

**LA5586**

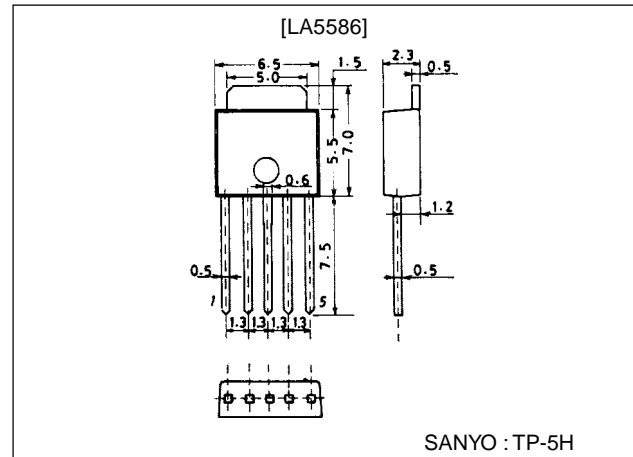
General-Purpose Compact DC Motor Speed Controller

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.

Package Dimensions

unit:mm

3103-TP-5H

Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC\ max}$		18	V
Allowable power dissipation	$P_d\ max$	Ta=25°C	1.0*	W
Operating temperature	Topr		-20 to +80	°C
Storage temperature	Tstg		-40 to +150	°C
Start current	$I_m\ max$	3s at SW-ON or lock mode	1.4	A

*1.7W (heat of fin is radiated to 1cm² Cu foil) at Ta=25°C

Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage range	$V_{CC\ op}$		3.8 to 16	V
Recommended operating temperature	Topr		-20 to +80	°C

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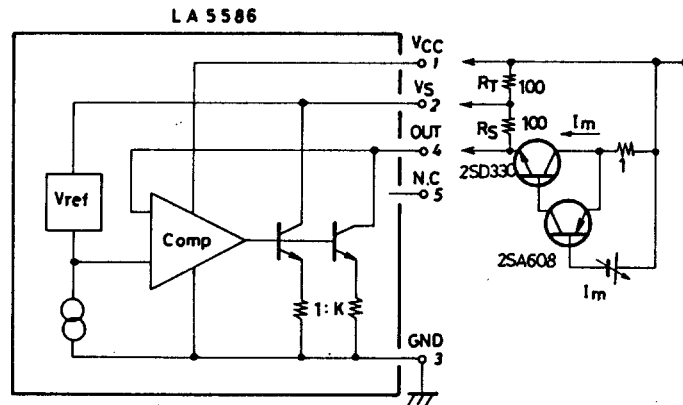
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Operating Characteristics at Ta = 25°C, See specified test circuit.

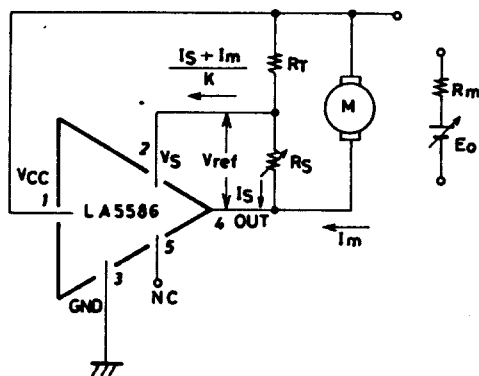
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Reference voltage	Vref	VCC=12V, Im=10mA	1.08	1.21	1.27	V
Quiescent flow-in current	Id	VCC=12V, Im=0		1.0	1.6	mA
Shunt ratio	K	VCC=12V, Im=50mA, 150mA	18	20	22	
Saturation voltage	Vsat	VCC=4.2V, RT=4.4Ω		0.94		V
Voltage of characteristic of reference voltage	$\frac{\Delta V_{ref}}{V_{ref}} / \Delta V_{CC}$	VCC=6.3 to 16V, Im=100mA		0.06		%/V
Voltage of characteristic of shunt ratio	$\frac{\Delta K}{K} / \Delta V_{CC}$	VCC=6.3 to 16V, Im=50mA, 150mA		0.1		%/V
Current characteristic of reference voltage	$\frac{\Delta V_{ref}}{V_{ref}} / \Delta I_m$	VCC=12V, Im=30 to 200mA		-0.01		%/mA
Current characteristic of shunt ratio	$\frac{\Delta K}{K} / \Delta I_m$	VCC=12V, Im=50mA, 100 to 150mA, 200mA		0.02		%/mA
Current characteristic of reference current	$\frac{\Delta I_s}{I_s} / \Delta V_{CC}$	VCC=6 to 16V, Im=0		0.1		%/V
Temperature characteristic of reference voltage	$\frac{\Delta V_{ref}}{V_{ref}} / \Delta T_a$	VCC=12V, Im=10mA, Ta=-20 to +80°C		-0.01		%/°C
Temperature characteristic of shunt ratio	$\frac{\Delta K}{K} / \Delta T_a$	VCC=12V, Im=50mA, 150mA, Ta=-20 to +80°C		-0.01		%/°C

Equivalent Circuit and Test Circuit



Unit (resistance: Ω)

Sample Application Circuit



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

From this equation,

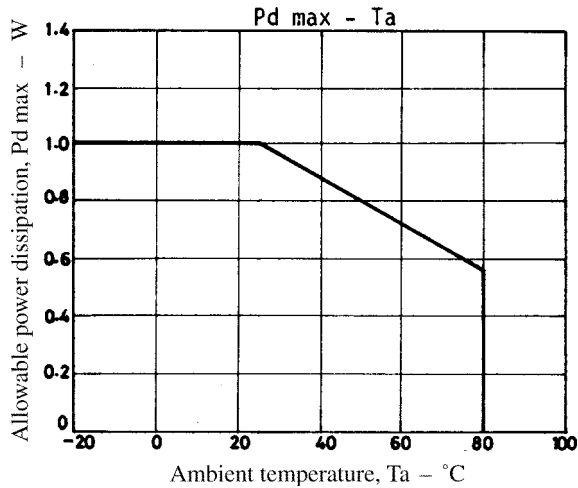
$$E_o = V_{ref} + R_T \left(1 + \frac{1}{K} \right) I_s + \left(\frac{R_T}{K} - R_m \right) I_m$$

Assuming $K \cdot R_m = R_T$

The number of revolutions is determined by

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

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



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