

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

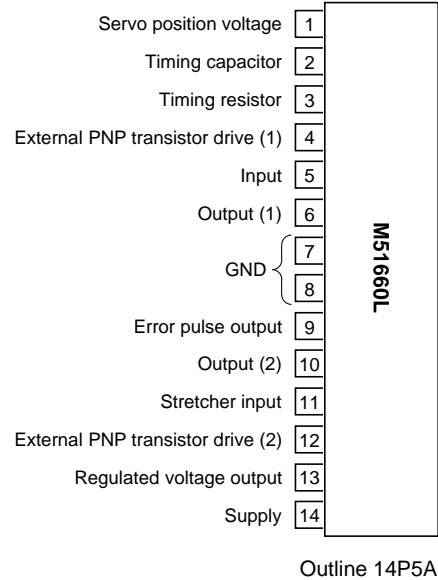
APPLICATION

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

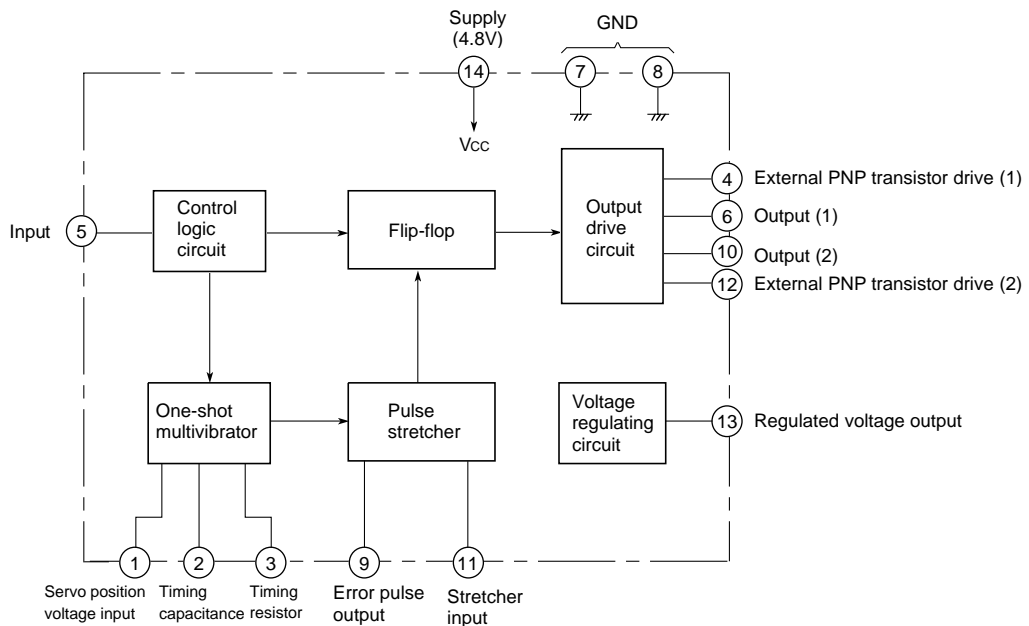
RECOMMENDED OPERATING CONDITIONS

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

PIN CONFIGURATION (TOP VIEW)



BLOCK DIAGRAM



SERVO MOTOR CONTROL FOR RADIO CONTROL

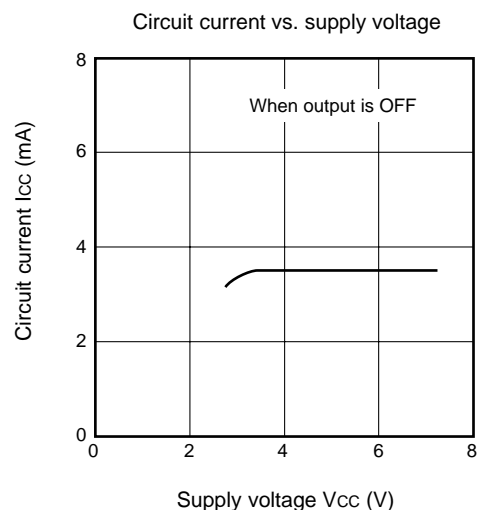
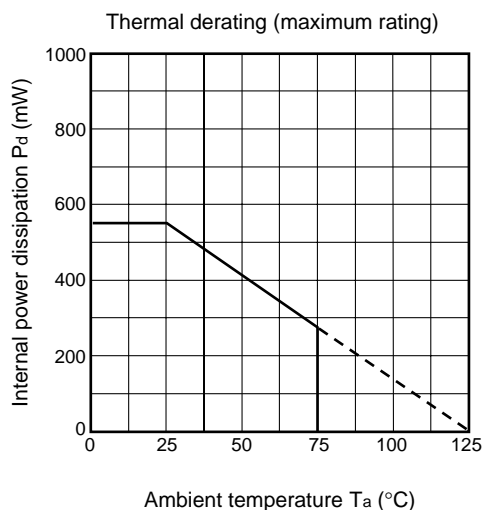
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C, unless otherwise noted)

| 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 |
| Pd | Power dissipation | | 550 | mW |
| Kθ | 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)

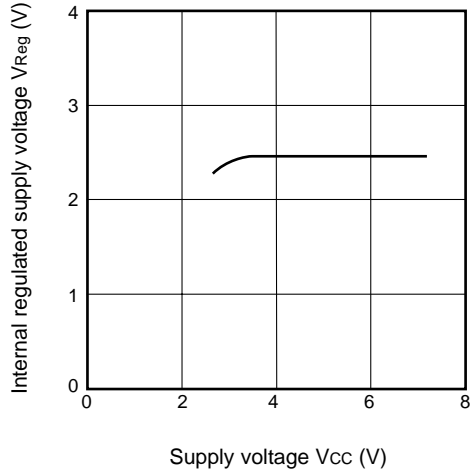
| Symbol | Parameter | Test conditions | Limits | | | Unit |
|--------|--|------------------------|--------|------|------|------|
| | | | Min. | Typ. | Max. | |
| ICC | Circuit current | When output is OFF | | 3.5 | 5 | mA |
| | | When output is ON | | 20 | | |
| VOL | Output voltage "L" | IO SINK = 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)

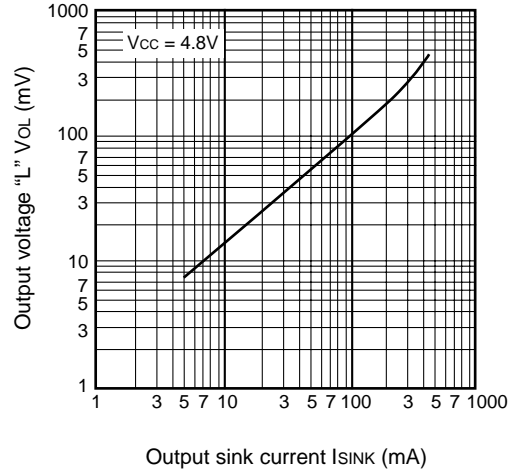


SERVO MOTOR CONTROL FOR RADIO CONTROL

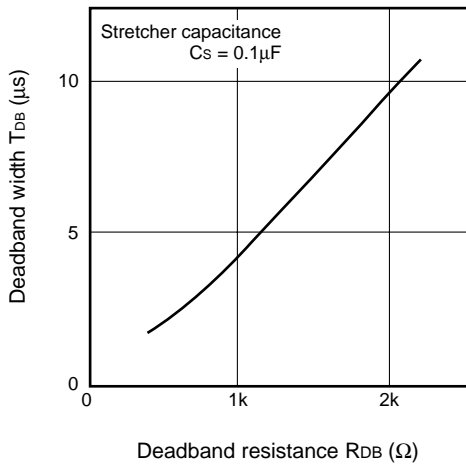
Internal regulated supply voltage vs. supply voltage



Output voltage "L" vs. output sink current

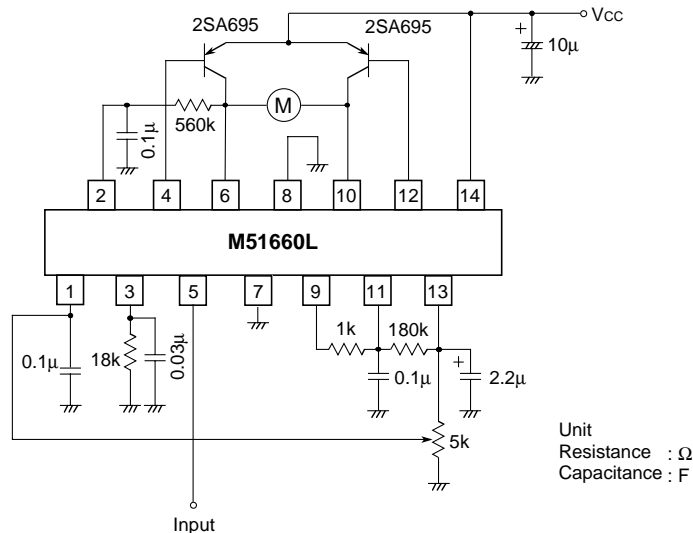


Deadband width vs. deadband resistance



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 μ 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 μ 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 18k Ω will yield a current of 1.0mA. A capacitor of approximately 0.03 μ 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 ⑪. 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 μ 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 μ F.
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