

## HMSK4371 Brushless Motor Driver

### 1 Features

- Replacement with MSK4371 of MSK Company
- Continuous output current: 30A
- Motor power voltage: 500V
- Torque control of four-quadrant
- 60/120 phase selection
- Inhibition function



Fig 1 HMSK4371 External view

### 2 Applications

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

### 3 Description

HMSK4371 is a exclusive module for brushless DC motor, module inside have the integrated three-phase MOSFET bridge, the MOSFET bridge can provide the maximum 500V power supply voltage the maximum output current is 30A. 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

Table 2 Electrical Characteristic (Complete according to the standard)

No.	Characteristic	( Unless other condition,	HMSK4371	Unit
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		$V_{CC}=15V\pm 5\%$ $V_S=110V\pm 5\%$ $-55^{\circ}C\leq T_c\leq 125^{\circ}C$	A group	min	max	
1	+15V power current/ $I_{CC}$	Speed control GND, empty load, Efficient HALL signal, frequency:40Hz, $V_H\geq 3V$ , $V_L\leq 0.8V$	1	-	150	mA
	-15V power current / $I_{EE}$		1	-	40	
2	Clock frequency/ $f_{cp}$	Efficient HALL signal, frequency:40Hz, $V_H\geq 3V$ , $V_L\leq 0.8V$	4\5\6	18.7	25.3	KHZ
3	Reference voltage/ $V_{REF}$	$R_{REF}=430\Omega$	1\2\3	5.82	6.57	V
4	Control voltage transconductance/ $g_m$	Efficient HALL signal, frequency:40Hz, efficient current control setup	4	2.7	3.3	A/V
5	Bias current/ $I_{OO}$	Efficient HALL signal, frequency:40Hz, $V_H\geq 3V$ , $V_L\leq 0.8V$	1	-25	25	MA
6	Current monitoring slope/K	Efficient HALL signal, frequency:40Hz, efficient current control setup	4	0.3	0.367	V/A

## 5 Pin Designations

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

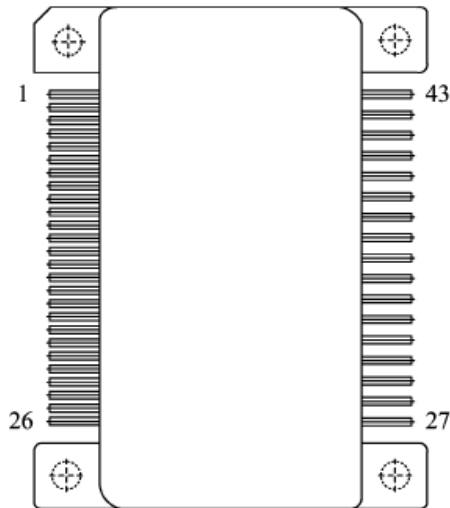


Figure 2 Platform

Table 3 Pin Designations

Pin	Symbol	Designation	Pin	Symbol	Designation
1	$V_{REF}$	Reference voltage output	23	GND	Ground

2	IN <sub>HALL A</sub>	A phase HALL signal	24	NC	NULL
3	IN <sub>HALL B</sub>	B phase HALL signal	25	NC	NULL
4	IN <sub>HALL C</sub>	C phase HALL signal	26	GND <sub>L</sub>	Detection ground
5	CON <sub>60/60/12</sub>	Phase control	27	GND <sub>P</sub>	Power ground
6	CON <sub>BRAKE</sub>	Motor braking control	28	GND <sub>P</sub>	Power ground
7	SYNC	Clock synchronization	29	GND <sub>PC</sub>	C phase power ground
8	CON <sub>DIS</sub>	Enable control	30	GND <sub>PC</sub>	C phase power ground
9	GND	Ground	31	OUT <sub>C</sub>	C phase output
10	NC	NULL	32	OUT <sub>C</sub>	C phase output
11	NC	NULL	33	V <sub>SC</sub>	C phase power Drive supply
12	OUT <sub>E/A</sub>	Error amplifier output	34	GND <sub>PB</sub>	B phase power ground
13	IN <sub>E/A-</sub>	Reverse input of error amplifier	35	GND <sub>PB</sub>	B phase power ground
14	GND	Ground	36	OUT <sub>B</sub>	B phase output
15	CON <sub>+</sub>	Control positive	37	OUT <sub>B</sub>	B phase output
16	CON <sub>-</sub>	Control negative	38	V <sub>SB</sub>	B phase power Drive supply
17	V <sub>CC</sub>	+15V supply	39	GND <sub>PA</sub>	A phase power ground
18	TEST <sub>I</sub>	Current Detection	40	GND <sub>PA</sub>	A phase power ground
19	V <sub>EE</sub>	-15V supply	41	OUT <sub>A</sub>	A phase output
20	NC	NULL	42	OUT <sub>A</sub>	A phase output
21	NC	NULL	43	V <sub>SA</sub>	A phase power Drive supply
22	NC	NULL			Ground

## 6 Circuit block diagram

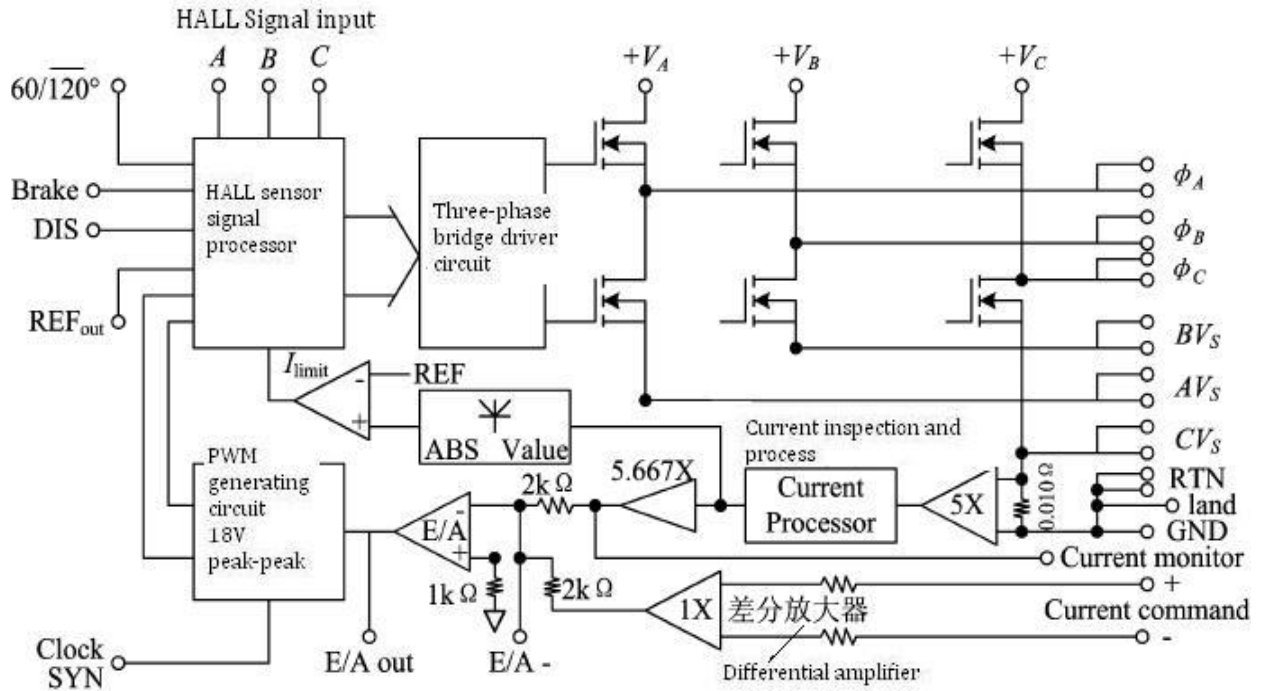


Fig 3 Single-circuit block diagram

## 7. Typical Connection Diagram

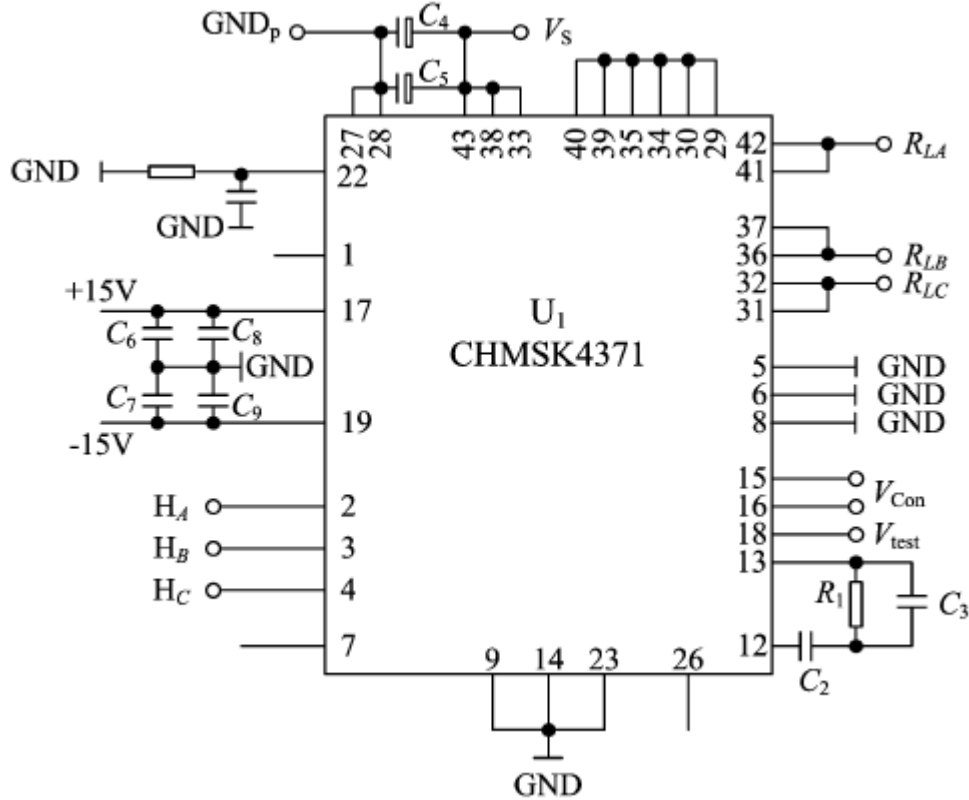


Fig 4 HMSK4371 connection diagram

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<sub>A</sub>、HALL<sub>B</sub>、HALL<sub>C</sub> phase shift 120°, TTL square wave.

## 8. Package Specifications

Outline of package is shown in Figure 5:

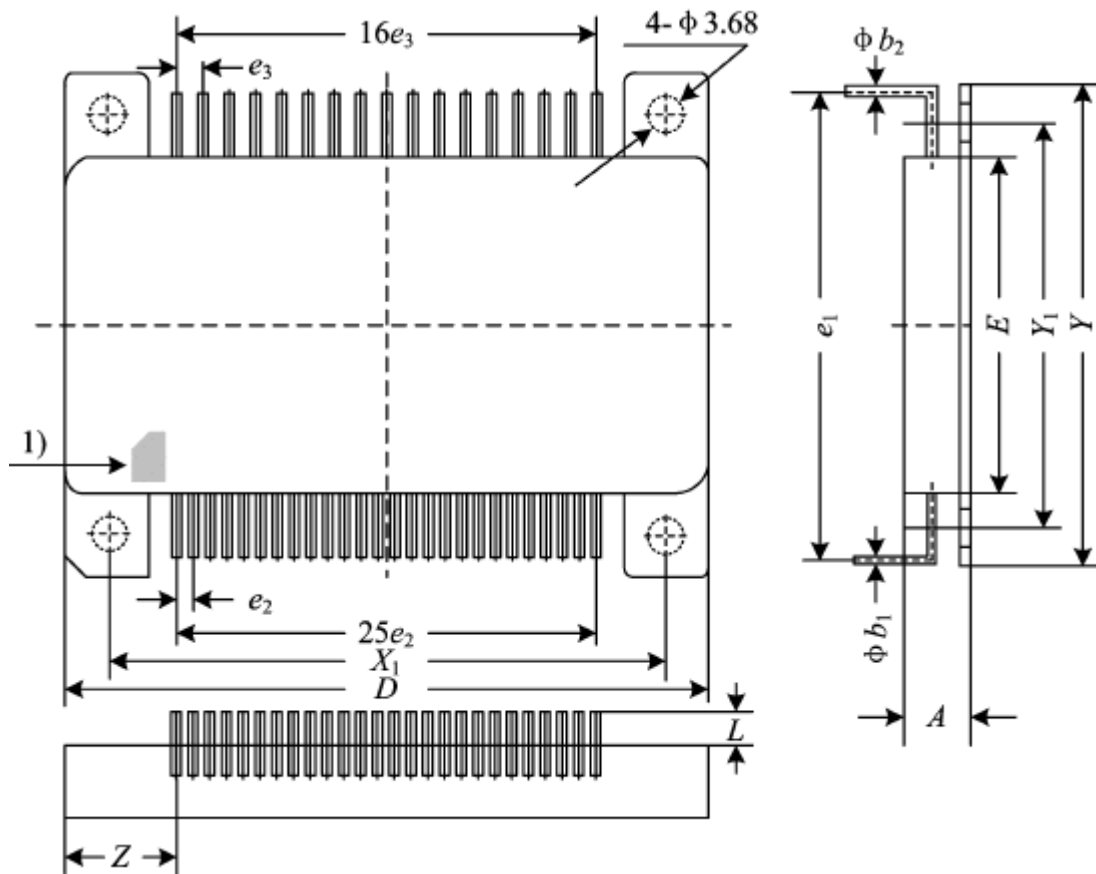


Table 4 Package outline

Symbols	Data /mm		
	Minimum	Typical	Minimum
A	-	-	10.03
$\phi b_1$	0.45	-	0.60
$\phi b_2$	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**