

# KA3100D

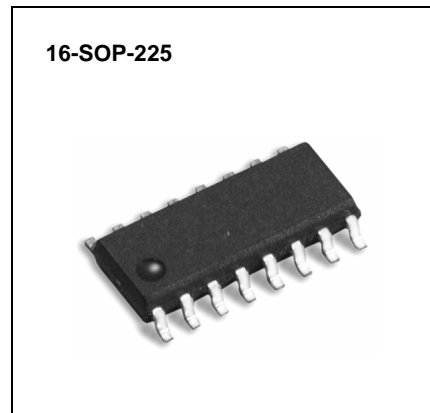
## Stepping Motor Driver

### Features

- Built-in vertical PNP power transistors
- Wide supply voltage range( $V_{CC} = 2.5V \sim 7.0V$ )
- Low saturation voltage ( $0.4V @ 0.4A$ )
- Built-in chip enable function
- Built-in shoot-through current protector
- Built-in thermal shutdown(TSD) function
- Built-in current-mode control circuit (IPEAK: 1A)

### Description

The KA3100D is a monolithic integrated circuit designed for a two-phase stepping motor driver of a FDD system.



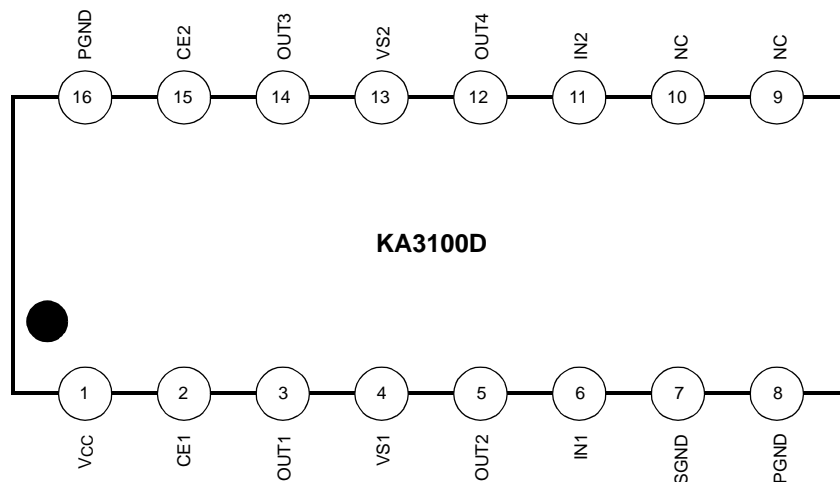
### Typical Application

- Floppy disk drive
- Camera stepping motor
- General stepping motor

### Ordering Information

Device	Package	Operating Temp.
KA3100D	16-SOP-225	-20 ~ +75°C
KA3100DTF	16-SOP-225	-20 ~ +75°C

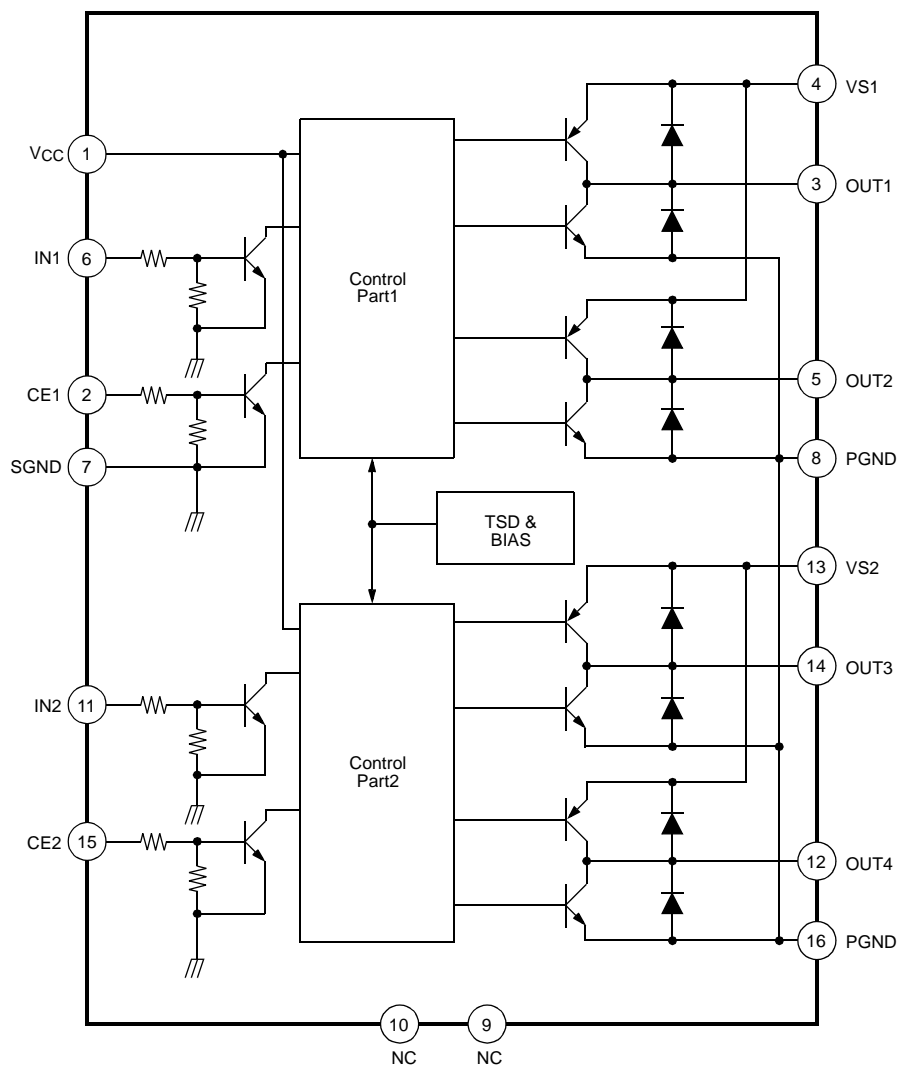
## Pin Assignments



## Pin Definitions

Pin Number	Pin Name	I/O	Pin Function Description
1	VCC	-	Logic part supply voltage
2	CE1	I	Chip enable 1
3	OUT1	O	Output 1
4	VS1	-	Power supply 1
5	OUT2	O	Output 2
6	IN1	I	Input 1
7	SGND	-	Signal ground
8	PGND	-	Power ground
9	NC	-	No connection
10	NC	-	No connection
11	IN2	I	Input 2
12	OUT4	O	Output 4
13	VS2	-	Power supply 2
14	OUT3	O	Output 3
15	CE2	I	Chip enable 2
16	PGND	-	Power ground

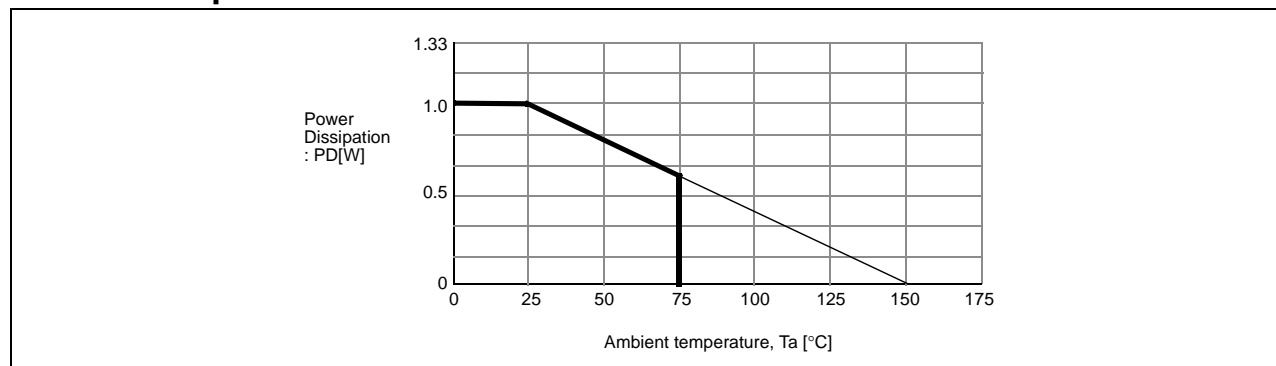
# Internal Block Diagram



## Absolute Maximum Ratings (Ta = 25°C)

Parameter	Symbol	Value	Unit
Supply voltage	VCC(MAX)	9.0	V
Power supply voltage	VS(MAX)	9.0	V
Output voltage	VOUT(MAX)	VS + Vef	V
Input voltage	VIN(MAX)	7.0	V
Peak output current	IO(PEAK)	1	A
Continuous output current	IO	0.4	A
Power dissipation	PD	0.55	W
Junction temperature	TJ	150	°C
Storage temperature	TSTG	-40 ~ 125	°C
Operating temperature	TA	-20 ~ 75	°C

## Power Dissipation Curve



Power dissipation decreases at the rate of 13.6mW / °C when mounted on 30mm × 30mm × 1.5mm PCB (Phenolic resin material) and used above Ta=25°C.

## Recommended Operating Conditions (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max	Unit
Logic circuit supply voltage	VCC	2.5	-	7.0	V
Power supply voltage	VS	2.5	-	7.0	V

## Electrical Characteristics

( $T_a=25^\circ\text{C}$ ,  $V_{CC}=5\text{V}$ ,  $V_{S1}=3\text{V}$ ,  $V_{S2}=3\text{V}$ , unless specified otherwise)

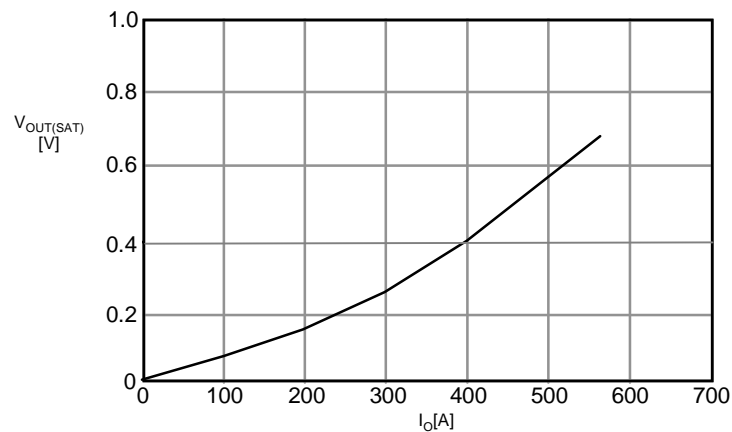
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Supply current 1	$I_{CC1}$	$CE1, 2=0\text{V}$ , $V_{INL}=3\text{V}$ or $0\text{V}$ , Each CH.	-	0.1	10	$\mu\text{A}$
Supply current 2	$I_{CC2}$	$CE1=3\text{V}$ , $V_{INL}=3\text{V}$ or $0\text{V}$ , Each CH.	-	12	18	$\text{mA}$
Saturation voltage 1	$V_{SAT1}$	$CE1=3\text{V}$ , $V_{INL}=3\text{V}$ or $0\text{V}$ , $I_{OUT}=0.2\text{A}$	-	0.2	0.3	$\text{V}$
Saturation voltage 2	$V_{SAT2}$	$CE1=3\text{V}$ , $V_{INL}=3\text{V}$ or $0\text{V}$ , $I_{OUT}=0.4\text{A}$	-	0.4	0.6	$\text{V}$
Input high level voltage	$V_{INH}$	-	1.8	-	$V_{CC}$	$\text{V}$
Input low level voltage	$V_{INL}$	-	-0.3	-	0.7	$\text{V}$
Input current	$I_{IN}$	$V_{IN}=3\text{V}$ , Each CH	-	100	200	$\mu\text{A}$
Chip enable current	$I_{CE}$	$CE=0\text{V}$ , Each CH	-	100	200	$\mu\text{A}$
Clamp diode leakage current	$I_{LEAK}$	$V_{CC}=7\text{V}$ , $V_S=7\text{V}$	-	-	30	$\mu\text{A}$
Clamp diode voltage	$V_{EF}$	$I_{OUT}=0.4\text{A}$	-	-	1.7	$\text{V}$

## Function Descriptions

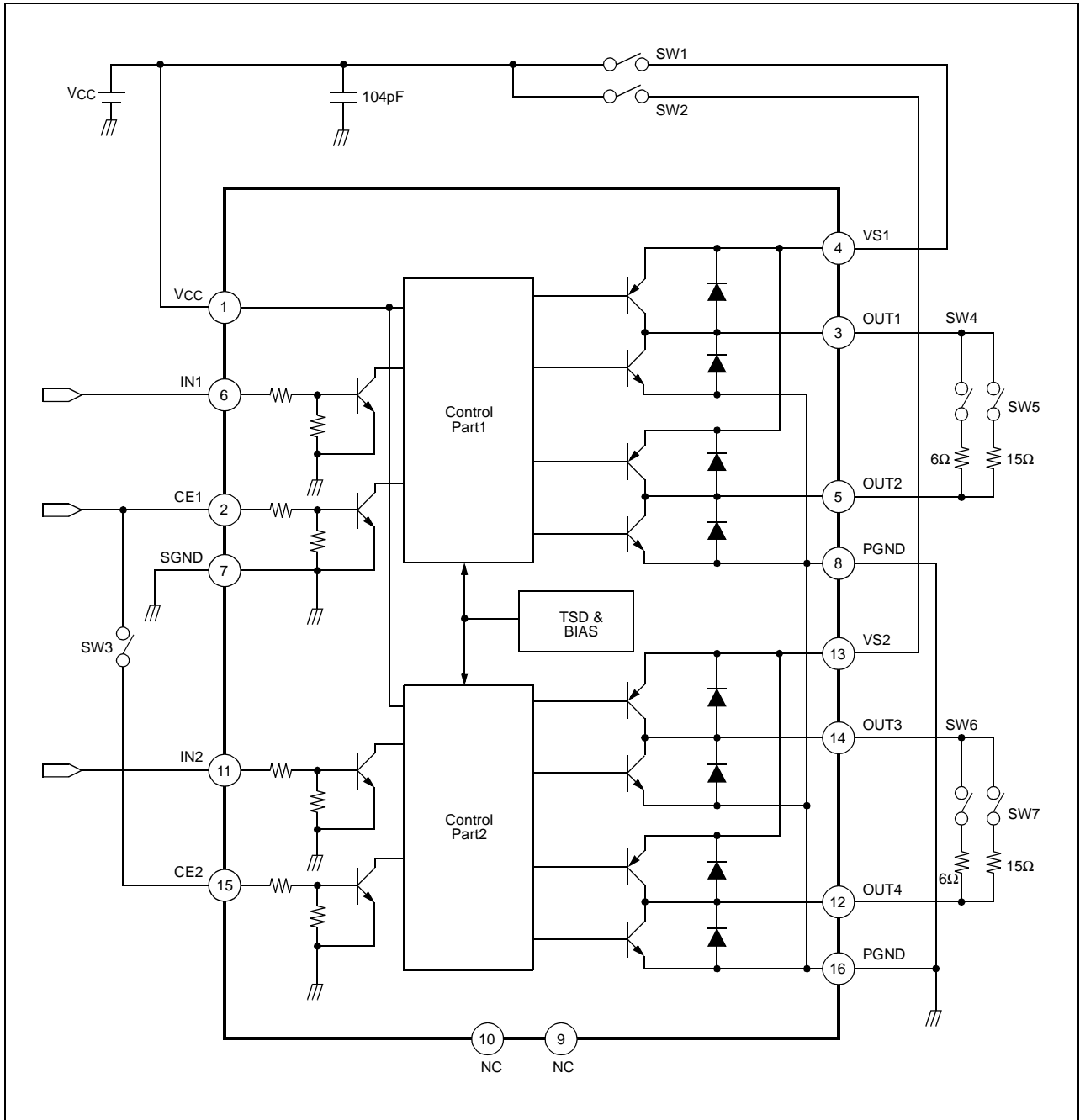
IN1 & IN2	CE1 & CE2	OUT1 & OUT3	OUT2 & OUT4	Motor rotation
Low	High	High	Low	Forward
High	High	Low	High	Reverse
Low	Low	Off	Off	Stand-by
High	Low	Off	Off	Stand-by

## Typical Performance Characteristics

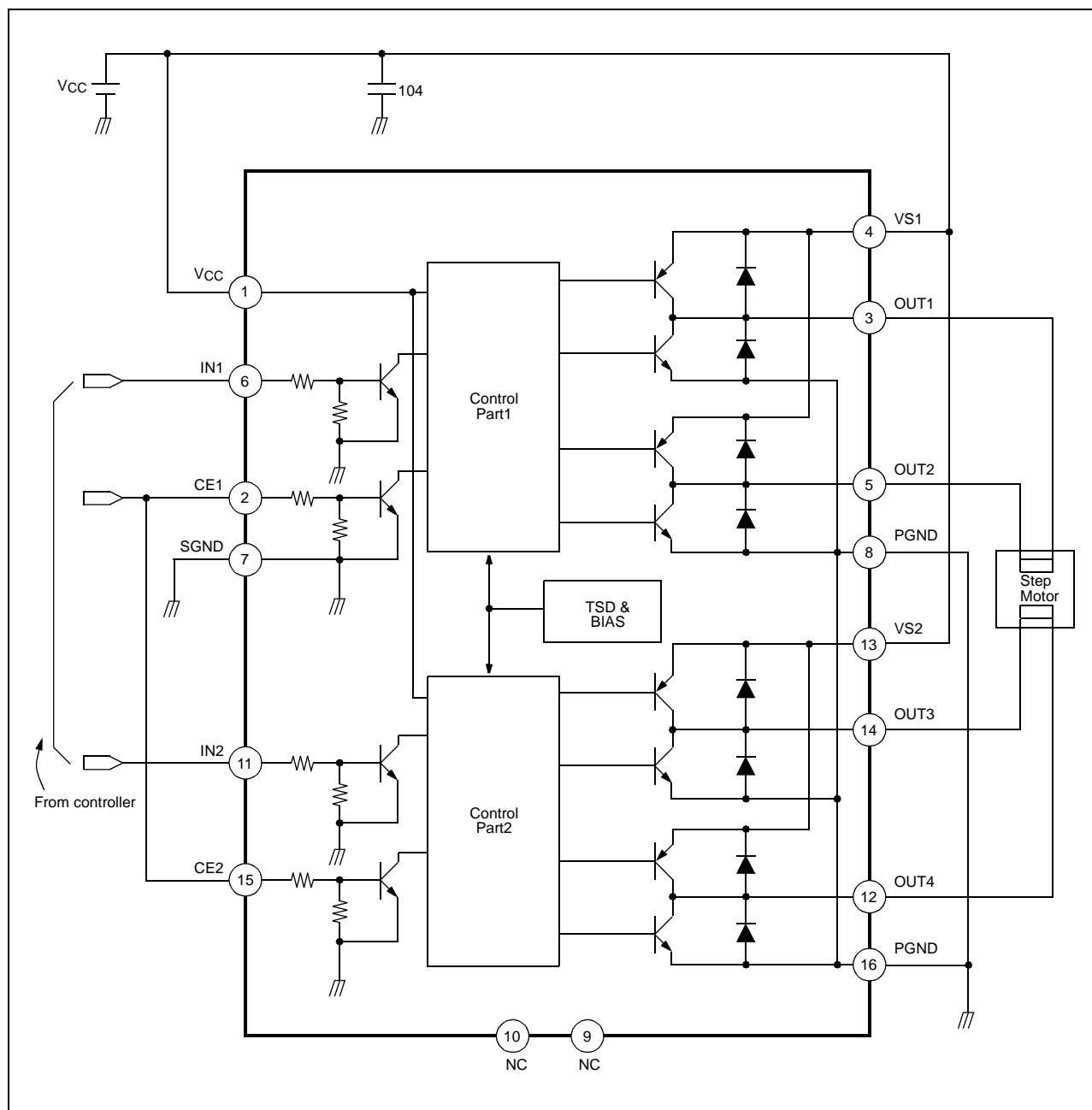
$v_{out(sat)}$  vs  $i_o$  Characteristic Graph



# Test Circuits



## Typical Application Circuits



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