

HMSK4310 Large Current Pulse Width Modulation Amplifier of Brushless Motor Driver

1 Features of HMSK4310 Large Current Pulse Width Modulation Amplifier of Brushless Motor Driver

- Replacement with MSK4310 of MSK Company
- Continuous output current: 10A
- Peak current: 15A
- Motor power voltage: 55V
- Internal contain HALL reaction and Logical control circuit
- Control for closed loop of speed ring



Fig 1 HMSK4310 External view

2 Applications of HMSK4310 Large Current Pulse Width Modulation Amplifier of Brushless Motor Driver

- Brushless motor Drive control
- Driven reaction load

3 Description of HMSK4310 Large Current Pulse Width Modulation Amplifier of Brushless Motor Driver

HMSK4310 is a three-phase motor driver with a speed ring, it can provide continuous output current with 10A and motor power supply with 55V, internal contain HALL reaction, switching circuit, and three-phase bridge driver circuit, in addition, it also contain programmable current-limiting protection of users.

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 HMSK4310 Large Current Pulse Width Modulation Amplifier of Brushless Motor Driver

Table 2 Electrical Characteristics

No.	Characteristic	(Unless other condition, V _{CC} =15V±5% V _{EE} =-15V±5%, V _S =28V±5% -55°C≤T _c ≤125°C)	HMSK4310			Unit
			A group	min	max	
1	+15V Supply current/I _{CC}	Speed control GND, empty load, Effective HALL signal, frequency:40Hz, V _H ≥3V, V _L ≤0.8V	1	-	50	mA
	-15V Supply current /I _{EE}		2、3	-	60	
			1	-	15	
	2、3		-	20		
2	Clock frequency/f _{cp}	Effective HALL signal, frequency:40Hz, V _H ≥3V, V _L ≤0.8V	4	21	29	KHZ
			5、6	20	30	
3	Static limit current/I _{LIMIT}	TRIMI hang on, Effective HALL signal, frequency:40Hz, V _H ≥3V, V _L ≤0.8V	1	0.4	1.6	A
4	Speed output high level/V _H	I _{Source} =5mA	4	3.6	4.2	V
5	Speed output low level /V _L	I _{Sink} =10mA	4	-	0.5	V
6	Speed indicate pulse width/T _w	R/C=20KΩ/0.01μF	4	150	250	μS
7	Reference voltage output/V _{REF}	R _{REF} =6.2KΩ	1	5.9	6.5	V

5 Pin Designations of HMSK4310 Large Current Pulse Width Modulation Amplifier of Brushless Motor Driver

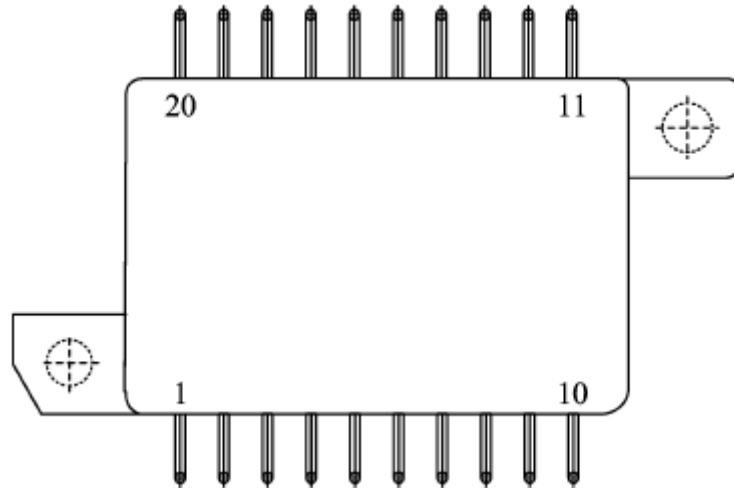


Figure 2 Platform

Table 3 Pin Designations

Pin	Symbol	Designation	Pin	Symbol	Designation
1	V_{CC}	+15V Supply	11	GND	Ground
2	V_{EE}	-15V Supply	12	TRIM _I	Current-limiting regulation
3	TEST _{SP}	Speed Detection	13	I _{NE/A-}	Reverse input of error amplifier
4	V_{REF}	Reference voltage output	14	OUT _{E/A}	Error amplifier output
5	RC _{EXT}	Speed indicator external connect RC	15	CON _{BRAKE}	Motor braking input control
6	IN _{HALL A}	A phase HALL signal	16	G _{NDP}	Power GND
7	IN _{HALL B}	B phase HALL signal	17	OUT _A	A phase output
8	IN _{HALL C}	C phase HALL signal	18	OUT _B	B phase output
9	CON _{SP-}	Speed control low level	19	OUT _C	C phase output
10	CON _{SP+}	Speed control high level	20	V_S	Power Drive supply

6 Circuit block diagram of HMSK4310 Large Current Pulse Width Modulation Amplifier of Brushless Motor Driver

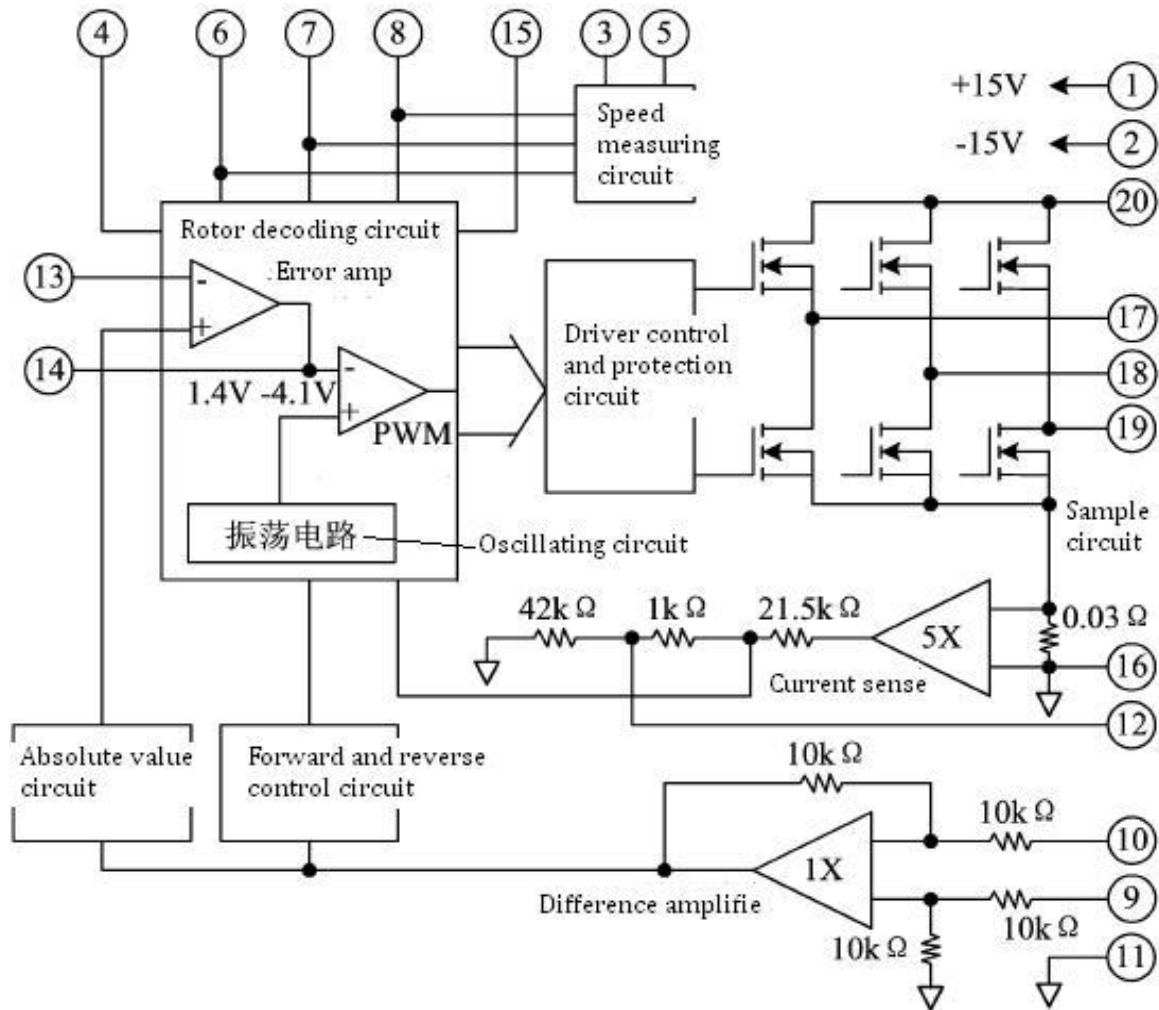


Figure 3 Single-circuit block diagram

7. Typical Connection Diagram of HMSK4310 Large Current Pulse Width Modulation Amplifier of Brushless Motor Driver

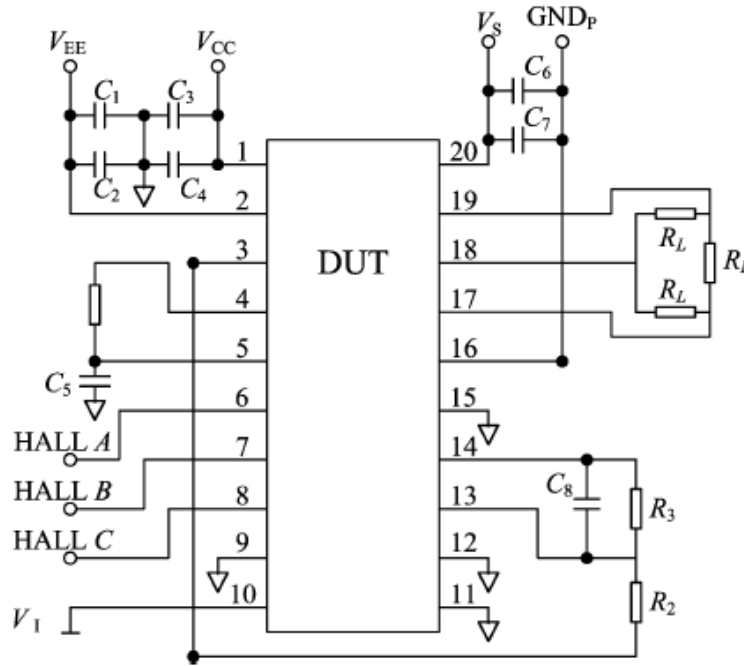


Fig 4 HMSK4310 connection diagram

Note1: $C_1=C_3 \geq 10\mu\text{f}/50\text{V}$ (choose according to need), $C_2=C_4=C_8=0.1\mu\text{F} \pm 5\%/50\text{V}$, $C_5=0.01\mu\text{F} \pm 5\%/50\text{V}$, $C_6 \geq 100\mu\text{f}/100\text{V}$ (choose according to need), $C_7 \geq 10\mu\text{f}/100\text{V}$;

Note 2: $R_1=20\text{K}\Omega \pm 5\%$, $R_2=R_3=100\text{K}\Omega \pm 5\%$;

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

Note 4: HALL_A、HALL_B 和 HALL_C phase shift 120° , TTL square wave.

Note 5: $4.0\text{V} \leq V_{CON} \leq 4.5\text{V}$

Supply bypass:

Power supply V_S should have sufficient bypass capacitors to ensure proper operation, otherwise it may be unstable and reduce efficiency, and the output may be oscillated. V_S power supply should be add a ceramic capacitor at least $1\mu\text{F}$, and then a low ESR value of the bypass capacitor in parallel, the size of selected at least $10\mu\text{f}/\text{A}$; For V_{CC} should also add a ceramic capacitor with $0.1\mu\text{F}$ and a low ESR value with $6.8\mu\text{F}-10\mu\text{F}$ of the bypass capacitor in parallel.

8. Package Specifications of HMSK4310 Large Current Pulse Width Modulation Amplifier of Brushless Motor Driver

Outline of package is shown in Figure 5:

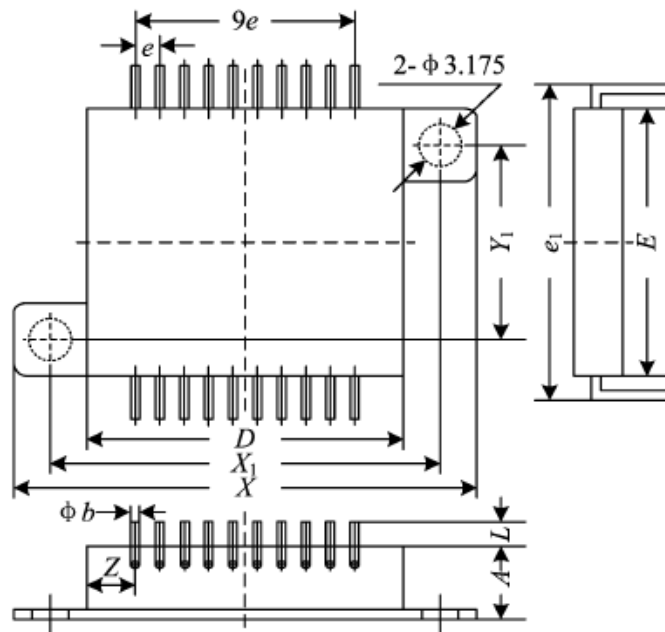


Table 4 Package Outline

Symbols	Unit/mm		
	Minimum	Typical	Maximum
A	-	-	7.62
ϕb	0.90	-	1.10
X	-	-	56.13
X_1	-	49.53	-
D	-	-	43.43
e	-	3.175	-
E	-	-	33.27
e_1	-	39.37	-
Y_1	-	26.67	-
L	4.40	-	-
Z	-	-	7.60

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