FAN8045G3

4-CH Motor Driver (5 Input & 4 Output)

Features

- 4-CH Balanced Transformerless (BTL) Driver
- Optional Input (CH4,5) For Output CH4
- Operating Supply Voltage : 4.5 V ~ 14V
- Built-in Thermal Shut Down Circuit (TSD)
- Built-in Channel Mute Circuit
- Built-in 1-OP AMP
- TSD Monitering Function

Description

The FAN8045G3 is a monolithic integrated circuit suitable for a 4-CH motor driver which drives a tracking actuator, a focus actuator, a sled motor, a spindle motor, and a tray motor of the CDP/CAR-CD/DVDP systems.

28-SSOPH-375SG2

Typical Application

- Compact Disk Player
- Video Compact Disk Player
- Car Compact Disk Player
- Digital Video Disk Player

Ordering Information

Device	Package	Operating Temp.
FAN8045G3	28-SSOPH-375-SG2	-35°C ~ +85°C
FAN8045G3X[note1]	28-SSOPH-375-SG2	-35°C ~ +85°C
FAN8045G3_NL[note2]	28-SSOPH-375-SG2	-35°C ~ +85°C
FAN8045G3X_NL	28-SSOPH-375-SG2	-35°C ~ +85°C

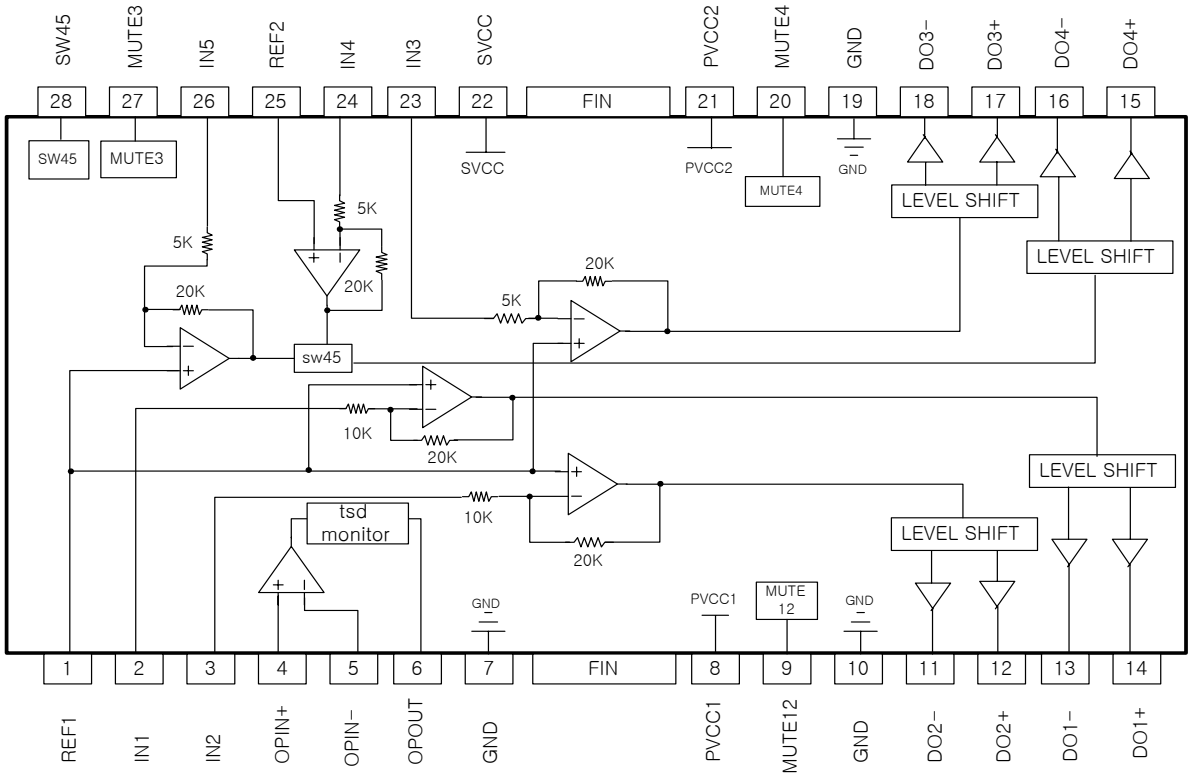
Notes:
1. X : Tape&Reel
2. NL : Lead free

Pin Assignments

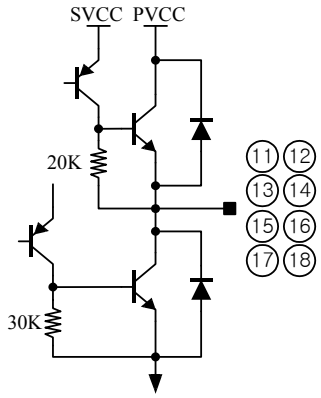
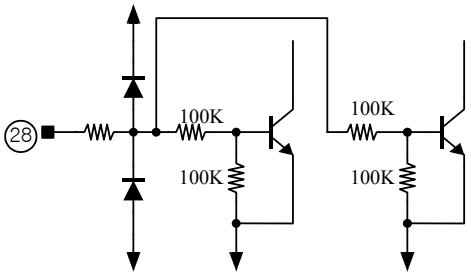
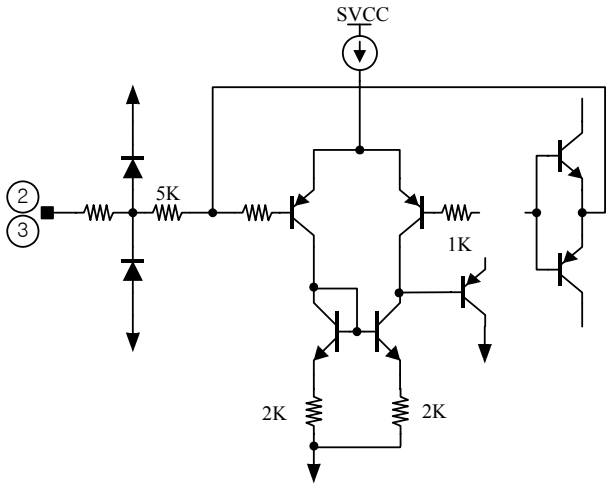
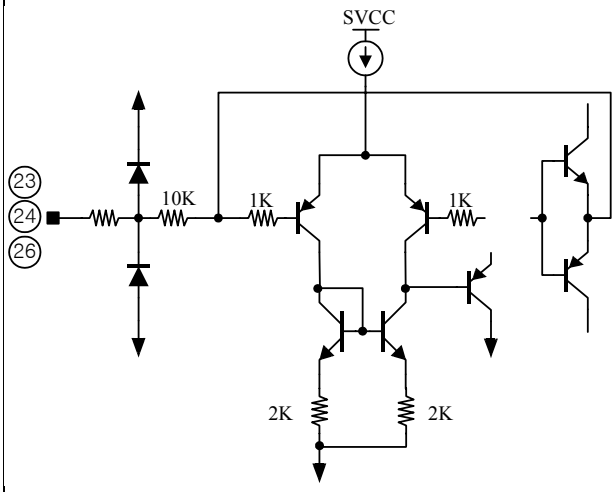
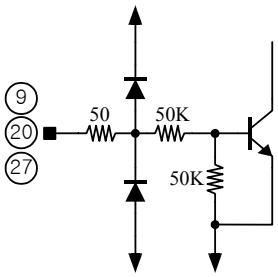
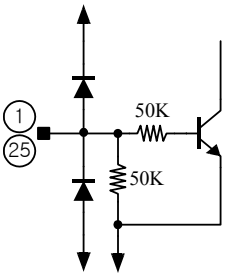
Pin Definitions

Pin Number	Pin Name	I/O	Pin Function Description
1	REF1	I	Bias Voltage Input
2	IN1	I	CH1 Input
3	IN2	I	CH2 Input
4	OPIN+	I	Nomal OP-AMP Input(+)
5	OPIN-	I	Nomal OP-AMP Input(-)
6	OPOUT	O	Nomal OP-AMP Output
7	GND	-	Signal Ground
8	PVcc1	-	Power Vcc (CH1,CH2)
9	MUTE12	I	Mute 1,2
10	GND	-	Power GND(CH1,CH2)
11	DO2-	O	CH2 Drive Output (-)
12	DO2+	O	CH2 Drive Output (+)
13	DO1-	O	CH1 Drive Output (-)
14	DO1+	O	CH1 Drive Output (+)
15	DO4+	O	CH4 Drive Output (+)
16	DO4-	O	CH4 Drive Output (-)
17	DO3+	O	CH3 Drive Output (+)
18	DO3-	O	CH3 Drive Output (-)
19	GND	-	Power GND(CH3,CH4)
20	MUTE4	I	Mute 4
21	PVcc2	-	Power Vcc (CH3,CH4)
22	SVcc	-	Signal Vcc
23	IN3	I	CH3 Input
24	IN4	I	CH4 Input
25	REF2	I	REF2
26	IN5	I	CH5 Input
27	MUTE3	I	Mute 3
28	SW45	I	Select Switch For 4,5CH

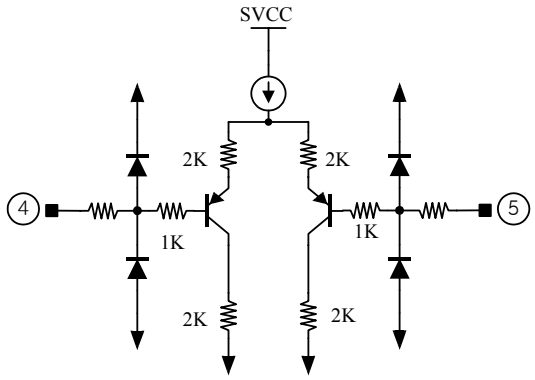
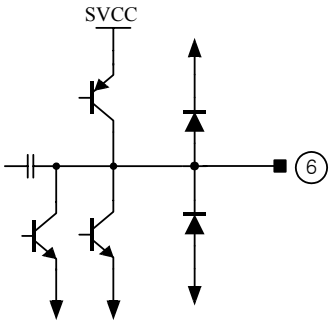
Internal Block Diagram



Equivalent Circuits

BTL Driver Output	SW45
	
BTL Input(CH1,2)	**BTL Input(CH3,4)**
	
Mute	**Reference**
	

Equivalent Circuits (Continued)

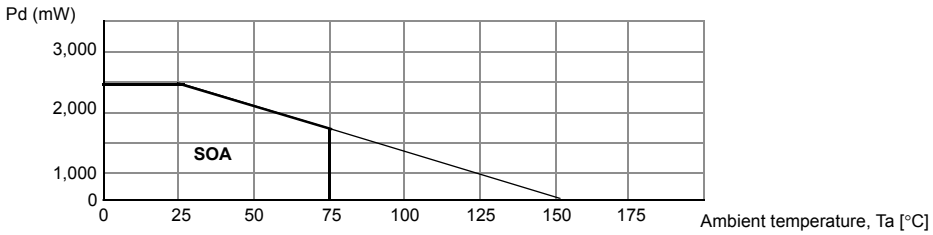
OP-AMP Input	OP-AMP Output
	

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Value	Unit
Maximum Supply Voltage	$SVCC_{MAX}$	18	V
	$PVCC1_{MAX}$	18	V
	$PVCC2_{MAX}$	18	V
Power Dissipation	P_D	2.5[note1,2,3]	W
Operating Temperature	T_{OPR}	−35 ~ +85	°C
Storge Temperature	T_{STG}	−55 ~ +150	°C
Maximum Output Current	I_{OMAX}	1	A

Notes:

1. When it is mounted on 70mm × 70mm × 1.6mm PCB.
2. Power dissipation decreases at the rate of 20mW/°C in T_A >25°C.
3. Do not exceed P_D and SOA.



Recommended Operating Conditions (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating Supply Voltage	SVCC	4.5	-	14	V
	PVCC1	4.5	-	SVCC	V
	PVCC2	4.5	-	SVCC	V

Electrical Characteristics

(SV_{CC} = PV_{CC2} = 12V, T_A = 25°C,PV_{CC1} = 5V , Ref1= 1.65V ,Ref2 = 2.5V , RL = 8Ω)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Quiescent Circuit Current	I_{CC}	Under no-load	-	17	25	mA
BTL DRIVER CIRCUIT (R_L=8Ω)						
Output Offset Voltage(CH12)	V_{OOF1}	V_{IN}=1.65V	-50	-	+50	mV
Output Offset Voltage(CH34)	V_{OOF2}	V_{IN}=1.65V	-100	-	+100	mV
Output Offset Voltage(CH5)	V_{OOF3}	V_{IN}=2.5V	-100	-	+100	mV
Maximum Output Voltage(CH12)	V_{OM1}	PVcc1=5V, R_L=8Ω	3.6	4.0	-	V
Maximum Output Voltage(CH34)	V_{OM2}	PVcc2=12V, R_L=24Ω	9.6	10.5	-	V
Close-loop Voltage Gain(CH12)	A_{VF}	V_{IN}= 0.3V	15.5	17.5	19.5	dB
Close-loop Voltage Gain(CH34)	A_{VF}	V_{IN}= 0.3V	21.5	23.5	25.5	dB
NORMAL OPAMP CIRCUIT(SV_{CC},PV_{CC2}=12V)						
Input Offset Voltage	V_{OF}	-	-10	-	+10	mV
Input Bias Current	I_{B1}	-	-	-	300	nA
High Level Output Voltage	V_{OH1}	-	11	-	-	V
Low Level Output Voltage	V_{OL1}	-	-	-	0.1	V
Output Sink Current	I_{SINK}	-	5	8	-	mA
Output Source Current	I_{SOU1}	-	1	5	-	mA
Open Loop Voltage Gain	G_{VO1}	f=1kHz, V_{IN}= -75dB	-	75	-	dB
Ripple Rejection Ratio[note1]	RR1	f=120Hz, V_{IN}= -20dB	-	65	-	dB
Slew Rate[note1]	SR1	f=120Hz, 2Vp-p	-	1	-	V/us
Common Mode Rejection Ratio[note1]	CMRR1	f=1kHz, V_{IN}= -20dB	-	80	-	dB
TSD ON Voltage[note1]	Vtsdon	-	-	-	0.5	V
MUTE AND OTHER FUNCTION CIRCUIT						
Mute On Voltage	V_{MON}	Pin9,20,27=Variation	-	-	0.5	V
Mute Off Voltage	V_{MOFF}	Pin9,20,27=Variation	2	-	-	V
SW On Voltage	V_{SWL}	Pin28=Variation	-	-	0.5	V
SW Off Voltage	V_{SWH}	Pin28=Variation	2	-	-	V
Mute Low Level Sink Current	IMTL	VMUTE = 0V	-15	0	15	uA
Mute High Level Sink Current	IMTH	VMUTE = 5V	-	85	170	uA
SW45 Low Level Sink Current	ISWL45	SW45 = 0V	-15	0	15	uA
SW45 High Level Sink Current	ISWH45	SW45 = 5V	-	85	170	uA
REF1 Sink Current	IRL	REF1 = 1.65V	-	52	104	uA
REF2 Sink Current	IRH	REF2 = 2.5V	-	85	170	uA

Note:

1.Guaranteed field. (No EDS/ Final test .)

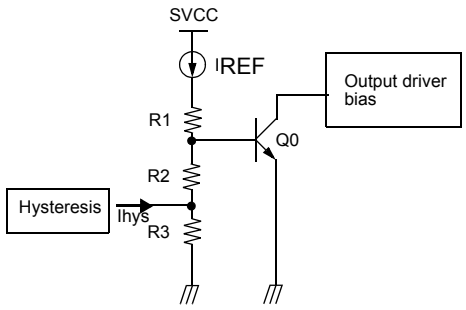
Application Information

1. MUTE,REF & SW45 Function

INPUT						OUTPUT					
SW45	MUTE12	MUTE3	MUTE4	REF1	REF2	BTL			PRE-AMP		OP
						CH12	CH3	CH4	CH4	CH5	
H	H	H	-	H	-	ON	ON	IN5	ON	ON	ON
H	H	L	-	H	-	ON	OFF	IN5	ON	ON	ON
H	H	H	-	L	-	OFF	OFF	OFF	OFF	ON	OFF
H	L	H	-	H	-	OFF	ON	OFF	ON	ON	ON
H	L	L	-	H	-	OFF	OFF	OFF	ON	ON	ON
L	-	-	L	-	-	OFF	OFF	OFF	OFF	ON	OFF
L	-	-	H	-	H	OFF	OFF	IN4	OFF	ON	OFF
L	-	-	H	-	L	OFF	OFF	OFF	OFF	ON	OFF

2. TSD Function

- When the chip temperature reaches to 167°C by abnormal condition, the TSD circuit is activated
- During TSD Function is activated, OP-AMP Output (pin 6) remains below 0.5V. (TSD monitoring function).
- This makes the bias current of the output drivers shut down, and all the output drivers are on cut-off state. Therefore the chip temperature begins to decrease.
- When the chip temperature falls to 63°C, the TSD circuit is deactivated and the output drivers start to operate normally.

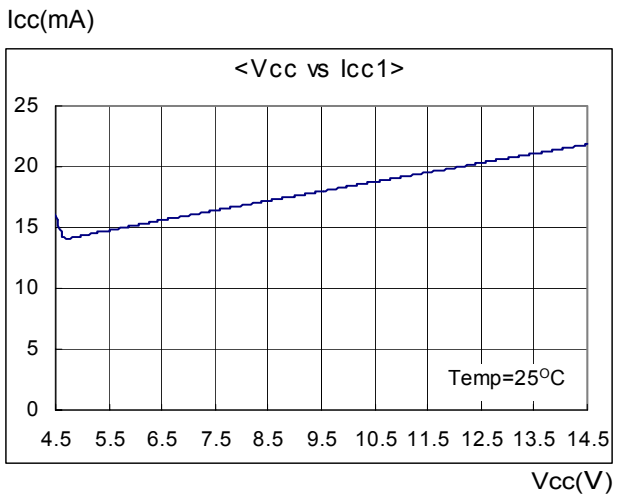


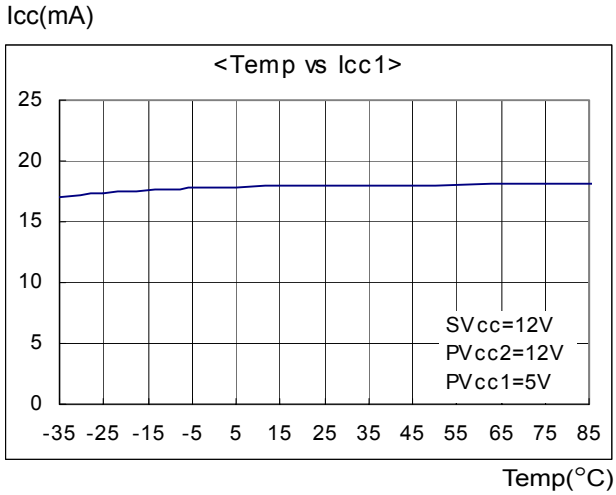
3. Notice

- If REF1(pin1) or REF2(pin25) is lower than 0.7V, BTL Output is off.
- Under Voltage Protecton Function. (If SVcc is lower than 3.8V, Chip is disable. Hysterisis is 0.2V)
- Mute ON BTL OutPut Voltage is as followed:
  - Mute ON BTL Output (CH1,2) = (PVcc1) / 2
  - Mute ON BTL Output (CH3,4) = ((PVcc2-0.6) / 2
- Each output to output and output to GND short should be kept away.

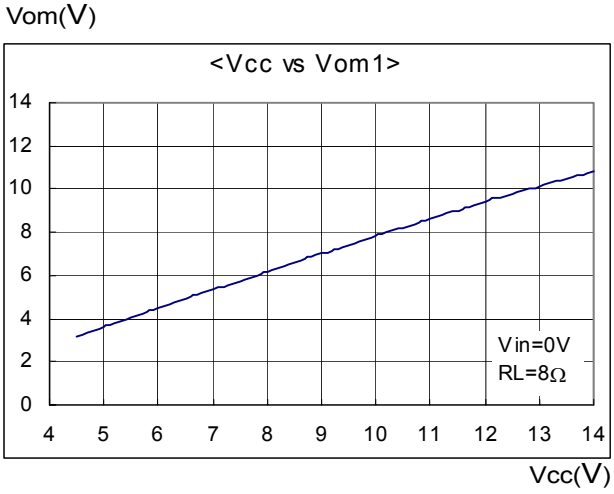
Typical Performance Characteristics

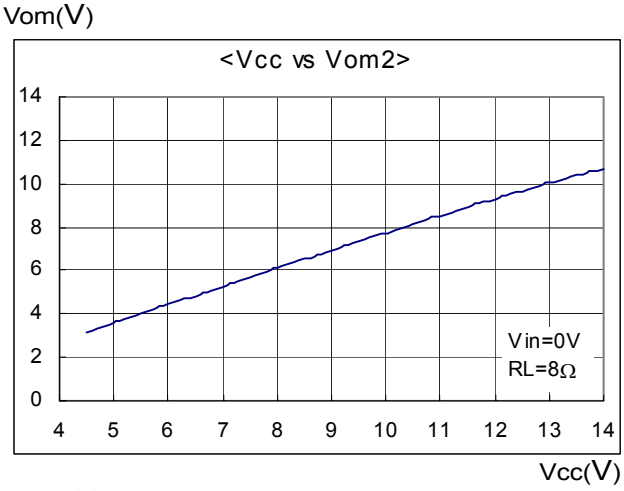
Total Circuit

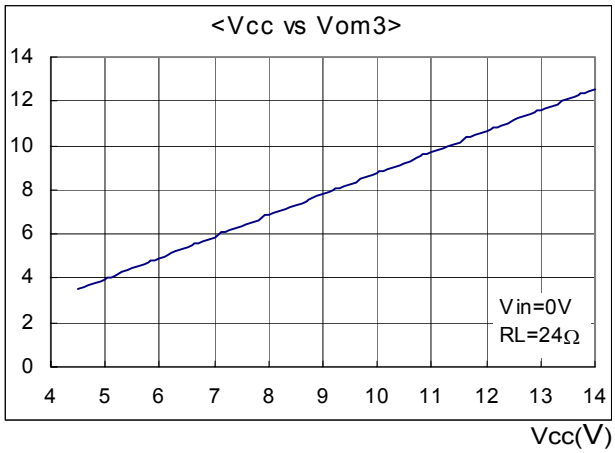


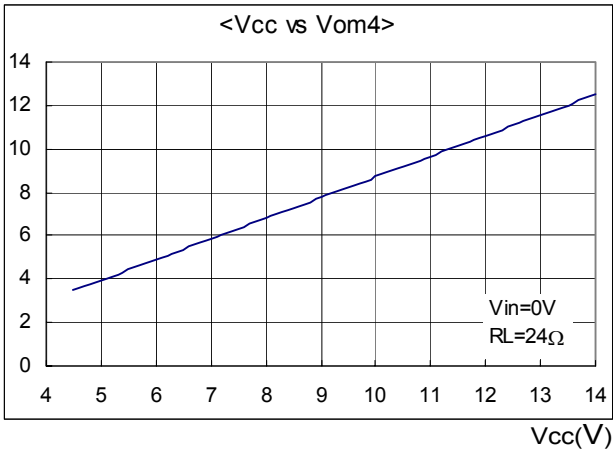


BTL Drive Part



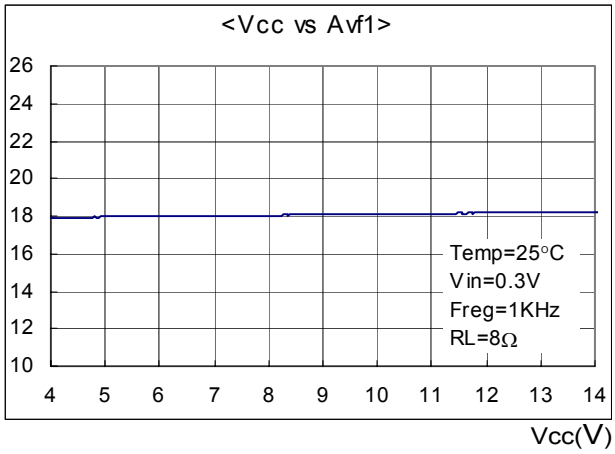






Typical Performance Characteristics (Continued)

Avf(dB)



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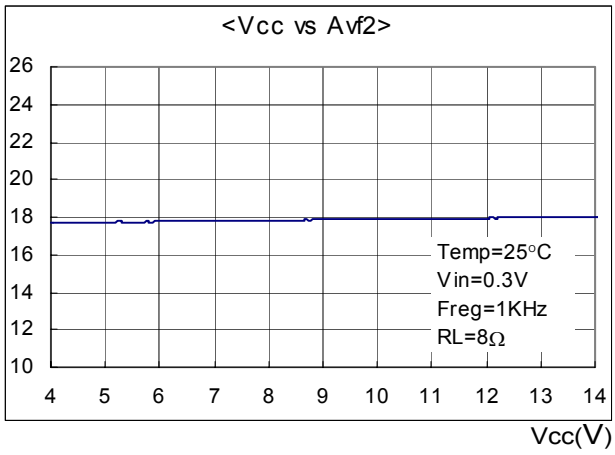

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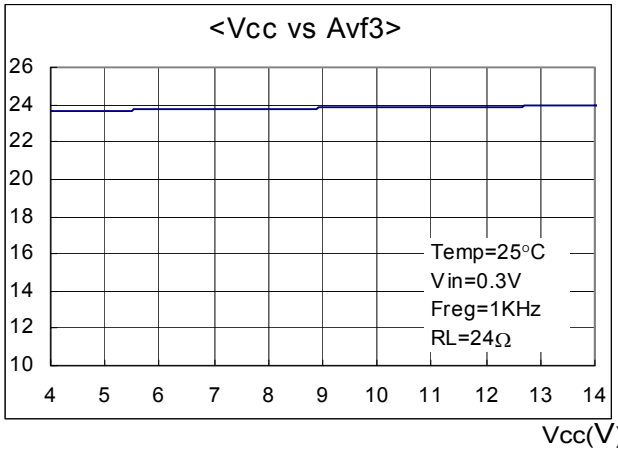

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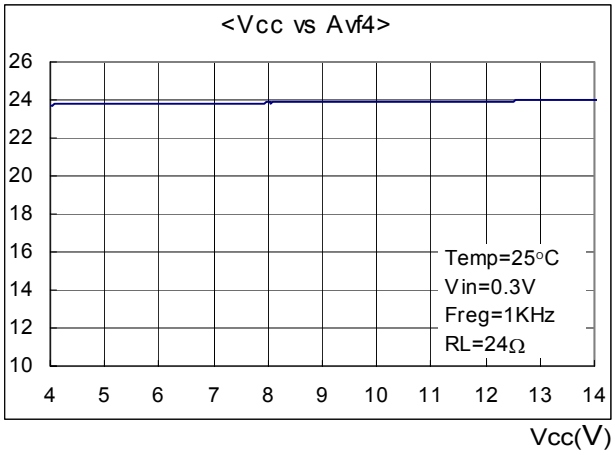

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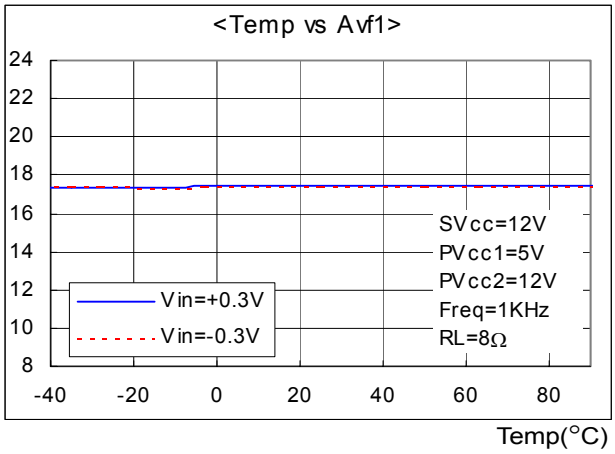

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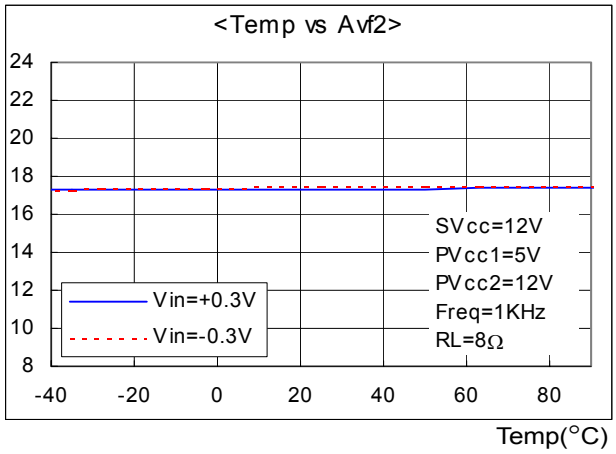

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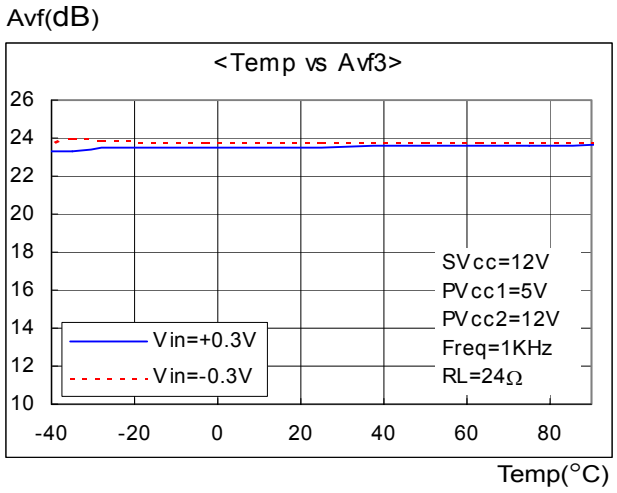
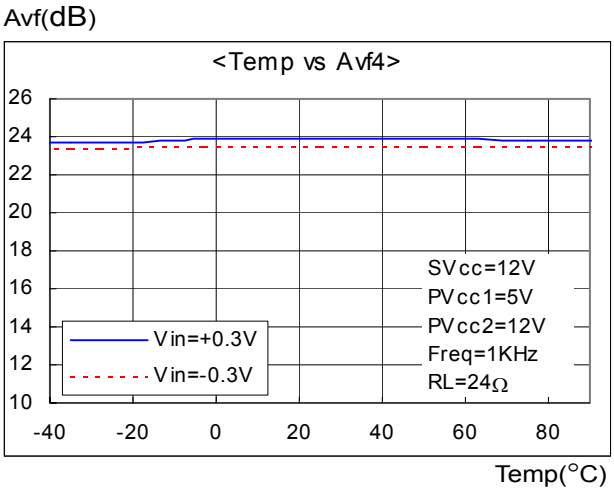
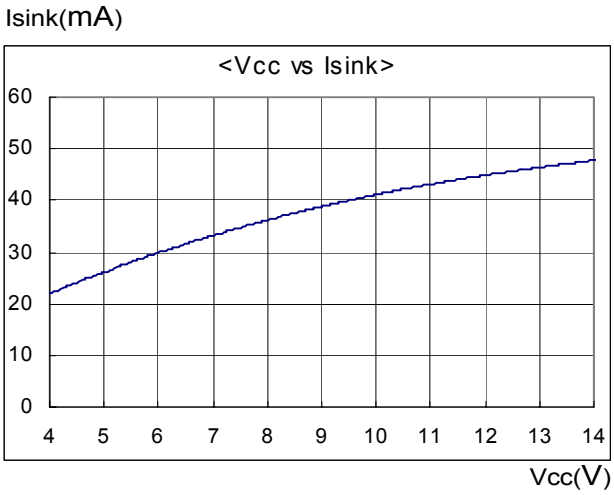
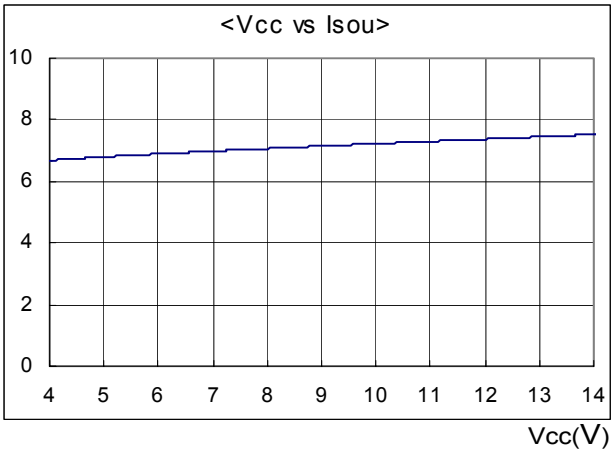
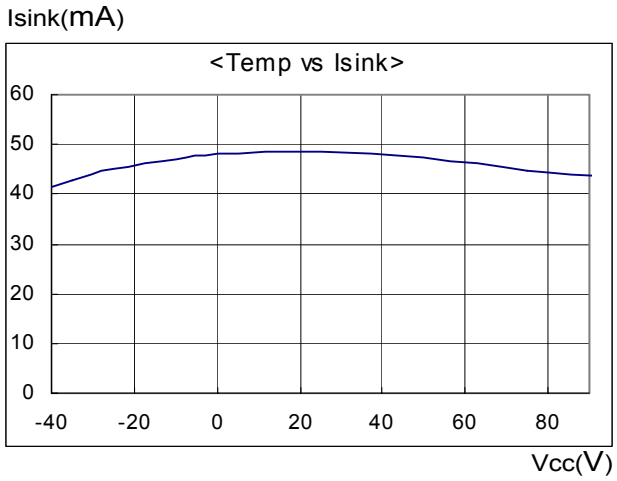


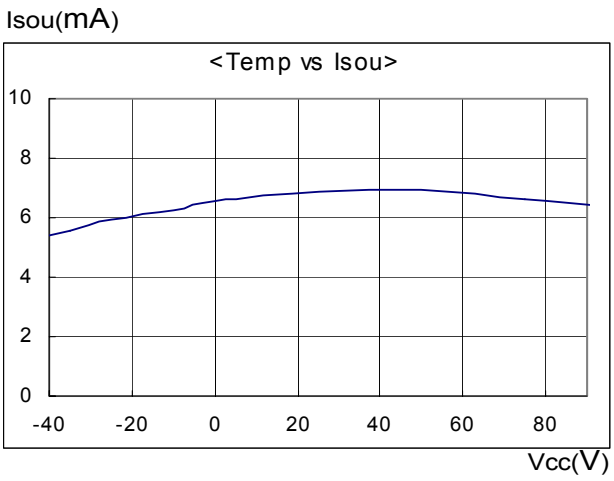


OP-AMP Part

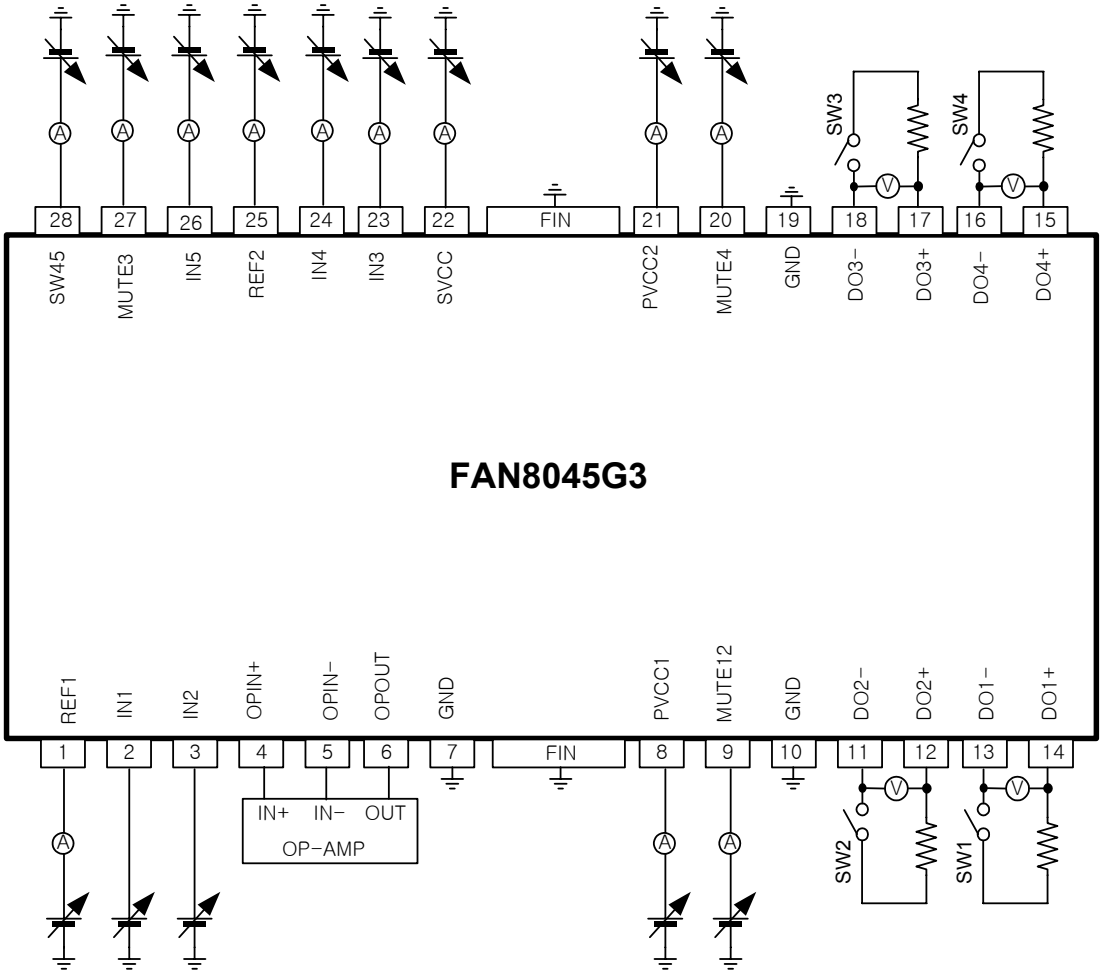


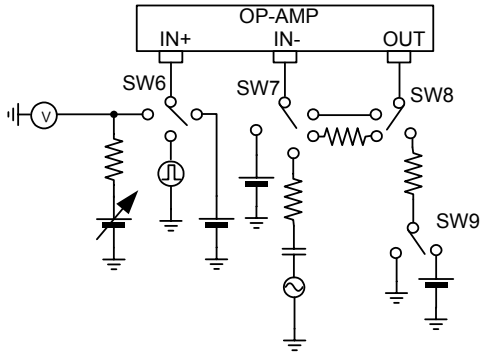




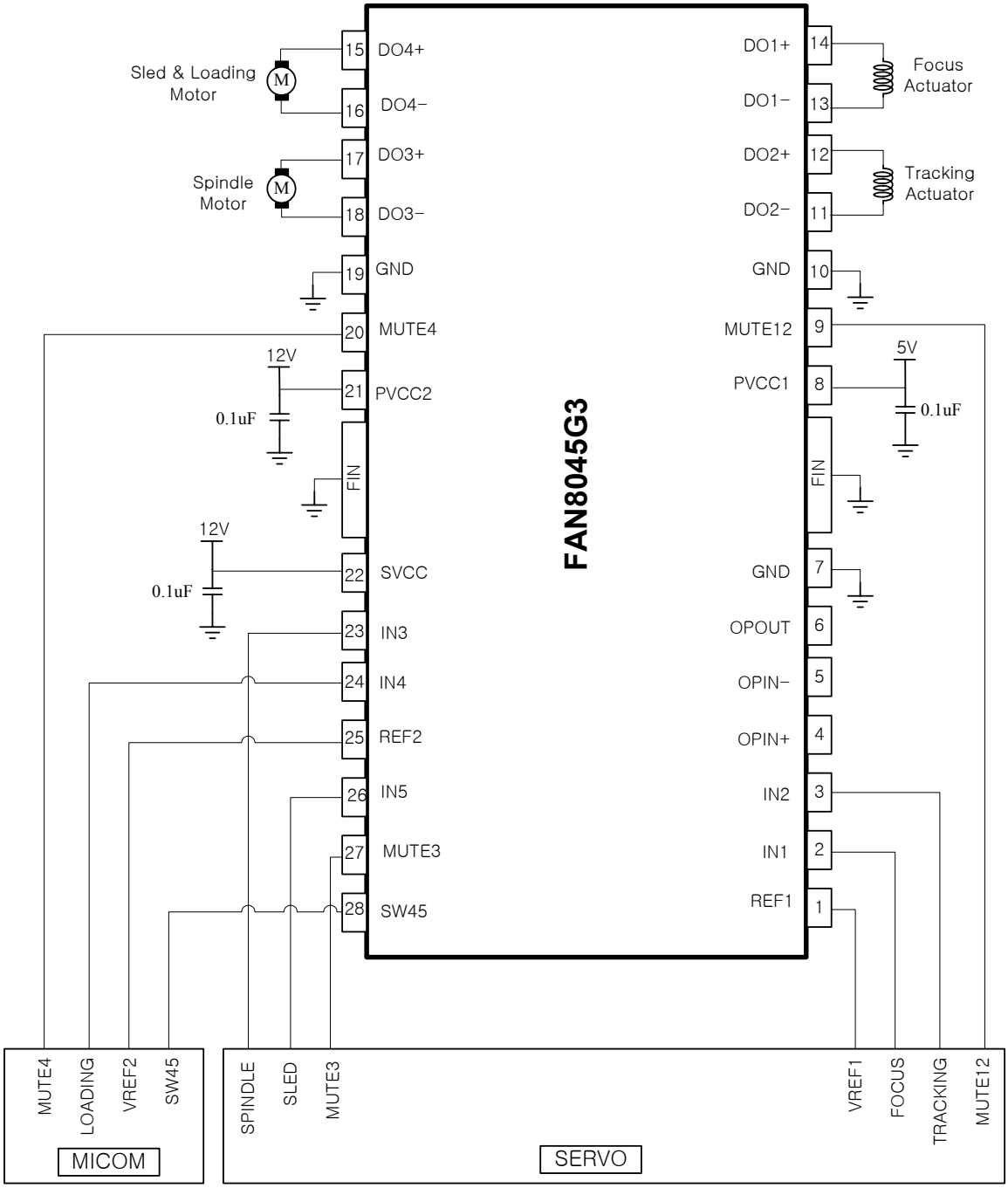


Test Circuits



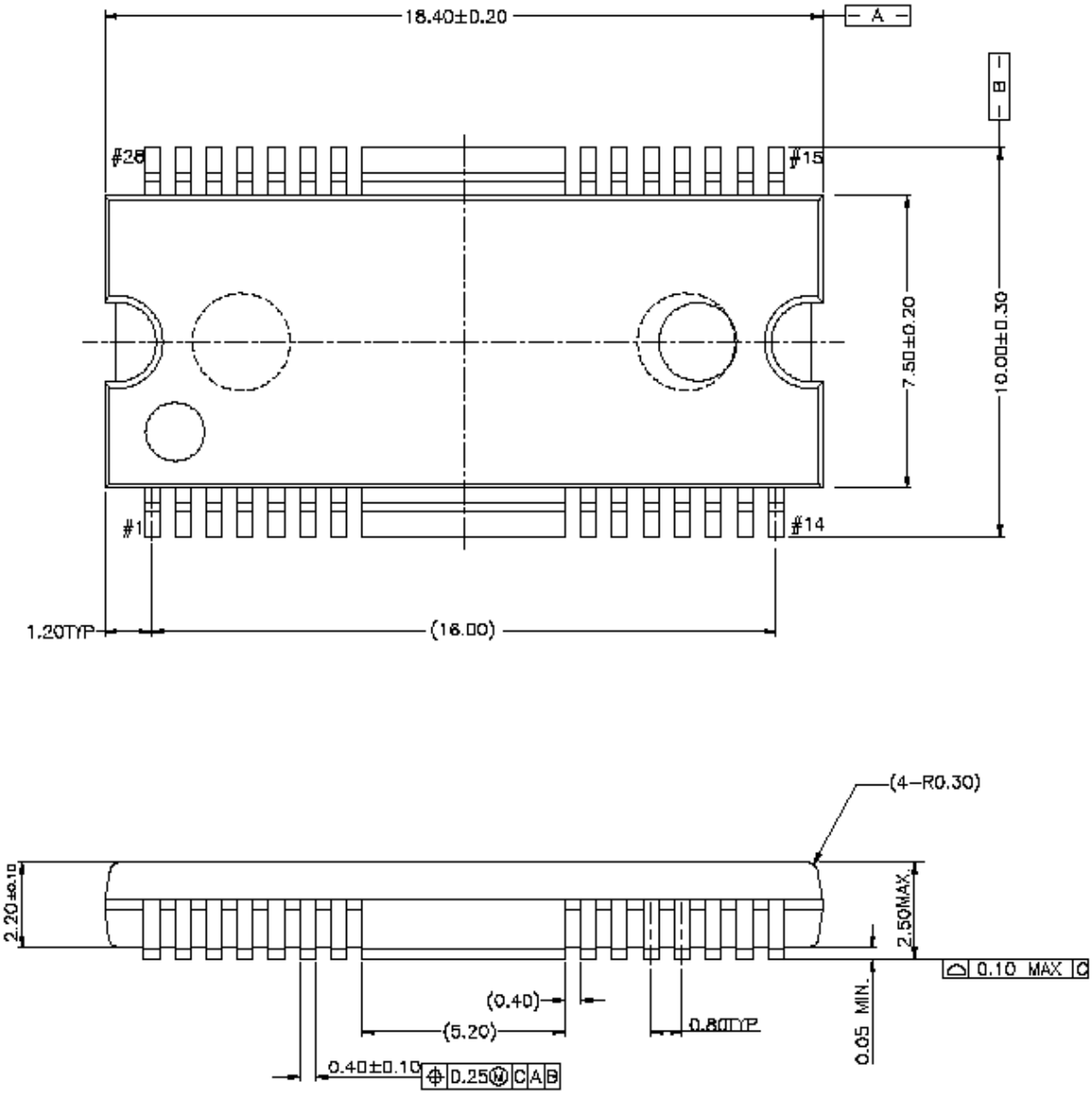


Typical Application Circuit



Package Dimension

28-SSOPH-375-SG2



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