

# HMSK4300 Isolation High Reliability Pulse Width Modulation Amplifier of Square wave Drive

## 1 Features of HMSK4300 Isolation High Reliability Pulse Width Modulation Amplifier of Square wave Drive

- 75V volt of motor power supply
- 10A output current converter capability,  
All N channel MOS-FET Output bridge type
- 100% dead-high transmission capacity
- Suitable for DC to 100KHZ AC PWM                      45x40.0x6.5mm<sup>3</sup>
- Short down/cross conduct protection                      Weight: 65g
- Protection for under-voltage lockout                      Fig 1 HMSK4300 External view
- Control for programmable dead-time
- Control for active shutoff by low level
- Isolated package design provides high voltage insulation and excellent heat transmission performance
- Working for optional three-foot bending



## 2 Applications of HMSK4300 Isolation High Reliability Pulse Width Modulation Amplifier of Square wave Drive

Three-phase brushless DC; Servo controller; Three-phase brushless AC; Cooling fan actuator control; Induction motor control; Air conditioning fan speed control.

## 3 Description of HMSK4300 Isolation High Reliability Pulse Width Modulation Amplifier of Square wave Drive

HMSK4300 is a three-phase bridge with a gate, sealed by the metal package, can output for 10A, the maximum voltage supply can reach to DC 75V. The signal voltage

Itage has under-voltage lockout protection, cross-conduction control, user-programmable dead time control and short-circuit limiting. In addition, the bridge output can be controlled by using low level shutoff. Due to the isolation technology of HMSK4300's package, it can make the internal MOSFET has better heat transfer performance and allows directly contact with the device and fin actuator without an insulating material.

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 HMSK4300 Isolation High Reliability Pulse Width Modulation Amplifier of Square wave Drive

Table 2 Electrical Characteristic

Parameter	Test condition	A group ④	MSK4300H③			MSK4300②			Unit
Control choice			min	Typical	max	min	Typical	max	
Static bias current	Shut off all the input	1,2,3		2.5	8		2.5	8	mA
Working current	Frequency=20KH Z,50% duty cycle	1,2,3		12.5	15		12.5	15	mA
Undervoltage threshold value(decline)		1	5.75	6.6	7.5	5.75	6.6	7.5	V
Undervoltage threshold value (rise)		1	6.2	7.1	8	6.2	7.1	8	V
Low level input voltage ①		-	-	-	0.8	-	-	0.8	V
High level input voltage ①		-	2.7	-	-	2.7	-	-	V
Low level input current ①	V <sub>IN</sub> =0V	-	60	100	135	60	100	135	Microampere
High level input current ①	V <sub>IN</sub> =5V	-	-1	-	+1	-1	-	+1	Microampere
Output bridge									
Drain-source breakdown voltage	I <sub>D</sub> =25μA, shut off all the input	-	70	-	-	70	-	-	V

Drain-source leakage current	$V_{DS}=70V$	-	-	-	25	-	-	25	Microampere
Drain-source turn-on resistance (each FET)	$I_D=10A$	1	-	-	0.3	-	-	0.3	Ohm
Drain-source turn-on resistance (FET, just for thermal calculation) ①		-	-	-	0.16	-	-	0.16	Ohm
Switching characteristic									
Rise time	$V_+=30V, R_L=3\Omega$	-	5	-	-	5	-	Nanosecond	
Decline time	$I_D=10A$	-	-	-	-	6	-	Nanosecond	
Conduction delay (down)	SWR resistance= $\infty$	4	-	0.5	2	-	0.5	3	Microsecond
Shut off delay (down)	SWR resistance= $\infty$	4	-	5	8	-	5	10	Microsecond
Conduction delay (up)	SWR resistance= $\infty$	4	-	5	8	-	5	10	Microsecond
Shut off delay (up)	SWR resistance= $\infty$	4	-	0.5	2	-	0.5	3	Microsecond
Dead time	SWR resistance= $\infty$	4	6	7	8	6	7	8	Microsecond
Dead time	SWR resistance 12K	4	0.3	0.5	0.7	0.3	0.5	0.7	Microsecond
Source –Drain diode characteristics									
Forward voltage①	$I_{SD}=10A$	-	-	1.05	1.25	-	1.05	1.25	V
Reverse recover time①	$I_{SD}=10A, di/dt=100A/\mu S$	-	-	75	-	-	75	-	Nanosecond

## 5 Pin Designations of HMSK4300 Isolation High Reliability Pulse Width Modulation Amplifier of Square wave Drive

Table 3 Pin Designations

Pin	Symbol	Designation	Pin	Symbol	Designation
1	BH'	B channel high-level logic signal input	6	$V_{BIAS}$	Power supply for gate Drive

2	BL	B channel low-level logic signal input	7	EN'	Working enable for system
3	AL	A channel low-level logic signal input	8	CL	C channel low-level logic signal input
4	AH'	A channel high-level logic signal input	9	CH'	C channel high-level logic signal input
5	SWR'	Dead time control	10	GND	GND
11	CΦ	Three-phase bridge C channel output	12	R <sub>SENSE</sub>	Power GND
13	R <sub>SENSE</sub>	Power GND	14	AΦ	Three-phase bridge A channel output
15	V+	+28V	16	V+	Connect +28V
17	BΦ	Three-phase bridge B channel output	18	NC	suspend

## 6 Circuit block diagram of HMSK4300 Isolation High Reliability Pulse Width Modulation Amplifier of Square wave Drive

Pulse width modulation amplifier includes signal processing circuit、 half-bridge driver circuit and power amplifier.

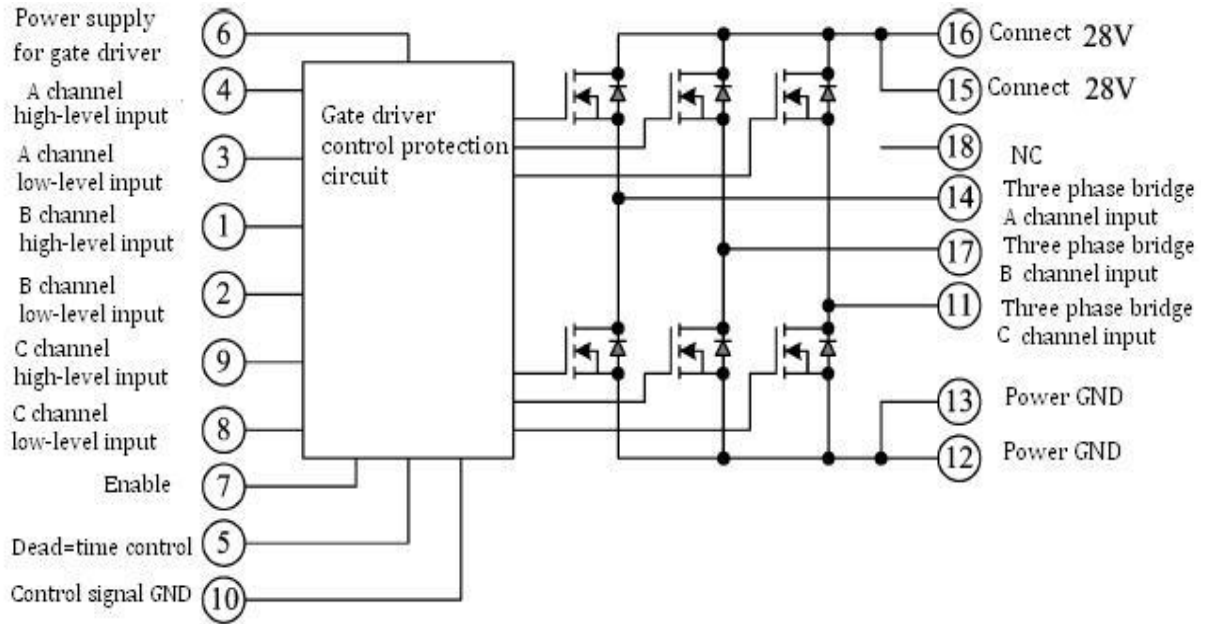


Figure 2 Single channel working block diagram

A triangle wave signal is generated by input control signal and square wave generator circuit, the effect of triangle wave signal and fixed level can generate width modulated square wave signal. Drive circuit can make isolation and distribution for the front width modulated square wave signal, then drive the power tubes, to make power amplifier and drive load for DC motor.

## 7. Typical Connection Diagram of HMSK4300 Isolation High Reliability Pulse Width Modulation Amplifier of Square wave Drive

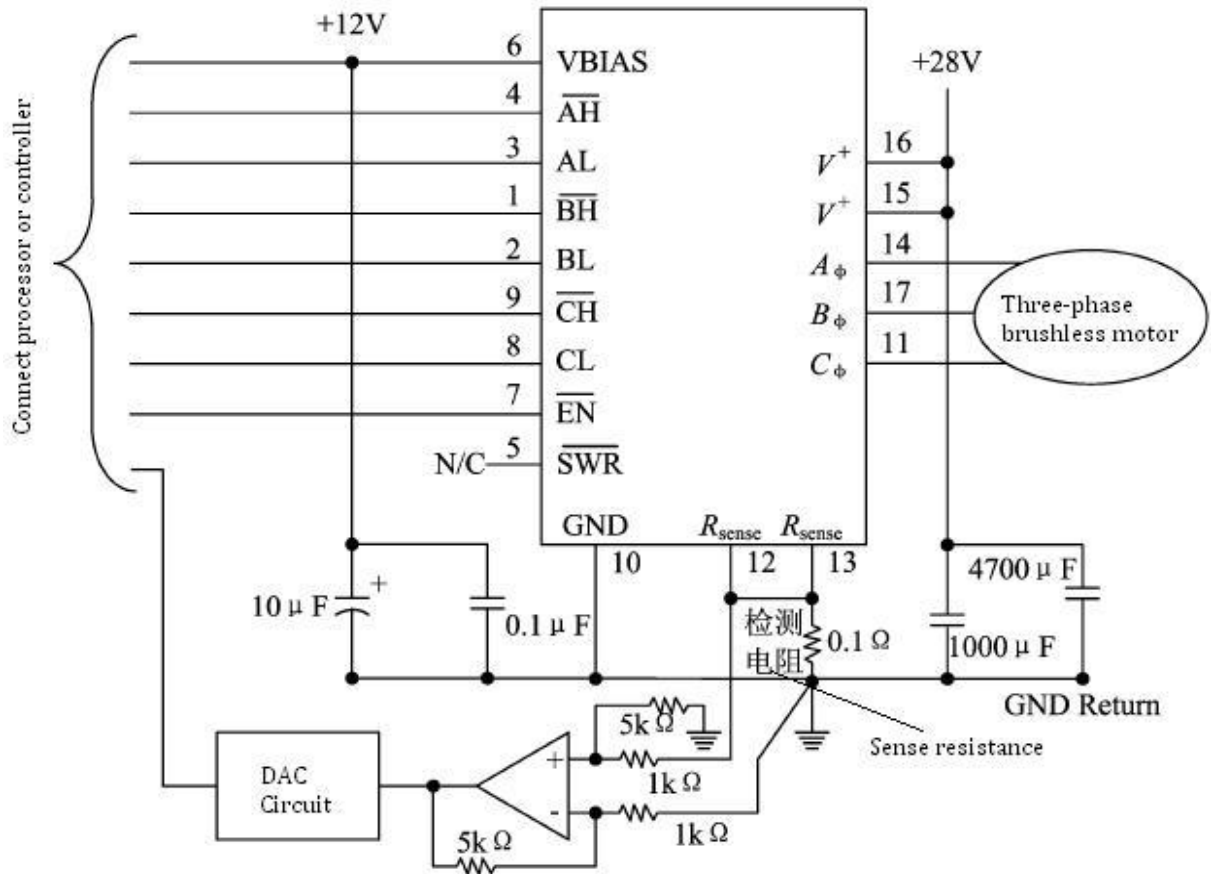
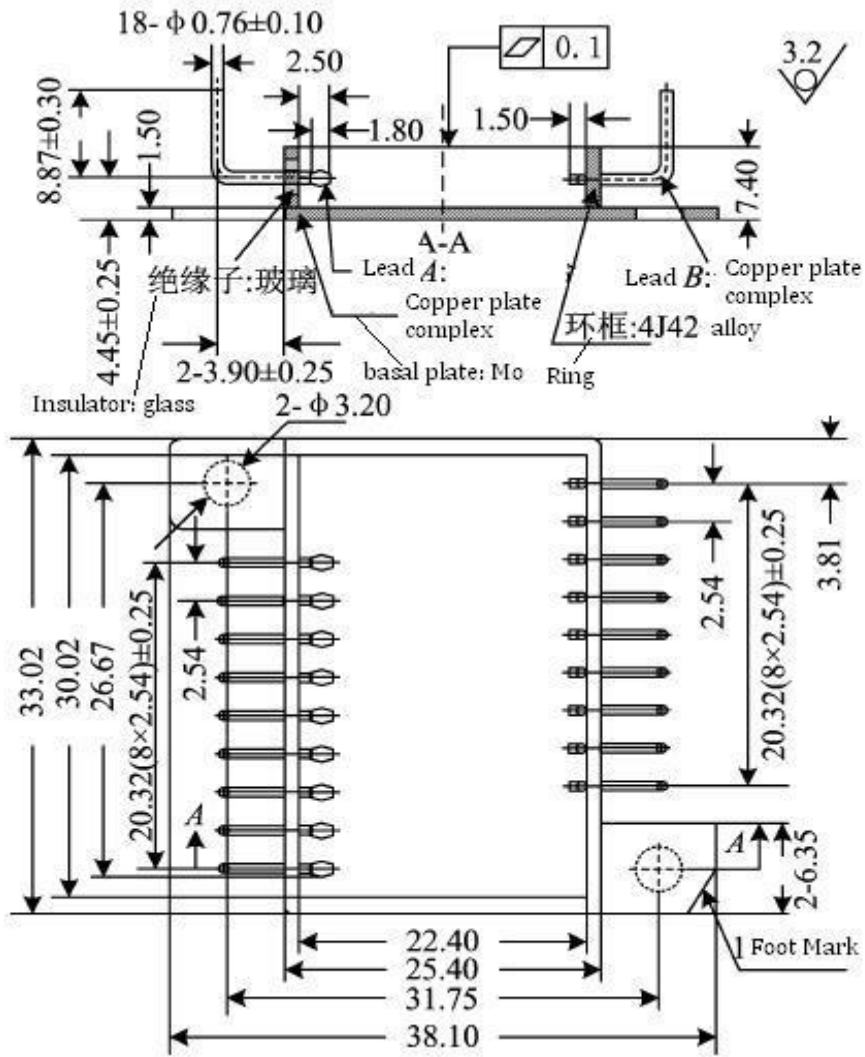


Figure 3 HMSK4300 connection diagram

## 8 . Package Specifications of HMSK4300 Isolation High Reliability Pulse Width Modulation Amplifier of Square wave Drive



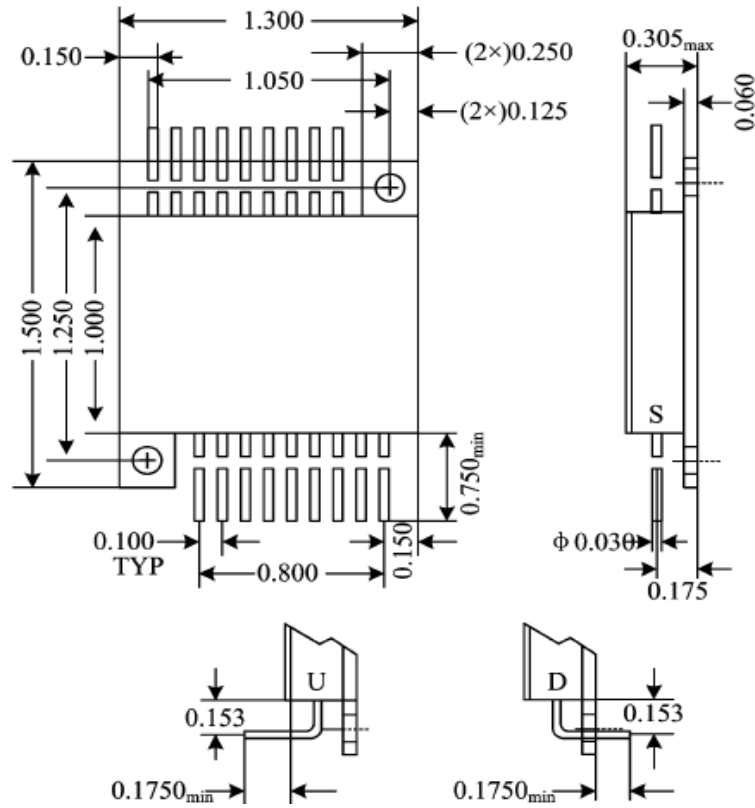


Figure 5 Package outline drawing

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