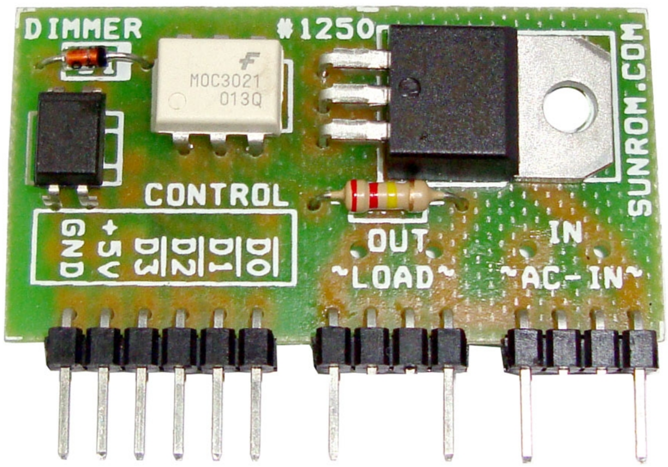
SUNROM TECHNOLOGIES

For more products visit our website http://www.sunrom.com

Document: Datasheet Date: 7-Sep-12 Model #: 1250 Product's Page: www.sunrom.com/p-1094.html

Dimmer Module – Digital Control – 16 Steps

The board can be used in applications where dimming of 110-220V AC power is required like dimming of bulb or fan. The input can be simple 4 bit high/low signal from microcontroller working at 3V or 5V which is isolated with the use of opto-couplers. Total of 16 levels of power control can be set from totally off(0%) to full on(100%) as per input control levels.



Features

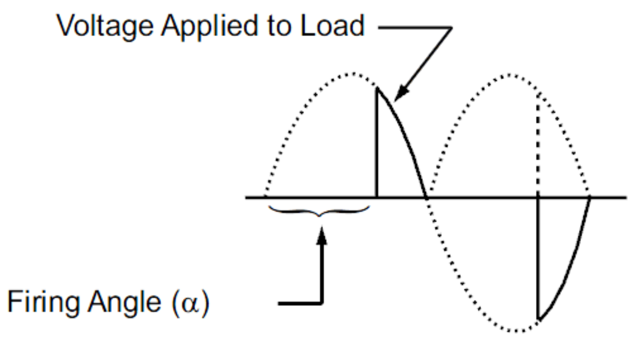
- Works on AC power supply
- Load Capacity 12 Amp AC
- Isolated Input 3-5V DC
- Works from any microcontroller input
- 16 Levels of Control

Specification

Parameter	Pin
AC Input	80V AC to 250V AC
AC Load Current	12 Amp Maximum
AC Load Type	Bulb (Resistive Load) or Fan (Inductive Load) up to 1000 Watts without heatsink
Frequency of mains	50 Hz or 60 Hz
Control Input Voltage	3 to 5V DC Isolated

Theory of Operation

In this dimmer, the alternating current (AC) phase control method is used to control the intensity of an incandescent lamp or fan, which is connected as a load. The rms value of the voltage supplied to the lamp is varied by controlling the firing angle of a Triac. The firing angle is the time the Triac is made on. The firing angle is determined by the control input. By controlling the firing angle, the rms voltage supplied to the load changes and according to the voltage light intensity of the bulb varies. Figure displays the effective voltage applied to a load by controlling the firing angle, α.



Controlling Input

The input to board is simple 4 bit binary input of HIGH/LOW signal from microcontroller. There are four inputs to board D0,D1, D2 & D3. Each data control line needs to be now made either HIGH or LOW as per dimming required.

This table list what input signal status correspond to which dimming level.

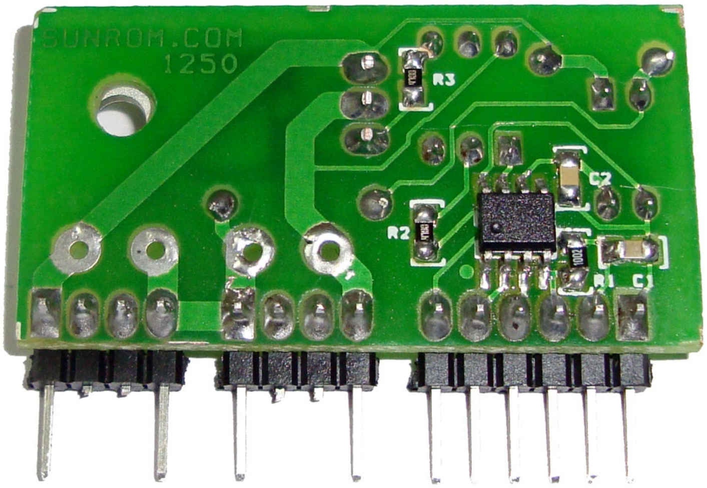
Input Value->	DATA3	DATA2	DATA1	DATA0	Dimming Level
0	0	0	0	0	100%=ON
1	0	0	0	1	85%
2	0	0	1	0	80%
3	0	0	1	1	75%
4	0	1	0	0	70%
5	0	1	0	1	65%
6	0	1	1	0	60%
7	0	1	1	1	50%
8	1	0	0	0	40%
9	1	0	0	1	30%
10	1	0	1	0	25%
11	1	0	1	1	20%
12	1	1	0	0	15%
13	1	1	0	1	10%
14	1	1	1	0	5%
15	1	1	1	1	0%=OFF

More Info

You can connect AC supply at the AC IN terminals.

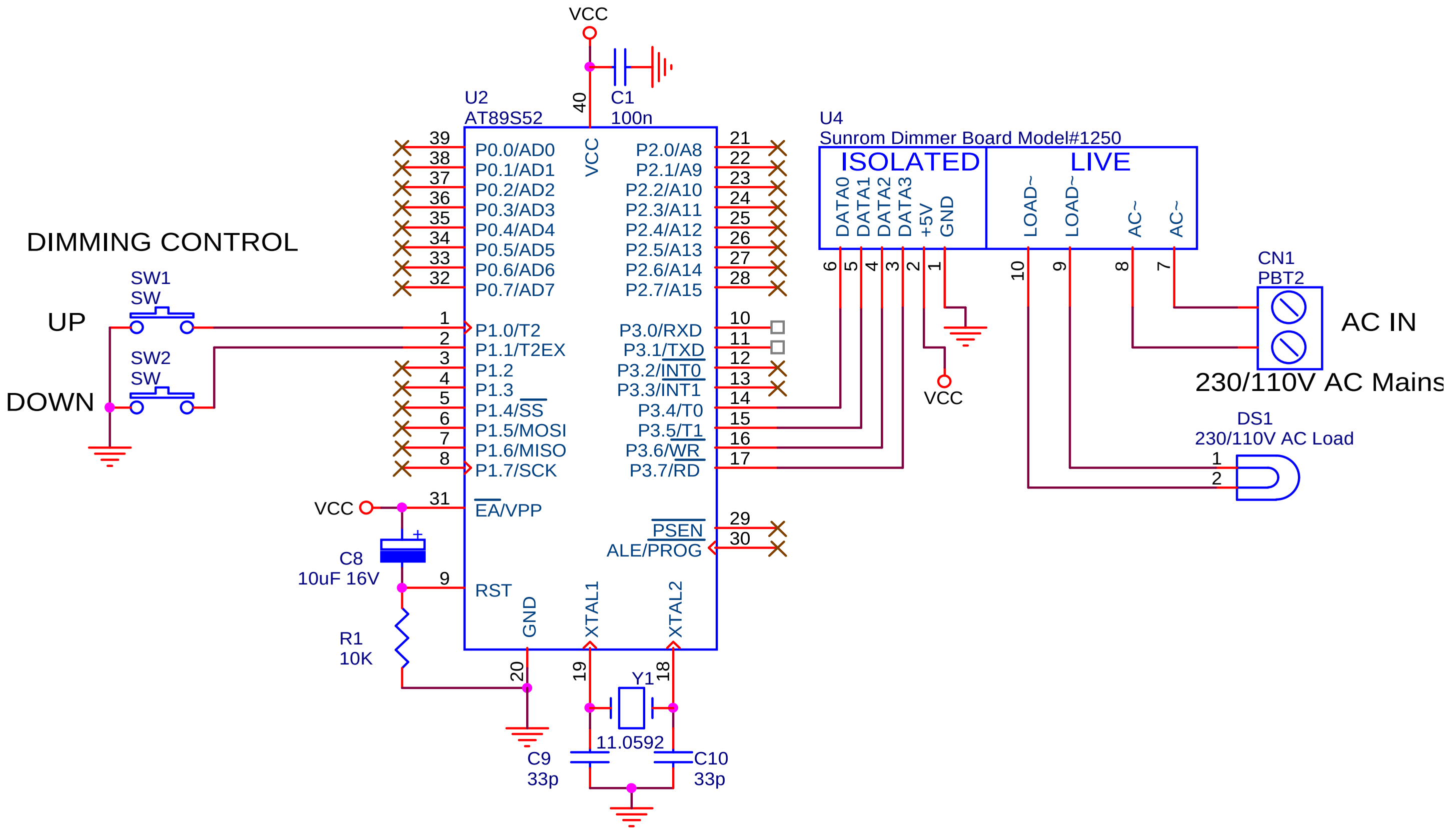
You can connect load at LOAD terminals. Load can be bulb or fan. Please note do not connect CFL lamp as they cannot be dimmed.

Here is back view of board. The 8 pin IC you see is a microcontroller programmed by us to work in this application.



Sample Application

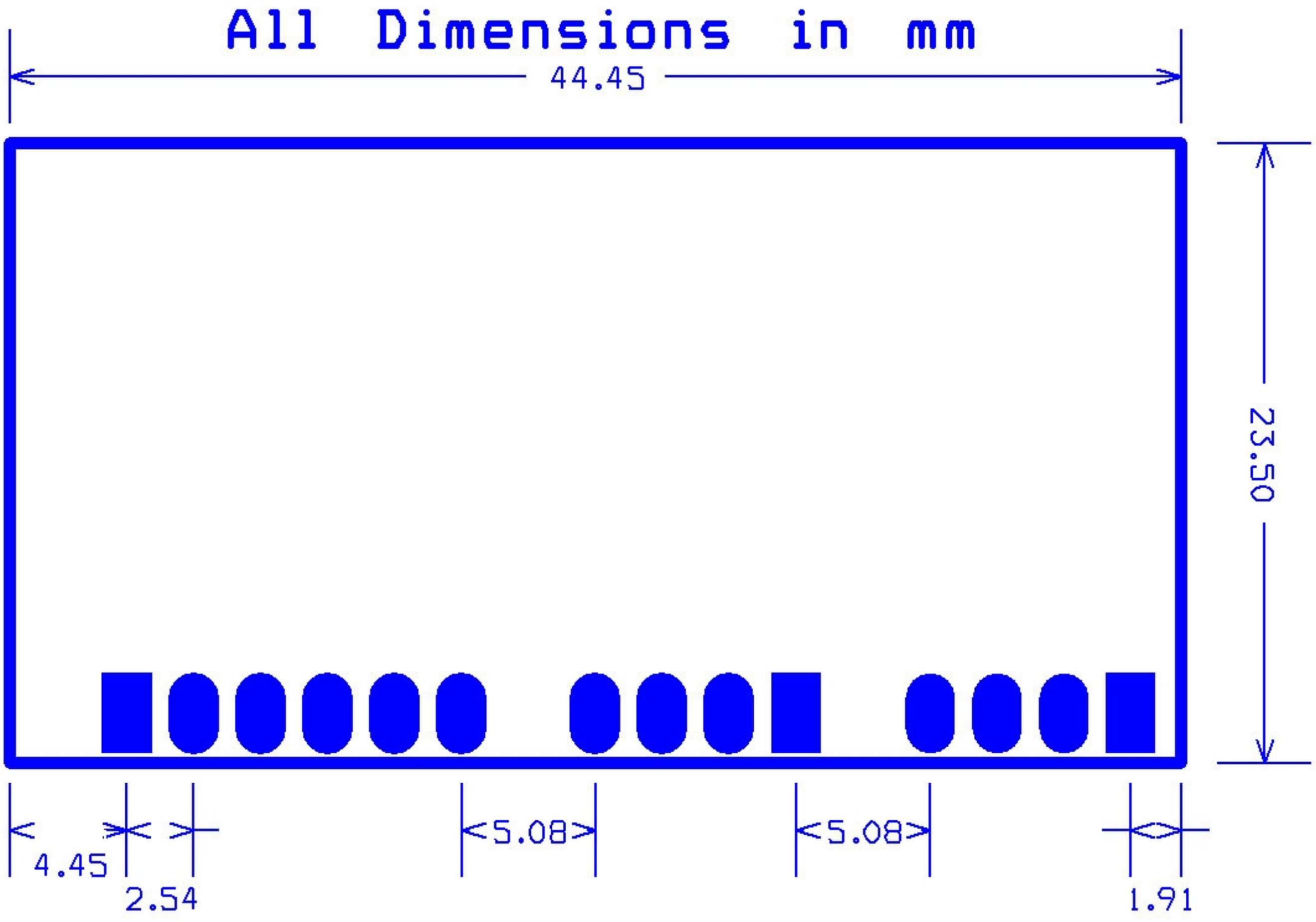
We give an application using AT89S52 microcontroller which controls dimming by two switches UP and DOWN. On power on the dimmer is set to OFF means 0% brightness. When DOWN is pressed the dimming is set to lower level. On pressing UP key dimming is set to higher level.



Sample Code for the application is on next page.

```c
#include <REGX51.H>

#define UP          P1_0
#define DOWN        P1_1

#define DATA0       P3_4
#define DATA1       P3_5
#define DATA2       P3_6
#define DATA3       P3_7

unsigned char level; // brightness level, valid values from 0 to 15 only.
// 0 level means full on, 100% brigtness
// 15 level means off

void delayms(int x) // delays x msec (at fosc=11.0592MHz)
{
        int j=0;
        while(x>=0)
        {
                for (j=0; j<100; j++);
                x--;
        }
}
void set_control()
{
        if(level&0x01) // check 0 bit
                DATA0 = 1;
        else
                DATA0 = 0;
        if(level&0x02) // check 1 bit
                DATA1 = 1;
        else
                DATA1 = 0;
        if(level&0x04) // check 2 bit
                DATA2 = 1;
        else
                DATA2 = 0;
        if(level&0x08) // check 3 bit
                DATA3 = 1;
        else
                DATA3 = 0;
}
void main()
{
        level = 15; // put to OFF
        set_control(); // update control as per level of brightness
        while(1)
        {
                if(UP == 0) // button pressed?
                {
                        delayms(20); // dethumb delay to stablise key bounce and false trigger
                        if(level<15) level++; // increment level
                        set_control(); // update control as per level of brightness
                        while(UP==0); // wait till switched pressed
                }
                if(DOWN == 0) // button pressed?
                {
                        delayms(20); // dethumb delay to stablise key bounce and false trigger
                        if(level>0) level--; // decrement level
                        set_control(); // update control as per level of brightness
                        while(DOWN==0); // wait till switched pressed
                }
        }
}
```

Dimensions


All Dimensions in mm
44.45
23.50
4.45
2.54
5.08
5.08
1.91