PRELIMINARY

M61018GP

MOTOR DRIVER FOR CAMERA

DESCRIPTION

M61018GP is a semiconductor integrated circuit built-in motor driver for compact camera.
All power transistors which have been used as external parts so far are built in by using minute bi-polar process ,so it contributes to reduction of the part cost and the miniaturization of the system .

FEATURES

• Built-in DC/DC converter   (Presser type,TYP 5.0V)
• Built-in Regulator circuit for Auto Focus (Depressor type,TYP 4.1V)
• Built-in IRED drive circuit (TYP Io=1A)
• Built-in DC motor driver circuit of 1.5CH

APPLICATION
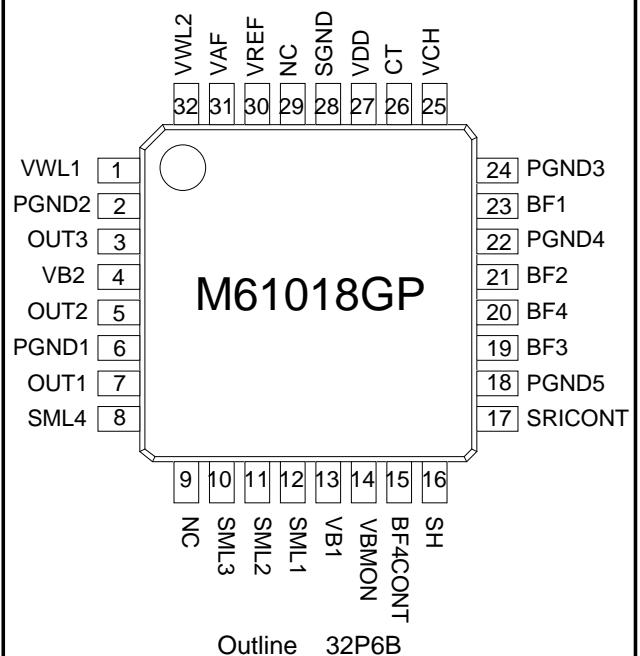
 Motor driver for compact camera etc.

RECOMMEND OPERATING CONDITION
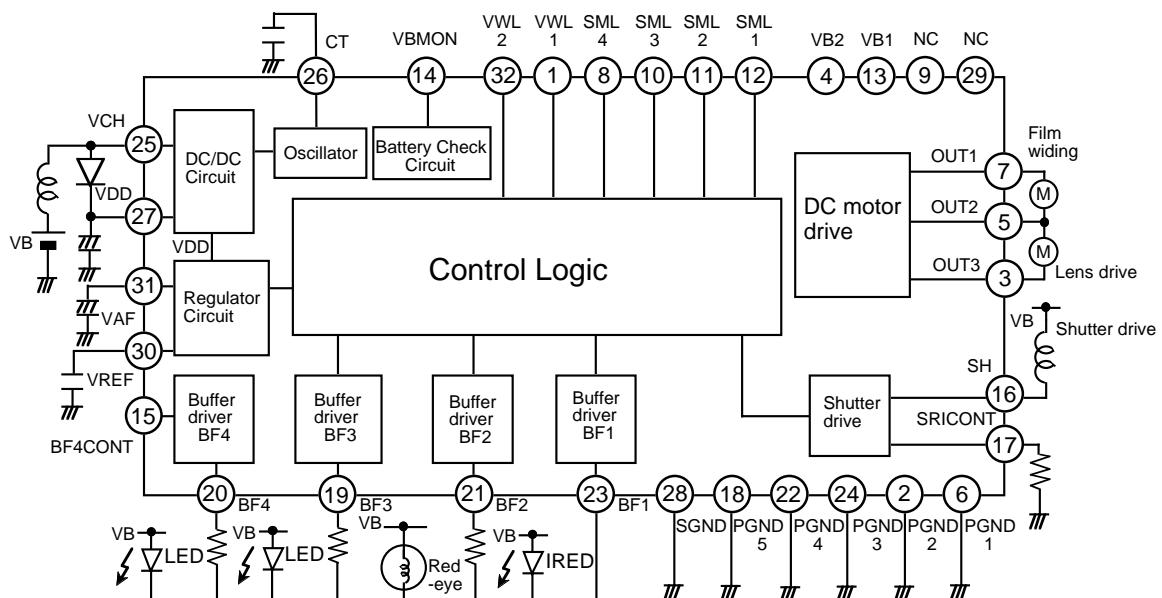
Supply voltage range • • • • • • • • • • • • • • • • • 1.8 to 3.5V

Rated supply voltage • • • • • • • • • • • • • • • 3.0V

PIN CONFIGURATION

Top pins (32–25): VWL2(32), VAF(31), VREF(30), NC(29), SGND(28), VDD(27), CT(26), VCH(25)

Left pins (1–8): VWL1 (1), PGND2 (2), OUT3 (3), VB2 (4), OUT2 (5), PGND1 (6), OUT1 (7), SML4 (8)

Right pins (24–17): PGND3 (24), BF1 (23), PGND4 (22), BF2 (21), BF4 (20), BF3 (19), PGND5 (18), SRICONT (17)

Bottom pins (9–16): NC(9), SML3(10), SML2(11), SML1(12), VB1(13), VBMON(14), BF4CONT(15), SH(16)

M61018GP

Outline   32P6B

BLOCK DIAGRAM

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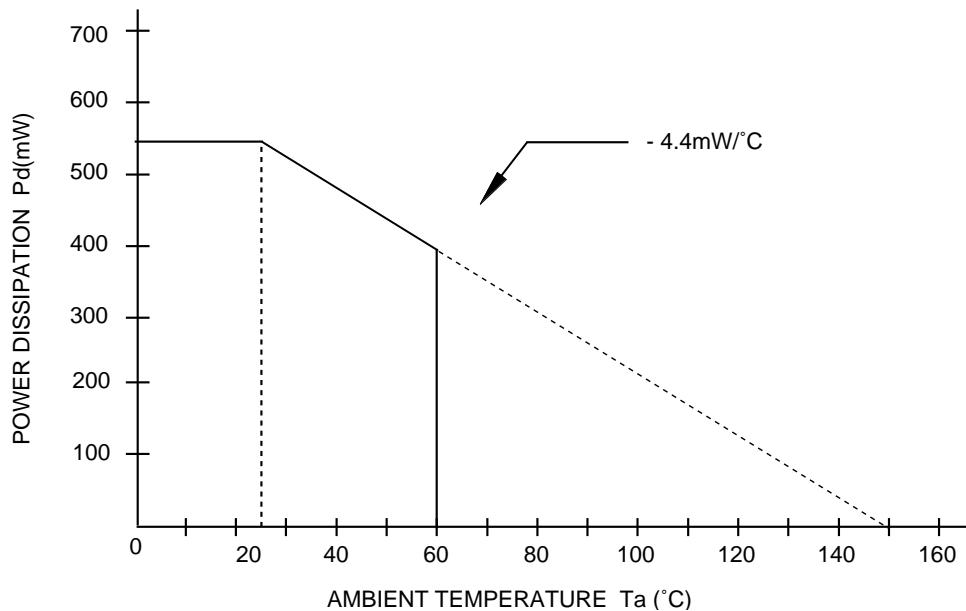
ABSOLUTE MAXIMUM RATINGS   (Ta=25˚C , unless noted)

Parameter	Symbol	Ratings	Unit	Remark
Supply voltage	VB	4.0	V	note1
Supply voltage	VDD	6.0	V	note1
Power dissipation	Pd	550	mW	Ta=25˚C
Thermal derating	Kθ	4.4	mW/ ºC	Ta≧25˚C
Pin input voltage	VIF	6.0	V	3,4,11,12,13,14,17pin
Another pin	VI/O	0 to VDD+0.3	V	note2
Operating temperature	Topr	- 20 to 60	˚C	
Storage temperature	Tstg	- 40 to 150	˚C	
Surge voltage	Vsurge	±1000V over	V	C=100PF R=1.5K

note1 : As a principle , do not provide reversely.
note2 : As a principle , do not provide over supply voltage or under ground voltage.

THERMAL DERATING (MAXIMUM RATING)

- 4.4mW/˚C

POWER DISSIPATION Pd(mW)

AMBIENT TEMPERATURE Ta (˚C)

ELECTRICAL CHARACTERRISTICS   (Ta=25°C,VB=3.0V,unless otherwise noted)

Classification	Parameter	Symbol	Test condition	Limit min	Limit typ	Limit max	Unit	Note
	Operating supply voltage range	VB		1.8	3.0	3.5	V	
Consuming current	While STAND BY consuming current	IB1	VWL1:H,VWL2:H	–	–	5.0	µA	
	While STAND BY consuming current	IDD1	VWL1:H,VWL2:H	–	–	5.0	µA	
	Usual consuming current	IDD2	Consuming current When driver don't operate (Operating only DC/DC converter)	–	5.0	10.0	mA	
DC/DC converter	Operating start voltage	Vstart	VB voltage	–	–	1.8	V	*1
	Operating stop voltage	Vstop	VB voltage	–	–	1.0	V	*1
	Oscillation frequency	fosc	C=330pF	35K	50K	65K	Hz	*1
	DUTY	duty		66	78	90	%	*1
	Output voltage	Vout	VDD voltage	4.5	5.0	5.5	V	*1
	Input stability	Vout1	VB=2.0 to 3.3V out=50mA	–	–	100	mV	*1
	Load stability	Vout2	VB=2.85V Iout=0 to 100mA	–	–	100	mV	*1
	Maximum output voltage	Iout	VB=2.85V Vout ≧ 4.5V	100	–	–	mA	*1
Regulator	Output voltage	VAF	VDD=4.5 to 5.5V IAF=50mA	3.90	4.10	4.30	V	
	Load stability	VAF	VDD=5V IAF=0 to 20mA	-10	–	10	mV	
	Ripple voltage	Vrip	VB=2.85V Vout ≧ 4.5V	0	–	10	mVp-p	
	Response time	TAF	CVAF=10µF CVREF=0.1µF	0		10	mS	
DC motor driver	Operating voltage	VB(DC motor)	VB voltage	1.6	–	3.5	V	
	Maximum output current	Iomax	t=10S	1.8	–	–	A	
	Continual maximum output current	Iocont		500	–	–	mA	
	Output saturation voltage	Vsat(DC motor)	Io=500mA Upper side+Lower side (saturation voltage total)	0	–	0.5	V	
	Spark killer diode forward voltage	VSF(DC motor)	Io=600mA	–	–	1.5	V	
	Overheat protection circuit operating temperature	Taohp		135	150	165	°C	
	Overheat protection hysteresis	Taohp		25	40	55	°C	
Shutter driver	Operating voltage	VB(shutter)	VB voltage	1.6	–	3.5	V	
	Simple output bias current	Isht1	1 Between SRICONT to GND	480	580	680	mA	
	Maximum output voltage	Isht2		700	–	–	mA	
	Output saturation voltage	Vsat(shutter)	Io=500mA SRICONT=0V	–	–	0.5	V	
	Spark killer diode forward voltage	VSF(shutter)	Io=600mA	–	–	1.5	V	

*1 L=47µH,CVDD=100 µF.
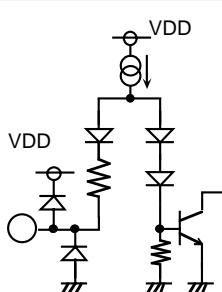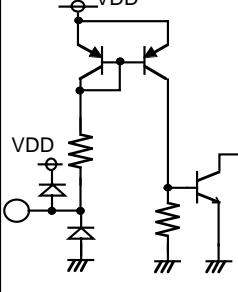
ELECTRICAL CHARACTERRISTICS(cont.)   (Ta=25°C,VB=3.0V,unless otherwise noted)

Classification	Parameter	Symbol	Test condition	Limit			Unit	Note
				min	typ	max		
Buffer1	Operating voltage	VB(BF1)	VB voltage	1.6	—	3.5	V	
	Maximum output current	Ibf1	t=1S	2.0	—	—	A	
	Output saturation voltage	Vsat(BF1)	Io=1A	—	—	0.5	V	
Buffer2	Operating voltage	VB(BF2)	VB voltage	1.6	—	3.5	V	
	Maximum output current	Ibf2	t=1S	800	—	—	mA	
	Output saturation voltage	Vsat(BF2)	Io=500mA	—	—	0.5	V	
Buffer3	Operating voltage	VB(BF3)	VB voltage	1.6	—	3.5	V	
	Maximum output current	Ibf3	t=1S	800	—	—	mA	
	Output saturation voltage	Vsat(BF3)	Io=500mA	—	—	0.5	V	
Buffer4	Operating voltage	VB(BF4)	VB voltage	1.6	—	3.5	V	
	Maximum output current	Ibf4		150	—	—	mA	
	Output saturation voltage	Vsat(BF4)	Io =100mA	—	—	0.5	V	
	Input current	Ibf4cont	BF4CONT=0V	-70	-50	-30	μA	
	H input voltage	VinH		4.2	—	6.0	V	
	L input voltage	VinL		0	—	0.3	V	
BC	Output voltage	Vbc	VB=1.6 to 3.5V	2/3VB -0.15	2/3VB	2/3VB +0.15	V	

Interface

Terminal name	Circuit diagram	Parameter	Limit			Unit	Test condition and note
			Min.	Typ.	Max.		
SML1 SML2 SML3 SML4		"H" input voltage	2.0	—	6.0	V	
		"L" input voltage	0	—	0.3		
		"H" input current	—	—	3.0	μA	VIH=5.5V
		"L" input current	-60	-40	-20		VIL=0V
VWL1 VWL2		"H" input voltage	VDD -0.3	—	6.0	V	
		"L" input voltage	0	—	0.3		
		"H" input current	—	—	3.0	μA	VIH=5.5V
		"L" input current	-70	-45	-25		VIL=0V

PRELIMINARY

VWL truth table

VWL1	VWL2	Output condition
H	H	Output OFF condition
H	L	Oscillation start (Oscillator ON) condition
L	L	DC/DC converter (5V)output condition
L	H	DC/DC&VAF regulator output condition VBMON output condition

*It needs the interval over 2mS in case of moving from the oscillation on to the output condition of DV/DC converter.

SML truth table

INPUT				MOTOR1	MOTOR2	Motor each output			Buffer each output				Note
SML1	SML2	SML3	SML4			OUT1	OUT2	OUT3	SH	BF1	BF2	BF3	
H	H	H	H	Stand-by	Stand-by	OFF	OFF	OFF	Stand-by	OFF	OFF	OFF	MOTOR1 control
H	H	H	L	Forward rotation	Stand-by	H	L	OFF	Stand-by	OFF	OFF	OFF	
H	H	L	H	Reverse rotation	Stand-by	L	H	OFF	Stand-by	OFF	OFF	OFF	
H	H	L	L	Brake	Stand-by	L	L	OFF	Stand-by	OFF	OFF	OFF	
H	L	H	H	Stand-by	Stand-by	OFF	OFF	OFF	Stand-by	OFF	OFF	OFF	MOTOR2 control
H	L	H	L	Stand-by	Forward rotation	OFF	H	L	Stand-by	OFF	OFF	OFF	
H	L	L	H	Stand-by	Reverse	OFF	L	H	Stand-by	OFF	OFF	OFF	
H	L	L	L	Stand-by	Brake	OFF	L	L	Stand-by	OFF	OFF	OFF	
L	H	H	H	Stand-by	Stand-by	OFF	OFF	OFF	Stand-by	OFF	OFF	OFF	Shutter control
L	H	H	L	Stand-by	Stand-by	OFF	OFF	OFF	ON	OFF	OFF	OFF	
L	H	L	H	Stand-by	Stand-by	OFF	OFF	OFF	Stand-by	ON	OFF	OFF	BF1
L	H	L	L	Stand-by	Stand-by	OFF	OFF	OFF	ON	ON	OFF	OFF	Shutter+BF1
L	L	H	H	Stand-by	Stand-by	OFF	OFF	OFF	Stand-by	OFF	OFF	OFF	
L	L	H	L	Stand-by	Stand-by	OFF	OFF	OFF	Stand-by	OFF	ON	OFF	BF2
L	L	L	H	Stand-by	Stand-by	OFF	OFF	OFF	Stand-by	OFF	OFF	ON	BF3
L	L	L	L	Stand-by	Stand-by	OFF	OFF	OFF	Stand-by	OFF	ON	ON	

*Please pass through the Brake or Stand-by mode by all means in case of moving from forward rotation to Reverse rotation or from Reverse rotation to forward rotation by the motor control.
  (ex.)Forward rotation --> Brake --> Reverse rotation, Reverse rotation-->Stand-by --> Forward rotation
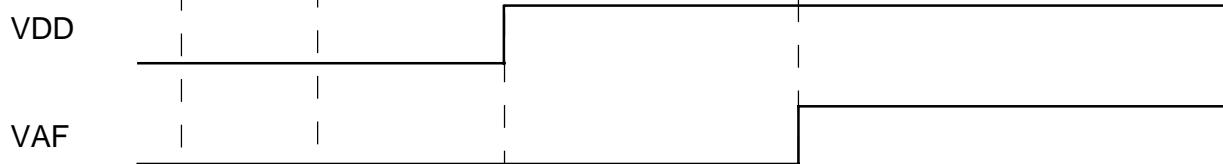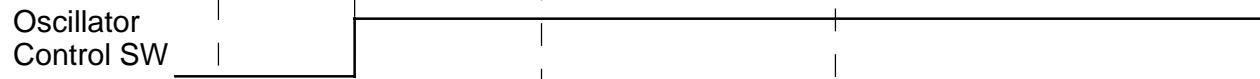
BF4 truth table

Input	Output
BF4CONT	BF4
H	OFF
L	L

Sequence Time chart example

Input signal

VB

VWL1

VWL2

Output signal

VDD

VAF

IC control content

Oscillator
Control SW

1mS   2mS   5mS

Regulator(VAF) : ON

DC/DC converter(VDD) : ON

Oscillator : ON

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