FAN8024D (KA3024D)

4-CH Motor Drive IC

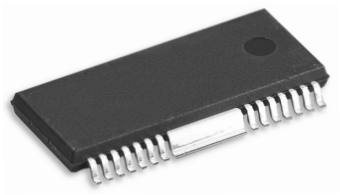
Features

- 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

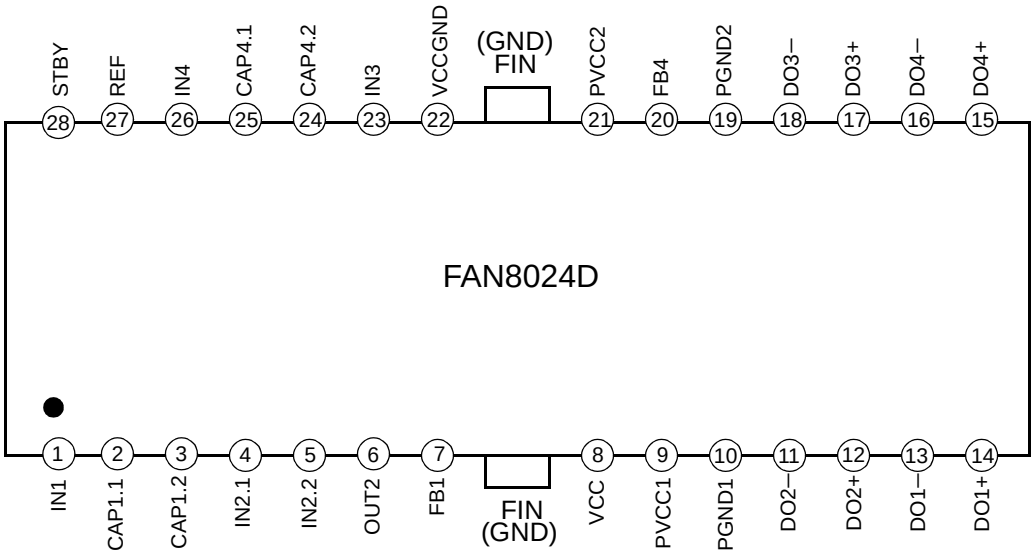


DC MOTOR DRIVE IC

Typical Applications

- Compact disk ROM
- Compact disk RW
- Digital video disk ROM
- Digital video disk RW
- Other compact disk media

Pin Assignments

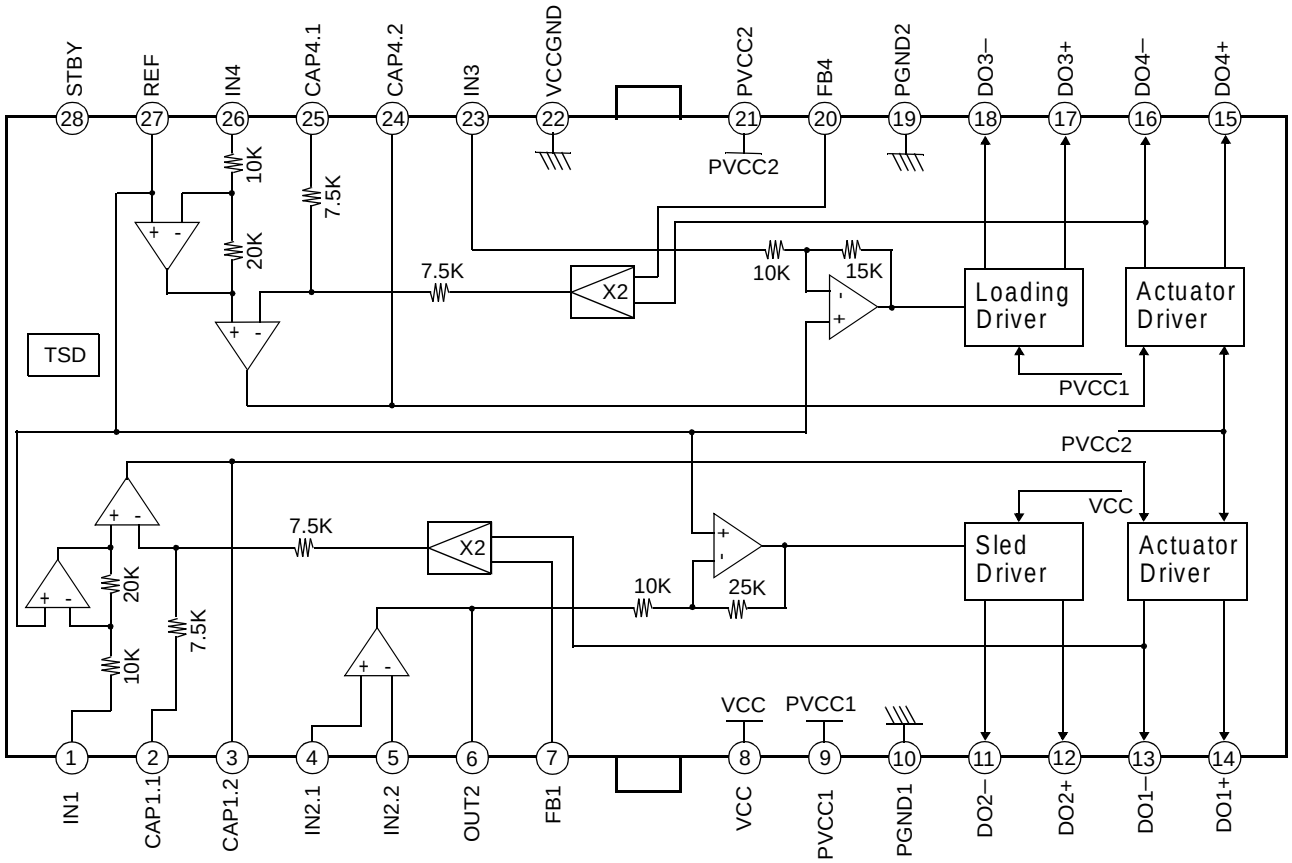


DC MOTOR DRIVE IC

Pin Definitions

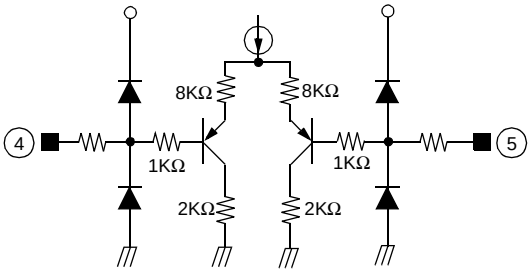
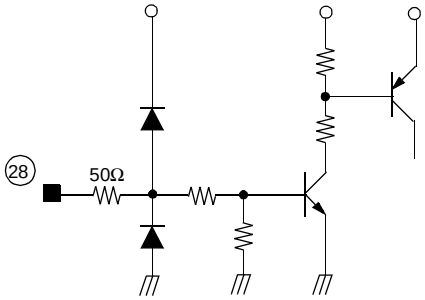
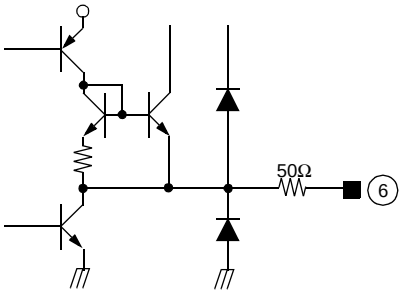
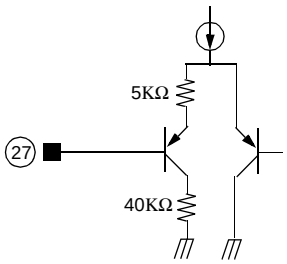
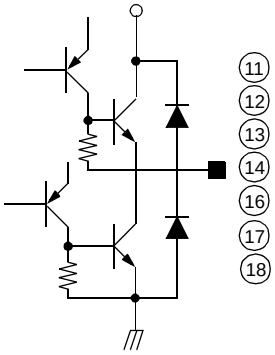
Pin Number	Pin Name	I/O	Pin Function Description
1	IN1	I	CH1 input
2	CAP1.1	-	Connection with capacitor
3	CAP1.2	-	for CH1
4	IN2.1	I	OP-AMP CH2 input(+)
5	IN2.2	I	OP-AMP CH2 input(-)
6	OUT2	O	OP-AMP CH2 output
7	FB1	I	Feedback for CH1
8	VCC	-	Signal Vcc
9	PVCC1	-	Power Supply 1
10	PGND1	-	Power Ground 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
25	CAP4.1	-	for CH4
26	IN4	I	CH4 input
27	REF	I	Bias voltage input
28	STBY	I	Stand-by input

Internal Block Diagram



DC MOTOR DRIVE IC

Equivalent Circuits

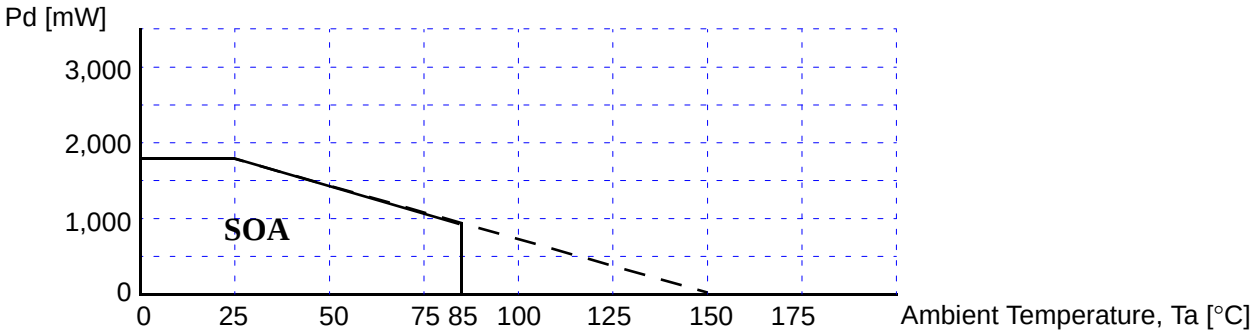
ERROR AMP INPUT	STAND-BY INPUT
	
ERROR AMP OUTPUT	**SIGNAL REFERENCE INPUT**
	
POWER AMP OUTPUT	
	

Absolute Maximum Ratings (Ta = 25°C)

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

Notes:

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).



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, Ta = 25 °C, V_{CC} = 12V, $PV_{CC}1,2$ = 5V & the other conditions & nomenclatures follow the test circuit)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
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
ACTUATOR DRIVE PART						
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
PRE OP–AMP (SLED DRIVER)						
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
SLED DRIVE PART						
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
Loading DRIVE PART						
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

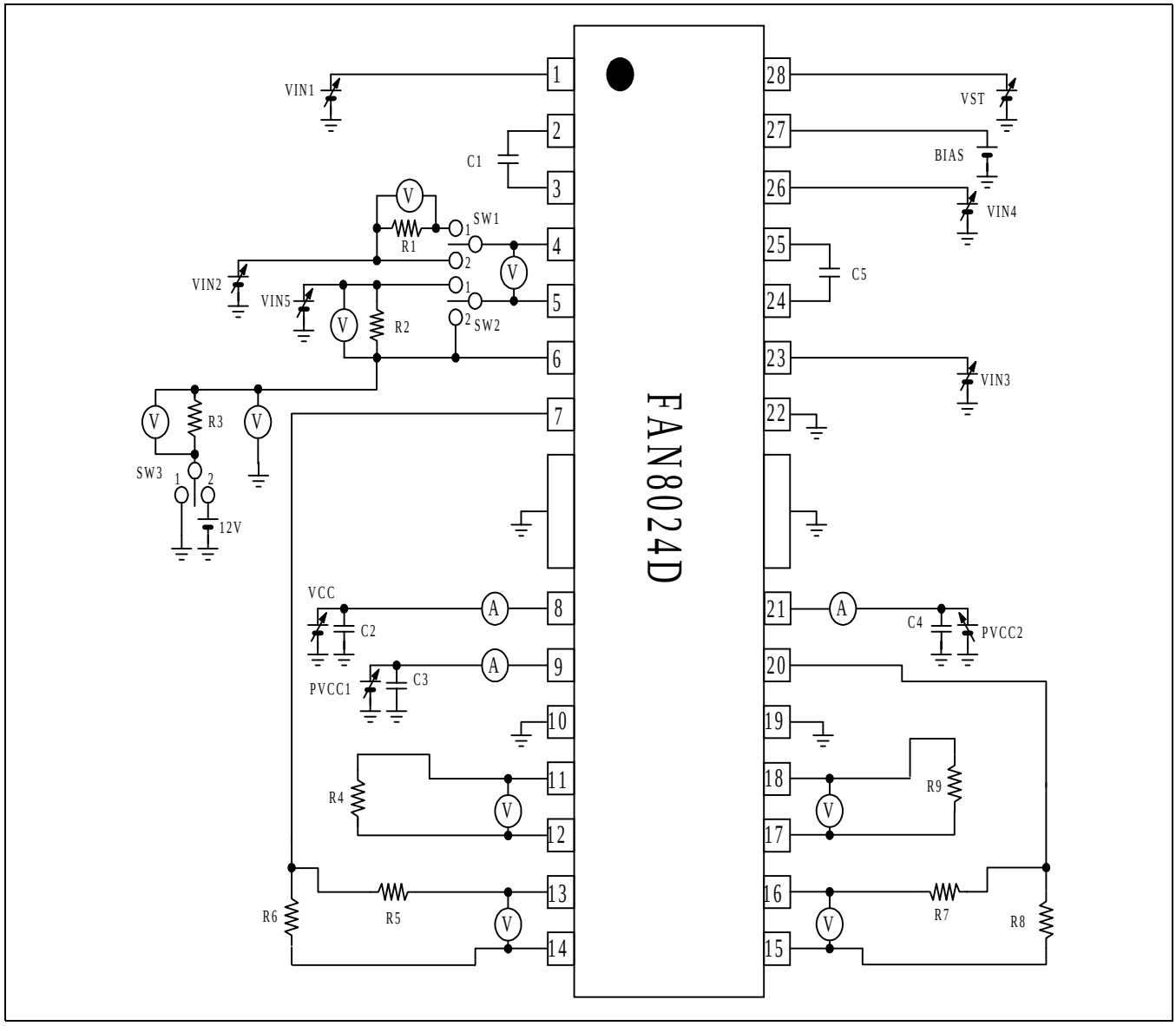
Thermal shutdown (TSD)

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

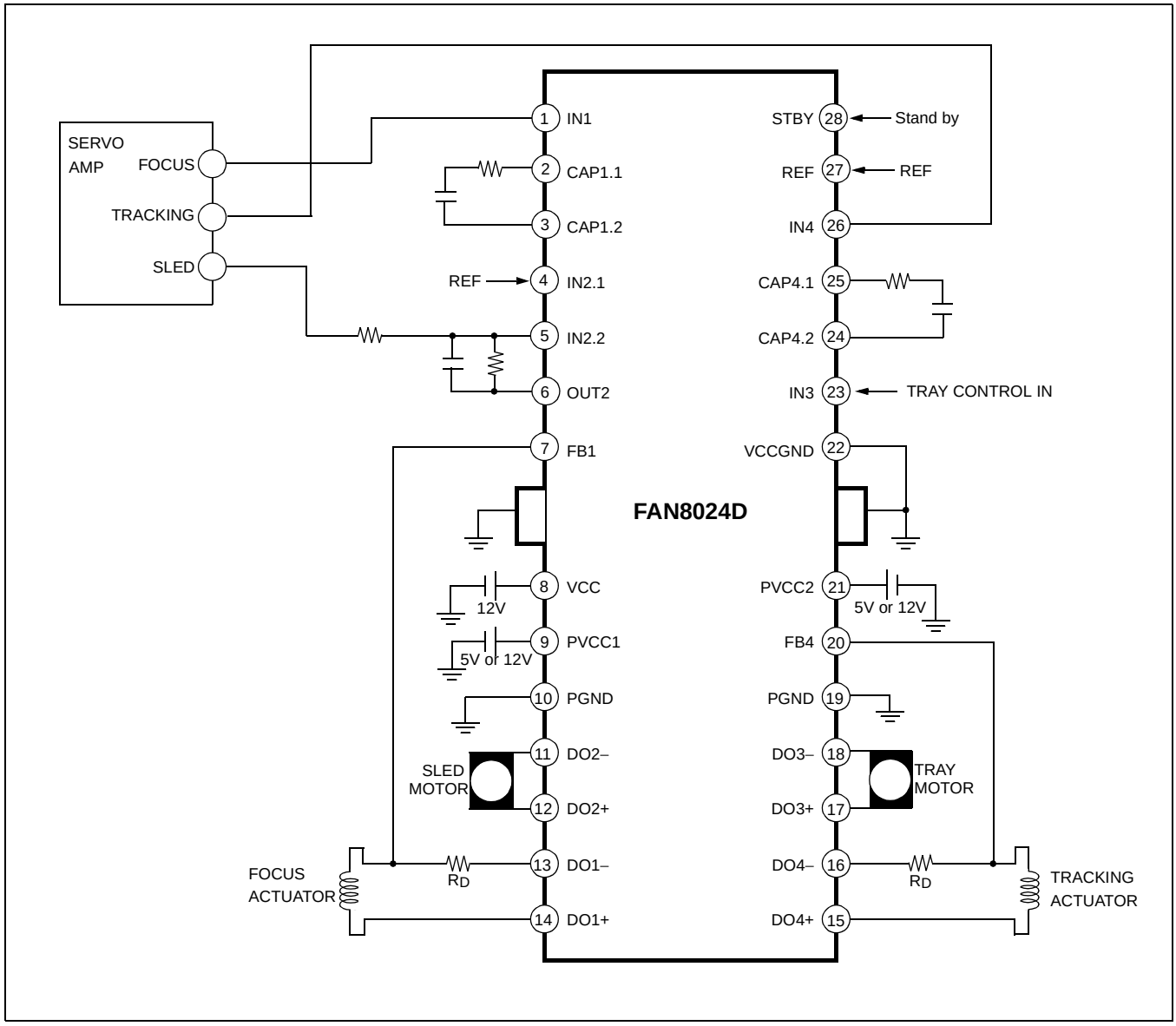
- PV_{cc1} (PIN 9)
  PV_{cc1} is the power for loading driver. The range is between 5V ~ 12V.
- PV_{cc2} (PIN 21)
  PV_{cc2} is the power supply for actuator driver that include focus and tracking actuator. The range is between 5V ~ 12V
- V_{cc} (PIN 8)
  V_{cc} pin supplies power for sled driver and 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	1MΩ	R6	5Ω	C2	10uF
R2	1MΩ	R7	4Ω	C3	10uF
R3	50Ω	R8	5Ω	C4	10uF
R4	8Ω	R9	8Ω	C5	100pF
R5	4Ω	C1	100pF	BIAS	2.5V

Typical Application Circuits



Ordering Information

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

DC MOTOR DRIVE IC

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