

# FAN8024D (KA3024D)

## 4-Channel Motor Driver

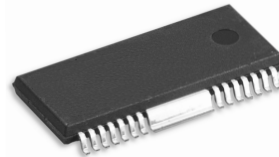
### Features

- 2-Channel BTL driver with current feedback
- 2-Channel BTL DC motor driver
- Built-in thermal shutdown circuit
- Built-in mute circuit
- Operating supply voltage: 4.5~13.2V
- Corresponds to 3.3V or 5V DSP

### Description

The FAN8024D is a monolithic IC, suitable for a 2-ch BTL DC motor driver and a 2-ch motor driver with current feedback which drives the focus and tracking actuator of a CD-media system.

28-SSOPH-375



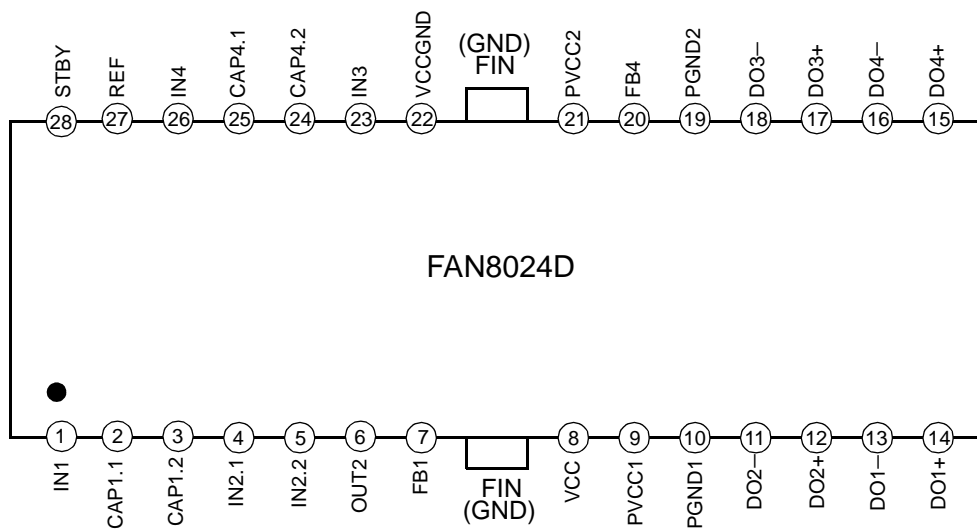
### Typical Applications

- Compact disk ROM (CD-ROM)
- Compact disk RW (CD-RW)
- Digital video disk ROM (DVD-ROM)
- Digital video disk RAM (DVD-RAM)
- Digital video disk player (DVDP)
- Other compact disk media

### Ordering Information

Device	Package	Operating Temp.
FAN8024D	28-SSOPH-375	-35 °C ~ 85 °C
FAN8024DTF	28-SSOPH-375	-35 °C ~ 85 °C

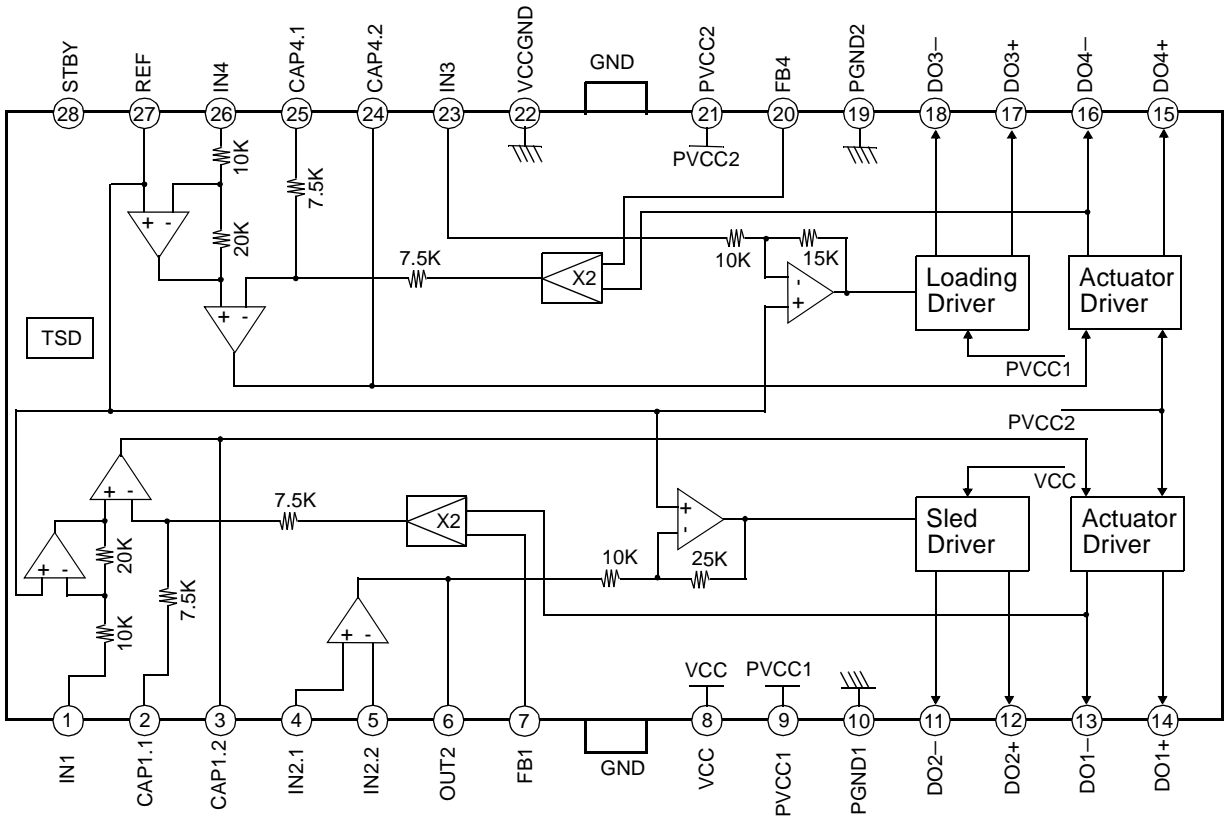
## Pin Assignments



## Pin Definitions

Pin Number	Pin Name	I/O	Pin Function Description
1	IN1	I	CH1 input
2	CAP1.1	-	Connection with capacitor for CH1
3	CAP1.2	-	
4	IN2.1	I	OP-AMP CH2 input(+)
5	IN2.2	I	OP-AMP CH2 input(-)
6	OUT2	O	OP-AMP CH2 output
7	FB1	I	Feedback for CH1
8	VCC	-	Signal Vcc
9	PVCC1	-	Power Supply 1
10	PGND1	-	Power Ground 1
11	DO2-	O	Drive2 Output (-)
12	DO2+	O	Drive2 Output (+)
13	DO1-	O	Drive1 Output (-)
14	DO1+	O	Drive2 Output (+)
15	DO4+	O	Drive4 Output (+)
16	DO4-	O	Drive4 Output (-)
17	DO3+	O	Drive3 Output (+)
18	DO3-	O	Drive3 Output (-)
19	PGND2	-	Power Ground 2
20	FB4	-	Feedback for CH4
21	PVCC2	-	Power Supply 2
22	VCCGND	-	Vcc ground
23	IN3	I	CH3 input
24	CAP4.2	-	Connection with capacitor for CH4
25	CAP4.1	-	
26	IN4	I	CH4 input
27	REF	I	Bias voltage input
28	STBY	I	Stand-by input

# Internal Block Diagram



## Equivalent Circuits

ERROR AMP INPUT	STAND-BY INPUT
ERROR AMP OUTPUT	SIGNAL REFERENCE INPUT
POWER AMP OUTPUT	

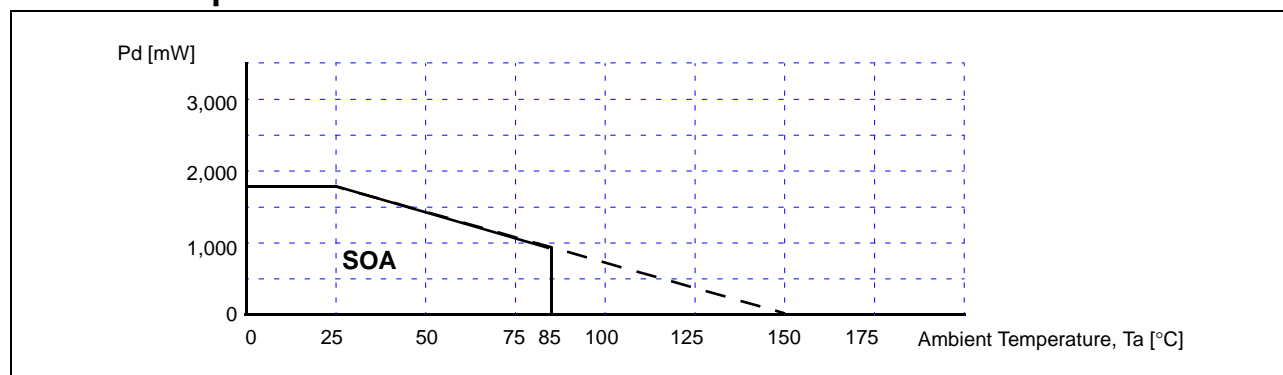
## Absolute Maximum Ratings (Ta = 25°C)

Parameter	Symbol	Value	Unit
Maximum supply voltage	$V_{CCmax}$	15	V
Power dissipation	$P_D$	1.7 <sup>note</sup>	W
Operating temperature range	$T_{OPR}$	-35 ~ +85	°C
Storage temperature range	$T_{STG}$	-55 ~ +150	°C

### NOTE:

1. When mounted on a 50mm × 50mm × 1mm PCB (Phenolic resin material).
2. Power dissipation reduces 13.6mW/°C for using above Ta = 25°C
3. Do not exceed  $P_D$  and SOA(Safe operating area).

## Power Dissipation Curve



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

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	$V_{CC}$	4.5	-	13.2	V

## Electrical Characteristics

(Unless otherwise specified,  $T_a = 25\text{ }^\circ\text{C}$ ,  $V_{CC} = 12\text{V}$ ,  $PV_{CC1,2} = 5\text{V}$  & the other conditions & nomenclatures follow the test circuit)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Quiescent Current1	$I_{CC1}$	Stand-by off	-	18	27	mA
Quiescent Current1	$I_{CC2}$	Stand-by on	-	-	0.5	mA
Stand-by On Voltage	$V_{STOn}$	-	-	-	0.5	V
Stand-by Off Voltage	$V_{STOff}$	-	2.0	-	-	V
<b>ACTUATOR DRIVE CIRCUIT</b>						
Output Offset Current	$I_{OO1,4}$	VIN1,4 set to BIAS	-6	0	+6	mA
Maximum Output Voltage1	$V_{OM1,4}$	VIN1,4 = 4.5V	3.6	4.0	-	V
Transconductance	$G_{M1,4}$	VIN1,4 = 100mVp-p, f=1kHz	1.5	1.7	1.9	A/V
<b>PRE OP-AMP (SLED DRIVER)</b>						
Common mode Input Range	$V_{OOM}$	SW1 & SW2 set to position 2, VIN2 sweep from 0V to 12V	0	-	11.0	V
Input Bias Current	$I_B$	SW1 & SW2 set to position 1	-300	-30	-	nA
Low Level Output Voltage	$V_{OL}$	SW1=>posit. 2, SW2=>posit. 1 VIN2 is 2.0V & VIN5 is 3.0V	-	0.1	0.3	V
Output Source Current	$I_{SOURCE}$	SW1 set to position 2 SW2 & SW3 set to position 1 VIN2 is 3.0V & VIN5 is 2.0V	1	4	-	mA
Output Sink Current	$I_{SINK}$	SW3 set to position 2 VIN2 is 2.0V & VIN5 is 3.0V	5	10	-	mA
<b>SLED DRIVE CIRCUIT</b>						
Output Offset Voltage of Input OP-Amp	$V_{OF2}$	SW1=>posit. 2, SW2=>posit. 1 VIN 2 & VIN5 set to BIAS	-100	0	+100	mV
Maximum Output Voltage2	$V_{OM2}$	SW1 & SW2 set to position 2 VIN2 set to 4.5V	10.0	10.9	-	V
Closed loop Voltage Gain1	$G_{VLO2}$	VIN2 = 100mVp-p, f=1kHz SW2 & SW1 set to position 2	18.0	20.0	22.0	dB
<b>Loading DRIVE CIRCUIT</b>						
Output Offset Voltage1	$V_{OF3}$	VIN3 set to BIAS	-50	0	50	mV
Maximum Output Voltage 3	$V_{OM3}$	VIN3 set to 4.5V	3.6	4.0	-	V
Closed loop Voltage Gain 2	$G_{VLO3}$	VIN3 = 100mVp-p, f=1KHz	13.5	15.5	17.5	dB

## Application Information

### 1. REFERENCE INPUT & STAND-BY FUNCTION

- Reference input (PIN 27)  
The applied voltage at the reference input pin must be between 1.4V and 6.5V, when  $V_{CC}=8.5V$ .
- Stand-by input (PIN 28)  
The following input conditions must be satisfied for the normal stand-by function.

Stand-by input voltage	Below 0.5V or OPEN	Stand-by function is activated so the bias block and the power block are disabled
Stand-by input voltage	Above 2.0V	Normal operation

### 2. PROTECTION FUNCTION

Thermal shutdown (TSD)

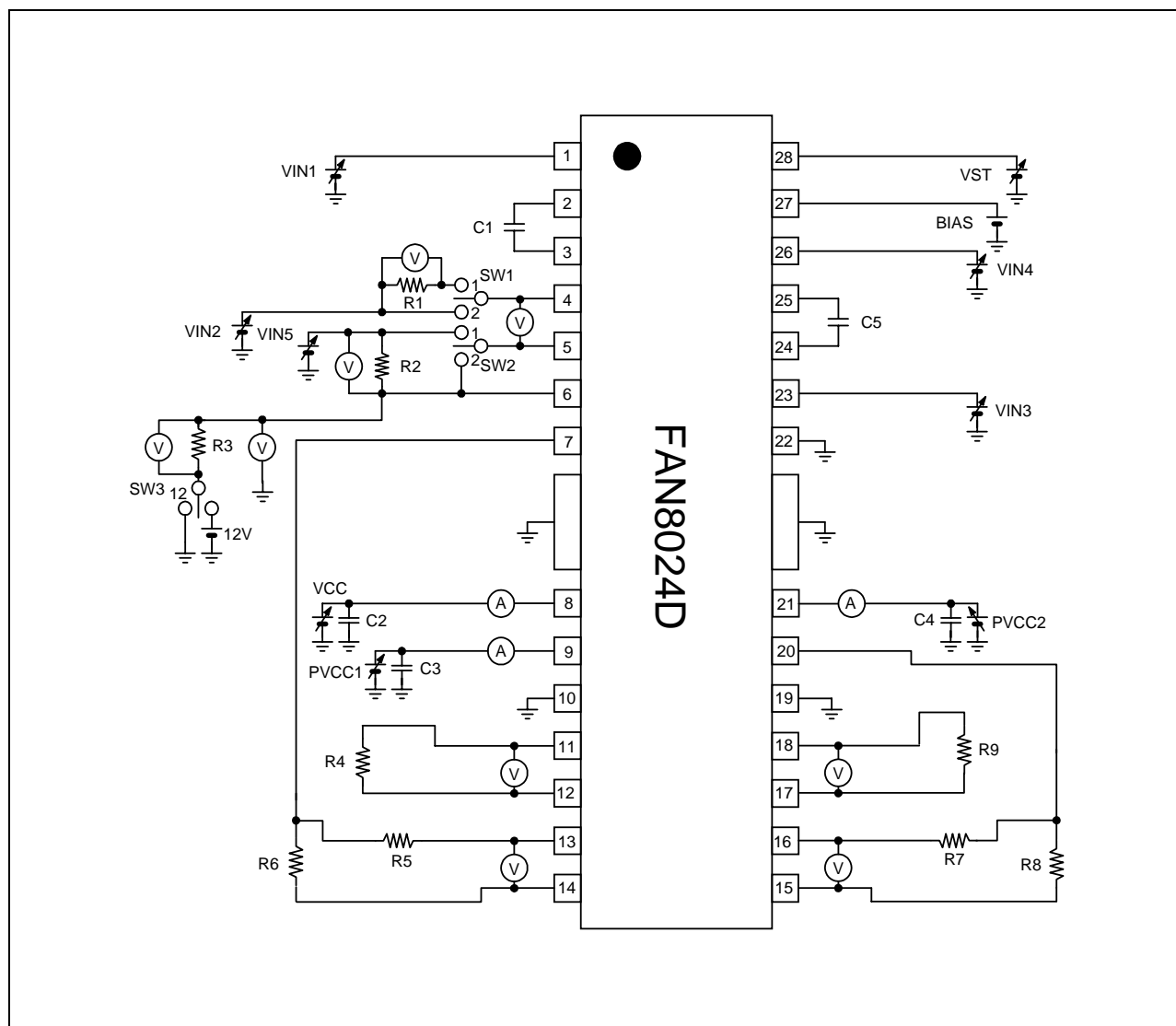
If the chip temperature rises above 175°C, the thermal shutdown (TSD) circuit is activated and the output circuit is in the mute state, that is off state. The TSD circuit has a temperature hysteresis of 25°C

### 3. SEPARATION OF POWER SUPPLY

- $PV_{cc1}$  (PIN 9)  
 $PV_{cc1}$  is the power for loading driver. The range is between 5V ~ 12V.
- $PV_{cc2}$  (PIN 21)  
 $PV_{cc2}$  is the power supply for actuator driver that include focus and tracking actuator. The range is between 5V ~ 12V
- $V_{cc}$  (PIN 8)  
 $V_{cc}$  pin supplies power for sled driver and signal logic part. The voltage applied to  $V_{cc}$  must be higher than  $PV_{cc1}$  and  $PV_{cc2}$  at least 1V

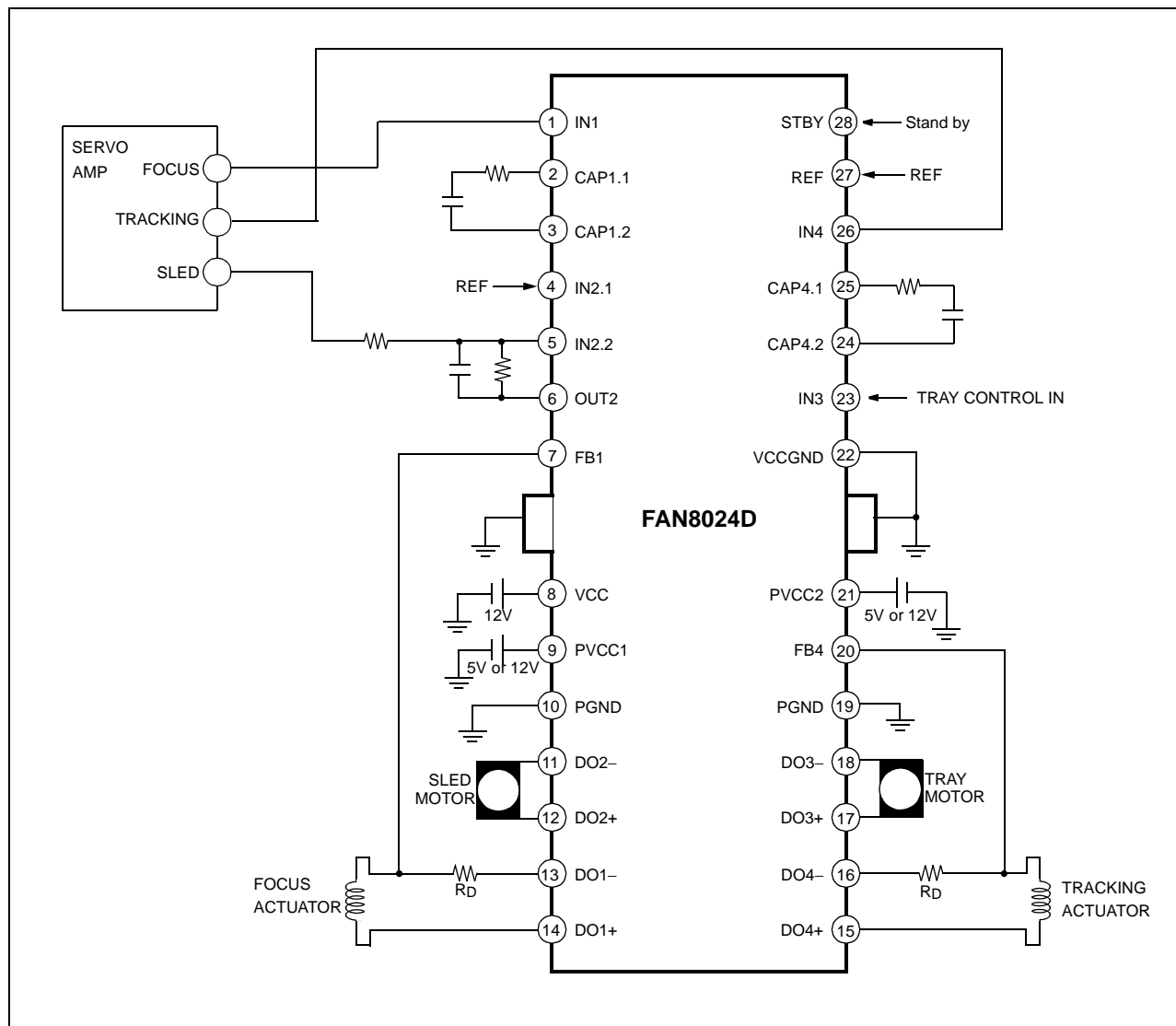


## Test Circuits



Symbol	Value	Symbol	Value	Symbol	Value
R1	1M $\Omega$	R6	5 $\Omega$	C2	10uF
R2	1M $\Omega$	R7	4 $\Omega$	C3	10uF
R3	50 $\Omega$	R8	5 $\Omega$	C4	10uF
R4	8 $\Omega$	R9	8 $\Omega$	C5	100pF
R5	4 $\Omega$	C1	100pF	BIAS	2.5V

## Typical Application Circuits



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