# Electronic Governer for DC Motors Monolithic IC LAG674

### **Outline**

This is an IC for DC motor electronic governors, developed with emphasis on low-voltage operation; it has control functions operating at voltages as low as 0.9 V (with performance guaranteed to 1.0 V).

### **Features**

- 1. Stabilized internal reference voltage generation circuit with a flat temperature characteristic (±100 ppm) and excellent reduced-voltage characteristics (operation stable down to 0.9 V)
- 2. Low startup voltage of 0.75 V max.
- 3. Internal power transistor ensures large startup currents (500 mA-min at 1.0 V using the standard circuit)
- On/off switching pin provided; on/off control possible at low startup voltages, power supply current while
  off is 5μA or less

### Package

SOP-8A (LAG674F)

# **Absolute Maximum Ratings**

Item	Symbol	Ratings	Units	
Operating temperature	Topr	-20~+60	$^{\circ}$ C	
Storage temperature	Tstg	-40~+125	$^{\circ}$ C	
Power supply current	Vcc	7	V	
Power consumption I	Pd1	600	mW	
Power consumption II	Pd2	900 *1	mW	
Operating voltage	Vop	5	V	
Output current	IL	1.0 *2	A	

<sup>\*1:</sup> When mounted on a 20 × 30 × 0.5 mm printed circuit board (glass-reinforced epoxy).

<sup>\*2:</sup> When Pd exceeds the rated value, the value of Pd takes precedence.

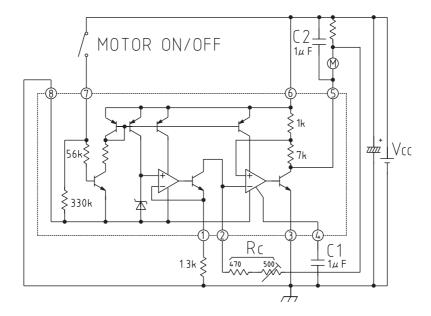
## Electrical Characteristics (Except where noted otherwise, Ta=25°C)

Item	Symbol	Measurement circuit	Measurement conditions	Min.	Тур.	Max.	Units
Recommended operating	**			4.0		- 0	
voltage range	Vccopr			1.0		5.0	V
Leakage current while off I	Ileak1	1	Vcc=5V, SW OFF			20	μА
Leakage current while off II	Ileak2	1	Vcc=1.2V, SW OFF			5	μА
Power supply current while on I	Icc1	2	Vcc=5V, SW ON		1.2	1.8	mA
Power supply current while on II	Icc2	2	Vcc=1.2V, SW ON		1.0	1.5	mA
Reference voltage	Vref	2	Vcc=1.2V	115	127	140	mV
Reference voltage fluctuation	⊿Vref	2	Vcc=1.0~5.0V	-0.5		0.5	mV/V
Output voltage	VM	3	Vcc=1.2, RM= $6\Omega$	0.56	0.61	0.66	V
Reference voltage fluctuation	∠VM	3	$V_{CC}=1.0\sim5.0V$ , $R_{M}=6\Omega$	-5		5	mV/V
Pin 7 threshold	VTH	DII 1	Voltage at which Icc reaches 90mA	0.3	0.43	0.5	V
Motor ON/OFF SW	V 111	1	RM= $6\Omega$ , IM=Icc-1mA				
Pin 7 input current I	I IN1	1	Vin (7PIN) =0.5V	0.8	1.6	3.4	μA
Pin 7 input current II	I IN2	1	Vin (7PIN) =3V	35	50	70	μА
Starting power supply voltage	Vccs	3	Voltage at which IM reaches 30mA			0.75	V
			RM= $1.2\Omega$ , IM=VM/ $1.2$			0.75	\ \ \
Startup current	IMS	3	Vcc=1.0V, R <sub>M</sub> =1.2Ω	500			mA
Output saturation voltage	Vosat	4	Vcc=1.0V, IM=200mA			0.2	V
Bridge ratio	K	5	Vcc=1.0~5.0V				
			IM=25~200mA	6.7	7.0	7.3	
			K=∠VM/∠VA <b>*</b> 1				
Output resistance	Ro	5	Vcc=1.0~5.0V				
			IM=25~225mA	50	80	120	mΩ
			Ro=⊿VM/⊿IA ★2				
Reference voltage temperature	⊿Vref	2	Vcc=1.2V		±100		ppm/T
characteristic	/⊿Ta	<i>L</i>	Ta=-20~60°C *3				
Output voltage	∠VM	3	Vcc=1.2V, R <sub>M</sub> =6Ω		±150		nnm /T
temperature characteristic	/⊿Ta	J	Ta=-20~60°C *3				ppm/T
Bridge ratio temperature	∧ <b>K</b>	ΔK /4Ta 5	Vcc=1.0~5.0V				
characteristic	/⊿Ta		IM=25~200mA		±100		ppm/T
Characteristic //	/∠  1 a		Ta=-20~60°C *3				
Output voltage aging drift	∠VMT	MT 3	Vcc=1.2, R <sub>M</sub> =6Ω	:	±0.1		%
characteristic	∠ V 1V1 1		T=15S~10M		±0.1		70

Measurement conditions: Except where noted otherwise, in measurement circuits Vcc=1.2V

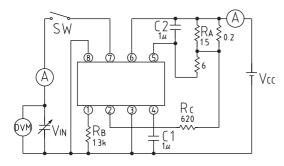
- \*1: At a certain point within the range Vcc=1.0 to 5.0 V, IM=25 to 200 mA, the value of VA is varied and the value  $\triangle$  VM/ $\triangle$  VA is determined.
- \*2: At a certain point within the range Vcc=1.0 to 5.0 V, the value of IM is varied between 25 mA and 225 mA, and the value  $\triangle VM/\triangle IA$  is determined.
- \*3: The temperature characteristics of the reference voltage, output voltage and bridge ratio, as well as the drift characteristic, are all reference values and are not guaranteed.

# Block Diagram

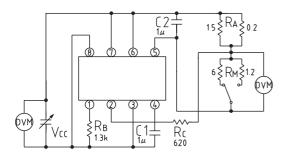


# **Measuring Circuit**

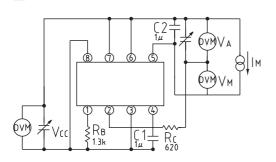
### ■ Measurement circuit 1



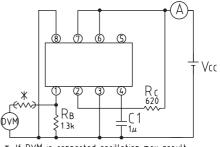
### ■ Measurement circuit 3



### ■ Measurement circuit 5



#### ■ Measurement circuit 2



\* If DVM is connected oscillation may result; when connecting DVM, please insert a resistance of 10  $k\Omega$  or so.

### Measurement circuit 4

