circuit, and suitable as a the two-phase stepping motor driver of a 5.25" FDD system.



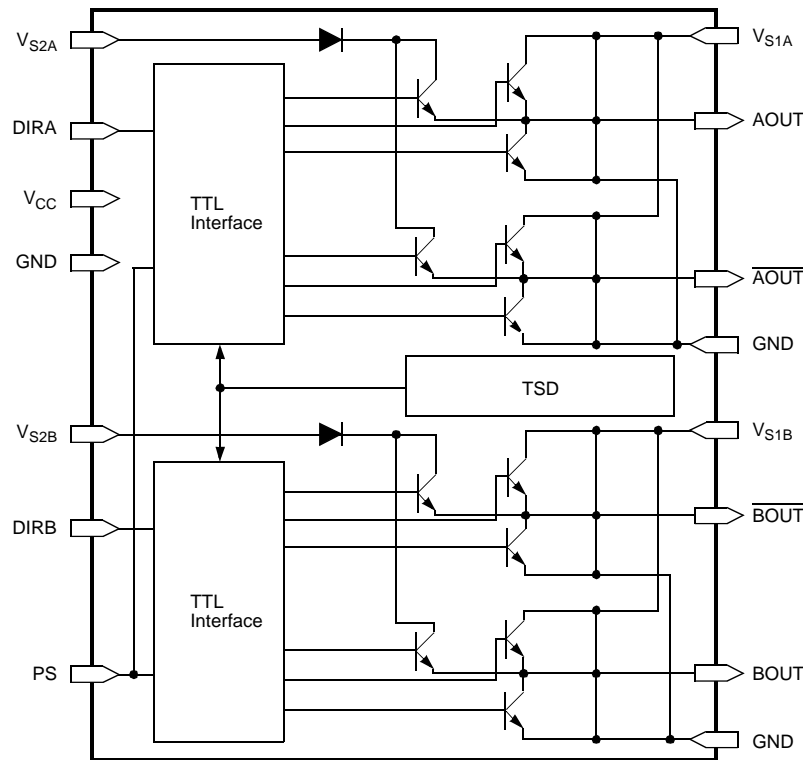
### FEATURES

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

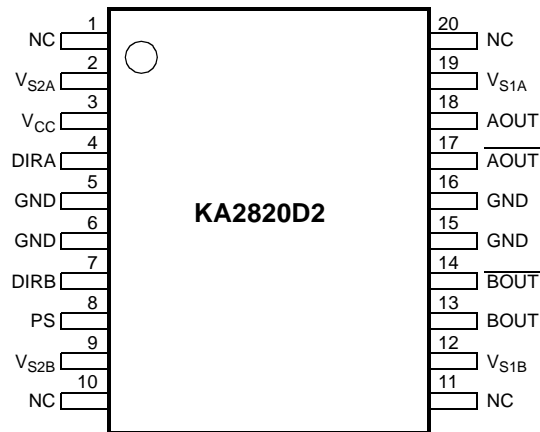
### ORDERING INFORMATION

Device	Package	Operating Temperature
KA2820D2	20-SOP-375	-20 ~ +75°C

### BLOCK DIAGRAM



## PIN CONFIGURATION



## PIN DESCRIPTION

Pin No.	Symbol	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	A-channel direction input	A
5	GND	Signal ground	A, B
6	GND	Signal ground	A, B
7	DIRB	B-channel direction input	B
8	PS	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	$\overline{BOUT}$	B-channel output	B
14	BOUT	B-channel inverting output	B
15	GND	Power ground	A, B
16	GND	Power ground	A, B
17	$\overline{AOUT}$	A-channel inverting output	A
18	AOUT	A-channel output	A
19	$V_{S1A}$	A-channel seeking supply voltage	A
20	NC	No connection	–

**ABSOLUTE MAXIMUM RATING (Ta=25°C)**

Characteristics	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**

Characteristics	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<sub>CC</sub>=5V, V<sub>S1</sub>=12V, V<sub>S2</sub>=5V, unless specified otherwise)

Characteristic	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Digital input "L" voltage	V <sub>IL</sub>	–	–	–	0.8	V
Digital input "H" voltage	V <sub>IH</sub>	–	2.0	–	–	V
Digital input "L" current	I <sub>IL</sub>	V <sub>IN</sub> =0.8V	–	0	10	μA
Digital input "H" current	I <sub>IH1</sub>	V <sub>IN</sub> =2.0V	–	1	10	μA
	I <sub>IH2</sub>	V <sub>IN</sub> =5V	–	0.3	1.0	mA
	I <sub>VCC</sub>	PS=0.8V	–	25	33	mA
	I <sub>V<sub>S1</sub>L</sub>	PS=0.8V	–	6	10	mA
Supply current	I <sub>V<sub>S2</sub>L</sub>	PS=0.8V	–	–	0.1	mA
	I <sub>V<sub>CC</sub>H</sub>	PS=2.0V	–	25	33	mA
	I <sub>V<sub>S1</sub>H</sub>	PS=2.0V	–	1	2	mA
	I <sub>V<sub>S2</sub>H</sub>	PS=2.0V	–	2.5	4	mA
Output sustain voltage	V <sub>SUS</sub>	I <sub>O</sub> =130mA, PS=0.8V	18	–	–	V
VS1 output saturation voltage	V <sub>SAT1</sub>	I <sub>O</sub> =130mA, PS=2.0V	–	1.5	2.0	V
VS2 output saturation voltage	V <sub>SAT2</sub>	I <sub>O</sub> =130mA	–	1.5	2.0	V
Output clamp voltage	V <sub>FU</sub>	I <sub>O</sub> =330mA (Upper)	–	3.0	5.0	V
	V <sub>FL</sub>	I <sub>O</sub> =330mA (Lower)	–	1.5	2.0	V
Output delay time	T <sub>PLH</sub>	Input pulse (2kHz)	–	1.0	5.0	μs
	T <sub>PHL</sub>	Input pulse (2kHz)	–	1.0	5.0	μs
TSD operating temperature	TSD	–	125	150	–	°C
TSD hysteresis	ΔTSD	–	–	25	–	°C

## APPLICATION INFORMATION

### 1. MOTOR CONTROL LOGIC

Mode selection-truth table

Input		Output			Operating Mode
PS	DIRX	XOUT	$\overline{XOUT}$		
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		

**NOTE:**

DIRX: DIRA or DIRB (Direction input)

XOUT: AOUT or BOUT (Non-inverting output)

$\overline{XOUT}$ :  $\overline{AOUT}$  or  $\overline{BOUT}$  (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").

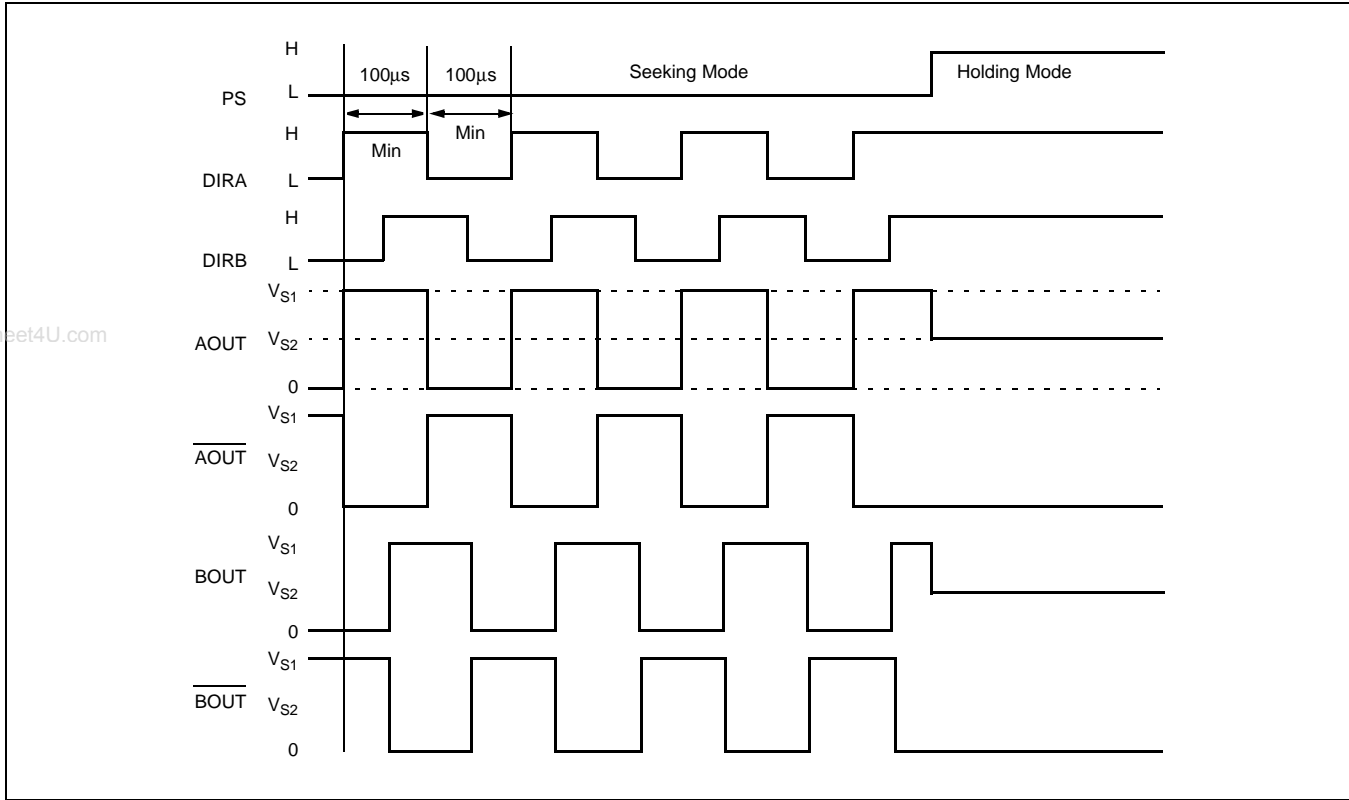
In holding mode, stepping motor is operated by low voltage ( $V_{S2}$ : Holding power supply voltage "5").

When the PS input signal is high, it will be minimized power consumption in this device.

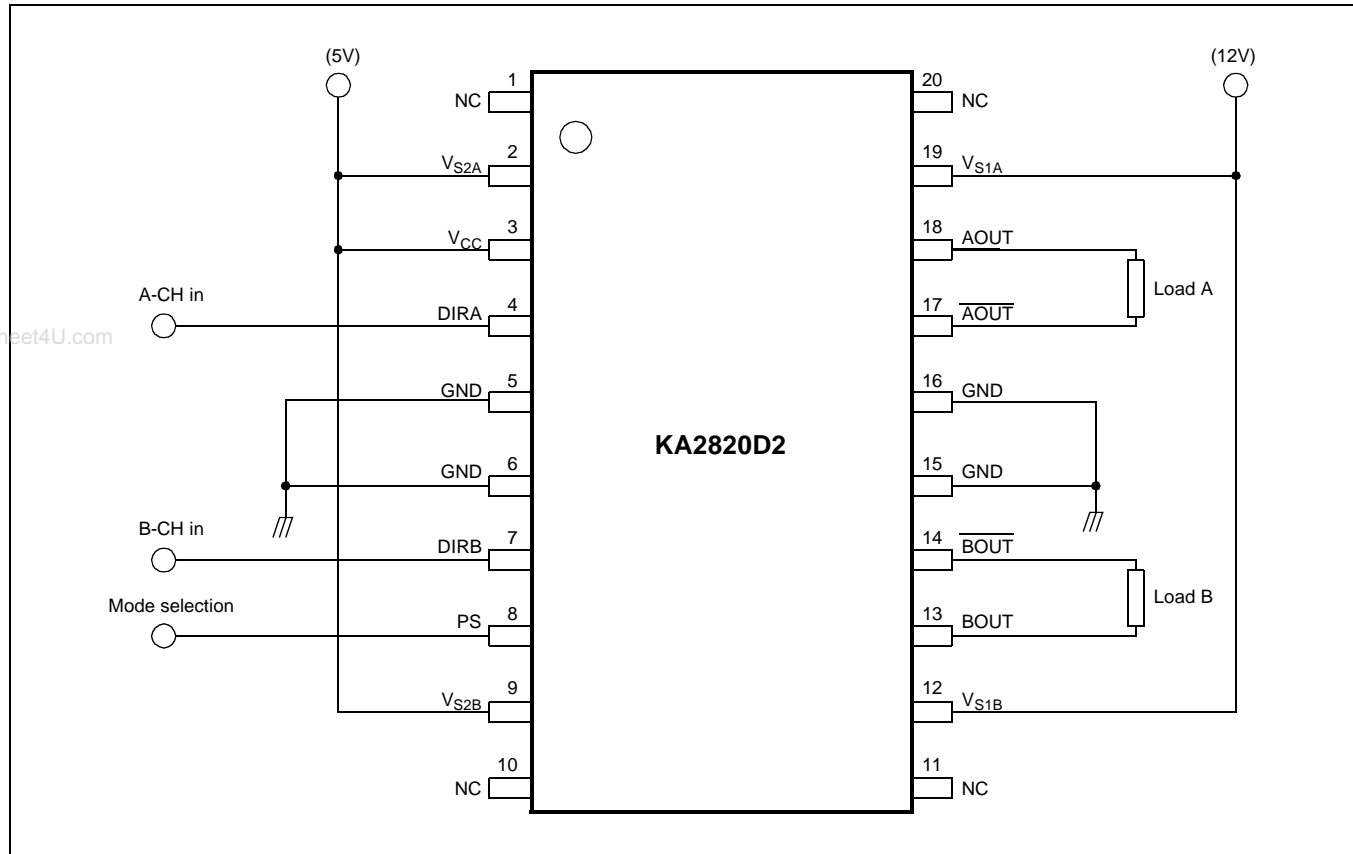
### 3. MAXIMUM DRIVE CURRENT CAPACITY AS FOLLOWS

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

TIMING CHART

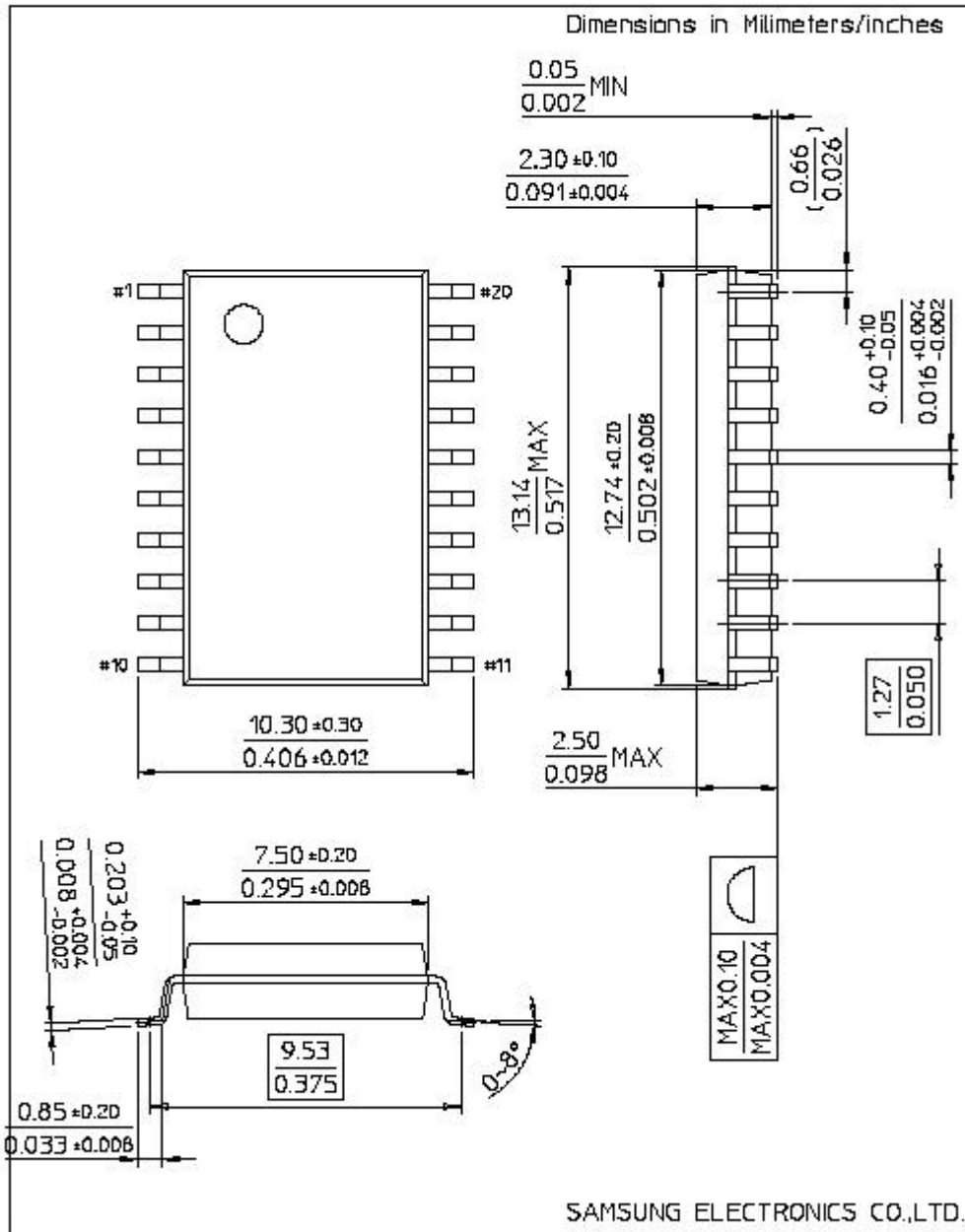


APPLICATION CIRCUIT



PACKAGE DIMENSION

**20-SOP-375**



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