



**LA5586**

General-Purpose Compact DC Motor Speed Controller

**Features**

- . Wide operating voltage range (3.8 to 16V)
- . Possible to make the equipment compact because of minimum number of external parts required and small-sized package
- . Easy to change the speed
- . Easy to increase the power dissipation because of the use of a fin
- . Various lead formings available for making the equipment compact
- . On-chip protector against inverted connection of power supply

**Maximum Ratings at Ta=25°C**

			unit
Maximum Supply Voltage	V <sub>CC</sub> max	18	V
Allowable Power Dissipation	P <sub>d</sub> max Ta=25°C	1.0*	W
Operating Temperature	T <sub>opr</sub>	-20 to +80	°C
Storage Temperature	T <sub>stg</sub>	-40 to +150	°C
Start Current	I <sub>m</sub> max 3sec at SW-ON or lock mode	1.4	A

\*1.7W(heat of fin is radiated to 1cm<sup>2</sup> Cu foil) at Ta=25°C

**Operating Conditions at Ta=25°C**

			unit
Supply Voltage Range	V <sub>CC</sub> op	3.8 to 16	V
Recommended Operating Temperature	T <sub>opr</sub>	-20 to +80	°C

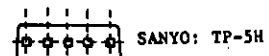
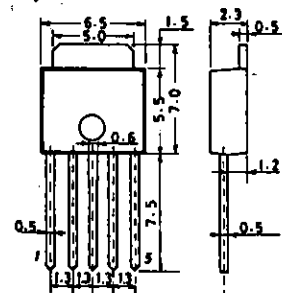
**Operating Characteristics at Ta=25°C, See specified Test Circuit.**

			min	typ	max	unit
Reference Voltage	V <sub>ref</sub>	V <sub>CC</sub> =12V, I <sub>m</sub> =10mA	1.08	1.21	1.27	V
Quiescent Current	I <sub>d</sub>	V <sub>CC</sub> =12V, I <sub>m</sub> =0		1.0	1.6	mA
Dissipation						
Shunt Ratio	K	V <sub>CC</sub> =12V, I <sub>m</sub> =50 to 150mA	18	20	22	
Saturation Voltage	V(sat)	V <sub>CC</sub> =4.2V, R <sub>T</sub> =4.4ohms		0.94		V
Voltage Characteristic of Reference Voltage	$\frac{\Delta V_{ref}}{\Delta V_{CC}}$	V <sub>CC</sub> =6.3 to 16V, I <sub>m</sub> =100mA		0.06		%/V
Voltage Characteristic of Shunt Ratio	$\frac{\Delta K}{\Delta V_{CC}}$	V <sub>CC</sub> =6.3 to 16V, I <sub>m</sub> =50 to 150mA		0.1		%/V
Current Characteristic of Reference Voltage	$\frac{\Delta V_{ref}}{\Delta I_m}$	V <sub>CC</sub> =12V, I <sub>m</sub> =30 to 200mA		-0.01		%/mA

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**Package Dimensions (unit: mm)**

3103

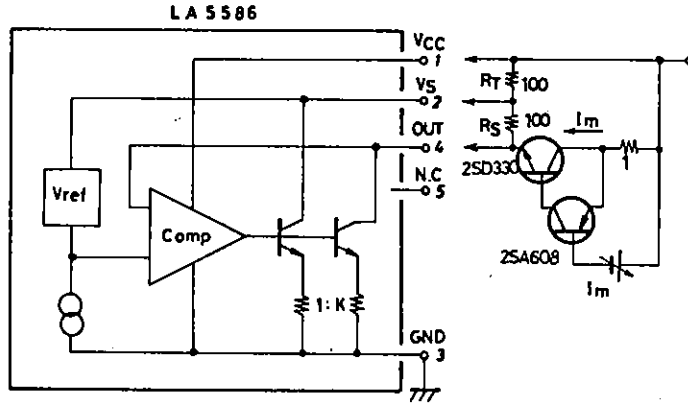


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		min	typ	max	unit
Current Characteristic of Shunt Ratio	$\frac{\Delta K}{\Delta I_m}$		0.02		%/mA
	$\frac{\Delta I_s}{\Delta V_{CC}}$			0.1	%/V
Temperature Characteristic of Reference Voltage	$\frac{\Delta V_{ref}}{\Delta T_a}$		-0.01		%/°C
	$\frac{\Delta K}{\Delta T_a}$		-0.01		%/°C

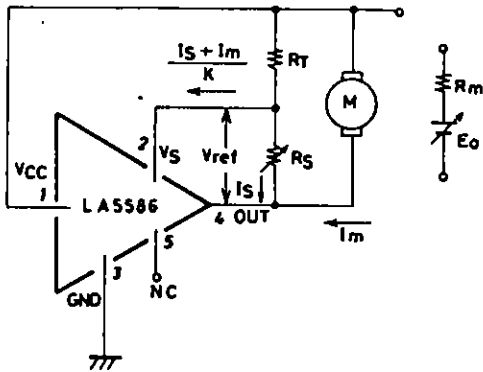
$V_{CC}=12V, I_m=50-100$  to  $150-200mA$   
 $V_{CC}=6$  to  $16V, I_m=0$   
 $V_{CC}=12V, I_m=10mA, T_a=-20$  to  $+80^\circ C$   
 $V_{CC}=12V, I_m=50-150mA, T_a=-20$  to  $+80^\circ C$

Equivalent Circuit and Test Circuit



Unit (resistance: Ω)

Sample Application Circuit



$$I_m \cdot R_m + E_0 = R_T \left( I_s + \frac{I_s + I_m}{K} \right) + V_{ref}$$

From this equation,

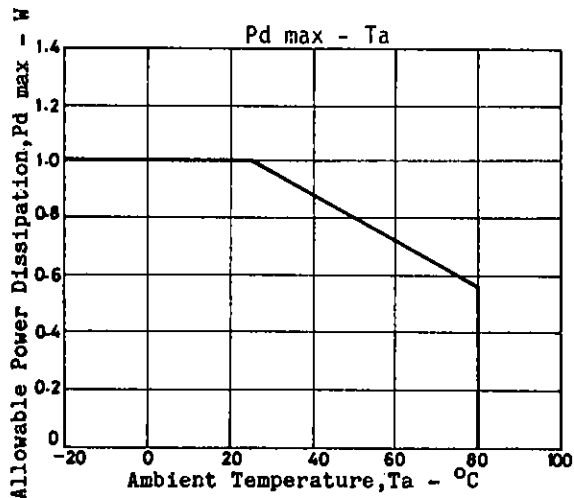
$$E_0 = V_{ref} + R_T \left( 1 + \frac{1}{K} \right) I_s + \left( \frac{R_T}{K} - R_m \right) I_m$$

Assuming  $K \cdot R_m = R_T$

The number of revolutions is determined by

$$E_0 = V_{ref} + R_T \left( 1 + \frac{1}{K} \right) I_s$$

Unless  $R_T(\max) < K \cdot R_m(\min)$  in the Sample Application Circuit, the operation becomes unstable.



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