

**LA5588**

## General-Purpose Compact DC Motor Speed Controller

### Overview

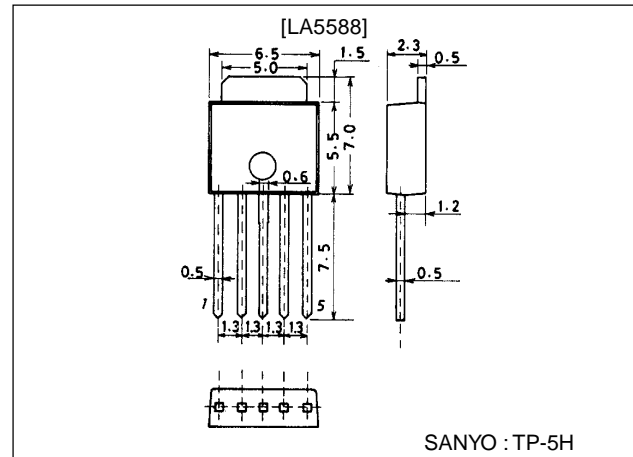
Suited for use in speed control of general-purpose compact DC motors for radio-cassette recorders, car stereos.

### Features and Functions

- Wide operating voltage range (4.5 to 18V).
- Possible to make the equipment compact because of minimum number of external parts required and small-sized package.
- Facilitates speed control.
- Easy to control rotational speed from low speed to high speed.
- On-chip kickback absorber.
- High stability in oscillation.
- Facilitates heat radiation because of the use of a fin.

### Package Dimensions

unit:mm

**3103-TP-5H**

### Specifications

#### Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_S$ max		20	V
Allowable power dissipation	$P_d$ max	Heat is radiated to Cu foil of 1cm <sup>2</sup> : 1.7W	1.0	W
Operating temperature	$T_{opr}$		-20 to +80	°C
Storage temperature	$T_{stg}$		-40 to +150	°C
Strating Current	$I_m$ max	Switch ON or lock	1.4	A

#### Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	$V_S$		3 to 18	V
Control Resistance	RA+RB		100	kΩ

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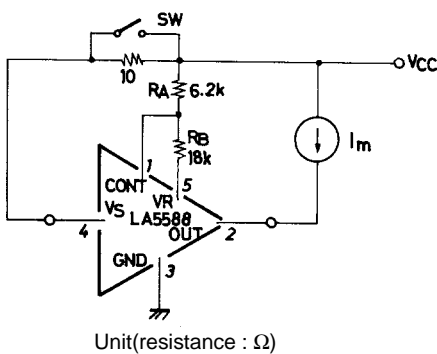
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Operating Characteristics at Ta = 25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Reference voltage	Vref	V <sub>S</sub> =8V, I <sub>m</sub> =100mA	1.1	1.2	1.3	V
2nd reference voltage	Vref'	V <sub>S</sub> =8V, I <sub>m</sub> =100mA	2.0	2.15	2.3	V
Quiescent flow-in current	I <sub>d</sub>	V <sub>S</sub> =8V, I <sub>m</sub> =0	0.5	1.73	2.5	mA
Shunt ratio	K	V <sub>S</sub> =8V, I <sub>m</sub> =0, 100mA	22	24	26	
Residual voltage	V(sat)	V <sub>S</sub> =3V, I <sub>m</sub> =200mA		1.1	1.4	V
Voltage characteristic of reference voltage	$\frac{\Delta V_{ref}}{V_{ref}} / \Delta V_S$	V <sub>S</sub> =3 to 18V, I <sub>m</sub> =100mA	-0.02	0	+0.02	%/V
Voltage characteristic of 2nd reference voltage	$\frac{\Delta V_{ref'}}{V_{ref'}} / \Delta V_S$	V <sub>S</sub> =3 to 18V, I <sub>m</sub> =100mA	-0.05	0.025	0.1	%/V
Voltage characteristic of quiescent flow-in current	$\frac{\Delta I_d}{I_d} / \Delta V_S$	V <sub>S</sub> =3 to 18V, I <sub>m</sub> =0		0.3	0.8	%/V
Voltage characteristic of shunt ratio	$\frac{\Delta K}{K} / \Delta V_S$	V <sub>S</sub> =3 to 18V, I <sub>m</sub> =0, 100mA	-0.8	-0.3	0.3	%/V
Current characteristic of reference voltage	$\frac{\Delta V_{ref}}{V_{ref}} / \Delta I_m$	V <sub>S</sub> =8V, I <sub>m</sub> =50 to 150mA	-0.002	0	0.002	%/mA
Current characteristic of 2nd reference voltage	$\frac{\Delta V_{ref'}}{V_{ref'}} / \Delta I_m$	V <sub>S</sub> =8V, I <sub>m</sub> =50 to 150mA	-0.1	-0.013	0.05	%/mA
Current characteristic of shunt ratio	$\frac{\Delta K}{K} / \Delta I_m$	V <sub>S</sub> =8V, I <sub>m</sub> =50mA, 100mA to 150mA, 200mA		0.008	0.025	%/mA
Temperature characteristic of reference voltage	$\frac{\Delta V_{ref}}{V_{ref}} / \Delta T_a$	V <sub>S</sub> =8V, I <sub>m</sub> =100mA, T <sub>a</sub> =20 to 80°C		0		%/°C
Temperature characteristic of 2nd reference voltage	$\frac{\Delta V_{ref'}}{V_{ref'}} / \Delta T_a$	V <sub>S</sub> =8V, I <sub>m</sub> =100mA, T <sub>a</sub> =20 to 80°C		0		%/°C
Temperature characteristic of Quiescent flow-in current	$\frac{\Delta I_d}{I_d} / \Delta T_a$	V <sub>S</sub> =8V, I <sub>m</sub> =100mA, T <sub>a</sub> =20 to 80°C		0.12		%/°C
Temperature characteristic of shunt ratio	$\frac{\Delta K}{K} / \Delta T_a$	V <sub>S</sub> =8V, I <sub>m</sub> =100mA, T <sub>a</sub> =20 to 80°C		0.02		%/°C

Test Circuit

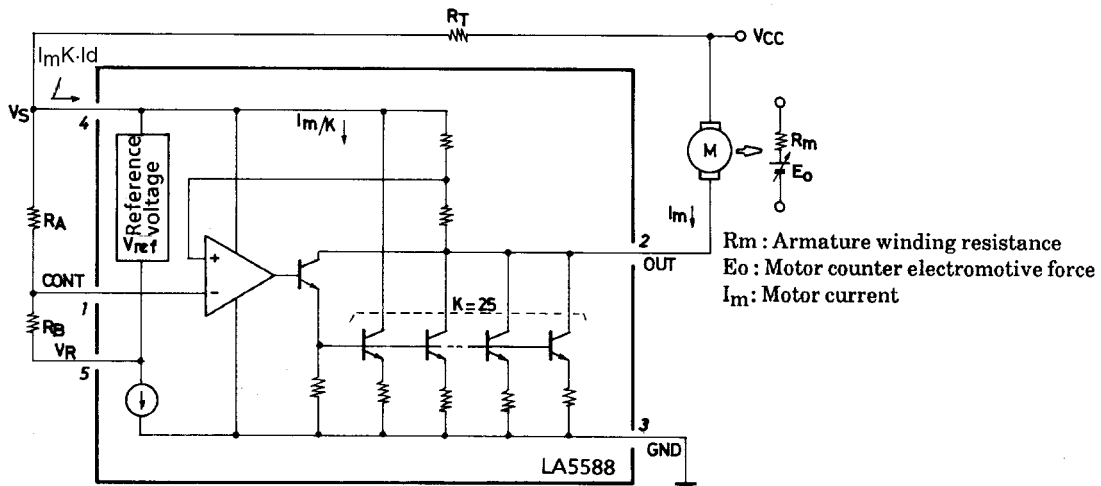


Unit(resistance : Ω)

- 1) Reference voltage (Vref)  
Measure the voltage across pins V<sub>S</sub> and V<sub>R</sub> with the SW ON.
- 2) 2nd reference voltage (Vref')  
Measure the voltage across pins V<sub>S</sub> and OUT with the SW ON.
- 3) Quiescent flow-in current (I<sub>d</sub>)  
Measure using the voltage across the resistor of 10Ω with the SW OFF.
- 4) Shunt ratio (K)  
With the SW OFF, measure I<sub>d</sub>, I<sub>d1</sub> at I<sub>m</sub>=I<sub>m1</sub> and I<sub>d</sub>, I<sub>d2</sub> at I<sub>m</sub>=I<sub>m2</sub> and calculate using the following formula.  

$$K = \frac{(I_{m2} - I_{m1})}{(I_{d2} - I_{d1})}$$
- 5) Residual voltage (V<sub>sat</sub>)  
With the SW OFF, measure the voltage across pins OUT and GND at V<sub>S</sub>=3V, I<sub>m</sub>=200mA.

Block Diagram



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