Power Switch Sensing LED Lighting Control Chip

Descriptions of Product

- TTY5003 is an LED lighting control chip that can detect the switching of power supplied by city electricity. The ON/OFF switching within the preset time can control the output modes of the LED lighting, with control of single and double lights, where the single light mode can control 3 levels of brightness while the double light mode can be implemented in lighting with double colors for hue control of different light sources. Such functions can control the brightness or change the light color for enriched life.

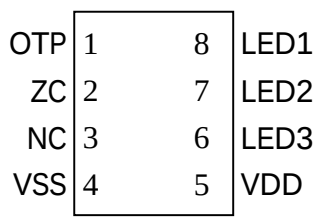
Features of the Product

- Operating Voltage：2.4V - 5.5V
- Applicable to three LED switching modes: single light control mode, single light double colors control mode, and double light switching control mode
- One can select single light double colors control mode or double light switching mode through the OPT pin. The single light control mode has its own independent OPT pin selected as Low
- Each LED switching mode has three levels of output for selection
- Use the Power switch to select the method of LED output
- Automatic light off in power outage

Product Applications

- Lighting equipment for home, living room, bathroom, hallway, and office.

Pin diagram of packaging



SOP-FO8

Pin Definition

Pin	Pin Name	Type	Descriptions of Function
1	OPT	I	Output selection for Single light double colors （High）／ Double light switching（low）, High when floating and Low for single light adjustment
2	ZC	I	Input for detection of zero crossing of AC power signal
3	NC	O	Unused, floating
4	VSS	P	Negative terminal of power supply
5	VDD	P	Positive terminal of power supply
6	LED3	O	LED output control of single light adjustment control mode （High）
7	LED2	O	Output control of single light double colors and double light switching control modes（High）
8	LED1	O	Output control of single light double colors and double light switching control modes（High）

Pin Type

- I Input
- O Output
- P Power supply

Descriptions of work mode：

- TTY5003 has three LED switching functions：

1. Single light adjustment control mode（LED1）:（option select = neglect）

   The order of output is：

   Off → Full Brightness（100%）→ Half brightness（50%）

   Dimmed（10%）

2. Single light double color control mode（with color light 1（LED1）and color light 2（LED2））:（option selsct = High or Open）

   The order of output is：

   Off → Color light 1 full brightness → Color light 2 full brightness

   Color lights 1 and 2 half brightness

3. Double light switching control mode（left light（LED1）and right light（LED2））:（option selsct = Low）

   The order of output is：

   Off → Left light full brightness → Right light full brightness

   Both left and right lights full brightness

- Definition of switching LED output by power switch：

1. When the power is turned off for less than 0.1 second, the switching is ineffective and the output remains at the original level.
2. When the power off time is with 0.1 second and 2 seconds, the switching is effective and the setting steps to the next level.
3. If the power off time (or outage) is longer than 2.0 seconds, the setting returns to the first level.
4. Dissipating current in each mode.

VDD=4.5V, ambient temperature is 25℃ LED output load 47KΩ

Level	Single light adjustment control mode	PWM Frequency	Single light double colors control mode	PWM Frequency	Double light switching control mode	PWM Frequency
1	125uA	All on	125uA	All on	125uA	All on
2	70uA	1.6KHz	125uA	All on	125uA	All on
3	30uA	1.6KHz	700uA	1KHz	240uA	All on

VDD=4.5V, ambient temperature is 25℃ LED output no load

Level	Single light adjustment control mode	PWM Frequency	Single light double colors control mode	PWM Frequency	Double light switching control mode	PWM Frequency
1	15uA	All on	15uA	All on	15uA	All on
2	15uA	1.6KHz	15uA	All on	15uA	All on
3	15uA	1.6KHz	600uA	1KHz	15uA	All on

AC／DC Characteristics

- **Absolute maximum ratings**

Item	Symbol	Rating
Operating Temperature	Top	-20℃ ~ +70℃
Storage Temperature	Tst	-50℃ ~ +125℃
Supply Voltate	VDD	VSS-0.3V ~ VSS+6.0V
Input Voltage	Vin	VSS-0.3V ~ VDD+0.3V
ESD（Human Body Mode）	ESD	> 5kV
Note：VSS symbolizes for system ground		

- **D.C. Characteristics**

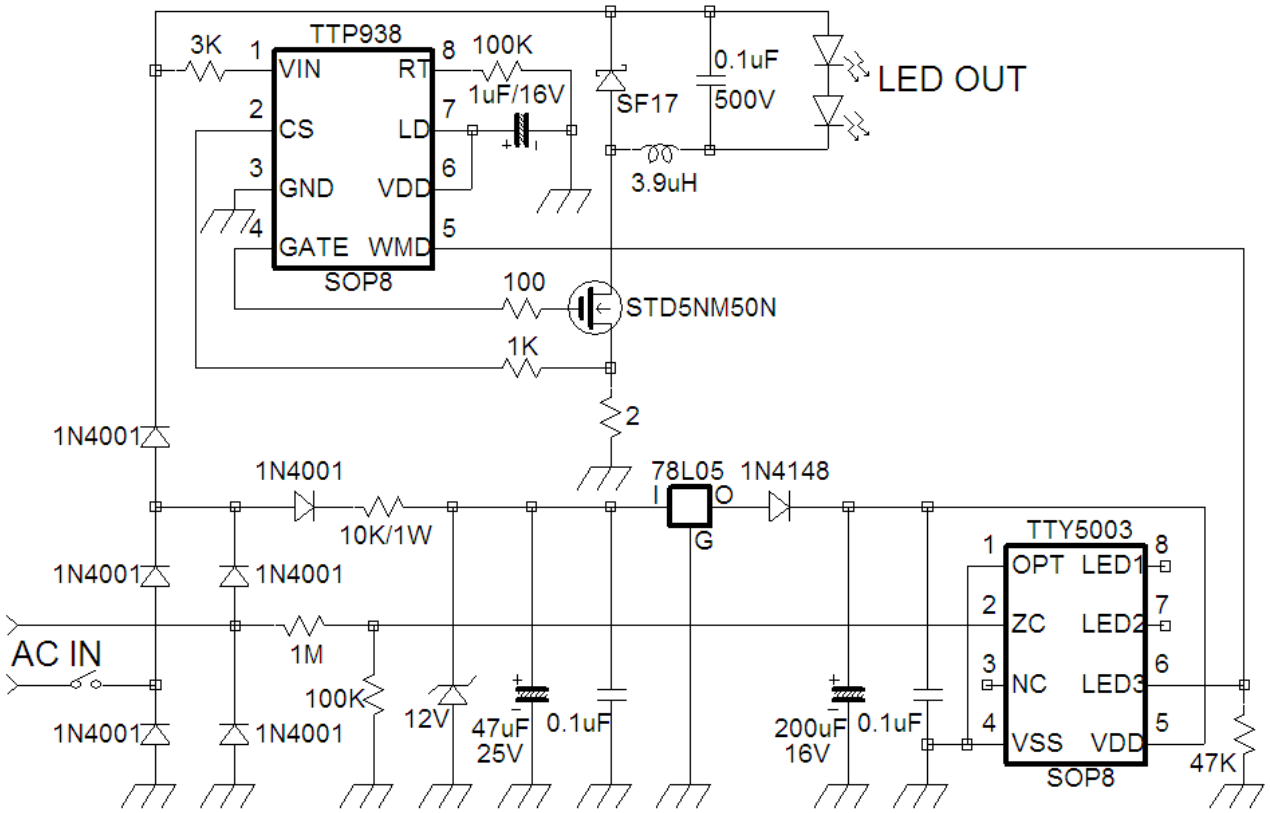
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Operating Voltage	VDD	OSCH generated by on-chip 910kHZ oscillator	2.4	-	5.5	V
Operating Current	I_{nd3}	Normal mode, no load VDD=3.0V, SCH=910kHz	-	0.4	0.7	mA
GREEN mode Current	Istbl	ADC OFF, OSCH stop, OSCL active, VDD=3.0V, no load	-	0.8	1.2	uA
	Istb2	ADC measurement cycle time=32ms, OSCH stop, OSCL active, Vdd=3.0V, no load	-	1.1	1.5	uA
Input low voltage	V_{IL}	Input Low voltage	0	-	0.2	VDD
Input high voltage	V_{IH}	Input High voltage	0.8	-	1.0	VDD
Sink Current of output	I_{OL}	Vdd=3.0V, V_{OL}=0.6V	2	4	-	mA
Source Current of output	I_{OH}	Vdd=3.0V, V_{OH}=2.4V	-	-4	-2	mA
Pull-high Resistor of PB and PC	R_{PH}	Vdd=3.0V	50	100	150	KΩ
（ambient temperature is 25℃）						

- **A.C. Characteristics**

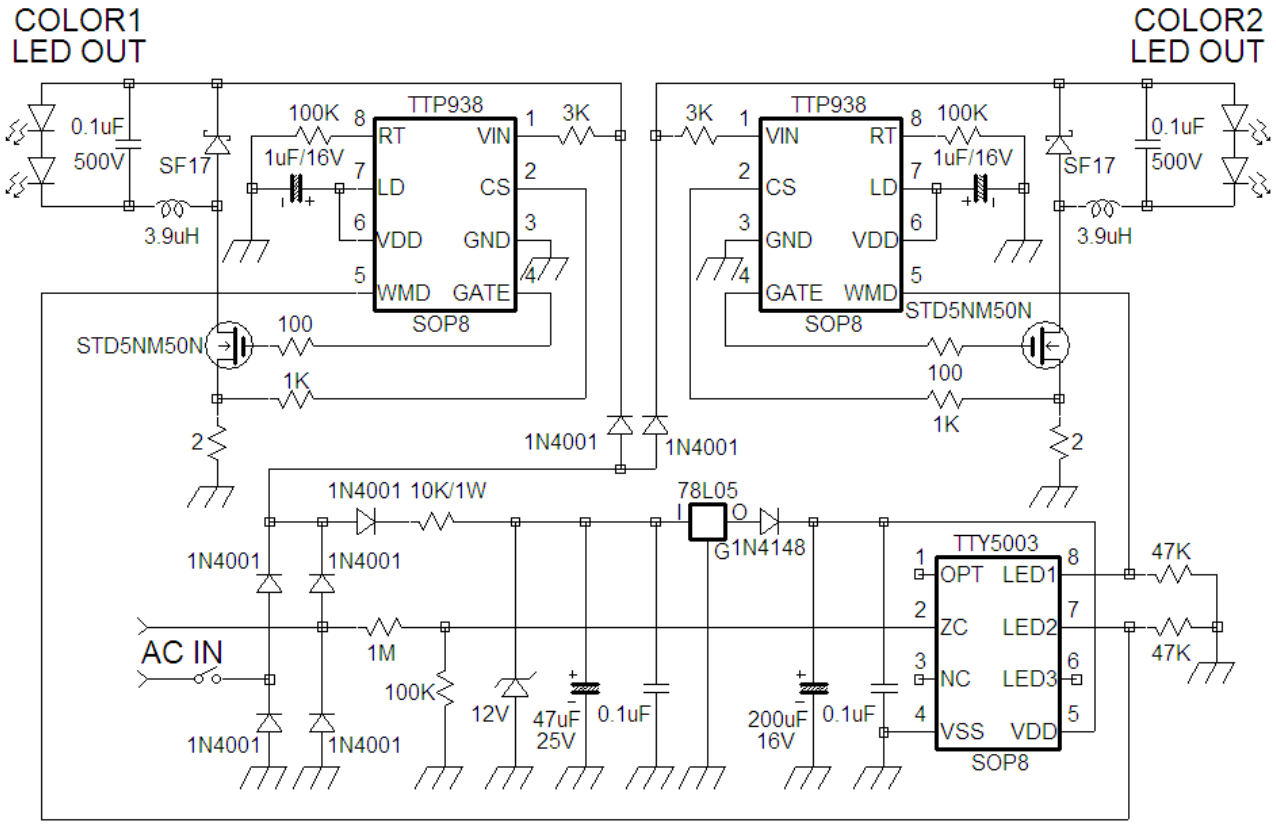
Parameter	Test Conditions	Min	Typ	Max	Unit
High-speed clock OSCH Frequency	On-chip 910kHz oscillator	882k	910K	937k	Hz
System stable time after power up	Stable time =（OSCL startupTime）+（1/OSCL）X 256	-	17	-	ms
Wake up time	Wake up time to low power mode =（OSCL startup time）+（1/OSCL）X 4	-	1	-	ms
	Wake up time to normal mode =（OSCH startup time）+（1/OSCH）X 4	-	1	-	ms
（VDD=3V, ambient temperature is 25℃）					

Diagram of Application Circuits

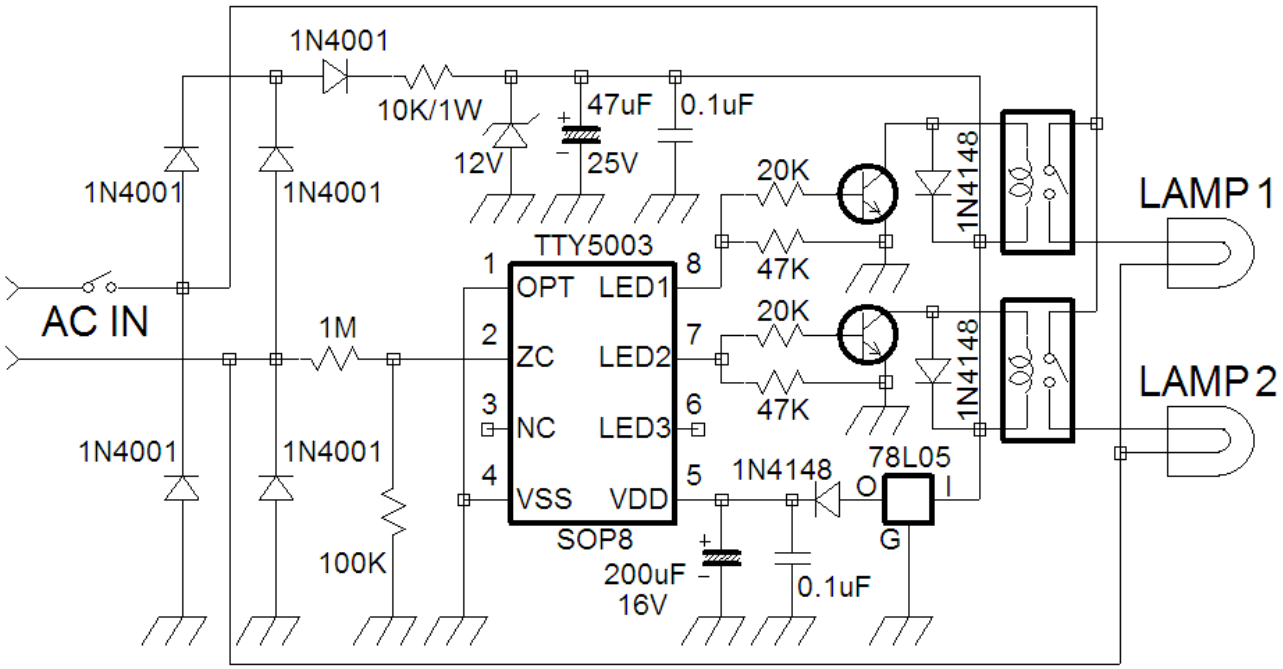
- **Single light adjustment control mode**



- **Single light double colors control mode**

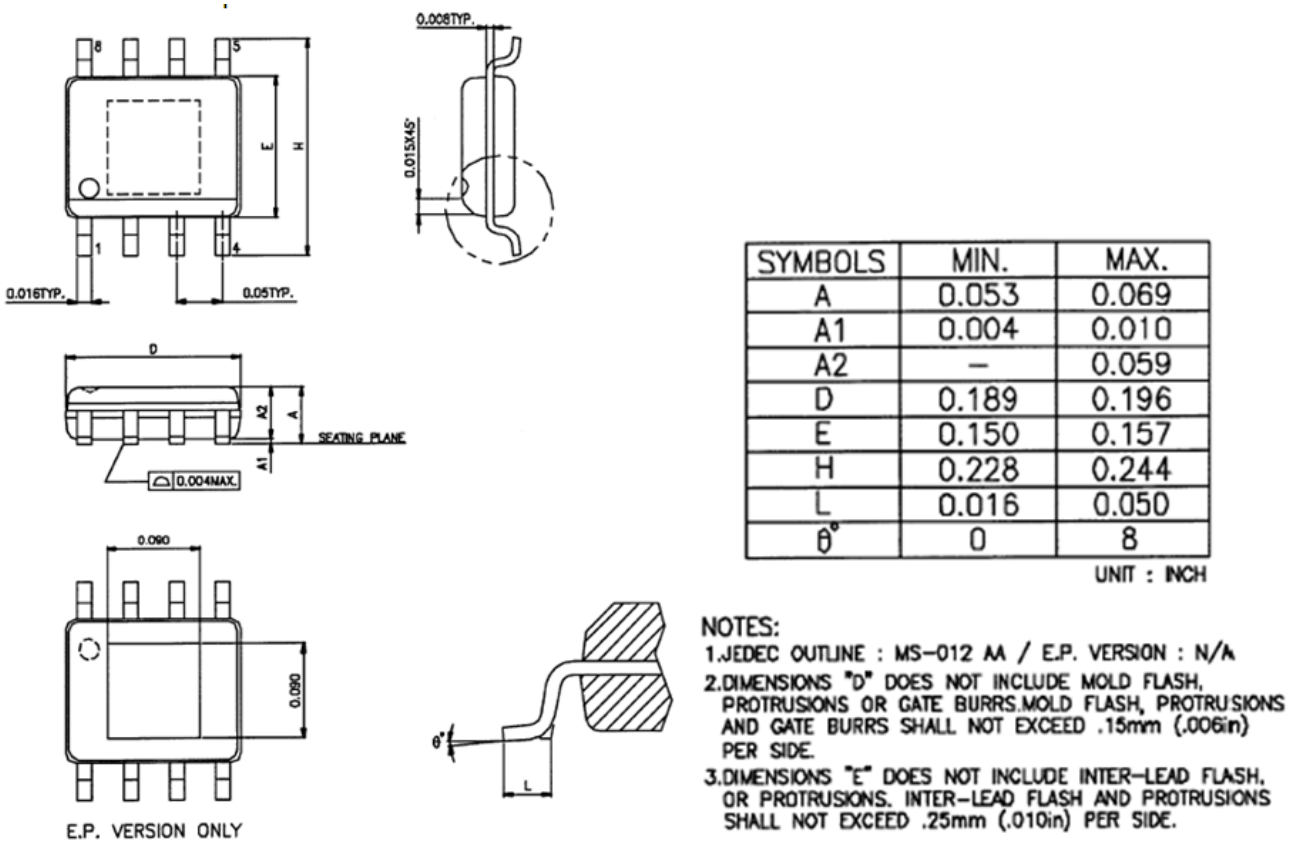


- **Double light switching control mode**



Descriptions of Packaging

- **SOP 8 pins**



SYMBOLS	MIN.	MAX.
A	0.053	0.069
A1	0.004	0.010
A2	–	0.059
D	0.189	0.196
E	0.150	0.157
H	0.228	0.244
L	0.016	0.050
θ°	0	8

UNIT : INCH

NOTES:
1. JEDEC OUTLINE : MS-012 AA / E.P. VERSION : N/A
2. DIMENSIONS "D" DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.MOLD FLASH, PROTRUSIONS AND GATE BURRS SHALL NOT EXCEED .15mm (.006in) PER SIDE.
3. DIMENSIONS "E" DOES NOT INCLUDE INTER-LEAD FLASH, OR PROTRUSIONS. INTER-LEAD FLASH AND PROTRUSIONS SHALL NOT EXCEED .25mm (.010in) PER SIDE.

Ordering Information

TTY5003		
Package Type	**Chip Type**	**Wafer Type**
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