

LOW VOLTAGE DC MOTOR CONTROLLER

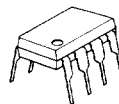
■ GENERAL DESCRIPTION

The NJM2606A is integrated circuit with wide operating supply voltage range for DC motor speed control. Especially, the NJM2606A is suited for 3V or 6V DC motor control.

■ FEATURES

- Operating Voltage (1.8V ~ 8V)
- Internal Low Saturation Voltage Output Transistor
- Package Outline DIP8, DMP8
- Bipolar Technology

■ PACKAGE OUTLINE

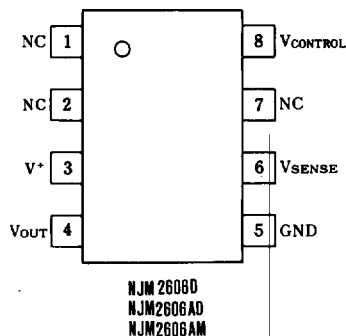


NJM2606D
NJM2606AD

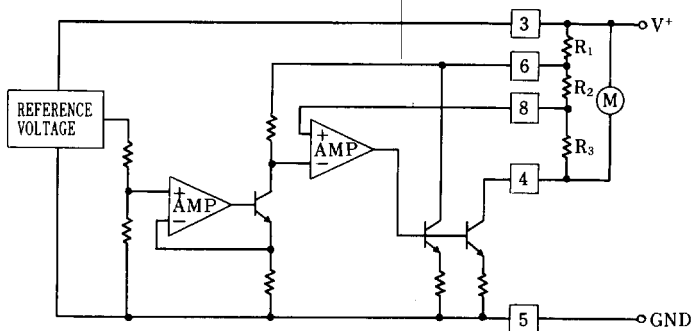


NJM2606AM

■ PIN CONFIGURATION



■ BLOCK DIAGRAM





NJM2606/2606A

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

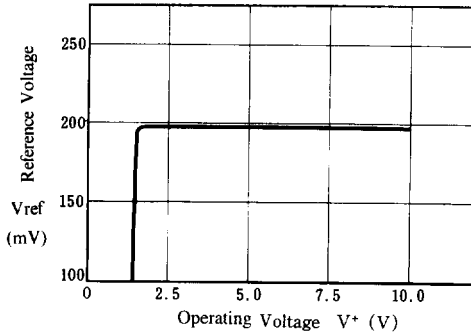
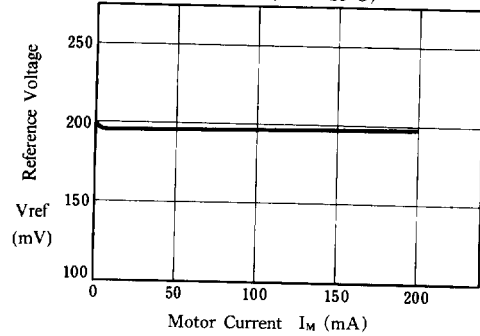
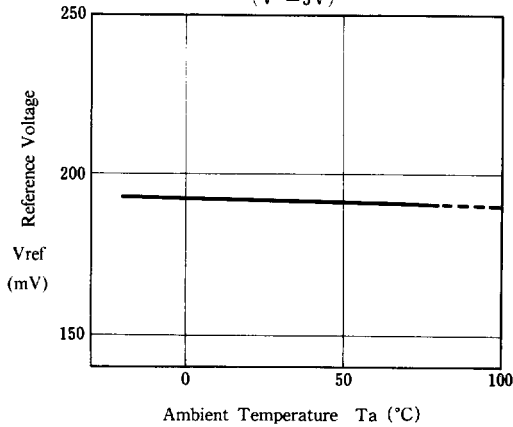
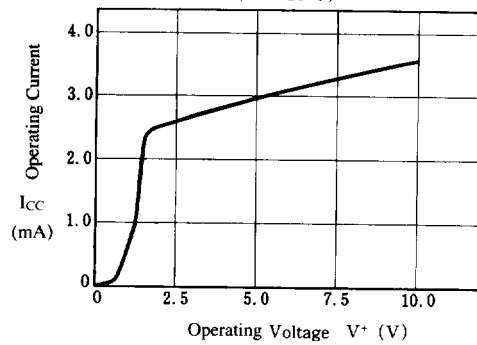
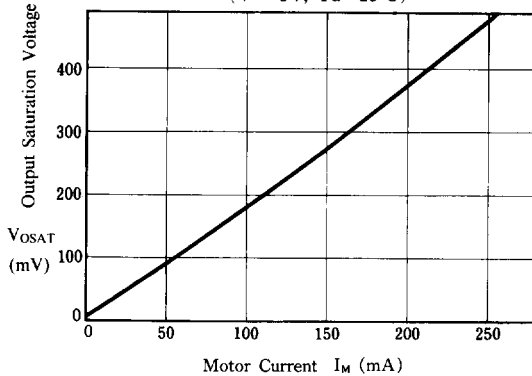
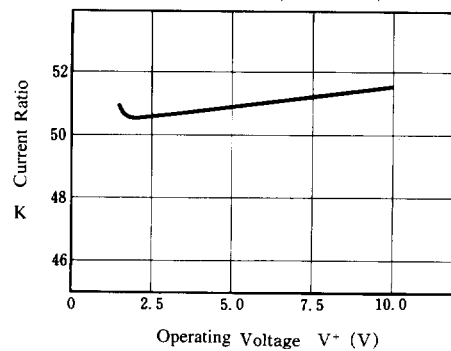
PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V ⁺	10	V
Peak-to-peak Output Current	I _{OP}	700	mA
Power Dissipation	P _D	(DIP8) 500 (DMP8) 300	mW mW
Operating Temperature Range	T _{opr}	-20~75	°C
Storage Temperature Range	T _{stg}	-40~125	°C

(note) At SW ON. (3 sec. at motor locked or 100msec at duty factor less than 0.1%)

■ ELECTRICAL CHARACTERISTICS

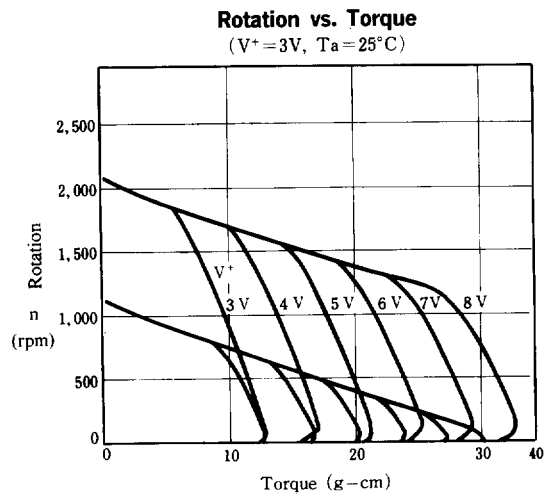
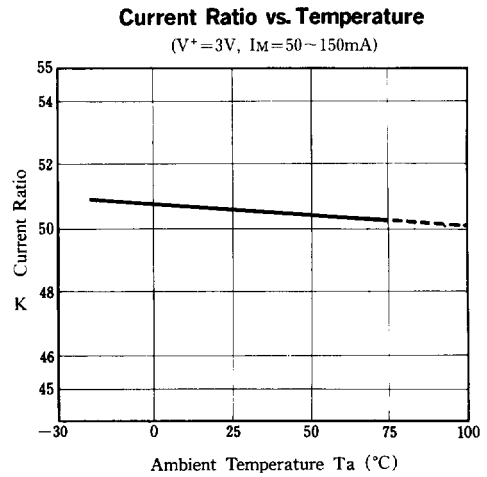
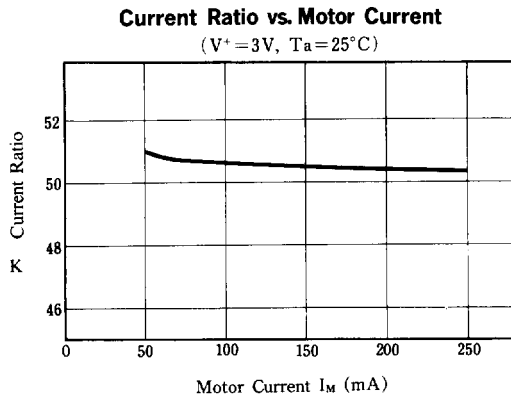
(Ta=25°C, V⁺=3V, I_M=100mA)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current	I _{CC}		—	2.4	6.0	mA
Output Saturation Voltage						
NJM2606	V _{OSAT}		—	0.18	0.3	V
NJM2606A	V _{OSAT}		—	0.13	0.18	V
Reference Voltage	V _{REF}		0.18	0.20	0.22	V
vs. Operating Voltage	ΔV _{RSV}	V ⁺ = 1.8V~8.0V	—	0.7	8.0	mV
vs. Output Current	ΔV _{ROC}	I _M = 20mA~200mA	—	2.7	9.0	mV
vs. Ambient Temperature	ΔV _{RT}	Ta = -20°C~+75°C	—	0.04	—	mV/°C
Current Ratio	K	I _M = 50mA~150mA	45	50	55	
vs. Operating Voltage	ΔK _{SV}	V ⁺ = 1.8V~8.0V	—	0.6	3.0	
		I _M = 50mA~150mA				
vs. Output Current	ΔK _{OC}	I _M = (20~50)~(170~200)mA	—	1.0	4.0	
vs. Ambient Temperature	ΔK _{TC}	Ta = -20°C~+75°C	—	1.0	—	1/°C
		I _M = 50mA~150mA				

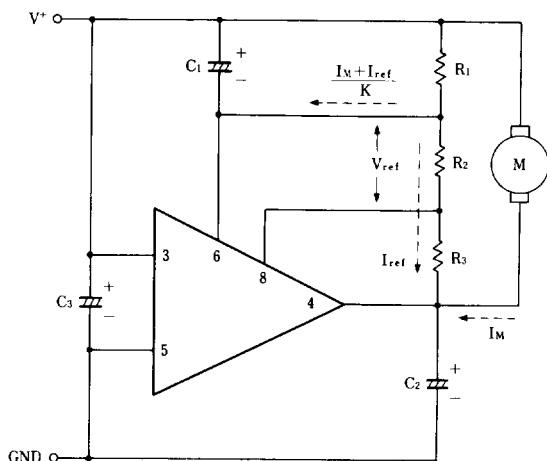
**■ TYPICAL CHARACTERISTICS****Reference Voltage vs. Operating Voltage** $(I_M = 100\text{mA}, T_a = 25^\circ\text{C})$ **Reference Voltage vs. Motor Current** $(V^+ = 3\text{V}, T_a = 25^\circ\text{C})$ **Reference Voltage vs. Temperature** $(V^+ = 3\text{V})$ **Operating Current vs. Operating Voltage** $(T_a = 25^\circ\text{C})$ **Output Saturation Voltage vs. Motor Current** $(V^+ = 3\text{V}, T_a = 25^\circ\text{C})$ **Current Ratio vs. Operating Voltage** $(I_M = 50 - 150\text{mA}, T_a = 25^\circ\text{C})$ 



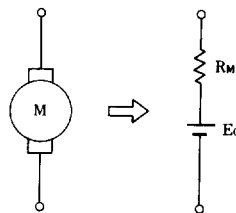
■ TYPICAL CHARACTERISTICS



■ TYPICAL APPLICATION



Select C_1 , C_2 , C_3 for each motor type.



V_{ref} : Reference Voltage
 K : Current Ratio
 I_M : Motor Current
 R_M : Internal Resistance of Motor
 E_0 : Motor Counter Electromotive Voltage

The voltage applied at the motor is set as V_M , which brings the following formula.

$$V_M = (R_1 + R_2 + R_3) I_{ref} + R_1 \cdot \frac{I_M + I_{ref}}{K}$$

Now that, $I_{ref} = V_{ref}/R_2$ so that, ($I_{ref} \approx 100\mu A$ setting is appropriate)

$$V_M = \frac{V_{ref}}{R_2} (R_1 + \frac{R_1}{K} + R_2 + R_3) + \frac{R_1}{K} I_M \dots\dots(1)$$

On the other hand, the voltage applied at the motor itself will be as in the following.

$$V_M = E_0 + R_M \cdot I_M \dots\dots(2)$$

Through (1), (2), and then leading to stabilize the control system.

$$R_M \cdot I_M > \frac{R_1}{K} \cdot I_M$$

$$\therefore R_1 < K \cdot R_M \dots\dots(3)$$

Taking in consideration of deviatons , $R_{1(MAX)} < K_{(MIN)} \cdot R_{M(MIN)}$ with the condition.

Items required checking in regard to the temperature coefficient

IC items

1. Reference voltage: Temperature coefficient of V_{ref} .

2. Current Ratio: Temperature coefficient of K

※ 1 External component items

3. Temperature coefficient of R_1 , R_2 and R_3

The relation among these 3 parts takes the very important roll.

4. Temperature coefficient of motor internal resistance

5. Temperature coefficient of motor generative voltage

6. Temperature coefficient ratio of R_1 and R_M

Count up from 3. 4.