查询SI-7200M供应商 捷多邦，专业PCB打样工厂，24小时加急出货

Bipolar Driver IC

SI-7200M

■ Ratings

(Ta = 25°C)

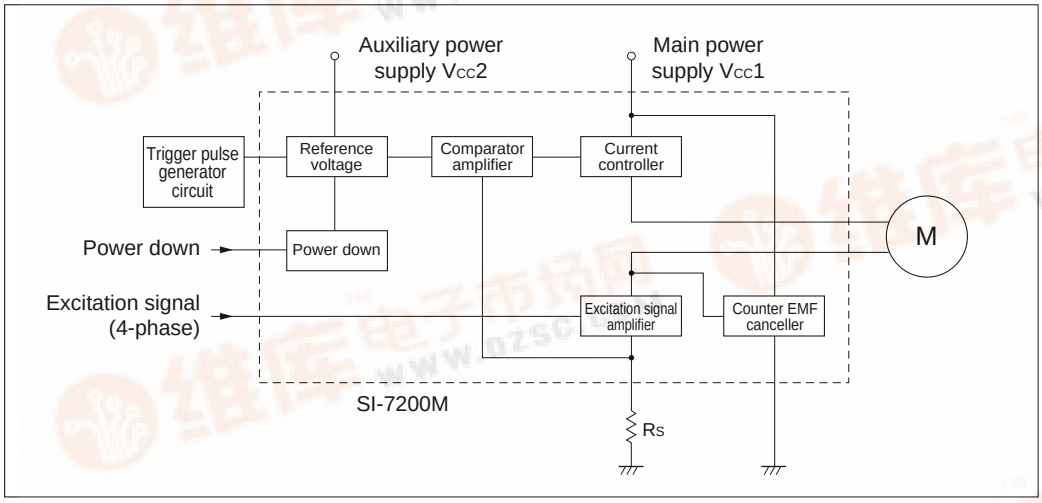
Absolute maximum rating / Type No.	Supply voltage (V) V_{CC1}	Supply voltage (V) V_{CC2}	Output current (A) I_O	Junction temperature (°C) T_j	Operating ambient temperature (°C) T_{op}	Storage temperature (°C) T_{stg}
SI-7200M	50	10	1.2	+125	–20 to +80	–30 to +100

■ Characteristics

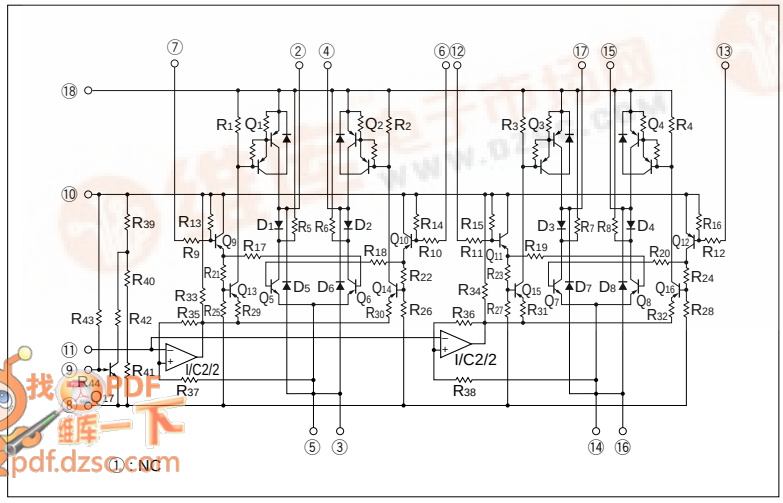
Electrical characteristics / Type No.	Supply voltage (V) V_{CC1} min	typ	max	V_{CC2} min	typ	max	*Output current (mA) I_O min	max	I_{O1} min	typ	max	I_{O2}(Power down) min	typ	max	Excitation signal Input voltage (V) V_{IL}(ON)	V_{IH}(OFF)	Input current (mA) I_{IL}	Power down Input voltage (V) V_{PD-L}(OFF)	V_{PD-H}(ON)	Input current (mA) I_{PD-L}	I_{PD-H}	Trigger pulse Input voltage (V) Vtrig	Input time (µs) Ttrig	Frequency (kHz) Ftrig	V_{CC2} input current (mA) I_{CC2}
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

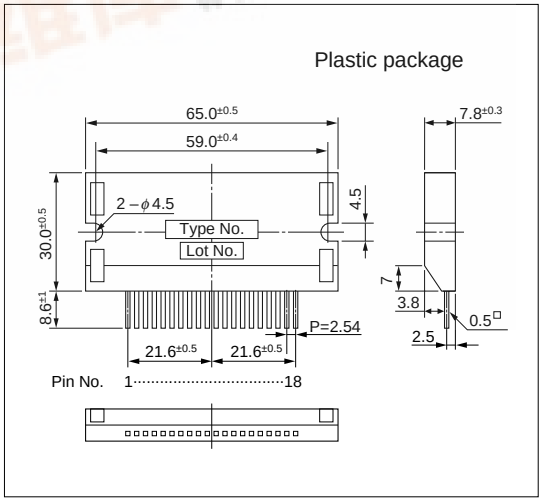


■ Equivalent circuit diagram

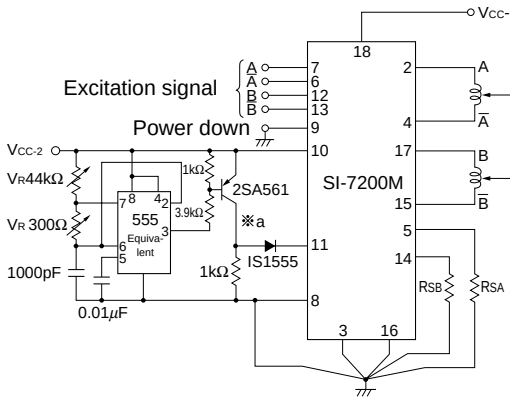


■ External dimensions

(Unit: mm)



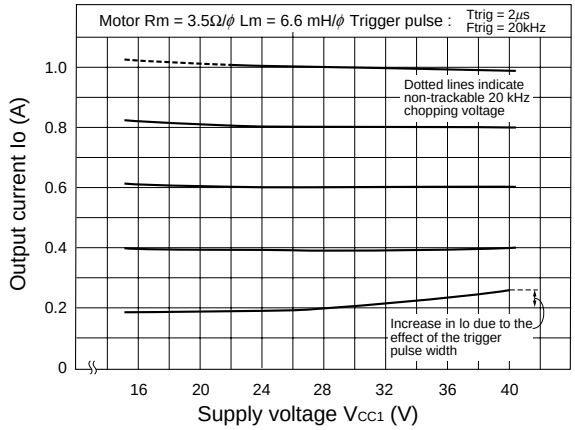
■ External connection diagram



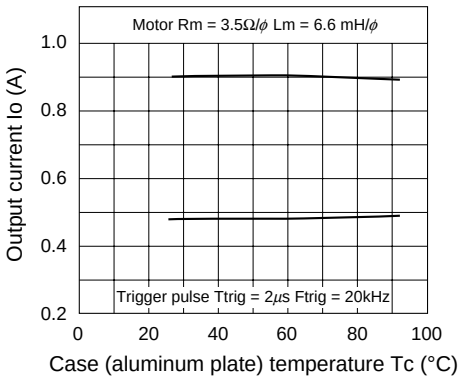
Power down pin : Active high
Excitation signal pin : Active low

I_{O1}, I_{O2} measurement conditions
Pin 1 : NC
V_{CC-1} = 35V
V_{CC-2} = 5V
R_{SA}, R_{SB} = 2.4Ω
SPM : stepper motor
Rating : R = 6.3Ω
L = 15.5mH
at 20°C
*a : Trigger pulse for output current control
Pulse width : 2μs
Frequency : 20 kHz

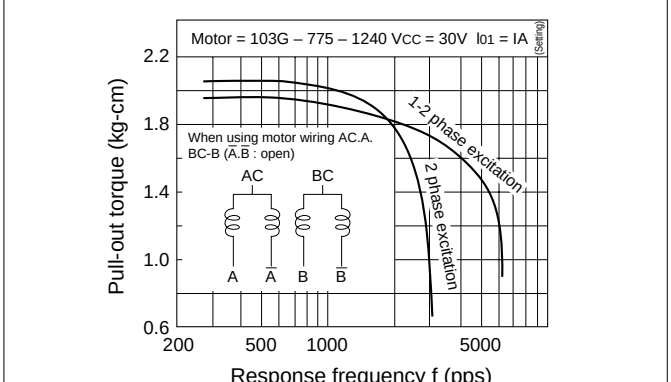
■ Supply voltage and output current



■ Output current and temperature



■ Torque and response frequency



Application Note

■ Determining the output current Io (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:

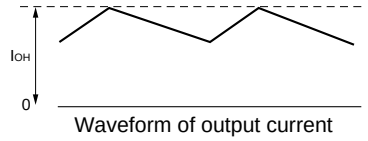
I_{O1} (effective value): 390 to 490mA

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 $I_{OH(MIN)}$ ~ $I_{OH(MAX)}$ range shown by the following formulas:

$$I_{OH(max)} \fallingdotseq \frac{1}{R_S} \quad (0.247 \times V_{CC-2} - 0.03)\ [A]$$

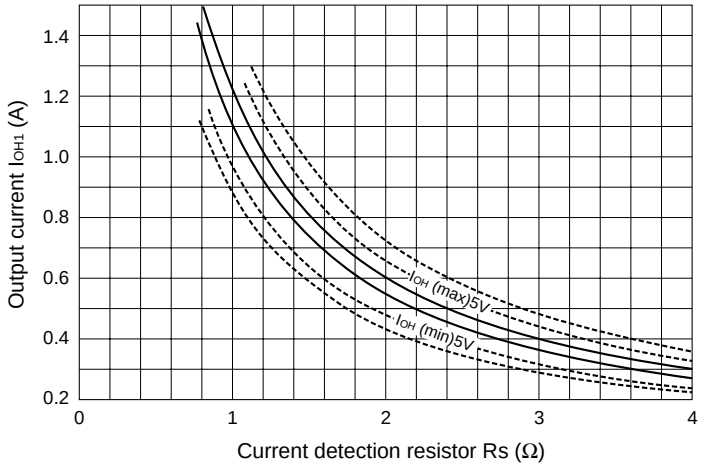
$$I_{OH(min)} \fallingdotseq \frac{1}{R_S} \quad (0.225 \times V_{CC-2} - 0.024)\ [A]$$

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



Waveform of output current

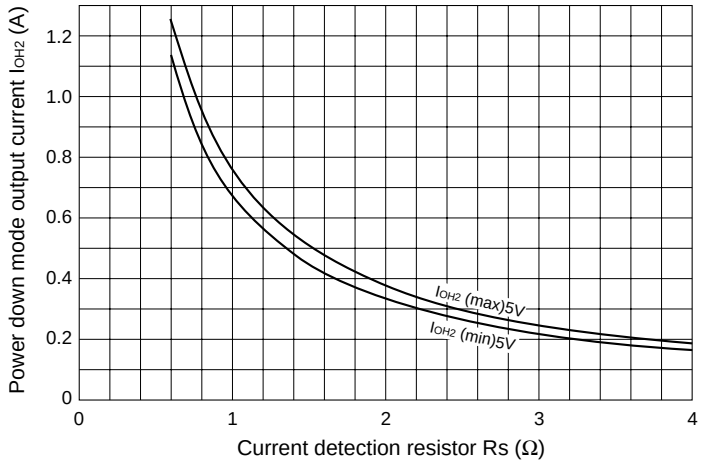
Output current vs. Current detection resistor



■ 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.

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.

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

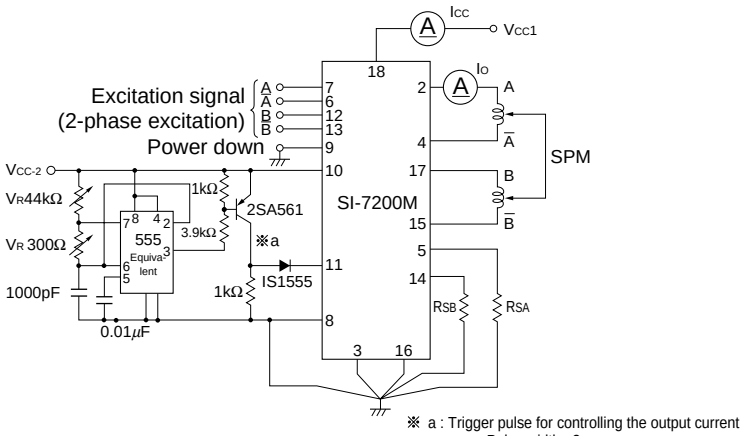
Where R_L: Resistance of the motor coil between pins 2 and 4 and pins 15 and 17

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.

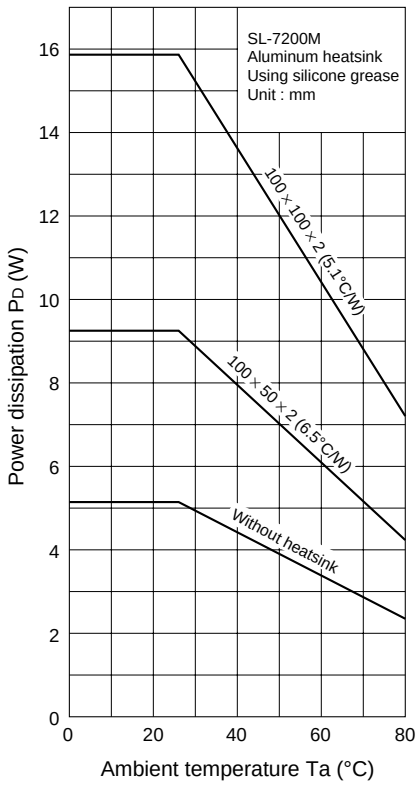
Method for measuring the SI-7200M current



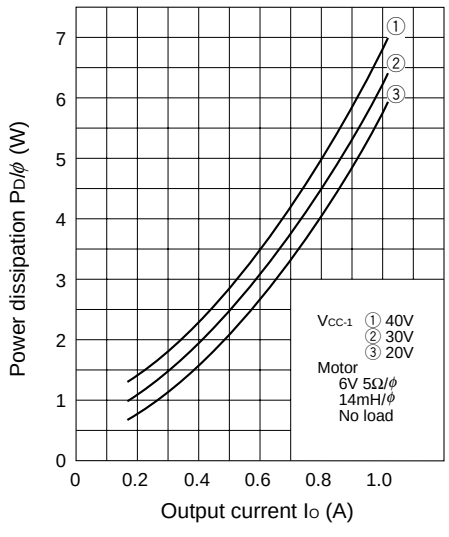
※ a : Trigger pulse for controlling the output current
Pulse width : 2μs
Frequency : 20 kHz

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

SI-7200M Derating curve



SI-7200M Power dissipation vs. Output current



SI-7200M, SI-7230M, SI-7115B, SI-7300A, SI-7330A, SI-7500A and SI-7502

Handling Precautions

(Note: The SI-7502 is applicable for item (2) only.)

For details, refer to the relevant product specifications.

(1) Tightening torque:

The torque to be applied in tightening screws when mounting the IC on a heatsink should be below 49N•m.

(2) Solvent:

Do not use the following solvents:

Substances that dissolve the package	Chlorine-based solvents	: Trichloroethylene, Trichloroethane, etc.
	Aromatic hydrogen compounds	: Benzene, Toluene, Xylene, etc.
	Ketone and Acetone group solvents	
Substances that weaken the package	Gasoline, Benzine and Kerosene	

(3) Silicone grease:

The silicone grease to be used between the aluminum base plate of the hybrid IC and the heatsink should be any of the following:

- G-746 SHINETSU CHEMICAL INDUSTRIES CO., LTD.
- YG6260 TOSHIBA SILICONE CO., LTD.
- SC102 DOW CORNING TORAY SILICONE CO., LTD.

Please pay sufficient attention in selecting silicone grease since oil in some grease may penetrate the product, which will result in an extremely short product life.

Others

- Resistance against radiation
  Resistance against radiation was not considered in the development of these ICs because it is assumed that they will be used in ordinary environment.