AN6650, AN6650S

Motor Control Circuits

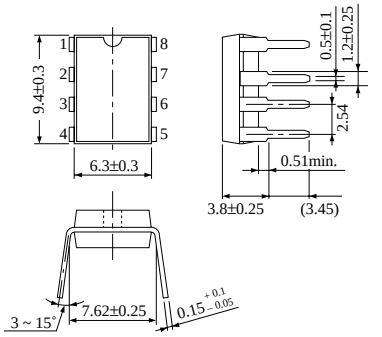
■ Overview

The AN6650 and the AN6650S are the electronic governors suitable for a low-voltage and compact DC motor which is used for a tape recorder, etc.

■ Features

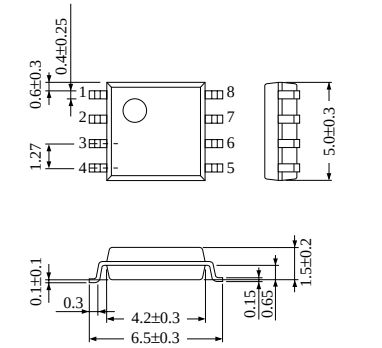
- Wide range of operating voltage : $V_{CC\ (opr)}$ =1.8V ~ 7V
  AN6650 : $V_{CC\ (opr)}$ =1.8V ~ 7V
  AN6650S : $V_{CC\ (opr)}$ =1.8V ~ 3.6V
- 2 package types
- Fewer external parts
- Speed control in steps with linear fine control

AN6650 Unit : mm



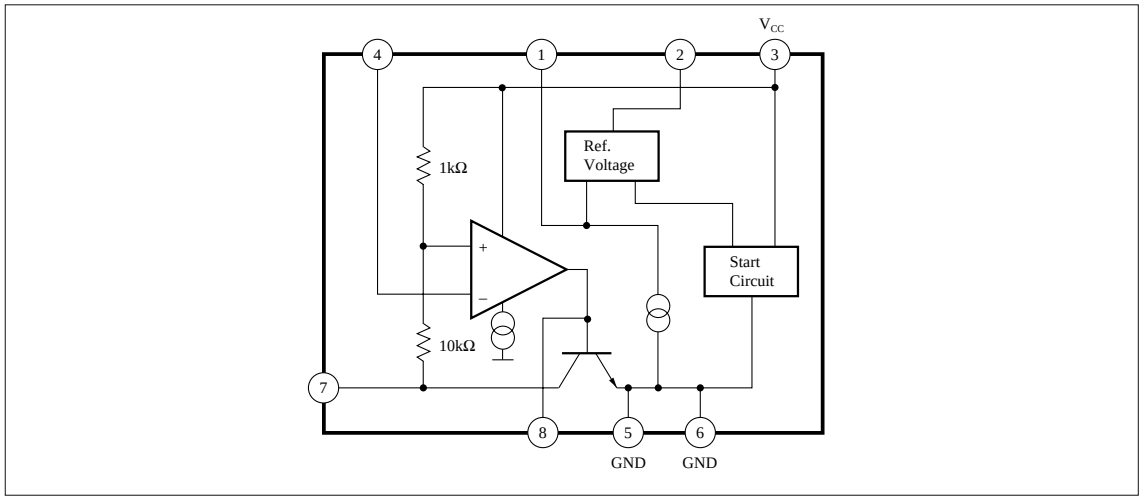
8-Lead DIP Package (DIP008-P-0300B)

AN6650S Unit : mm



8-Lead SOP Package (SOP008-P-0225A)

■ Block Diagram



■ Pin Descriptions

Pin No.	Pin Name	Pin No.	Pin Name
1	V_{REF} ⊖	5	GND
2	V_{REF} ⊕	6	GND
3	V_{CC}	7	Motor Pin
4	Comparator Input	8	Phase Compensation

■ Absolute Maximum Ratings (Ta= 25˚C)

Parameter		Symbol	Rating		Unit
Supply Voltage	AN6650	V_{CC}	7.5		V
	AN6650S		4		
Circuit Voltage	AN6650	$V_{n-5,6}$ (n = 1, 2, 3, 4)	– 0.5	7.5	V
	AN6650S		– 0.5	4	
Circuit Voltage		$V_{n-5,6}$	– 0.5	1	V
Supply Current		I_{CC} *	1000		mA
Circuit Current		I_7	—	1000	mA
Power Dissipation	AN6650	P_D	750		mW
	AN6650S		360		
Operating Ambient Temperature	AN6650	T_{opr}	–20 ~ + 75		˚C
	AN6650S		–20 ~ + 60		
Storage Temperature	AN6650	T_{stg}	– 40 ~ +150		˚C
	AN6650S		– 40 ~ +125		

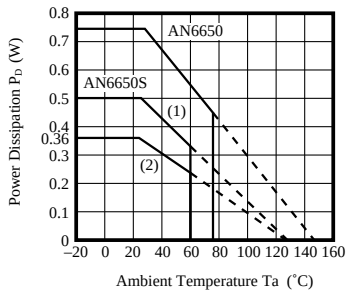
* AN6650 : t ≤ 5μs, AN6650S : t ≤ 1μs

■ Electrical Characteristics (Ta = 25˚C)

Parameter		Symbol	Condition	min.	typ.	max.	Unit
Supply Current		I_{CC}	V_{CC} = 3V,	—	2	3	mA
Reference Voltage		V_{ref}	V_{CC} = 3V, V_{2-1}>10kΩ	1.20	1.28	1.35	V
Starting Voltage		$V_{CC\,(S)}$	Supply voltage in which 30mA current flows to Ra	—	1.0	1.2	V
Saturation Voltage		V_{sat}	V_{CC} = 1.8V, Ra = 4.7Ω	—	0.2	0.5	V
Voltage Characteristics 1	AN6650	$\frac{\Delta V_{ref}}{V_{ref}}/\Delta V_{CC}$	V_{CC} = 1.8V ~ 7.0V	–1.25	0.1	1.25	%/V
	AN6650S		V_{CC} = 1.8V ~ 3.6V				
Voltage Characteristics 2	AN6650	$\frac{\Delta Va}{Va}/\Delta V_{CC}$	V_{CC} = 1.8V ~ 7.0V	–1.2	0.1	1.2	%/V
	AN6650S		V_{CC} = 1.8V ~ 3.6V				
Current Characteristics		$\frac{\Delta V_{ref}}{V_{ref}}/\Delta I_7$	I_7 = 1mA ~ 20mA	– 0.2	0.01	0.2	%/mA
Temperature Current Characteristics		$\frac{\Delta V_{ref}}{V_{ref}}/\Delta Ta$	Ta = –20˚C ~ + 60˚C, V_{CC} = 3.0V	—	0.01	—	%/˚C

Note) Operating Supply Voltage Range : $V_{CC\,(opr)}$ = 1.8V ~ 3.6V

P_D – Ta



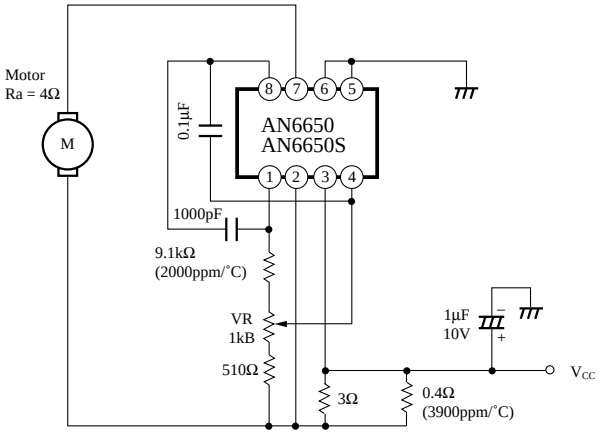
In case of AN6650S

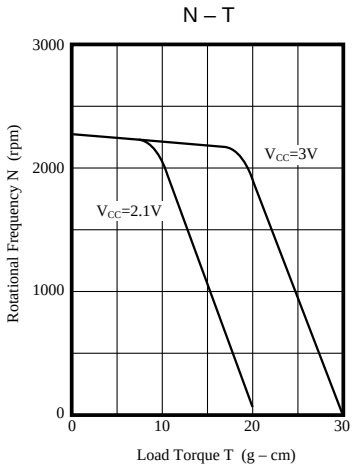
(1) Epoxy substrate mounted (55mm × 20mm × 0.7mm)

(2) Single unit

■ 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