FAN8700

Camera Motor Drive and Control IC

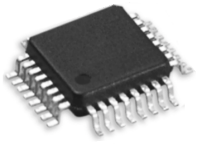
Features

- Built-in DC Motor Driver
  : For Film Winding & Zooming
- Voltage Controlled Stepping Motor Driver
- Built-in AE Meter Driver
- Built-in IRED Driver For Auto-Focus
- Low Drop out Regulator(5V/3V)
- Built-in step-up DC/DC Converter Controller

Description

The FAN8700 is a monolithic integrated circuit, and suitable for the motor driver (AE, AF, zoom and reel motor driver) and the controller (IRED driver, supply , step-up converter control, etc.) in camera systems.

32-LQFP-0707



Typical Applications

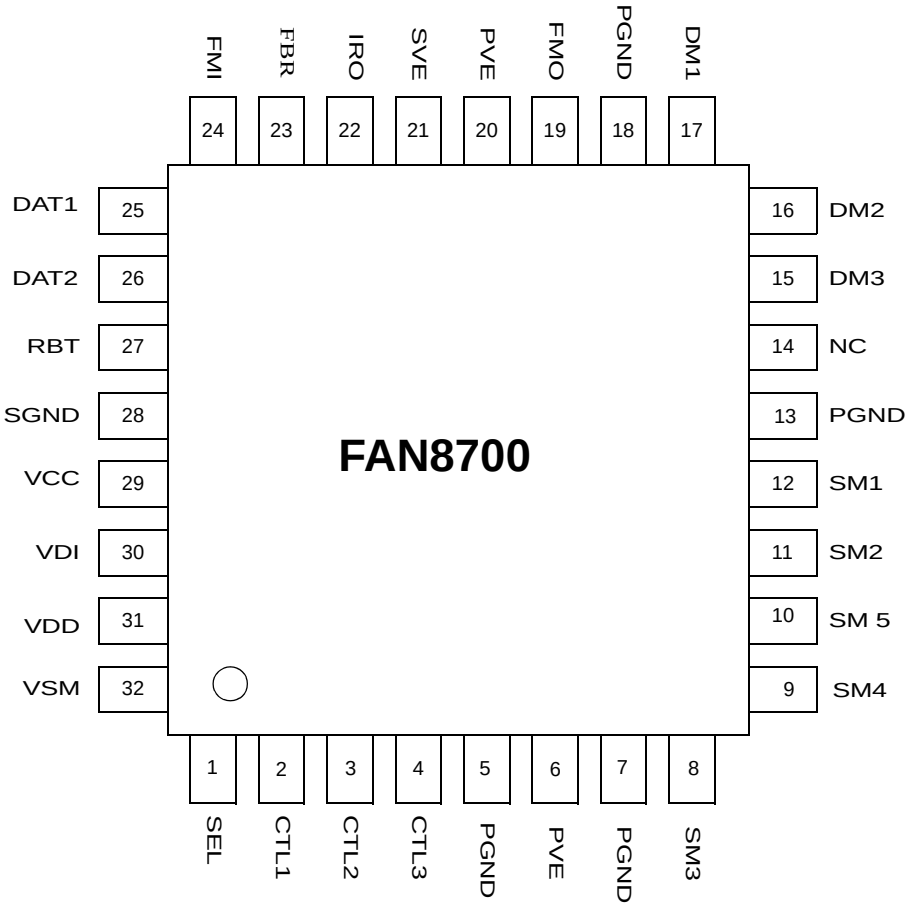
- Camera system

Ordering Information

Device	Package	Operating Temp.
FAN8700	32-LQFP-0707	-20°C ~ +60°C

Rev.1.0.0

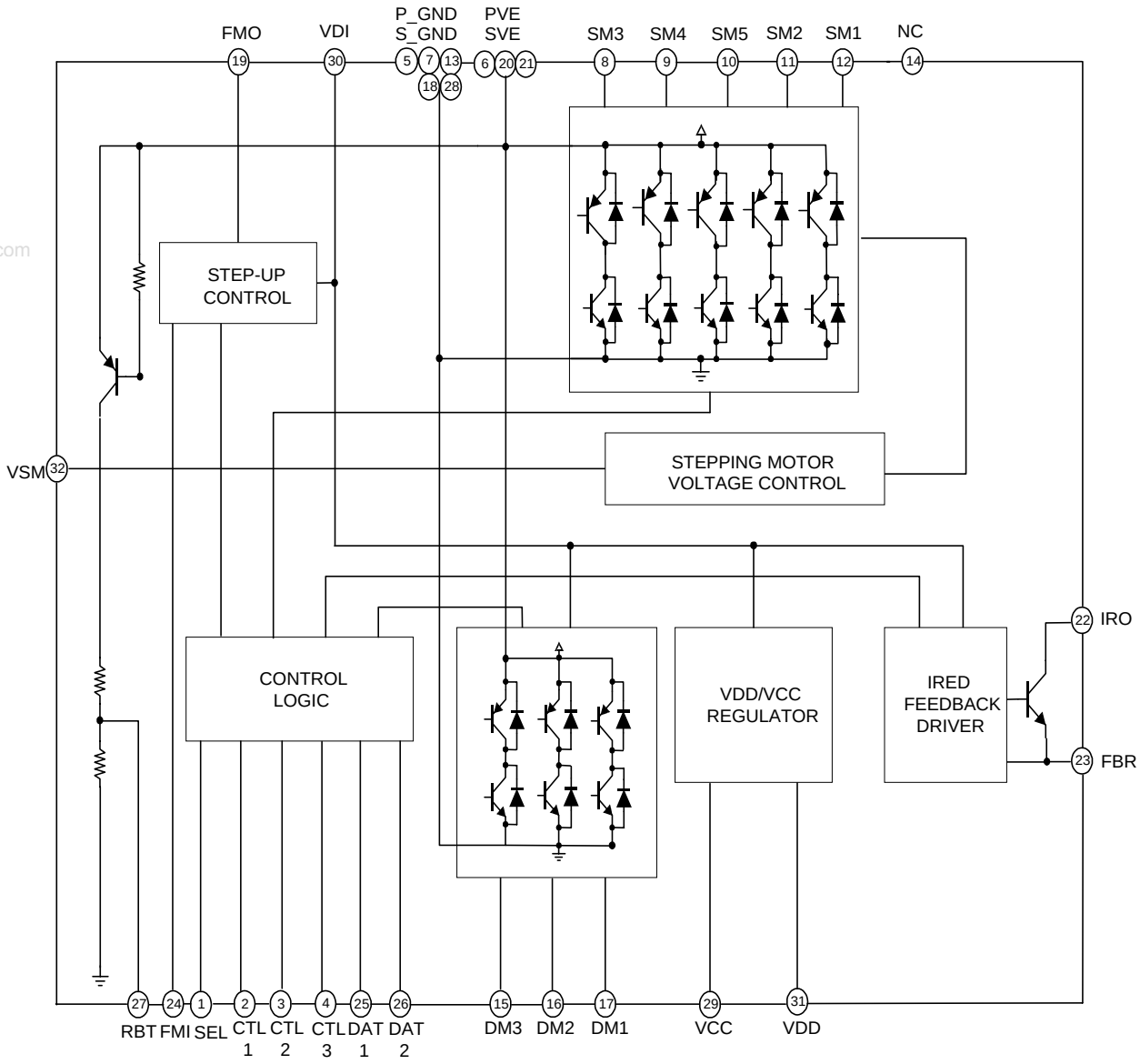
Pin Assignments



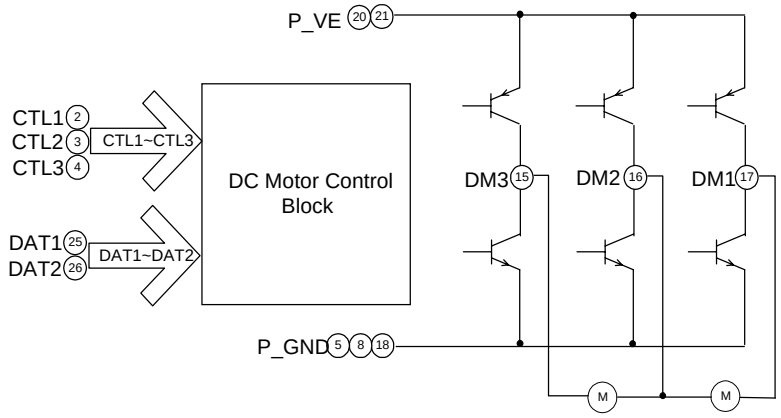
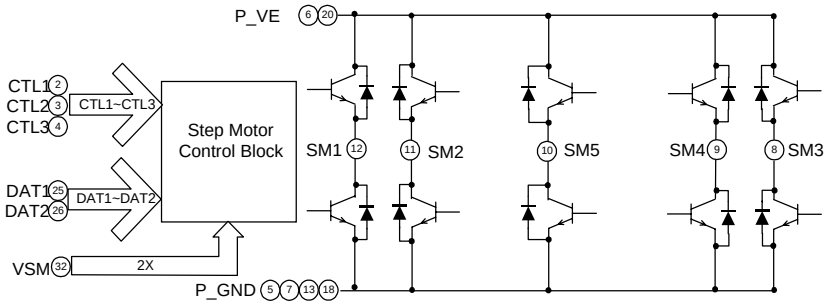
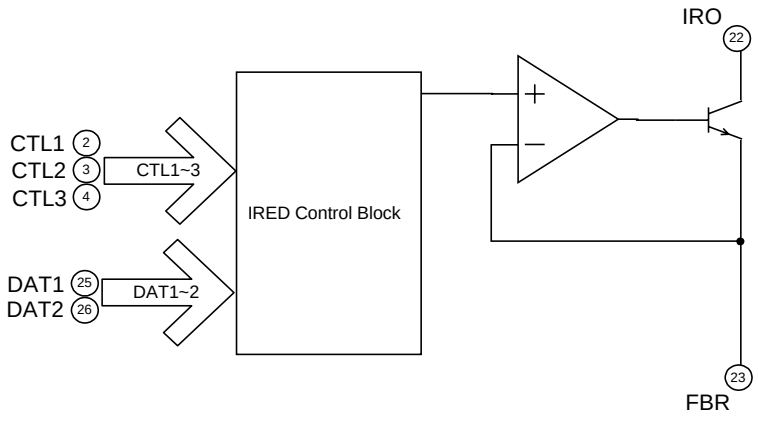
Pin Definitions

Pin Number	Pin Name	Pin Function Description
1	SEL	IC Enable Input
2	CTL_1	Operating Mode Control Input1
3	CTL_2	Operating Mode Control Input2
4	CTL_3	Operating Mode Control Input3
5	PGND	Power Ground
6	PV_E	Power V_E
7	PGND	Power Ground
8	SM_3	Stepping Motor Output3
9	SM_4	Stepping Motor Output4 /AE Meter Output
10	SM_5	Stepping Motor Output5 /AE Meter Output
11	SM_2	Stepping Motor Output2
12	SM_1	Stepping Motor Output1
13	PGND	Power Ground
14	NC	No Connection
15	DM_3	DC Motor Output 3
16	DM_2	DC Motor Output 2
17	DM_1	DC Motor Output 1
18	PGND	Power Ground
19	FMO	Step-up Converter Switching Output
20	PV_E	Power V_E
21	SV_E	Signal V_E
22	IRO	IRED drive output
23	FBR	IRED Drive Current Setting Input
24	FMI	Step-up converter switching Clock input
25	DAT_1	Each Mode Output Control Input1
26	DAT_2	Each Mode Output Control Input2
27	RBT	V_E Voltage Divided Output
28	SGND	Signal Ground
29	V_{CC}	Low Drop-out Regulator Output
30	V_{DI}	Setp-up Output Voltage Feedback Input
31	V_{DD}	Low Drop-out Regulator Output
32	VSM	Stepping Motor Output Voltage Control Input

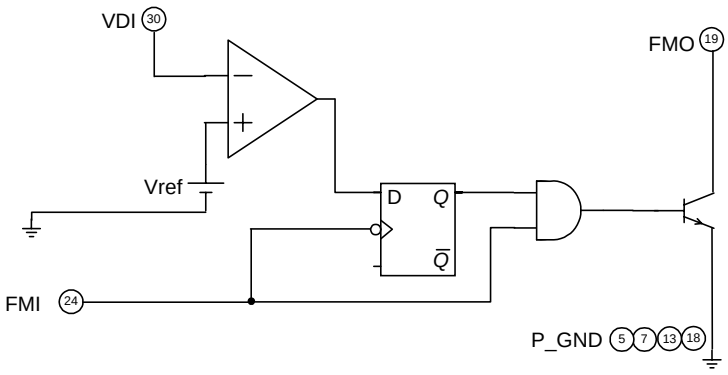
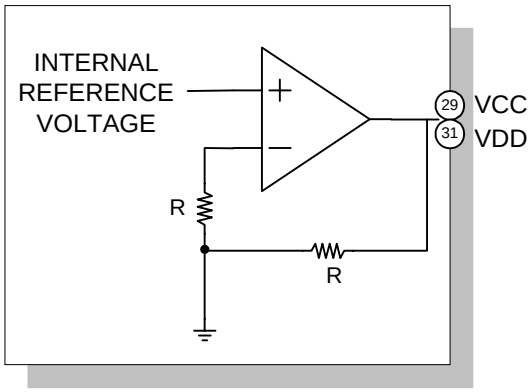
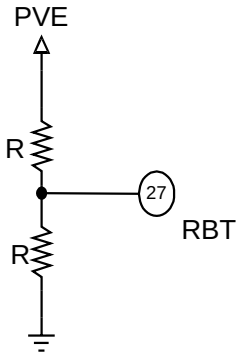
Internal Block Diagram



Equivalent Circuits

Description	Pin No.	Internal Circuit
1.5-Channel DC Motor Drive Block		
SEL	1	
$CTL_{1\sim3}$	2~4	
$DAT_{1\sim2}$	25,26	
DM_1	17	
DM_2	16	
DM_3	15	
PVE	6,20	
P_GND	5,7,13,18	
Step-up Control Block		
SEL	1	
$CTL_{1\sim3}$	2~4	
$DAT_{1\sim2}$	25,26	
SM_1	12	
SM_2	11	
SM_3	8	
SM_4	9	
SM_5	10	
P_GND	5,7,13,18	
IRED Drive Block		
SEL	1	
$CTL_{1\sim3}$	2~4	
$DAT_{1\sim2}$	25,26	
IRO	22	
FBR	23	

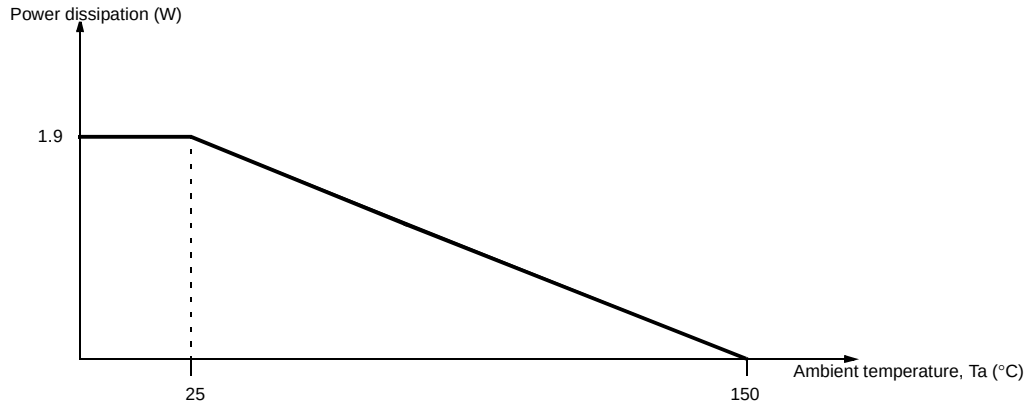
Equivalent Circuits (Continued)

Description	Pin No.	Internal Circuit
Step-up Control Block		
SEL	1	
FMI	24	
VDI	30	
FMO	19	
P_GND	5, 7, 13, 18	
Regulator Block		
SEL	1	
VCC	29	
VDD	31	
P_GND	5, 7, 13, 18	
RBT Block		
SEL	1	
RBT	27	
P_GND	5, 7, 13, 18	

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Value	Unit	Remark
Supply voltage	V_E	4.5	V	-
V_{CC} output current	I_{VCC}	50	mA	-
V_{DD} output current	I_{VDD}	80	mA	-
Stepping motor output current	$I_{SM1,2,3,4,5}$	500	mA	-
DC motor output current	I_{DM}	2000	mA	500ms
IRED output current	I_{IRED}	2000	mA	(3000mA/10mS)
Output terminal voltage	V_{OUT}	5.5	V	500us
Input terminal voltage	V_{IN}	5.5	V	-
Power dissipation	P_D	1.9	W	-
Thermal resistance	Rja	65	^{o}C/W	-
Operating temperature range	T_{OPR}	-20 ~ +60	°C	-
Storage temperature range	T_{STG}	-55 ~ +125	°C	-

Power Dissipation Curve



Note:
1. PCB Information (Ref. EIA/JSED51-3 and EIA/JSED51-7)
2. Board Layer : 1 Layer
3. Board Thickness : 1.6mm
4. Board Dimension : 76.2 X 114.3 mm

Recommended Operating Conditions (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating supply voltage	V_E	2.0	-	4.0	V

Electrical Characteristics

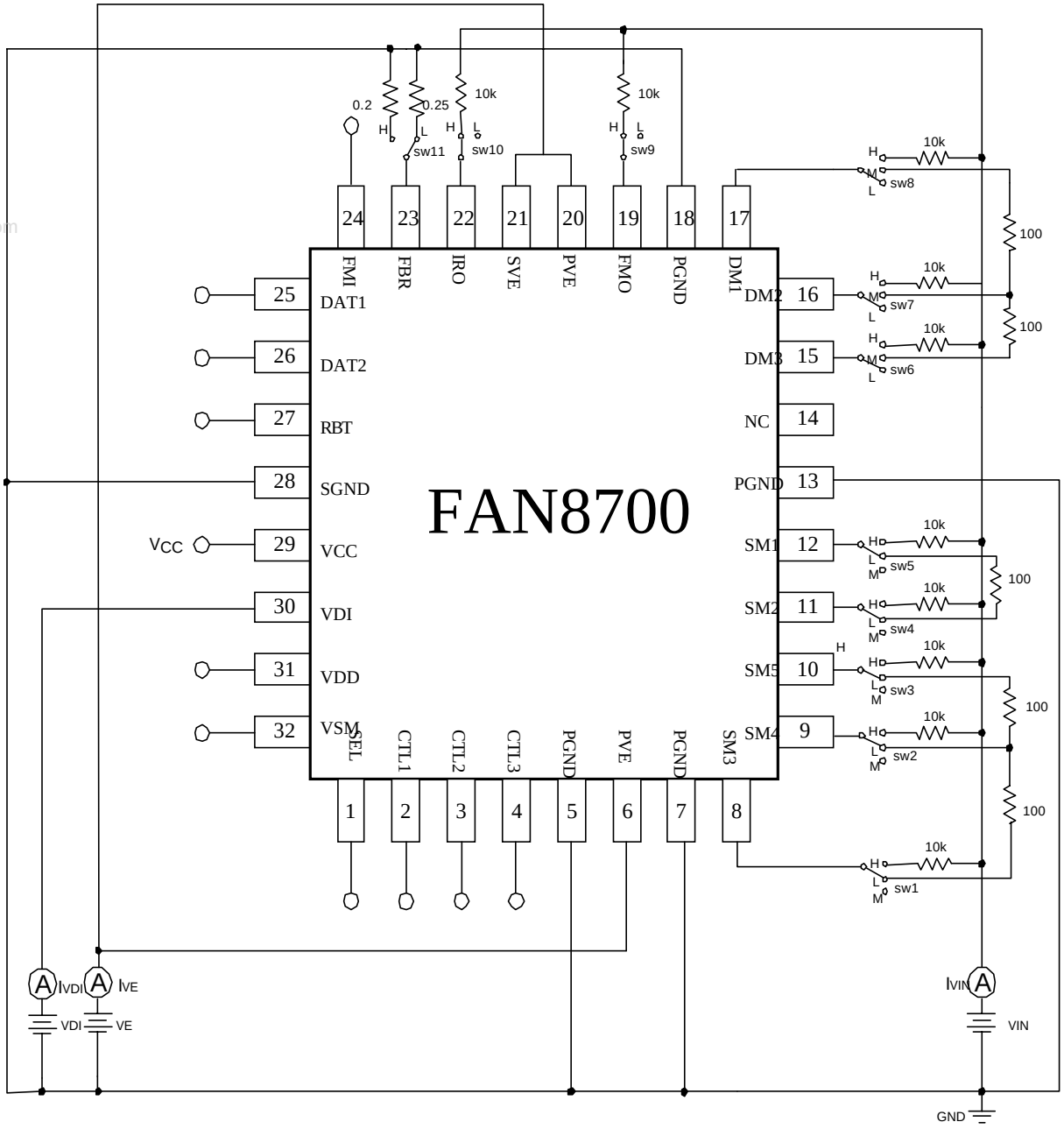
(Ta = -20°C ~ 60°C, V_E = 2V)

Block	Characteristics	Symbol	Condition	Min.	Typ.	Max.	Unit
Total	Leakage Current	I_{STB}	V_E = 4.0V,V_{SEL} = 0V	-	-	1.0	mA
	Input Threshold Voltage	V_{IT}	-	0.75	1.1	1.5	V
	Input High Current	I_{IH}	V_{IH} = 3V	-	-	150	mA
Step-up & DC-DC CONVERTER	Minimum Operating Voltage	V_{OPR1}	-	-	-	1.0	V
	Step-up Output Voltage 1	V_{VDI1}	I_{LOAD}=100mA	5.3	5.5	5.7	V
	Step-up Output Voltage 2	V_{VDI2}	I_{LOAD}=100mA	8.3	8.6	8.9	
	FMO Output Voltage 1	$V_{SAT1/1}$	I_{LOAD}=700mA	-	-	0.3	V
	FMO Output Voltage 2	$V_{SAT1/2}$	I_{LOAD}=1000mA	-	-	0.4	
	FMI Step-up Clock Range	f	-	39	156	313	KHz
Regulator	V_{DD} Output Voltage	V_{DD}	I_{VDD}=60mA	2.85	3.0	3.15	V
	V_{DD} Drop-out Voltage	$V_{SAT2/1}$	I_{VDD}=60mA,V_{DD}=2V	-	-	0.3	
	V_{CC} Output Voltage	V_{CC}	I_{VCC}=40mA	4.8	5.00	5.2	V
	V_{CC} Drop-out Voltage	$V_{SAT2/2}$	I_{VCC}=40mA,V_{CC}=3V	-	-	0.3	V
RBT	Minimum Operating Voltage	V_{OPR3}	-	-	-	1.5	V
	Stand-by Output Voltage	V_{STB}	V_E=4V,V_{SEL}=0V	-	-	0.1	V
	Output Voltage	V_{RBT}	-	0.47	0.5	0.53	× V_E
	Output Voltage Temperature Coefficient	V_T	-	-	-	2.0	mV/°C
DC Motor	Minimum Operating Voltage	V_{OPR4}	-	-	-	1.0	V
	Output Saturation Voltage	V_{SAT4}	V_E=1.6V,I_{DM}=400mA	-	-	0.45	V
Step motor Driver	Minimum Operating Voltage	V_{OPR5}	-	-	-	1.6	V
	Output Saturation Voltage	VSAT5	V_E=2.6V,I_{SM}=500mA	-	-	0.7	V
	Output Voltage Relative Difference	DV	V_E=2.6V V_{SM}=1.0V,R_L=10W $SM_{1~2}$,$SM_{3~4}$	-0.1	0	0.1	V
	Output Voltage 1 (Output Pin to Ground)	VO_1	V_E=2.6V,R_L=10W, V_{SM}=1.0V SM_1,SM_2,SM_3,SM_4	1.9	2.0	2.1	V
	Output Voltage 2 (Output Pin to Ground)	VO_2	V_E=2.6V,R_L=5W, V_{SM}=1.0V ,SM_4,SM_5	1.85	1.95	2.05	V
Ired	Minimum Operating Voltage	V_{OPR6}	-	-	-	1.5	V
	Output Saturation Voltage	V_{SAT6}	I_{IRED}=1000mA	-	-	1.0	V
	Output Current	I_{IRED}	RFBR=0.3W	0.9	1.0	1.1	A

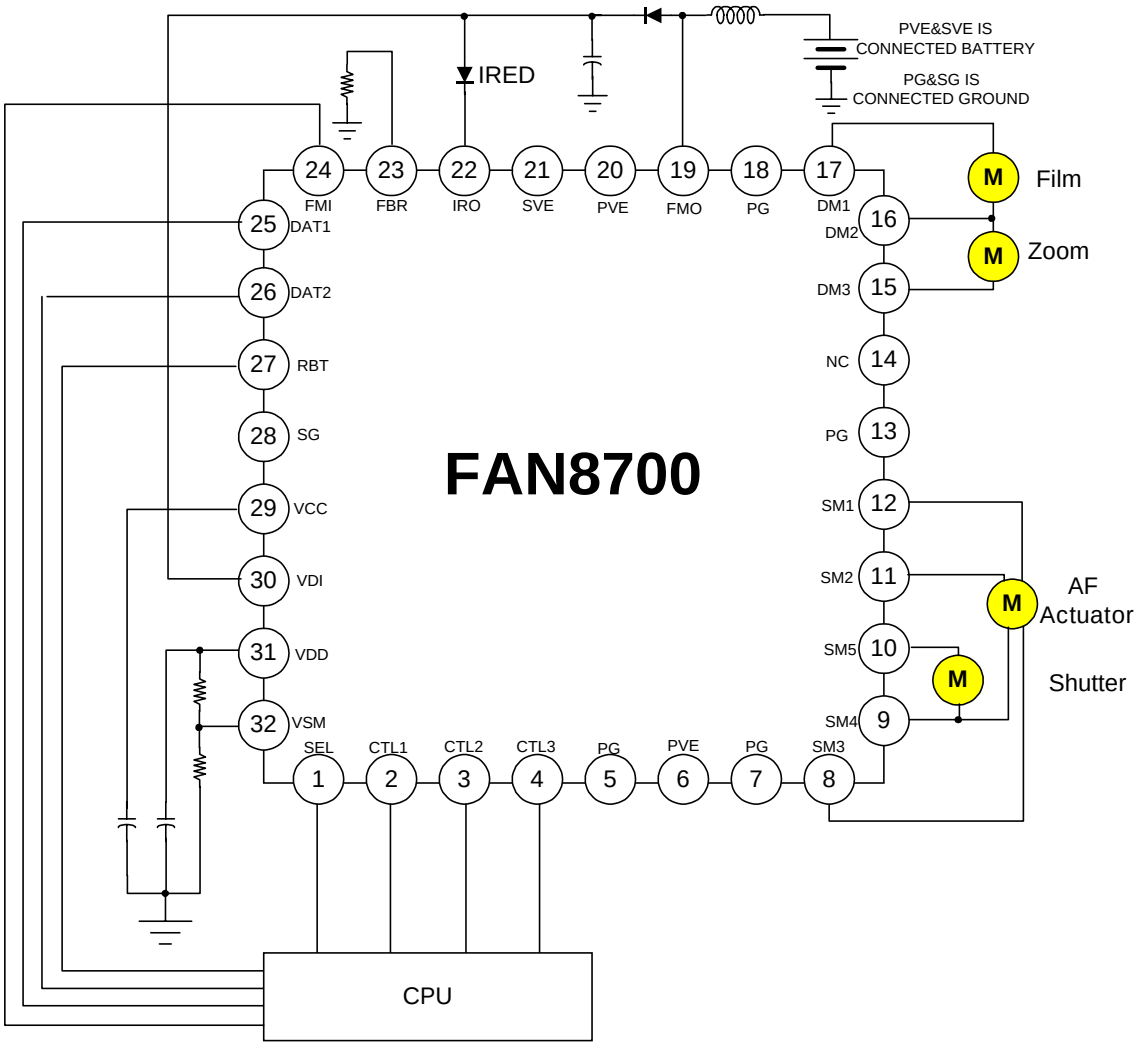
Control Code Table

Mode	Sel	Ctl_1	Ctl_2	Ctl_3	Dat_1	Dat_2	Output Port				Remark
-	-	L	L	L	-	-	-	-	-	-	-
-	-	-	-	-	-	-	SM_1	SM_2	SM_3	SM_4	
Stepping Motor Drive	H	H	L	H	L	L	L	H	L	H	
					L	H	L	H	H	L	
					H	L	H	L	L	H	
					H	H	H	L	H	L	
-	-	-	-	-	-	-	SM4	SM5	-	-	
Ae Meter Drive	H	H	L	L	L	L	OFF	OFF	-	-	
					L	H	H	L	-	-	
					H	L	L	H	-	-	
					H	H	L	L	-	-	
Ired	H	H	H	H	L	L	-	-	-	-	5.5V Step-up
					L	H	-	-	-	-	8.6V Step-up
					H	L	-	-	-	-	Ired On Step-up Off
					H	H	-	-	-	-	5.5VStep-up
-	-	-	-	-	-	-	CTL	DM_1	DM_2	DM_3	-
Dcmotor1 Control	H	L	L	H	L	L	-	OFF	OFF	OFF	OFF
					L	H	-	H	L	OFF	CW
					H	L	-	L	H	OFF	CCW
					H	H	-	L	L	OFF	Brake
Dcmotor2 Control	H	L	H	L	L	L	-	OFF	OFF	OFF	OFF
					L	H	-	OFF	H	L	CW
					H	L	-	OFF	L	H	CCW
					H	H	-	OFF	L	L	Brake

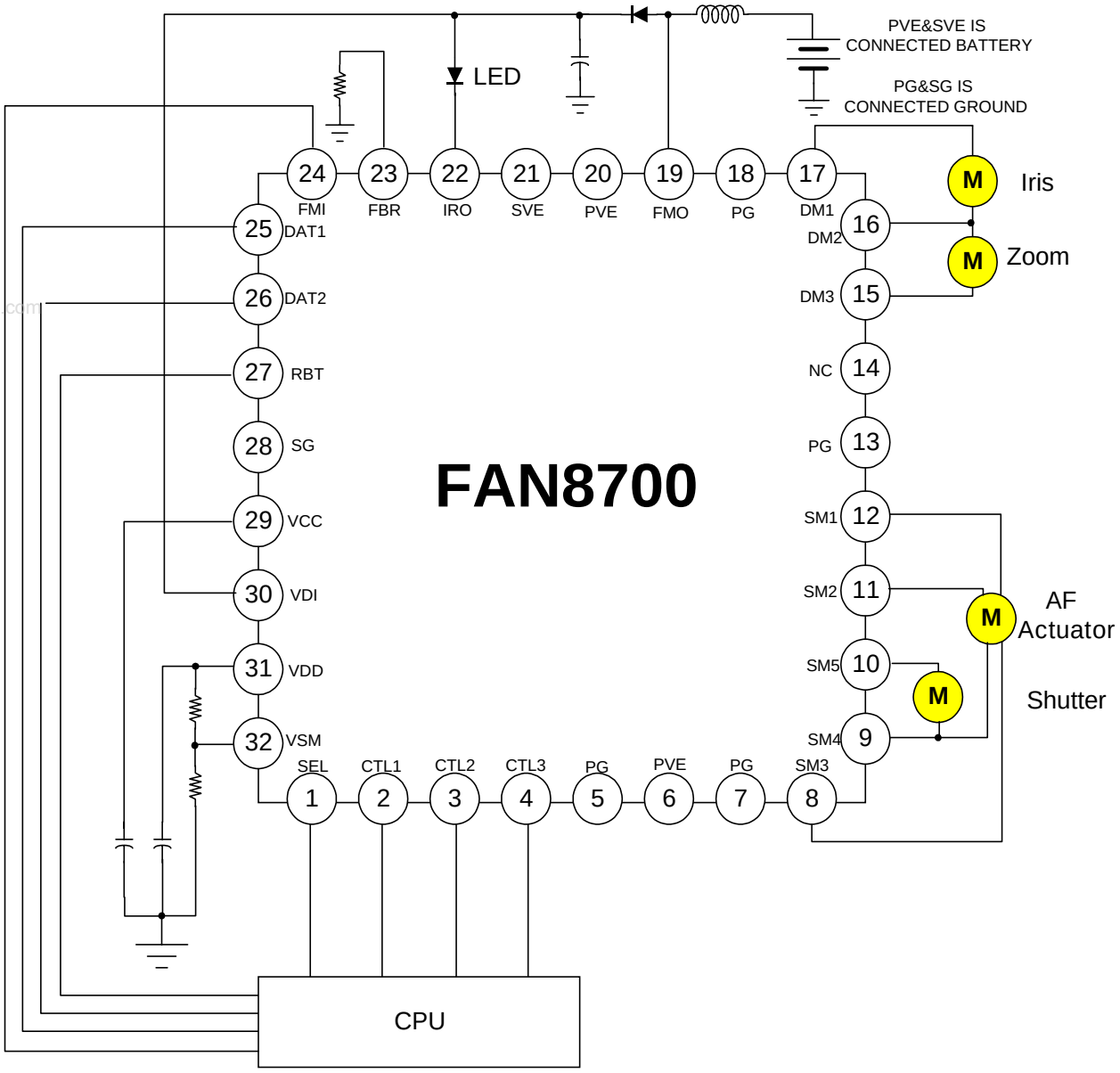
Test Circuits



Typical Application Circuits 1

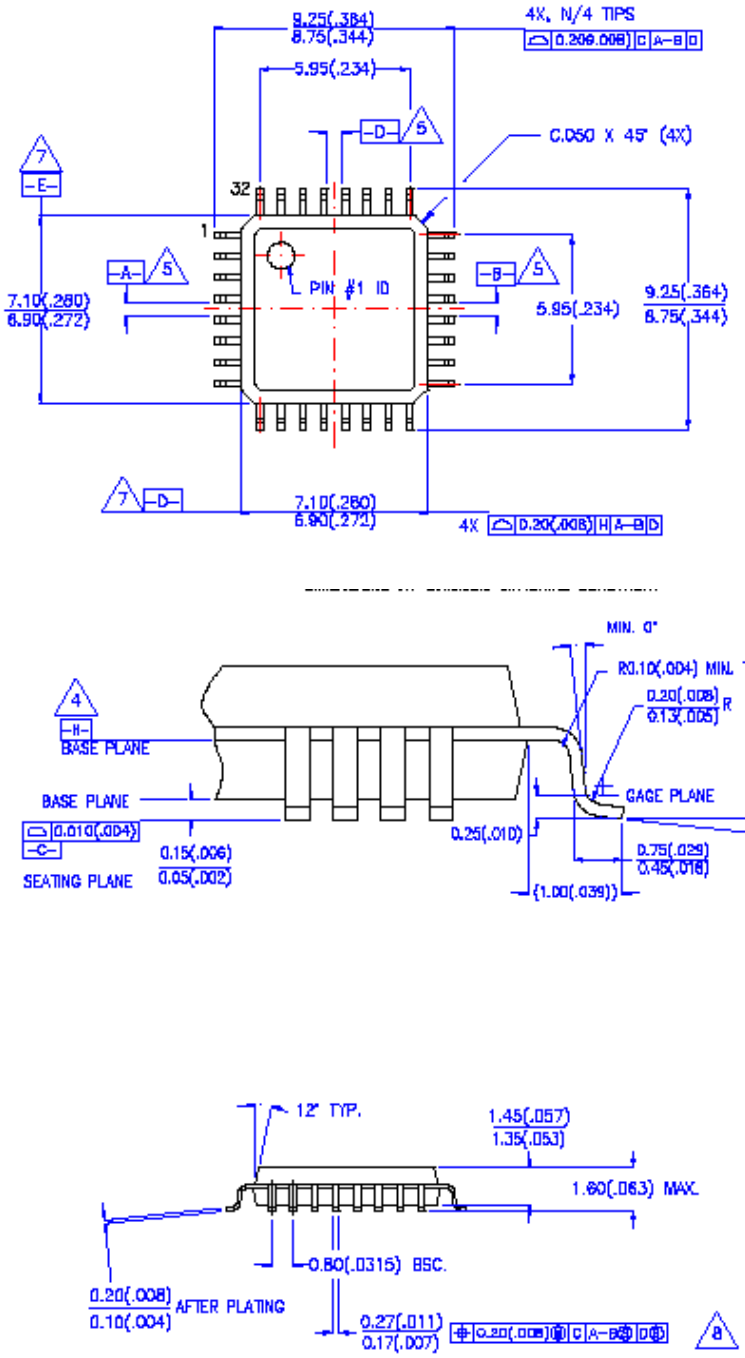


Typical Application Circuits 2



Package Dimensions (Unit: mm)

32-LQFP



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