1 properties

High level of integration

GDT has two output

Maximum support 20Apeak current support

large-capacity drive full-bridge

2 Application

Double resonance Tesla coil

Tesla coil SKP

3 Description

KC15051 Tesla coil is a general purpose controller. It supports the DR (double resonance Tesla coil), SKP (jump pulse Tesla coil).

A single power supply, either AC or DC support for users to save rectifier power supply controller circuit. A storage capacitor having a large capacity to support longer On time, the controller and reduces the power requirements of pulsed power. GDT driving last stage with low R_{on} MOSFET full bridge, driving current 20Apeak maximum support, so that the full-bridge power switch having a steeper edge, effectively reduce the switching loss. Built GDT dual drive, allows the user to use the large-capacity full-bridge to replace a five three winding into two winding GDT GDT, GDT design reduces the difficulty and reduce the switching power loss of the full bridge.

Version 4

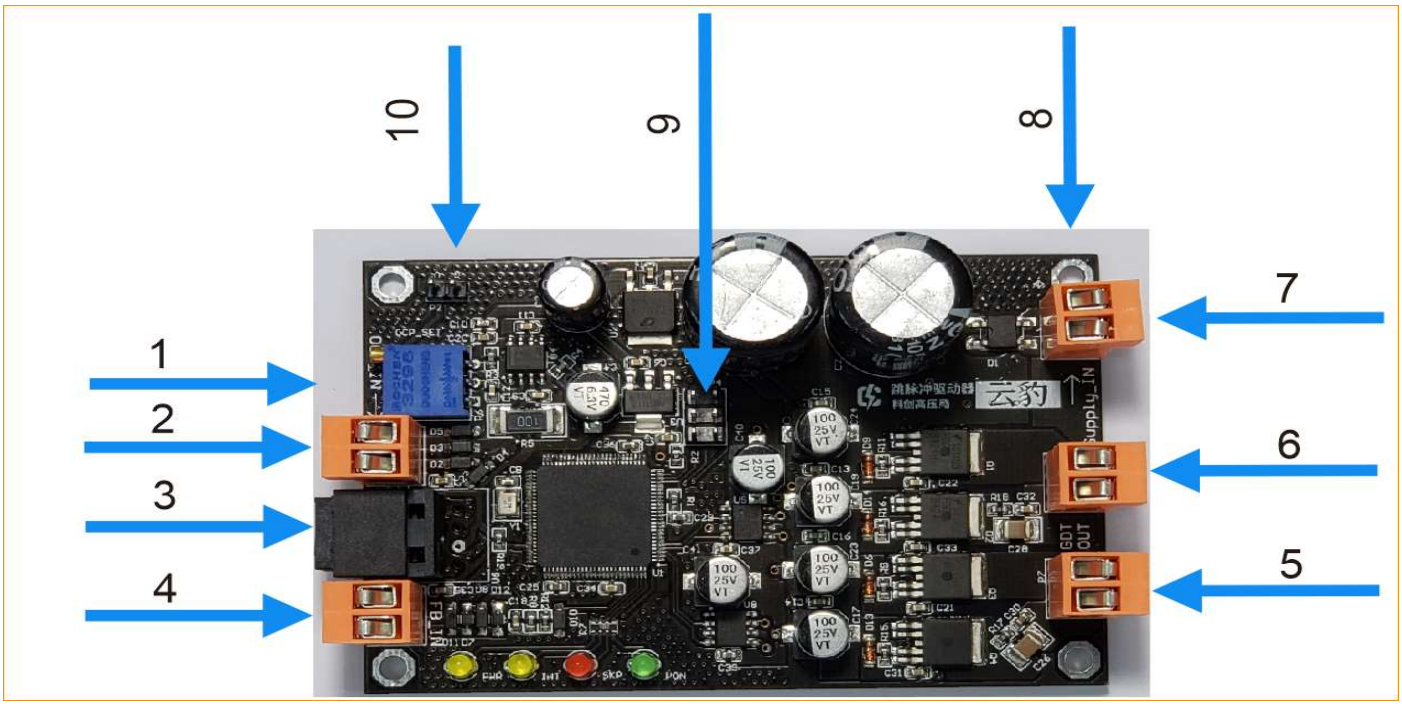
V1.0

Revision History

version number	Revision Date	Remark
V1.0	2018/12/9	initial version

5 pin definitions

5.1, the pin definitions



1, the pin definitions

Numbering	Mark	I / O	description
1	OCP_SET	-	Overcurrent point adjustment potentiometer
2	OCP_IN	I	Current feedback terminal
3	OPT	I	Optical interface
4	FB_IN	I	Voltage feedback terminal
5	GDT	O	A GDT output terminal
6	GDT	O	GDT B output terminal
7	Supply_IN	-	A power supply terminal
8	G	-	Ground terminal
9	P4	- NC	

5.2 Indicator

2, indicator function

name	Features
PWR	Power Indicator
INT	Indicator optical input
SKP	Overcurrent indicator
PON	Voltage feedback input indicator

6 Specifications

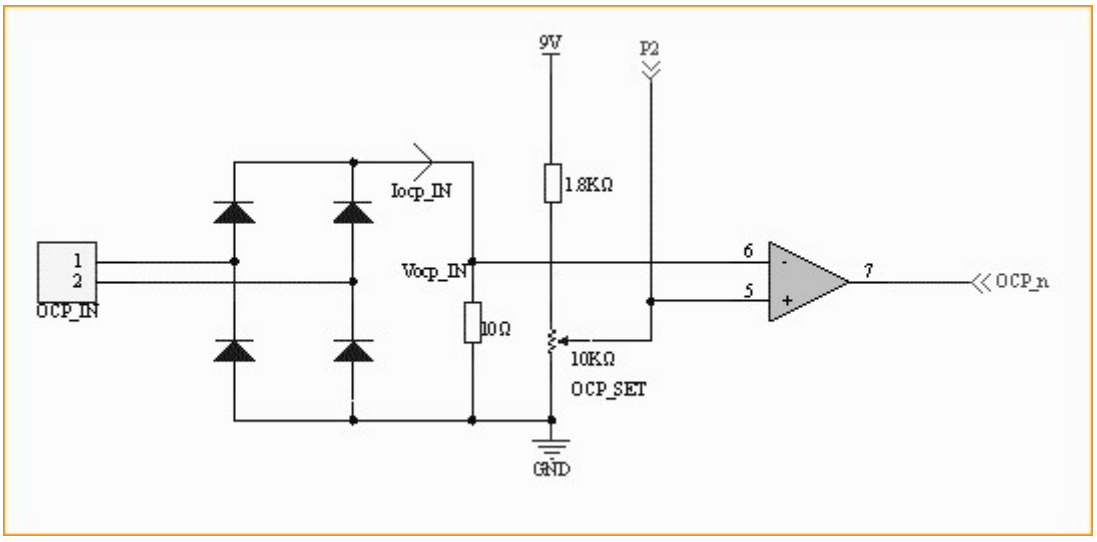
6.1 Absolute Maximum Ratings

		MIN	MAX	UNIT
Voltage	A power supply voltage, AC input terminal 7	9	15	V
	A power supply voltage, the DC input terminal 7	12	25	V
	OCP_IN rms	-	3	V
	OCP_IN peak	8	8	V
	FB_IN peak	3.3	-	V
Electric current	OCP_IN rms	-	900	mA
	FB_IN rms	-	900	mA
	GDT A, B terminal of the current peak		20	A
temperature	Ambient temperature	0	50	℃

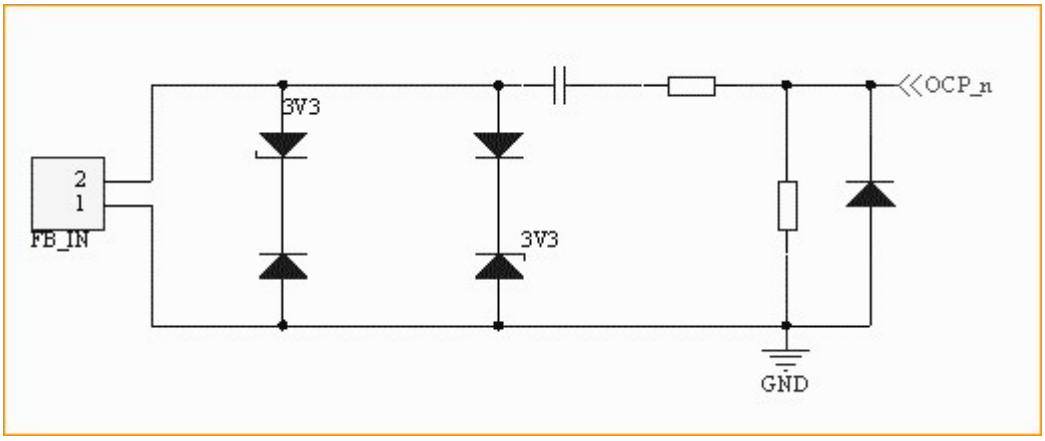
6.2 Recommended operating voltage

	MIN	MAX	UNIT
A power supply voltage, AC input terminal 7	12	14	V
A power supply voltage, the DC input terminal 7	12	twenty four	V

Principle 7 port



3, current feedback



4, voltage feedback

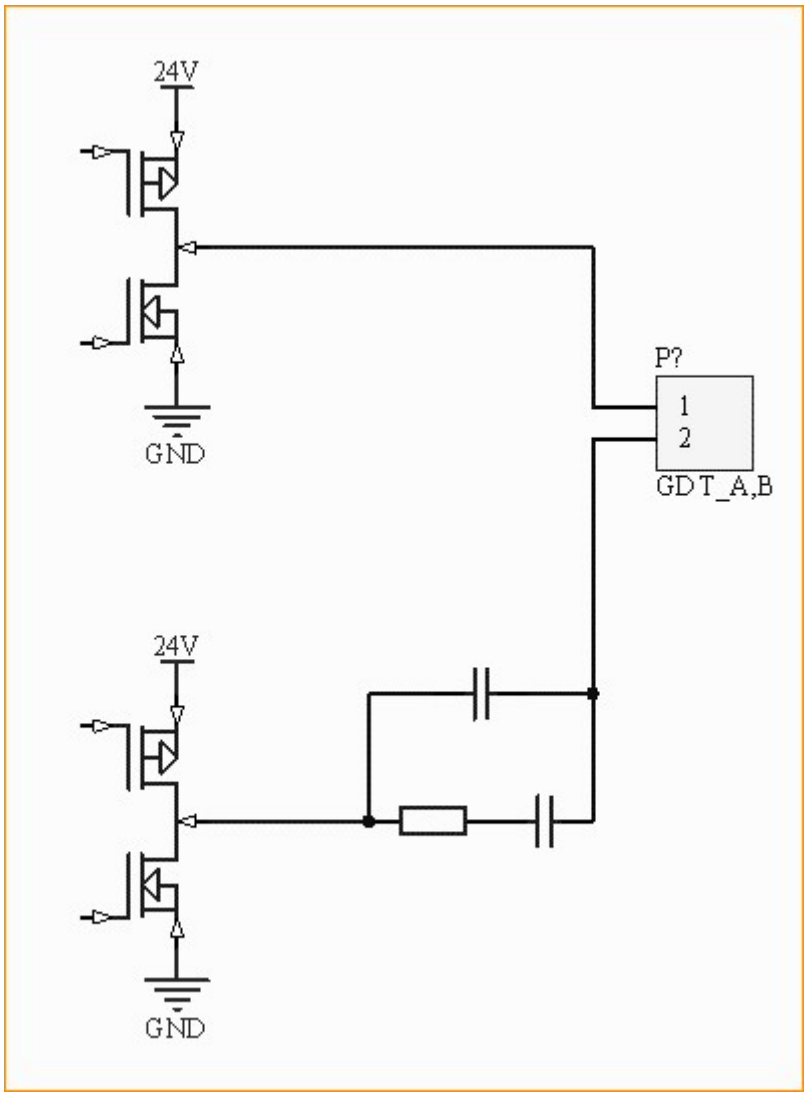


FIG 5, GDT final drive

8 Functional Description

1 OCP_SET

Adjusting the reference voltage of the overcurrent comparator Figure 3

10 may be set by measuring the terminal voltage detection reference voltage value

2 OCP_IN

Current feedback module shown in Figure 3.

After the feedback current IV converted Vocp_IN, Vocp_IN is compared with a reference voltage comparator 10 ohm resistor overcurrent after full-bridge rectifier into the CPLD. When the current comparator Vocp_IN reference voltage is greater than the triggering OCP. Work waveform shown in Figure 6

OCP_IN port input current and the current relationship between the signal voltage is Iocp_IN × 10 = Vocp_IN

3 FB_IN

Voltage feedback module shown in Figure 4

Voltage feedback signal is rectified by the limiter blocking capacitor into the CPLD.

note! This feedback signal affect the loop polarity reversal Tesla coil is not working properly or not oscillate.

4 GDT, AB drive

MOS driver using a full-bridge drive as GDT, the maximum allowed pulse current 20Apeak. GDT AB two output signals are in phase.

However, the end of the driver stage will be a slight common polymorphism at high frequency, the drive will cause severe fever, the present is not recommended for continuous high frequency driving drive applications.

5 G grounding terminal

Mounting holes at four corners of the driver only one hole near the power source is grounded, the other space are floating. Ground must follow the principle of a single point ground, PCB ground plane to avoid a large current flows

Fiber port 6

DLT1120 fiber needs with our dedicated interrupter use

If the interference environment is too large may cause self-excited optical head, can be solved by changing the capacitance C35 large modules

7 PWR indicator

When the power PWR drive access indicator lights

8 INT indicator

When the head receives the optical fiber when the useful signal INT indicator lights

9 SKP indicator

When current feedback signal is greater than the overcurrent comparator reference SKP indicator lights, and GDT output is closed until the current feedback signal is less than the overcurrent comparator reference.

10 PON lights

When a signal is input PON lights FB_IN

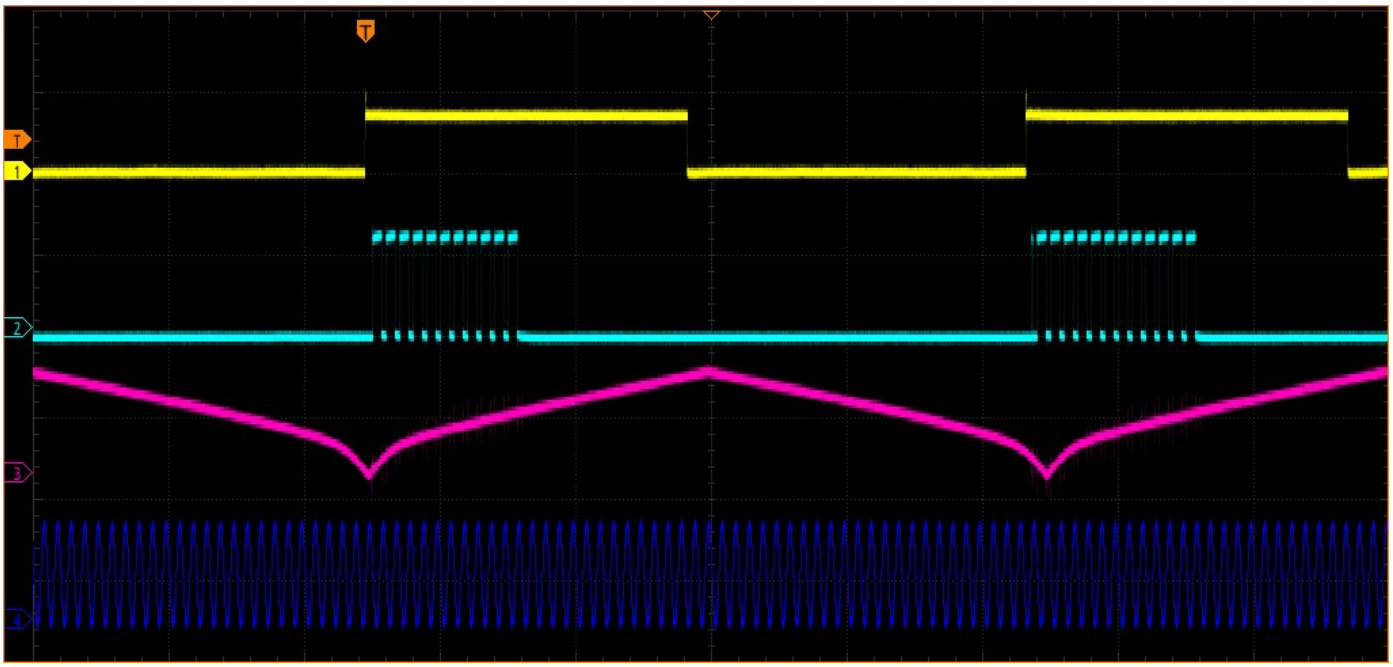
11 On time limit

On time is an interrupter input signal pulse width.

When the pulse width is greater than 10ms, it will be forced to stop outputting the clouded leopard On time work to avoid high power tube damage.

9 working wave

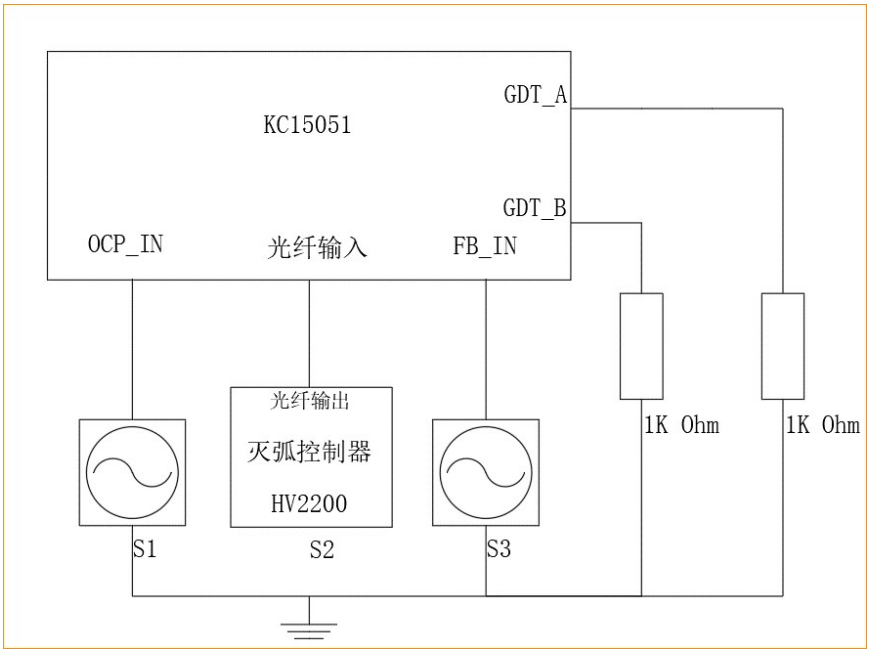
Test Conditions: FB_IN @ 100kHz optical input 1MHz @ OOK modulated carrier modulation 2kHz



An optical input signal envelope (yellow), 2 GDT (light blue), 3 OCP_IN (pink), 4 FB_IN (blue)

6, operational waveforms

The test circuit 10



7, testing principle

S3 @ 100Khz sine wave

S2 @ OOK modulated carrier modulation 1MHz 2kHz S1 @

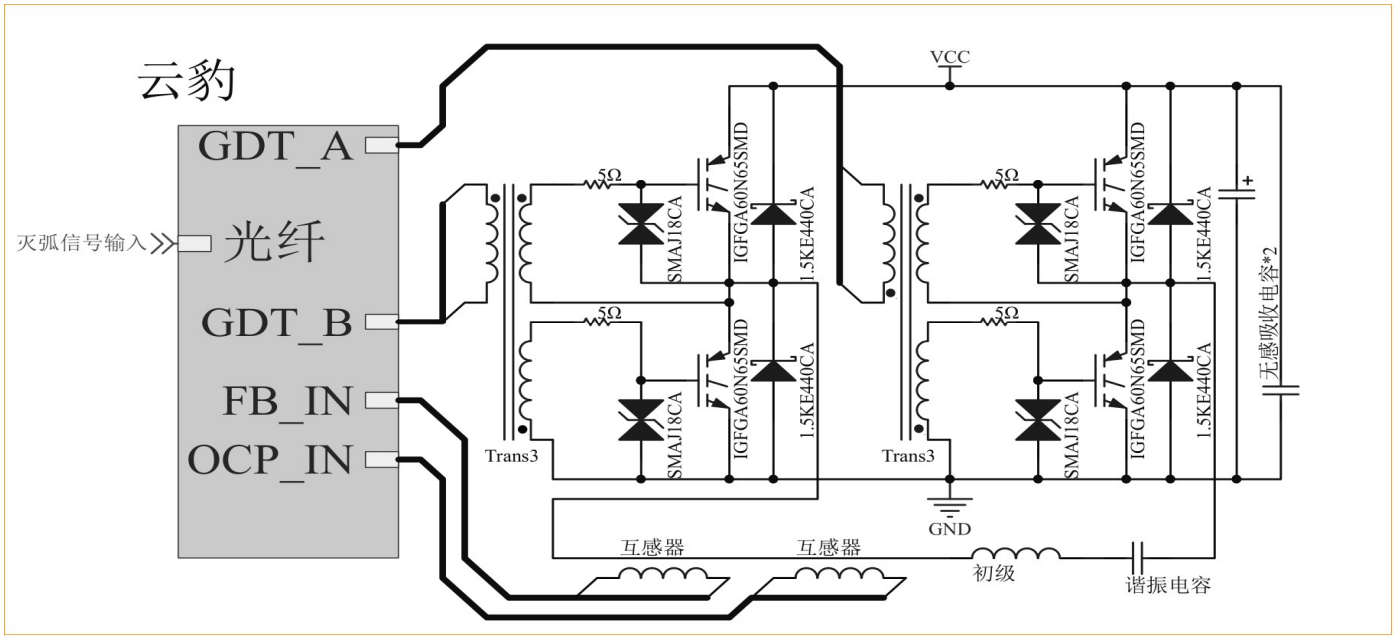
2Khz triangular wave measurement results shown in Figure 4.

FIG 62 is a port signal output GDT on either end of the ground voltage.

OCP_IN, FB_IN are close to the terminal pin OCP_SET potentiometer direction is positive, the other negative pins.

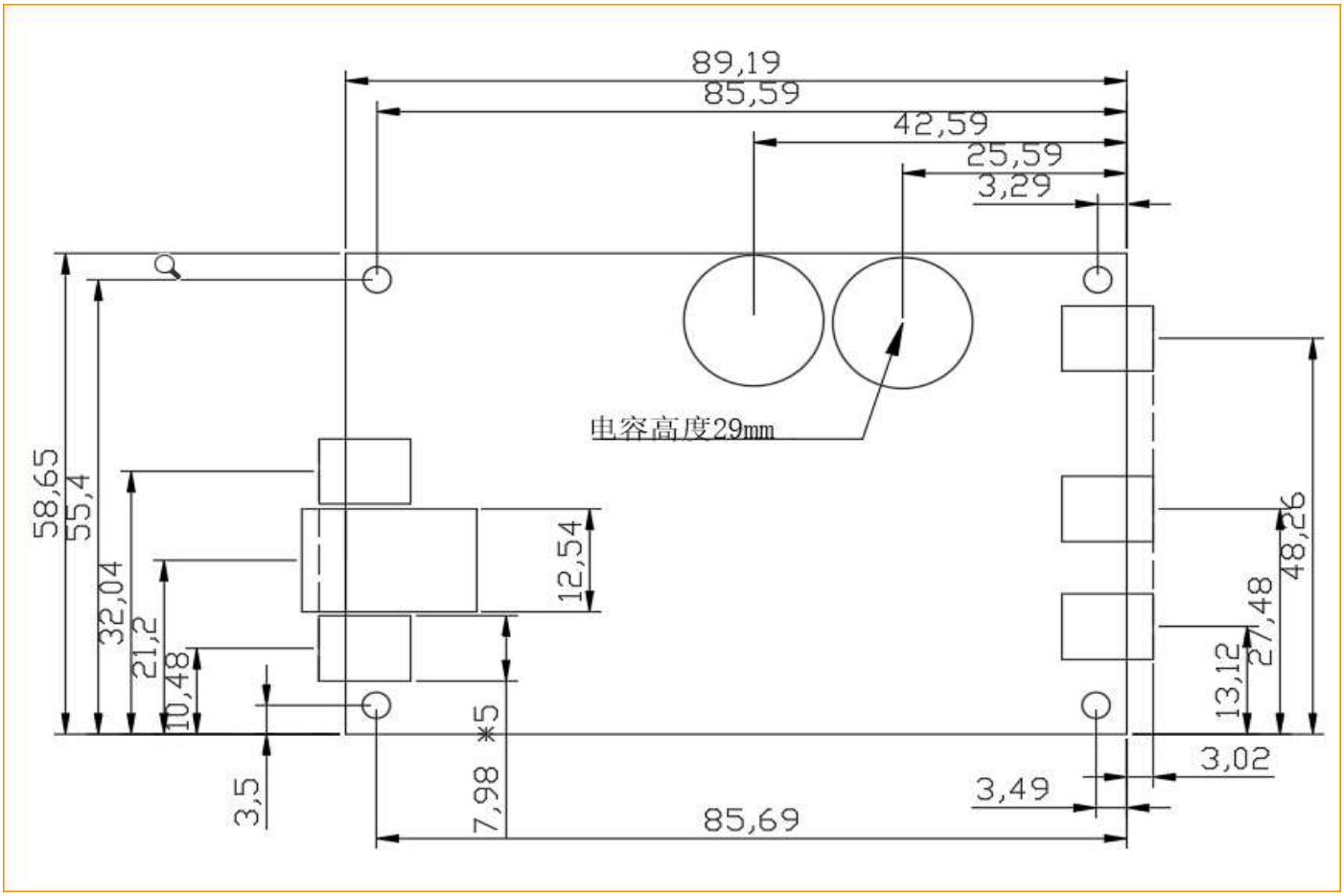
Quenching the controller (HV2200) set to AUTO, SKP mode, by adjusting the frequency, pulse width of two knobs, the output envelope adjusted to about 2kHz, 50% duty cycle rectangular wave.

11 typical wiring method



8, a typical wiring diagram

12 Mechanical Size



9, the mechanical dimensions

The dimensions of the unit is mm, recommended by substantially ± 0.5mm tolerance considerations, the connector according to ± 1mm tolerance consideration.

13 toxic and hazardous substances or elements

Part Name	Toxic and hazardous substances or elements					
	Lead (Pb)	Mercury (Hg) compartment (Cd)		Hexavalent chromium (Crd6 +)	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
PCBA	×	○	○	○	○	○
optical fiber	○	○	○	○	○	○

○ : Indicates the hazardous substance contained in all components in homogeneous materials were SJ / T 11363-2006 Limit requirement in the following standards.

×: represents the hazardous substance content of at least one homogeneous material of the part exceeds the SJ / T 11363-2006 The provisions of the standard limit requirements.

14 Packaging Availability

model	Fiber Model	From the bulk	Package dimensions	weight	Order No.
KC15051.01	BLT1120	1	180 * 100 * 117mm	350g	KC1505101

15 Notes

1 initial commissioning, make a full bridge work status of the test with low pressure. If high pressure, if the reverse polarity may damage FB_IN full bridge. Please use the feedback transformer 2 double ring transformer. Single phase mismatch may damage the magnetic transformer full-bridge. If the full bridge 3 can be used with smaller capacity single output driver 2 GDT arm.

Please ensure that the drive plate 4 between the single-point ground or grounding impedance is small enough, to avoid interference flows PCB ground plane. High voltage full bridge 5 is electrically check the polarity of GDT prior to avoid common-mode arm.

Tesla Coil 6 generates strong electromagnetic field work, the induced current in the metal around the electronic device, accompanied by strong electromagnetic radiation. 7 people with a non-invasive electronic medical devices. Interventional devices are equipped with electronic medical equipment must be kept away. Around 8 if electronic medical equipment, Tesla coil turn may cause malfunction of these devices, life-threatening.

9 Tesla coil, and make sure that the device is well grounded therearound, and maintaining a sufficient safety distance. (Note: not to split the arc does not mean absolute security, users must clearly know other threats Tesla coil).

Tesla coil 10 and the power control section are hazardous voltage, the charging operation can not; interrupter control box should be used without an optical fiber conductor means, like a radio communication with a Tesla coil, to avoid accidental leakage. Tesla coils have large-capacity storage device, which is still fatal after power voltage, must ensure that the charges are completely released when debugging.

Tesla coil operating circuit 11 and an arc produces high temperatures, the working process to ensure normal operation of cooling fan, and the prohibition is placed near explosives.

16 Disclaimer

Production and operation Tesla coil could result in personal injury or property damage, the risk is inherent in the Tesla coil, the application is necessarily knowing the Tesla coil, and not directly related to the quality of related products. Produced any adverse consequences of the use of Tesla coils have nothing to do with this device designers, manufacturers, distributors, users must bear all the consequences themselves. Otherwise, do not make the purchase, using Tesla coils and related equipment. The controller is not clouded leopard consumer goods, and is mainly used for professional medium-sized Tesla coil, must have the relevant expertise to purchase and use. Related parties under no obligation to determine whether the user has the expertise, the user does not bear any consequences of improper use.