

HSA04 High Power Pulse Width Modulation Amplifiers

1 Features

- Compatible with SA04 of APEX
- Widely motor input voltage range : 16V~200V
- Analog signal circuit input or TTL square wave input
- Max Continuous output current 20A
- Overheat Current-limiting protection function



58.9×40.4×6.99mm³

Weight: 55g

Fig1 HSA04 External view

2 Application

Motor controlling with brush

Drive reactive load

3 Descriptions

HSA04 is a pulse width modulation type power amplifier which operates in the switching mode, it can provide 4KW maximum transmission power for the load; the product needs two power supply; + 15v for the small signal control circuit power supply; 16v-200v is the motor power supply for the internal H bridge. The control signal of the input circuit is the DC level signal of 3v-7v. The internal output 45 KHZ TTL is wave signal, the output width of the square wave signal frequency is 22.5KHZ. The key input can turn off the four drive tubes of the H-bridge circuit. It has overheat and Current-limiting protection function .

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

4 Technical Specifications

Table 1: Rated conditions and Recommended operating conditions

Absolute maximum rating	Recommended operating conditions
Supply voltage +VS: 200V Supply voltage +VCC: 16V Input voltage, +PWM: 0~+11V Input voltage, -PWM: 0~+11V Input voltage, I _{limit} /SHDN: 0~+10V Internal power loss : 380W Storage temperature: -65~+150°C Operating Temperature (TC) : -55~+125°C	Supply voltage +VS: 200V Supply voltage +VCC: 15V Input voltage, +PWM: +3~+7V Shut-off input voltage , I _{limit} /SHDN: 0.1V

Table 2 electrical characteristics

No	Character	Conditions -55°C ≤ T _c ≤ 125°C	HSA04			Symbol
			min	Typical value	max	
1	Output clock high level	-	4.8	-	5.3	V
2	Output clock low level	-	0	-	0.4	V
3	Clock output frequency	-	42	45	48	KHZ
4	triangular center voltage	-	-	5	-	V
5	triangular wave peak -peak voltage	-	-	4	-	V
6	switching operation frequency	-	-	22.5	-	KHZ
7	output efficiency	V _s =200V, output current 10A	-	97	-	%
8	Continuous working current	Below 70°C (case temperature)	-	-	20	A
9	Peak working current	-	-	-	30	A
10	Power +V _s	-	16	-	200	V
11	Power +V _{cc}	-	14	15	16	V
12	+V _{cc} static current	I _o =0	-	-	50	mA
13	I _{limit} / shutoff threshold	-	90	-	110	mV
14	Operating Temperature (T _C)	-	-55	-	+125	°C

5 Lead function descriptions

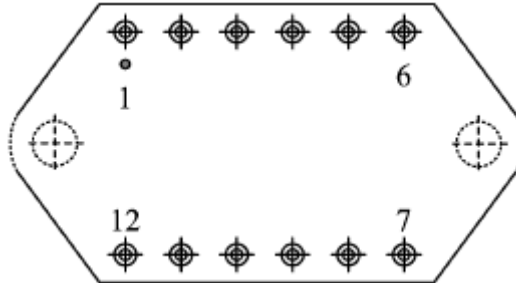


Fig 2 upward view

Table 3 Pin Designations

No	symbol	Designation	No	symbol	Designation
1	CLK IN	Clock input (1)	7	$I_{sense\ B}$	Load current inductor B
2	CLK Out	clock output(2)	8	B_{out}	Output B
3	+PWM	Control signal input	9	+V _S	+Vs input
4	-PWM/RAMP	internal triangular output	10	+V _{CC}	+Vcc input
5	GND	System Ground	11	A_{out}	output A
6	$I_{limit}/SHDN$	Current limiter/ shut off	12	$I_{sense\ A}$	Load current inductor A

6 Circuit block diagram

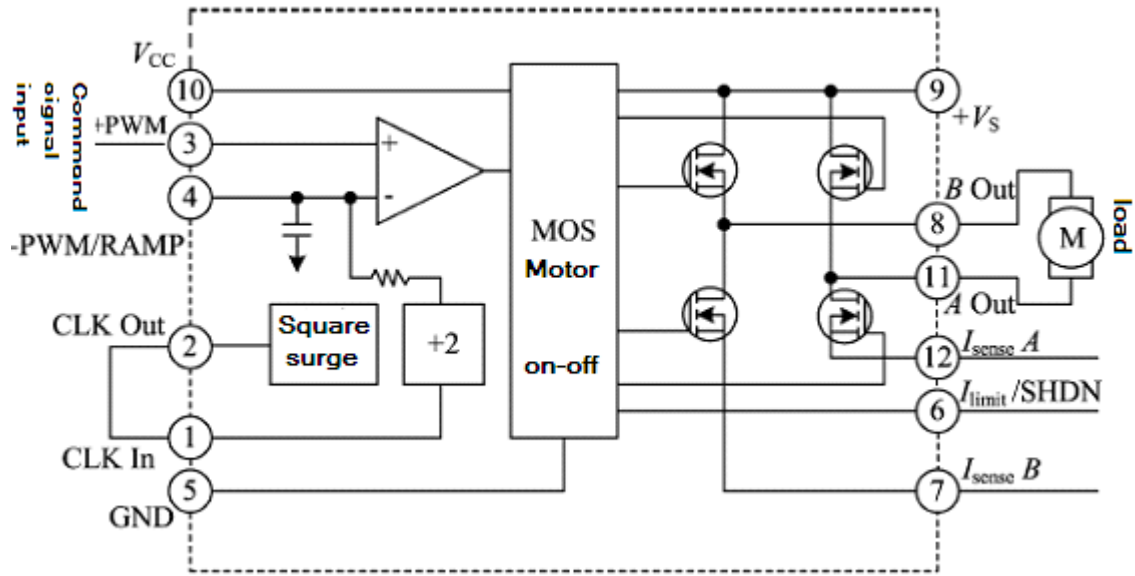


Fig 3 Circuit block diagram

7. Typical Connection Diagram

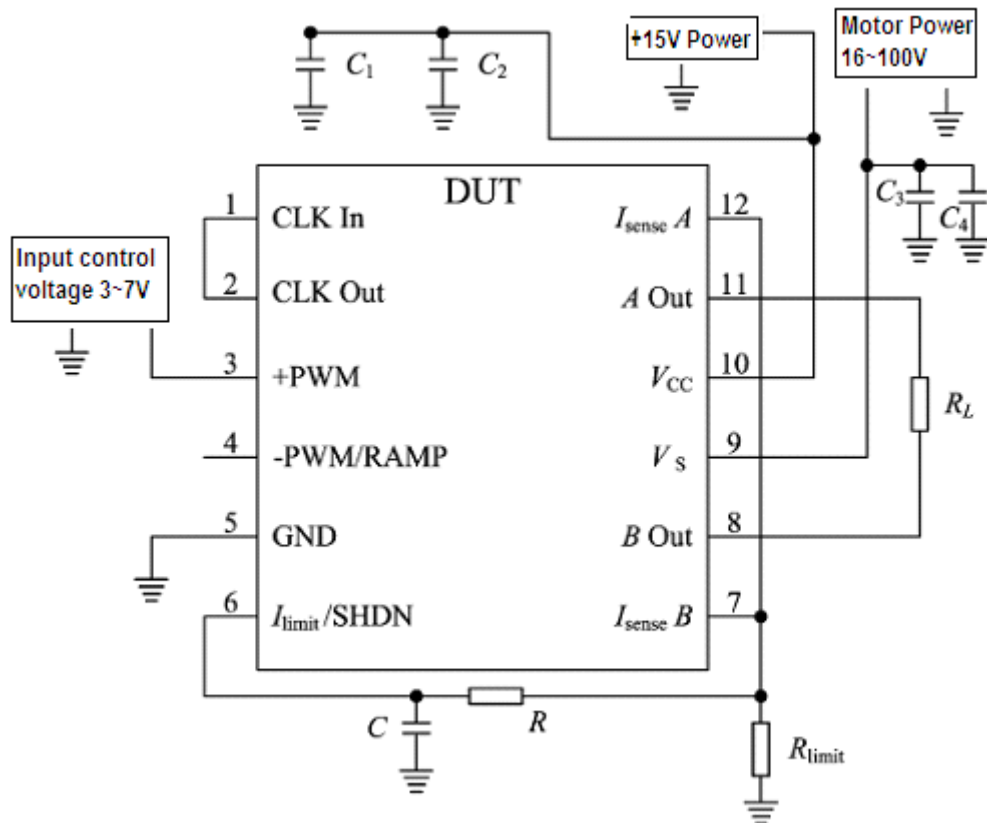


Fig 4 Typical connection diagram

7.1 Power supply bypass

HSA04 power supply should have plenty of bypass to ensure its correct operation, the motor power supply should add a ceramic capacitor C_3 , and then in parallel with a low ESR value of the bypass capacitor C_4 , the capacitance should be at least $10\mu\text{f} / \text{A}$. for VCC the same, a $0.1 \mu\text{F}$ - $0.47\mu\text{F} / 50\text{V}$ ceramic capacitor C_1 and a low ESR value of $6.8\mu\text{F}$ - $10\mu\text{F} / 50\text{V}$ bypass capacitor C_2 . All bypass capacitors should be connected as close as possible to the corresponding root of power port.

7.2 Unprotected circuit typical connection diagram

If the system does not need current limiting protection circuit, you can see Figure 5 to connect.

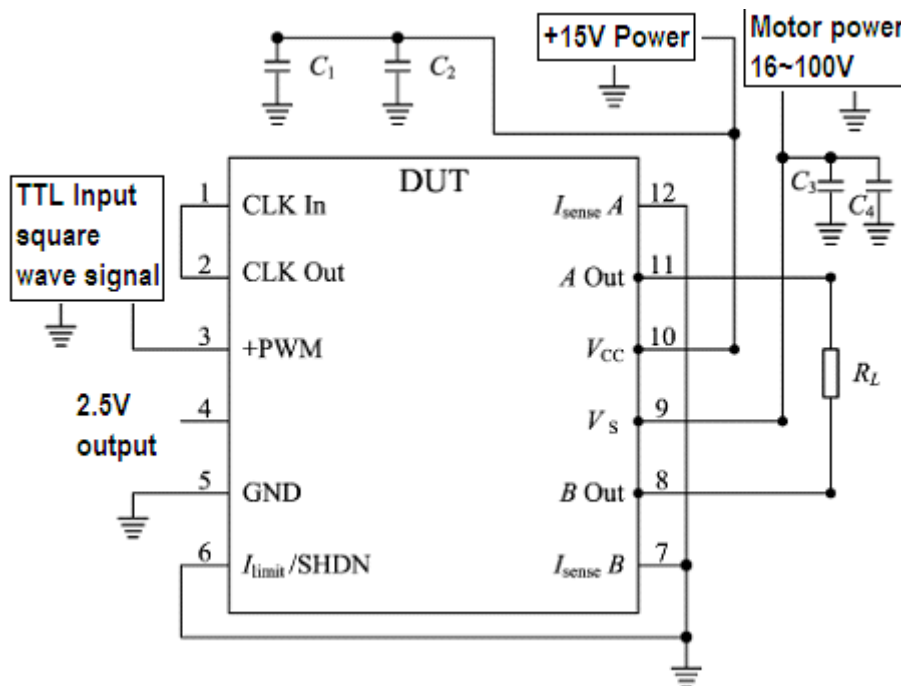


Fig 5 unprotected circuit typical connection diagram

8. Package Specifications

Package outline is shown as in fig 6.

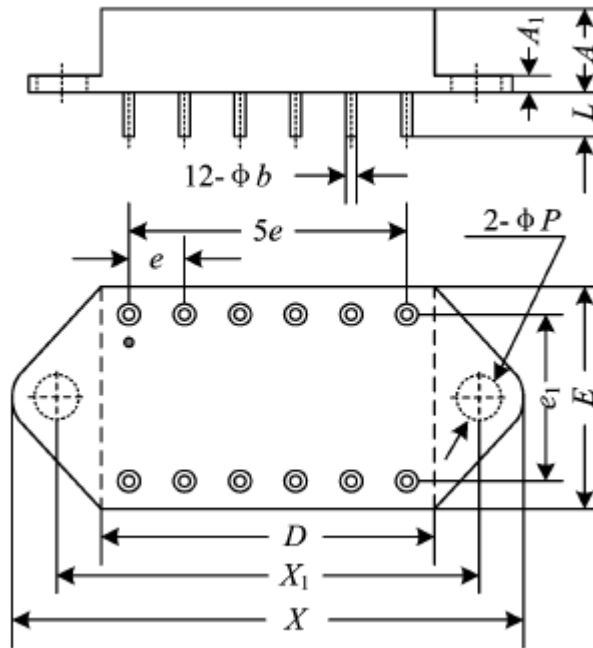


Fig6 package outline drawing

Form 4 Package Outline

Symbol	Data/mm		
	Min	Typical	Min
A	-	-	6.99
A_i	2.28	-	2.44
ϕb	1.47	-	1.57
D	-	-	40.40
E	-	-	40.40
e	-	5.08	-
e_1	-	30.48	-
L	11.43	-	12.70
X_1	49.56	-	49.96
X	-	-	58.90
ϕP	3.80	-	4.20



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