

EG8010 Datasheets

(Single Phase Sinusoid Inverter ASIC)

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EG8010 DATASHEETS

1. Features

- **+5V single supply**
- **4 settings of output frequency can set by 2 pins**
 - 50Hz constant frequency sine-wave
 - 60Hz constant frequency sine-wave
 - 0-100Hz adjustable frequency sine-wave
 - 0-400Hz adjustable frequency sine-wave
- **2 modulation modes can set by 1 pin**
 - Unipolar modulation
 - Bipolar modulation
- **4 settings of dead time can set by 2 pins**
 - 300nS
 - 500nS
 - 1.0uS
 - 1.5uS
- **External 12MHz crystal oscillator**
- **23.4KHz Modulation frequency**
- **Output Voltage \ Current \ Temperature detect and handle**
- **3 seconds soft start can select by 1 pin**
- **USART communication support**
- **Voltage \ Current \ Temperature \ Frequency Display support by external LCD**
- **Parameters and functions customize support**

2. Description

EG8010 is a digital pure sine wave inverter ASIC (Application Specific Integrated Circuit) with complete function of built-in dead time control. It applies to DC-DC-AC two stage power converter system or DC-AC single stage low power frequency transformer system for boosting. EG8010 can achieve 50/60Hz pure sine wave with high accuracy, low harmonic and distortion by external 12MHz crystal oscillator. EG8010 is a CMOS IC that integrates SPWM sinusoid generator, dead time control circuit, range divider, soft start circuit, circuit protection, RS232 serial communication, 12832 serial LCD unit, and etc.

3. Application

- | | |
|-------------------------------------|---------------------------------------|
| ■ Single-Phase sinusoid inverter | ■ Digital Generator |
| ■ Solar power generation inverter | ■ Medium frequency power supply |
| ■ Wind power generation inverter | ■ Single-phase motor speed controller |
| ■ UPS(Uninterruptible power supply) | ■ Single-phase frequency transformer |

- Sinusoid light modulator
- Sinusoid voltage regulator
- Sinusoid generator
- Inverter welder

4. Pinouts

4.1. Pin map

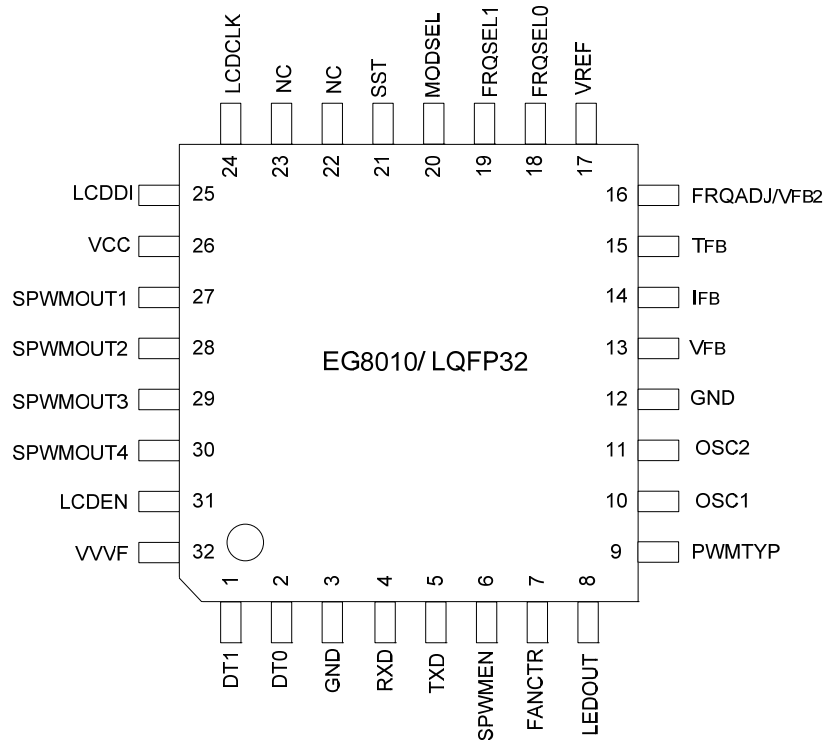







Figure 4.1EG8010 pin map

4.2. Pin descriptions

Designator	Name	I/O	Descriptions
26	VCC	VCC	Power supply
3,12	GND	GND	Ground
1	DT1	I	DT1, DT0: Dead time setup “00”: 300ns “10”: 1us “01”: 500ns “11”: 1.5us
2	DT0	I	
4	RXD	I	USART data receiver
5	TXD	O	USART data transmitter
6	SPWMEN	I	SPWM output enable: “0”:Disable “1”:Enable
7	FANCTR	O	Extern Fan control: It turns high to drive the extern fan when the temperature is over than 45°C. It turns low when the temperature is below 40°C.

8	LEDOUT	O	LED warning display: Normal:  Over current:  Over voltage:  Below voltage:  Over temperature: 
9	PWMTYP	I	PWM type select “0”: positive polarity PWM type, MOSFET on when SPWMOUT is high “1” positive polarity PWM type, MOSFET on when SPWMOUT is low Best configuring pin according to driver device and referring to the typical application schematic below, otherwise will result in both sides of MOS tubes conducting at the same time.
10	OSC1	I	12MHz extern crystal oscillator input
11	OSC2	I	12MHz extern crystal oscillator output
13	VFB	I	AC output voltage feedback input
14	IFB	I	AC output current feedback input
15	TFB	I	Temperature feedback input
16	FRQADJ/ VFB2	I	Frequency adjust input on Frequency adjust mode AC output voltage feedback input on Bipolar modulation mode
17	VREF	I	Voltage reference input
18	FRQSEL0	I	AC output frequency select, “00”: 50Hz “01”: 60Hz
19	FRQSEL1	I	“10”: 0-100Hz Frequency adjust mode “11”: 0-400Hz Frequency adjust mode
20	MODSEL	I	Modulation mode select “0”: Unipolar modulation mode “1”: Bipolar modulation mode
21	SST	I	Soft start enable “0”: Disable “1”: Enable
22, 23	NC	-	Not connect
24	LCDCLK	O	Clock signal of LCD serial bus
25	LCDDI	O	Data signal of LCD serial bus
27	SPWMOUT1	O	Right-high FET SPWMOUT of Full bridge
28	SPWMOUT2	O	Right-low FET SPWMOUT of Full bridge
29	SPWMOUT3	O	Left-high FET SPWMOUT of Full bridge
30	SPWMOUT4	O	Left-low FET SPWMOUT of Full bridge
31	LCDEN	O	Chip select signal of LCD serial bus
32	VVVF	I	Variable voltage variable frequency function enable: “0”: Disable “1”: Enable

5. Block Diagram

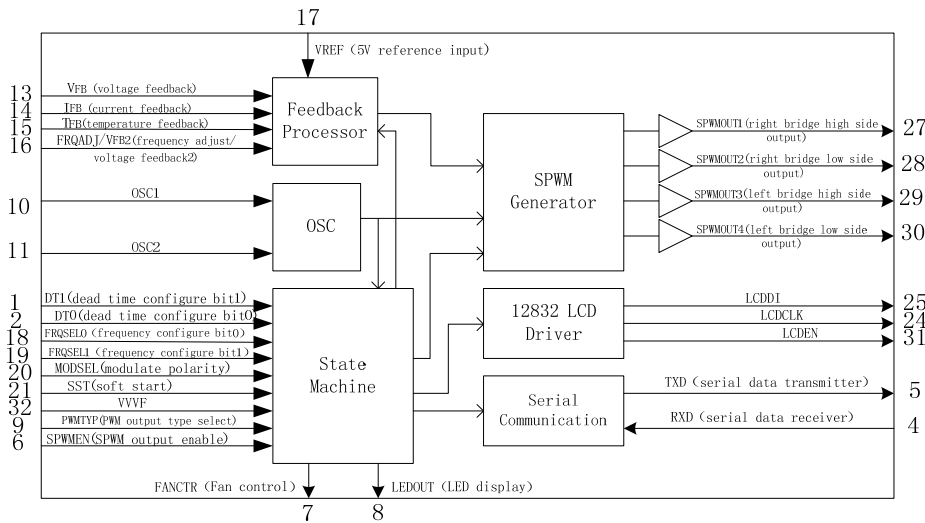


Figure 5-1. EG8010 block diagram

6. Typical Application schematic

6.1 EG8010+IR2110S Sinusoid inverter(unipolar modulation)

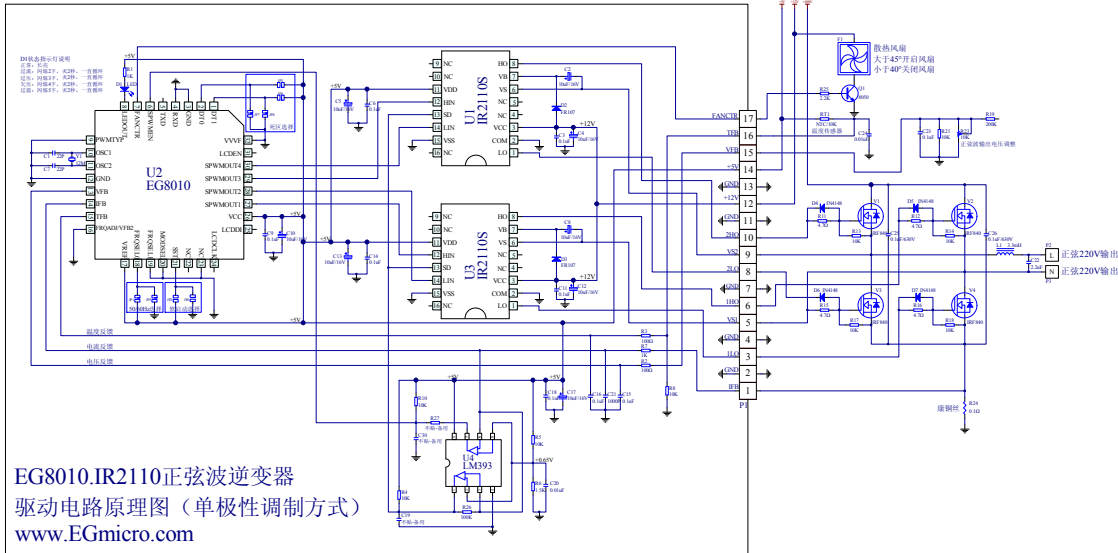


Figure 6-1. EG8010+IR2110S Sinusoid inverter (unipolar modulation)

Note:

- In constant frequency mode, 50Hz(FRQSEL1,FRQSEL0=00) or 60Hz(FRQSEL1,FRQSEL0=01), Pins FRQADJ/VFB2 and VVVF have no effect. AC output voltage is adjusted by the feedback resistor R23. This application can be used in as dimmer and voltage regulator.
- In variable frequency and constant voltage mode (Pin VVVF at "0" low electrical level) 0~100Hz(FRQSEL1,FRQSEL0=10)or 0Hz~400Hz(FRQSEL1,FRQSEL0=11), pin FRQADJ needs to connect an external adjustable resistor. Pin FRQADJ adjusts output frequency and R23 sets output voltage.
- In variable frequency and variable voltage mode (Pin VVVF at "1" high electrical level) 0~100Hz(FRQSEL1,FRQSEL0=10) or 0Hz~400Hz(FRQSEL1,FRQSEL0=11), pin FRQADJ needs to connect an external adjustable resistor. Pin FRQADJ sets output frequency and voltage. EG8010 maintains V/F as a constant. R23 sets output frequency at 50Hz when voltage effective value is 220V.

6.2 EG8010+IR2110S+Cross-conduction prevention logic Sinusoid inverter (unipolar modulation)

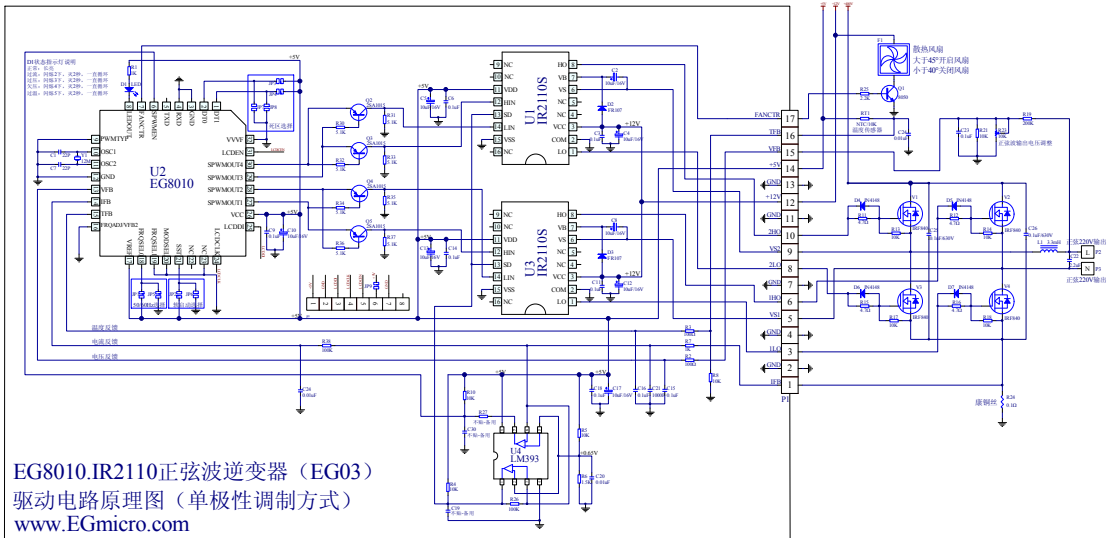


Figure 6-2. EG8010+IR2110S+cross-conduction prevention logic sinusoid inverter(unipolar modulation)

6.3 EG8010+IR2106SSinusoid inverter (unipolar modulation)

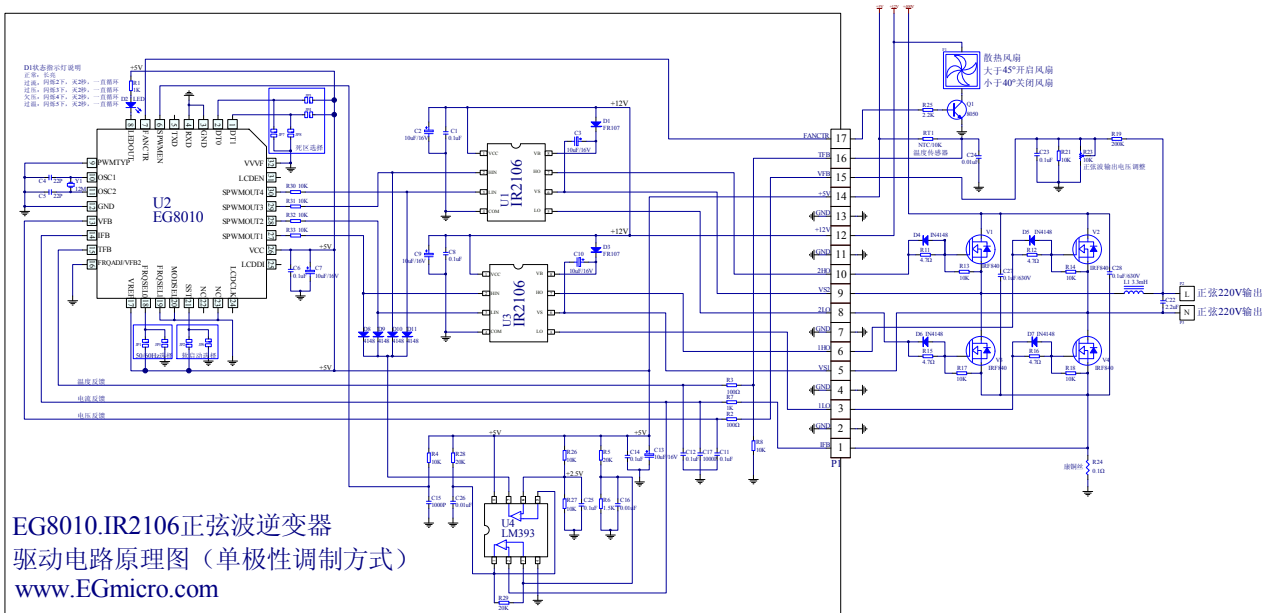


Figure 6-3. EG8010+IR2106S Sinusoid inverter (unipolar modulation)

Note:

- In constant frequency mode, 50Hz(FRQSEL1,FRQSEL0=00) or 60Hz(FRQSEL1,FRQSEL0=01), Pins FRQADJ/VFB2 and VVVF have no effect. AC output voltage is adjusted by the feedback resistor R23. This application can be used in as dimmer and voltage regulator.
- In variable frequency and constant voltage mode (Pin VVVF at "0" low electrical level) 0~100Hz(FRQSEL1,FRQSEL0=10)or 0Hz~400Hz(FRQSEL1,FRQSEL0=11), pin FRQADJ needs to connect an external adjustable resistor. Pin FRQADJ adjusts output frequency and R23 sets output voltage.
- In variable frequency and variable voltage mode (Pin VVVF at "1" high electrical level) 0~100Hz(FRQSEL1,FRQSEL0=10) or 0Hz~400Hz(FRQSEL1,FRQSEL0=11), pin FRQADJ needs to connect an external adjustable resistor. Pin FRQADJ sets output frequency and voltage. EG8010 maintains V/F as a constant. R23 sets output frequency at 50Hz when voltage effective value is 220V.

6.4 EG8010+TLP250 Sinusoid inverter (unipolar modulation)

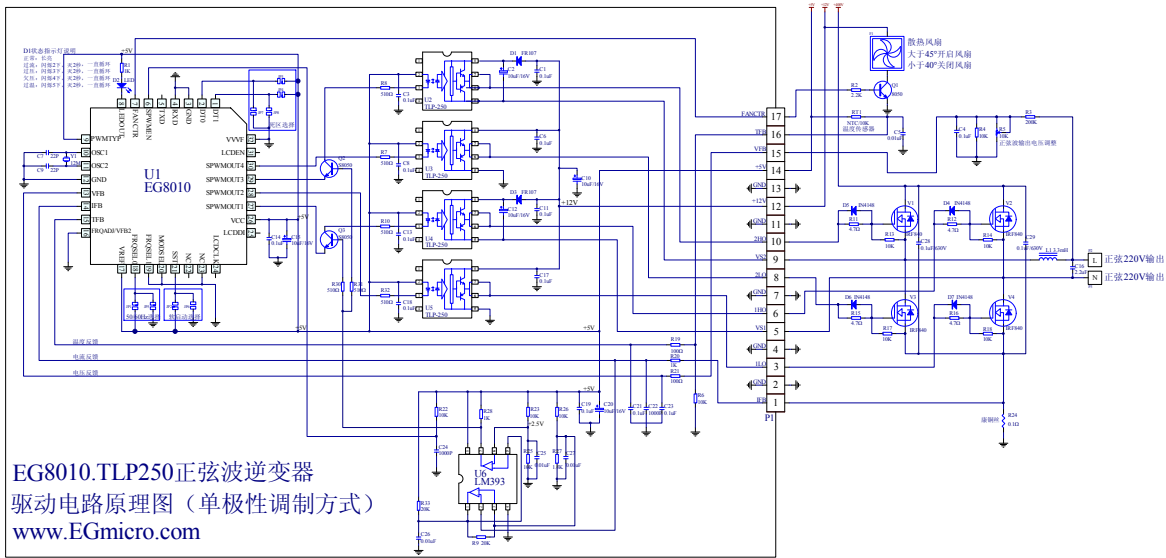


Figure6-4. EG8010+TLP250 Sinusoid inverter (unipolar modulation)

Note:

- In constant frequency mode, 50Hz(FRQSEL1,FRQSEL0=00) or 60Hz(FRQSEL1,FRQSEL0=01), Pins FRQADJ/VFB2 and VVVF have no effect. AC output voltage is adjusted by the feedback resistor R23. This application can be used in as dimmer and voltage regulator.
- In variable frequency and constant voltage mode (Pin VVVF at "0" low electrical level) 0~100Hz(FRQSEL1,FRQSEL0=10) or 0Hz~400Hz(FRQSEL1,FRQSEL0=11), pin FRQADJ needs to connect an external adjustable resistor. Pin FRQADJ adjusts output frequency and R23 sets output voltage.
- In variable frequency and variable voltage mode (Pin VVVF at "1" high electrical level) 0~100Hz(FRQSEL1,FRQSEL0=10) or 0Hz~400Hz(FRQSEL1,FRQSEL0=11), pin FRQADJ needs to connect an external adjustable resistor. Pin FRQADJ sets output frequency and voltage. EG8010 maintains V/F as a constant. R23 sets output frequency at 50Hz when voltage effective value is 220V.

6.5 EG8010+IR2110S Sinusoid inverter (bipolar modulation)

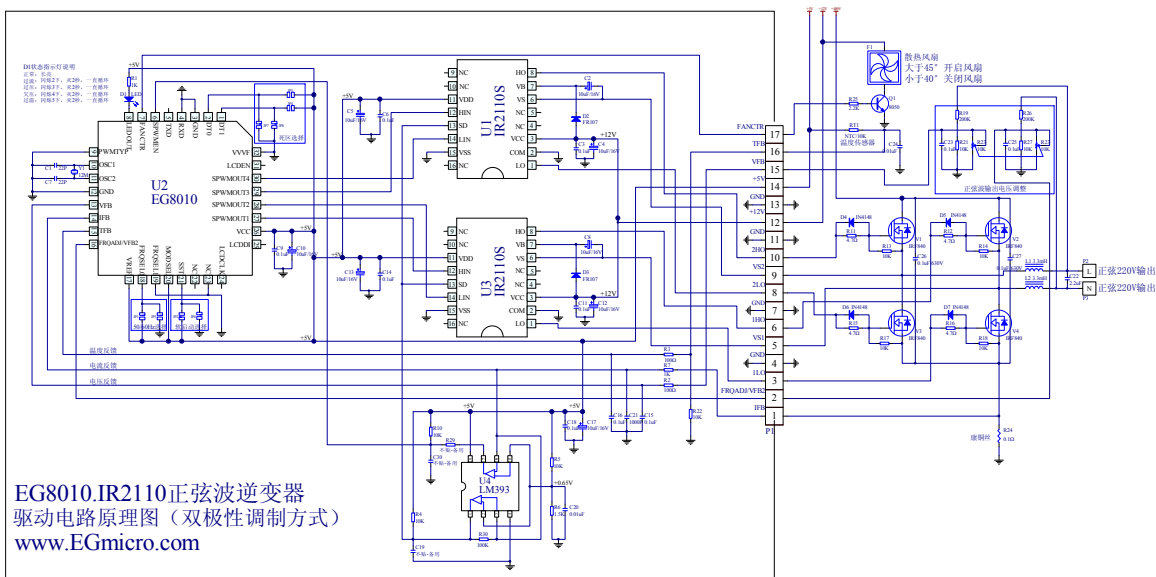


Figure 6-5. EG8010+IR2110S Sinusoid inverter (bipolar modulation)

Note:

- In bipolar modulation at constant frequency mode 50Hz(FRQSEL1,FRQSEL0=00) or 60Hz(FRQSEL1,FRQSEL0=01), pin 20(MODESEL) connects to high level. AC output voltage is adjusted by resistor R23.
- Bipolar modulation mode does not support variable adjustment.

6.6 EG8010+IR2110S Sinusoid inverter (low power frequency transformer)

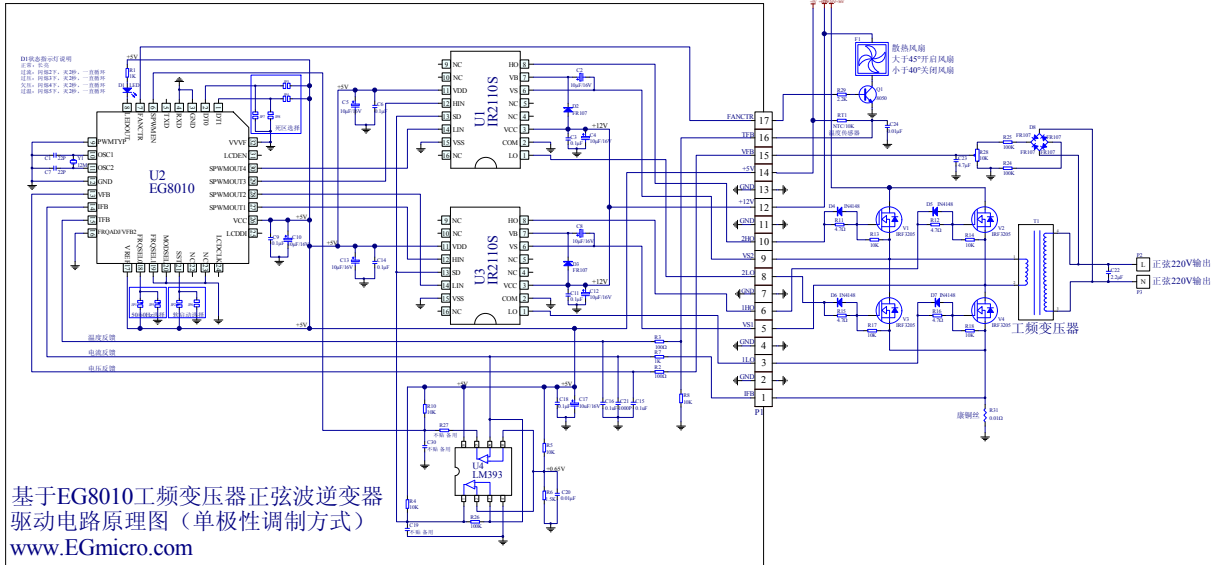


Figure 6-6. EG8010+IR2110S Sinusoid inverter (low power frequency transformer)

Note:

1. T1 needs to use low power frequency transformer. Transformer filters PWM high frequency signal by connecting its secondary turns to a 2.2uF/400V capacitor of CBB. After filtering, it outputs 50Hz/60Hz sinusoid.
2. For full-bridge power MOSFET choose low $R_{ds(on)}$ MOSFET according to the input voltage.

7. Electrical Characteristics

7.1 Absolute maximum ratings

TA=25°C unless otherwise specified.

Symbol	Ratings	Conditions	Min	Max	Unit
VCC	Supply voltage	Respect to the GND	-0.3	6.5	V
I/O	Input voltage on any pin	Respect to the GND	-0.3	5.5	V
Isink	Output current sunk by any I/O and control pin	-	-	25	mA
Isource	Output current source by any I/Os and control pin	-	-	-5	mA
TA	Ambient Temperature	-	-45	85	°C
Tstr	Storage temperature	-	-65	125	°C

Note: Exceeding extreme conditions may permanently damage the chip. EG8010's reliability may be affected running at the extreme conditions for a long time.

7.2 Typical ratings

TA=25°C, Vcc=5V, OSC=12MHz unless otherwise specified.

Symbol	Ratings	Conditions	Min	Typical	Max	Unit
Vcc	Supply voltage	-	2.7	5	5.5	V
VREF	Reference voltage	-	-	5	-	V
I/O	Input voltage	Respect to the GND	0	-	5	V
Icc	Supply current	Vcc=5V, OSC=12MHz	-	10	15	mA
VFB	Voltage feedback	Vcc=5V	-	3.0	-	V
IFB	Current feedback	Vcc=5V	-	0.5	-	V
TFB	Temperature feedback	Vcc=5V	-	4.3	-	V
Vin(H)		Vcc=5V	2.0	5.0	5.5	V
Vin(L)		Vcc=5V	-0.3	0	1.0	V
Vout(H)		Vcc=5V, IOH=-3mA	3.0	5.0	-	V
Vout(L)		Vcc=5V, IOL=10mA	-	-	0.45	V
Isink		-	-	-	20	mA
Isource		-	-	-	-3	mA

8. Application note

8.1 AC Output Voltage Feedback

EG8010 works under two modulation modes: unipolar modulation and bipolar modulation. Under unipolar modulation, only one bridge (EG8010 pins SPWMOUT3 & SPWMOUT4) is used for SPWM modulate output, and another bridge (EG8010 pins SPWMOUT1, SPWMOUT2) is used for fundamental wave output. A filter inductor needs to connect to SPWM output port, and a voltage feedback circuit needs to connect to SPWM inductor's output port(as shown in Fig 8.1a). Under bipolar modulation, both bridges (EG8010 pins SPWM3, SPWM4, SPWM1, SPWM2) are used for SPWM output. Using both inductors will result in better filtering, a voltage feedback circuit need difference and feedback handling by voltage divider of both channels (as shown in Fig 8.c).

Under unipolar modulation, EG8010's voltage feedback process is through measuring the AC voltage output of inverter by pin(13)VFB. Pin (16)FRQADJ/VFB2 only functions as FRQADJ, while VFB2 feedback has no effect. For such voltage sampling and feedback circuit shown in Fig 8.1a, it calculates the error between measured peak voltage and the sinusoid voltage reference (3V), and adjusts the output voltage accordingly. When output voltage increases, the pin voltage increases. The circuit does the error calculation and adjust range divider factor, therefore decreases the voltage to achieve voltage stabilization. Conversely, as the voltage on this pin decreases, the chip will increase output voltage.

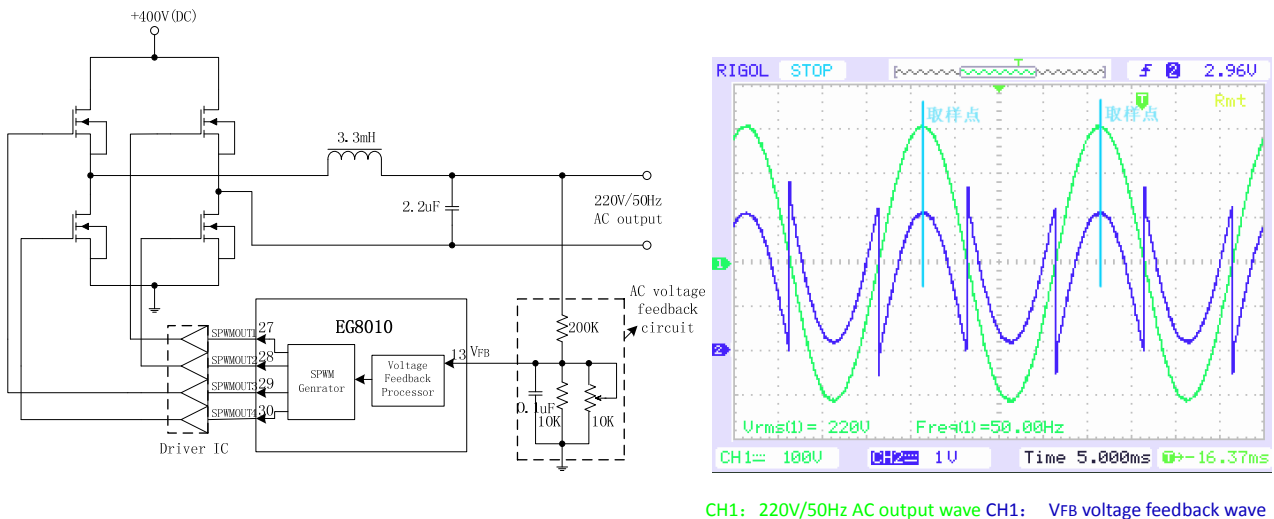


Figure 8.1a EG8010voltage sampling and feedback circuit under unipolar modulation

Figure 8.1bObservedSPWM unipolar modulation sinusoid output and VFB feedback wave

Figure 8.1b is the actual testing wave under unipolar modulation. EG8010 uses the peak point sampling to output voltage, which has advantages of accurate voltage stabilization and short voltage adjustment time. If output voltage is deviated by some reasons such as change of load or input voltage, EG8010 can recover to expected output voltage in one to three AC cycle.

Under bipolar modulation, EG8010's voltage feedback process is through measuring the output voltage of the left bridge by pin VFB2. Pin (16)FRQADJ/VFB2 only functions as VFB2 to measure the output voltage of right bridge, while FRQADJ has no effect at this time. For such voltage feedback circuit shown in Fig 8.c, it calculates the error between peak differential voltage measured by two channels differential feedback and the sinusoid max voltage reference (3V), and adjusts the output voltage accordingly. The circuit does the error calculation and adjust range divider factor to achieve voltage stabilization. Bipolar modulation can adjust to expected output voltage in one to three AC cycle as well.

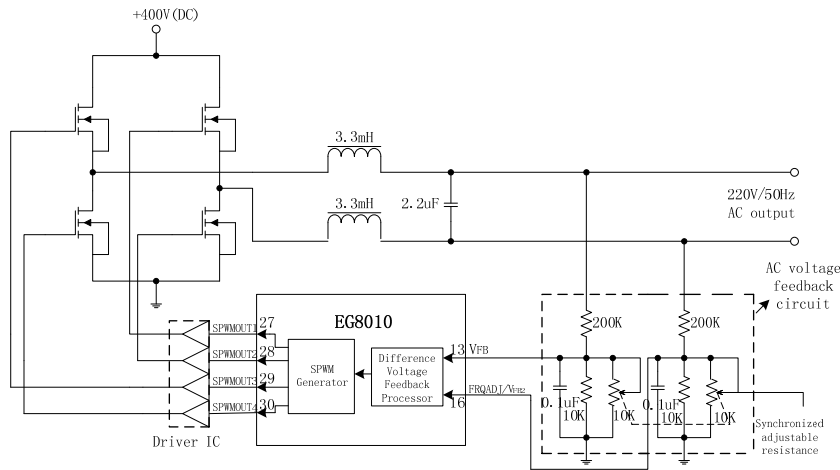


Figure 8.1cEG8010Outputvoltage feedback circuit under bipolar modulation

To prevent output voltage is too low or too high when supply to the load, EG8010 has integrated overvoltage and undervoltage protection. Overvoltage protection is set at 3.15V with 300mS delay. Undervoltage protection is set at 2.75V with 3S delay. When either situation happens, depending on pin (9)PWMTYP's setting, EG8010 will set the level of SPWMOUT1 to SPWMOUT4 at "0" or "1", and shut down all power MOSFET to decrease the voltage to zero. Eight seconds after overvoltage or undervoltage protection activates, EG8010 will turn on power MOSFET for 100ms to re-determine output voltage. If overvoltage or undervoltage issue still exists, EG8010 will repeat the process above every eight seconds. If EG8010 runs regularly for more than one minute, it will zero the counter of overvoltage and undervoltage. However, if EG8010 does not function regularly after five 8-second cycle, it will complete turn off the output of SPWM unit. It needs a hard reset to start again.

8.2 AC Output Current Feedback

Pin IFB measures the output load current for overcurrent protection detection. As the current sampling and feedback circuit shown in figure 8.1a, pin IFB's reference peak voltage is 0.5V and overcurrent detection time is 600mS. If current is higher than inverter's load current by some reason, EG8010 will set the electrical level of SPWMOUT1 to SPWMOUT4 at "0" or "1" and shut down all power MOSFET to decrease the voltage to zero depending on pin (9)PWMTYP's setting. This function mainly protects power MOSFET and the load. Sixteen seconds after overcurrent protection activates, EG8010 will turn on power MOSFET for 100ms to re-determine load current. If overcurrent issue still exists, EG8010 will repeat the process above every sixteen seconds. If EG8010 runs regularly for more than one minute, it will zero the counter of overcurrent. However, if EG8010

does not function regularly after five 16-second cycle, it will complete turn off the output of SPWM unit. It needs a hard reset to start again. If in some scenarios the starting current is relatively high and it takes longer timeto start, which overcurrent protection is not suitable, Pin IFB can beconnected to the ground.

8.3 Temperature Feedback

Pin TFB measures inverter’s environment temperature. Its main functions are overtemperature protection detection and displaying the environment temperature onto 12832 LCD. For temperature detection circuit shown in figure 8.3a, NTC thermal resistor RT1 and measuring resistor Rf1 form a simple voltage divider circuit. Voltage changes as the NTC resistance changes, and thus we can acquire the corresponding temperature. Thermal resistor has 10k resistance at 25°C(B=3380). Pin TFB’s overtemperature voltage sets at 4.3V. EG8010 will set the level of SPWMOUT1 to SPWMOUT4 at “0” or “1” and shut down all power MOSFET to decrease the voltage to zero depending on pin (9)PWMTYP’s setting. Once overtemperature protection activates, EG8010 will re-determine environment temperature. If pin TFB ‘s voltage is below 4.0V, EG8010 will turn off overtemperature protection and the inverter functions regularly. If overtemperature protection is not used, this pin needs to be grounded.

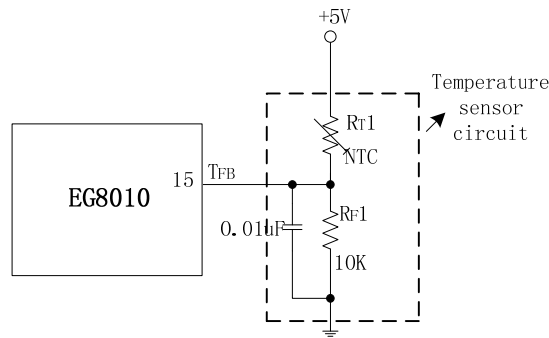


Figure 8.3a EG8010 Temperature detection circuit

8.4 PWM Output Type Set

Pin PWMTYP selects PWM’s output type. If PWMTYP is “0”, positive PWM output applies to the field where the dead level is meanwhile low(such as driver IR2110 or IR2106). Figure 8.4a is the output wave of pin SPWMOUT (high electrical level drives power MOSFET.)Figure 8.4b is an application schematic of drive IR2110 when PWMTYP= “0”.

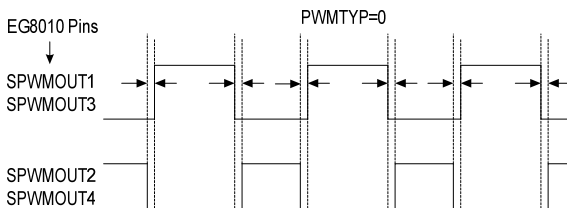


Figure 8.4a EG8010 Positive PWM output

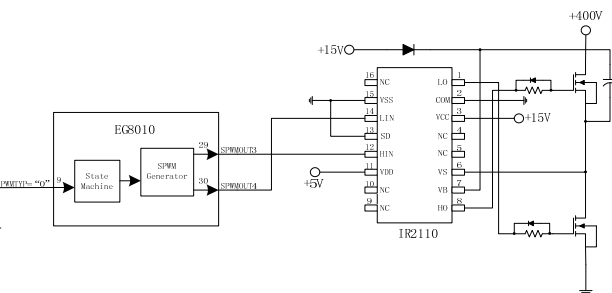


Figure 8.4b EG8010 Positive PWM driver IR2110

PWMTYP="1" outputs negative PWM and applies to the field where the dead level is meanwhile high (such as opticalcoupler's negative pole like TLP250). Figure 8.4c is the output wave of SPWMOUT. (low electrical level drives opticalcoupler and outputs high level drive power MOSFET),. Figure 8.4d is an application schematic of negative PWM type driver TL250 opticalcoupler.

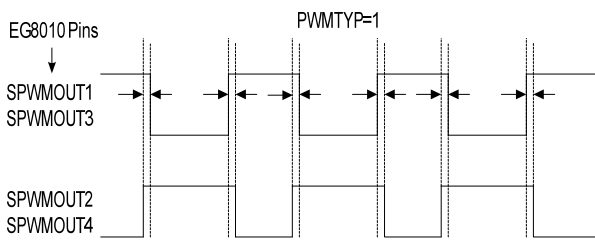


Figure 8.4c Negative PWM output

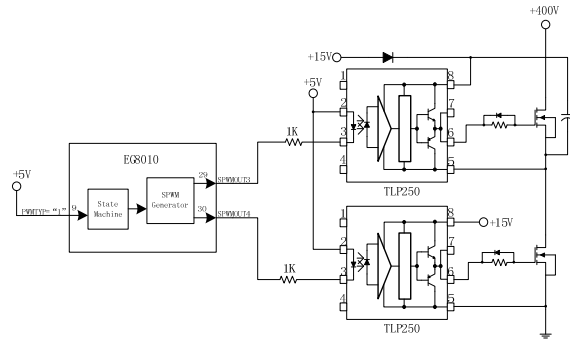


Figure 8.4d Negative PWM output drives TLP250

8.5 Dead Time Setting

Pin DT1, DT0 controls the dead time. Dead time control is one of the important characteristics of power MOSFET. Lack of enough dead time will result in the damage of MOSFET due to conduction. If the dead time is too long, it will lead to distortion of waveform and overheating of MOSFET. Figure 8.5a is EG8010's four dead time control settings. "00"= 300nS. "01"= 500nS. "10"= 1uS. "11"= 1.5uS.

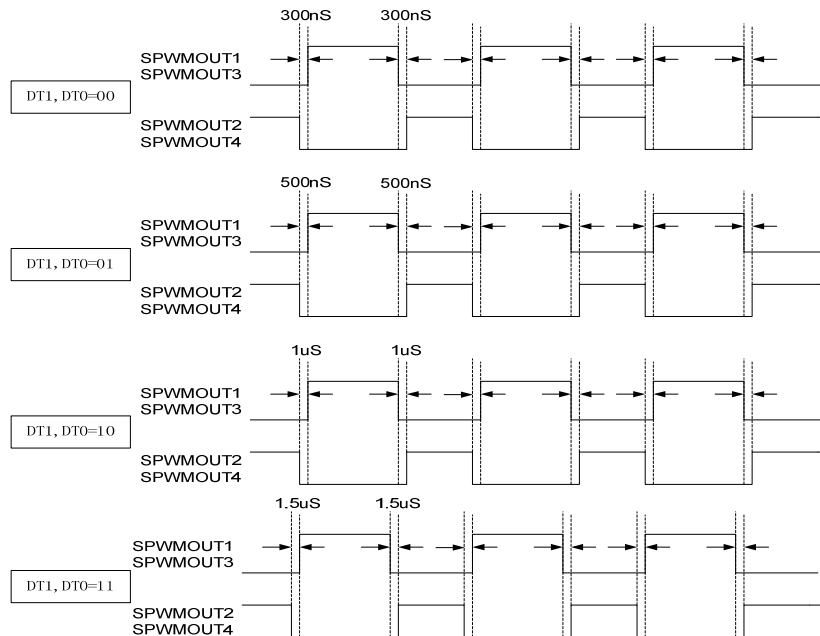


Figure 8.5a EG8010 Dead time control setting

8.6 Frequency Setting

EG8010 has two frequency modes: constant frequency mode and adjustable frequency mode. In adjustable frequency mode, EG8010 only uses unipolar modulation, and pin (20)MODSEL has to connect to low level. Pins FRQSEL1 and FRQSEL0 set the frequency mode. In constant frequency

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mode, “00” outputs 50Hz frequency and “01” outputs 60Hz frequency. FRQADJ has no function in constant mode. Pin (16) is used as VFB2 voltage feedback circuit under bipolar modulation. In adjustable frequency mode, “10” outputs frequency in range of 0-100Hz and “11” outputs frequency in range of 0-400Hz. Pin FRQADJ adjusts the frequency as shown in figure 8.6a. Pin FRQADJ’s voltage varies from 0-5V, which is corresponding to the fundamental wave output frequency from 0-100Hz or 0-400Hz. This function accompanies with pin VVVF can be used in the single phase frequency transformer system.

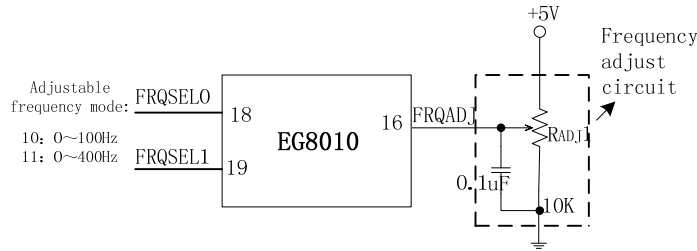


Figure 8.6a EG8010 Frequency adjust circuit

8.7 VVVF (Variable Voltage and Variable Frequency Mode)

To ensure motor’s electromagnetic torque is constant while varying frequency, setting VVVF=“1” will keep the value of V/F at a constant, Voltage is adjusted as the output frequency changes. When VVVF=“0”, output voltage is not changed when frequency varies.

8.8 Serial 12832 LCD Setting

EG8010 supports 12832 LCD modules. It can display inverter’s voltage, frequency, temperature and current information to the user. Figure 8.8a shows how to connect EG8010 with 12832 LCD.

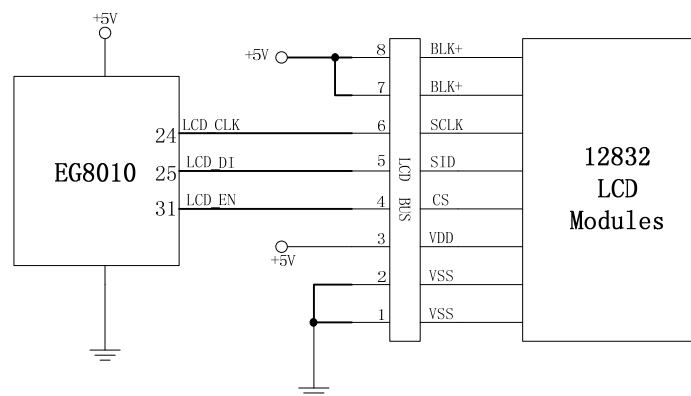


Figure 8.8a EG8010 Serial 12832 LCD

EG8010’s LCD communication control protocol supports ST7920 LCD modules such as 12832 LCD. Control time sequence is shown in figure 8.8b.

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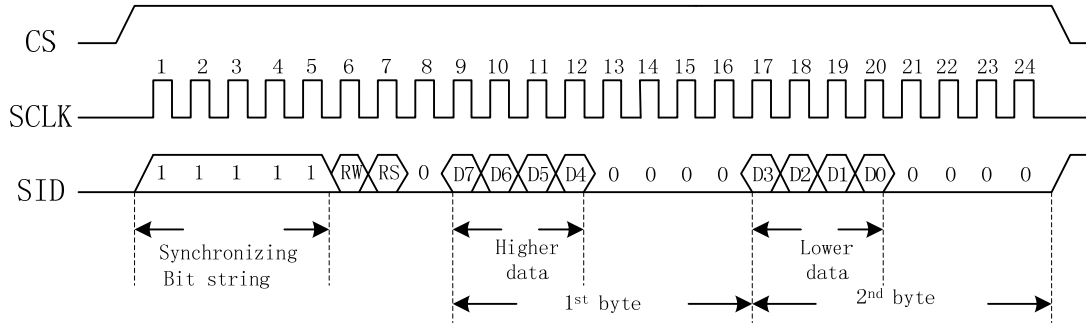


Figure 8.8b EG8010 Serial 12832 LCD time sequence

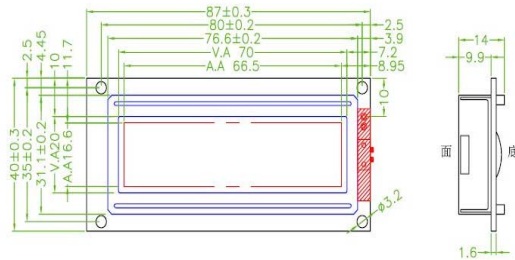


Figure 8.8c: Display on LCD when EG8010 connects to 12832

Figure 8.8d: 12832 LCD dimension

8.9 RS232 Serial communication port

EG8010 uses RS232 serial communication port to configure inverter's parameters such as voltage, frequency, dead time through opticalcoupler as shown in figure 8.9a

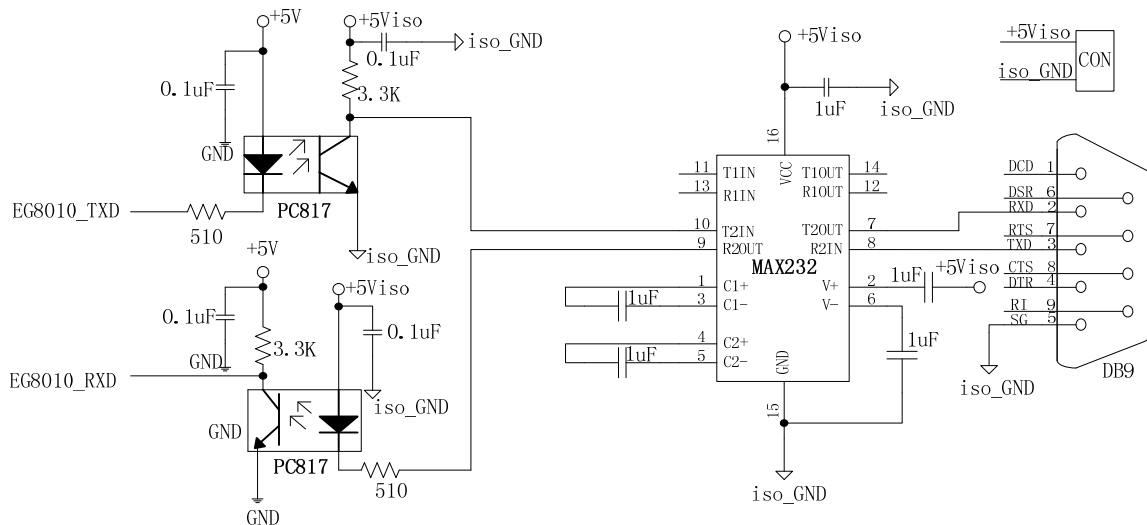


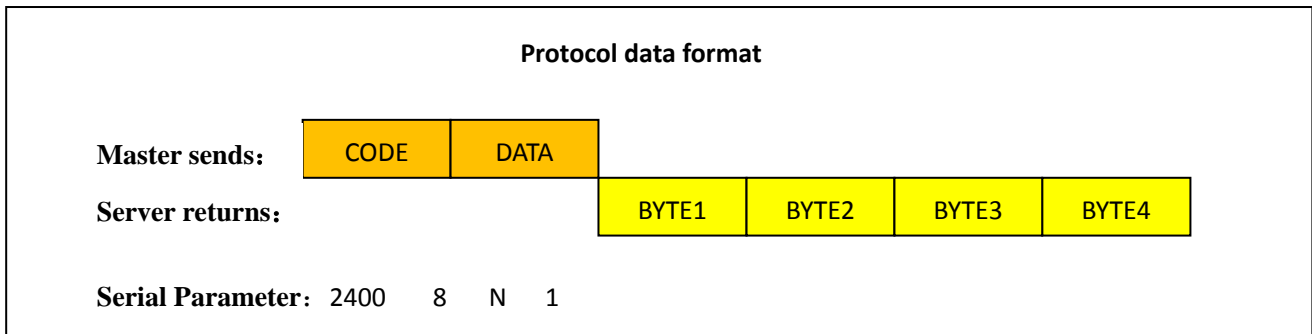
Figure 8.9a RS232serial communication port

Serial port parameters:

- Baud rate: 2400
- Data bit length: 8
- Parity: none
- Stop bit: 1

Protocol description:

Use MCU or PC as master, EG8010 as server. Once server receives data from master, it responds immediately and sends the data back to master.



Format shown as the figure above. During the communication, master sends two bytes data: the first is command byte and the second is data byte. When server receives two bytes, immediately returns four data bytes.

Command format:

Read Mode:

1. Read voltage, current, temperature and frequency.

Function			Read voltage, current, temperature AD values and frequency. EG8010 returns BYTE1 (voltage AD value), BYTE2 (current AD value), BYTE3 (temperature AD value) and BYTE4 (frequency)							
			BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Master sends	CODE	41H (Read)	0	1	0	0	0	0	0	1
	DATA	00H	0	0	0	0	0	0	0	0
Server returns	BYTE1	Voltage	V7	V6	V5	V4	V3	V2	V1	V0
	BYTE2	Current	I7	I6	I5	I4	I3	I2	I1	I0
	BYTE3	Temperature	T7	T6	T5	T4	T3	T2	T1	T0
	BYTE4	Frequency	F7	F6	F5	F4	F3	F2	F1	F0

V7~V0: Feedback voltage AD value from pin VFB

I7~I0: Feedback current AD value from pin IFB

T7~T0: Feedback temperature AD value from pin

F7~F0: configuration of sinusoid output frequency

2. Enable/ disable SPWM output

Function			Enable/ disable SPWM output Once EG8010 receives the command, it returns BYTE1 (81H) to indicate written successfully.							
			BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Master sends	CODE	81H	1	0	0	0	0	0	0	1
	CTL	Control byte	-	-	-	-	-	-	-	-
Server returns	BYTE1	81H	1	0	0	0	0	0	0	1
	BYTE2	Reserved	0	0	0	0	0	0	0	0
	BYTE3	Reserved	0	0	0	0	0	0	0	0
	BYTE4	Reserved	0	0	0	0	0	0	0	0

The second byte the master sends is control byte CTL

CTL= "55h": Enable SPWM output.

CTL= "0AAH": Disable SPWM output.

3. Write control commands

Function			EG8010's working mode is configured by serial communication Once EG8010 receives the command, it returns BYTE1 (82H) to indicate written successfully.							
			BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Master sends	CODE	82H	1	0	0	0	0	0	1	0
	CTL	Control byte	MOD	DT1	DT0	VVVF	SST	MS	FS1	FS0
Server returns	BYTE1	82H	1	0	0	0	0	0	1	0
	BYTE2	Reserved	0	0	0	0	0	0	0	0
	BYTE3	Reserved	0	0	0	0	0	0	0	0
	BYTE4	Reserved	0	0	0	0	0	0	0	0

MOD sets the control mode: "0"= by external I/O; "1"=by internal register

DT1, DT0 sets the dead time: "00"= 300nS; "01"= 500nS; "10"=1uS; "11"= 1.5uS

VVVF selects variable voltage variable frequency mode: "0"= variable frequency constant voltage; "1"= variable frequency variable voltage

SST selects soft start mode: "0"= soft start mode off; "1"= soft start mode on.

MS selects modulation mode: "0"= unipolar modulation; "1"= bipolar modulation.

FS1, FS0 selects AC output frequency: "00"= 50Hz, "01"= 60Hz, "10"= 0~100Hz, "11"= 0~400Hz

4. Write AC output voltage

Function			Write output voltage. Once EG8010 receives the command, it returns BYTE1 (83H) to indicate written successfully.							
			BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Master sends	CODE	83H	1	0	0	0	0	0	1	1
	Vol	Value	V7	V6	V5	V4	V3	V2	V1	V0
Server returns	BYTE1	83H	1	0	0	0	0	0	1	1
	BYTE2	reserved	0	0	0	0	0	0	0	0
	BYTE3	reserved	0	0	0	0	0	0	0	0
	BYTE4	reserved	0	0	0	0	0	0	0	0

Voltage is adjusted linearly. 1LSB= 19.6mV

Vol7 ~ Vol0 ranges from 0x00~0xFF, corresponding to Pin VFB's voltage 0V~5V

5. Write AC output frequency

Function			Write output frequency. Once IC receives the command, it returns BYTE1 (84H) to indicate written successfully.							
			BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Master sends	CODE	84H	1	0	0	0	0	1	0	0
	FRQ	Value	F7	F6	F5	F4	F3	F2	F1	F0
Server returns	BYTE1	84H	1	0	0	0	0	1	0	0
	BYTE2	reserved	0	0	0	0	0	0	0	0
	BYTE3	reserved	0	0	0	0	0	0	0	0
	BYTE4	reserved	0	0	0	0	0	0	0	0

When FRQSEL1 and FRQSEL0 = "10",

Frq7~Frq0= "0x00": Output frequency= 0Hz

Frq7~Frq0= "0xFF": Output frequency= 100Hz

Frq7~Frq0= "0x7F": Output frequency= 50Hz

When FRQSEL1 and FRQSEL0 = "11",

Frq7~Frq0= "0x00": Output frequency= 0Hz

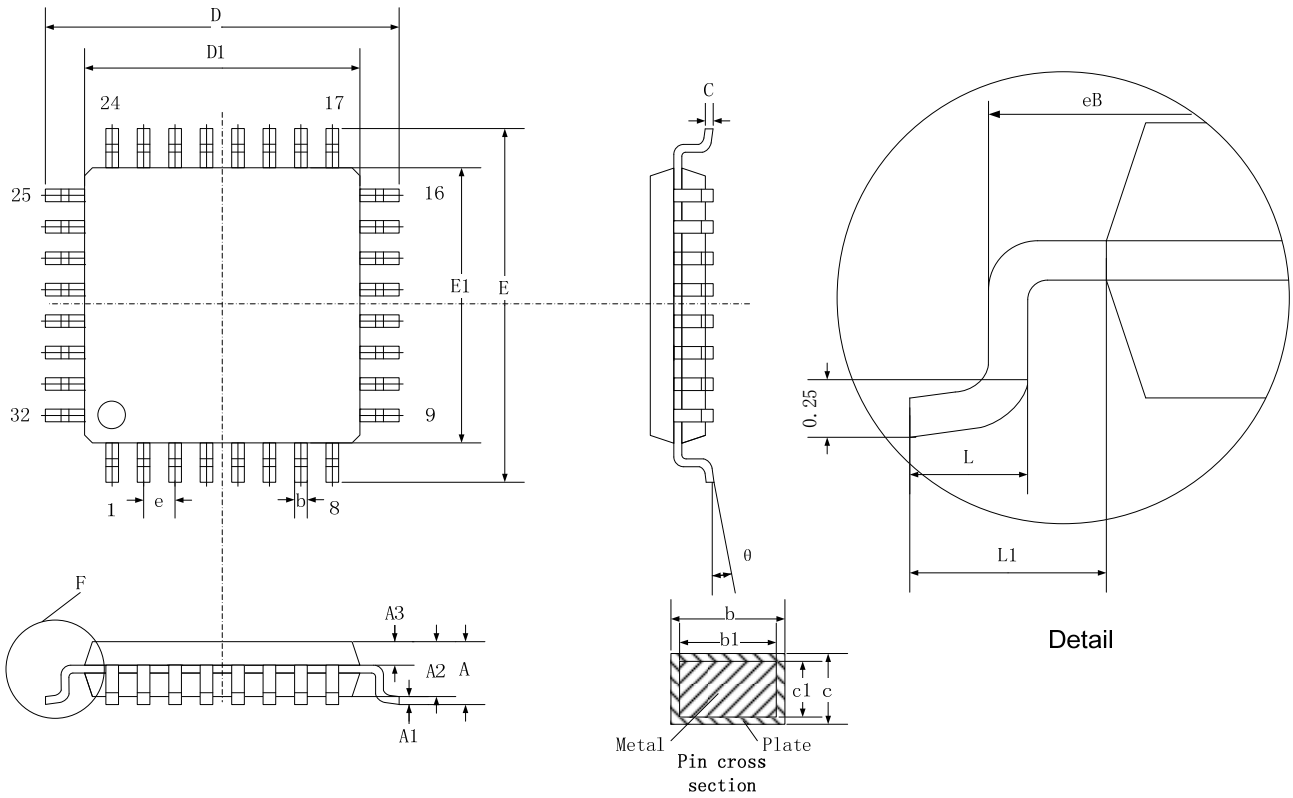
Frq7~Frq0= "0xFF": Output frequency= 400Hz

Frq7~Frq0= "0x7F": Output frequency= 200Hz

Above are linear adjustments.

9. Package Dimensions

LQFQ32 package dimension:



Symbol	A	A1	A2	A3	b	b1	c	c1	D	D1	E	E1	e	eB	L	L1	θ
MIN	-	0.05	1.35	0.59	0.32	0.31	0.13	0.12	8.80	6.90	8.80	6.90	0.80 BSC	8.10	0.40	1.00 BSC	0
NOM	-	-	1.40	0.64	-	0.35	-	0.13	9.00	7.00	9.00	7.00		-	-		-
MAX	1.60	0.20	1.45	0.69	0.43	0.39	0.18	0.14	9.20	7.10	9.20	7.10		8.25	0.65		7
Unit	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	°