

Electronic Governor 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)
4. On/off switching pin provided; on/off control possible at low startup voltages, power supply current while off is 5 μ A or less

Package

SOP-8A (LAG674F)

Absolute Maximum Ratings

Item	Symbol	Ratings	Units
Operating temperature	T _{OPR}	-20~+60	°C
Storage temperature	T _{STG}	-40~+125	°C
Power supply current	V _{CC}	7	V
Power consumption I	Pd1	600	mW
Power consumption II	Pd2	900 *1	mW
Operating voltage	V _{OP}	5	V
Output current	I _L	1.0 *2	A

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

*2: 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.	Typ.	Max.	Units
Recommended operating voltage range	Vccopr			1.0		5.0	V
Leakage current while off I	Ileak1	1	V _{CC} =5V, SW OFF			20	μA
Leakage current while off II	Ileak2	1	V _{CC} =1.2V, SW OFF			5	μA
Power supply current while on I	Icc1	2	V _{CC} =5V, SW ON		1.2	1.8	mA
Power supply current while on II	Icc2	2	V _{CC} =1.2V, SW ON		1.0	1.5	mA
Reference voltage	Vref	2	V _{CC} =1.2V	115	127	140	mV
Reference voltage fluctuation	ΔVref	2	V _{CC} =1.0~5.0V	-0.5		0.5	mV/V
Output voltage	VM	3	V _{CC} =1.2, R _M =6Ω	0.56	0.61	0.66	V
Reference voltage fluctuation	ΔVM	3	V _{CC} =1.0~5.0V, R _M =6Ω	-5		5	mV/V
Pin 7 threshold Motor ON/OFF SW	VTH	1	Voltage at which Icc reaches 90mA R _M =6Ω, I _M =I _{CC} -1mA	0.3	0.43	0.5	V
Pin 7 input current I	I _{IN1}	1	V _{IN} (7PIN) =0.5V	0.8	1.6	3.4	μA
Pin 7 input current II	I _{IN2}	1	V _{IN} (7PIN) =3V	35	50	70	μA
Starting power supply voltage	Vccs	3	Voltage at which I _M reaches 30mA R _M =1.2Ω, I _M =V _M /1.2			0.75	V
Startup current	I _{MS}	3	V _{CC} =1.0V, R _M =1.2Ω	500			mA
Output saturation voltage	Vosat	4	V _{CC} =1.0V, I _M =200mA			0.2	V
Bridge ratio	K	5	V _{CC} =1.0~5.0V I _M =25~200mA K=ΔVM/ΔVA *1	6.7	7.0	7.3	
Output resistance	R _o	5	V _{CC} =1.0~5.0V I _M =25~225mA R _o =ΔVM/ΔIA *2	50	80	120	mΩ
Reference voltage temperature characteristic	ΔVref /ΔTa	2	V _{CC} =1.2V Ta=-20~60°C *3		±100		ppm/T
Output voltage temperature characteristic	ΔVM /ΔTa	3	V _{CC} =1.2V, R _M =6Ω Ta=-20~60°C *3		±150		ppm/T
Bridge ratio temperature characteristic	ΔK /ΔTa	5	V _{CC} =1.0~5.0V I _M =25~200mA Ta=-20~60°C *3		±100		ppm/T
Output voltage aging drift characteristic	ΔVMT	3	V _{CC} =1.2, R _M =6Ω T=15S~10M		±0.1		%

Measurement conditions: Except where noted otherwise, in measurement circuits V_{CC}=1.2V

*1: At a certain point within the range V_{CC}=1.0 to 5.0 V, I_M=25 to 200 mA, the value of V_A is varied and the value ΔVM/ ΔVA is determined.

*2: At a certain point within the range V_{CC}=1.0 to 5.0 V, the value of I_M is varied between 25 mA and 225 mA, and the value ΔVM/ ΔIA 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.

