



## TC618CS Single Channel DC Motor Driver

### TC618CS Summary

This product provides an integrated brush DC motor drive solution for battery powered toys, low-voltage or battery powered motion control applications. The H-bridge drive circuit designed with n-channel and p-channel power MOSFET is integrated in the circuit, which is suitable for driving a winding of a brush DC motor or a stepping motor. The circuit has a wide working voltage range (from 2V to 9.6V), the maximum continuous output current reaches 2.1A, and the maximum peak output current reaches 3.5A.

### TC618CS Characteristic

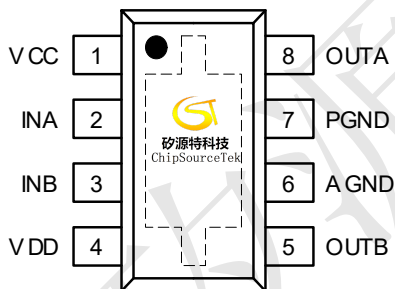
- Single channel built-in power MOS full bridge drive.
- Drive forward,backward,stop and brake function.
- Built in hysteresis thermal effect OTP.
- Low on resistance( $0.26\ \Omega$ )
- The Max continuous output current can reach 2.1A,and the peak current is 3.5A
- No need for peripheral filter capacitor
- ESOP-8 Packing.

### TC618CS Application

- Toy motor drive

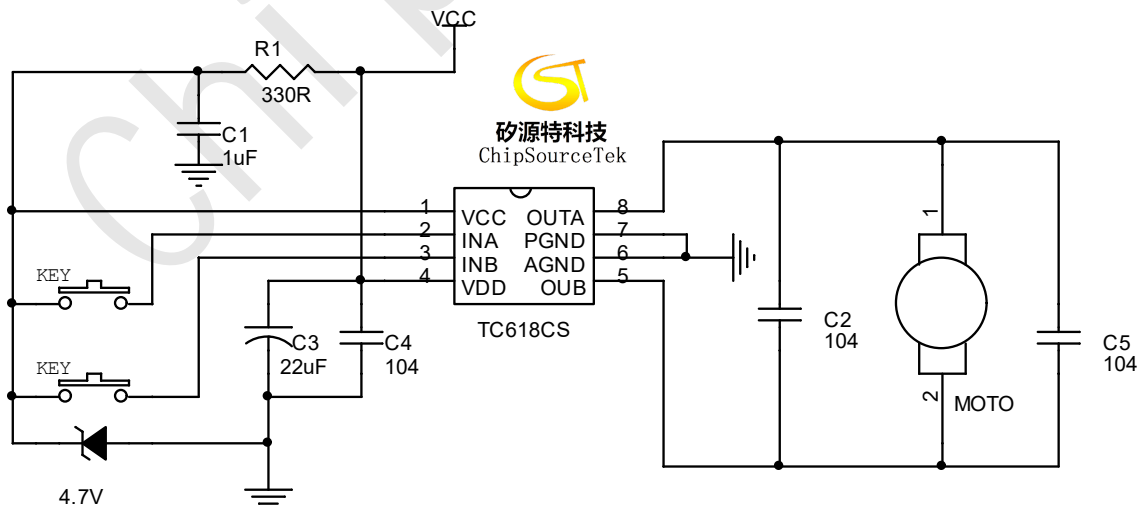
### TC618CS Packing

- ESOP-8



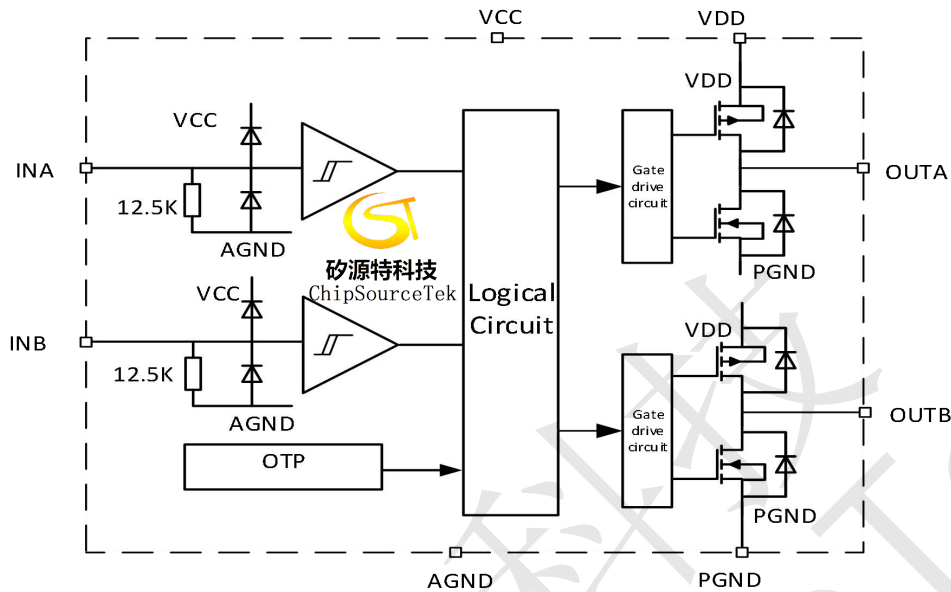
| PIN NO | Pin Name | I/O | Function                              |
|--------|----------|-----|---------------------------------------|
| 1      | VCC      | --  | Logic control power terminal          |
| 2      | INA      | I   | Forward logic input                   |
| 3      | INB      | I   | Reverse logic input                   |
| 4      | VDD      | --  | Power supply terminal                 |
| 5      | OUTB     | O   | Reverse output                        |
| 6      | AGND     | --  | Logic control circuit ground terminal |
| 7      | PGND     | --  | Output power tube ground terminal     |
| 8      | OUTA     | O   | Forward rotation output               |

### TC618CS Typical Application Circuit





## TC618CS Block Diagram



## TC618CS Absolute Maximum Rating

| Rating                            | Symbol        | Value   | Unit               |                             |
|-----------------------------------|---------------|---------|--------------------|-----------------------------|
| Logic supply voltage              | VCC           | 7       | V                  |                             |
| Power supply voltage              | VDD           | 11      | V                  |                             |
| Power                             | Pd            | ESOP-8  | 0.96               | W                           |
| Thermal resistance                | $\theta_{JA}$ | ESOP-8  | 130                | $^{\circ}\text{C}/\text{W}$ |
| Operating temperature             | Topr          | -20~85  | $^{\circ}\text{C}$ |                             |
| Junction temperature              | Tj            | 150     | $^{\circ}\text{C}$ |                             |
| Storage temperature               | Tstg          | -55~150 | $^{\circ}\text{C}$ |                             |
| Welding temperature               |               | 350~370 | $^{\circ}\text{C}$ |                             |
| Peak current of output            | Iop           | 3.5     | A                  |                             |
| Maximum continuous output current | Ioc           | 2.1     | A                  |                             |

## TC618CS Recommended working conditions

| Rating                             | Symbol | Value      | Unit |
|------------------------------------|--------|------------|------|
| Power supply voltage               | VDD    | 2.0~9.6    | V    |
| Logic supply voltage               | VCC    | 2~5V       | V    |
| Control input voltage              | VIN    | 0~5        | V    |
| Forward and reverse output current | Iout   | -2100~2100 | mA   |



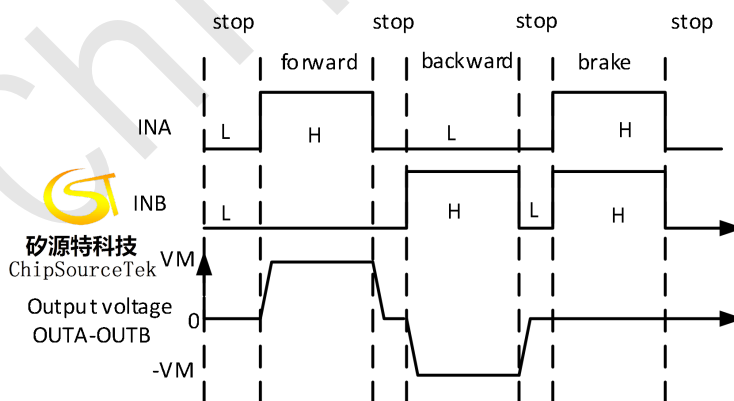
## TC618CS Electrical Characteristics

| Characteristics             | Symbol | Conditions      | MIN | TYPE | MAX | Unit |
|-----------------------------|--------|-----------------|-----|------|-----|------|
| Circuit turn-off current    | ICCST  | INA=INB=1       | —   | 0    | 10  | uA   |
|                             | IDDST  |                 | —   | 0    | 10  | uA   |
| Operating current           | ICC    | INA=H, INB=L or | —   | 85   | —   | uA   |
|                             | IDD    | INA=L, INB=H    | —   | 140  | —   | uA   |
| High level input voltage    | VINH   |                 | 2.0 | —    | —   | V    |
| Low level input voltage     | VINL   |                 | —   | —    | 0.8 | V    |
| High level input current    | IINH   | VIN=3V          | —   | 250  | 400 | uA   |
| Low level input current     | IINL   | VIN=0V          | -1  | 0    | —   | uA   |
| Pull down resistance        | RIN    |                 | —   | 12   | —   | KΩ   |
| Output conduction impedance | RON    | Io=±200mA       | —   | 0.26 | 0.6 | Ω    |

## TC618CS Input / output logic table

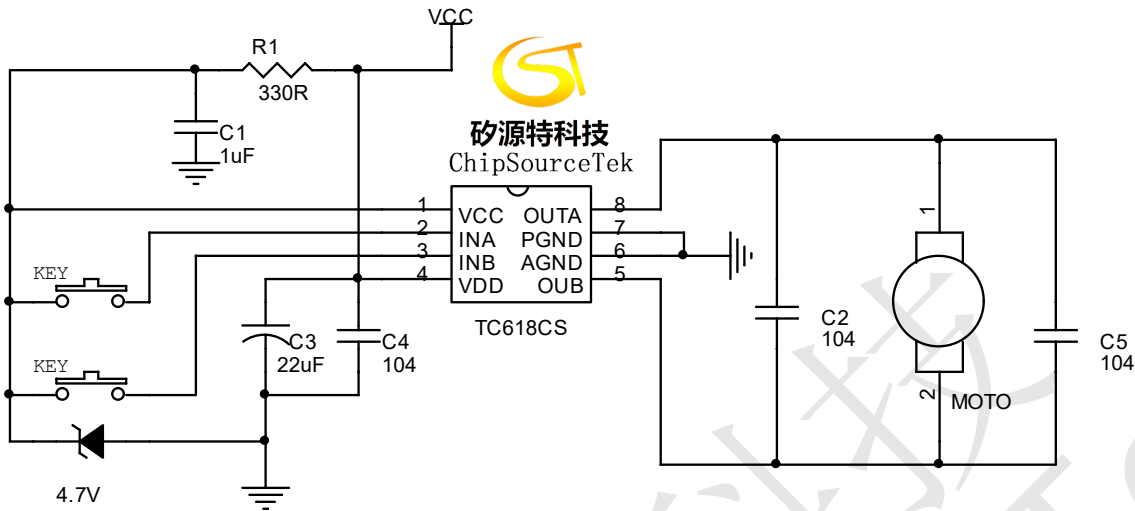
| INPUT  |        | OUTPUT  |         | Mode           |
|--------|--------|---------|---------|----------------|
| INA1/2 | INB1/2 | OUTA1/2 | OUTB1/2 |                |
| L      | L      | Hi-Z    | Hi-Z    | Standby status |
| H      | L      | H       | L       | Forward        |
| L      | H      | L       | H       | Backward       |
| H      | H      | L       | L       | Brake          |

## TC618CS Input / output waveform





## TC618CS Application reference circuit and PCB wiring guidance



Note: In the figure, the C2 capacitor is placed on the PCB board, which can be used or omitted depending on the interference degree of the motor used. Of course, the plug-in 104 connected to the motor cannot be omitted. In different applications, only one C3 and C4 can be installed: in 3V applications, it is recommended to use at least one 1uF VDD capacitor; At least one 4.7uF is used in 4.5V applications; At least one 10uF is used in 6V applications; Use at least one 22uF in 9V applications. All of them are placed close to the VDD pin of the IC using the chip capacitor, and the connection between the negative pole of the capacitor and the GND end of the IC should also be as short as possible. That is, although the capacitance is close, the wiring and routing are far away. VDD connection shall be as short as possible. Otherwise, VDD shall have its own capacitance. In addition, when using a large electrolytic plug-in capacitor, it is recommended to add another 100nF chip capacitor to the VDD pin.

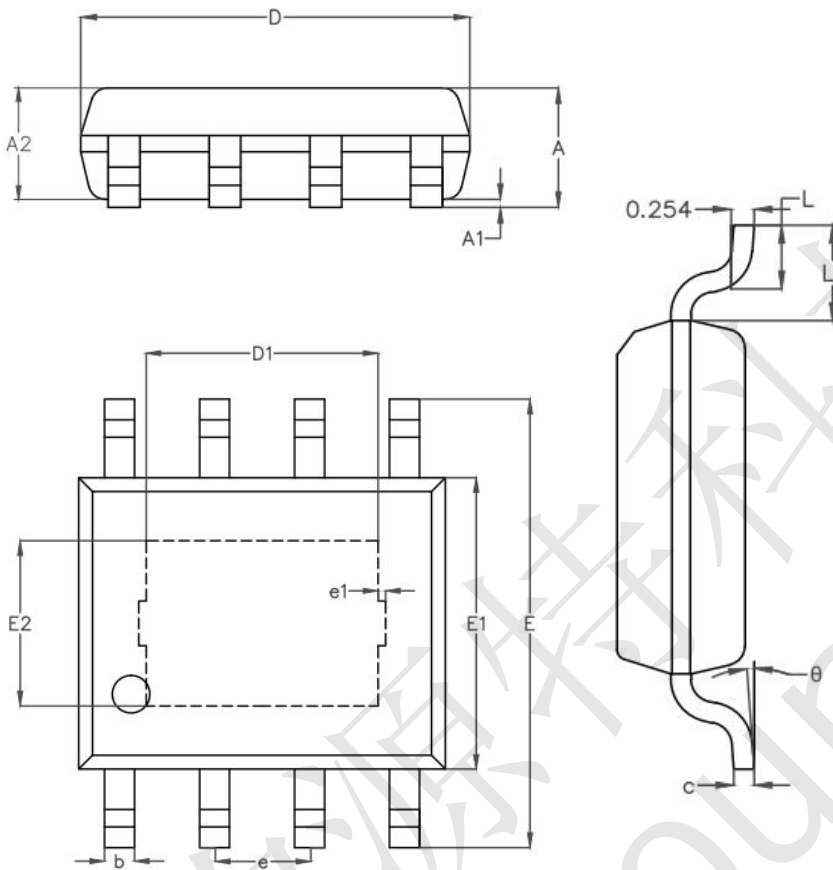
### Precautions for chip use

1. The above recommended circuits and parameters are only applicable to ordinary remote control car toys. When using TC618CS for other toys and motor drives, please use them according to the actual situation.
2. The continuous current drive capability is affected by the packaging form, VDD, VCC, chip difference, ambient temperature, PCB material and thickness and other factors. The parameters given in the specification are for reference only. In actual use, please consider a certain margin according to the product.
3. TC618CS is designed and manufactured by MOS process and is sensitive to static electricity. It is required to pay attention to anti-static measures in the whole process of packaging, transportation, processing and production.
4. The locked rotor current value of the motor should not exceed the peak current of the chip by 3.5A. Exceeding this value is likely to cause the chip to burn.
5. The reverse connection of power supply will cause permanent damage to the chip, and in serious cases, it will cause the plastic packaging material to smoke. It can be considered to add Schottky diodes to VDD to prevent reverse connection.



## TC618CS Package dimension drawing

➤ ESOP-8



| SYMBOL   | MILLIMETER |      |      |
|----------|------------|------|------|
|          | MIN        | NOM  | MAX  |
| A        | 1.38       | 1.50 | 1.60 |
| A1       | 0.03       | 0.10 | 0.15 |
| A2       | 1.35       | 1.40 | 1.45 |
| A3       | 0.55       | 0.60 | 0.65 |
| b        | 0.35       | 0.40 | 0.45 |
| c        | 0.19       | 0.22 | 0.25 |
| D        | 4.85       | 4.90 | 4.95 |
| D1       | 3.07       | 3.17 | 3.27 |
| E        | 5.80       | 6.00 | 6.20 |
| E1       | 3.85       | 3.90 | 3.95 |
| E2       | 2.18       | 2.28 | 2.38 |
| e        | 1.22       | 1.27 | 1.32 |
| e1       | 0.05       | 0.10 | 0.15 |
| L        | 0.45       | 0.60 | 0.75 |
| L1       | 1.00       | 1.05 | 1.10 |
| $\theta$ | 0°         | 4°   | 8°   |