

Bipolar Driver IC

SI-7200M

■ Ratings

(Ta = 25°C)

Type No.	Supply voltage (V)		Output current (A)	Junction temperature (°C)	Operating ambient temperature (°C)	Storage temperature (°C)
	V _{CC1}	V _{CC2}	I _o	T _j	T _{op}	T _{stg}
SI-7200M	50	10	1.2	+125	-20 to +80	-30 to +100

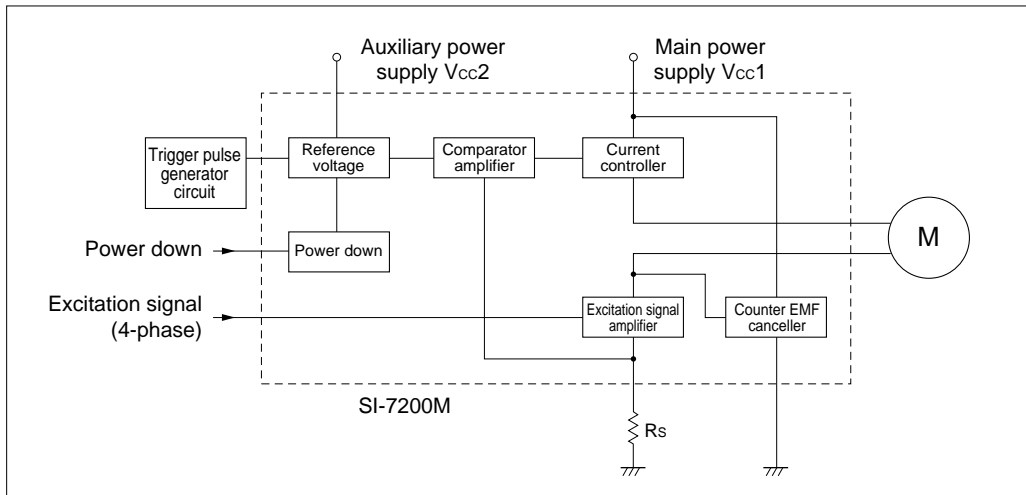
■ Characteristics

Type No.	Supply voltage (V)						*Output current (mA)						Excitation signal				Power down				Trigger pulse						V _{CC2} input current (mA)					
	V _{CC1}		V _{CC2}		I _o		I _{o1}		I _{o2} (Power down)		V _{IL} (ON)		V _{IH} (OFF)		I _L	V _{PD-L} (OFF)		V _{PD-H} (ON)		I _{PD-L}	I _{PD-H}	V _{trig}		T _{trig}		F _{trig}		I _{CC2}				
	min	typ	max	min	typ	max	min	max	min	typ	max	min	max	min	max	max	min	max	min	max	min	max	min	max	min	typ		typ	max	max		
SI-7200M	15	30	40	4.5	5	5.5	200	1000	390	440	490	235	275	315	0	0.5	V _{CC2} -0.4	V _{CC2} +2	1.6	0	0.4	2	V _{CC2}	1	2	3.5	V _{CC2}	1.0	2.0	20	25	45

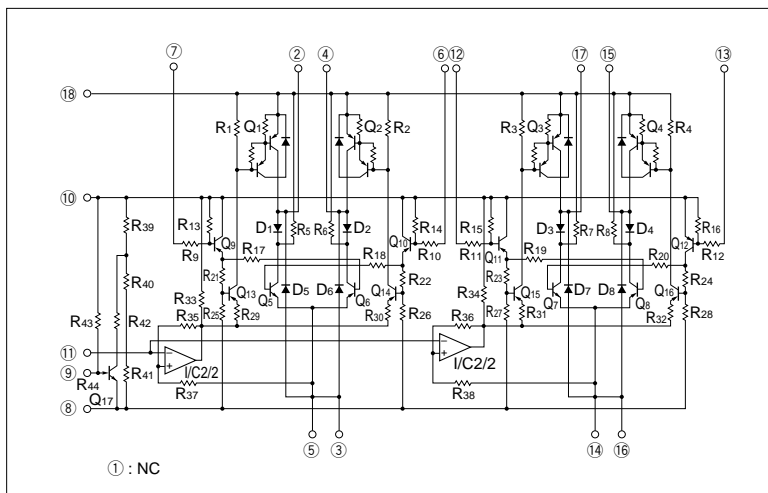
* I_{o1} : Measurement conditions shown in the external connection diagram

I_{o2} : Measurement conditions shown in the external connection diagram with pin 9 open

■ Block diagram

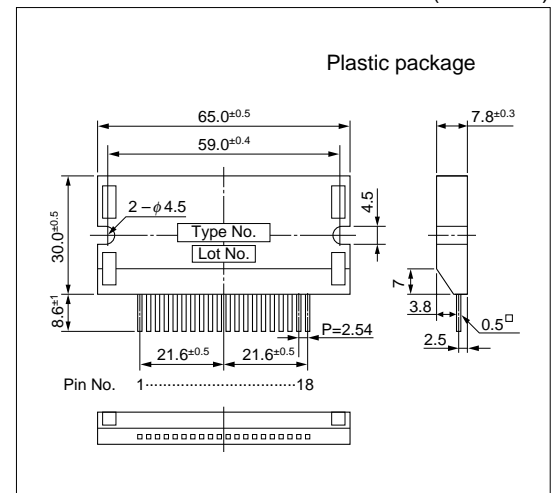


■ Equivalent circuit diagram



■ External dimensions

(Unit: mm)



Application Note

■ Determining the output current I_o (motor coil current)

The output current, I_o is fixed by the following circuit elements:

R_s : Current detection resistor

V_{CC-2} : Auxiliary supply voltage

Based on the specifications of SI-7200M, its output current I_o can be seen as:

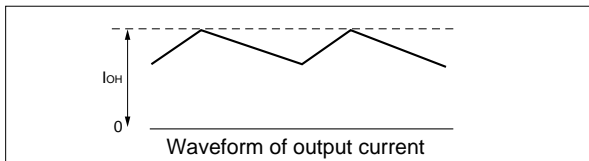
I_{o1} (effective value): 390 to 490mA

To compute I_o when different values are used for R_s and V_{CC-2} , use the approximation formula below or the graph at the right. The maximum ripple value I_{OH} of the output current waveform is within the $I_{OH(MIN)} \sim I_{OH(MAX)}$ range shown by the following formulas:

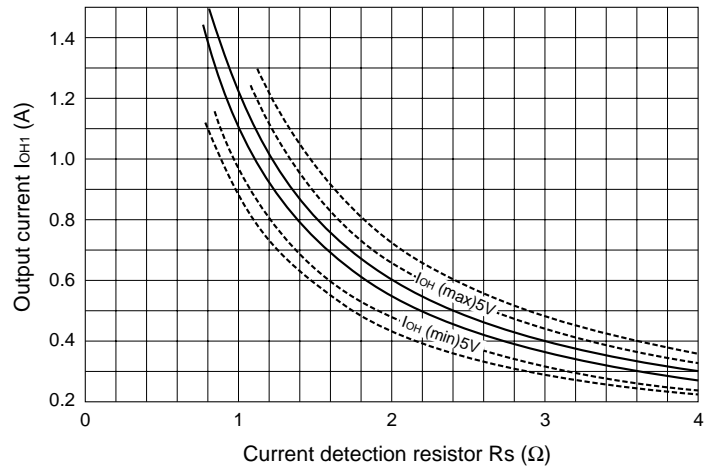
$$I_{OH(max)} \doteq \frac{1}{R_s} (0.247 \times V_{CC-2} - 0.03) \text{ [A]}$$

$$I_{OH(min)} \doteq \frac{1}{R_s} (0.225 \times V_{CC-2} - 0.024) \text{ [A]}$$

To fine-adjust the output current, connect a 20K Ω variable resistor across pins 8 and 11.



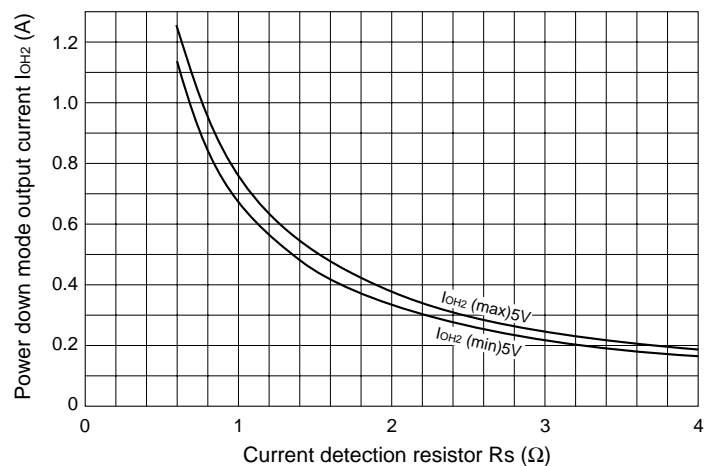
Output current vs. Current detection resistor



■ Power down mode

The SI-7200M can be operated in power down mode. By pulling up pin 9 to high level I_o can be reduced to 60% of the motor rotation current.

Power down output current vs. Current detection resistor



■ Operating voltage range

The SI-7200M can be used in applications (low coil resistance R_L and high supply voltage V_{CC}) where SI-7200E and SI-7230E cannot be used.

SI-7200M

Application Note

Thermal design

Procedures for thermal design of SI-7200M are shown below.

(1) As shown in the figure below, the supply current I_{CC} and the output current I_o are measured at the maximum level of the supply voltage V_{CC} . However, the motor is in holding mode at the 2-phase excitation.

(2) From the above measurements, the internal power dissipation (2-phase) of the hybrid IC can be obtained through the following formula.

$$P_D = V_{CC} \times I_{CC} - 2I_o^2 (R_L + R_s)$$

Where R_L : Resistance of the motor coil between pins 2 and 4 and pins 15 and 17

Shown in the lower graph is a sample calculation of P_D vs. I_o .

(3) The heatsink area corresponding to the ambient temperature can be obtained from the SI-7200M derating curve shown in the right.

(4) Verify that the temperature of the aluminum base plate of the hybrid IC or adjacent heatsink is below 85°C (equivalent to max. ambient temperature) when operating under actual load conditions.

* For details on thermal design, refer to the technical data book

