

MITSUBISHI <CONTROL / DRIVER IC>
M51660L

SERVO MOTOR CONTROL FOR RADIO CONTROL

DESCRIPTION

The M51660L is a semiconductor integrated circuit for use in servo motor control in radio control applications. Housed in a 14-pin molded plastic zig-zag inline package (ZIP), the M51660L contributes to the miniaturization of the set. The built-in voltage regulating circuit, and the differential comparator used in the comparator circuit provide the M51660L with extremely stable power supply voltage fluctuation characteristics and temperature change characteristics.

FEATURES

- Small circuit current 3.5mA typ.
 (When output is off)
- Excellent power supply and temperature stability
- Simple setting of dead band
- Includes protection circuit for continuous "H" level input

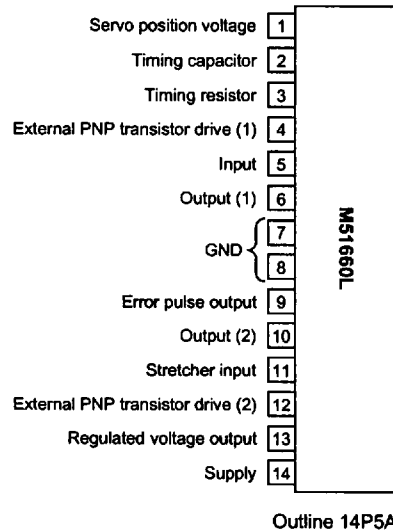
APPLICATION

Digital proportional system for radio control, and servo motor control circuit, etc.

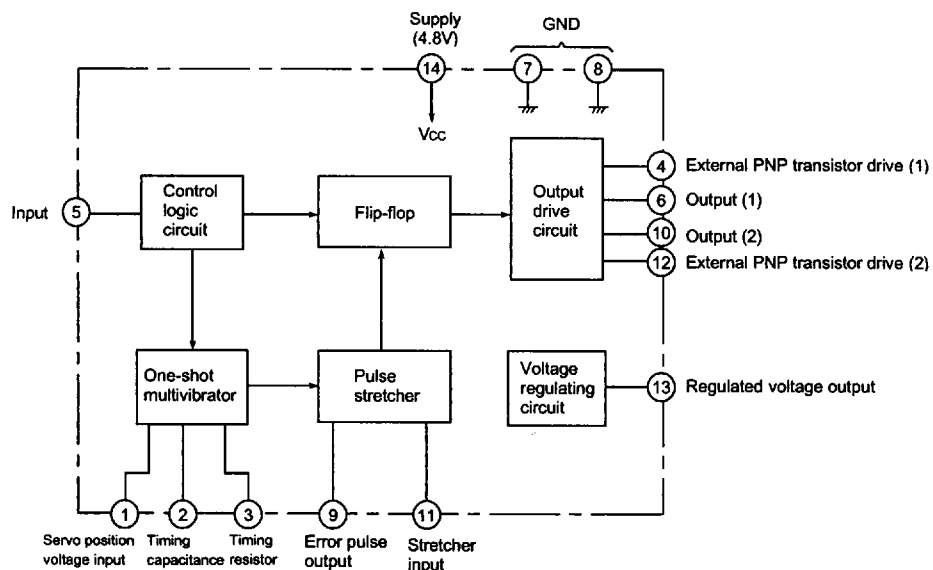
RECOMMENDED OPERATING CONDITIONS

- Supply voltage range 3.5 – 7V
- Rated supply voltage 4.8V

PIN CONFIGURATION (TOP VIEW)



BLOCK DIAGRAM



SERVO MOTOR CONTROL FOR RADIO CONTROL

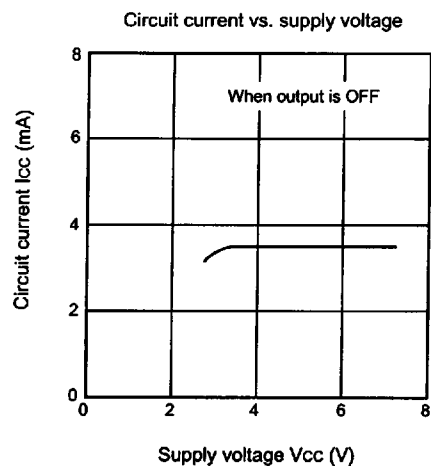
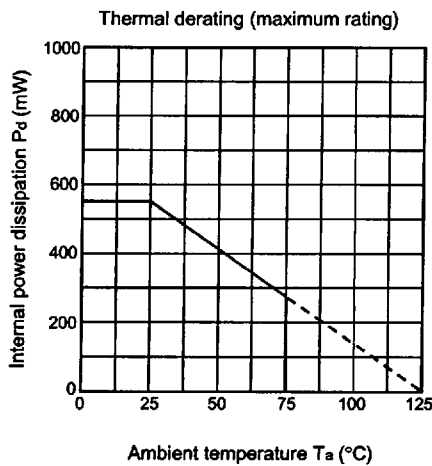
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Ratings	Unit
Vcc	Supply voltage		7.5	V
Io SINK	Output sink current		500	mA
Io SOURCE	Output source current		200	mA
Pa	Power dissipation		550	mW
Ke	Thermal derating range	Ta ≥ 25°C	5.5	mW/°C
Topr	Operating temperature		-20 – +75	°C
Tstg	Storage temperature range		-40 – +125	°C

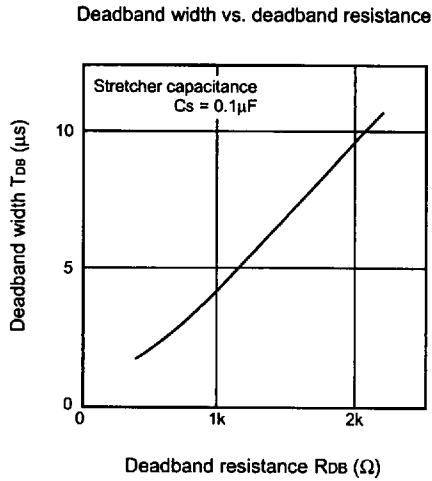
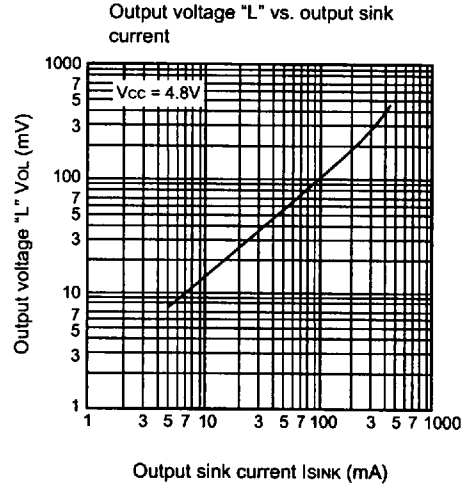
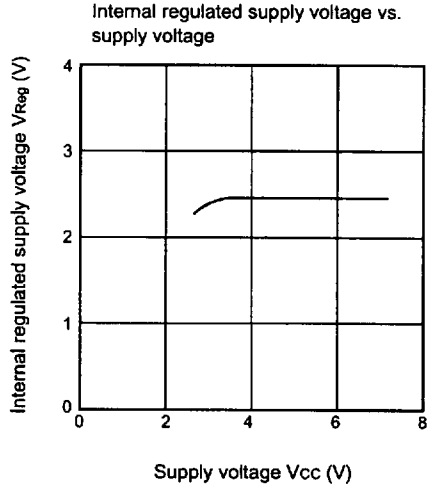
ELECTRICAL CHARACTERISTICS (Ta = 25°C and Vcc = 4.8V, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
Icc	Circuit current	When output is OFF		3.5	5	mA
		When output is ON		20		
VOL	Output voltage "L"	Io SINK = 100mA		0.1	0.2	V
		Io SINK = 400mA		0.4	0.7	
VOH	Output voltage "H"	Io SOURCE = 100mA	3.4	3.8		V
IPNP	External PNP transistor Drive current		30			mA
VReg	Internal regulated supply voltage		2.3	2.45	2.6	V
IReg	Internal regulated supply output current				3.0	mA
TDB	Minimum dead band width	Rdb = 510Ω, Cs = 0.1μF			1.5	μs

TYPICAL CHARACTERISTICS (Ta = 25°C, unless otherwise noted)

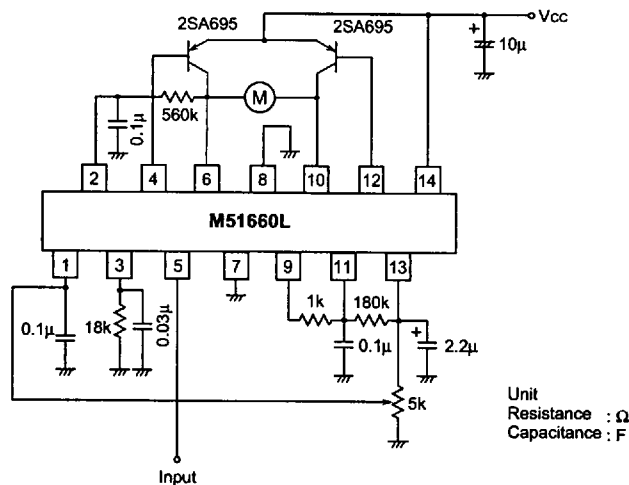


SERVO MOTOR CONTROL FOR RADIO CONTROL



APPLICATION EXAMPLE

Servo motor control circuit for radio-controlled



TECHNICAL APPLICATION NOTES**PIN DESCRIPTION**

- 1. Servo Position Voltage Input Pin (Pin ①)**
Connect the potentiometer terminal for position detection that follows the output axis. Compare this voltage with the voltage of the triangular wave of pin ② and drive the motor. A capacitor of approximately $0.1\mu\text{F}$ should be connected for noise prevention.
- 2. Timing Capacitor Pin (Pin ②)**
Connect a capacitor that will generate a triangular wave by constant current charging. A typical value is $0.1\mu\text{F}$. Also connect a feedback resistor from the output here.
- 3. Timing Resistor (Pin ③)**
Connect a resistor that will determine the value of the constant current of pin ②. A resistor of $18\text{k}\Omega$ will yield a current of 1.0mA . A capacitor of approximately $0.03\mu\text{F}$ should be connected in parallel with the resistor to increase stability.
- 4. External PNP Transistor Drive ① (Pin ④)**
Connect to the base of the external PNP transistor.
- 5. Input Pin (Pin ⑤)**
Operate with a positive pulse of peak value 3V or greater.
- 6. Output ① Pin (Pin ⑥)**
Connect a feedback resistor between this pin and pin ②.
- 7. Ground (pins ⑦ and ⑧)**
- 8. Error Pulse Output pin (Pin ⑨)**
Connect a resistor between this pin and pin ⑩. The dead band will change according to the value of this resistor.
- 9. Output ② pin (Pin ⑩)**
This is the output ② pin.
- 10. Stretcher Input Pin (Pin ⑪)**
Connect the capacitor and resistor of the pulse stretcher section.
- 11. External PNP Transistor Drive ② (Pin ⑫)**
Connect to the base of the external PNP transistor.
- 12. Regulated Voltage Output Pin (Pin ⑬)**
This is the output of the internal regulated supply voltage. Make connections from this pin to a potentiometer or pulse stretcher resistor. Connect a capacitor of approximately $2.2\mu\text{F}$ for stability.
- 13. Supply Voltage (Pin ⑭)**
The supply voltage exhibits uniform characteristics from 3.5V to 7V . Connect a capacitor of approximately $10\mu\text{F}$.