

PWM power amplifier (MPA2504)

1. Features (for outside view, see Fig. 1)

- Soldered metal package
- Max. output current reaches 10A
- Max. drive working voltage: 80V
- Input signal voltage outputs linear width-modulated square wave within the range of 0~0.2V
- Integrates signal processing and current amplification



Size : 90×65×16.5mm³; weight: 144g

Fig. 1 Outside view of MPA2504

2. Scope of application

Speed regulation and control of DC motor; inductive load of drive; C-D welding controller.

3. Description

Model MPA2504 PWM power amplifier adopts DC pulse width modulation (PWM) technology with strong functions, its circuit includes two parts: signal processing and power amplification. In this device, when the input signal falls within the range of 0~0.2V, input controls the width modulation of output, when the input signal is higher than 0.2V, the output becomes saturated. When MPO reaches above 100W, the output voltage is 27V and output continuous current is 10A. It can also be customized according to user's requirement. The circuit is a modular structure made in soldered metal package.

4. Electrical performance

Table 1 Rated conditions and recommended operating conditions

		Rated conditions	
Absolute rated value	max.	Positive supply voltage V ₊₁	17V
		Positive supply voltage V ₊₂	80V
		Negative supply voltage V ₋	-17V
		Reference input voltage (effective value)	30V
		Storage temperature range	-55~+105
Recommended operating conditions		Positive supply voltage V ₊₁	15V
		Positive supply voltage V ₊₂	28V
		Negative supply voltage V ₋	-15V
		Reference input voltage (effective value) V	26V
		Reference frequency f	2kHz
		Working temperature range (T _A)	-40~+85

Table 2 Electric characteristics

Parameter	MPA2504 Enterprise military standard(Q/HW20391-2003)			
	Condition	Max.	Min.	Unit
Output voltage	V ₊₂ = 28V	—	25	V
Output current	V ₊₂ = 80V	10	—	A
Output frequency	—	2.2	1.8	kHz
Reference input voltage	—	28.6	23.4	V
Reference signal frequency	—	2.2	1.8	kHz
Output duty cycle	0~0.2V input	5	95	%

5. Operating principle (Fig. 2)

The input signal of this circuit is sinusoidal modulated signal after switching between coarse and fine channels, this signal outputs a DC level signal through amplification of AC amplifier, phase discrimination, filtration and integral circuit, this DC level signal is compared with the triangular wave signal produced by the triangular wave generator in the pulse width comparator, and generates PWM square wave signal whose pulse width varies with DC level signal, this square wave signal produces four paths of independent drive signal through MOSEFT driver to drive four MOSEFT field-effect switching tubes of H bridge amplifier, respectively so as to

make H bridge work in two-polarity mode. The main theoretical basis of this circuit is the theory of DC pulse width speed control system.

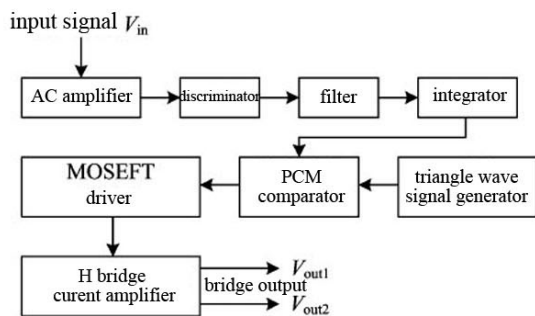


Fig. 2 Circuit block diagram

6 MTBF versus temperature curve(Fig. 3)

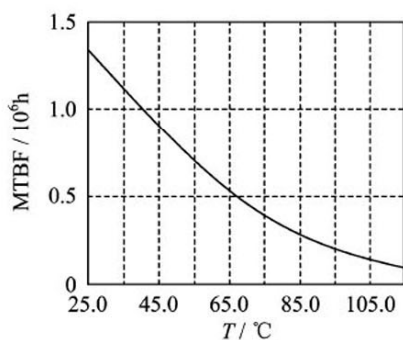


Fig. 3 MTBF vs temperature curve

7 Pin designation (Fig. 4, Table 3)

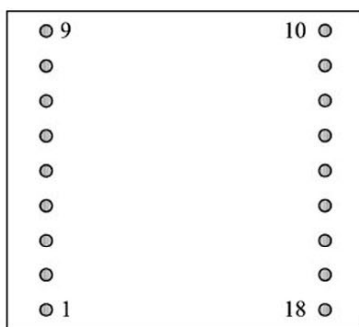


Fig. 4 Schematic diagram of pins(bottom view)

Table 3 Pin designation

Pin	Symbol	Function	Pin	Symbol	Function
1	V_{in}	input signal	10	out ₄	sampling output
2	NC	no connection	11	GND ₂	power signal ground
3	NC	no connection	12	TIAOLin	zeroing
4	V_{+1}	+15V power supply	13	out ₂	bridge output 2
5	Case	case ground	14	out ₁	bridge output 1
6	V_{-}	-15V power supply	15	out ₃	input signal detection output
7	V_{+2}	power supply	16	-in	inverting input of DC amplifier
8	R_{Hi}	excitation input high end	17	+in	non-inverting input of DC amplifier
9	R_{Lo}	excitation input low end	18	V_{PID}	PID adjusting input

8. Connection diagram for typical application (Fig. 5)

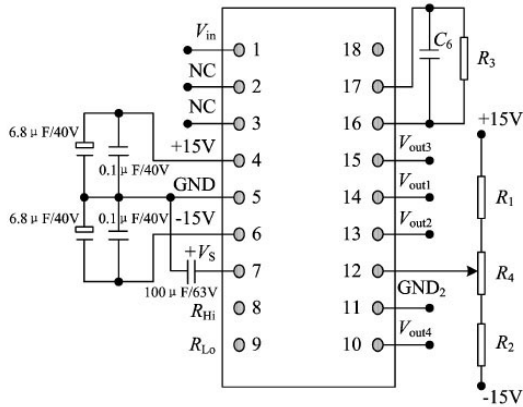


Fig. 5 Connection diagram for typical application

Operating instructions

Connect the circuit according to Fig. 5, C_6 and R_3 are the feedback elements of DC amplification stage in the circuit. R_3 can take 20K Ω . R_1 , R_2 and R_4 are used for zero adjustment of the system.

Pin 7 is input end of 28V power supply, pin 4 and 6 are input ends of +15V and -15V power supply respectively, pin 7 needs to be connected with 100 μ F/63V decoupling capacitance and 0.1~1 μ F/40V high frequency ceramic dielectric capacitance, pin 4 and 6 need to be connected with 6.8 μ F/40V decoupling capacitance and 0.1~1 μ F/40V high frequency ceramic dielectric capacitance.

9. Package specifications (Fig. 6, Table 4)

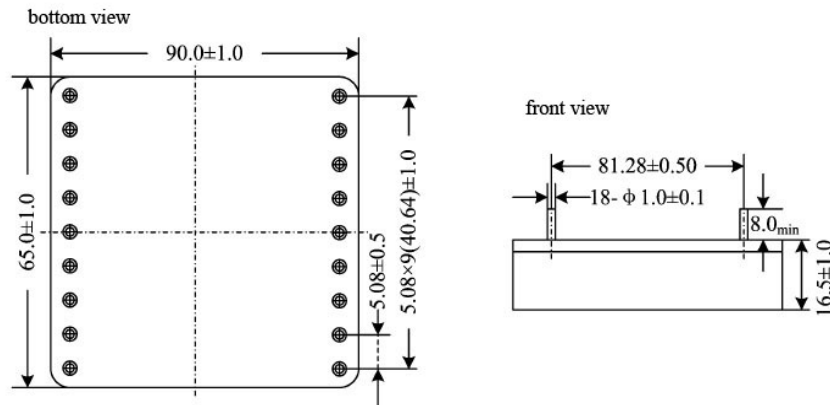


Fig. 6 Outside view and dimensions of package

Table 4 Case materials

Case model	Header	Header plating	Cover	Covering plating	Pin material	Pin plating	Sealing style	Notes
PP9065 -18	Cold rolled steel (08AL)	Ni/Sn	Cold rolled steel (08AL)	Ni/Sn	Fe-Ni alloy (4J50)	Ni/Sn	Pressure packaging	

10. Part numbering key (Fig. 7)

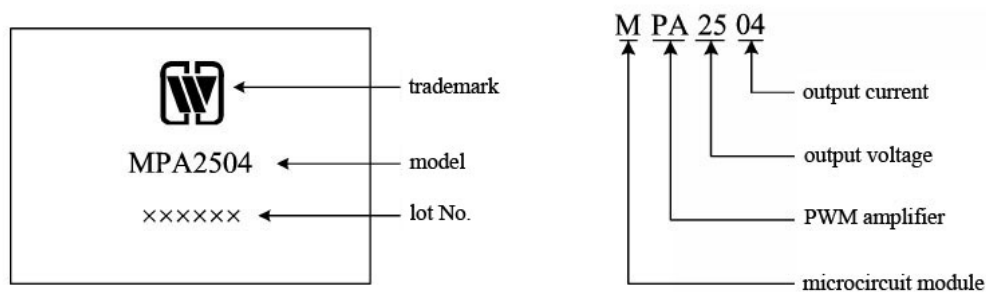


Fig. 7 Part numbering key

Note: Product of different input power and frequency can be customized according to user's requirements.

Application notes

When measuring the output waveform between A_{out} and B_{out} of the product with an oscilloscope, the input power supply plug of the oscilloscope shall be 2-phase.

Supply voltage must be kept to the voltage of correct polarity.
When the user places an order for the product, detailed electric performance indexes shall refer to the relevant enterprise standard.