

AN6650/S

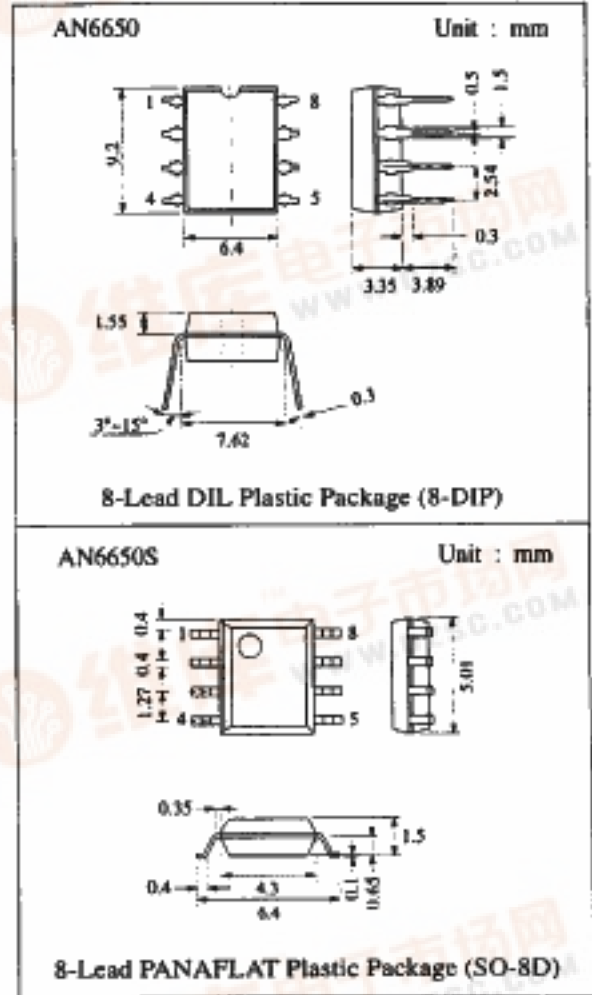
Motor Control Circuits

■ Description

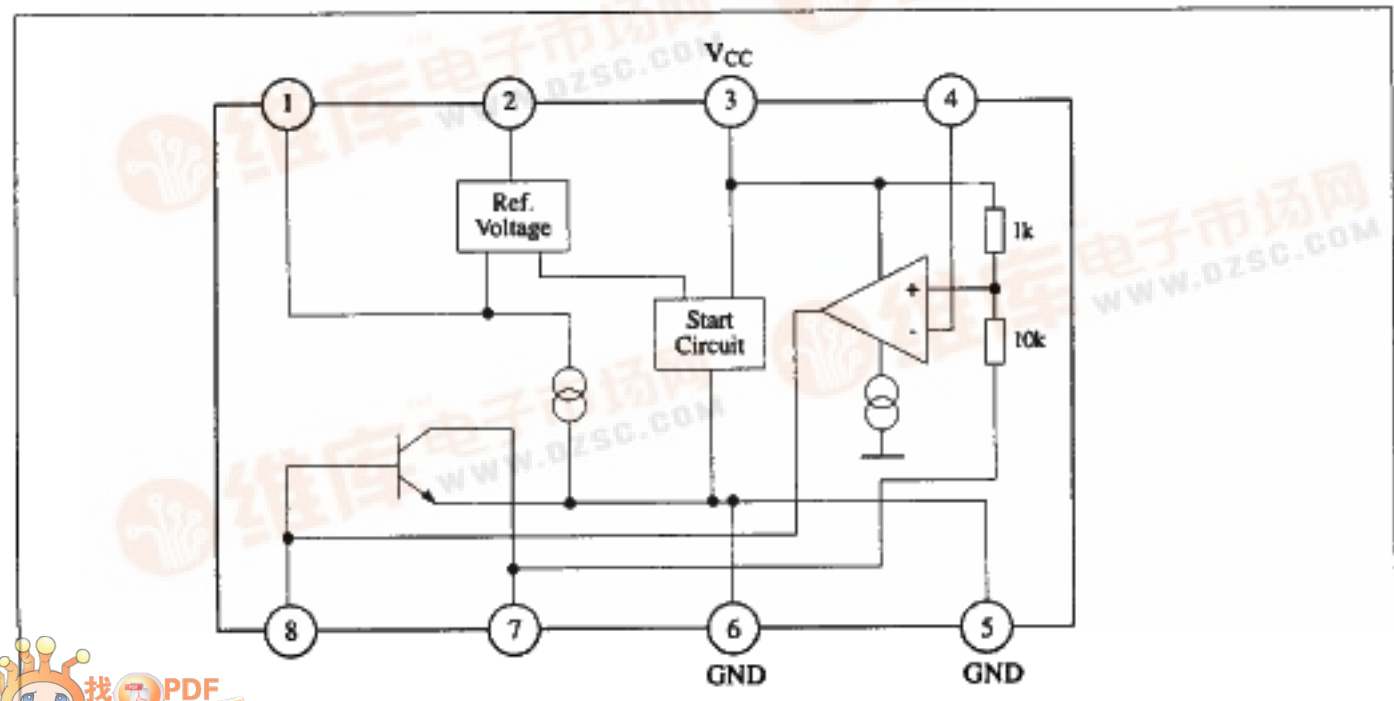
The AN6650/S are the monolithic electronic governor integrated circuits suitable for a low-voltage and compact DC motor which is used for a tape recorder, etc.

■ Features

- Wide range of operating voltage
AN6650: $V_{CC(opr)} = 1.8V \sim 7.0V$
AN6650S: $V_{CC(opr)} = 1.8V \sim 3.6V$
- Fewer external parts
- Speed control in steps with linear fine control



■ Block Diagram



AN6650/S

■ Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Rating	Unit	
Supply Voltage	AN6650	7.5	V	
	AN6650S	4		
Circuit Voltage	AN6650	-0.5	7.5	V
	AN6650S	-0.5	4	
Circuit Voltage	$V_{n-5,6}$ (n = 1, 2, 3, 4)	-0.5	1	V
Supply Current	I_{CC}^*	1000	mA	
Circuit Current	I_T	-	1000	mA
Power Dissipation	AN6650	750	mW	
	AN6650S	360		
Operating Ambient Temperature	AN6650	-20 ~ +75	°C	
	AN6650S	-20 ~ +60		
Storage Temperature	AN6650	-40 ~ +150	°C	
	AN6650S	-40 ~ +125		

* AN6650: $t \leq 5s$, AN6650S: $t \leq 1s$

Operating Supply Voltage Range (AN6650): $V_{CC} = 1.8V \sim 7.0V$

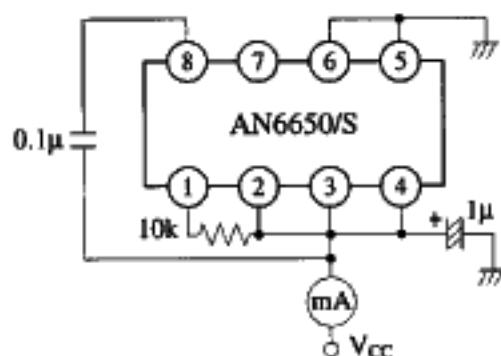
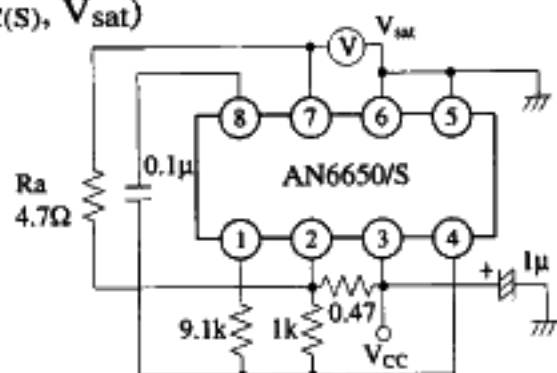
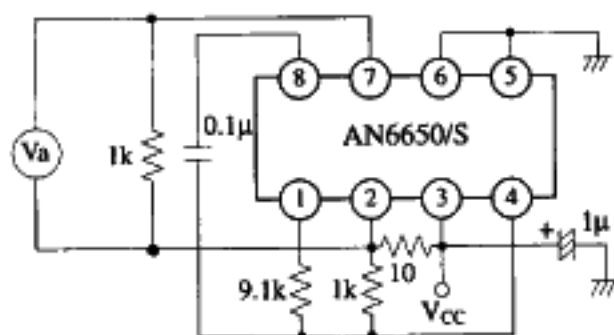
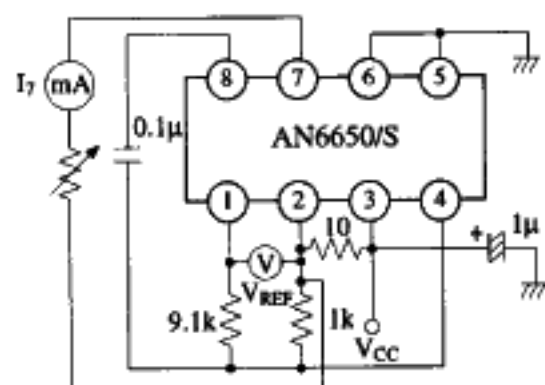
Operating Supply Voltage Range (AN6650S): $V_{CC} = 1.8V \sim 3.6V$

■ Electrical Characteristics (Ta=25°C)

Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Supply Current	I_{CC}	1	$V_{CC} = 3V$		2	3	mA
Reference Voltage	V_{REF}	4	$V_{CC} = 3V, R_{2,1} > 10k\Omega$	1.20	1.28	1.35	V
Starting Voltage	$V_{CC(S)}$	2	Supply voltage in which 30mA current flows to R_s		1.0	1.2	V
Saturation Voltage	V_{sat}	2	$V_{CC} = 1.8V, R_s = 4.7\Omega$		0.2	0.5	V
Voltage Characteristics 1	AN6650	1	$V_{CC} = 1.8 \sim 7V,$ $V_{CC} = 1.8 \sim 3.6V$	-1.25	0.1	1.25	%V
	AN6650S						
Voltage Characteristics 2	AN6650	3	$V_{CC} = 1.8 \sim 7V,$ $V_{CC} = 1.8 \sim 3.6V$	-1.2	0.1	1.2	%V
	AN6650S						
Current Characteristics	$\frac{\Delta V_{REF}}{V_{REF}} / \Delta I_T$	4	$I_T = 1mA \sim 20mA$	-0.2	0.01	0.2	%/mA
Temperature current Characteristics	$\frac{\Delta V_{REF}}{V_{REF}} / \Delta T_s$	4	$V_{CC} = 3V$ $T_a = -20^\circ C \sim 60^\circ C$		0.01		%/°C

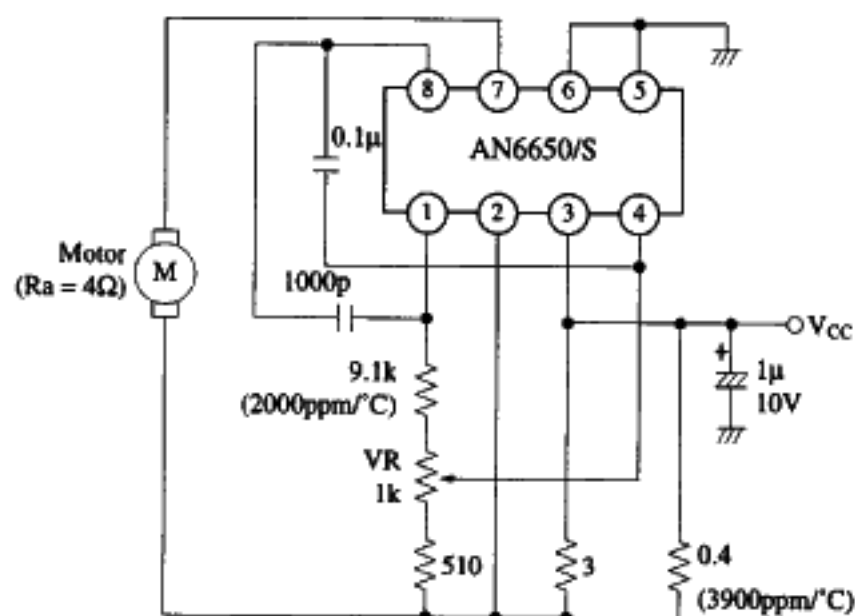
■ Pin

Pin No	Pin Name	Pin No	Pin Name
1	$V_{REF} \ominus$	5	GND
2	$V_{REF} \oplus$	6	GND
3	V_{CC}	7	Motor Pin
4	Comparator Input	8	Phase Compensation

Test Circuit 1 (I_{CC} , $\frac{\Delta V_{REF}}{V_{REF}}/\Delta V_{CC}$)Test Circuit 2 ($V_{CC(S)}$, V_{sat})Test Circuit 3 ($\frac{\Delta V_a}{V_a}/\Delta V_{CC}$)Test Circuit 4 ($\frac{\Delta V_{REF}}{V_{REF}}/\Delta I_7$, $\frac{\Delta V_{REF}}{V_{REF}}/\Delta T_a$)

■ Application Circuit

Speed Control Circuit with 3V Core Motor



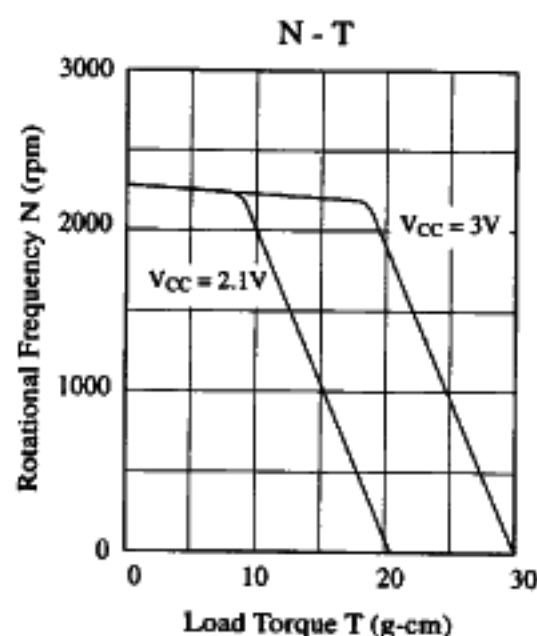
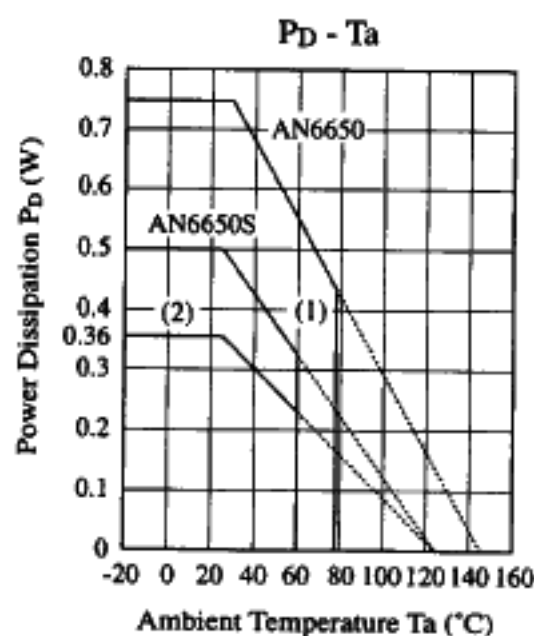
Motor Constants

R_a : Internal resistor = 4Ω

K_a : Electromotive force constant = 0.4mV/rpm

K_T : Torque constant = 30g.cm/A

■ Characteristics Curve



In case of AN6650S

(1) Epoxy substrate mounted (55mm x 20mm x 0.7mm)

(2) Single unit.