

HMSK4370 Military Pulse Width Modulation Amplifier of Brushless Motor Driver

1 Features of HMSK4370 Military Pulse Width Modulation Amplifier of Brushless Motor Driver

- Replacement with MSK4370 of MSK Company
- Continuous output current: 10A
- Motor power voltage: 500V
- Torque control of four-quadrant
- 60/120 phase selection
- Inhibition function



Fig 1 HMSK4370 External view

2 Applications of HMSK4370 Military Pulse Width Modulation Amplifier of Brushless Motor Driver

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

3 Description of HMSK4370 Military Pulse Width Modulation Amplifier of Brushless Motor Driver

HMSK4370 is a exclusive module for brushless DC motor, module inside has the integrated three-phase MOSFET bridge, the MOSFET bridge can provide the maximum 500V power supply voltage , the maximum output current is 10A. The module is consisted 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 HMSK4370 Military Pulse Width Modulation Amplifier of 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)	HMSK4370			Unit
			A group	min	max	
1	+15V power current/I _{CC}	Speed control GND, empty load, Efficient HALL signal, frequency:40Hz, V _H ≥3V, V _L ≤0.8V	1	-	150	mA
	-15V power current /I _{EE}		1	-	60	
2	Clock frequency/f _{CP}	Efficient HALL signal, frequency:40Hz, V _H ≥3V, V _L ≤0.8V	4\5\6	14	20	KHZ
3	Reference voltage/V _{REF}	RREF=430Ω	1\2\3	5.82	6.57	V
4	Control voltage transconductance/g _m	Efficient HALL signal, frequency:40Hz, efficient current control setup	4	0.75	1.25	A/V
5	Bias current/I _{OO}	Efficient HALL signal, frequency:40Hz, V _H ≥3V, V _L ≤0.8V	1	-100	100	MA
6	Current monitoring slope/K	Efficient HALL signal, frequency:40Hz, efficient current control setup	4	0.75	1.25	V/A
7	Static current-limiting value /I _{LIMIT}	Connect 1.92KΩ between current-limiting regulation and GND	1	3.5	6.5	A

5 Pin Designations of HMSK4370 Military Pulse Width Modulation Amplifier of Brushless Motor Driver

Package leading-out terminal is shown in Figure 2, it's a platform view.

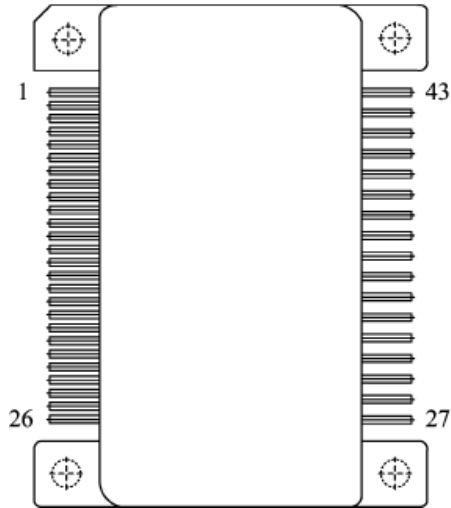


Figure 2 Platform

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	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 HMSK4370 Military Pulse Width Modulation Amplifier of Brushless Motor Driver

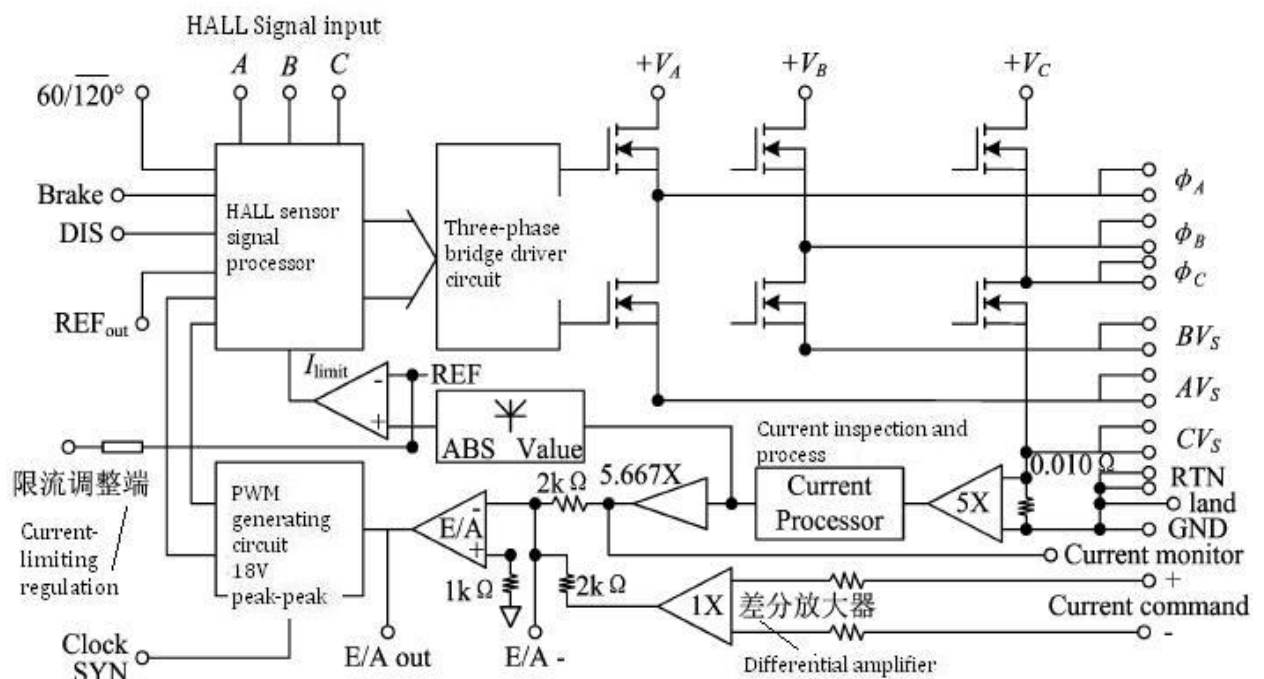


Figure 3 Single-circuit block diagram

7. Typical Connection Diagram of HMSK4370 Military Pulse Width Modulation Amplifier of Brushless Motor Driver

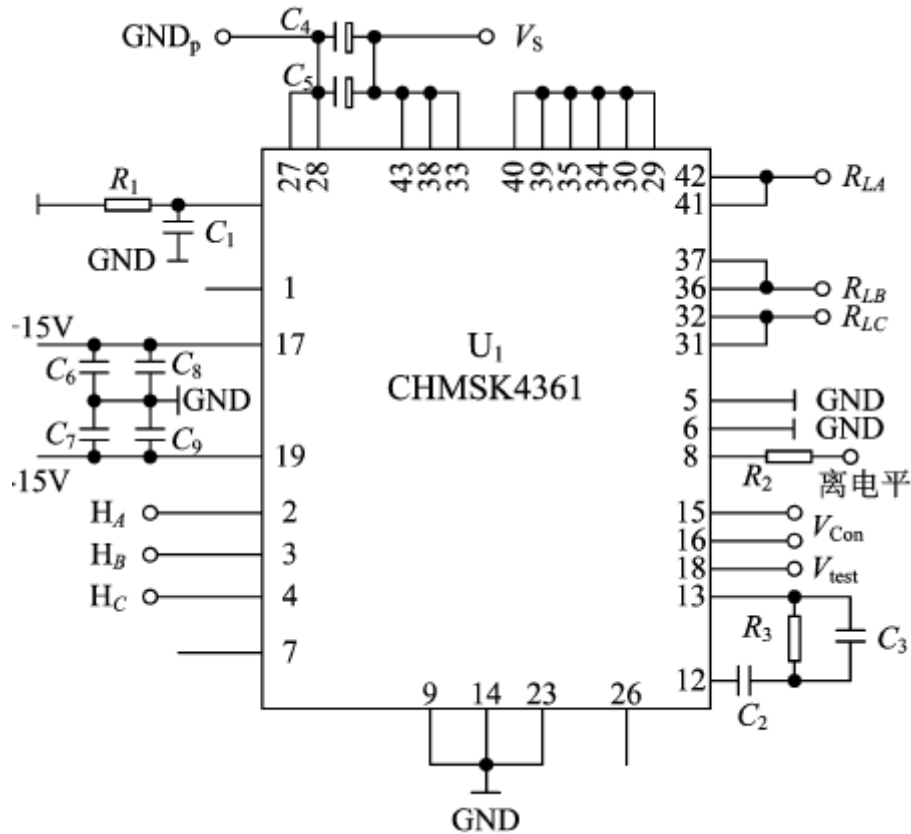


Fig 4 HMSK4370 connection diagram

Note1: $C_1=C_2 \geq 220\mu\text{f}/500\text{V}$ (choose according to need) ,
 $C_5 \geq 10\mu\text{f}/450\text{V}, C_6=C_7 \geq 10\mu\text{f}/50\text{V}, C_8=C_9 = 0.1\mu\text{f} \pm 5\%/50\text{V}$;

Note 2: $C_1 = 0.01\mu\text{f} \pm 5\%/50\text{V}$, $C_2 = 1\mu\text{f} \pm 5\%/50\text{V}$, $C_3 = 0.1\mu\text{f} \pm 5\%/50\text{V}$,
 $R_1 = 1.92\text{K}\Omega \pm 5\%, R_2 = 10\text{K}\Omega \pm 5\%, R_3 = 1\text{K}\Omega \pm 5\%$;

Note 3: $V_{CC} = 15\text{V} \pm 5\%, V_{ee} = -15\text{V} \pm 5\%, V_S = 28\text{V} \pm 5\%$

Note 4: $7\text{V} \geq V_{CON} \geq 2\text{V}$

Note 5: HALL_A、 HALL_B and HALL_C phase shift 120°, TTL square wave.

8. Package Specifications of HMSK4370 Military Pulse Width Modulation Amplifier of Brushless Motor Driver

Outline of package is shown in Figure 5:

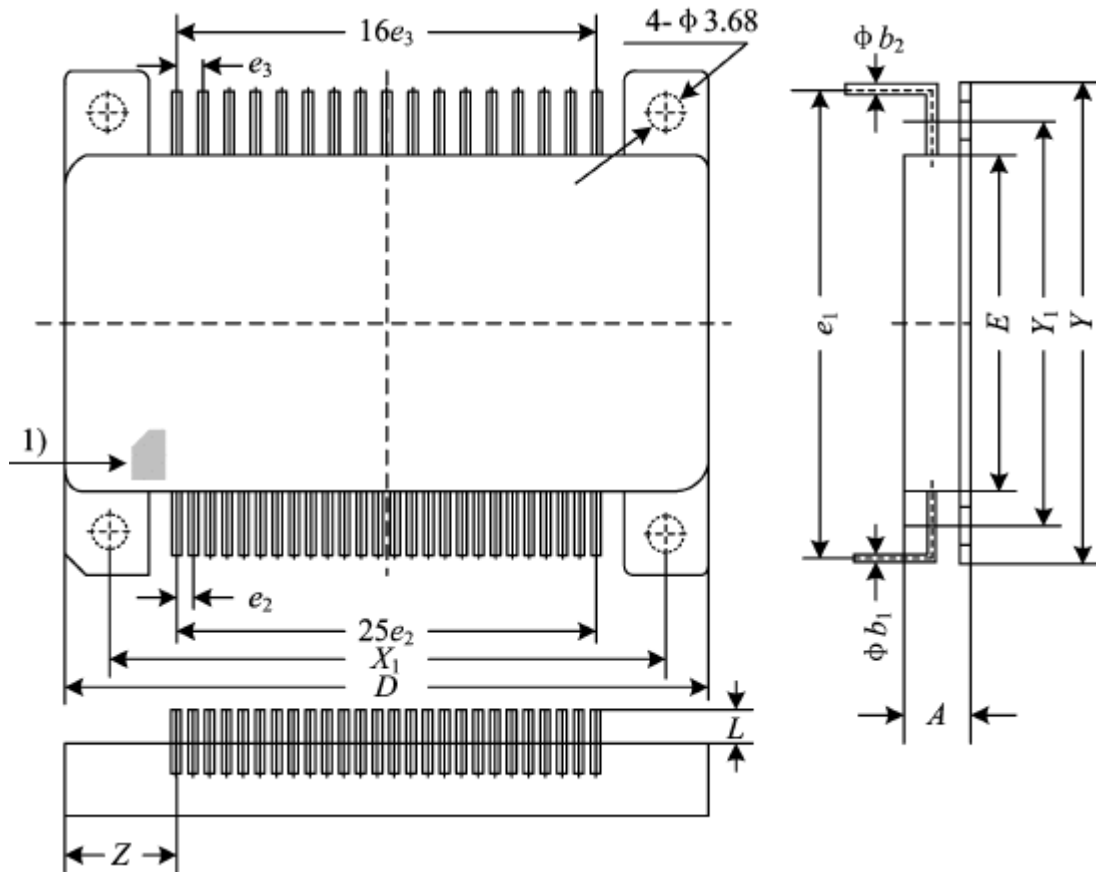


Table 4 Package outline

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