

HMSK4361 Large Current Pulse Width Modulation Amplifier Brushless Motor Driver

1 Features of HMSK4361 Large Current Pulse Width Modulation Amplifier Brushless Motor Driver

- Replacement with MSK4361 of MSK Company
- Continuous output current: 30A
- Motor power voltage: 75V
- Torque control of four-quadrant
- 60/120 phase selection
- Inhibition function



Fig 1 HMSK4361 External view

2 Applications of HMSK4361 Large Current Pulse Width Modulation Amplifier Brushless Motor Driver

- Three-phase brushless motor drive control
- Driven reaction load
- Servo control

3 Description of HMSK4361 Large Current Pulse Width Modulation Amplifier Brushless Motor Driver

HMSK4361 is a exclusive module for brushless DC motor, module inside have the integrated three-phase MOSFET bridge, the MOSFET bridge can provide the maximum power supply voltage is 75V, the maximum output current is 30A. The module is consist of HALL sensor interface circuit, PWM, power amplifier, current detection and current feedback interface and so on.

This series of products are made of thick film hybrid integrated process, metal sealed package. Product design and manufacturing meet the requirements of MIL-STD and detailed specifications, the quality level is H-class.

4 Technical Specifications of HMSK4361 Large Current Pulse Width Modulation Amplifier Brushless Motor Driver

Table 2 Electrical Characteristic (Complete according to the standard)

| No. | Characteristic | (Unless other condition, V _{CC} =15V±5% V _S =-15V±5%, V _S =28V±5% -55°C≤T _c ≤125°C) | HMSK4361 | | | Unit |
|-----|---|--|----------|------|------|------|
| | | | A group | min | max | |
| 1 | +15V power current/I _{CC} | Speed control GND, empty load, Effective HALL signal, frequency:40Hz, V _H ≥3V, V _L ≤0.8V | 1 | - | 90 | mA |
| | -15V power current /I _{EE} | | 1 | - | 40 | |
| 2 | Clock frequency/f _{CP} | Effective HALL signal, frequency:40Hz, V _H ≥3V, V _L ≤0.8V | 4\5\6 | 18.7 | 25.3 | KHZ |
| 3 | Reference voltage/V _{REF} | RREF=430Ω | 1\2\3 | 5.82 | 6.57 | V |
| 4 | Control voltage transconductance/g _m | Effective HALL signal, frequency:40Hz, efficient current control setup | 4 | 2.4 | 3.6 | A/V |
| 5 | Bias current/I _{OO} | Effective HALL signal, frequency:40Hz, V _H ≥3V, V _L ≤0.8V | 1 | -100 | 100 | MA |
| 6 | Current monitoring slope/K | Effective HALL signal, frequency:40Hz, effective current control setup | 4 | 0.25 | 0.45 | V/A |

5 Pin Designations of HMSK4361 Large Current Pulse Width Modulation Amplifier Brushless Motor Driver

Permutation of leading-out terminal is according to Figure 2, it's a platform view.

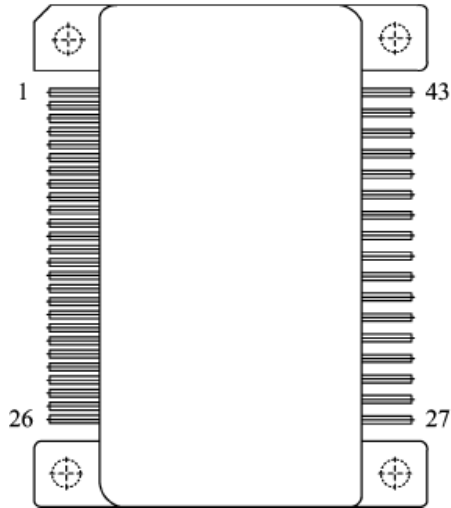


Figure 2 Platform

Table 3 Pin Designations

| Pin | Symbol | Designation | Pin | Symbol | Designation |
|-----|------------------|--------------------------|-----|------------|----------------------------|
| 1 | V_{REF} | Reference voltage output | 23 | GND | Ground |
| 2 | $IN_{HALL A}$ | A phase HALL signal | 24 | NC | NULL |
| 3 | $IN_{HALL B}$ | B phase HALL signal | 25 | NC | NULL |
| 4 | $IN_{HALL C}$ | C phase HALL signal | 26 | GND_L | Detection ground |
| 5 | $CON_{60/60/12}$ | Phase control terminal | 27 | GND_P | Power ground |
| 6 | CON_{BRAKE} | Motor braking control | 28 | GND_P | Power ground |
| 7 | SYNC | Clock synchronization | 29 | GND_{PC} | C phase power ground |
| 8 | CON_{DIS} | Enable control | 30 | GND_{PC} | C phase power ground |
| 9 | GND | Ground | 31 | OUT_C | C phase output |
| 10 | NC | NULL | 32 | OUT_C | C phase output |
| 11 | NC | NULL | 33 | V_{SC} | C phase power Drive supply |
| 12 | $OUT_{E/A}$ | Error amplifier output | 34 | GND_{PB} | B phase power ground |

| | | | | | |
|----|--------------------|----------------------------------|----|-------------------|----------------------------|
| 13 | IN _{E/A-} | Reverse input of error amplifier | 35 | GND _{PB} | B phase power ground |
| 14 | GND | Ground | 36 | OUT _B | B phase output |
| 15 | CON ₊ | Control positive | 37 | OUT _B | B phase output |
| 16 | CON ₋ | Control negative | 38 | V _{SB} | B phase power Drive supply |
| 17 | V _{CC} | +15V supply | 39 | GND _{PA} | A phase power ground |
| 18 | TEST _I | Current detection | 40 | GND _{PA} | A phase power ground |
| 19 | V _{EE} | -15V supply | 41 | OUT _A | A phase output |
| 20 | NC | NULL | 42 | OUT _A | A phase output |
| 21 | NC | NULL | 43 | V _{SA} | A phase power Drive supply |
| 22 | NC | NULL | | | |

6 Circuit block diagram of HMSK4361 Large Current Pulse Width Modulation Amplifier Brushless Motor Driver

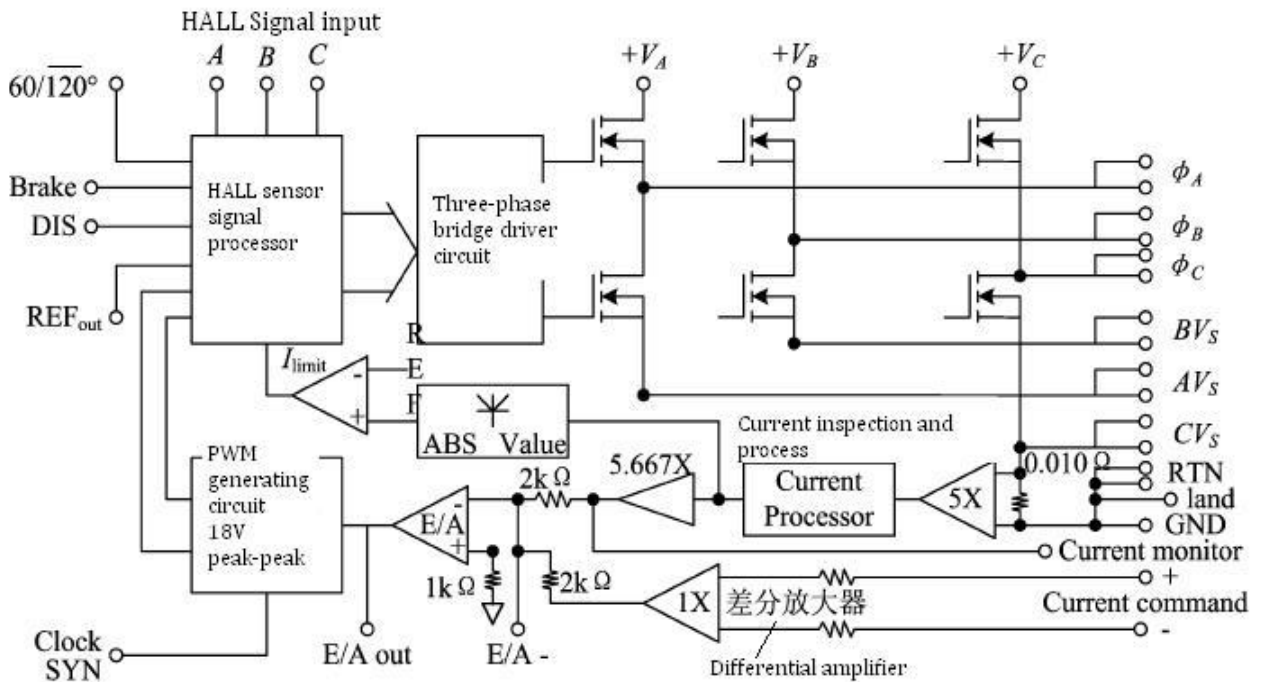


Figure 3 Single-circuit block diagram

7. Typical Connection Diagram of HMSK4361 Large Current Pulse Width Modulation Amplifier Brushless Motor Driver

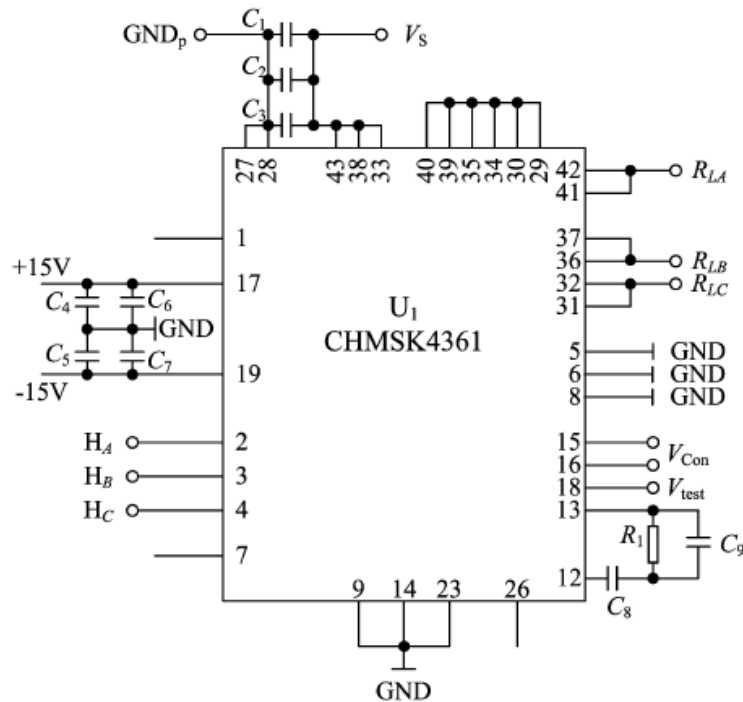


Fig 4 HMSK4361 connection diagram

Note1: $C_1=C_2 \geq 470\mu\text{f}/100\text{V}$ (choose according to need), $C_3 \geq 78\mu\text{f}/100\text{V}$ (choose according to need)

Note2: $C_4=C_5 \geq 10\mu\text{f}/50\text{V}$, $C_6=C_7=0.1\mu\text{f} \pm 5\%/50\text{V}$, $C_8=0.33\mu\text{f} \pm 5\%/50\text{V}$, $C_9=0.01\mu\text{f} \pm 5\%/50\text{V}$, $R_1=2\text{K}\Omega \pm 5\%$

Note3: $V_{CC}=15\text{V} \pm 5\%$, $V_{EE}=-15\text{V} \pm 5\%$, $V_S=28\text{V} \pm 5\%$

Note4: $7\text{V} \geq V_{CON} \geq 2\text{V}$

Note5: $HALL_A$ 、 $HALL_B$ 和 $HALL_C$ phase shift 120° , TTL square wave.

8. Package Specifications of HMSK4361 Large Current Pulse Width Modulation Amplifier Brushless Motor Driver

Outline of package is shown in Figure 5:

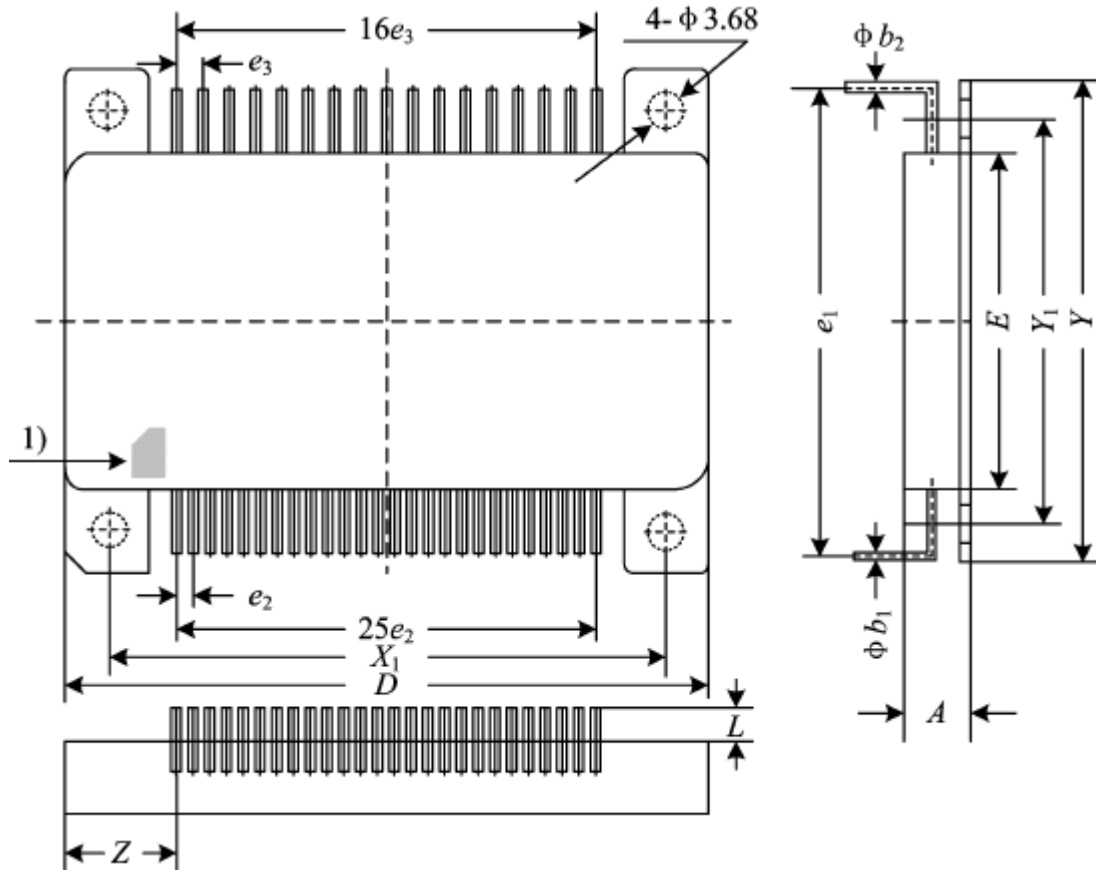


Table 4 Package outline

| Symbols | Data /mm | | |
|-----------|----------|---------|---------|
| | Minimum | Typical | Minimum |
| A | - | - | 10.03 |
| $\Phi b1$ | 0.45 | - | 0.60 |
| $\Phi b2$ | 0.90 | - | 1.10 |
| D | - | - | 78.99 |
| X1 | - | 72.39 | - |
| e2 | - | 2.54 | - |
| e3 | - | 3.81 | - |
| E | - | - | 40.89 |
| Y1 | - | 47.24 | - |
| Y | - | - | 53.59 |
| e1 | - | 53.34 | - |
| Z | - | - | 7.9 |
| L | 3.05 | - | - |

Application Notes please refer to the appendix, must read it carefully