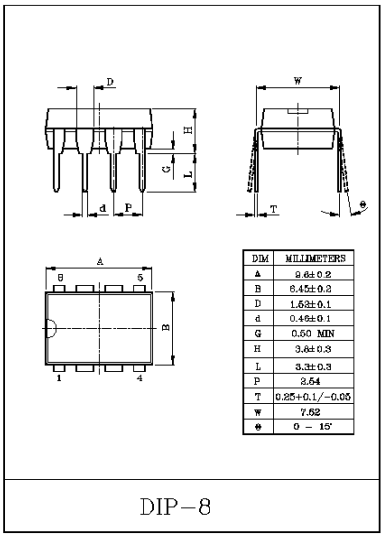
DC MOTOR SPEED CONTROLLER

FEATURES

- Wide operation voltage range : 1.8~8V
- Possible to make applicable sets compact because of minimum number of external parts required.
- Easy to adjust speed.
- On-chip stable low reference voltage capable of providing 2 speed.
- V_{ref}=0.5V.



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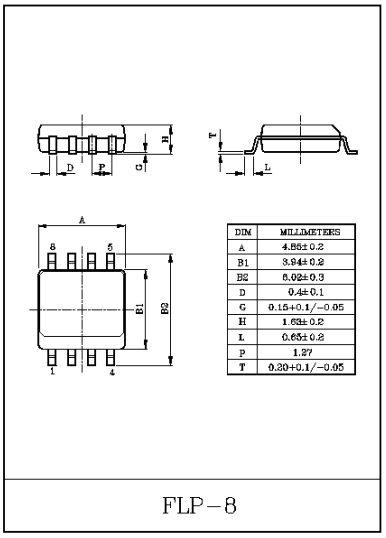


FLP-8

MAXIMUM RATINGS (Ta=25℃)

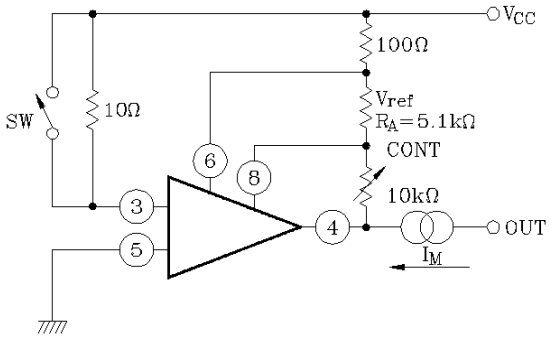
CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V_{CC}	10	V
Motor Current		I_M	700	mA
Power Dissipation	KIA6901P	P_D	600	mW
	KIA6901F		240	
Operating Temperature		T_{opr}	-25~75	℃
Storage Temperature		T_{stg}	-55~150	℃

ELECTRICAL CHARACTERISTICS (Ta=25℃, V_{CC}=3V, I_M=100mA)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Reference Voltage	V_{ref}	I_M=100mA	0.44	0.50	0.54	V
Quiescent Current	I_{CCQ}	I_M=100mA	-	2.4	6.0	mA
Shunt Ratio	K	I_M=50~150mA	45	50	55	
Output Saturation Voltage	$V_{CE(sat)}$	I_M=200mA	-	0.32	0.5	V
Reference Voltage Variance (Note 1)	ΔV_{ref1}	Ta=-20~80℃, I_M=100mA	-	-0.008	-	%/℃
	ΔV_{ref2}	I_M=20~200mA	-	0.005	-	%/mA
	ΔV_{ref3}	V_{CC}=1.8~8V, I_M=100mA	-	0.1	-	%/V
Shunt Ratio Variance (Note 2)	ΔK_1	Ta=-20~80℃, I_M=50~150mA	-	0.02	-	%/℃
	ΔK_2	I_M=20~50mA to 170~200mA	-	-0.07	-	%/mA
	ΔK_3	V_{CC}=1.8~8V, I_M=50~150mA	-	0.3	-	%/V

Note 1 : $\frac{\Delta V_{ref}}{V_{ref}} / \Delta Ta,\ \Delta I_M,\ \Delta V_{ref}$ Note 2 : $\frac{\Delta K}{K} / \Delta Ta,\ \Delta I_M,\ \Delta V_{ref}$

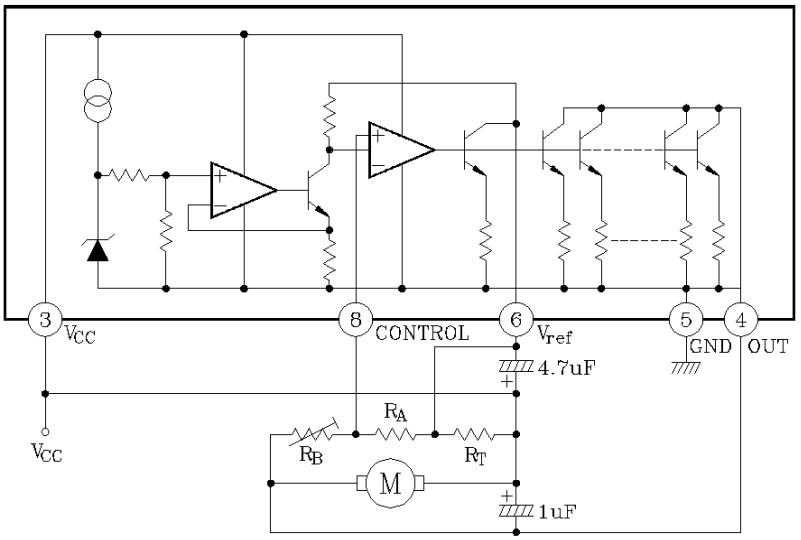
TEST CIRCUIT



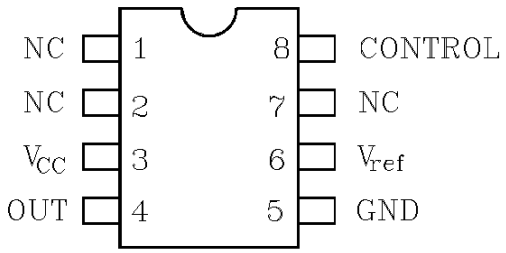
Test Method

1. V_{ref}
   With SW turned ON, measure the voltage developed across R_A.
2. I_{CCQ}
   With SW turned OFF, measure I_{CCQ} for the voltage developed across resistor 10Ω.
3. K
   With SW turned ON, measure current I_{50} flowing through resistor 100Ω at I_M=50mA and current I_{150} flowing through resistor 100Ω at I_M=150mA, and calculate K by using the following formula.
   $$K = \frac{100}{I_{150} + I_{50}}$$
4. $V_{CE(sat)}$
   With SW turned ON, connect each pin of V_{CC}, V_{ref}, CONT to 3V and feed I_M=200mA and measure the voltage developed across pin④ and ⑤.

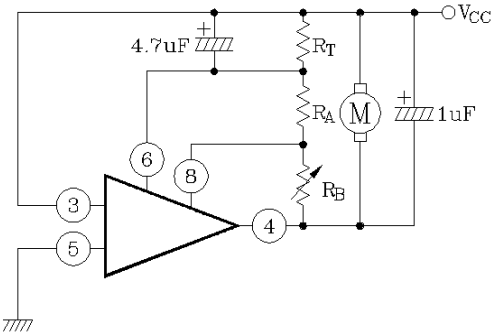
EQUIVALENT CIRCUIT BLOCK DIAGRAM



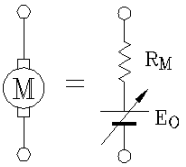
PIN ASSIGNMENT



APPLICATION CIRCUIT 1 :



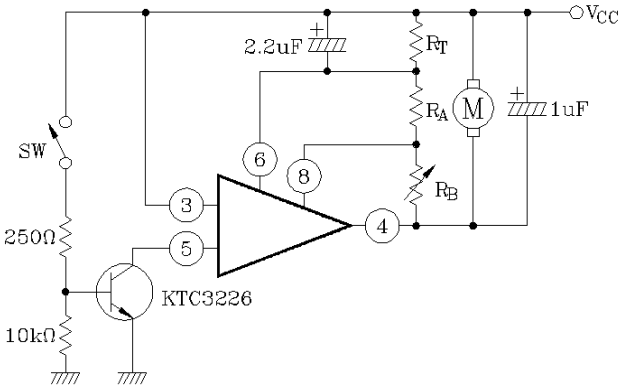
Unless $R_{T(max)} < K \cdot R_{M(min)}$ the operation becomes unstable.
R_A is Set to 5.1kΩ
R_M=Motor DC resistance



R_M(internal resistance)
E_O(counter electromotive force)

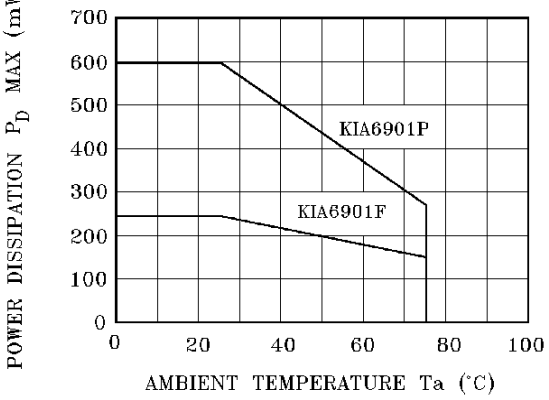
The values and positions of electrolytic capacitors depend on the type of a motor to be used.

APPLICATION CIRCUIT 2 : WITH STOP CIRCUIT

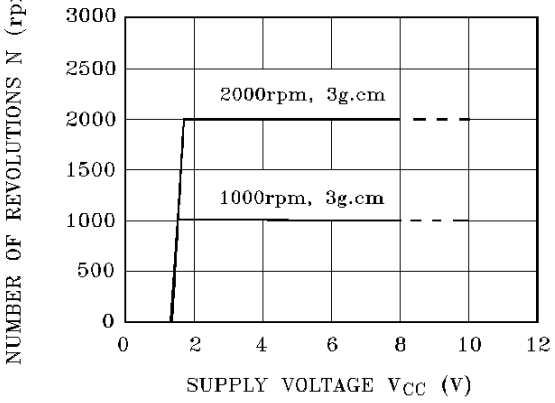


$R_{T(max)} < K \cdot R_{M(min)}$
R_A is set to 5.1kΩ

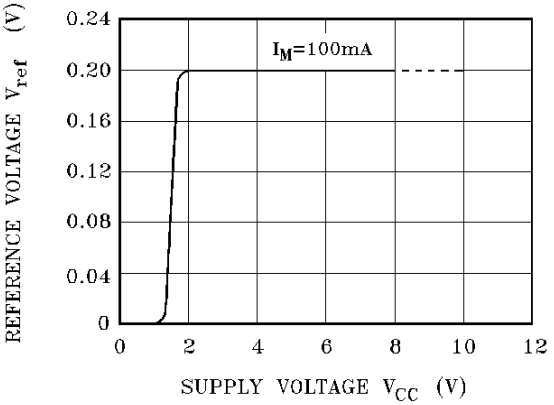
P_D MAX – Ta



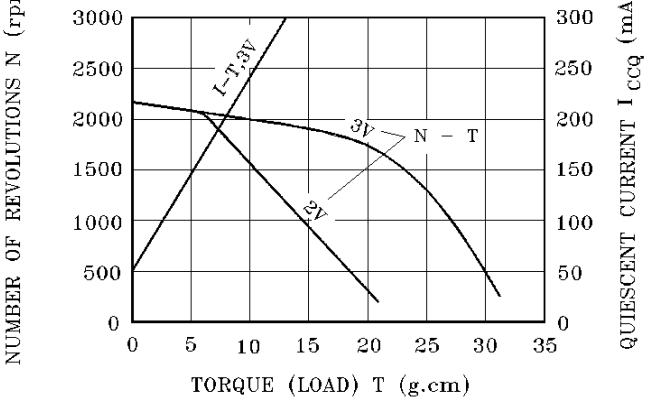
N – V_{CC}



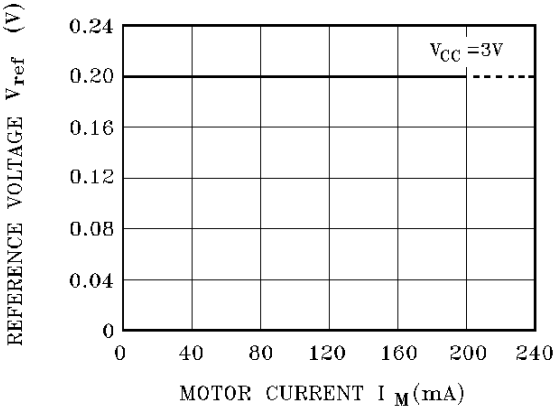
V_{ref} – V_{CC}



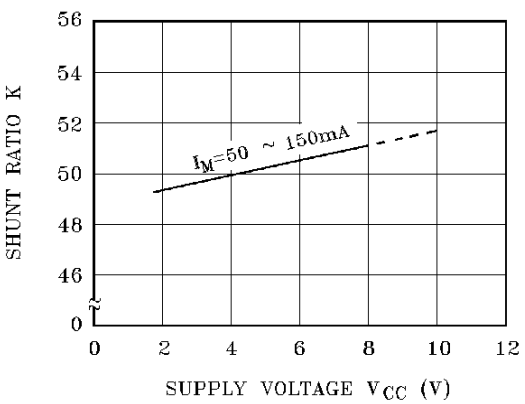
N, I_{CCQ} – T



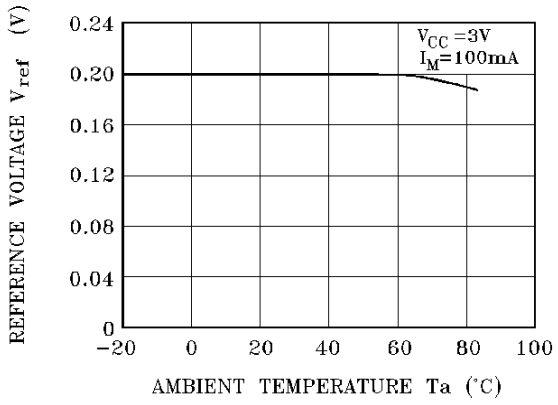
V_{ref} – I_M



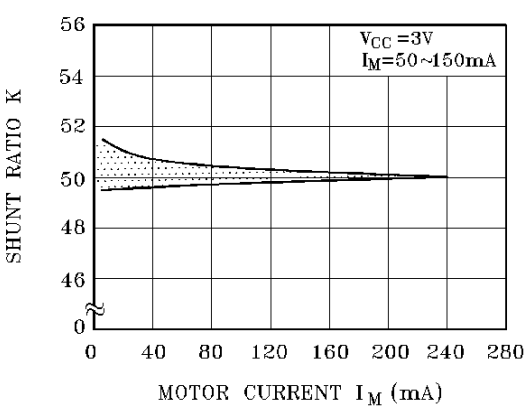
K – V_{CC}



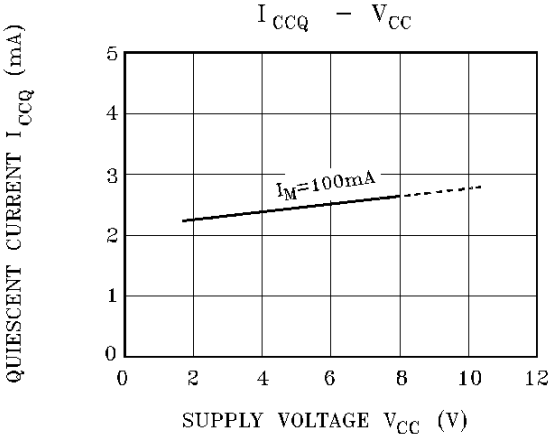
V_{ref} – Ta



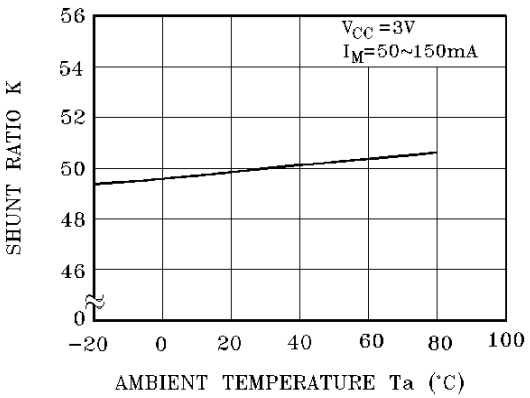
K – I_M



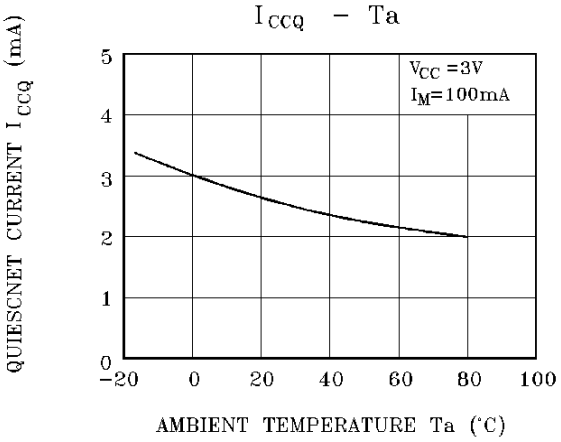
I_{CCQ} – V_{CC}



K – Ta



I_{CCQ} – Ta



I_{CCQ} – I_M